TouchWare

User's Guide

MicroTouch®

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TouchWare, Version 3.4
- Windows Touchscreen Driver, Version 3.4
- DOS Touchscreen Driver, Version 3.5
- Microcal Diagnostic Utility, Version 6.1

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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 gaming, 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 Touchscreen control panel and the ThruGlass control panel to customize your working environment for a touchscreen
- Use the Pen Configuration utility to set the pen mode (if you are using a TouchPen controller)
- Use the Microcal Diagnostic utility to test the operation of the touchscreen

This manual assumes you already connected your MicroTouch touchscreen to your computer. You are now ready to install TouchWare and experience the power of touch.

What You Need to Know

This document assumes you have basic computer skills. You should know how to use the mouse and keyboard, choose commands from menus, open and run application programs, and save files.

If you need to learn more about these tasks, refer to the manuals and diskettes that came with your PC.

MicroTouch Support Services

MicroTouch provides extensive support services through our technical support organization, web site, and bulletin board system (BBS).

MicroTouch Technical Support

Technical Support is available as follows:

- 24 hours a day, Monday through Friday (excluding holidays)
- 9:00 a.m. to 5:00 p.m. Eastern Standard Time, Saturday and 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

You can contact MicroTouch Technical Support by calling the hot line, sending a fax, or sending electronic mail.

- 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

You can visit the MicroTouch web site at the following address:

http://www.microtouch.com

You can download MicroTouch touchscreen software and drivers, obtain regularly updated technical information on MicroTouch products, and learn more about our company.

MicroTouch Bulletin Board System

MicroTouch also has a Bulletin Board System (BBS) that you can access 24 hours a day, 7 days a week. You can use the BBS to download updates of the latest drivers and obtain regularly updated technical information on MicroTouch products.

You can reach the MicroTouch BBS at the following numbers:

- 978-659-9250
- 978-683-0358

To connect to the BBS, you need standard communication software and a modem that supports 2400, 4800, 9600, 14400, or 28800 baud. Additionally, the communication parameters must be set as follows:

No parity, 8 data bits, and 1 stop bit (N81)

Once you establish a modem connection with the BBS, the system prompts you to log in using your name. You can register with MicroTouch the first time you log in to the BBS. The menu of available options is self-explanatory.

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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 Windows 95, Windows 3.1, or DOS.

This chapter explains how to install TouchWare. You have the following options:

- Run the Setup program from Windows 95 to install the touchscreen files for both Windows 95 and DOS
- Run the Setup program from Windows 3.1 to install the touchscreen files for both Windows 3.1 and DOS
- Run the Install program from DOS to load only the touchscreen files for DOS

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

What Is TouchWare?

Your touch product includes several software tools to help you work with and customize the touchscreen or pen. 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, Windows 3.1, and DOS)
- Touchscreen control panels (Windows and DOS)
- ThruGlass control panels (Windows and DOS)
- Pen Configuration utilities (Windows and DOS)
- Microcal Diagnostic utility (DOS only)
- Online help
- TouchWare Uninstall utility

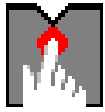
Touchscreen Drivers

TouchWare includes touchscreen drivers for Windows 95, Windows 3.1, and DOS. The driver is the software that the system uses to communicate with the touchscreen.

The Windows touchscreen drivers enable you to use the MicroTouch touchscreen with applications running in the Windows environment. You can run Windows programs and use touch (finger or pen) input without any program modifications.

The DOS touchscreen driver is a mouse emulator. It enables DOS applications that support a standard Microsoft mouse to use a touchscreen as an alternative (or complimentary) input device. You can install the DOS touchscreen driver separately or you can install it with the Windows touchscreen driver.

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 beep when you touch the screen
- How fast you need to tap to produce a double-click

You can also use the Touchscreen control panel to calibrate the touchscreen, change the controller frequency, and define whether to display the cursor in your touch application. If you display the cursor, you can define where the cursor appears relative to your touch (an offset).

TouchWare has a Touchscreen control panel for Windows and DOS. For more information on these control panels, refer to Chapter 2.

ThruGlass Control Panel

If you have a ThruGlass Touchscreen, use the ThruGlass control panel to complete the following tasks:

- Specify the type of ThruGlass touchscreen
- Adjust the touchscreen controller frequency and sensitivity
- Calibrate the ThruGlass touchscreen
- Test the operation of the ThruGlass touchscreen
- Access terminal mode and enter firmware commands

TouchWare has a ThruGlass control panel for Windows and DOS. For more information on these control panels, refer to Chapter 3.

Pen Configuration Utility

The Pen Configuration utility lets you specify the input device you want to use with the touchscreen. You can use the MicroTouch pen, your finger, or both. You only need to use this utility if your touchscreen uses a TouchPen controller.

TouchWare has a Pen Configuration utility for Windows and DOS. For more information on this utility, refer to Chapter 4.

Microcal Diagnostic Utility

Microcal is a DOS-based diagnostic utility you can use to verify the operation of the touchscreen and pen.

Microcal is very useful for determining whether the touchscreen is connected. If the touchscreen is connected properly, Microcal will report the COM port, IRQ, and baud rate that the touchscreen controller is using.

You can also use Microcal to calibrate the touchscreen, change the baud rate, open a Draw program to test the touchscreen and pen, or use the terminal emulator to enter firmware commands. For more information on Microcal, refer to Chapter 5.

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.

For more information, refer to “Uninstalling TouchWare” later in this chapter.

Checking the ReadMe File

The TouchWare diskette includes a ReadMe file, which contains product summary information and enhancement information.

Before you install the TouchWare software, check the ReadMe file for any last minute changes and updates.

▶ To view the ReadMe file from Windows 95:

1. Insert the TouchWare Disk 1 into a diskette drive.
2. Click the Start button and then click Run. In the Open box, type the following command:

   A:\README.TXT (or **B:\README.TXT**, depending on your drive)
3. Select OK to display the document. Use the scroll bar and arrow keys to display the next and previous pages.

To output the ReadMe file to your printer, open the File menu and choose Print. To close the file and exit from the application, open the File menu and choose Exit.

▶ To view the ReadMe file from Windows 3.1:

1. Insert the TouchWare Disk 1 into a diskette drive.
2. Access the Windows Program Manager.

3. Open the File menu and choose Run. In the Command Line box, type the following command:

   A:\README.TXT (or **B:\README.TXT**, depending on your drive)

4. Select OK to display the document. Use the scroll bar and arrow keys to display the next and previous pages.

To output the ReadMe file to your printer, open the File menu and choose Print. To close the file and exit from the application, open the File menu and choose Exit.

▶ To view the ReadMe file from DOS:

1. Insert the TouchWare Disk 1 into a diskette drive.
2. Access the DOS prompt.
3. Type the following command:

   TYPE *drive-designator***:\README.TXT | MORE**

   where *drive-designator* is the letter that represents the diskette drive you are currently using. For example, use A: if you are using Drive A.

4. Press Enter to display the document. Continue to press Enter to display the next screen of information.

Installing TouchWare for Windows and DOS

When you install TouchWare 3.4, you have two installation options:

- Express
- Custom

The Express option installs all TouchWare files for both Windows and DOS (less than 2MB total), and automatically places the files in the MTS\TOUCH directory. The Express option creates a folder or program group, called MicroTouch TouchWare, with icons for each TouchWare program.

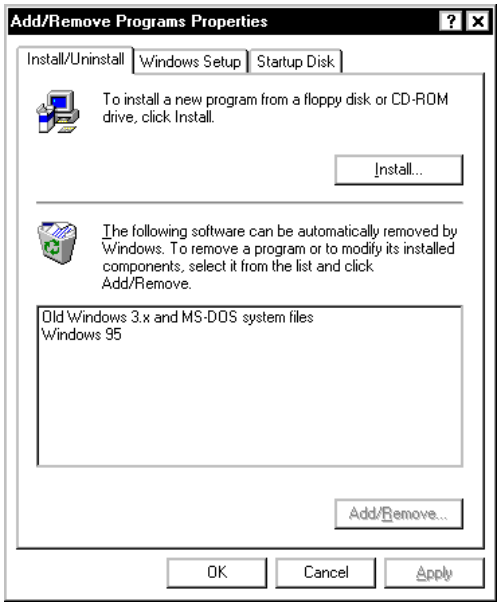
The Custom option also installs all TouchWare files for both Windows and DOS (less than 2MB total). However, you can specify the destination directory for the TouchWare files and the name of the folder or program group for the TouchWare programs.

Installing TouchWare from Windows 95

▶ To install TouchWare from Windows 95:

1. Make sure the touchscreen is connected. If not, the Setup program cannot properly configure the touchscreen.
2. Start Windows. Make sure no other applications are open.
3. Insert the TouchWare Disk 1 into a diskette drive.
4. Click the Start button on the taskbar.
5. Point to Settings, and then click Control Panel.

6. Double-click Add/Remove Programs to open the following dialog box:



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

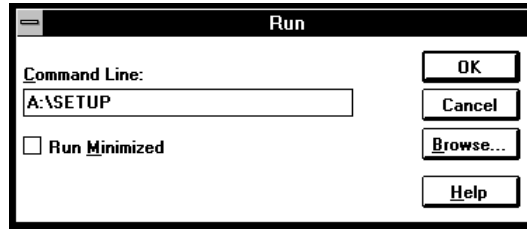
Note: Remember to calibrate the touchscreen after loading the software to ensure optimal performance. Refer to "Calibrating the Touchscreen" in Chapter 2.

Installing TouchWare from Windows 3.1

▶ To install TouchWare from Windows 3.1:

1. Make sure the touchscreen is connected. If not, the Setup program cannot properly configure the touchscreen.
2. Start Windows. Make sure no other applications are open.
3. Insert the TouchWare Disk 1 into a diskette drive.
4. Access the Program Manager.
5. Open the File menu and choose Run. In the Command Line box, type the following command:

   A:\SETUP (or **B:\SETUP,** depending on your diskette drive)



6. Select OK. The Setup program begins to execute and load the TouchWare files.
7. Follow the instructions displayed on the screen. Make your selections carefully when answering questions to complete the installation.

Note: Remember to calibrate the touchscreen after loading the software to ensure optimal performance. Refer to "Calibrating the Touchscreen" in Chapter 2.

Installing TouchWare for DOS Only

Skip this section if you have already run Setup. TouchWare includes 2 diskettes -- only the second diskette is used during a DOS only installation. Note that you run an Install program rather than a Setup program from DOS.

When you install TouchWare from DOS, the Install program only loads the touchscreen files specific to DOS. The installation includes the following files:

- Touchscreen driver for DOS
- Touchscreen control panel for DOS
- Pen Configuration utility for DOS
- Microcal Diagnostic utility
- ThruGlass control panel for DOS
- DOS help files

If you do not plan to use any of the touchscreen files for Windows, you may want to install just the DOS touchscreen files.

▶ To install TouchWare for DOS only:

1. Make sure the touchscreen is connected. If not, the Install program cannot properly configure the touchscreen.
2. Close all applications and exit from Windows.
3. Insert the TouchWare Disk 2 into a diskette drive.
4. Access the DOS command line prompt.
5. Change to the drive that has the TouchWare diskette. For example, enter **A:** if you inserted the TouchWare diskette in Drive A.
6. Type **INSTALL** followed by the source disk drive, the destination drive, and the destination directory.

For example, the following command copies the files from Drive A (source drive) to Drive C (destination drive) and the \MTS\TOUCH directory:

INSTALL A: C:\MTS\TOUCH

7. Press Enter. The system reports that it is about to copy the DOS touchscreen files and prompts for confirmation that you want to continue.

8. Press **C** to start the installation.

   - First, the Install program copies all DOS touchscreen files from the TouchWare diskette to the specified destination drive and directory.
   - Next, the Install program automatically searches through the system and configures the touchscreen to the proper COM port, interrupt, and communication rate.
   - Finally, the Install program prompts if you want it to automatically modify your AUTOEXEC.BAT file.

     If you let the Install program modify your AUTOEXEC.BAT file, the system automatically loads the DOS touchscreen driver whenever you start your computer.

     If you do not let the Install program modify the AUTOEXEC.BAT file, you must load the DOS touchscreen driver before using a DOS touch application. For more information, refer to “Loading the DOS Touchscreen Driver” later in this chapter.

Note: Remember to calibrate the touchscreen after loading the software to ensure optimal performance. Refer to “Calibrating the Touchscreen” in Chapter 2.

Loading the DOS Touchscreen Driver

After you install the files for the DOS touchscreen driver, you must load the driver before you can run a DOS touch application or open the DOS Touchscreen control panel.

You can run the DOS touchscreen driver from a full-screen DOS session within Windows. However, the Windows touchscreen driver cannot be running. Error message reads: "Windows x.x is running in 386 Enhanced mode. Device not found."

This means either the Windows Touchscreen driver is loaded or the COM port/IRQ designations are incorrect.

You can manually load the DOS touchscreen driver when needed, or you can let the system automatically load the driver when you start up your computer.

▶ To manually load the DOS touchscreen driver:

1. Close all applications and exit from Windows.
2. Access the DOS command line prompt.
3. Use the Change Directory (cd) command to switch to the directory that has the DOS touch driver files. By default, the Install program loads TouchWare into the C:\MTS\TOUCH directory.
4. Type **DOSTOUCH** and then press Enter. The system displays a message that the driver is now installed. For example:

```
MicroTouch Mouse Emulator – Version x.x
Copyright © 1990-1997 MicroTouch Systems, Inc.
Driver installed
```

▶ To automatically load the DOS touchscreen driver when you start up your computer, add the following line to your AUTOEXEC.BAT file:

drive-designator:*directory***DOSTOUCH**

where *drive-designator* and *directory* define the location (disk and path) of the files for the DOS touchscreen driver. For example:

C:\MTS\TOUCH\DOSTOUCH

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.INI, WIN.INI, and system registry files.

Note: The touchscreen remains active until you reboot the system. This means that the COM port and IRQ designated by the touchscreen controller and driver are still in use until you restart the system.

During the software installation, TouchWare creates a DEISL1.ISU log file. This file contains the instructions necessary to uninstall TouchWare. Do not delete the DEISL1.ISU file. The program cannot uninstall TouchWare if the log file is deleted.

Once the Uninstall is complete, you must restart your system because the touchscreen driver is still loaded in memory and controlling the COM port and IRQ. The touchscreen is still active until you reboot.

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." Go to the MTS/Touch folder and remove any remaining files.

▶ To uninstall TouchWare from Windows 95:

1. Start Windows.
2. Click the Start button on the taskbar.
3. Point to Programs, and then point to MicroTouch TouchWare.
4. Click on TouchWare Uninstall. The Uninstall program begins.
5. Follow the instructions displayed on the screen.

▶ To uninstall TouchWare from Windows 3.1:

1. Start Windows.
2. Access the TouchWare Program Group.
3. Double-click TouchWare Uninstall. The Uninstall program begins.
4. Follow the instructions displayed on the screen.

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, audible feedback, double-click speed, and cursor options. Use the Touchscreen control panel to set your preferences.

For all MicroTouch touchscreens except a ThruGlass touchscreen, complete the installation and setup as described in Chapter 2.

For a ThruGlass touchscreen, continue the installation by completing the following tasks:

- Specify the type of ThruGlass touchscreen you are using.
- Adjust the controller frequency.
- Adjust the controller sensitivity.
- Calibrate the touchscreen.
- Test the touchscreen.

Use the ThruGlass control panel to complete these procedures. For more information, refer to Chapter 3.

C H A P T E R 2

Touchscreen Control Panel

You can use the Touchscreen control panel to set the following preferences for your touchscreen:

- Touch Mode – define the touch actions that equate to a mouse click, double-click, and drag
- Audible Feedback – define whether you hear a beep when you touch the screen
- Double-Click Speed – define how fast you need to tap to produce a double-click
- Controller Frequency – tune the controller to the best frequency for the current monitor settings and working environment
- Cursor Options – define whether to display the cursor in your touch application and where the cursor appears relative to your touch (an offset)

In addition to setting preferences, you can use the control panel to calibrate the touchscreen for the current video resolution, view status information about the touchscreen, and access online help.

