

TouchWare for Windows

User's Guide

MicroTouch®

The information in this document is subject to change without notice. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of MicroTouch Systems, Inc. MicroTouch may have patents or pending patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. The furnishing of this document does not give you license to these patents, trademarks, copyrights, or other intellectual property except as expressly provided in any written license agreement from MicroTouch.

© 1997-99 MicroTouch Systems, Inc. All rights reserved.
Printed in the United States of America.

Document Title: *TouchWare for Windows User's Guide*
Document Number: 19-224, Version 2.2

TouchWare, Version 5.4
Windows Touchscreen Driver, Version 5.4

MicroTouch, the MicroTouch logo, AdLink, ClearTek, DrivePoint, Fatura, FinePoint, Ibid, the Ibid logo, KeyPad, Microcal, PicturePad, PrivacyTouch, Prospector, The Public Browser, QuickPoint, ScreenWriter Tablet, SimpleTouch, SurfControl, ThruGlass, TouchMate, TouchPad, TouchPen, TouchWare, TouchTek, TruePoint, TuffTouch, UnLink, UnMouse, WebStation, and WorldService are either registered trademarks or trademarks of MicroTouch Systems Incorporated in the United States and/or other countries.

Microsoft, MS, MS-DOS, and Windows are registered trademarks of Microsoft Corporation.

Contents

About This Manual

MicroTouch Support Services.....	8
MicroTouch Technical Support	8
MicroTouch on the World Wide Web.....	8
MicroTouch Corporate Headquarters and Worldwide Offices	9

Chapter 1

Installing TouchWare

What Is TouchWare?.....	11
Touchscreen Drivers.....	12
Touchscreen Control Panel	12
Online Help	12
TouchWare Uninstall	12
Checking the ReadMe File.....	13
Installing TouchWare	13
Silent Install of TouchWare	14
Silent Install With Diskettes.....	15
Silent Install With CD-ROM, Hard Drive, or Network Drive.....	16
Completing the Touchscreen Setup.....	17
Uninstalling TouchWare	17

Chapter 2 Touchscreen Control Panel

Opening the Touchscreen Control Panel.....	20
Calibrate Tab.....	20
When to Calibrate the Touchscreen	21
Calibrating the Touchscreen	21
Testing the Calibration.....	22
Touch Settings Tab	23
Touch Modes.....	24
Right-click Tool	25
Touch Sound	25
Double-click Speed and Area.....	25
Cursor Tab.....	26
Cursor Visibility.....	27
Cursor Vertical Offset.....	27
Edge Adjustment.....	28
Stabilize Cursor.....	28
When to Stabilize the Cursor	28
Testing the Newly Selected Frequency	29
Pen Tab	30
Pen/Finger Mode.....	31
Pen Only Mode	32
Finger Only Mode	32
Stabilize Cursor for Finger and TouchPen.....	32
Test TouchPen.....	32
Hardware Tab.....	33
Controller Information	33
Connection	35
Find Touchscreen*	35
About TouchWare.....	36
Restore Defaults	36
Tools Tab	37
Touchscreen Diagnostics	38
Video Diagnostics	39
Touchscreen Linearization	40
Touchscreen Options.....	42
Advanced Touchscreen Settings	46

Chapter 3	ThruGlass Touchscreen Configuration	
	Setting Up a ThruGlass Touchscreen.....	50
	Screen Type.....	51
	Sensitivity.....	52
	Diagnostics.....	52
	Show Noise	52
	Show Base	53
	Show Depth.....	54
	Auto Frequency	54
	When to Adjust the Controller Frequency	55
	Calibrating the ThruGlass Touchscreen.....	55
	Testing the ThruGlass Touchscreen.....	55
	Adjusting ThruGlass Video Resolution	56
	ThruGlass Troubleshooting.....	56
	Summary of Firmware Commands	57
	Additional ThruGlass Specific Commands.....	58
	ThruGlass Command Line Commands	58
Chapter 4	Troubleshooting the Touchscreen	
	Troubleshooting Overview.....	61
	Before You Call Tech Support.....	62
	Touchscreen Status Lights.....	62
	What to do if.....	63
	Cursor does not display on screen after starting Windows	63
	Cursor does not reach out to edges of screen	63
	Cursor is jittery or drawing lines not straight and smooth	64
	Cursor jumps or bounces suddenly across screen	64
	Drawing lines are not straight and smooth.....	64
	Double-click on touchscreen doesn't work.....	64
	Full screen DOS needed.....	65
	Operating two serial devices	66
	Touch delayed in Windows NT.....	67
	Touch not working	68
	Touchscreen not found.....	68
	Pen controller not found.....	69
	Error Messages.....	70

Windows NT Error Messages	70
---------------------------------	----

Appendix A Multiple Touchscreens (Serial Controllers)

Desktop Appearance	74
Monitor Layout	75
Installing TouchWare for Multiple Monitors.....	76
Click Mode.....	78
Setting TouchWare Preferences for Each Touchscreen	78
Changing Your Multiple Touchscreen Configuration	78

Appendix B USB Multiple Touchscreens

System Requirements for Multiple USB Touchscreens.....	79
Connecting Multiple USB Touchscreens.....	80
Configuring Multiple Monitors in Windows	81
Mapping Multiple USB Touchscreens.....	82
Selecting the Current Touchscreen	83

Appendix C Miscellaneous Information

Touchscreen Driver Settings	85
Direct Access to Calibration	86
MousePort Touchscreen Controller Overview.....	87
System Requirements for the MousePort Controller	87
Connecting a MousePort Touchscreen Controller	87
Installing TouchWare for the MousePort Controller	88
Touchscreen Files.....	89
Touchscreen Care and Cleaning.....	91

Index

About This Manual

The MicroTouch touchscreen is the most intuitive pointing device available for the PC series of computers and monitors. Touchscreens make using computers as simple as touching the screen.

Touchscreens are ideal for a variety of applications, including entertainment, training systems, information and self-service kiosks, point-of-sale, factory automation, laboratory and medical instrumentation, interactive selling demonstrations, and educational programs.

This manual describes how to

- Install TouchWare, the software for your touchscreen
- Use the different tabs on the Touchscreen control panel to customize your work environment -- Calibrate, Touch Settings, Cursor, Pen, Hardware, and Tools
- Configure your system for multiple touchscreens

This manual assumes you have already connected the MicroTouch touchscreen to your computer*. If not, refer to the *TruePoint Touch Monitor Installation Guide* included with your monitor. You are now ready to install TouchWare and experience the power of touch.

* This is not the case for USB controllers – For USB you should install TouchWare prior to connecting the touchscreen.

MicroTouch Support Services

MicroTouch provides extensive technical support through our telephone hot line and web site.

MicroTouch Technical Support

MicroTouch Technical Support is available as follows:

- 24 hours a day, Monday–Friday (excluding holidays)
- 9:00 a.m.–5:00 p.m., EST, Saturday–Sunday (excluding holidays)

Whenever you contact Technical Support, please provide the following information:

- Part number and serial number from the MicroTouch label on your monitor or touchscreen controller
- Type of MicroTouch touchscreen
- Version number of your MicroTouch TouchWare
- Make and model of your personal computer
- Name and version number of your operating system
- Type of mouse connected to your system
- List of other peripherals connected to your computer
- List of application software in use

To contact Technical Support:

- Technical Support Hot Line: 978-659-9200
- Technical Support Fax: 978-659-9400
- Technical Support E-Mail: support@microtouch.com

MicroTouch on the World Wide Web

Visit the MicroTouch Web site at www.microtouch.com to download MicroTouch touchscreen software and drivers, obtain regularly updated technical information on MicroTouch products, and learn more about our company.

MicroTouch Corporate Headquarters and Worldwide Offices

United States

MicroTouch Systems, Inc.
300 Griffin Brook Park Drive
Methuen, MA 01844
United States
Phone: 978-659-9000; Fax: 978-659-9100
Web Site: <http://www.microtouch.com>
E-Mail: touch@microtouch.com
Support Hot Line: 978-659-9200
Support Fax: 978-659-9400
Support E-Mail: support@microtouch.com

Australia

MicroTouch Australia, Pty Ltd.
797 Springvale Road
Mulgrave Victoria 3170 Australia
Phone: +613 9582 4799
Web Site: <http://www.microtouch.com.au>
E-Mail: touch@microtouch.com.au
Support: support@microtouch.com.au

France

MicroTouch Systems SARL
Europarc de Créteil
19, rue Le Corbusier
94042 Créteil Cedex France
Phone: +33 (1) 45 13 90 30
Email: support@microtouch.fr

Germany

MicroTouch Systems GmbH
Schiess-Straße 55
40549 Düsseldorf Germany
Phone: +49 (0) 211-5 99 07-0
Email: support@microtouch.de

Hong Kong

MicroTouch Systems Ltd.
Unit 1, 26/F, Westley Square
48 Hoi Yuen Road, Kwun Tong
Kowloon, Hong Kong, SAR, PRC
Phone: +852-2333-6138
Fax: +852-2333-6861
Email: support@microtouch.com.hk

Italy

MicroTouch Systems srl
C.so Milano, 19
20052 Monza (MI) Italy
Phone: +39 (0) 39-230-2230
Email: support@microtouch.it

Japan

MicroTouch Systems K.K.
Bellevue Mizonokuchi Building 3F
3-2-3, Hisamoto, Takatsu-ku
Kawasaki-shi, Kanagawa 213 Japan
Phone: +81 (44) 811-1191
Fax: +81 (44) 811-1138
Email: support@microtouch.co.jp

Korea

MicroTouch Systems, Inc.
#402, 4th Floor, Nam-Kyung Building
769-6 Yeoksam-Dong, Kangnam-Gu
Seoul, Korea
Phone: +82 (2) 552-3198

Spain

MicroTouch Systems SL
Via Augusta 13-17, Oficina 704
08006 Barcelona Spain
Phone: +34 93 415 62 85
Email: supportspain@microtouch.co.uk

Taiwan R.O.C.

MicroTouch Systems, Inc. Taiwan
9-3 Floor, No. 33, Sec. 1, Minsheng Road
Panchiao, Taipei County 22046
Taiwan, R.O.C.
Phone: +886-2-2959-6647
Fax: +886-2-2959-6747
Email: support@microtouch.com.tw

United Kingdom

MicroTouch Systems, Ltd.
163 Milton Park Abingdon
Oxon OX14 4SD England
Phone: +44 (0) 1235-444400
Email: support@microtouch.co.uk

C h a p t e r 1

Installing TouchWare

TouchWare is the software for your MicroTouch touchscreen. It provides full touchscreen functionality for all software applications running under Microsoft Windows.

This version of TouchWare software for your MicroTouch touchscreen supports serial, ThruGlass, USB, and MousePort controllers.

Once you install TouchWare, you can select, launch, and drag objects using the touchscreen. To make a selection, you simply touch the screen. It's that easy and natural – just touch to select.

What Is TouchWare?

Your touch product includes several software tools to help you work with and customize the touchscreen and the TouchPen. Software drivers are available for touch-based applications for use in different environments.

Specifically, TouchWare includes the following programs and utilities:

- Touchscreen drivers (for Windows 95/98 and Windows NT 4.0)
- Touchscreen control panel (for serial, MousePort, USB, and ThruGlass controllers)
- Online help
- TouchWare Uninstall utility
- Microcal

Touchscreen Drivers

TouchWare includes touchscreen drivers – the software the system uses to communicate with the touchscreen. The Windows touchscreen drivers enable you to use the MicroTouch touchscreen with applications running in Windows environments. You can run Windows programs and use touch (finger or pen) input without any program modifications.

Touchscreen Control Panel

You can use the Touchscreen control panel to set your preferences for the touchscreen. For example, you can define the following preferences:

- Whether the touch action occurs when you touch the screen or when you lift your finger (or pen) off the screen
- Whether you hear a sound when you touch the screen
- How fast you need to touch to produce a double-click

You can also use the Touchscreen control panel to calibrate the touchscreen, to stabilize the cursor, and define where the cursor appears relative to your touch (an offset), and to run diagnostic programs.

Online Help

TouchWare has online help for setting up and using the touchscreen. These help files use standard Windows Help, complete with hypertext and hypergraphics, to create and display available topics.

Online help provides you with information specific to a TouchWare function or option. You can use the online help to find answers to all your TouchWare questions.

TouchWare Uninstall

The Uninstall utility automatically deletes all TouchWare components from your computer and removes all TouchWare entries from the system files.

Checking the ReadMe File

After you install TouchWare, check the ReadMe file for any last minute changes, updates, product summary information and enhancement information.

To view the ReadMe file:

1. Click on Start → Programs → MicroTouch
2. Click on ReadMe.

Installing TouchWare

When you install TouchWare, you have two installation options:

- Express Install
- Custom Install

The Express option installs all TouchWare files and automatically places the files in the Program Files\MicroTouch\TouchWare directory. The Express option also creates a MicroTouch Touchscreen icon on the Windows Control Panel and a Program group called MicroTouch, with icons for each TouchWare program.

The Custom option also installs all TouchWare files, however, you can specify the destination directory for the TouchWare files and the name of the program group for the TouchWare programs. Use Custom install to configure your system with multiple monitors. Refer to Appendix A for more details.

Note: If you are using a MousePort controller, refer to Appendix C for important information.

To install TouchWare:

1. Make sure the touchscreen is properly connected. The Setup program cannot configure the touchscreen without it.

USB Note: For USB systems, do *not* connect the touchscreen to your computer until you have installed TouchWare.

2. Start Windows. Make sure no other applications are open.
3. Insert the TouchWare Disk 1 into the drive.

4. Click on Start → Settings → Control Panel.
5. Double-click Add/Remove Programs to open the following dialog box:



6. Choose the Install/Uninstall tab.
7. Click Install. The system displays a dialog box reminding you to insert the product's first installation disk.
8. Click Next. The system automatically searches your disk drives for an installation program. The MicroTouch installation program is called SETUP.EXE.
9. Click Finish to run the SETUP.EXE installation program. The Setup program begins to execute and load the TouchWare files.
10. Follow the instructions displayed on the screen. Make your selections carefully when answering questions to complete the installation.

Silent Install of TouchWare

This section describes how to use the TouchWare silent install facility. A silent install can be performed with diskettes, CD-ROM or a network drive. To begin, a silent install script must be created that will contain recorded install instructions. This script can be created by interactively running the

setup program in the record mode. When the setup program runs in the silent mode, it will receive input from the recorded install script rather than from the user. An *Insert Next Disk* dialog will appear when running the silent install from diskettes. No dialogs whatsoever will appear when running from larger drives that can hold the entire contents of the install. Installing from diskettes can be done in under 2 minutes, while installing from a fast hard drive can be done in under 20 seconds. Upon completion of the silent install a file called setup.log is created with a Result Code entry equal to zero indicating a successful install.

The steps below outline the necessary procedure for creating and running a silent install.

Note: This procedure should be performed on a machine that does not have TouchWare installed in order to avoid the upgrade prompt at the start of the install.

Silent Install With Diskettes

1. Insert the TouchWare installation diskette #1 into your computer's floppy drive.
2. Edit the silent.ini file on diskette #1 to reflect the port and baud settings to be used for all silent installations.
3. Run the setup program from the taskbar Start/Run dialog to record your installation steps using the following command: A:\Setup.exe -r. The recorded steps reside in the Windows directory in a file called Setup.iss.
4. Copy Setup.iss file to each of the three TouchWare install diskettes and then delete the Setup.iss file from the Windows directory.
5. Invoke the silent install from the taskbar Start/Run dialog as follows: A:\Setup.exe -s. Note that dialogs will appear during the silent install asking for disk #2 and disk #3 when needed.