Opening the Touchscreen Control Panel

TouchWare has a Touchscreen control panel for Windows and a Touchscreen control panel for DOS.

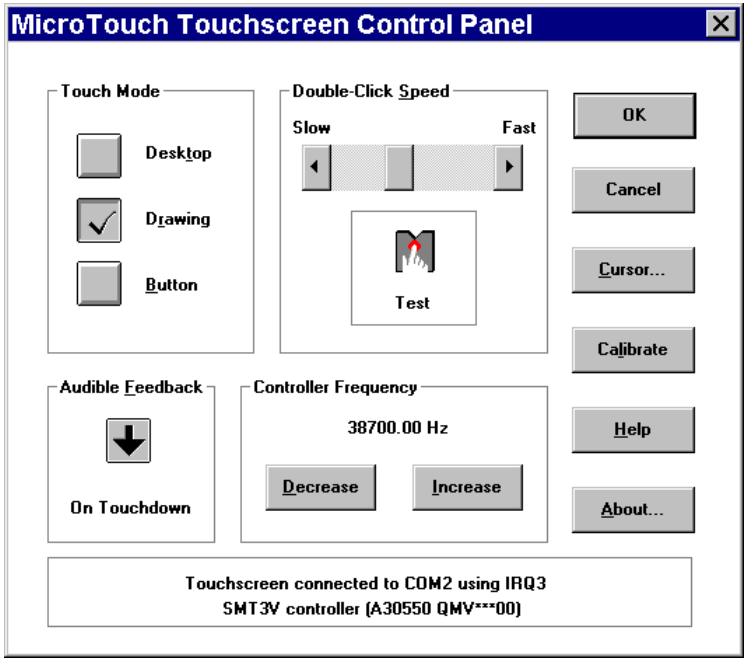
The layout and functionality of the Touchscreen control panel are similar under Windows and DOS. The following sections explain the parameters and how they affect touchscreen operations.

The way you open the Touchscreen control panel varies depending on whether you are using Windows 95, Windows 3.1, or DOS.

In Windows 95

To open the Touchscreen control panel in Windows 95:

1. Click the Start button on the taskbar.
2. Point to Programs, and then point to MicroTouch TouchWare.
3. Click MicroTouch Touchscreen to open the control panel.



In Windows 3.1

To open the Touchscreen control panel in Windows 3.1, double-click on the MicroTouch Touchscreen icon in the MicroTouch TouchWare program group.

In DOS

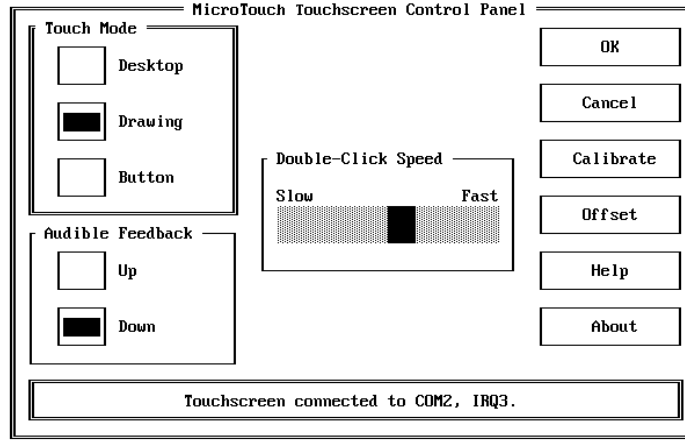
To open the DOS Touchscreen control panel, you enter the DOSPANEL command. You need to know where on the disk the file is located.

▶ To open the Touchscreen control panel in DOS:

1. Access the DOS command line prompt.
2. Enter the disk drive that contains the touchscreen files. For example, enter **C:** if the files are on Drive C.
3. Use the Change Directory (cd) command to switch to the directory that contains the DOS touchscreen files. For example:

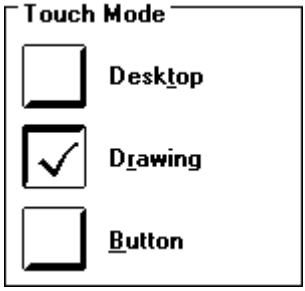
   cd \MTS\TOUCH

   By default, the touchscreen files are located in the C:\MTS\TOUCH directory.
4. Type **DOSPANEL** and then press Enter. The system displays the DOS Touchscreen control panel.



Selecting a Touch Mode

Use the Touch Mode options to specify the touch actions that equate to mouse click, double-click, and drag events. You can select desktop mode, drawing mode, or button mode.



To describe the touch modes, this section uses the following terminology:

- *Touch* means to place your finger on the screen.
- *Tap* means to touch the screen and quickly lift your finger off the screen.

Desktop Mode

Desktop mode is useful for general-purpose desktop applications. In desktop mode, the initial touch locates the cursor on the screen. Holding your finger steady is equivalent to pressing and holding the mouse button. Lifting your finger is equivalent to releasing the mouse button.

To click, touch the object and then lift your finger off the screen.

To double-click, quickly tap the object twice, in the same location. The two taps must occur within the time defined by the double-click speed in the Touchscreen control panel.

To drag, touch the object, pause momentarily to generate a button down, and then slide your finger. When you are finished dragging, lift your finger off the screen.

In desktop mode, dragging has an additional feature to facilitate text selection. For text selection, you can touch, drag, and pause at the point to begin text selection. After pausing, continue dragging to select the desired text.

Drawing Mode

Drawing mode is useful for draw, paint, illustrator, and graphics applications. In drawing mode, touching the screen is equivalent to pressing and holding down the mouse button. Lifting your finger is equivalent to releasing the mouse button.

To click, touch the object and then lift your finger off the screen.

To double-click, quickly tap the object twice, in the same location. The two taps must occur within the time defined by the double-click speed in the Touchscreen control panel.

To drag, touch the object and slide your finger. When you are finished dragging, lift your finger off the screen.

Button Mode

Button mode is useful for applications that exclusively use buttons for the controls. In button mode, touching the screen is equivalent to pressing and releasing the mouse button. The action happens immediately. You do not need to lift your finger off the screen for the action to happen.

To click, touch the object.

To double-click, quickly tap the object twice, in the same location. The two taps must occur within the time defined by the double-click speed in the Touchscreen control panel.

To drag, touch the object and then slide your finger. When you are finished dragging, lift your finger off the screen.

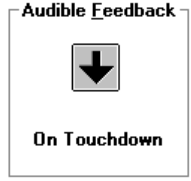
Table 1. Comparison of Touch Modes

Event	Desktop Mode	Drawing Mode	Button Mode
When the action occurs	A touch positions the cursor. Holding the touch steady is equivalent to pressing and holding the mouse button. Lifting off is equivalent to releasing the mouse button.	A touch is equivalent to pressing and holding down the mouse button. Lifting off is equivalent to releasing the mouse button.	Touching the screen is equivalent to pressing and releasing the mouse button. The action occurs as soon as you touch the screen.
Click	• Touch the object. • Lift off the screen.	• Same as desktop mode.	• Touch the object.
Double-click	• Tap the object twice quickly at the same location.	• Same as desktop mode.	• Same as desktop mode.
Drag	• Touch the object. • Pause momentarily. • Drag the object to a new location. • Lift off the screen.	• Touch the object. • Drag the object to a new location. • Lift off the screen.	• Touch the object. • Drag the object to a new location. • Lift off the screen.
Select text	• Touch the text. • Drag to starting point of your selection. • Pause momentarily. • Continue to drag to select text. • Lift off the screen.	Not Applicable	Not Applicable

Audible Feedback

Use the Audible Feedback options to specify whether the system generates a beep when a touch event occurs.

Continue to select the Audible Feedback button to cycle through the available options.



Indicates the system produces a beep when you touch the screen.

Indicates the system produces a beep when you lift your finger off the screen.

Indicates the system produces no beep when a touch event occurs.

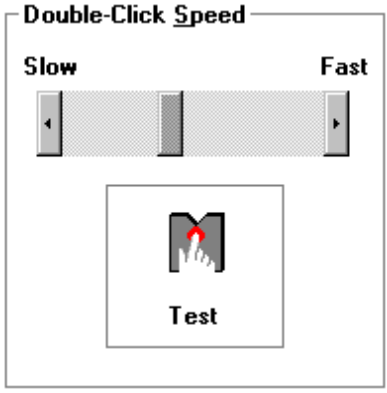
In the DOS Touchscreen control panel, the Audible Feedback controls are slightly different.

- To hear a beep when you lift your finger off the screen, select the Up option.
- To hear a beep when you touch the screen, select the Down option.
- If you do not want to hear any beep when a touch event occurs, make sure both options are off.

Setting the Double-Click Speed

The Double-Click Speed scroll bar lets you specify how quickly you must tap or touch the screen for the system to interpret your actions as a double-click.

A double-click occurs when you quickly touch the screen twice. When using the touchscreen, *double-click speed* is the time lapse allowed between the first liftoff and the next touch. If the speed of your next touch falls within this time period, then a double-click occurs.



Note: The Double-Click Speed setting affects both the touchscreen and the mouse. You can change the double-click speed by using the Touchscreen control panel or the Mouse control panel. Altering the double-click speed for the touchscreen also changes the setting for the mouse, and vice versa.

▶ To adjust the double-click speed, drag the scroll box toward Slow or Fast. In the Windows Touchscreen control panel, you can also click the left and right arrows on the scroll box.

A faster setting provides rapid tap/touch recognition, while a slower setting allows for more sedate movements. If the setting is very fast, and you tap slowly, the application will see two successive taps as two single clicks, rather than as a double-click.

▶ To test the current setting for the double-click speed, quickly tap the MicroTouch icon twice in the same location.

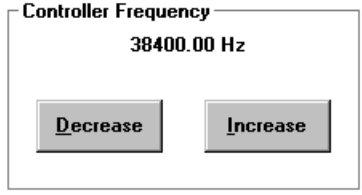
When the MicroTouch icon changes color, the system has recognized your action as a double-click. You can adjust the double-click speed as necessary.

Note: The DOS Touchscreen control panel does not have a test icon.

Adjusting the Touchscreen Controller Frequency

In general, you will not need to adjust the frequency setting for the controller. However, depending on your operating environment, the touchscreen may receive interference from the monitor. Some monitors are "noisier" than others and will cause interference with the touchscreen. This interference prevents the touchscreen controller from receiving clear, quality signals when you touch the screen. As a result, you may notice some performance problems when moving the cursor or drawing lines.

To obtain a clear signal, use the Controller Frequency adjustment in the Touchscreen control panel. The range of frequency levels and the default level depends on your touchscreen controller. You can set a new operating frequency, and then check the behavior and performance of the touchscreen at that frequency level.



When to Adjust the Controller Frequency

You should adjust the controller frequency in the following cases:

- Any time you change the video mode or video resolution of your monitor. The video resolution, for example 640*x*480 or 800*x*600, is sometimes referred to as *desktop area* (in Windows 95). Your monitor's video card determines the available resolutions.
- Any time you move the touchscreen and controller, or move electrical equipment near your touchscreen and controller.
- Any time the cursor movement is very erratic or jittery. (This is NOT a subtle movement. If you need to adjust the frequency, the cursor will be very jumpy.)

Adjusting Frequency for the Current Environment

You should adjust the controller frequency and test the touchscreen using the environmental conditions that your touch application will use.

Frequency can be influenced by environmental conditions, such as other electrical equipment in the area of the touchscreen controller and the monitor itself.

If you move the touchscreen and controller after you adjust frequency, you need to readjust it for the new environment. If you move new electrical equipment close to the touchscreen and controller, readjust frequency.

Additionally, you should always adjust frequency using a MicroTouch tool designed for the *operating system* that your touch application will use. Refer to Table 2 for the MicroTouch tool you should use to adjust the controller frequency.

Table 2. Frequency Tools

Controller	Touch Environment	Frequency Tool
All except ThruGlass and TouchPen	Windows	Windows Touchscreen control panel
	DOS	Microcal
TouchPen	DOS or Windows	Microcal
ThruGlass	Windows	Windows ThruGlass control panel
	DOS	DOS Touchscreen control panel

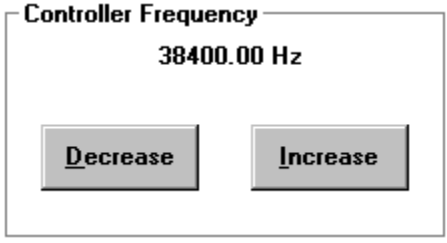
Adjusting Frequency

Frequency is not linear. If you choose a frequency setting that does not work, keep trying. The ideal frequency for your system may be the next frequency setting (up or down).

Note: You cannot use the Touchscreen control panel to adjust the controller frequency of a ThruGlass controller or TouchPen controller. If you have a TouchPen controller, use Microcal. For more information, refer to Chapter 5. If you have a ThruGlass controller, use the ThruGlass control panel. For more information, refer to Chapter 3.

▶ To adjust the controller frequency:

1. Open the Touchscreen control panel. Look in the Controller Frequency box and note the current frequency setting. The frequency values depend on your specific controller.



2. Use the Increase and Decrease buttons to adjust the frequency. Try clicking the value up or down to determine the optimum setting based on the current noise the touchscreen is receiving.

   Note: Do not touch the screen during the frequency setup process. The frequency setup process measures the amount of noise when you are not touching the screen.

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

4. If you need to make any frequency adjustments, use the Increase and Decrease buttons. Adjust the frequency until the touch test produces acceptable results.

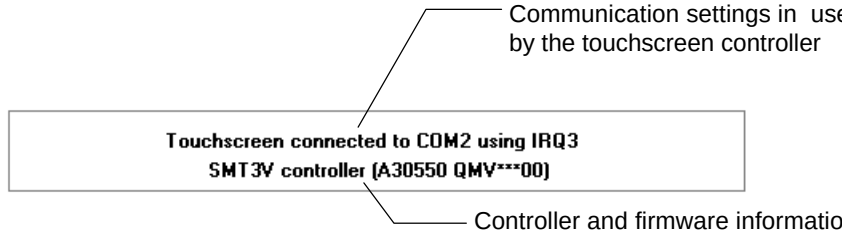
   Continue to adjust the frequency until you find the best setting. If you can obtain good performance (when you touch the screen the cursor holds steady) at different frequencies, choose the highest frequency to obtain optimum performance. In general, a higher frequency produces a stronger signal.

   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.

Touchscreen Status Information

The Touchscreen status box contains two information groups:

- Communication settings being used by the touchscreen controller
- Controller and firmware information



Communication Settings

The top portion of the status box shows the communication port (COM1 – COM7) and the interrupt request (IRQ) currently in use by the touchscreen controller.

Controller and Firmware Information

The bottom line in the Status box shows the controller type and the controller's output identity which is a combination of the hardware and firmware versions in the following format to identify the controller:

CcXxxx

where:

Cc = Two characters that describe the type of controller.

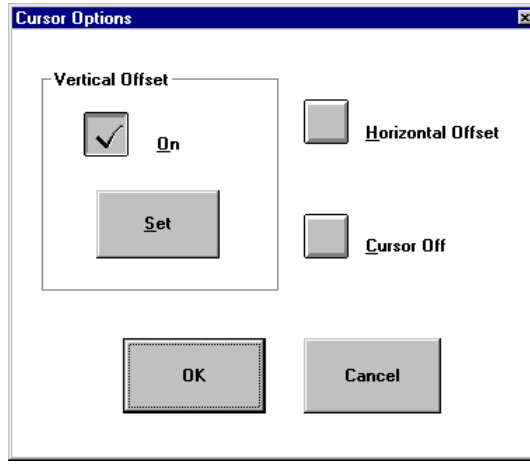
Characters	Controller Type
A3	Serial/SMT, Serial/SMT2, Serial/SMT3V, and Serial/SMT3RV controllers
A4	PC Bus controller
P5	TouchPen controller
Q1	Serial/SMT3 and Serial/SMT3R
TG	ThruGlass controller

Xxxx = Four digits that indicate the firmware version. The first two digits represent the version number; the last two digits represent the revision level. For example, 0380 means Version 3, Revision 8 (that is, 3.8).

Cursor Options

You can set the following options for the mouse cursor:

- Vertical offset
- Horizontal offset
- Whether to display the cursor



Vertical Offset

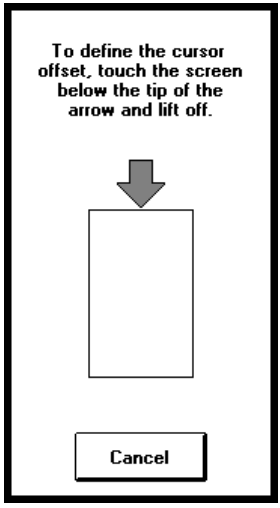
After you calibrate the touchscreen, the mouse cursor should be located directly underneath your finger when you touch the center of the screen. However, you may prefer to offset the cursor slightly above your touch so you can point more easily and precisely.

The Vertical Offset option lets you define the distance between your touch 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 specify a vertical offset for the cursor in Windows:

1. Open the Windows Touchscreen control panel.
2. Select Cursor to display the Cursor Options dialog box.

3. Select the On option in the Vertical Offset box.
4. Select Set. The following screen appears:



5. 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 amount. Thereafter, the cursor will be positioned above your finger by a distance equal to the offset amount.

▶ To specify a vertical offset for the cursor in DOS:

1. Open the DOS Touchscreen control panel.
2. Select Offset.
3. Touch the screen at the desired distance below the cursor block, within the rectangular space provided.

   The system prompts you to test the offset by moving the cursor around the screen. If you are satisfied with the offset, select Yes. To define the offset again, select No.

Note: As your finger approaches the bottom edge of the screen, the offset decreases so you can touch items in this area.

Horizontal Offset

There may be times when the screen image extends completely to the left and right edges of the screen (that is, 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 you activate the horizontal offset, TouchWare automatically offsets the horizontal position of the cursor near the left and right edges. You can now easily reach the edges of the screen image.

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

Note: The DOS Touchscreen control panel does not have a Horizontal Offset option. Therefore, you cannot define a horizontal offset for the DOS touchscreen driver.

Showing and Hiding the Cursor

Many users do not want to display the cursor when working with a touch application. By default, the touchscreen driver displays the cursor in your Windows and DOS applications.

▶ To hide the cursor for your Windows applications:

1. Open the Windows Touchscreen control panel.
2. Select Cursor to display the Cursor Options dialog box.
3. Select the Cursor Off option.

▶ To change the cursor display for your DOS applications:

- Call Int 33, function 2 to hide the cursor.
- Call Int 33, function 1 to show the cursor.

For more information on the DOS cursor, refer to the *Microsoft Mouse Programmer's Reference*.

Calibrating the Touchscreen

During the manufacturing process, MicroTouch calibrates every touchscreen. *Calibration* aligns the touchscreen with the underlying video. Specifically, calibration defines the dimensions of the image area of the touchscreen, determines the edges of the touchscreen's image, 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.

When to Calibrate the Touchscreen

You should calibrate the touchscreen in the following cases:

- After you initially install TouchWare.
- Any time you change the video resolution or video mode of your monitor. The video resolution, for example 640*x*480 or 800*x*600, is sometimes referred to as *desktop area* (in Windows 95). 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 adjust the frequency of the touchscreen controller.
- Any time the cursor does not follow the movement of your finger, or does not reach the edges of the touchscreen.

When you calibrate the touchscreen, the controller stores the touch points in non-volatile memory. Therefore, you do not need to calibrate the touchscreen each time you start your system.

Calibrating for the Current Environment

You should calibrate and test the touchscreen using the environmental conditions that your touch application will use. For example, if you move the touchscreen after calibrating it, you may need to readjust it for the new environment.

Additionally, you should always calibrate using a MicroTouch tool designed for the *operating system* that your touch application will use. Refer to Table 3 for the proper MicroTouch tool to calibrate your touchscreen.

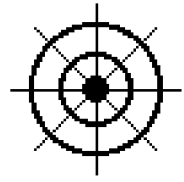
Table 3. Calibration Tools

Controller	Touch Environment	Calibration Tool
All except ThruGlass	Windows	Windows Touchscreen control panel
	DOS	DOS Touchscreen control panel or Microcal
ThruGlass	Windows	Windows ThruGlass control panel or Windows Touchscreen control panel
	DOS	Microcal

Calibrating Procedure

▶ To calibrate the touchscreen:

1. Open the Windows Touchscreen control panel.
2. Select Calibrate. A calibration target appears in the lower left corner of the screen.



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 targets slowly and accurately until the system registers the touch point. Be careful to keep your palm away from the touchscreen when you touch the target.

Note: If you do not touch the screen within twenty seconds, the system automatically cancels the calibration process. In this case, there is no change to the current calibration settings.

3. Touch the target in the lower left corner. The system displays a second calibration target in the upper right corner of the screen.
4. Touch the second target.

   A dialog box prompts you to test the calibration by moving the cursor around the screen.
5. Test the calibration as follows:
   - Touch various spots 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 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.

Note: If you are using a TouchPen controller and pen, repeat the calibration procedure with the pen.

If you need to recalibrate the screen, make sure to touch the corners 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 black non-image area, you will distort the touchscreen calibration.

Getting Help

▶ To display help information about the options in the Touchscreen control panel, select Help.

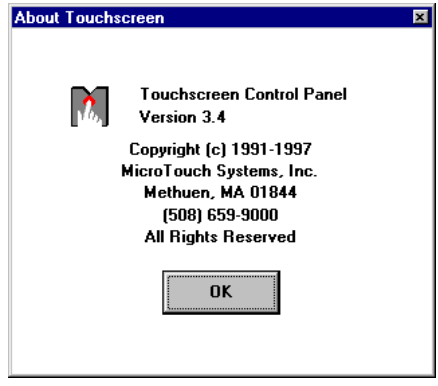
- To learn more about using Help, press F1.
- To display more information about a topic, click on that topic.

If you are using the DOS Touchscreen control panel, the system displays the first topic. Use the Next and Prev buttons to cycle through the available help information.

Getting Information About the Touchscreen Control Panel

▶ To display information about the Touchscreen control panel, select About.

The system displays the Touchscreen control panel version number and copyright notice.

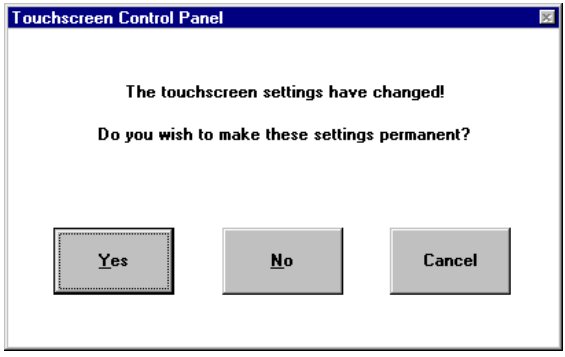


▶ To close the information window, select OK.

Saving Changes to the Touchscreen Control Panel

▶ To save your changes to the Touchscreen control panel, select OK.

If you made changes, the system reports that the settings have been modified and prompts if you want to make the settings permanent.



Respond to the prompt as follows:

- To make your changes permanent, select Yes. Your changes remain in effect until you change them again.
- To make your changes active for this session only, select No. In this case, the system stores your changes in memory. The next time you start up your computer, the system returns to your permanent settings.
- To return to the Touchscreen control panel and continue to make changes, select Cancel.

C H A P T E R 3

ThruGlass Control Panel

Use the ThruGlass control panel to set up the ThruGlass touchscreen to work in the current environment. After setting up the touchscreen, you may occasionally want to use the ThruGlass control panel to adjust the touchscreen.

When you set up or adjust your ThruGlass touchscreen, use the ThruGlass tools designed for the operating system in which you will be running your ThruGlass application.

If you will be using your ThruGlass touchscreen in the Windows environment, use the Windows ThruGlass control panel to set up and adjust your touchscreen. If you will be using your ThruGlass touchscreen in the DOS environment, use the DOS ThruGlass control panel to set up and adjust your touchscreen.

In addition, MicroTouch provides Microcal, a DOS tool for setup and diagnostics.

Note: The ThruGlass control panel is only for use with the ThruGlass controller and touchscreen.

This chapter describes the two ThruGlass control panels and summarizes the ThruGlass touchscreen setup process.

Setting Up a ThruGlass Touchscreen

After installing the ThruGlass touchscreen and controller, use the ThruGlass control panel to set up the controller and touchscreen for the current installation and environment.

The way that you set up the ThruGlass touchscreen varies depending on whether it will be used in the Windows or DOS environment.

Setup Requirements

As you prepare to set up your ThruGlass touchscreen, consider the following setup requirements:

- Set up and test the touchscreen in the environment in which you will be using the touchscreen.

  Some touchscreen settings are influenced by environmental conditions (for example frequency adjustments vary based on the amount of interference in the environment). If you move the touchscreen and controller after adjusting it, you need to readjust it for the new environment. If you change the touchscreen mounting equipment or move new electrical equipment close to the touchscreen and controller, readjust it.

  Additionally, you should always adjust frequency using a MicroTouch tool designed for the *operating system* that your touch application will use. The following ThruGlass tools are designed to provide optimum touchscreen performance in the Windows or DOS environments:

  - Windows ThruGlass control panel
  - DOS ThruGlass control panel
  - Microcal

  For information about what tools you should use to set up or adjust your touchscreen, refer to “Setting Up a ThruGlass Touchscreen for Use in Windows” or “Setting Up a ThruGlass Touchscreen for Use in DOS” later in this chapter.

- Make sure your system's video resolution is appropriate for your touch application before you set up the touchscreen. The video resolution, for example 640*x*480 or 800*x*600, is sometimes referred to as *desktop area* (in Windows 95). Your monitor's video card determines the available resolutions.

  When you adjust the controller frequency, the system automatically finds the frequency that works best with the current video resolution. When you calibrate the touchscreen, you calibrate it for the current video resolution. You should adjust the frequency and calibrate for the video resolution that you will be using with your touch application.

- If you are using the Windows ThruGlass control panel, you must have a keyboard or mouse attached to your system.

  When you initially install TouchWare, touch is disabled until you specify the ThruGlass touchscreen type in the ThruGlass control panel. You can use the keyboard or mouse to specify the ThruGlass touchscreen type.

  Also, you may occasionally select a frequency that causes touch to be disabled (the touchscreen will not recognize touch). You can use the keyboard or mouse to change to another frequency.

Setting Up a ThruGlass Touchscreen for Use in Windows

To set up the ThruGlass touchscreen for use in the Windows environment, use the Windows ThruGlass control panel to complete the following steps:

1. Specify the type of ThruGlass touchscreen you are using.
2. Adjust the ThruGlass controller frequency.
3. Adjust the ThruGlass controller sensitivity.
4. Calibrate the ThruGlass touchscreen.
5. Test operation of the ThruGlass touchscreen.

For information about how you complete each of these procedures, refer to “Using the Windows ThruGlass Control Panel” later in this chapter.

Note: You must have a keyboard or mouse attached to your system while setting up and configuring your ThruGlass touchscreen.

Setting Up a ThruGlass Touchscreen for Use in DOS

▶ To set up the ThruGlass touchscreen for use in the DOS environment, complete the following steps:

1. Adjust the ThruGlass controller frequency and sensitivity using the DOS ThruGlass control panel.
2. Calibrate the ThruGlass touchscreen using Microcal.
3. Test operation of the ThruGlass touchscreen using Microcal.

For information about how you adjust the controller frequency and sensitivity, refer to “Using the DOS ThruGlass Control Panel” later in this chapter. For information about how you calibrate and test the touchscreen using Microcal, refer to Chapter 5.

After Setting Up a ThruGlass Touchscreen

After you set up your ThruGlass touchscreen, you may want to set your touchscreen preferences such as the double-click speed or touch mode. To set your touchscreen preferences, use the Touchscreen control panel. For more information, refer to Chapter 2.

Using the Windows ThruGlass Control Panel

Use the ThruGlass control panel to

- Specify the type of ThruGlass touchscreen you are using
- Adjust the controller frequency and sensitivity for use in the Windows environment
- Calibrate the ThruGlass touchscreen
- Test the operation of the ThruGlass touchscreen
- Access terminal mode and enter firmware commands

If you will be using the touchscreen in the DOS environment, refer to "Using the DOS ThruGlass Control Panel" later in this chapter for setup information.

Before you set up the ThruGlass touchscreen, make sure the system's video resolution is appropriate for your touch application. When you adjust the controller frequency during setup, the ideal frequency for the active video resolution is chosen.

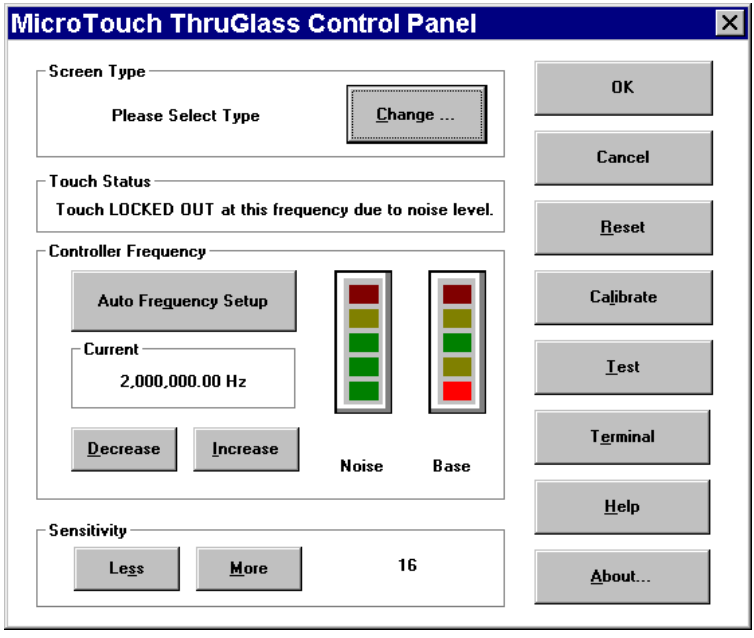
Opening the Windows ThruGlass Control Panel

The way you open the control panel varies depending on whether you are using Windows 95 or Windows 3.1.

▶ To open the ThruGlass control panel in Windows 95:

1. Click the Start button on the taskbar.
2. Point to Programs, and then point to MicroTouch TouchWare.
3. Click ThruGlass control panel.

▶ To open the ThruGlass control panel in Windows 3.1, double-click on the ThruGlass control panel icon located in the MicroTouch TouchWare program group.



Touch Status

The Touch Status area provides information about the status of the ThruGlass controller and touchscreen. You can check this area during the touchscreen setup to see the status of the touchscreen.

Usually the touchscreen is active.

When you initially install the ThruGlass controller and touchscreen, Touch Status reports that touch is locked out. Touch is disabled until you specify the ThruGlass touchscreen type. For more information, refer to “Setting the ThruGlass Screen Type” later in this chapter.

At other times you may see a message indicating that touch is locked out at the current frequency due to the noise level. Usually this message appears when a control panel process begins. If the message remains on the screen, change to another frequency using Auto Frequency Setup. Use the shortcut keys or the mouse. For more information, refer to "Adjusting the ThruGlass Frequency" later in this chapter.

Setting the ThruGlass Screen Type

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-inch or 10-inch screens, laminated or bonded screens. Locate the part number on the touchscreen cable at the lower right corner of the touchscreen. You will need this number to specify the touchscreen type.

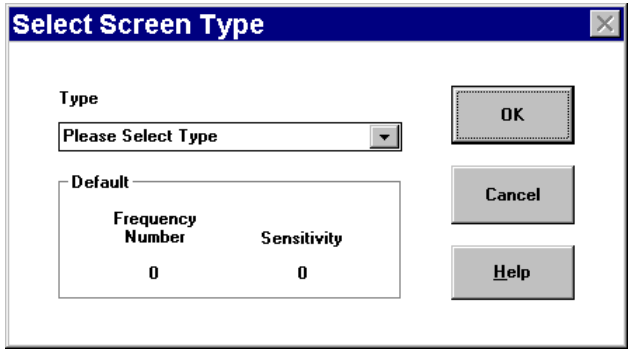
Each screen type has a default frequency and sensitivity value, therefore you must specify the screen type before adjusting the controller frequency or sensitivity settings.