Note: There will not be a message announcing completion of the install. Wait until you are comfortable that the computer is no longer accessing the final disk before assuming that the installation has been successful.

6. Reboot the computer to activate TouchWare.

Silent Install With CD-ROM, Hard Drive, or Network Drive

1. Create a temporary directory on your computer's hard drive.
2. Now, from the temporary directory, copy each of the three TouchWare install diskettes into its own subdirectory called disk1, disk2, and disk3 respectively.
3. Edit the silent.ini file in the disk1 directory to reflect the port and baud settings to be used for all silent installations.
4. Run the setup program from the taskbar Start/Run dialog to record your installation steps using the following command:
C:\Temp\disk1\setup.exe -r. The recorded steps will reside in the Windows directory in a file called Setup.iss. This example assumes that C:\Temp is your temporary directory from step 1.
5. Copy Setup.iss file into the disk1 directory and then delete the Setup.iss file from the Windows directory.
6. Copy all three disk directories onto the CD-ROM, hard drive, or network drive, that will be used to perform the silent install. The temporary disk images created from step 2 may be deleted.
7. Invoke the silent install from the taskbar Start/Run dialog as follows:
F:\TouchWare\disk1\Setup.exe -s. This example assumes that you have copied the silent install disk directories to F:\TouchWare.

During the silent installation, a directory called TouchWare will be created on the same drive as Windows, under the Program Files directory. Support files will be copied into the TouchWare directory.

Upgrades are not performed during silent installs. You cannot install over previous TouchWare releases. TouchWare versions earlier than and including TW3.4 should be uninstalled prior to a performing a silent install.

Multiple monitor silent installs are not supported.

The silent express install type has been tested and verified.

Note: When using the silent install on machines with the Windows directory named Win95, an empty notepad application will be invoked twice. The fix is to simply close the notepad applications and the silent installation will continue.

Completing the Touchscreen Setup

Once TouchWare has been installed, you must restart the system in order to load the touchscreen driver. TouchWare provides many options for optimizing performance of the touchscreen. You can adjust settings for touch mode, touch sounds, double-click speed, double-click area, and other cursor options. Use the Touchscreen control panel to set your preferences and calibrate to specific screen resolution.

Uninstalling TouchWare

The Uninstall program removes all TouchWare components from your computer. These components include TouchWare files, directories, program folders, and folder items. The Uninstall program also removes all TouchWare entries from the system registry files.

Note: The Uninstall program may not work correctly if the Windows control panel is open. Close the Windows control panel, as well as TouchWare, before running Uninstall.

To uninstall TouchWare:

1. Click on Start → Programs → MicroTouch.
2. Click on TouchWare Uninstall. The Uninstall program begins.
3. Follow the instructions displayed on the screen.

You may receive a message when the Uninstall is complete that “Some elements could not be removed. You should manually remove items related to the application.” This is perfectly normal, several files will remain in use until you reboot the system. Click on Details... to see the remaining files.

Note: Once the Uninstall is complete, you *must* restart your system. The touchscreen driver is still in use until you restart the system. The exception to this is the USB controller, which will uninstall the driver when the last touchscreen is disconnected.

C h a p t e r 2

Touchscreen Control Panel

The TouchWare control panel consists of tabs to determine the best settings for your touchscreen configuration. You can change TouchWare settings for calibration, touch modes, cursor options, pen settings, hardware and diagnostic tools to suit your preferences.

- Use the Calibrate tab to calibrate the touchscreen for the current video resolution
- Use the Touch Settings tab to define the touch actions that equate to mouse actions or place the right-click tool on your desktop enabling you to utilize right-click functionality using the touchscreen
- Use the Cursor tab to stabilize the cursor and tune the controller to the best frequency for the current monitor settings
- Use the Hardware tab to determine the basic system settings for your touchscreen, verify the touchscreen is communicating properly, select baud rate, and restore system defaults.
- Use the Tools tab to run diagnostic tests from the desktop and to enable Advanced Functions for your touchscreen.

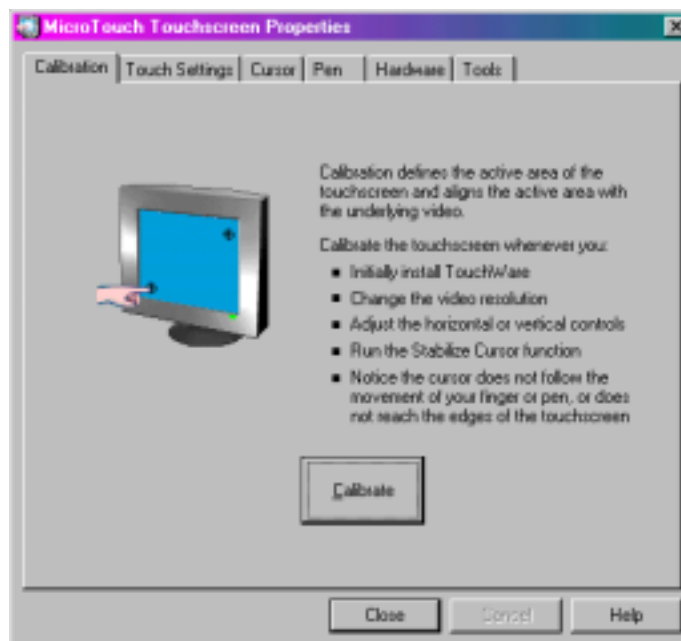
Note: If you have a ThruGlass controller, a ThruGlass Configuration tab will appear in place of the Pen tab. If you are running a USB multiple monitor setup, you will see an additional tab called Multiple Monitors.

Opening the Touchscreen Control Panel

You can open the Touchscreen control panel several ways:

- Simply click of the MicroTouch TouchWare icon on the desktop.
- OR
- Click Start → Programs → MicroTouch TouchWare → MicroTouch TouchWare to open MicroTouch Touchscreen Properties page.
- OR
- Click Start → Settings → Control Panel → MicroTouch Touchscreen icon.

Calibrate Tab



The calibration process aligns the touchscreen with the underlying video. Specifically, calibration defines the dimensions of the active area of the touchscreen and locates the center of the touchscreen. If the screen is not calibrated, the active area of the touchscreen may not be aligned properly or may be unnecessarily small in size.

Once calibrated, the information is saved by the touchscreen for each video resolution. Therefore, you only need to recalibrate the touchscreen the first time you change to a particular video resolution.

Note that the TouchWare installation will recognize the type of touchscreen and automatically set the appropriate calibration style:

- 2-point calibration for capacitive touchscreens.
- 5-point calibration for resistive touchscreens.

Note: Advanced users may switch calibration styles using the Tools tab → Options → Advanced Touchscreen Settings dialog.

When to Calibrate the Touchscreen

You should calibrate the touchscreen in the following cases:

- The first time you change to a particular video resolution (for example 640x480 or 800x600) or video mode of your monitor. Your monitor's video card determines the available resolutions.
- Any time you change the size of the video image by adjusting the horizontal and vertical controls on your monitor.
- Any time you run the Stabilize Cursor function from the Cursor tab.
- Any time the cursor does not follow the movement of your finger, or does not reach the edges of the touchscreen.

Calibrating the Touchscreen

1. Select the Calibrate tab.
2. Click the Calibrate button. Calibration targets appear on the screen. A hand guides you through the calibration process pointing, in turn, to the appropriate target.



Note: If you press Escape or do not touch the touchscreen within 20 seconds, the system automatically cancels the calibration process with no change to the current settings.

3. Touch the touchscreen and position your fingertip to completely cover the yellow target. The area around the hand will begin to flash. When the calibration completes, the message “Touch Enabled” will appear.

When touching the calibration target, make sure you

- Face the monitor directly.
 - Perform the calibration in the position (sitting or standing) you expect to use the touchscreen.
 - Touch the calibration target firmly and precisely with your fingertip. Be careful to keep your other fingers away from the touchscreen as you touch the target.
4. Repeat these instructions for additional calibration target(s).
 5. A dialog box prompts you to test the calibration. If you accidentally touched the screen in the wrong place during calibration, you will distort the touchscreen calibration. Test to make sure you are happy with the calibration results.
 6. If you are using a TouchPen, repeat the calibration procedure with the pen.

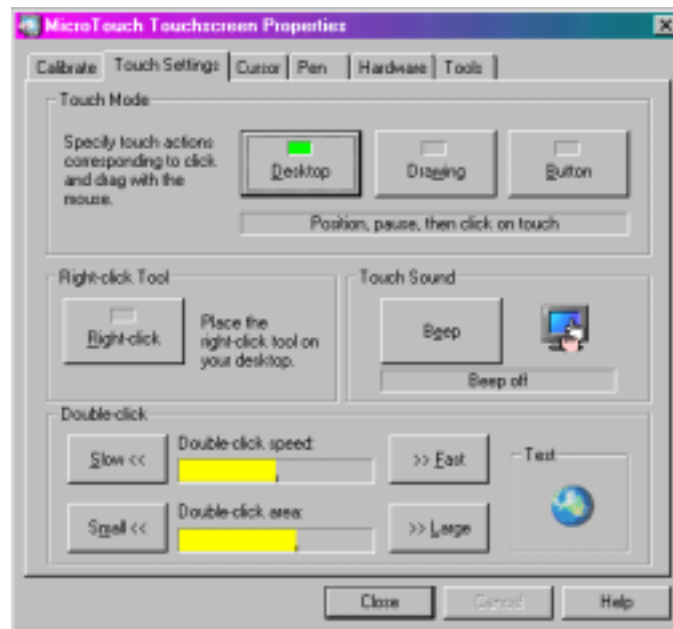
Note: Advanced users may disable calibration verification using the Advanced Touchscreen Settings dialog.

Testing the Calibration

Recalibrate the touchscreen if any of the following tests fail.

- Touch random points on the screen. The cursor should be located underneath your finger or pen when you touch the screen.
- Drag your finger across the screen and check that the cursor follows your movements.
- Touch each corner and along the edges of the screen. Verify that the cursor reaches the full image area of the screen. Be sure you can touch and activate all icons and menus across the entire screen.
- If you need to recalibrate the screen, make sure to touch the targets carefully. It is possible that one of your touches did not register properly or you accidentally touched the screen in the wrong place during calibration. For example, if you touch beyond the targets or into the non-image area, you will distort the touchscreen calibration.

Touch Settings Tab



You can use the Touch Settings tab to customize the response of your touchscreen:

- Touch mode – define the touch actions that equate to a mouse click, double-click, and drag.
- Right-click tool – place the right-click tool on your desktop enabling you to utilize right-click functionality using the touchscreen.
- Touch sound – define whether you hear a sound when you touch the screen and when that sound occurs (touchdown or liftoff).
- Double-click speed and area – define how fast you need to touch and the space in which you must touch in order to produce a double-click.
- Test – enables you to test the double-click speed and area.

Touch Modes

Desktop Mode

Desktop mode is most useful for general-purpose desktop applications. In Desktop mode, a touch positions the cursor much like a mouse. Holding the touch steady is equivalent to pressing and holding the mouse button. Lifting off is equivalent to releasing the mouse button.

- To click, touch the object. Lift off the screen.
- To double-click, touch the object twice quickly at the same location.
- To drag, touch the object. Pause. Slide your finger to the new location. Lift your finger off the screen.

Note: When using the Draw tool, you must pause for the system to recognize touch before drawing.

Drawing Mode

Drawing mode is most useful for draw, paint, illustrator, and graphics applications. In Drawing mode, a touch is equivalent to pressing and holding down the mouse button. This is considered the easiest mode to use with immediate reaction to touch. Lifting off is equivalent to releasing the mouse button.

- To click, touch the object. Lift off the screen.
- To double-click, touch the object twice quickly at the same location.
- To drag, touch the object. Slide your finger to the new location. Lift off the screen.

Button Mode*

In Button mode, touching the screen is equivalent to pressing and releasing the mouse button. The action occurs as soon as you touch the screen. This mode is best for button based applications (like a calculator). This mode is not good for drawing or dragging objects.

- To click, touch the object.

* When you choose a Custom Touch mode (Tools → Touchscreen Options), the text on this button face will change from “Button” to “Custom”. You must then select Custom to activate your choice.

- To double-click, touch the object twice quickly at the same location.
- To drag, touch the object. Pause. Slide your finger to the new location. Lift off the screen. The object is still selected and can be activated with another touch.

Right-click Tool

Places an icon on the desktop (always on top) that allows you to select which mouse button to activate on touch. Note that this works for the next click action only. Control returns to the left mouse button as soon as you are done. In multiple monitor situations, you will get a separate right click tool for each touchscreen.

You can position this icon anywhere on your desktop by selecting it, pausing until the four-pointed arrow appears, and dragging it wherever you want.

Left button is typically used for normal select and normal drag. Right button is typically used for applet properties such as context menu and special drag.

Touch Sound

Select audible beep on touchdown, liftoff, or no beep at all. Click on the Beep button to select the appropriate option for your application. The default setting is no beep on touch (Beep off).

Note: For additional customization, refer to the custom touch sound option found on the Tools tab → Options dialog.

Double-click Speed and Area

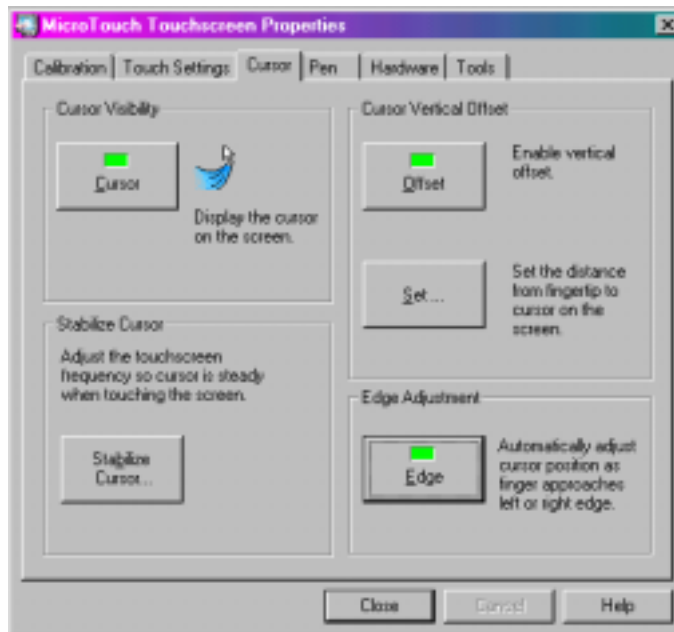
The *double-click speed* defines how quickly you must touch the screen for the system to interpret your actions as a double-click. Set the double-click speed in the slow to medium range for optimum performance with a touchscreen. The black line on the display shows the default setting.

The *double-click area* defines the space in which you must touch the screen for the system to interpret your actions as a double-click. Set the double-click area in the medium to high range for optimum performance with a touchscreen. The black line on the display shows the default setting.

Touch the globe twice to test the double-click speed and area settings. If the MicroTouch Enabled logo begins to circle the globe, the touchscreen recognized your touch as a double-click.

Note: Altering the double-click settings for the touchscreen will change the settings for the mouse, and vice versa.

Cursor Tab



The Cursor tab enables you to customize the response of the cursor to your touch. Using this tab, you can:

- Specify whether to display or hide the cursor
- Define the vertical distance between your touch and the position of the cursor on the screen
- Adjust the cursor movement on the horizontal axis
- Stabilize the cursor

Cursor Visibility

The Cursor Visibility option is for Windows 9X users who do not want to display the cursor when working with a touch application. By default, the touchscreen displays the cursor in your application. Click on the Cursor button to toggle the cursor on or off.