You only need to set the screen type when you install a new touchscreen on your system.

After the initial ThruGlass touchscreen installation, the Screen Type option indicates that you need to select a screen type. There is no default setting. After you specify the touchscreen type, the Screen Type option always displays the touchscreen type.

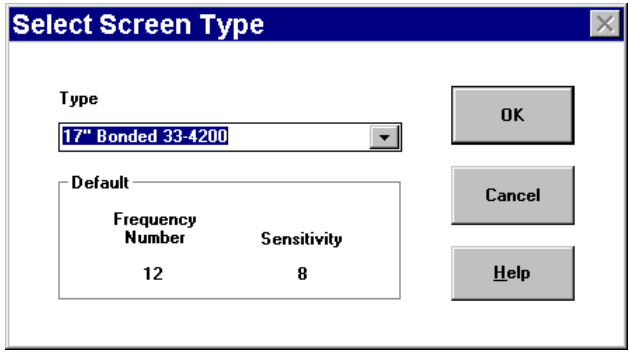
▶ To specify the type of touchscreen you are using:

1. Open the Windows ThruGlass control panel.
2. Select Change to display the following screen.



3. Select your screen type from the drop-down list and click OK. You can find the touchscreen part number on the touchscreen cable at the lower right corner of the 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.



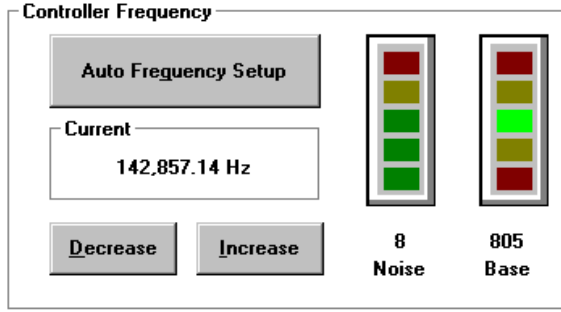
   The screen type option displays frequency and sensitivity default values for the screen type you selected. These are standard values for many typical touch applications. You should still adjust the controller frequency and sensitivity for your current environment.

Adjusting the ThruGlass Frequency

Adjust the frequency of the controller after you install the ThruGlass hardware and software and specify the touchscreen type.

Depending on your operating environment, the touchscreen may receive interference from the monitor. Some monitors are “noisier” than others and will cause interference with the touchscreen. This interference prevents the system from receiving clear, quality signals when you touch the screen. As a result, you may notice some performance problems when moving the cursor or drawing lines.

You can change the controller frequency to eliminate erratic or jittery cursor movement, ragged lines, or random touch points being registered by the ThruGlass controller.



When to Adjust the Controller Frequency

You should adjust the controller frequency in the following cases:

- After you initially install TouchWare (and set the ThruGlass touchscreen type).
- Any time you change the ThruGlass Screen Type setting.
- Any time you change the video mode or video resolution of your monitor. The video resolution, for example 640*x*480 or 800*x*600, is sometimes referred to as *desktop area* (in Windows 95). Your monitor’s video card determines the available resolutions.

- Any time you move the touchscreen and controller, change the touchscreen mounting equipment, or move electrical equipment near your touchscreen and controller.
- Any time the cursor movement is erratic or jittery (this is *not* a subtle movement), or the controller is registering random touch points.

Adjusting Frequency for the Current Environment

You should adjust the controller frequency and test the touchscreen using the environmental conditions that your touch application will use.

Frequency can be influenced by environmental conditions, such as other electrical equipment in the area of the touchscreen controller, the touchscreen mounting equipment, and the monitor itself.

If you move the touchscreen and controller after you adjust frequency, you need to readjust it for the new environment. If you change the touchscreen mounting equipment or move new electrical equipment close to the touchscreen and controller, readjust frequency.

Additionally, you should always adjust frequency using a MicroTouch tool designed for the *operating system* that your touch application will use. Refer to Table 4 for the MicroTouch tool you should use to adjust the controller frequency.

Table 4. Frequency Tools

Controller	Touch Environment	Frequency Tool
All except ThruGlass and TouchPen	Windows	Windows Touchscreen control panel
	DOS	Microcal
TouchPen	DOS or Windows	Microcal
ThruGlass	Windows	Windows ThruGlass control panel
	DOS	DOS ThruGlass control panel

Adjusting Frequency

Before adjusting the frequency, check that the screen type setting is correct. If not, change the screen type setting, and then adjust the frequency. For more information, refer to "Setting the ThruGlass Screen Type" earlier in this chapter.

For information about adjusting the controller frequency for use in the DOS environment, refer to "Using the DOS ThruGlass Control Panel" later in this chapter.

▶ To adjust the controller frequency:

1. Open the ThruGlass control panel.
2. Click on Auto Frequency Setup.

   Do not touch the screen until the frequency setup process is complete. Touching the screen influences the results of the frequency adjustment.

   The Noise and Base meter values are reset to 0, and then begin to fluctuate as Auto Frequency Setup adjusts the frequency. When the optimal frequency for the current environment is found, the Base value stops changing and at least one block in the base meter is green. The Noise value continues to vary.

   Auto Frequency Setup usually finds the ideal frequency for your current environment.
3. Test the touchscreen as follows:
   - Touch the screen in several places and move your finger around 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.
   - Check the frequency Noise and Base meters. If a meter displays red or yellow, readjust the controller frequency. The meters should display green.
4. If you need to make any frequency adjustments, use the Increase and Decrease buttons. Adjust the frequency until the touch test

produces acceptable results and the Noise and Base meters display green.

While adjusting the frequency, you may change to a frequency at which the ThruGlass touchscreen cannot work. A message will appear on the control panel telling you that touch is locked out at that frequency. Use the shortcut keys or the mouse to change to another frequency.

Frequency is not linear. If you choose a frequency setting that does not work, keep trying. The next frequency setting (up or down) may be appropriate.

Any time you change the frequency, be sure to adjust the sensitivity and calibrate the touchscreen.

Adjusting the ThruGlass Sensitivity

Adjust the ThruGlass controller sensitivity after you install the ThruGlass hardware and software, specify the correct screen type, and adjust the controller frequency.

Sensitivity controls the touch response so that it is appropriate for the thickness of the non-conductive material (for example, glass or plastic) in front of the ThruGlass touchscreen.

You can increase or decrease the sensitivity to adjust the *feel* of the ThruGlass touchscreen.

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

For information about adjusting the controller sensitivity for use in the DOS environment, refer to “Using the DOS ThruGlass Control Panel” later in this chapter.

▶ To adjust the controller sensitivity:

1. Open the Windows ThruGlass control panel.
2. Use the Sensitivity buttons to increase or decrease the sensitivity. Click on the button.

   Do not touch the screen until the sensitivity adjustment is complete. Touching the screen influences the results.

   Note: At the 0 sensitivity setting the touchscreen does not recognize touch.

3. Test the sensitivity setting by touching the screen.

   Does the controller respond or the cursor move before you touch the screen? If so, try decreasing sensitivity.

   Do you need to press hard or use more than one finger to activate a touch? If so, try increasing sensitivity.

4. Adjust the sensitivity setting until you get a good response to your touch.

Calibrating the ThruGlass Touchscreen

During the manufacturing process, MicroTouch calibrates every touchscreen. *Calibration* aligns the touchscreen with the underlying video. Specifically, calibration defines the dimensions of the image area of the touchscreen, determines the edges of the touchscreen’s image, 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.

When to Calibrate the Touchscreen

You should calibrate the touchscreen in the following cases:

- After you initially install TouchWare.
- Any time you change the video resolution or video mode of your monitor. The video resolution, for example 640*x*480 or 800*x*600, is sometimes referred to as *desktop area* (in Windows 95). 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 adjust the frequency of the touchscreen controller.
- Any time the cursor does not follow the movement of your finger or does not reach the edges of the touchscreen.

When you calibrate the touchscreen, the controller stores the touch points in non-volatile memory. Therefore, you do not need to calibrate the touchscreen each time you start your system.

Calibrating for the Current Environment

You should calibrate and test the touchscreen using the environmental conditions that your touch application will use. For example, if you move the touchscreen after calibrating it, you may need to readjust it for the new environment.

Additionally, you should always calibrate using a MicroTouch tool designed for the *operating system* that your touch application will use. Refer to Table 5 for the MicroTouch tool you should use to calibrate your touchscreen.

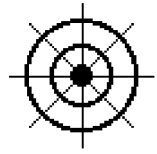
Table 5. Calibration Tools

Controller	Touch Environment	Calibration Tool
All except ThruGlass	Windows	Windows Touchscreen control panel
	DOS	DOS Touchscreen control panel or Microcal
ThruGlass	Windows	Windows ThruGlass control panel or Windows Touchscreen control panel
	DOS	Microcal

Calibrating the Touchscreen

▶ To calibrate the touchscreen:

1. Open the Windows ThruGlass control panel.
2. Select Calibrate. A calibration target appears in the lower left corner of the screen.



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 targets slowly and accurately until the system registers the touch point. Be careful to keep your palm away from the touchscreen when you touch the target.

Note: If you do not touch the screen within twenty seconds, the system automatically cancels the calibration process. In this case, there is no change to the current calibration settings.

3. Touch the target in the lower left corner. The system displays a second calibration target in the upper right corner of the screen.
4. Touch the second target.

   A dialog box prompts you to test the calibration by moving the cursor around the screen.
5. Test the calibration as follows:
   - Touch various spots on the screen. The cursor should be located underneath your finger or pen when you touch the screen.
   - Touch each corner and 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.
6. If the cursor is not located underneath your finger, or does not reach the edges of the screen image, complete the following:
   - If you installed the touchscreen hardware, make sure that the touchscreen is properly mounted in front of the monitor.
   - Recalibrate the touchscreen.

If you need to recalibrate the screen, make sure to touch the corners 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 black non-image area, you will distort the touchscreen calibration.

Be sure to keep your palm away from the screen when you touch the target. Calibration can be affected by your hand being close to the screen.

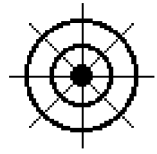
Testing the ThruGlass Touchscreen

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

▶ To test the ThruGlass touchscreen:

1. Open the ThruGlass control panel.
2. Select Test.

   A dialog box prompts you to test the touchscreen by touching the screen. A target appears on the screen.



3. Touch the target, then touch the screen in different places. Touch the corners and edges of the screen. Check the touchscreen.

Touchscreen Behavior	Adjustment
The screen is sensitive to your touch and recognizes a light touch.	None.
The controller responds or the cursor moves before you actually touch the screen.	Decrease sensitivity.
You need to press hard to activate a touch or you need to use more than one finger to activate a touch.	Increase sensitivity.
The cursor is erratic or jittery.	Adjust the controller frequency.
The controller is registering random touch points.	Adjust the controller frequency.
The cursor does not reach the edges of the video image.	Recalibrate the touchscreen.
The cursor is not located underneath your finger.	Recalibrate the touchscreen.

Using the ThruGlass Touch Terminal

Use the touch terminal to send firmware commands directly to the ThruGlass controller, to receive responses from the controller, and to view touch position data sent from the controller. For a description of the available firmware commands, refer to the *Touch Controllers Reference Guide*.

A response from the controller may indicate the controller successfully executed the command, may report the output identity of the controller, or may display the X, Y coordinate position of your touch on the screen.

Note: The touch terminal is only for use with ThruGlass controllers.

Controller Operating Modes

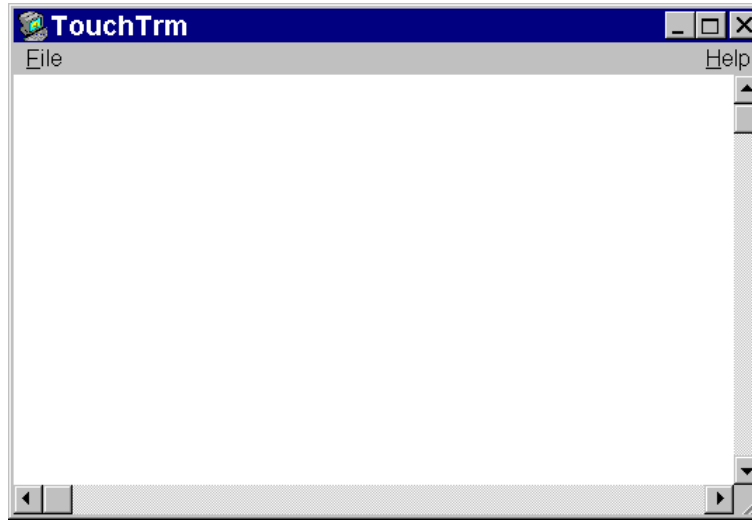
The controller operates in two modes: factory diagnostic and touch operation. The controller powers up in touch operation mode. When you open the touch terminal, it is in touch operation mode.

There is no command prompt in touch operation mode. When you are in touch operation mode, touching the screen causes a response on the screen. The response varies based on the controller's firmware settings.

Diagnostic mode provides a caret (>) command prompt. You might accidentally get into diagnostic mode by pressing Esc three times. When you are in diagnostic mode, you do not get a response when you touch the screen.

Caution: Diagnostic mode is intended for factory use only. You should return to touch operation mode by typing **go** (in lowercase).

▶ To access the touch terminal, select Terminal and click Start in the popup. A terminal window appears.



Enter firmware commands as described in the *Touch Controllers Reference Guide*.

You can set your touch terminal preferences or font using the Preferences command on the File menu.

Setting Preferences

Use the Preferences command on the File menu to change the touch terminal settings or the font used in the touch terminal.

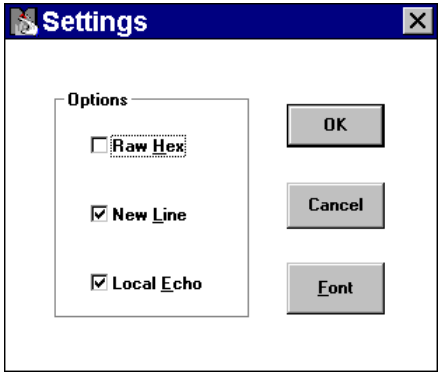
You can change the following touch terminal settings:

- Raw Hex—displays the responses from the controller in hexadecimal format instead of the default, decimal format.
- New Line—automatically inserts a new line between the commands you type and the controller responses.
- Local Echo—displays the commands you type in the terminal window.

▶ To change the touch terminal settings:

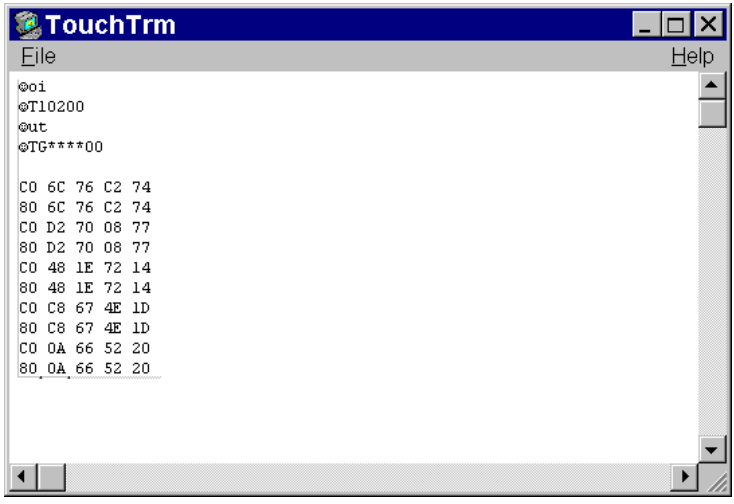
1. Choose Preferences on the touch terminal File menu.

   The Settings dialog box appears.



2. Change an option by selecting or deselecting the option's check box.
3. Select OK to save your changes and close the Settings dialog box.

The following illustration is an example of commands and controller responses in the touch terminal with the New Line and Local Echo preferences turned on.

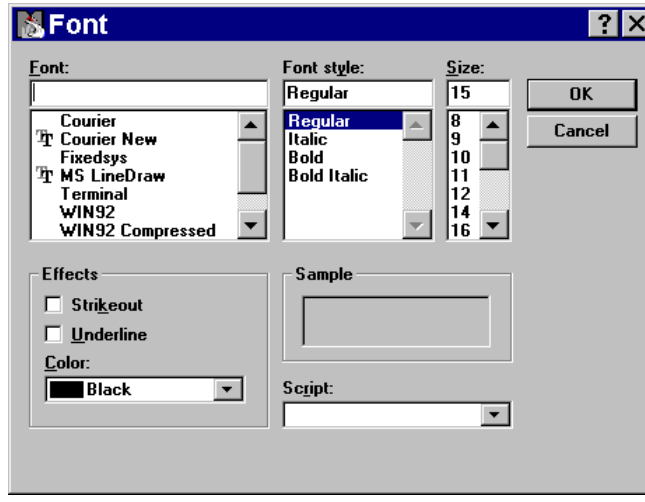


▶ To change the touch terminal font:

1. Choose Preferences on the touch terminal File menu.

   The Settings dialog box appears.

2. Select Font. The Font dialog box appears.



3. Make your font changes. Select OK to save your font changes and close the dialog box.

4. Select OK to save your changes and close the Settings dialog box.

Getting Information About the Touch Terminal

▶ To display information about the touch terminal, choose About on the touch terminal Help menu.

The system displays the version number and the copyright notice.

Clearing the Touch Terminal

▶ To clear the touch terminal window:

Choose Clear on the touch terminal File menu.

Closing the Touch Terminal

▶ To close the touch terminal window:

Choose Exit on the touch terminal File menu.

Adjusting Video Resolution

MicroTouch recommends that you adjust your system's video resolution before you set up the touchscreen. Adjusting the video resolution after setting up the touchscreen causes touch to be locked out (the touchscreen will not recognize touch).

If you must change the video resolution after setting up the touchscreen, use the following instructions.

▶ To change the video resolution after setting up the touchscreen:

1. Open the ThruGlass control panel.
2. Change the Sensitivity setting to the lowest setting (0).

   Touch is not recognized at this sensitivity setting.
3. Change the video resolution.

   For information on how to change the video resolution, refer to your system documentation.

   Some systems require that you reboot your system for the new video resolution to become active. If you must reboot, close the ThruGlass control panel, reboot, then reopen the ThruGlass control panel and complete the next step.
4. Click on Auto Frequency Setup.

   Do not touch the screen until the frequency setup process is complete. Touching the screen influences the results of the frequency adjustment.
5. Reset Sensitivity to a higher setting.

After adjusting the controller sensitivity, test the touchscreen. For more information, refer to "Testing the ThruGlass Touchscreen" later in this chapter.

Resetting the ThruGlass Touchscreen Settings

If you have any problems when adjusting the touchscreen, use the Reset button to issue a "soft reset" command to the ThruGlass controller. A soft reset is equivalent to powering the controller off and on again.

▶ To reset the ThruGlass controller:

1. Open the ThruGlass control panel.
2. Select Reset. Do not touch the screen during the Reset process.

Getting Help on the Windows ThruGlass Control Panel

▶ To display help information about the options in the ThruGlass control panel, select Help.

The system accesses an index of online help topics.

- To learn more about using Help, press F1.
- To display more information about a topic, click on that topic.

Getting Information About the Windows ThruGlass Control Panel

▶ To display information about the ThruGlass control panel, select About.

The system displays the version number and the copyright notice.

▶ To close the information window, select OK.

Saving Changes to the Windows ThruGlass Control Panel

To save your changes to the ThruGlass control panel, select OK.

Using the DOS ThruGlass Control Panel

Use the DOS ThruGlass control panel to set up the controller and touchscreen for the current DOS environment. Use the ThruGlass control panel for DOS to

- Adjust the controller frequency and sensitivity
- Test and align the ThruGlass touchscreen

If you will be using the touchscreen in the Windows environment, refer to "Using the Windows ThruGlass Control Panel" earlier in this chapter for setup information.

ThruGlass Control Panel and the DOSTOUCH.INI File

When you install TouchWare, the Setup program copies the DOS ThruGlass control panel file (TGCAL.EXE) and the DOSTOUCH.INI file to the hard disk. By default, the Setup program copies these files into the following MicroTouch Systems (MTS) directory:

C:\MTS\TOUCH

You can specify a different directory during the installation process.

The DOSTOUCH.INI file defines the communication (COM) port and the IRQ used by the ThruGlass touchscreen. When you run the DOS ThruGlass control panel, the system reads the COM port and IRQ information in the DOSTOUCH.INI file to determine where the touchscreen is connected. The system **does not** search for the touchscreen. Therefore, the DOSTOUCH.INI file must be in the same directory as the TGCAL.EXE file. It is installed in the same directory by default. Additionally, if the COM port and IRQ information in the DOSTOUCH.INI file is incorrect, the DOS ThruGlass control panel will not run.

Opening the DOS ThruGlass Control Panel

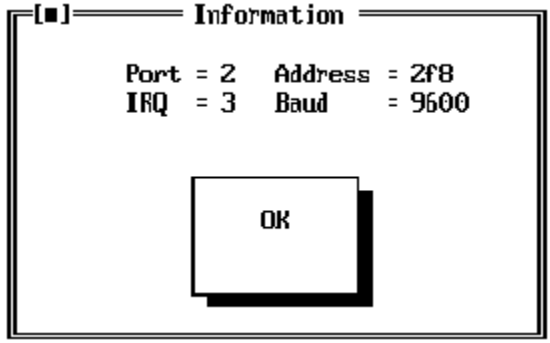
The DOS ThruGlass control panel is a DOS application. Therefore, you must exit from Windows to open it.

▶ To open the DOS ThruGlass control panel:

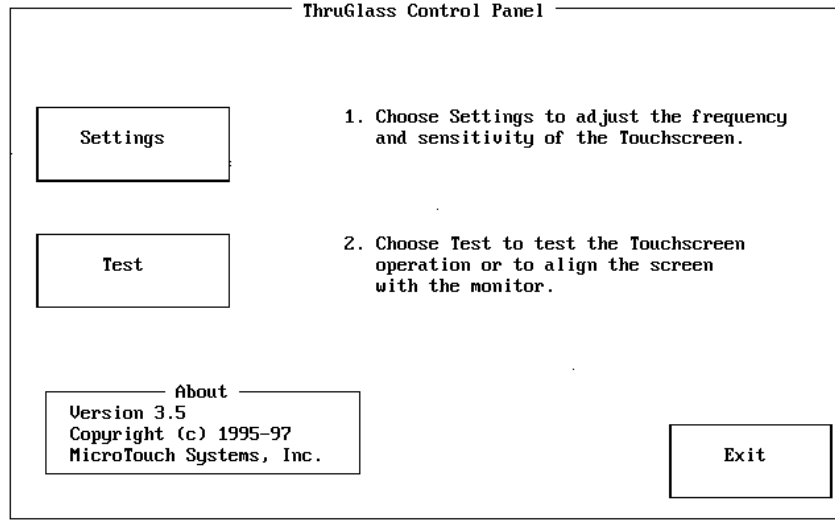
1. Exit from Windows and access the DOS command line prompt.
2. Enter the disk drive that contains the touchscreen files. For example, enter **C:** if the files are on Drive C.
3. Use the Change Directory (cd) command to switch to the directory that contains the touchscreen files. For example:

   cd \MTS\TOUCH
4. Type TGCAL and then press Enter.

   A screen appears providing information about the communication port, baud rate, address, and interrupt request.



5. Select OK to display the ThruGlass control panel.



Selecting Options in the DOS ThruGlass Control Panel

To select an option in the DOS ThruGlass control panel, you can touch the screen, use a mouse, or use the keyboard.

The highlighted option is the currently active option. You can press Enter to select the active option.

Alternatively, you can press the corresponding shortcut key to select an option. Highlighted characters are the shortcut keys.

Adjusting ThruGlass Frequency and Sensitivity

After you install the ThruGlass hardware and software, you must adjust the touchscreen controller frequency and sensitivity.

For information about adjusting the controller frequency and sensitivity for use in the Windows environment, refer to “Using the Windows ThruGlass Control Panel” earlier in this chapter.

About Adjusting Frequency

Depending on your operating environment, the touchscreen may receive interference from the monitor. Some monitors are “noisier”

than others and will cause interference with the touchscreen. This interference prevents the system from receiving clear, quality signals when you touch the screen. As a result, you may notice some performance problems when moving the cursor or drawing lines.

You can change the controller frequency to eliminate erratic or jittery cursor movement, ragged lines, or random touch points being registered by the ThruGlass controller.

When to Adjust the Controller Frequency

You should adjust the controller frequency in the following cases:

- After you initially install TouchWare.
- Any time you change the video mode or video resolution of your monitor. The video resolution, for example 640*x*480 or 800*x*600, is sometimes referred to as *desktop area* (in Windows 95). Your monitor's video card determines the available resolutions.
- Any time you move the touchscreen and controller, change the touchscreen mounting equipment, or move electrical equipment near your touchscreen and controller.
- Any time the cursor movement is erratic or jittery, or the controller is registering random touch points.

Adjusting Frequency for the Current Environment

You should adjust the controller frequency and test the touchscreen using the environmental conditions that your touch application will use.

Frequency can be influenced by environmental conditions, such as other electrical equipment in the area of the touchscreen controller, the touchscreen mounting equipment, and the monitor itself.

If you move the touchscreen and controller after you adjust frequency, you need to readjust it for the new environment. If you change the touchscreen mounting equipment or move new electrical equipment close to the touchscreen and controller, readjust frequency.

Additionally, you should always adjust frequency using a MicroTouch tool designed for the *operating system* that your touch application will use. Refer to Table 6 for the MicroTouch tool you should use to adjust the controller frequency.

Table 6. Frequency Tools

Controller	Touch Environment	Frequency Tool
All except ThruGlass and TouchPen	Windows	Windows Touchscreen control panel
	DOS	Microcal
TouchPen	DOS or Windows	Microcal
ThruGlass	Windows	Windows ThruGlass control panel
	DOS	DOS ThruGlass control panel

About Adjusting Sensitivity

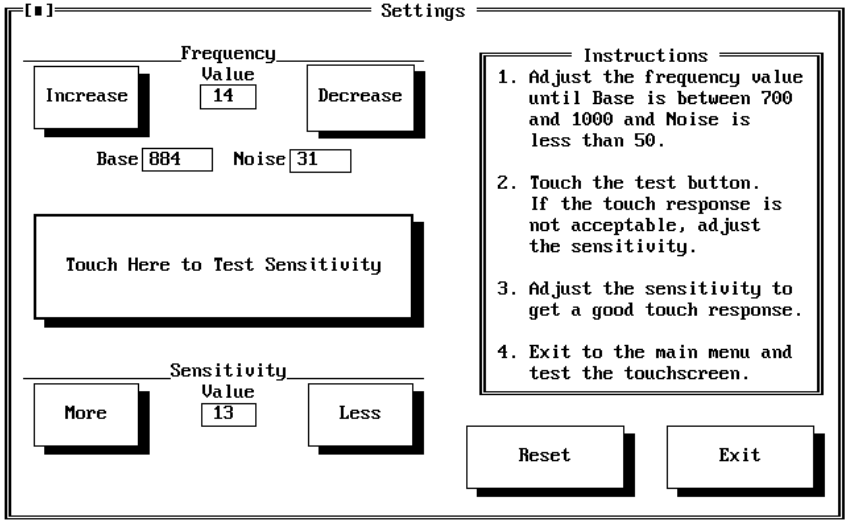
Sensitivity controls the touch response so that it is appropriate for the thickness of the non-conductive material (for example, glass or plastic) in front of the ThruGlass touchscreen.

You can increase or decrease the sensitivity to adjust the *feel* of the ThruGlass touchscreen.

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

▶ To adjust the frequency and sensitivity settings:

1. Open the DOS ThruGlass control panel.
2. Select Settings.



3. Check the Base and Noise values. Make sure that
   - Base is between 700 and 1000
   - Noise is less than 50

   If necessary, use the Increase and Decrease buttons to adjust the frequency until the Base and Noise values are within the acceptable ranges.

   Wait at least 3 seconds after each change for the Base value to settle before you touch the screen again.

   Touch the screen to test frequency. If the cursor movement is erratic or jittery, or the controller is registering random touch points, adjust the frequency until you find a good setting.

4. Touch the Touch Here To Test Sensitivity button.

   Does the controller respond or the cursor move before you touch the screen? If so, try decreasing sensitivity.

   Do you need to press hard or use more than one finger to activate a touch? If so, try increasing sensitivity.

5. Adjust the sensitivity until you get a good response when you touch the test button.

   Wait at least 3 seconds after each change for the Base value to settle before you touch the screen again.

Note: To restore the touchscreen settings to the factory defaults, select Reset.

---

6. Select Exit when you finish adjusting frequency and sensitivity.

   The system automatically saves your changes.

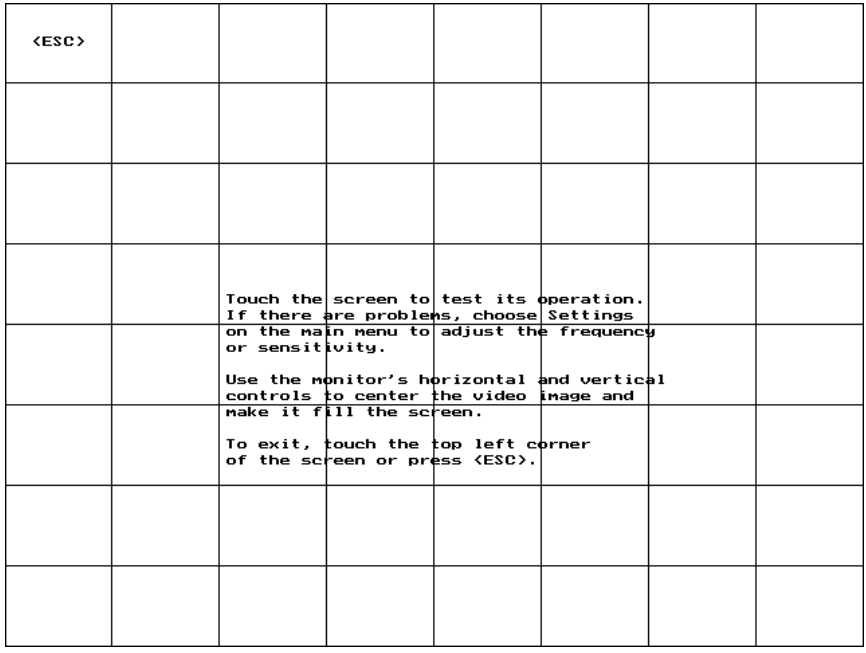
Any time you adjust the frequency or sensitivity, you should test how the touchscreen is working and verify you are satisfied with the operation of the touchscreen. Refer to the next section for more information.

Testing and Aligning the ThruGlass Touchscreen

Use the Test option in the DOS ThruGlass control panel to check that the touchscreen controller is correctly responding to your touch and that the video image is aligned properly.