While this option is disabled in Windows NT, users can access the Mouse properties page to hide the cursor.

To hide the cursor in Windows NT 4.0 systems:

1. Click the Start button, and then point to Settings.
2. Click Control Panel.
3. Double-click the Mouse icon to open the Mouse Properties Page
4. Click on the Pointers tab.
5. Select Touchscreen Hidden Cursors scheme and click OK.

Note: Some applications can override this setting by loading their own cursors.

Cursor Vertical Offset

After you calibrate the touchscreen, the cursor should be located directly underneath your finger when you touch the screen. However, you may prefer to offset the cursor slightly above your touch so you can see the cursor and point more easily and precisely to small objects.

The Cursor Vertical Offset option lets you define the distance between your fingertip and the position of the cursor on the screen. Offsetting the cursor is helpful when selecting small items, such as single letters in word processing, check boxes, or radio buttons.

To set the Cursor Vertical Offset:

1. In the Cursor Vertical Offset box on the Cursor tab, click the Offset button. The function is enabled (“ON”) when the green indicator is illuminated. The Set button then becomes active.
2. Click Set.
3. Touch the screen at the desired distance below the tip of the arrow, within the rectangular space provided. The distance between your

liftoff position and the tip of the arrow is the offset distance. Thereafter, the cursor will be positioned above your finger or pen by a distance equal to the offset distance. As your finger or pen approaches the bottom edge of the screen, the cursor offset automatically decreases so you can touch items in this area.

Edge Adjustment

Sometimes the screen image extends beyond the edge of the monitor bezel. In these cases, it may be difficult to touch items at the left and right edges of the screen. If the Edge Adjustment option is on, TouchWare automatically offsets the horizontal position of the cursor near the left and right edges, so you can easily reach the edges of the screen image.

TouchWare only makes this adjustment at the left and right edges of the screen. You cannot define the horizontal offset amount.

Stabilize Cursor

The Stabilize Cursor option adjusts the operating frequency of the touchscreen controller. In general, you will not need to stabilize the cursor for the touchscreen. However, if you are experiencing problems with a jittery cursor, ragged lines, or random touch points, you may want to run the Stabilize Cursor option.

Use the Stabilize Cursor option to test the available frequency settings and determine the best frequency. The range of frequency settings and the default setting depends on your touchscreen controller. You can set a new operating frequency, and then check the performance of the touchscreen at that frequency setting.

When to Stabilize the Cursor

You should stabilize the cursor any time the cursor movement is very erratic or jittery. This is NOT a subtle movement. The cursor will be very jumpy. To test stability, use the Draw program to draw some lines on the screen. Check that they are smooth and thin. If the lines are wide and have ragged edges, the frequency setting is probably not correct for your controller. Run Stabilize Cursor.

Note: This test will take several minutes. Do *not* touch the screen, mouse or keyboard during the test. The test is measuring the amount of noise when there is no touch.

Cursor Stabilization Procedure

1. Choose Stabilize Cursor from the Cursor tab.
2. If you are using a TouchPen controller in pen/finger mode, a dialog box appears asking if you want to adjust the frequency for pen or finger. Specify the desired touch method.

Note: On a TouchPen system, you must stabilize the cursor twice (once with your finger and once with the pen) if you are using both a pen and your finger as touch devices.

3. The system then does a preliminary check of all the frequency settings.
4. The Analyzing Frequencies dialog box appears. The system tests each frequency setting and determines the optimum setting.
5. Once the test is complete, a dialog box informs you of the best frequency as determined by the test. You can click on Accept to switch to this frequency setting or you may click on the Advanced... button to test and select the frequencies for yourself.
6. The test results are displayed in descending order with the recommended frequency at the top of the list. The current selected frequency is also indicated.
7. Select a different frequency and click Apply.

Testing the Newly Selected Frequency

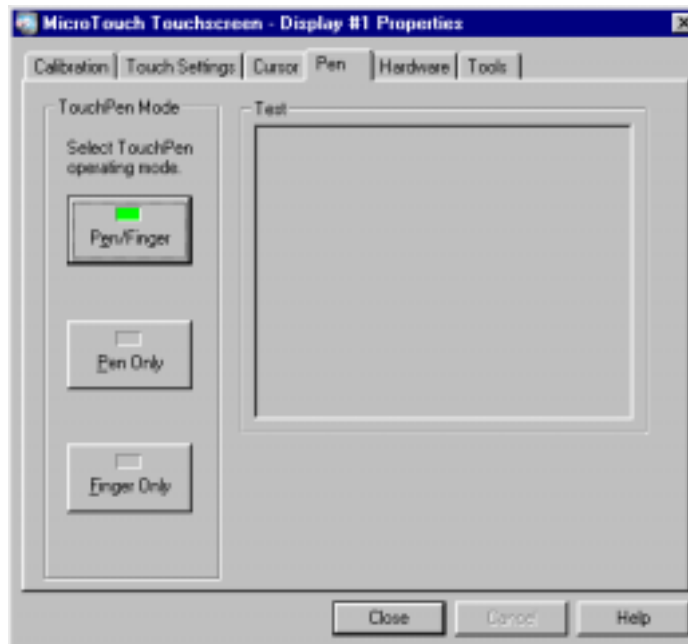
Any time you adjust the frequency you should test how the touchscreen is working and verify you are satisfied with the operation of the touchscreen.

Test the touchscreen by touching the screen in several places and sliding your finger around the screen. The cursor should hold steady and smooth. If you see erratic or jittery cursor movement, readjust the controller frequency.

Adjust the frequency until your touch test produces acceptable results. A good test is to go to the Draw program and hold your finger steady on the screen. If the resulting pattern isn't fuzzy, you have a good frequency.

It is recommended that you recalibrate the touchscreen after using Stabilize Cursor.

Pen Tab



Note: If you have a ThruGlass controller, a ThruGlass Configuration tab will appear in place of the Pen tab. Refer to Chapter 3 for further information on TouchWare for ThruGlass.

The Pen tab options are available only if your system has a TouchPen controller. TouchPen Mode defines whether the touchscreen recognizes input from both a pen and a finger, from a pen only, or from a finger only. The default mode is Pen/Finger, which means that you can use either your finger or your pen to select options.

The pen works in much the same way as a mouse regardless of the Touch Mode setting. Touching the screen with a pen is equivalent to pressing and holding down the left mouse button. Lifting the pen off the screen is

equivalent to releasing the mouse button. Touch Sound is disabled when using the pen (no beep on touch).

From the Pen tab, select one of the TouchPen mode buttons using the mouse, a pen, your finger, or the appropriate shortcut key.

Note the TouchPen mode is immediately active. For example, if you select Pen Only, the system recognizes only the pen as a touch device. You cannot use your finger to make a selection. You can still use shortcut keys or the mouse to select an option.

The system saves the TouchPen mode so that the next time you power up the system, the selected TouchPen mode is active.

Pen/Finger Mode

The system recognizes both pen and finger touches on the screen. This mode is the default mode for TouchPen controllers. If the system detects both pen and finger touches at the same time, it gives the pen higher priority and acknowledges only the pen touches. This priority prevents accidental touches from your finger or hand being interpreted as input.

If you are using the pen and you lift the pen from the screen, the system does not recognize finger (or hand) touch until after a system-defined time delay. If a finger or hand is on the screen when the pen lifts off, the system ignores the finger or hand until you lift off and touch the screen again.

For example, if you rest your hand on the screen while you write with the pen, you can lift the pen and put it back again without your hand touch being acknowledged.

You must calibrate the touchscreen twice (once with your finger and once with the pen) if you are using Pen/Finger mode.

Note: Changing the TouchPen mode setting can optimize the performance of the touchscreen. In Pen/Finger mode, the TouchPen controller checks for input from either a pen or a finger. The controller always gives priority to the pen. Therefore, if you are not currently using the pen for your touch application, use Finger Only mode for optimum system performance.

Pen Only Mode

The system recognizes only pen touches on the screen. The system ignores finger touches on the screen.

Finger Only Mode

The system recognizes only finger touches on the screen. The system ignores pen touches on the screen.

Stabilize Cursor for Finger and TouchPen

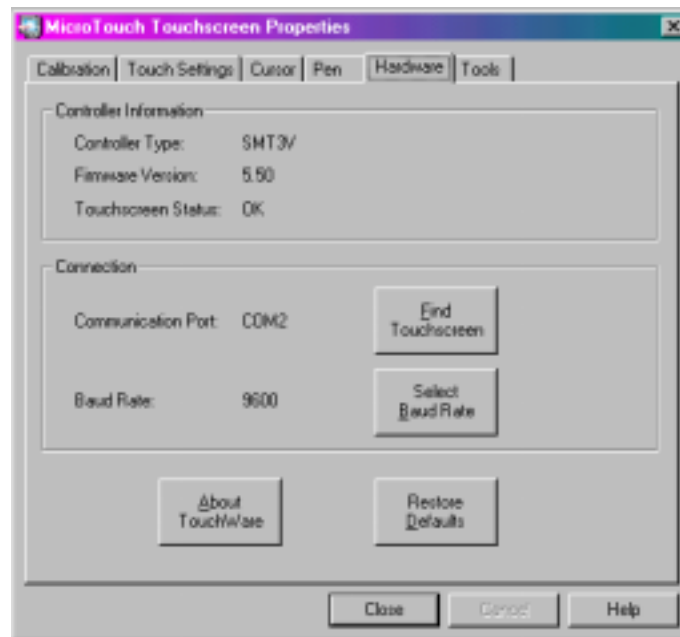
If you are using pen/finger mode when you select Stabilize Cursor from the Cursor tab, a dialog box appears asking if you want to adjust the frequency for pen or finger. You can stabilize the cursor for use with either a pen or finger.

The recommended frequency setting may be different for the pen and the finger; therefore you must adjust each input method independently. You could find that the performance of one touch method is acceptable, while another touch method may need stabilization.

Test TouchPen

Touch in the designated test area to sample draw mode and to determine if the selected TouchPen mode is working.

Hardware Tab



USB Note: The Hardware tab will appear different for USB controllers. No Connection information is provided. Refer to screen on following page

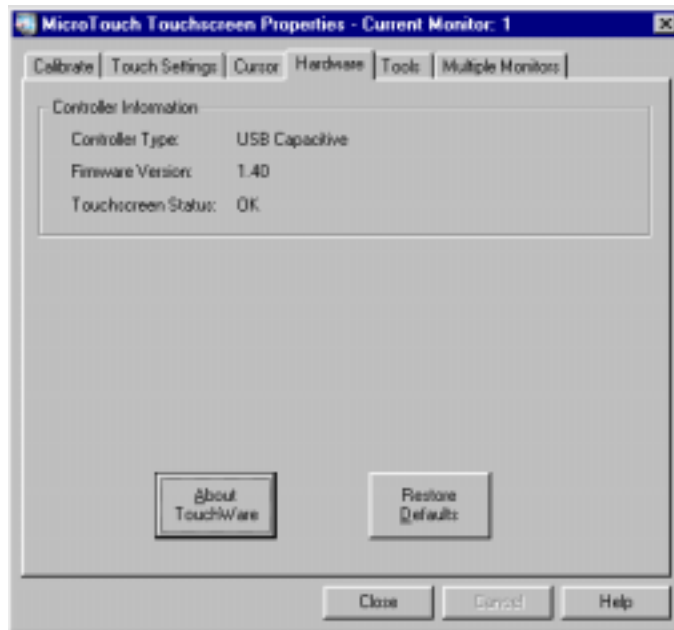
Use the Hardware tab to determine the basic system settings for your touchscreen, select baud rate, and restore system defaults.

Controller Information

Controller Type

The following controllers are supported in this version of TouchWare:

- Serial/SMT series controllers
- MT4XX series controllers
- PC Bus controller
- TouchPen controller
- ThruGlass controller
- USB controller
- MousePort controller (PS/2)



Firmware Version

These digits represent the version number and the revision level of the touchscreen controller firmware.

Touchscreen Status

Touchscreen status refers to whether or not the touchscreen has been found and is operational.

Possible messages include:

OK -- Touchscreen found and operational.

Touchscreen Not Found – Touchscreen not found. Refer to Troubleshooting the Touchscreen for further information on this message.

Any other error messages indicate a hardware failure. Refer to Error Messages or contact MicroTouch Technical Support for more information.

Connection

Communication Port*

Displays the COM port used for the touchscreen hardware connection.

If you have two serial devices operating together, such as a touchscreen and a mouse, be sure each device uses a unique COM port and IRQ number. For example, the mouse can use COM1/IRQ4 and the touchscreen can use COM2/IRQ3. Using the same COM port or IRQ creates device conflicts. The touchscreen must have a unique IRQ; it cannot share an IRQ with another device.

Use the Microsoft Hardware Conflict Troubleshooter (available in Windows Help) to try and resolve this problem.

Find Touchscreen*

When you select the Find Touchscreen option, TouchWare:

- Scans the available communication ports supported by Windows for a touchscreen. Find Touchscreen searches the baud rates used by the touchscreen.

Note: TouchWare will only work with COM ports configured, recognized, operational and supported by Windows at the time of install.

- Tries to communicate with the touchscreen controller.
- Waits for the touchscreen controller to respond.
- Requests information about the touchscreen and its controller.

If TouchWare does not find the touchscreen, check that the touchscreen is connected properly, and then repeat the search. Refer to Chapter 4 Troubleshooting the Touchscreen for more information on what to do if your touchscreen is not found. Note that this option cannot search any COM ports in use by other applications.

* Verify that any previously loaded hardware/software (i.e., mouse or modem) that used the same COM port as your touchscreen has been uninstalled. Just because the hardware is disconnected doesn't mean that the software isn't claiming the port. Ensure that all components are completely removed from the System files.

Select Baud Rate

The standard baud rate for MicroTouch controllers is 9600, which is generally acceptable for most applications. You may also select 19200, 4800, 2400 or 1200 baud.

Note: The Select Baud Rate setting is not available for ThruGlass. If you change the baud rate, you could render your ThruGlass touchscreen inoperable.

About TouchWare

Lists the version of TouchWare (including Driver, Control Panel, Utility DLL, Operating System, etc.) currently installed on your system. This information is particularly helpful if you need to call Technical Support.

Restore Defaults

This option is useful if you have reconfigured the software and need to get back to the original TouchWare settings.

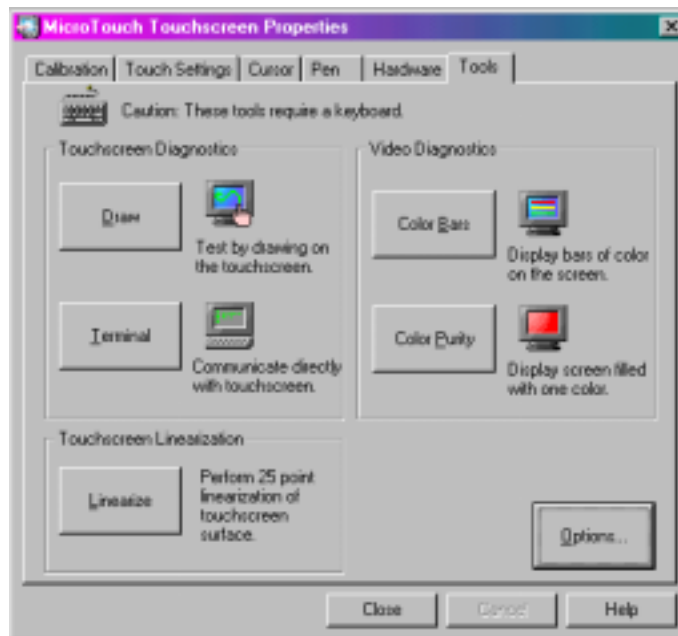
Note: This option does *not* restore calibration or frequency settings.