▶ To use the Test option to test the touchscreen:

1. Open the DOS ThruGlass control panel.
2. Select Test.



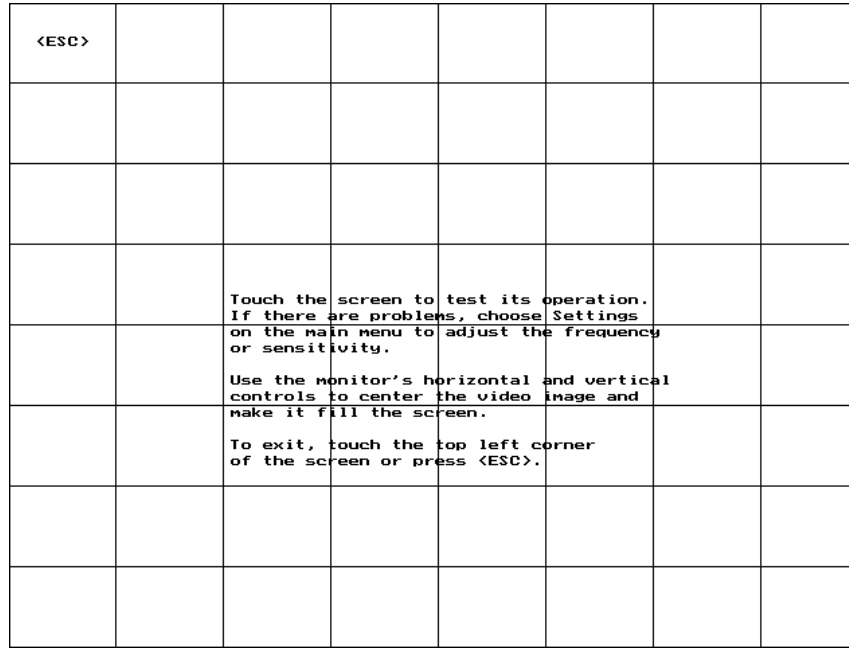
3. Touch various places on the screen and move your finger around the screen. Check for the following:

Touchscreen Behavior	Adjustment
The screen is sensitive to your touch or recognizes a light touch.	None.
The controller responds or the cursor moves before you actually touch the screen.	Decrease sensitivity.
You need to press hard to activate a touch or you need to use more than one finger to activate a touch.	Increase sensitivity.
The cursor is erratic or jittery.	Adjust the controller frequency.
The controller is registering random touch points.	Adjust the controller frequency.

Press Esc when you are done testing the touchscreen and press Exit to exit the ThruGlass control panel.

▶ To use the Test option to check the video image alignment:

1. Open the DOS ThruGlass control panel.
2. Select Test.



3. Use the monitor's horizontal and vertical controls to adjust the video image, if necessary.
   - Make sure the video image fills the screen.
   - Make sure the video image is centered in the viewing area.
4. Press Esc when you are done testing the touchscreen.
5. Press Exit to exit the ThruGlass control panel.

Restoring Factory Defaults

If you have any problems when adjusting the touchscreen or cannot get a response from the touchscreen, first check that the touchscreen is correctly installed. If the touchscreen is correctly installed, try restoring the touchscreen settings to the factory defaults.

▶ To restore the touchscreen settings to the factory defaults:

1. Open the DOS ThruGlass control panel.
2. Select Settings.
3. Select Reset.

C H A P T E R 4

Pen Configuration Utility

Some MicroTouch touchscreens connect to a TouchPen controller. The TouchPen controller lets you use a MicroTouch electronic pen to touch the screen. The electronic pen device, referred to in this document as the *pen*, connects to the back of the touch monitor.

The Pen Configuration utility lets you set the pen mode. If your system has a TouchPen controller, the *pen mode* defines whether the touchscreen recognizes input from both a pen and a finger, from a pen only, or from a finger only. This chapter

- Provides an overview of operating a pen with the touchscreen
- Describes how to set the pen mode for Windows
- Describes how to set the pen mode for DOS

Touch Mode and Feedback for the Pen

The pen works in much the same way as a mouse regardless of the Touch Mode. 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.

The pen ignores the Audible Feedback setting in the Touchscreen control panel. Sounds are disabled when using the pen.

Note: You need to run the Pen Configuration utility and change the pen mode only if your touchscreen is using a TouchPen controller. If you are not using a TouchPen controller, the utility ignores your selection and makes no changes to the current configuration.

Pen Modes and Pen Priority

The *pen mode* defines how the pen operates with the touchscreen. Table 7 describes the available pen modes.

Table 7. Pen Modes

Pen Mode	Description
Pen or Finger (Automatic)	The system recognizes input from both a pen and a finger. This mode is the factory default pen mode for the TouchPen controller. Pen or Finger mode is also called *automatic* mode.
Pen Only	The system recognizes pen touches on the screen. The system ignores finger touches on the screen.
Finger Only	The system recognizes finger touches on the screen. The system ignores pen touches on the screen.

If you are using Pen or Finger mode, the system gives higher priority to the pen. This priority prevents accidental screen touches from your finger or hand as being interpreted as input.

- 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. Also, if you are using your finger and the pen touches the screen, the pen overrides the finger 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. You cannot adjust the delay amount.

  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.
- 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.

Performance Considerations for the Pen

The following settings affect the performance of a pen:

- Pen mode
- Calibration
- Communication (baud) rate
- Double-click speed

Pen Mode Setting

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

Calibration

You must calibrate the touchscreen twice (once with your finger and once with the pen) if you are using both a touch pen and your finger as touch devices.

Communication Rate

The standard baud rate for MicroTouch controllers is 9600. This rate is generally acceptable for most applications. However, if you are using a pen, the best baud rate depends on your application and your system.

For example, the 19200 baud rate is intended for use with character recognition systems that require high pen data rates. However, systems that cannot handle the higher data rates seen from the pen may result in degraded pen performance. To improve performance on these systems, select a slower baud rate.

The controller baud rate must equal the baud rate used by the designated COM port and touchscreen driver. To change the baud rate used by the touchscreen driver, use the SYSTEM.INI or the DOSTOUCH.INI files. To change the baud rate used by the controller, use the Microcal utility.

Note: With specific video cards, you may notice finger touch performance lagging behind when using a pen controller. In Windows 95 this relates to the video card drivers. Lowering the baud rate will improve performance.

Double-Click Speed

The double-click speed defines how quickly you must tap or touch the screen for the system to interpret your actions as a double-click. If you are using Pen or Finger mode, set the double-click speed in the slow to medium range for optimum performance. To change the double-click speed, use the Touchscreen control panel. For more information, refer to Chapter 2.

Setting the Pen Mode for Windows

The Windows Pen Configuration utility (WINPEN.EXE) specifies the pen mode for Windows.

You can set the Windows pen mode as follows:

- You can open the Windows Pen Configuration utility and select a pen mode.
- You can use the Windows Pen Configuration command to create individual icons or shortcuts for pen modes.

When You Set the Windows Pen Mode

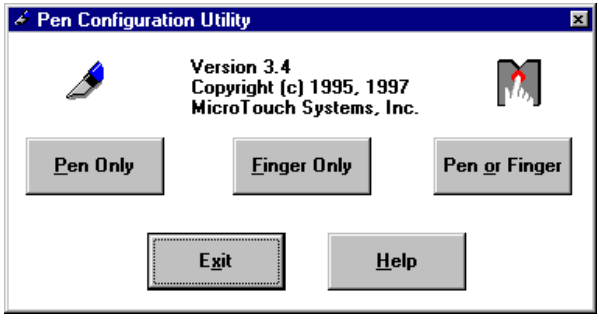
When you select a pen mode, the Pen Configuration utility sends a command to the TouchPen controller and makes the new mode immediately active. The Pen Configuration utility also saves the new pen mode setting to the SYSTEM.INI file when you exit from the utility.

The pen mode remains in effect until you change it again or until you reboot your system or reset the controller. When you turn on your system, the TouchPen controller always defaults to Pen or Finger mode. When you start Windows, the touchscreen driver looks in the SYSTEM.INI file for the current pen mode and makes that setting.

Using the Windows Pen Configuration Utility

▶ To use the Pen Configuration utility to set the Windows pen mode:

1. Open the Pen Configuration utility:
   - If you are using Windows 95, click the Start button, point to Programs, point to MicroTouch TouchWare, and then click Pen Configuration.
   - If you are using Windows 3.1, double-click on the Pen Configuration icon found in the MicroTouch program group.



2. Select one of the pen mode buttons.

Caution: The pen 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 touch to make a selection. You can still use the shortcut keys or the mouse to select an option.

3. Select Exit to close the Pen Configuration utility.

Using the WINPEN Command

You can use the Windows Pen Configuration command, WINPEN.EXE, to create individual icons or shortcuts for each pen mode that you use frequently. You can then simply double-click on the icon to automatically change pen modes.

The WINPEN command has the following options:

/P = Pen Only mode

/F = Finger Only mode

/PF = Pen or Finger mode

When you use the WINPEN command, include the appropriate command switch, and be sure to specify the complete command path (drive and directory location).

For example, suppose the WINPEN command is on Drive C in the \MTS\TOUCH directory. To set the pen mode to Pen Only, enter the following command:

C:\MTS\TOUCH\WINPEN /P

Setting the Pen Mode for DOS

The DOS Pen Configuration command, DOSPEN.EXE, specifies the pen mode for DOS.

You can set the DOS pen mode as follows:

- You can specify the pen mode at the DOS command line by issuing a DOSPEN command.
- You can include the DOSPEN command in a batch file for automatic processing by your DOS touch application.
- You can open the DOS Pen Configuration utility and select a pen mode.

When You Set the DOS Pen Mode

When you set the pen mode, the new mode is active immediately. The pen mode remains in effect until you change it again or until you reboot your system or reset the controller. When you turn on your system, the TouchPen controller always defaults to Pen or Finger mode.

However, you can add a command line to your AUTOEXEC.BAT file to automatically set the pen mode when you power on your system. Alternatively, you can create a batch file that your touch application uses to set the pen mode.

Using the DOSPEN Command

To set the DOS pen mode, run the DOSPEN command with the appropriate switch. The following options are available:

/P = Pen Only mode

/F = Finger Only mode

/PF = Pen or Finger mode

/? = Command help (displays the available options)

▶ To specify a DOS pen mode from the command line:

1. Access the DOS command line prompt.
2. Enter the disk drive that contains the touchscreen files. For example, enter **C:** if the files are on Drive C.
3. Use the Change Directory (cd) command to switch to the directory that contains the DOS touchscreen files. For example:

   cd \MTS\TOUCH

   By default, the touchscreen files are located in the \MTS\TOUCH directory.
4. Type **DOSPEN** followed by a command switch and then press Enter. For example, to select Pen Only mode, enter the following command:

   DOSPEN /P

Defining the DOS Pen Mode in a Batch File

You can also add a DOSPEN command with the correct path to a batch file, such as the AUTOEXEC.BAT file. For example:

C:\MTS\TOUCH\DOSPEN /F

In this example, the DOS pen mode is automatically set to Finger Only when you power up your system.

Note: For DOSPEN to run successfully from the AUTOEXEC.BAT file, you must load the DOS touchscreen driver (DOSTOUCH) in the AUTOEXEC.BAT file **before** executing the DOSPEN command.

Using the DOS Pen Configuration Utility

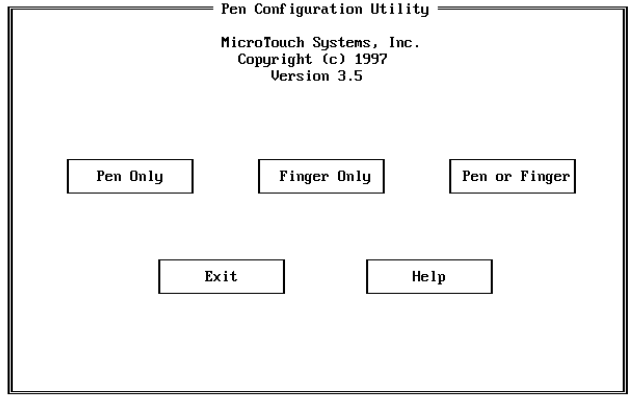
You can also use the DOSPEN command to open the DOS Pen Configuration utility.

▶ To open the DOS Pen Configuration utility:

1. Access the DOS command line prompt.
2. Enter the disk drive that contains the touchscreen files. For example, enter **C:** if the files are on Drive C.
3. Use the Change Directory (cd) command to switch to the directory that contains the DOS touchscreen files. For example:

   cd \MTS\TOUCH

   By default, the files are located in the \MTS\TOUCH directory.
4. Type **DOSPEN** and then press Enter. The system displays the DOS Pen Configuration utility.



5. Select one of the pen mode buttons.

   Caution: The pen 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 the shortcut keys or the mouse to select an option.

6. Select Exit to close the Pen Configuration utility.

C H A P T E R 5

Microcal Diagnostic Utility

Microcal is a DOS-based diagnostic utility you can use to test the touchscreen and pen. You do not need to run Microcal unless you are experiencing problems with your touchscreen.

You can use Microcal to

- Locate the touchscreen
- Verify the screen is communicating properly
- Calibrate the touchscreen
- Test the operation of the touchscreen and pen
- Adjust the touchscreen controller's frequency
- Change the communication settings
- Check the monitor's video
- Access Terminal Emulation mode and enter firmware commands
- Configure other operating parameters, such as sensitivity, data protocol, and AutoBaud detection

---

Note: If you are using a ThruGlass controller, you cannot change the baud rate, frequency, or sensitivity using Microcal.

Running Microcal

When you install TouchWare, the Setup program automatically copies the Microcal Diagnostic utility and associated files to the hard disk. By default, the Setup program copies Microcal into the following MicroTouch Systems (MTS) directory:

C:\MTS\TOUCH

You can specify a different directory during the installation process.

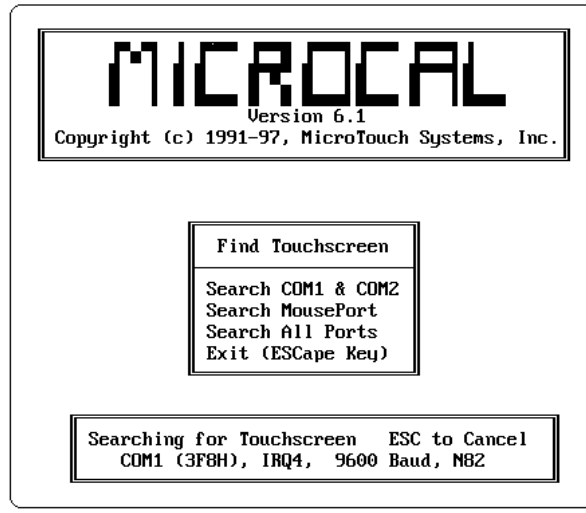
Microcal is a DOS application. Before running Microcal, you must exit from Windows. You cannot run Microcal from a DOS session within Windows. Additionally, Microcal cannot test the touchscreen while other applications are in use.

▶ To run Microcal:

1. Exit from Windows and access the DOS command line prompt.
2. Enter the disk drive that contains the Microcal files. For example, enter **C:** if the files are on Drive C.
3. Use the Change Directory (cd) command to switch to the directory that contains the Microcal files. For example:

   cd \MTS\TOUCH
4. Type **MICROCAL** and then press Enter.

   Microcal displays the Find Touchscreen menu and automatically starts to scan the communication ports (COM1 and COM2) trying to find a touchscreen. Microcal uses all valid combinations of IRQs (interrupt requests), baud rates, and communication settings (parity, data bits, stop bits) when searching these two COM ports.



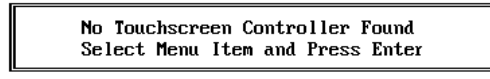
You can press Esc at any time to cancel the search for a touchscreen.

If a Touchscreen Is Found

If a touchscreen is found on either COM1 or COM2, Microcal displays the Touchscreen Diagnostics and Configurator screen. You can now select other menu options.

If a Touchscreen Is Not Found

If a touchscreen is not found on COM1 or COM2, Microcal reports that the search was unsuccessful:



Microcal returns to the Find Touchscreen menu. You can choose one of the following options:

- Search COM1 and COM2 again.
- Search the mouse port.
- Search all serial communication ports and the mouse port.
- Exit from the Microcal utility

- To select a menu option, use the cursor up and down arrow keys to highlight an option. After you highlight the option, press Enter to select the option.

  Before you repeat the search, make sure the touchscreen is properly connected.

  If you choose Search the MousePort, Microcal searches the mouse port on your PC to find a touchscreen.