Restores original TouchWare settings for:

- Touch Mode (Desktop)
In Multiple Monitor mode, the default is Click.
- Touch Sound (Off)
- Double-click Speed and Area (Midrange)
- Cursor Visibility (On)
- Cursor Vertical Offset (Off)
- Edge Adjustment (Off)
- TouchPen Mode (Pen/Finger)
- Advanced Touchscreen Settings
 - 2-point calibration for capacitive/5-point calibration for resistive
 - Touch enabled
 - Splash screen enabled
 - Calibration reminder enabled
 - Calibration verification enabled

- Linearization disabled (unless TP4)
- Noise filter disabled
- Diagnostic tools disabled
- Multiple monitor touch modes disabled (except for multiple monitors)

Tools Tab



Use the Tools tab to perform basic touchscreen diagnostic tests to optimize the performance of your touchscreen. This tab is also the gateway to additional options and advanced touchscreen settings.

Note: You must have a keyboard attached to your system when using some of these optional tools.

Touchscreen Diagnostics

Draw

The Draw program lets you test the operation of the touchscreen and pen by checking the accuracy and speed with which the system responds to your touch. To draw, simply touch the screen and drag your finger or pen. When using Desktop Mode, you must pause for the system to recognize touch before drawing.

The following options will help you use the Draw program more effectively:

- B (blank) -- clears the screen and displays a blank drawing canvas.
- G (grid) -- clears the screen and displays a grid that you can use as a drawing guide (default setting).
- L (line) -- draws solid lines on the screen (default setting). This option is not available in Multiple Monitor mode.
- D (dots) -- draws dotted lines on the screen, where each dot represents a point reported by the touchscreen.
- Space Bar -- clears the screen instructions leaving the grid or a blank drawing area.

The Draw background reflects your Desktop color scheme. You could experience problems if you have changed your desktop color to a light background. The Draw grid lines are white and you will not be able to see the test lines. Change your background color to a dark selection for best results. Click on Start → Settings → Control Panel → Display → Appearance.

Terminal

You do *not* need to use firmware commands in order to use your touch system. Developers and support personnel can use firmware commands at their discretion to initialize the controller, select operating or touch modes, specify data formats, and execute diagnostic functions. Terminal emulation mode sends firmware commands directly to the touchscreen controller and enables you to view touch position data sent from the controller. This window will automatically timeout with no activity.

For a complete description of the available firmware commands, refer to the *Touch Controllers Reference Guide (19-213)*.

Caution: If you are not familiar with the use of firmware commands, *do not use* this option. Executing some commands may alter the performance of your touchscreen or render it inoperable.

Video Diagnostics *

The Color Bars and Color Purity options let you test the monitor video output. These options *do not test* the touchscreen. Typically, you do not need to use these options unless you are assembling or repairing touchscreen monitors.

Color Bars

When you select the Color Bars option, TouchWare displays 15 bars that span the color spectrum from black to white.

When examining the colors, check the following items:

- Look at each color and ensure that it matches its description.
- Look at the edges of each color bar and ensure that it does not bleed at the edge or spread into other colors.

If you notice problems, try adjusting the contrast and brightness controls on the monitor.

If there are still problems with the video, you can continue to troubleshoot the problem by using the Color Purity option. Remember that bad video indicates a hardware problem with the monitor or video card, not the touchscreen.

Color Purity

Most CRT monitors have three electron guns (or signals) that send the primary colors – red, green, and blue – to the screen. (The exception to this is flat panel displays.) The Color Purity option lets you test each primary color individually. You can also test combinations of these colors to produce some of the same colors shown in the Color Bars option.

* Advanced users may disable these video diagnostic tools using the Options button → Advanced Touchscreen Settings dialog.

The advantage of the Color Purity option is that the color fills the screen. You can check a color for consistent appearance and saturation across the screen. Refer to the following Color Table to learn how to produce each color by turning the color guns on or off. For example, turn on red and blue to view magenta, or turn on green and blue to view cyan.

When viewing a color with the Color Purity option, look for the color to be uniform across all areas of the screen. Shading, shadows, and distortion in the color indicate there may be problems with the video.

Some monitors have a Degauss button. If you notice any problems with the color, try pressing the Degauss button to neutralize the magnetic field that builds up on the CRT. Also, check that other monitor controls are set properly. For more information on these controls, refer to the documentation for your particular monitor.

If there are still problems with the video, review the installation procedure for the touchscreen and check that you reassembled the monitor properly. Remember that video problems indicate a problem with the monitor or video card, not the touchscreen.

Table 1. Color Table

Color	Red	Green	Blue
Black	Off	Off	Off
Blue	Off	Off	On
Cyan	Off	On	On
Green	Off	On	Off
Magenta	On	Off	On
Red	On	Off	Off
Yellow	On	On	Off
White	On	On	On

Touchscreen Linearization

Note: Touchscreen linearization is typically available for pen systems only. However, advanced users may enable linearization using the Tools → Options → Advanced Touchscreen Settings dialog.

To perform a 25-point linearization of the touchscreen surface:

1. Make sure the video image is centered in the screen area using the horizontal and vertical controls.
2. Open the touchscreen control panel and select the Tools tab.
3. Click Linearize. This will bring up 25 linearization targets on the screen. A hand guides you through the linearization process pointing, in turn, to the next appropriate target.



Note: If you press Escape or do not touch the touchscreen within 20 seconds, the system automatically cancels the linearization process with no change to the current settings.

4. Touch the touchscreen and position your fingertip to completely cover the yellow target. The area around the hand will begin to flash. When the linearization completes, the message “Touch Enabled” will appear.

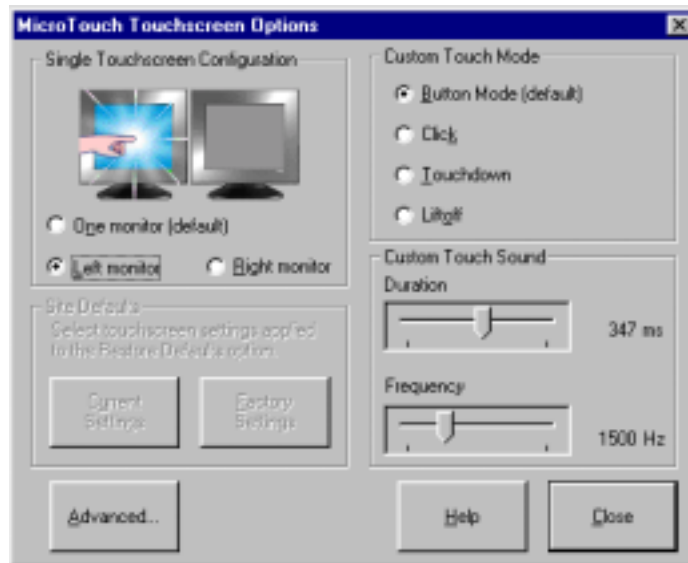
When touching the target, make sure you

- Face the monitor directly.
 - Perform the linearization in the position (sitting or standing) you expect to use the touchscreen.
 - Touch the target firmly and precisely with your fingertip. Be careful to keep your other fingers away from the touchscreen as you touch the target.
5. Repeat these instructions until all 25 targets have been touched.
 6. The 25 targets will now be replaced with a set of 16 targets used to verify the linearization performed in steps 1 through 5.
 7. Repeat the previous process for each of these targets. This process automatically returns to the control panel once complete. If you are using a TouchPen, repeat the linearization procedure with the pen.

To test the accuracy of the linearization process, use the Draw program to draw some lines on the screen. Check that they are smooth and thin.

To exit this program at any time during the process, press ESCape.

Touchscreen Options



The Touchscreen Options button enables functions added to the original TouchWare control panel. Using this dialog enables you to further customize TouchWare to suit your setting. Touchscreen Options include:

- Single Touchscreen Configuration
- Custom Touch Mode
- Site Defaults (for NT users)
- Custom Touch Sound
- Advanced Touchscreen Settings

Single Touchscreen Configuration







The Single Touchscreen Configuration option is useful for applications requiring 2 monitors, only one of which is a touchscreen. For example, you may want to have a touch monitor running an interactive program while the non-touch monitor runs a display-only application.


This option confines touch to a single screen in a two monitor configuration. This enables you to use a single touchscreen with an image split horizontally (tiled) across 2 screens. You need only select which side is the touchscreen – right or left (primary or secondary in Windows 98).

Note: This option is only active for *single* touchscreen installations. It is disabled in *multiple* touchscreen installations. If you want to have more than one touchscreen running at the same time, you must install the touchscreen software for multiple monitors. Refer to Appendix A for more information on Multiple Monitors.

Select one monitor (default) to place the entire desktop image on one monitor without a split screen. This is the equivalent of standard touchscreen software installed on a single touch monitor.

For tiled applications, if your touchscreen is on the left, click Left monitor. If your touchscreen is on the right, click Right monitor. The possible configurations for serial controllers using this option are as follows:

If you have:	Windows 95 or Windows NT 4.0	Windows 98
1 Monitor 1 Touchscreen 1 Video Card	Supported 	Supported 
2 Monitors 1 Touchscreen 1 Video Card 1 Splitter	Supported -- Mirrored only 	Supported -- Mirrored only 
2 monitors 1 touchscreen 1 video card 2 outputs	Supported – Mirrored and tiled  or 	Not supported

2 monitors 1 touchscreen 2 video cards	Not supported	Supported -- Tiled only 
---	---------------	---

Custom Touch Mode

Custom Touch Mode provides three additional touch modes to the original Touch Modes found on the Touch Settings tab. In fact, Custom Touch Mode enables you to reconfigure how the third Touch Mode button on the Touch Settings tab works. If you choose a Custom Touch Mode (Click, Touchdown or Liftoff), the button name will change from “Button” to “Custom” on the Touch Settings tab. You must then select “Custom” to activate this choice.

- Button Mode (default)
- Click Mode
- Touchdown Mode
- Liftoff Mode

Refer to the Touch Settings tab for the standard touch mode options.

Button Mode (default)

This option is exactly the same as Button Mode on the Touch Settings tab.

Click Mode*

This option is exactly the same as Click Mode for Multiple touchscreens. Click mode provides button operation only. The touchscreen sends a button-down, followed by a button-up to the operating system. Drawing or dragging is not supported in this mode.

Touchdown Mode*

Touchdown Mode enables you to create an immediate button action as soon as you touch the screen. In Touchdown Mode, you cause a button down at the cursor location, with a short pause and then a button up. You can leave your finger on the screen but only a single touch is registered until you lift your finger off the screen and touch down again.

Touching the screen is equivalent to pressing and releasing the mouse button. The action occurs as soon as you touch the screen. This mode is best for button based applications (like a calculator). Drawing or dragging is not supported in this mode.

Liftoff Mode*

Liftoff Mode enables you to position the cursor where you want before creating a button action. In Liftoff Mode, the cursor will follow your finger for more accurate touch. When you want to select an item, lifting your finger off the screen will cause a button down, short pause, and then a button up to occur.

Touching the screen is equivalent to moving the mouse position. The button down/button up action occurs when you remove your finger from the screen. This mode is useful for applications requiring greater accuracy because it lets you carefully position the cursor prior to acting on it. Drawing or dragging is not supported in this mode.

Site Defaults

The Site Defaults option (for NT administrators only) enables you to restore system defaults to either your Current Settings (site-specific) or the original Factory Settings when you select Restore Defaults from the Hardware tab. This option does not restore calibration or frequency settings.

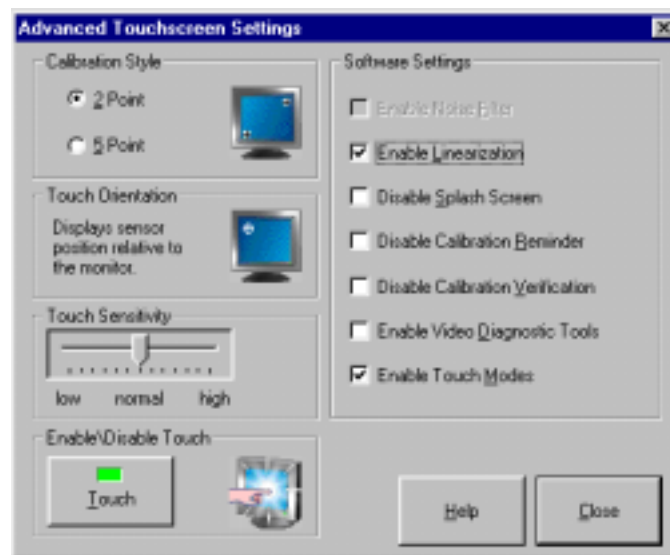
* When you choose this mode, “Button” will change to “Custom” in the Touch Mode selection buttons on the Touch Settings tab. You must then select “Custom” to activate this choice.

Custom Touch Sound

This option enables you to set the exact pitch and duration of the touch sound selected on the Touch Settings tab.

Note: If you have selected No Beep on the Touch Settings tab, this option will be disabled.

Advanced Touchscreen Settings



Calibration Style*

The calibration process aligns the touchscreen with the underlying video. Specifically, calibration defines the dimensions of the active area of the touchscreen and locates the center of the touchscreen. If the screen is improperly calibrated, the active area of the touchscreen may not be aligned or may be unnecessarily small in size.

* **Warning:** Executing this option may alter the performance of your touchscreen or render it inoperable. You should be aware of expected results before executing any option. If you are not familiar with the outcome of these settings, you should **not** be using this option.

Once you calibrate for each video resolution, the information is saved by the touchscreen. Therefore, you do not need to calibrate the touchscreen each time you start your system.

TouchWare provides 2 choices for calibration style:

- 2-point calibration is ideal for capacitive touchscreens.
- 5-point calibration is most commonly used for resistive touchscreens.

Touch Orientation

This is an information-only icon.

The Touch Orientation option is included for advanced users who alter the orientation of the touchscreen in custom installations. This orientation (or direction of the sensor mounted in the monitor) is determined the first time calibration is run. Once TouchWare is installed, the calibration program automatically determines the correct sensor positioning.

The touchscreen icon illustrates how your sensor is placed in your monitor. The white target indicates the location of the upper left corner of the touchscreen. Standard installation of the touchscreen sensor matches this upper left corner point to the monitor.

Disable Touch*

This option allows you to disable touch functionality. The only way to restore touch is with a keyboard or mouse. This setting will remain in effect until you reboot your system.

Touch Sensitivity*

The configuration process sets the default sensitivity that, in most cases, will be appropriate for your touchscreen. However, you can change this setting manually if you are not satisfied with the *response* of the touchscreen.

- If the controller responds or the cursor moves before you actually touch the screen, you should decrease the sensitivity.

* **Warning:** Executing this option may alter the performance of your touchscreen or render it inoperable. You should be aware of expected results before executing any option. If you are not familiar with the outcome of these settings, you should *not* be using this option.

- If you need to press hard or use more than one finger in order to activate a touch, you should increase the sensitivity.

Software Settings*

These Software Settings are intended for use by advanced users attempting to streamline the installation of TouchWare on many systems at a time. These settings are not intended for use by individual users.