  If you choose Search All Ports, Microcal begins to scan the serial communication ports (COM1 – COM7) and the mouse port trying to find a touchscreen. For each communication port, Microcal searches the various IRQs (interrupt requests), baud rates, and communication settings (parity, data bits, and stop bits). Remember that you can press Esc at any time to cancel the search for a touchscreen.

  If you choose Exit, Microcal cancels the search and returns to the DOS prompt.

Options When Running Microcal

By default, Microcal initially searches only COM1 and COM2 trying to find the touchscreen. If the touchscreen is not found, Microcal displays menu options that let you search the communication ports (COM1 – COM7) and the mouse port. You need to run the search again.

If you know the port your touchscreen is using, you can specify the COM port when you enter the MICROCAL command. For example:

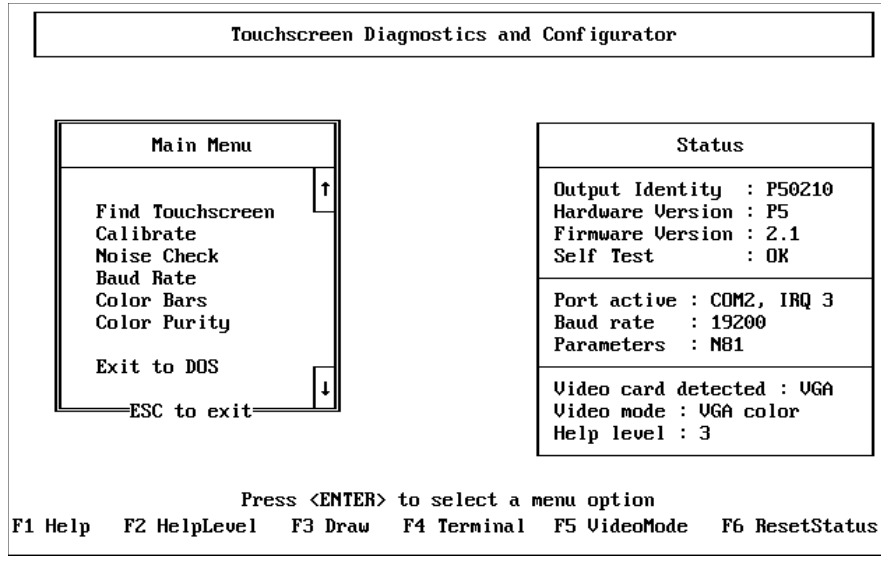
MICROCAL /C4

In this case, Microcal searches only COM4 for the touchscreen. Microcal still uses all valid combinations of IRQs (interrupt requests), baud rates, and communication settings (parity, data bits, and stop bits) when searching the specified port.

For more information on the options you can specify when running Microcal, refer to “Microcal Command Options” later in this chapter.

Working in Microcal

After Microcal finds a touchscreen, the Touchscreen Diagnostics and Configurator screen appears.

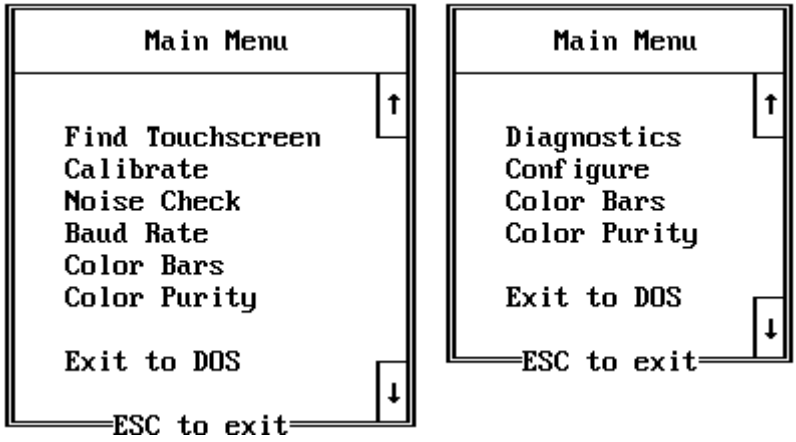


This screen has a Main menu for selecting options, a status box that reports current information about the touchscreen, and a line at the bottom that lists the available function keys.

Note: Controllers support different options. Depending on your touchscreen controller, the Touchscreen Diagnostics and Configurator screen may look different from the one shown above.

Selecting Options from the Main Menu

- To select a menu option, use the cursor up and down arrow keys to highlight an option. After you highlight the option, press Enter to select the option.



- To exit from any option or menu, press Esc. The system always prompts for confirmation before exiting from Microcal.

Note: To display a list of help topics, press **?** at the Main menu. Use the cursor arrow keys to highlight the topic you want, and then press Enter.

Using the Function Keys

In addition to the options on the Main menu, there are several function keys available when using Microcal. Table 8 describes these keys.

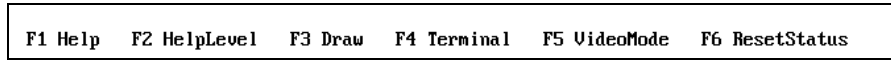


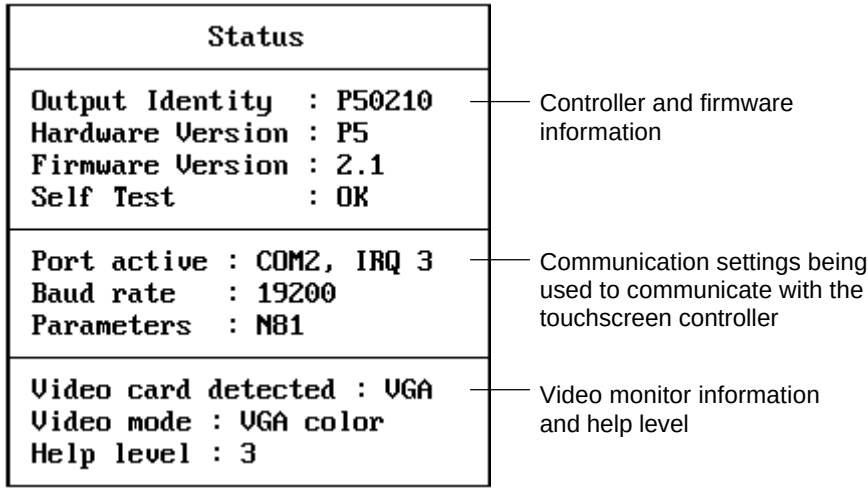
Table 8. Microcal Function Keys

Function Keys	Description
F1	Opens online help for Microcal.
F2	Selects the level of help to display. There are three levels of help. The Status box shows the current help level.
F3	Opens a Draw program.
F4	Opens a Terminal Emulation program.
F5	Changes the video mode for the Microcal utility.
F6	Resets Microcal and the touchscreen. The Status box clears all information about the controller and its communication settings, and displays a Search not activated message. You need to select the Find Touchscreen option so Microcal can locate the touchscreen and obtain information about the controller.

The Microcal Status Box

The Status box contains three information groups:

- Controller and firmware information
- Communication settings being used to communicate with the touchscreen controller
- Video monitor information and help level



The Status box displays this information only if the touchscreen is found.

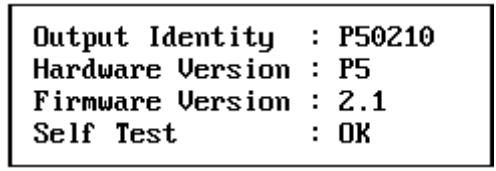
Any time you press F6 to reset the touchscreen, the Status box clears all information about the controller and its communication settings, and displays the following message:

```
Search not activated
```

You need to select the Find Touchscreen option so Microcal can locate the touchscreen and obtain information about the controller. You can select other Microcal options after the touchscreen is found.

Controller and Firmware Information

The top portion of the Status box shows the controller's output identity, hardware version, firmware version, and results of the self-test.



The output identity is a combination of the hardware version and the firmware version. If the touchscreen is found, Microcal uses the following format to identify the controller:

CcXxxx

where:

Cc = Two characters that describe the type of controller.

Characters	Controller Type
A3	Serial/SMT, Serial/SMT2, Serial/SMT3V, and Serial/SMT3RV controllers
A4	PC Bus controller
P5	TouchPen controller
Q1	Serial/SMT3, Serial/SMT3R, and MousePort controllers
TG	ThruGlass controller

Xxxx = Four digits that indicate the firmware version. The first two digits represent the version number; the last two digits represent the revision level. For example, 0380 means Version 3, Revision 8 (that is, 3.8).

Note that Microcal also displays the Output Identity information in the Hardware Version and Firmware Version fields in the Status box.

Communication Settings

The middle portion of the Status box shows the communication port (COM1 – COM7), the interrupt request (IRQ), the baud rate, and the data format parameters being used by your computer to communicate with the touchscreen controller.

```
Port active : COM2, IRQ 3
Baud rate   : 19200
Parameters  : N81
```

The Parameters field lists the data format as follows:

- Parity (N=none, E=even, and O=odd)
- Number of data bits (7 or 8)
- Number of stop bits (1 or 2)

If you are using a MousePort controller, the Port Active field displays **Mouse** when a MousePort controller is found. No baud rate or parameter information is displayed.

Video Monitor Information and Help Level

The bottom portion of the Status box shows the video card detected, the current video mode, and the current help level.

```
Video card detected : VGA
Video mode : VGA color
Help level : 3
```

▶ To change the video mode, press F5. You can continue to press F5 to cycle through the available video modes.

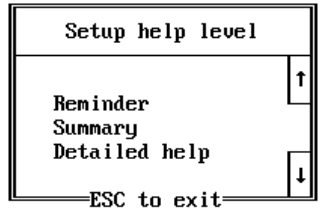
Note: If you change the video mode, you should calibrate the touchscreen again. The display area is different in each video mode.

▶ To change the level of help displayed, press F2.

Getting Help when Using Microcal

Microcal includes an online help facility.

- To display a list of all help topics, press ?. Use the cursor arrow keys to highlight the topic you want, and then press Enter.
- To get help about an option on a menu, use the cursor arrow keys to highlight the menu option, and then press F1 or H. The system displays help information for the currently selected menu option.
- To select the level of help displayed, press F2. The following menu appears:



You can choose one of three levels of help. Table 9 describes each help level.

Table 9. Help Levels

Level	Menu Choice	Description
1	Reminder	Provides a short description of the function. Use this level if you simply need a reminder of what a particular menu option does.
2	Summary	Provides a more detailed description of the function.
3	Detailed	Provides a full description of the function. Use this level if you are not familiar with Microcal.

The Status box displays the current help level.

Finding the Touchscreen

When you open Microcal, Microcal automatically searches your system and tries to find a touchscreen.

Microcal also has a Find Touchscreen option. If Microcal has already found the touchscreen, you do not need to use this option. However, you can press F6 to reset the touchscreen and its controller to an initial state. In this case, the Status box displays the message:

```
Search not activated
```

You must then select the Find Touchscreen option. If you select another option before finding the touchscreen, the system displays a message that you must first find the touchscreen.

▶ To find the touchscreen, select Find Touchscreen.

(Depending on the type of touchscreen controller connected to your system, you may need to select Diagnostics from the Main menu, and then select Find Touchscreen.)

When you select the Find Touchscreen option, Microcal

- Scans the communication ports (COM1 – COM7) and mouse port for a touchscreen; and searches the valid combinations of communication IRQs, baud rates, and parameters to enable communication with the controller
- Tries to communicate with the touchscreen controller
- Requests information on the touchscreen and its controller
- Waits for the touchscreen controller to respond

If Microcal finds the touchscreen, the Status box displays the current COM port, IRQ, baud rate, and communication parameters (parity, data bits, stop bits). You can now select other options.

If Microcal does not find the touchscreen, the Status box reports that Microcal failed to find the touchscreen. Check that the touchscreen is connected properly, and then repeat the search.

Calibrating the Touchscreen Using Microcal

During the manufacturing process, MicroTouch calibrates every touchscreen. *Calibration* aligns the touchscreen with the underlying video. Specifically, calibration defines the dimensions of the image area of the touchscreen, determines the edges of the touchscreen's image, 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.

When to Calibrate the Touchscreen

You should calibrate the touchscreen in the following cases:

- After you initially install TouchWare.
- Any time you change the video resolution or video mode of your monitor. The video resolution, for example 640*x*480 or 800*x*600, is sometimes referred to as *desktop area* (in Windows 95). 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 adjust the frequency of the touchscreen controller.
- Any time the cursor does not follow the movement of your finger or touch pen, or does not reach the edges of the touchscreen.

When you calibrate the touchscreen, the controller stores the touch points in non-volatile memory. Therefore, you do not need to calibrate the touchscreen each time you start your system.

Calibrating for the Current Environment

You should calibrate and test the touchscreen using the environmental conditions that your touch application will use. For example, if you move the touchscreen after calibrating it, you may need to readjust it for the new environment.

Additionally, you should always calibrate using a MicroTouch tool designed for the *operating system* that your touch application will use. Refer to Table 10 for the MicroTouch tool you should use to calibrate your touchscreen.

Table 10. Calibration Tools

Controller	Touch Environment	Calibration Tool
All except ThruGlass	Windows	Windows Touchscreen control panel
	DOS	DOS Touchscreen control panel or Microcal
ThruGlass	Windows	Windows ThruGlass control panel or Windows Touchscreen control panel
	DOS	Microcal

Calibrating for Finger and Touch Pen

If you are using both your finger and a touch pen as touch-input devices, you must calibrate the screen twice: once with your finger and once with the pen. The touchscreen controller stores both sets of calibration data.

Calibrating the Touchscreen

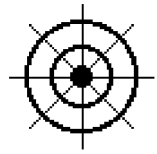
▶ To use Microcal to calibrate the touchscreen:

1. Select Calibrate.

   (Depending on the type of touchscreen controller connected to your system, you may need to select Diagnostics from the Main menu, and then select Calibration.)

   A dialog box prompts for confirmation that you want to calibrate the touchscreen.

2. Type **Y** to begin the calibration process. The system displays a calibration target in the lower left corner of the screen.



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 targets slowly and accurately. The system does not register the touch point until you lift off the screen. If you are using a ThruGlass controller, be careful to keep your palm away from the touchscreen when you touch the target.

3. Touch the target in the lower left corner. The system displays a second calibration target in the upper right corner of the screen.
4. Touch the second target.

After you touch the second target, Microcal returns to the menus. At this point, you should test the calibration and verify that the screen is set up properly.

Testing the Calibration

▶ To test the calibration:

1. Press F3 to open the Draw program. Microcal displays a list of keys you can press when using the Draw program.
2. Press the space bar to clear the screen.
3. Test the touchscreen. Check the following items:
   - Touch various spots on the screen. The cursor should be located underneath your finger or pen when you touch the screen. Also, the cursor should be steady when you hold your finger or pen to the screen.

- Draw to each corner and edge 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.
- Press G to display the grid. Draw several horizontal, vertical, and diagonal lines. Trace the grid lines and compare your lines with the grid. Look for the lines to be smooth and straight.

If the cursor …	Then you must …
Is not located underneath your finger, or does not reach the edges of the screen image	Recalibrate the touchscreen. If you installed the touchscreen hardware (for example a ThruGlass touchscreen), make sure that the touchscreen is properly mounted in front of the monitor.
Is erratic or jittery, or if the lines are not smooth and straight	Adjust the controller frequency, and recalibrate the screen. The touchscreen is receiving too much interference from the monitor or the surrounding environment.

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 black non-image area, you will distort the touchscreen calibration.

Also, if you are using a ThruGlass controller, perhaps a false touch was registered because your hand was close to the touchscreen.

For more information on the keys available when using the Draw program, refer to “Drawing and Testing” later in this chapter.

Drawing and Testing

The Draw program lets you touch the screen and draw lines, shapes, and curves. Use the Draw program to test the operation of the touchscreen and pen.

Opening the Draw Program

▶ To open the Draw program, press F3.

Microcal displays a list of keys you can press when using the Draw program. (Refer to Table 11.) Microcal automatically updates the list of available keys based on the video mode and the type of controller being used.