- Enable Noise Filter – use to correct grounding problems
- Enable Linearization – activates 25 point calibration for use when viewable/touchable area is smaller than full screen
- Disable Splash Screen – enabled on startup for advanced users
- Disable Calibration Reminder – for advanced users, this option allows users to turn off the automatic calibration reminder message
- Disable Calibration Verification – for advanced users, this option allows users to turn off the automatic calibration verification message
- Enable Video Diagnostic Tools – this option allows users to turn on color testing
- Enable Touch Modes – this option allows users to turn on additional touch modes in a multiple monitor setup

C h a p t e r 3

ThruGlass Touchscreen Configuration

This chapter provides information unique to ThruGlass TouchWare users. Refer to the *ThruGlass Touchscreen Hardware Installation Guide* for more detailed information on setting up ThruGlass. Refer to earlier chapters of this book for information on installing TouchWare and the overall functionality of the TouchWare control panel.

Note: In systems equipped with ThruGlass, the ThruGlass tab appears in place of the Pen tab.

The ThruGlass tab enables you to:

- Specify the size and type of ThruGlass touchscreen you are using
- Adjust the controller sensitivity
- Test the operation of the ThruGlass touchscreen
- Run ThruGlass diagnostic tests
- Adjust the controller frequency

After installing the ThruGlass touchscreen and controller, use the ThruGlass tab to configure the touchscreen for the current installation and environment. When you select the ThruGlass Screen Type, you automatically set in motion a configuration process that sets the default sensitivity and determines the best operating frequency for your controller.

Setting Up a ThruGlass Touchscreen

Install the ThruGlass controller using the *ThruGlass Touchscreen Hardware Installation Guide* for detailed information.

Note: You must have a keyboard or mouse attached to your system to initially configure your ThruGlass touchscreen. When you initially install TouchWare, touch is disabled until you specify the Screen Type in the ThruGlass tab. Use the keyboard or mouse to specify the ThruGlass screen type.

Before you configure the ThruGlass touchscreen, make sure the video resolution¹ is appropriate for your touch application. Your monitor's video card determines the available resolutions.

Configure the ThruGlass touchscreen by specifying the size of ThruGlass touchscreen, such as 17-, 15-, 12- or 10-inch screens. The part number appears on the cable at the lower right corner of the touchscreen.

When you select the ThruGlass Screen Type, you automatically set in motion a configuration process that sets the default sensitivity and determines the best frequency for your controller.

If you change video resolution or scan rate², a dialog box will automatically pop up advising you to reselect your screen type in order to optimize ThruGlass performance. *If you change **only** the scan rate on a Windows 95 system, this message will not appear. You must manually reset the screen type by selecting None and then reselect the screen type.*

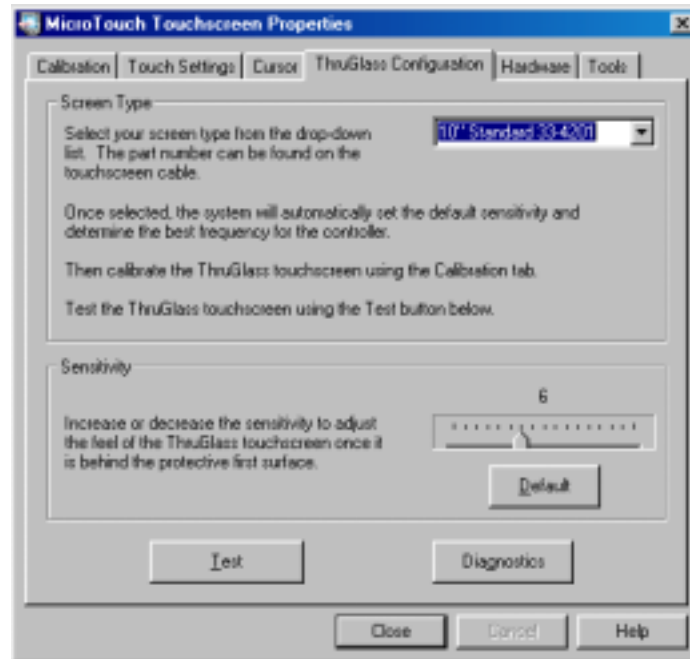
After you configure your ThruGlass touchscreen, calibrate the touchscreen using the Calibrate tab. You can then set preferences such as the double-click speed or touch mode using the other touchscreen control panel tabs. Refer to Chapter 2 for more information.

¹ Video resolution, i.e., 800x600 or 640x480, is also known as Desktop Area on the Settings/Control Panel/Display Properties Page.

² Scan rate is also known as Refresh rate depending on your video card.

Screen Type

Caution: You must have a keyboard or mouse attached to your system to initially configure your ThruGlass touchscreen.



If you are specifying the screen type for the first time, touch is disabled. Use the mouse or keyboard to select the screen type. However, do *not* touch the screen, keyboard or mouse once the configuration process has begun.

After you install the ThruGlass hardware, use Screen Type to specify the type of touchscreen you are using. MicroTouch makes different types of ThruGlass touchscreens, such as 17-, 15-, 12- or 10-inch screens. The part number can be found on the touchscreen cable at the lower right corner of the touchscreen.

When you select the ThruGlass Screen Type, you automatically set in motion a configuration process that sets the default sensitivity and determines the best frequency for your controller.

Sensitivity

Using the Sensitivity setting, the touch response can be optimized for the thickness of the non-conductive material (for example, glass or plastic) in front of the ThruGlass touchscreen.

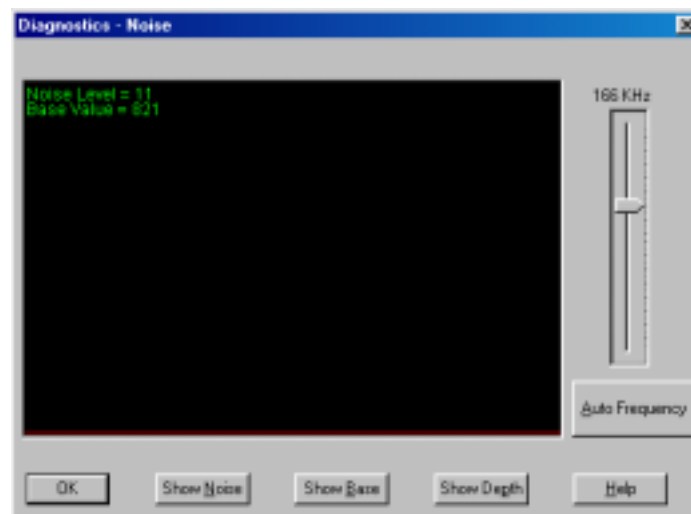
The configuration process sets the default sensitivity which, in most cases, will be appropriate for your touchscreen. However, you can change this setting manually if you are not satisfied with the response of the ThruGlass touchscreen.

- If the controller responds or the cursor moves before you actually touch the first surface, you should decrease the sensitivity.
- If you need to press hard or use more than one finger in order to activate a touch, you should increase the sensitivity.

Diagnostics

Diagnostics will help to determine whether your ThruGlass touchscreen is working correctly. Before running these tests, make sure the ThruGlass is installed in its operational position, i.e., kiosk doors closed, artwork installed, monitor in final operating location.

Show Noise

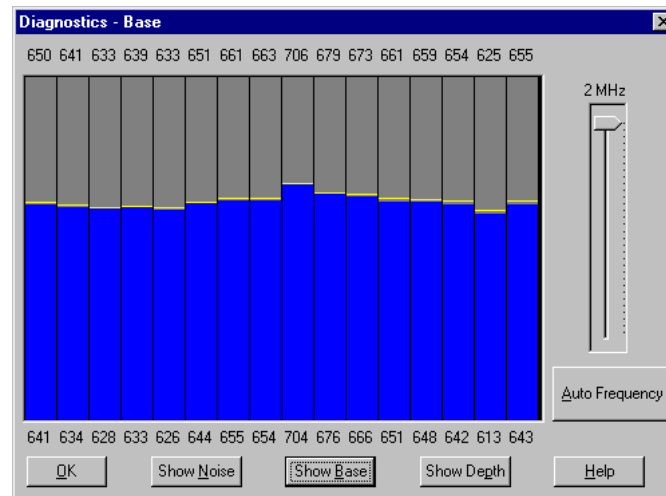


The Noise Level indicates the amount of noise detected by the controller at the current frequency. Ideally, the Noise Level should be less than 30. Choose Auto Frequency to determine the best frequency for your controller. If you are still unsatisfied with this setting, you can select a different frequency manually and retest.

The red line is a graphical representation of the noise level. It should be positioned low and hold steady as shown in the screen below.

Note that touching the screen affects the noise level. To obtain accurate readings of the overall system noise, do not touch the screen, keyboard or mouse during this process.

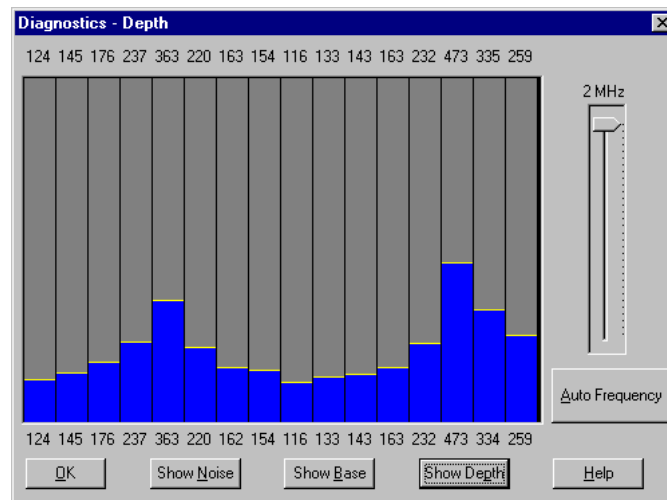
Show Base



Show Base shows the operating range of the controller. Optimal levels should be over 400 and less than 1023. The yellow lines represent peak holds. All values should be in the top half of the screen.

If any bar is substantially different from its neighbor, there may be a problem such as metal near the sensor or a broken connection. The exception to this is the change from the horizontal to vertical axis at bar 8, where you are likely to see a jump in height. Touching the screen should show a reduction in height of all bars with the lowest reading being the touch point.

Show Depth



Show Depth is a graphical representation of the amount of touch signal that the controller sees when the screen is touched. The best values are above 125. Overall, the higher the values, the better, without topping out the graph.

If you sweep your finger slowly from side to side and top to bottom across the screen, you should see that all bars reach a similar maximum height. The yellow lines indicate the maximum reading of any given bar.

The leftmost bars represent readings from the horizontal axis. The rightmost eight represent the vertical axis. There may be a slight difference in the average from these two groups.

Auto Frequency

The Auto Frequency function adjusts the operating frequency of the touchscreen. In general, you will not need to adjust the frequency once you have configured the touchscreen. However, if you are experiencing erratic or jittery cursor movement, ragged lines, or random touch points, you may want to use the Auto Frequency option and rerun the process.

You can manually set a new operating frequency, and then check the performance of the touchscreen at that frequency setting. Use the Auto Frequency slide bar to select and test the available frequency settings and determine the best frequency. The range of frequency settings and the

default setting depends on your installation. You can adjust the ThruGlass sensitivity after changing the frequency.

Do not touch the screen, keyboard or mouse during this process.

When to Adjust the Controller Frequency

You should adjust the controller frequency any time the cursor movement is very erratic or jittery. This is NOT a subtle movement. The cursor will be very jumpy. To test stability, use the Draw program to draw some lines on the screen. Check that they are smooth. If the lines appear ragged, the frequency setting is probably not correct for your controller.

To adjust the controller frequency:

- Open the ThruGlass tab.
- Click on Diagnostics then click on Auto Frequency.
- Do not touch the screen until the auto frequency process is complete. Touching the screen influences the results of the frequency adjustment.
- The results obtained from changing the frequency are not predictable. If you choose a frequency setting that does not work, keep trying. The next frequency setting (up or down) may be appropriate.

Calibrating the ThruGlass Touchscreen

You should calibrate the ThruGlass touchscreen after you have set the screen type and adjusted sensitivity and frequency. Use the Calibrate tab to adjust the calibration of the ThruGlass touchscreen.

Testing the ThruGlass Touchscreen

Use the Test button to check that the ThruGlass touchscreen is correctly responding to your touch.

To test the ThruGlass touchscreen:

- Open the ThruGlass tab.
- Click on Test. A dialog box prompts you to test the touchscreen by touching the screen. A target appears on the screen.

- Touch the screen in several places and move your finger around the screen. Touch the corners and edges of the screen. The cursor should be steady and cursor movement should be smooth. If you see erratic or jittery cursor movement or if the controller registers random touch points, readjust the controller frequency.

Adjusting ThruGlass Video Resolution

MicroTouch recommends that you adjust the desired video resolution and scan rate before you configure the touchscreen. Adjusting the video resolution after configuring the touchscreen can cause touch to be erratic.

If you change the video resolution or scan rate after configuring the touchscreen, you will see a message advising you to reselect your screen type in order to automatically configure the sensitivity and frequency. *If you change **only** the scan rate on a Windows 95 system, this message will not appear. You must manually reset the screen type by selecting None and then the screen type.*

Alternatively, you can adjust the controller frequency by selecting the Auto Frequency button from the Diagnostics screen.

Values for each video resolution are stored in the system registry so you need only do this once for each video resolution setting.

ThruGlass Troubleshooting

The ThruGlass touchscreen should be sensitive to your touch and recognize a light touch. If not, you may be experiencing one of the following problems:

- If the controller responds or the cursor moves before you actually touch the first surface — decrease sensitivity.
- If you need to press hard or use more than one finger to activate a touch — increase sensitivity.
- If the cursor is erratic or jittery — adjust the controller frequency.
- If the controller is registering random touch points — adjust the controller frequency.
- If the cursor does not reach the edges of the video image — recalibrate the touchscreen.

- If the cursor is not located underneath your finger — recalibrate the touchscreen.

Summary of Firmware Commands

ThruGlass controllers use an enhanced set of the commands detailed in the following tables. MicroTouch recommends you use the commands listed in Table 2.

Caution: If you are not familiar with the use of firmware commands, *do not use* them. Executing some commands may alter the performance of your touchscreen or render it inoperable.

Table 2. Firmware Commands Recommended for Development

Command Name	ASCII Code	Description
Calibrate Extended	CX	Initiates an interactive, two-point calibration.
Format Tablet	FT	Outputs the X, Y touch coordinate data in a five-byte packet.
Mode Stream	MS	Sends a continuous stream of X, Y coordinate data when you touch the screen.
Null Command	Z	Queries the controller and waits for a response.
Output Identity	OI	Identifies the controller type and the firmware version.
Reset	R	Initializes the hardware and the firmware, causes the controller to stop sending data, and recalculates the environmental conditions.
Restore Defaults	RD	Returns the controller to the factory default operating parameters.
Unit Type	UT	Identifies the type of touchscreen controller connected to your system.

Additional ThruGlass Specific Commands

These commands can be used for diagnostics and configuration of ThruGlass controllers.

Table 3. ThruGlass Specific Controller Commands

Command Name	ASCII Code	Description
Mode Noise	MN	Stream noise data packets
Extended Mode	MX	Send firmware algorithm data on press
Set Creep	SC [pressed released]	Set/show base update rates
Set Sensitivity	SS [max/min adjacent unused speed fast level release]	Set/show touch algorithm parameters
Set Frequency	SF [freq]	Set/show frequency
Set Phase	SP [resIn delay]	Set/show phase
Set Type	ST [0..3]	Set/show controller & screen orientation
Set Correction X	SCX [xtbl X0 X1 X2 X3 X4 X5 X6 X7]	Set/show X depth correction parameters
Set Correction Y	SCY [ytbl Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7]	Set/show Y depth correction parameters
Format Raw ASCII	FRA	Show 16 sensor channel values
Format Base ASCII	FBA	Show 16 base values
Format Depth ASCII	FZA	Show 16 press depth values
Noise ASCII	NOA	Show noise data

ThruGlass Command Line Commands

Sending ESCAPE,ESCAPE,ESCAPE will place the ThruGlass controller into 'terminal' mode. The following commands are then active. Note that some parameter values can render the controller inoperative. FR will return the controller to factory default settings. Note that these commands are for diagnostic use only and are not recommended for normal operation.

- Enter either full command or abbreviation followed by <ENTER>.
- Angle brackets indicate required parameter.
- Square brackets indicate optional parameter(s).

- Vertical bar indicates a choice must be made from list.

Table 4. ThruGlass Terminal Mode Commands

Command	Abbreviation	Description
Adcall	aa	Show 16 sensor channel values
Baseall	ba	Show base values
baud [1200 2400 4800 9600]	bd	Set/show communication rate
coldreset	cr	Perform power-up restart
Depthall	de	Show press depth values
eeprom <address> [data]	ee	Set/show EEPROM values directly
Factoryreset	fr	Reset to factory default settings
Go	go	Start normal operation
help [command]	he	Show list of these commands
helpcta	hc	Show test of CTRL-A commands
mode [mode]	mo	Set/show operation mode
noise	no	Show noise analysis
sens [maxmin adjacent unused speed fast level release]	ss	Set/show touch algorithm parameters
scx [xtbl X0 X1 X2 X3 X4 X5 X6 X7]	scx	Set/show X depth correction parameters
scy [ytbl Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7]	scy	Set/show Y depth correction parameters
setcreep [pressed released]	sc	Set/show base update rates
setfreq [freq]	sf	Set/show frequency
setphase [resIn delay]	sp	Set/show phase
setlinx [center edge offset]	slx	Set/show X linearity parameters
setliny [center edge offset]	sly	Set/show Y linearity parameters
Tpcal	tpc	Perform two-point calibration
tpval [X1 Y1 X2 Y2]	tpy	Set/show two-point calibration values
tpcreset	tpr	Reset two-point calibration to default
type [0..3]	ty	Set/show controller & screen orientation
version	ve	Show version information
Warmreset	wr	Restart all processes

C h a p t e r 4

Troubleshooting the Touchscreen

This chapter provides tips and strategies for problems you may encounter with the touchscreen either during installation or normal use.

MicroTouch is committed to helping you get the most from your touchscreen. MicroTouch provides extensive technical support through our telephone hot line and web site. For more information on technical support, refer to the “About This Manual” section at the beginning of this document.

Troubleshooting Overview

If you are experiencing problems with the touchscreen, check that all cables are connected properly and restart your system.

For cursor adjustments, you may need to

- Calibrate the touchscreen
- Define cursor offset
- Stabilize the cursor

If your touchscreen or mouse is not working, the communication settings may be incorrect. If both devices are trying to use the same communication port or IRQ, a hardware device conflict will result. The touchscreen cannot share an IRQ with another device.

Verify that any previously loaded hardware/software that used the same COM port as your touchscreen has been uninstalled. Just because the hardware is disconnected doesn't mean that the software isn't claiming the

port. Ensure that all components are completely removed from the system files. Refer to manufacturer's documentation for additional help.

To correct the communication settings, use the Windows Hardware Conflict Troubleshooter from Windows Help.

Before You Call Tech Support

Have the following information ready and available before you call technical support.

- Is this a new installation? Have you ever installed TouchWare before?
- Has the touchscreen software worked prior to this?
- Have you added any new hardware or software to the system?
- What operating platform are you using: Windows NT or Windows 9X?
- What type of mouse are you using?
- Did the software find the touchscreen? Look on the Hardware tab.
- Can you draw on the touchscreen? Are the lines straight? If not, you may need to stabilize the cursor.
- Part number and serial number from the MicroTouch label on your monitor or touchscreen controller.
- Make and model of your personal computer.
- Type of MicroTouch touchscreen (capacitive, resistive, ThruGlass).
- Version number of your MicroTouch TouchWare. Go to the Hardware tab – then click on the About box.
- List of peripherals connected to your computer.
- Other application software in use.

Touchscreen Status Lights

Some touchscreens have a light-emitting diode (LED) that indicates the status of the touchscreen unit and monitors several diagnostic features in the unit. Note that there is no LED on a TouchPen controller.

When you first power up a touchscreen monitor, the LED initially goes bright, then dim. When you touch the screen, the LED should brighten

again. If you are experiencing problems with the touchscreen, be sure to check the LED for status information.

- If the LED remains *bright* when you are not touching the screen, there may be a problem with your hardware.
- If the LED remains *dim* when you touch the screen, there may be a problem with your hardware.
- If the LED *continuously blinks*, this is an indication that the power-on self-test failed. A blinking status light usually indicates a problem with the controller hardware, such as a RAM error, ROM error or NOVRAM error.
- If the LED *is not lit*, power is not being supplied to the controller. If this is the case:
 - Check your power connections.
 - Check that the monitor is turned on.
 - Check that the keyboard power tap (optional) is connected.
 - Check that the power supply unit (optional) is plugged in.

Refer to the *Touch Controllers Reference Guide* for more details. Contact Technical Support for additional information.

What to do if...

Cursor does not display on screen after starting Windows

Open the Cursor tab and make sure that Cursor Visibility is enabled. Check the Windows control panel Mouse properties page to make sure that Touchscreen Hidden Cursors is not selected. This is used to hide the cursor in Windows NT systems. Refer to Chapter 2 “Touchscreen Control Panel” for more information.

Cursor does not reach out to edges of screen

Try calibrating the touchscreen. When calibrating the screen, be sure you touch the center of each target firmly and precisely.

You may also want to turn on the Edge Adjustment in the Cursor tab.

Cursor is jittery or drawing lines not straight and smooth

You need to stabilize the cursor by adjusting the controller frequency setting. Run the Stabilize Cursor option.

Any time you adjust the frequency you should test how the touchscreen is working and verify you are satisfied with the operation of the touchscreen. It is a good idea to calibrate the touchscreen again.

Cursor jumps or bounces suddenly across screen

You are most likely touching the screen in more than one spot at the same time. Be sure to point and touch with one finger only. Keep your other fingers away from the touchscreen. Don't rest your other hand on the monitor at the same time.

Drawing lines are not straight and smooth

You need to stabilize the cursor by adjusting the controller frequency setting. Run the Stabilize Cursor option.

Any time you adjust the frequency you should test how the touchscreen is working and verify you are satisfied with the operation of the touchscreen. It is a good idea to calibrate the touchscreen again.

Double-click on touchscreen doesn't work

Use the Touch Settings tab to adjust the double-click speed and area. The double-click speed defines how quickly you must touch the screen for the system to interpret your actions as a double-click. Set the double-click speed in the slow to medium range for optimum performance with a touchscreen. The tick mark on the bar indicates the default setting.

The double-click area defines the space in which you must touch the screen for the system to interpret your actions as a double-click. Set the double-click area in the medium to high range for optimum performance with a touchscreen. The tick mark on the bar indicates the default setting.

Click on the globe (Test) to test the double-click speed and area settings. If the MicroTouch Enabled logo begins to circle the globe (or stop circling), the touchscreen recognized your touch as a double-click.

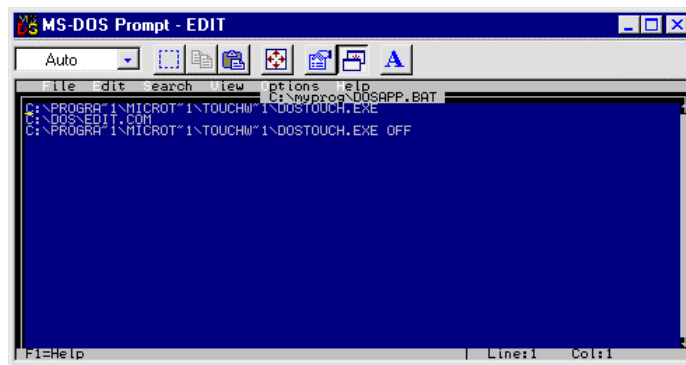
Note: Changing this setting will affect the double-click setting of the mouse.

Full screen DOS needed

To run a touch application in a full screen DOS window in Windows 95, you must run the MicroTouch DOS touchscreen driver DOSTOUCH.EXE before running your application. You can create a batch file that automatically loads the touchscreen driver and then runs your application. Full screen DOS applications are not supported in Windows NT.

Note: To run DOSTOUCH from a batch file, you must include the full path to DOSTOUCH. By default, the MicroTouch Setup program installs the DOS touchscreen driver to the following directory:
C:\Program Files\MicroTouch\TouchWare\DOSTOUCH.EXE
If you changed the directory during installation, make sure you specify the correct DOSTOUCH path.

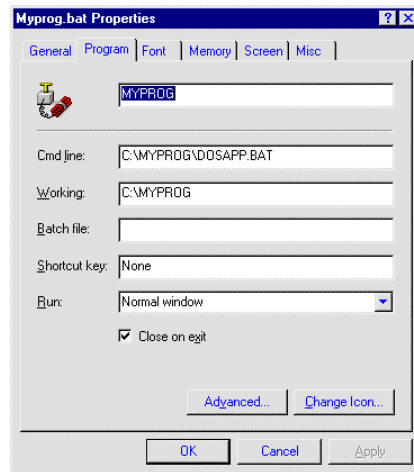
1. Create a batch file that executes your DOS application.
 - The first line of the batch file will be
c:\progra~1\microt~1\touchw~1\dostouch (or directory you installed the driver in if different).
 - The second line will be your program name including the path.
 - The third line will be c:\progra~1\microt~1\touchw~1\dostouch off (or directory you installed the driver in if different).



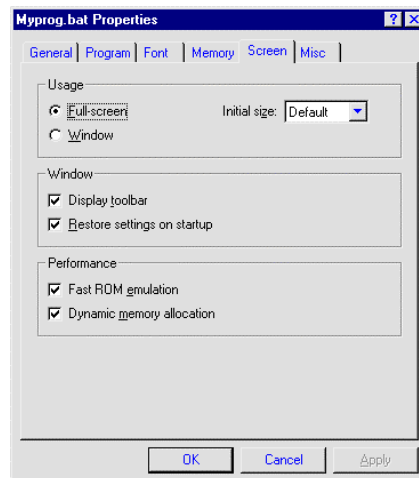
2. Create a shortcut on the desktop for the batch file. Right click on the shortcut, and go to Properties.



3. Make sure you have a check mark in the "Close on Exit" box.



4. Click on the Screen tab. Under "Usage" make sure "Full Screen" is selected.



5. Click on Apply and then click OK.

Operating two serial devices

If you have two serial devices operating together, such as a touchscreen and a mouse, be sure each device uses a unique COM port and IRQ number. For example, the mouse can use COM1/IRQ4 and the touchscreen can use COM2/IRQ3. Using the same COM port address or IRQ creates device conflicts. The touchscreen must have a unique IRQ; it cannot share an IRQ with another device.

Verify that any previously loaded hardware/software that used the same COM port as your touchscreen has been uninstalled. Just because the hardware is disconnected doesn't mean that the software isn't claiming the port. Ensure that all components are completely removed from the System files. Refer to manufacturer's documentation for additional help.

Use the Microsoft Hardware Conflict Troubleshooter (available in Windows Help) to try and resolve this problem.

Touch delayed in Windows NT

In Windows NT systems, TouchWare becomes active 10 to 15 seconds after the cursor appears when booting up your system. If touch does not become active early enough to suit your application, you can manually adjust the serial device driver startup order. These instructions are intended for use with a standard system. *If you have a custom driver for your serial ports and know which device driver controls your touchscreen COM port, you can make changes at your own discretion.*

Caution: Make an Emergency Repair Disk (ERD) prior to making any changes to your system registry. Refer to Windows NT Help for instructions on using the Repair Disk utility to make an emergency repair disk.

To manually adjust the serial device driver startup order:

1. Log in to an account with administrator privileges.
2. Click on the Start button and point to Settings.
3. Click on Control Panel.
4. Double-click on Devices. Scroll down through the list until you get to Serial. Check to ensure that the Status is Started.
5. Select Serial in the list window, then click Startup.
6. Change the Startup type from Automatic to System. Click OK.
7. Restart your system in order for this change to take effect.

Touch not working

The touchscreen is not communicating with the controller. Check the following items:

- Make sure the touchscreen controller is connected to the correct port.
- Review the installation procedures and verify all hardware is properly connected. Check the serial port and touchscreen cable connections. Check that the touchscreen and controller cables do not have any kinks and that connector pins are not bent.
- If you are using the PC Bus controller, check that the controller is firmly seated in the expansion bus slot in your computer. Check that the jumpers are properly set on the card.
- If your controller has an LED and you can see it, touch the screen to determine if the LED brightens to check for power. If the LED is flashing, refer to the touchscreen status lights for a list of possible errors.
- Reset the touchscreen and its controller. Turn off both the computer and the monitor, wait a few minutes, and then turn on each device again.
- If the touchscreen is still not communicating after checking the hardware, verify that any previously loaded hardware/software that used the same COM port as your touchscreen has been uninstalled. Just because the hardware is disconnected doesn't mean that the software isn't claiming the port. Ensure that all components are completely removed from the System files.
- If TouchWare has located the appropriate communication port, this field will contain a COM port number. If the touchscreen was not found, this field will be grayed out and the Find Touchscreen button will be active. Check to ensure that all cables are correctly fastened and click on Find Touchscreen to locate the COM port in use.

Touchscreen not found

The touchscreen is not communicating with the controller. If TouchWare does not find the touchscreen, check that the touchscreen is connected properly, and then repeat the search. Note that this option cannot search any COM ports in use by other applications.

Note: Verify that any previously loaded hardware/software that used the same COM port as your touchscreen has been uninstalled. Just because the hardware is disconnected doesn't mean that the software isn't claiming the port. Ensure that all components are completely removed from the System files.

Check the following items:

- Make sure the touchscreen controller is connected to the correct port.
- Review the installation procedures and verify all hardware is properly connected. Check the serial port and touchscreen cable connections. Check that the touchscreen and controller cables do not have any kinks and that connector pins are not bent.
- If you are using the PC Bus controller, check that the controller is firmly seated in the expansion bus slot in your computer. Check that the jumpers are properly set on the card.
- If your controller has an LED and you can see it, check the controller's LED for power on. If the LED is flashing, refer to the controller status lights for a list of possible errors.
- Reset the touchscreen and its controller. Turn off both the computer and the monitor, wait a few minutes, and then turn on each device again.
- If the touchscreen is still not communicating after checking the hardware, verify the correct COM port and baud rate, and run Find Touchscreen again.
- If TouchWare has located the appropriate communication port, this field will contain a COM port number. If the touchscreen was not found, this field will be grayed out and the Find Touchscreen button will be active. Check to ensure that all cables are correctly fastened and click on Find Touchscreen to locate the COM port in use.
- If you are trying to use COM 4, be aware that some older video chip sets incorrectly map I/O addresses. TouchWare will only work with COM ports configured, recognized, operational and supported by Windows at the time of install.

Pen controller not found

You tried to set the pen mode, and either the pen or TouchPen controller is not properly connected, or you do not have a TouchPen controller in your system. Check the following:

- If you have a pen, make sure that it is properly plugged into your monitor.
- If you have a TouchPen controller, review the installation procedures and verify all hardware is properly connected.

Error Messages

Some error messages that you might receive when using the touchscreen include the following. Anything other than “OK” or “Touchscreen not found” indicates a hardware failure. Contact MicroTouch Technical Support for more information.

- OK -- Touchscreen found and operational.
- Touchscreen Not Found – Touchscreen not found.
- A/D Error -- Touchscreen hardware error. (SMT2/TP4)
- ASIC Error -- Touchscreen hardware error. (SMT2/TP4)
- Hardware Error (HWD in USB)-- Touchscreen hardware error. (SMT3)
- NOVRAM Error (B1 and/or B2 in USB)-- Checksum error in NOVRAM, using defaults.
- PWM Error -- Touchscreen hardware error. (SMT3)
- RAM Error -- Touchscreen hardware error.
- ROM Error -- Checksum error in ROM.
- CBL Error – Cable error in USB

Windows NT Error Messages

The following error messages are specific to Windows NT systems only and will appear in the system error log:

1. **Not enough memory is available for device \Device\PointerPort0**
The driver failed to allocate non-paged memory. This is an indication of *very* low memory resources.
What to do: Configure more RAM memory. The driver does not use much memory so it is likely that some other driver is the culprit.
2. **Too many PointerPort devices are defined. Could not create device: \DosDevices\MtsTch0.**

There is a large upper limit (about 64) on the total number of pointing devices (mice, tablet, touchscreens) supported by the MicroTouch driver.

What to do: Use fewer pointing devices.

3. **Could not create DeviceMap entry for device \Device\PointerPort0**

The driver failed to make an entry in the registry that identifies the driver to the operating system. This may indicate a corrupt registry.

What to do: Use your Emergency Recovery Disk to restore the registry.

4. **Could not create symbolic link for device \Device\PointerPort0**

The driver failed to make an entry in the registry that identifies the driver to user applications (i.e., the control panel). This may indicate a corrupt registry.

What to do: Use your Emergency Recovery Disk to restore the registry.

5. **Touchscreen was not found on communications port \DosDevices\COM1 for device \Device\PointerPort0**

The indicated COM port was open correctly, but no touchscreen responded when the driver probed the serial port. This is, by far, the most common error.

What to do: Check to make sure the touchscreen is connected and powered correctly. Cycle the power on the touchscreen. Check to make sure the port number is correct. Use the Find Touchscreen button on the Touchscreen control panel.

6. **Touchscreen was found, but failed to initialize properly for device \Device\PointerPort0**

A touchscreen responded on the given serial port, but did not pass all the initialization commands at boot time.

What to do: Reboot. Cycle touchscreen power. Call technical support with touchscreen model number and TouchWare version number.

7. **An internal error occurred in communications port for device \Device\PointerPort0**

An error occurred in configuring COM port.

What to do: Check that your serial driver is working correctly.

8. **Could not set timeouts on communications port
\\DosDevices\\COM1, for touchscreen device \\Device\\PointerPort0**
An error occurred in configuring COM port.
What to do: Check that your serial driver is working correctly.
9. **Could not set baudrate on communications port
\\DosDevices\\COM1, for touchscreen device \\Device\\PointerPort0**
An error occurred in configuring COM port.
What to do: Check that your serial driver is working correctly.
10. **Could not set line control on communications port
\\DosDevices\\COM1, for touchscreen device \\Device\\PointerPort0**
An error occurred in configuring COM port.
What to do: Check that your serial driver is working correctly.
11. **Unknown operation was requested for communications port
\\DosDevices\\COM1, for touchscreen device \\Device\\PointerPort0**
A bad command was issued to the COM port driver.
What to do: Check that your serial driver is working correctly.

A p p e n d i x A

Multiple Touchscreens (Serial Controllers)

MicroTouch TouchWare can support multiple touch monitors in applications where more than one touchscreen is required in a system. This appendix describes how to:

- Set up multiple touch monitors
- Configure your system for multiple monitors
- Use multiple touch monitors

USB Note: Multiple monitor setup for USB systems is different. Please refer to Appendix B for information on USB multiple monitor situations.

Your multiple monitor configuration is a critical part of setting up your system. Before installing TouchWare, you must install the hardware and software (i.e., video and com cards) needed to support multiple monitors according to manufacturer's instructions. Refer to Windows Help for more information when adding new hardware. Typically, you will need video cards for multiple monitor connections and available communication ports for each touchscreen.

The number of *monitors* you can have is limited only by the hardware constraints of your system. Up to 4 *touchscreen monitors* can be connected at any given time.

When you set up a system with multiple touch monitors, you may need to install additional video ports. Each standard monitor or touch monitor is

connected to a separate video port. Refer to your system documentation for information about installing additional video ports.

You may also need to install additional COM ports according to manufacturer's instructions. Only specific models of COM port expansion cards are supported for multiple touchscreen operation. MicroTouch has tested and evaluated multiple monitor hardware. Call technical support for details and an updated list. Note that you cannot share ports using a "Y" adapter.

During this process, each touchscreen must be connected to a COM port in *ascending* order prior to installing TouchWare. For example, the first touchscreen is the lowest numbered available port, the second touchscreen is the next higher port, and so on.

Verify that any previously loaded hardware/software that used the same COM port as your touchscreen has been uninstalled. Just because the hardware is disconnected doesn't mean that the software isn't claiming the port. Ensure that all components are completely removed from the System files.

After you have installed and connected the necessary hardware, you must determine the multiple monitor configuration. Note that for Windows 95 and NT systems, video resolution, number of colors, and monitor size should be the same for each monitor in a multiple monitor setup.

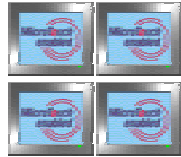
Note: Your hardware configuration should always match your software configuration.

Desktop Appearance

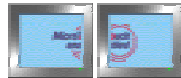
Once you have determined which configuration is appropriate to your application, you must determine how you want the information displayed. The number of monitors you can have is limited only by the hardware constraints of your system. You may have up to 4 touchscreen monitors attached at any given time. TouchWare defines two modes:

- Mirror Monitors – where each monitor displays the same image.
- Tile Monitors – where each monitor displays a portion of the same image. Windows 95 and NT require an even number of *touch monitors* (2 or 4). Windows 98 will support 2, 3, or 4 touch monitors.

Mirrored Images (rows and columns do not apply)



Tiled Images (1 row X 2 columns)



Tiled Images (2 rows X 1 column)



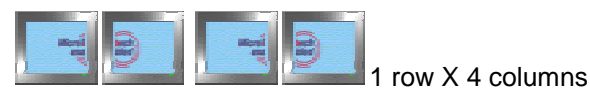
Tiled Images (2 rows X 2 columns)



Monitor Layout

When using tiled monitors, MicroTouch has defined the following scenarios. Windows 95 and NT require an even number of *touch monitors* (2 or 4). Windows 98 will support 2, 3, or 4 touch monitors.

If you choose tiled, possible horizontal configurations are as follows:



If you choose tiled, possible vertical configurations are as follows:

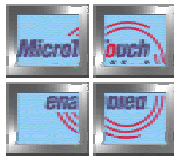


2 rows X 1 column



4 rows X 1 column

You may also set up a stacked configuration consisting of 4 touch monitors in the following pattern:



2 rows X 2 columns

Installing TouchWare for Multiple Monitors

Make sure all touchscreen monitors are connected and operational prior to installing TouchWare software. This does *not* apply to USB systems – refer to Appendix B for information on installing software for USB systems. The install program will search for available COM ports and touchscreens and configure only the number of touch monitors found during installation.

Note: If the setup program fails to find all your touchscreens, check the connections, reboot your system, and try loading software again.

To install TouchWare for Multiple Monitors:

1. Follow the general instructions to begin the software installation.

Note: If you have previously loaded TouchWare, you must completely uninstall the software and reboot your system prior to reinstalling.

2. On the Select Installation Type screen, select Custom Install for one or more touchscreens. Click Next.
3. On the Default Calibration Type screen, select the Default Calibration format for your system: either 2-point or 5-point. Click Next.
4. On the Select Number of Touchscreens screen, select Multiple touchscreens. Click Next.
5. Multiple Touchscreen Search should produce details on *all touchscreens active and connected* to your system. If the install program fails to find all your touchscreens, check the connections, reboot your system and try loading the software again.
6. On the Select Destination Location screen you can choose to install to a different directory. For multiple monitor setup, we recommend you accept defaults.
7. On the Multiple Touchscreen Configuration screen, you have the option to select a Desktop Appearance of mirrored or tiled. (Refer to the following sections for more information.) This should match the setup determined by your hardware configuration to support multiple monitors.
8. If you choose tiled, Windows 95 and NT require an even number of *touch monitors* (2 or 4). Windows 98 will support 2, 3, or 4 touch monitors. You then have the additional choice of monitor layout.
9. To help you determine your best configuration, refer to “Desktop Appearance” and “Monitor Layout” earlier in this appendix.

Be sure to match your previous selections for monitor display properties. For Windows 95 and NT systems, identical display video modes, colors and sizes are assumed for multiple touchscreen operation (for example, all monitors are 17 inch displays set for 800x600, 256 colors).

Remember that once you have installed TouchWare for Multiple Monitors the number of the selected touchscreen appears in the title bar of the Control Panel positioned on the selected touchscreen. You can touch a monitor and determine if the screen is working as you expected. Test each screen and confirm that you have connected them correctly. Reconnect as needed. Don't forget that you need to calibrate each screen.

Click Mode

Multiple touchscreens default to a single touch mode called Click. The Touch Mode selection buttons on the Control Panel Touchscreen Property sheet are disabled. Click mode provides button operation only. The touchscreen sends a button-down, followed by a button-up to the operating system. No drawing or dragging is supported in multiple screen installations. Use the Advanced Touchscreen Settings dialog to enable additional touch modes.

Setting TouchWare Preferences for Each Touchscreen

Once you have set up the system to your liking, configure each touchscreen.

1. Open the TouchWare Control Panel.
2. Select the touchscreen you want to focus on from the Select Touchscreen dialog box.
3. Calibrate each touchscreen.
4. Set other preferences. Define global settings and individual settings. Each monitor can have certain individual preferences such as: Calibration, Stabilize Cursor, Touch Sounds, Cursor Vertical Offset, Edge Adjustment, TouchPen Mode, Communication port and baud rate. Other preferences apply to all touchscreens.

Changing Your Multiple Touchscreen Configuration

The user must uninstall, then reinstall TouchWare to change multiple-monitor configurations (COM ports, number of monitors, row/column settings, etc.). Some things to remember are:

- If you add or remove a touchscreen monitor, you must reconfigure your system. You must reinstall the TouchWare software.
- Be sure to select Custom install.
- Be sure to define Desktop appearance to match Monitor Layout.

A p p e n d i x B

USB Multiple Touchscreens

TouchWare supports systems with more than one USB touchscreen. Depending on your specific application, you can configure as many as four monitors in a touch system. Additionally, your system can have any combination of touch monitors and standard (non-touch) monitors. For example, a system might have a total of four monitors, three of which have touchscreens.

The basic steps in setting up a system having multiple USB touchscreens are as follows:

- Connect each monitor to a unique video port in the computer
- Connect each touchscreen to a USB port
- Configure the monitors in the Windows Control Panel
- Map each touchscreen to its associated monitor
- Calibrate each touchscreen

System Requirements for Multiple USB Touchscreens

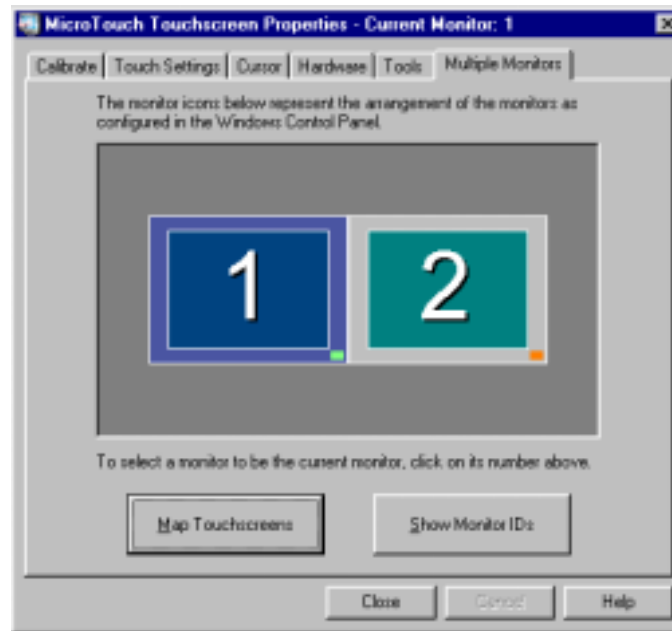
To configure a system with multiple USB touchscreens the following items are required:

1. A video card (or video port) for each monitor
Each monitor must be connected to a unique video card or port in the computer. The video card must support Windows 98 for multiple monitor configurations. Microsoft maintains a list of video adapters approved for multiple screen use in Windows 98 on its web site.

2. A USB port connection for each touchscreen
Each touchscreen must be connected to a USB port capable of supplying power to the touchscreen. USB hubs meeting this requirement are supported.

You can configure your system with up to a maximum of four touchscreens. Any combination of touch monitors and standard (non-touch) monitors is supported.

Connecting Multiple USB Touchscreens



Connect each monitor to a unique video card (adapter) or port. You may have to install additional video cards into your system. Consult your system documentation for information on installing additional hardware.

Each video card must be capable of operating in multiple monitor configurations. Not all video cards meet this requirement. Microsoft maintains a list of video adapters approved for multiple screen use in Windows 98 on its web site.

To connect multiple monitors:

1. Shut down your system.

2. Install additional video cards if required.
3. Connect the video input of each monitor to a video port in your system.
4. Apply power to your system and monitors. Windows detects the new video adapters and installs the appropriate drivers.
5. Verify that there are no error messages displayed.

Connect each touchscreen to a USB port. A standard computer system has two USB ports available. If you are configuring a system having more than two touchscreens, you must provide additional USB ports with a hub. Each USB port must meet the standard USB specifications for low powered devices. The touchscreens receive their power from the USB connection.

To connect multiple touchscreens:

1. Connect a touchscreen cable to any available USB port in your system. Your system will beep, indicating that it has detected the touchscreen. If you do not hear a beep, you should re-install TouchWare. Refer to Chapter 1 for additional information.
2. Connect the next touchscreen cable to any available USB port. Again, your system will beep.
3. Repeat step 2 until all your touchscreens are connected.

Note: The first touchscreen you connect to a USB port is designated the default touchscreen by TouchWare.

Configuring Multiple Monitors in Windows

You must configure the monitors in the Windows Control Panel before you can map the touchscreens. Windows controls the video display of each monitor. Refer to Windows online help for information on configuring multiple monitors.

To configure multiple monitors in Windows:

1. Open the Display Properties dialog box in the Windows Control Panel.
2. Select the Settings tab.
3. Position the monitor icons according to the physical arrangement of the monitors. You can identify a monitor by clicking on the monitor icon

and selecting Identify on the pop up menu. A large number appears on the corresponding monitor. Drag the icon to its new position.

Enable each monitor by making it part of the active desktop. You can also right-click on a monitor icon and select Enable from the pop up menu. Refer to your Windows documentation for information on enabling multiple monitors.

The primary monitor¹ displays the desktop and task bar. If you want to change the primary monitor, you must shut down your system and connect the desired monitor to the primary video adapter.

Mapping Multiple USB Touchscreens

After you have configured the monitors in the Windows Control Panel, you must map each touchscreen. Mapping is the process of identifying each monitor with its associated touchscreen. Once you have mapped the touchscreens, TouchWare can reference any touchscreen and monitor in your system.

To map multiple touchscreens:

1. Open the Multiple Monitors Tab.
2. Follow the directions displayed on the screen. If a message dialog box is not displayed, click Map Touchscreens.

Map each touchscreen in your system by touching the ID number displayed on each monitor. If a monitor does not have a touchscreen, press the ESC key, or wait ten seconds for the mapping process to automatically continue.

Notes:

1. The Multiple Monitors tab is only displayed when multiple USB touchscreens are installed in your system.
 2. The monitor icons displayed on the Multiple Monitors tab correspond to the monitor configuration you specified in the Windows Control Panel.
-

¹ The monitor connected to the primary video adapter in your system. When you install multiple video adapters in your computer, one adapter is designated the primary by your computer.

Selecting the Current Touchscreen

In multiple monitor configurations, the Touchscreen Properties are applied to the *current* touchscreen. You select a touchscreen to be the current touchscreen by selecting a monitor icon on the Multiple Monitors tab.

To select a touchscreen to be the current touchscreen:

1. Open the Multiple Monitors tab.
2. Click on the monitor icon corresponding to the touchscreen that you want to become the current touchscreen. To identify the monitors, click Show Monitor IDs. The monitor ID numbers are displayed on all monitors simultaneously.

The monitor icon is highlighted indicating it is the current monitor. The current monitor ID is also displayed in the title bar of the Touchscreen Properties dialog box. The touchscreen mapped to this monitor is the current touchscreen.

Notes:

1. You can apply different properties to each touchscreen. The exceptions are the double-click and the cursor visibility. Any changes you make to double-click speed and area are applied simultaneously to every touchscreen and mouse in your system. Any change you make to the cursor visibility is applied simultaneously to every monitor in your system.
 2. Monitors with touchscreens are indicated by a small green square located at the bottom right of each monitor icon. Monitors without a touchscreen display a small orange square.
-

A touchscreen remains the current touchscreen unless you select a different one or close the Touchscreen Properties dialog box. When the Touchscreen Properties dialog box is opened, the current touchscreen is always the default touchscreen¹.

¹ The first touchscreen you connect to a USB port in your system. You can change the default by unplugging and reconnecting all of your touchscreens. The first touchscreen you connect to a USB port is designated the default touchscreen.

A p p e n d i x C

Miscellaneous Information

This appendix contains information on:

- Touchscreen driver settings
- Direct access to calibration
- MousePort controller
- TouchWare system files
- Touchscreen care and cleaning

Touchscreen Driver Settings

You can define settings for the touchscreen using the Touchscreen control panel. TouchWare stores the touchscreen settings in the Windows registry.

Whenever you save your changes to the Touchscreen control panel, TouchWare records the new settings in the System Registry. These changes take effect immediately.

Direct Access to Calibration

You can directly access calibration without opening the Touchscreen control panel. The Windows calibration program is **MTSCAL.EXE**.

The program has a **/C** option that makes only the calibration screen available on execution. When you specify the **/C** option, the program immediately opens the calibration screen, and terminates when the calibration process is completed. This option is useful if you want to prevent users from changing other settings in the control panel.

Other options available with this command are:

- **/c2** – for 2-point calibration
- **/c5** – for 5-point calibration
- **/e** – to enable touch
- **/d** – to disable touch
- **/n=? (1—4)** to determine which touchscreen to calibrate in a multiple touchscreen setup

To set up a shortcut to the Touchscreen calibration program using any of these options:

1. Click on Start → Programs → Windows Explorer.
2. Click on Tools → Find → Files or Folders.
3. In the Named box, type **MTSCAL.EXE** and press Enter to begin the search.
4. Select **MTSCAL.EXE** in the list window.
5. Click on File → Create Shortcut. The system automatically creates a shortcut. Drag the shortcut icon onto the desktop.
6. Right-click on the shortcut and then click Properties.
7. Edit the information in the target box to include the **/C** option for the #2 monitor. For example:

`"C:\Program Files\MicroTouch\TouchWare\MtsCal.exe" /C /n=2`

MousePort Touchscreen Controller Overview

The MousePort touchscreen controller is a PS/2-compatible controller. The enclosed controller is externally mounted to the back of your monitor.

The controller cable has a 6-pin DIN male connector. You plug this cable into the PS/2 mouse connector on the back of your PC.

If you are using MicroTouch touchscreen technology, the MousePort controller offers an alternative plug solution. If you do not need a mouse in your system, you can take advantage of the mouse port for the touchscreen. You can then use the serial ports and bus slots for other peripheral devices.

System Requirements for the MousePort Controller

The hardware and software requirements for using a MousePort touchscreen controller are as follows:

- PC with an available PS/2 mouse port connector
- Microsoft Windows 9X or Windows NT 4.0

Connecting a MousePort Touchscreen Controller

The MousePort touchscreen controller is mounted to the back of your touch monitor. The controller has an attached PS/2 communication cable with a 6-pin DIN male connector.

- To connect a MousePort controller, plug the controller cable into the PS/2 mouse connector on the back of your PC.

Supplying Power to the MousePort Controller

The mouse connector on the back of your computer cannot supply enough power to the touchscreen controller. Therefore, power to the MousePort controller must be supplied from a source inside the monitor.

Note: The connector on the end of the MousePort controller cable does not have a built-in power plug. You cannot use an external power supply or a keyboard power tap to power the MousePort controller.

Testing the MousePort Controller

To verify and test that the MousePort controller is operating properly, you can use the Microcal Diagnostic utility.

Note: Remember that a MousePort touchscreen controller does not connect to a serial port. Therefore, you cannot use standard communication programs (for example, ProComm, Telex, or Windows Terminal) to verify that the MousePort controller is operating properly.

Installing TouchWare for the MousePort Controller

Caution: If you are not familiar with the operation of mouse drivers, *do not attempt to install the MousePort controller*. Installing TouchWare for MousePort controllers may alter the performance of your touchscreen or render it inoperable.

To correctly install the MousePort software, you must be sure of the following:

- If a mouse will be used in addition to the touchscreen, the operating system must be functional with a serial mouse connected.
- The installation will add a virtual COM port at COM9. Make sure the system is not currently using COM9.

Note for Microsoft Intellipoint users: Installing TouchWare will disable the wheel functionality on PS/2 mice.

Note for Kensington Mouseworks users: Installing TouchWare will disable the special functions of Kensington PS/2 mice.

Follow the procedure outlined in Chapter 1 to install TouchWare for MousePort controllers.

Touchscreen Files

Table 3 TouchWare System Files

	Serial			MousePort			USB
File Names	Win95	Win98	WinNT4	Win95	Win98	WinNT4	Win98
MtsTch0.vxd	Y	Y		Y	Y		
MtsTch1.vxd	Y	Y		Y	Y		
MtsTch2.vxd	Y	Y		Y	Y		
MtsTch3.vxd	Y	Y		Y	Y		
TouchMgr.vxd	Y	Y		Y	Y		
MtsTch.sys			Y			Y	
MtsPS2.vxd				Y	Y		
MtsPS2.inf				Y	Y		
mtsi8042.sys						Y	
MtsUsb1.vxd							Y
MtsUsb1.inf							Y
MtsTouch.cpl	Y	Y	Y	Y	Y	Y	Y
MtsTsMon.exe	Y	Y	Y	Y	Y	Y	Y
MtsCal.exe	Y	Y	Y	Y	Y	Y	Y
MtsApiLt.dll	Y	Y	Y	Y	Y	Y	Y
MtsResrc.dll	Y	Y	Y	Y	Y	Y	Y
MtsUtils.dll	Y	Y	Y	Y	Y	Y	Y
MtsFreq.dll	Y	Y	Y	Y	Y	Y	
MtsTG.dll	Y	Y	Y				
MtsTG.cfg	Y	Y	Y				
MtsRegs.dll							Y
MtsUsbIo.dll							Y

Table 3 TouchWare System Files (continued)

File Names	Serial			MousePort			USB
	Win95	Win98	WinNT4	Win95	Win98	WinNT4	Win98
MtsUsbUI.dll							Y
CleanUp.exe	Y	Y	Y	Y	Y	Y	Y
CleanUp.dat	Y	Y	Y	Y	Y	Y	Y
P2CleanUp.dat				Y	Y	Y	
P2CleanUp.log				Y	Y	Y	
Upgrade.log	Y	Y	Y	Y	Y	Y	Y
UnInst.dll	Y	Y	Y	Y	Y	Y	Y
MtsHlpID.exe	Y	Y	Y	Y	Y	Y	Y
MtsHelp.hlp	Y	Y	Y	Y	Y	Y	Y
MtsHelp.cnt	Y	Y	Y	Y	Y	Y	Y
MtsHelp.gid	Y	Y	Y	Y	Y	Y	Y
Readme.txt	Y	Y	Y	Y	Y	Y	Y
Support.txt	Y	Y	Y	Y	Y	Y	Y
ReadMe.ico	Y	Y	Y	Y	Y	Y	Y
desktop.ico	Y	Y	Y	Y	Y	Y	Y
blank.cur	Y	Y	Y	Y	Y	Y	Y
UsbUtils.exe						Y	
MicroCal.exe	Y	Y	Y	Y	Y	Y	
MtsFont.bin	Y	Y	Y	Y	Y	Y	
dostouch.exe	Y	Y	Y	Y	Y	Y	
dostouch.ini	Y	Y	Y	Y	Y	Y	
dostouch.ovl	Y	Y	Y	Y	Y	Y	
freqdos.exe	Y	Y	Y	Y	Y	Y	
freq.exe	Y	Y	Y	Y	Y	Y	

Table 3 TouchWare System Files (continued)

File Names	Serial			MousePort			USB
	Win95	Win98	WinNT4	Win95	Win98	WinNT4	Win98
mfc42.dll*	Y	Y	Y	Y	Y	Y	Y
msvcrt.dll*	Y	Y	Y	Y	Y	Y	Y
oleaut32.dll*	Y	Y	Y	Y	Y	Y	Y
atl.dll*	Y	Y	Y	Y	Y	Y	Y
comctl32.dll*	Y	Y	Y	Y	Y	Y	Y

* Only installed if new version

Touchscreen Care and Cleaning

The touchscreen does not require much maintenance.

MicroTouch does, however, recommend that you periodically clean the glass touchscreen surface.

- Use isopropyl alcohol or a non-abrasive glass cleaner. Avoid using cleaners other than glass cleaners. Do not use any vinegar-based solutions.
- Apply the cleaner with a soft cloth. Avoid using gritty cloths.
- Always dampen the cloth and then clean the screen.

Always handle the touchscreen with care. Do not pull on or stress cables.

Index

A

About TouchWare 36
Auto Frequency 54

B

Before You Call Tech Support 62
Button Mode 24, 44

C

Calibrate 22, 63
Calibrate Tab
 Calibration Overview 20
 Testing the Calibration 22
 When to Calibrate the Touchscreen
 21
Calibrating the Touchscreen 20
calibration
 2-point calibration 36, 47, 86
 5-point calibration 36, 47, 86
 direct access 86
Calibration Reminder 48
calibration style 21, 47
 2-point calibration 21
 5-point calibration 21
Calibration Verification 48

Changing Your Multiple Touchscreen
 Configuration 78
cleaning the touchscreen 91
Click Mode 44, 45, 78
Color Bars 39
Color Purity 39, 40
Color Table 40
COM port 74
Communication Port 35
control panel 20
Control Panel 36
controller frequency, adjusting 55
Controller Type 33
corporate headquarters 9
current touchscreen 83
Cursor Jitter 29
Cursor Stabilization Procedure 29
Cursor Tab
 Cursor Vertical Offset 27
 Cursor Visibility 27
 Edge Adjustment 28
 Stabilize Cursor 28
Cursor Vertical Offset 27
Cursor Visibility 27
Custom Install 77
Custom Touch Mode 42, 44
Custom Touch Sound 42, 46

D

- Defaults 36
- Desktop Appearance 74
- Diagnostics, ThruGlass 52
- Direct Access to Calibration 86
- Disable Touch 47
- DOS
 - full screen 65
- Double-click Area 25
- Double-click Speed 25, 26
- Draw 38
- Draw and Test 32
- Drawing Mode 24
- Driver 36

E

- Edge Adjustment 28
- Edge Button 28
- Error Messages 70

F

- Find Touchscreen 35
- Finger Only Mode 32
- Firmware Commands 38
- firmware commands, ThruGlass 57, 88
- Firmware Version 34
- Frequency 29, 32
- Full Screen DOS Needed 65

H

- headquarters, corporate 9

I

- installing TouchWare 13

- Installing TouchWare for Multiple Monitors 76

J

- Jittery Cursor 29

L

- LEDs 62
- Liftoff Mode 44, 45
- Linearization 37, 40, 48

M

- Mapping 82
- Mirror Monitors 74
- monitor icon 83
- Monitor Layout 75
- MousePort 87
- Multiple Touchscreen Monitors 73

N

- Noise Filter 48
- Noise Level 53

O

- Operating System 36

P

- Pen and Finger Mode 31
- Pen Only Mode 32
- Pen Tab
 - Draw and Test 32
 - Finger Only Mode 32
 - Pen and Finger Mode 31
 - Pen Only Mode 32

Stabilize Cursor for Finger and
TouchPen 32

R

ReadMe file 13
registry 85
Restore Defaults 36
Right-click Tool 25

S

Select Baud Rate 36
Sensitivity, ThruGlass 52
Setting TouchWare Preferences for Each
Touchscreen 78
Setting Vertical Offset 27
Show Base 53
Show Depth 54
Show Monitor IDs 83
silent install 14
 from hard drive 16
 with diskettes 15
Single Touchscreen Configuration 42
Single Touchscreen option 43
Site Defaults 42, 45
Software Settings 48
Splash Screen 48
Stabilize Cursor 28
Stabilize Cursor for Finger and
TouchPen 32

T

Terminal 38
Testing the Calibration 22
Testing the Monitor Video 39
ThruGlass 30, 36, 49, 50
 calibration 55

 diagnostics 52
 Screen Type 49, 50
 sensitivity 52
 troubleshooting 56
Tile Monitors 74
Touch Mode 24
 Button Mode 24
 Desktop Mode 24
 Drawing Mode 24
Touch Modes 24, 44, 48
Touch Orientation 47
Touch Sensitivity 47
Touch Settings Tab
 Double-click Area 25
 Double-click Speed 25
 Right-click Tool 25
 Touch Sounds 25
Touch Sounds 25
Touchdown Mode 44, 45
touchscreen
 cleaning the 91
Touchscreen Calibration 20
touchscreen drivers 12
Touchscreen Linearization 40
Touchscreen Options 42
Touchscreen Status 34
Touchscreen Status Lights 62
 Blinking LED 63
 Bright LED 63
TouchWare
 installing 13
 Uninstalling 17
TouchWare Information 36
troubleshooting 61

U

Uninstall utility 12
USB touchscreen 79

V

- Vertical Offset 27
- Video Diagnostic Tools 48
- video resolution, adjusting 56

W

- What to do if...
 - Cursor does not appear after starting Windows 95 63
 - Cursor does not reach out to edges of screen 63
 - Cursor is jittery 64
 - Cursor jumps or bounces suddenly across the screen 64
 - Double-click doesn't work 64
 - Drawing lines are not straight and smooth 64
 - Operating two serial devices 66
 - Touch is not working 68
 - Touchscreen not found 68
- When to Calibrate the Touchscreen 21
- When to Stabilize the Cursor 28
- worldwide offices 9