Drawing Tips

Refer to the following drawing tips to familiarize yourself with the draw program:

- Before drawing, press the space bar to clear the screen and display a blank drawing canvas. You can also press G to clear the screen and display a grid that you can use as a drawing guide.
- If you are using a pen, you can choose between three modes for drawing: Automatic mode (the same as Pen and Finger mode), Pen mode, and Finger mode. Press the key for the hardware touch mode you want.
- To draw, simply touch the screen and drag your finger or pen.

Table 11. Keys for Microcal Draw

Press …	To …
D	Display the touch points as individual dots.
L	Connect the individual touch points with a line.
G	Display a 10 x 10 grid on the screen.
Space bar	Clear the screen (including the grid) and display a blank screen.
1 – 9	Change the color of the drawing line. (EGA and VGA only.)
1 – 3 9	Change the color of the drawing line. (CGA only.) Change the color palette. (CGA only.)
P F A	Select Pen mode. Select Finger mode. Select Automatic (Pen and Finger) mode. These options are available only if you are using a TouchPen controller.
F1	List the keys available when using the Draw program.
F2	Clear the screen and then toggle the background color.
Esc	Exit from the Draw program.

Adjusting the Frequency

Depending on your operating environment, the touchscreen may receive interference from the monitor. Some monitors are "noisier" than others and will cause interference with the touchscreen. This interference prevents the system from receiving clear, quality signals when you touch the screen. As a result, you may notice some performance problems when moving the cursor or drawing lines.

You can change the controller frequency to eliminate erratic or jittery cursor movement, ragged lines, or random touch points being registered by the controller.

Use the Noise Check option to adjust the frequency level.

When to Adjust the Controller Frequency

You should adjust the controller frequency in the following cases:

- After you initially install TouchWare.
- Any time you change the video mode or video resolution of your monitor. The video resolution, for example 640*x*480 or 800*x*600, is sometimes referred to as *desktop area* (in Windows 95). Your monitor's video card determines the available resolutions.
- Any time you move the touchscreen and controller, change the touchscreen mounting equipment, or move electrical equipment near your touchscreen and controller.
- Any time the cursor movement is erratic or jittery, or the controller is registering random touch points.

Adjusting Frequency for the Current Environment

You should adjust the controller frequency and test the touchscreen using the environmental conditions that your touch application will use.

Frequency can be influenced by environmental conditions, such as other electrical equipment in the area of the touchscreen controller, the touchscreen mounting equipment, and the monitor itself.

If you move the touchscreen and controller after you adjust frequency, you need to readjust it for the new environment. If you change the touchscreen mounting equipment or move new electrical equipment close to the touchscreen and controller, readjust frequency.

Additionally, you should always adjust frequency using a MicroTouch tool designed for the *operating system* that your touch application will use. Refer to Table 12 for the MicroTouch tool you should use to adjust the controller frequency.

Table 12. Frequency Tools

Controller	Touch Environment	Frequency Tool
All except ThruGlass and TouchPen	Windows	Windows Touchscreen control panel
	DOS	Microcal
TouchPen	DOS or Windows	Microcal
ThruGlass	Windows	Windows ThruGlass control panel
	DOS	DOS ThruGlass control panel

Adjusting Frequency for Finger and Touch Pen

You can adjust the controller frequency for use with a pen device or a finger. The optimum frequency level may be different for the pen and the finger, therefore you adjust each touch method separately. You may find that the performance of one touch method is fine, while the other touch method needs the frequency adjusted.

If you are using a TouchPen controller, the Noise Check option prompts you about whether you want to set the frequency for the pen or finger. If you need to set the frequency for both touch methods, you can run Noise Check for each touch method.

If you will be using the touch application in Windows, after changing the frequency, exit Microcal and check the new frequency in Windows.

About Noise Check

You use the Noise Check option in Microcal to adjust the controller frequency.

Before you modify the operating frequency of the touchscreen controller, familiarize yourself with Noise Check and frequency adjustment considerations.

Accessing the Noise Check Option

You access the Noise Check option from different locations, depending on your touchscreen controller.

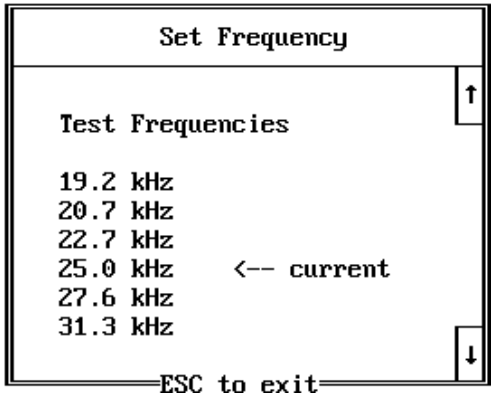
- Noise Check might be located on the Main menu.
- Noise Check might be located on the Diagnostics menu.

There are two noise check programs available. The noise check program opened by Microcal depends on the type of touchscreen controller you are using.

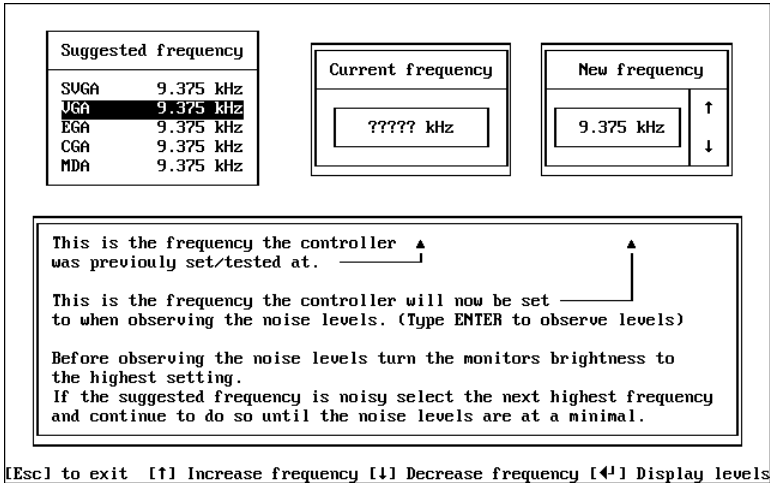
This manual refers to the noise check programs as Automatic Frequency Adjust and Manual Frequency Adjust. Instructions for using these two programs follow this section. Determine which noise check program your controller uses, and consult the appropriate instructions.

To determine which noise check program your controller uses, select the Noise Check option and look at the first screen.

Automatic Frequency Adjust displays the following screen:



Manual Frequency Adjust displays the following screen:



Using Automatic Frequency Adjust

Use the Noise Check option to test the available frequency levels and determine the best frequency. You can set a new operating frequency, and then check the behavior and performance of the touchscreen at that frequency level.

Testing Frequency Levels and Selecting a New Frequency

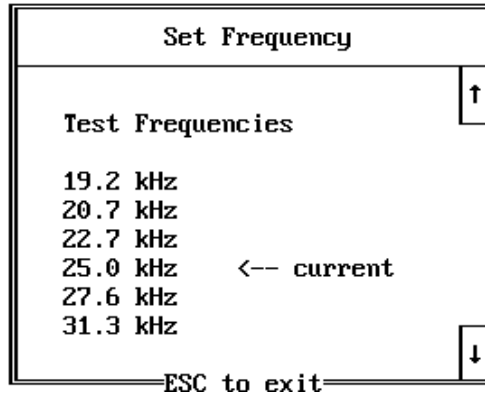
▶ To test operating frequencies and set a new frequency:

1. Choose Noise Check from the Microcal Main menu or Diagnostics menu.

   If you are using a TouchPen controller, a dialog box appears asking if you want to adjust the frequency for pen or finger. Specify the touch method for which you want to adjust the frequency.

   You may see an initializing screen as Microcal does a preliminary check of the frequency levels.

   The Set Frequency dialog box appears.



2. Choose Test Frequencies. Microcal displays a testing area.

3. Press the space bar to begin testing.

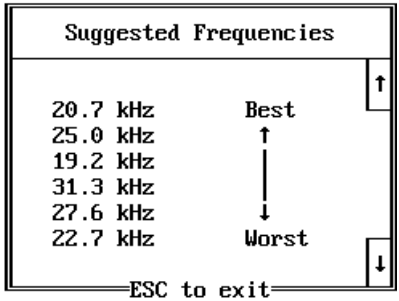
Caution: Do not touch the screen during the test. The test is measuring the amount of noise when you are not touching the screen.

Microcal tests each frequency level and determines the optimum setting based on the current noise the touchscreen is receiving.

When the test is complete, read the instructions displayed on the screen.

4. Press Esc to close the instruction box.

   Microcal displays a list of frequencies and highlights the suggested frequency.



5. Use the arrow keys to select the desired frequency and then press Enter. Select a frequency that is at or near the top of the list.

   A dialog box warns that you are about to change the controller operating frequency and asks for confirmation. To change the frequency, type **Y**.

6. Type **Y** to open the Draw program and test the touchscreen performance at the new frequency. Test as follows:

   Draw lines on the screen. Check that they are smooth and thin. If the lines that are wide and have ragged edges, the frequency level is probably not correct for your controller. Try another frequency.

   If the cursor is erratic or jittery or the controller is registering random touch points, adjust the frequency.

   For information about using the Draw program, refer to “Drawing and Testing” earlier in this chapter.

   The touchscreen automatically uses your new frequency setting each time you start up the system. The selected frequency remains set until you change it again.

Note: Any time you change the frequency, be sure to calibrate the screen again. For more information, refer to “Calibrating the Touchscreen Using Microcal” earlier in this chapter.

Using Manual Frequency Adjust

You can use the Noise Check option to set a new operating frequency, test the frequency, and try other frequency levels if necessary.

Question Marks in the Current Frequency Box

Every time you start Microcal and select the Noise Check option, the Current Frequency box displays question marks (????). These question marks indicate that Microcal has no way of detecting the current operating frequency for the controller. Microcal cannot show you the current frequency.

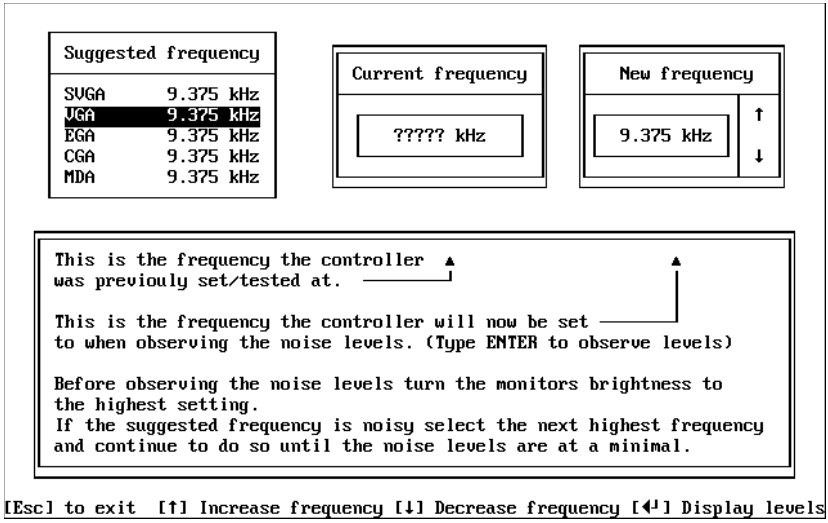
As you select, save, and test different frequencies, Microcal displays the currently saved frequency and the new frequency you are about to test. If you do not save a frequency during the edit session, the Current Frequency still displays question marks.

Selecting a New Frequency

▶ To display and test a new operating frequency:

1. Choose Noise Check. Depending on your controller type, Noise Check is located on the Microcal Main menu or the Diagnostics menu.

   The following screen appears:



2. Use the up arrow key to increase the frequency; use the down arrow key to decrease the frequency. The New Frequency box displays the frequency you selected.

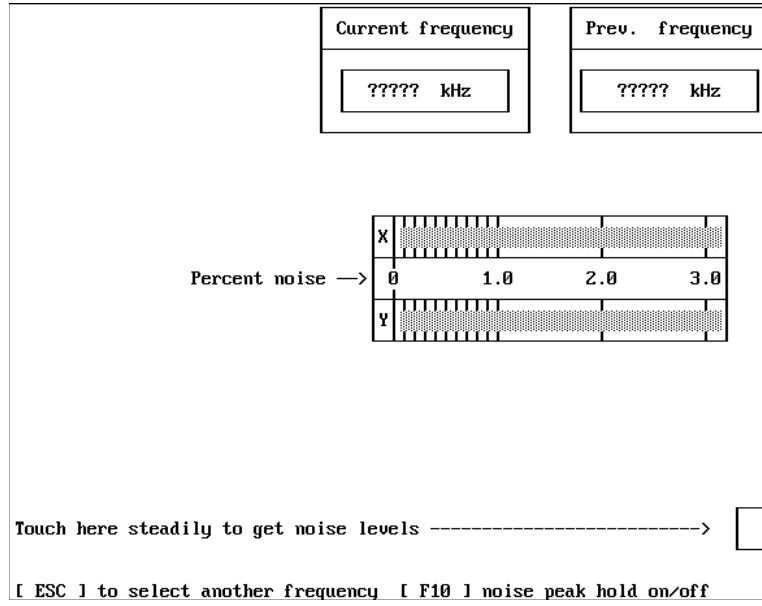
Before you save the new frequency, always test the frequency and see if it improves the performance of the touchscreen.

Testing the Newly Selected Frequency

▶ To test the selected operating frequency:

1. Turn the monitor's brightness to the highest setting.
2. Press Enter to display the noise levels. A dialog box warns that Microcal cannot detect the current frequency and prompts for confirmation that you want to change the frequency.

3. Type **N** to view the noise levels without changing the current frequency. The following screen appears:



4. Touch the box in the lower right corner and hold your finger to the screen.
5. Observe the fluctuating bars in the Percent Noise plots. Look at the peak noise plot with the current setting, and then try other frequency levels. The best setting is between 0 and 1.0 (the lower the better).
6. Press F10 to hold the bar at peak.

The objective is to reduce the peak and average noise levels in these plots by changing the frequency.

Continue to adjust the frequency until you find the best setting. If you can obtain a good performance at many frequencies, choose the highest frequency to obtain optimum performance. In general, a higher frequency produces a stronger signal.

If you still need to adjust the frequency, press Esc to return to the Noise Check screen.

Saving the Operating Frequency

▶ To save the operating frequency:

1. Make sure the New Frequency box displays the frequency you want to save.
2. Press Enter to display the levels.
3. Type **Y** to save the frequency.

The touchscreen automatically uses your new setting each time you start up the system. The selected frequency remains set until you change it again.

Note: Any time you change the frequency, be sure to calibrate the screen again. For more information, refer to "Calibrating the Touchscreen Using Microcal" earlier in this chapter.

Setting the Baud Rate

You can reset the touchscreen controller to a specific communication rate (baud rate). The new baud rate is stored in the controller's memory.

Matching Controller and Driver Baud Rates

When you use Microcal to change the baud rate, you are changing the rate at which the touchscreen controller communicates. You must make sure the touchscreen driver uses the same baud rate. If the baud rates are different, the controller and the touchscreen cannot communicate.

You have several options for changing the baud rate used by the touchscreen driver.

- You can install TouchWare again and specify the new baud during the installation.

- If you are using the Windows touchscreen driver, you can edit the BaudRate setting in the [Windows Touchscreen] section in the SYSTEM.INI file. Refer to Appendix A for more information.
- If you are using the DOS touchscreen driver, you can edit the BaudRate setting in the DOSTOUCH.INI file. Alternatively, you can specify the baud rate on the command line when you load the DOS touchscreen driver. Refer to Appendix A for more information.

Controller Restrictions

Depending on the type of touchscreen controller connected to your system, Microcal may not have a Baud Rate option on the Main menu. For these controllers, you need to use the AutoBaud Detection option on the Configure menu. You must first disable the AutoBaud feature and then set the communication rate. For more information, refer to "AutoBaud Detection and Disabling" later in this chapter.

If you are using a MousePort controller, you do not have a Baud Rate option. There is no baud rate associated with MousePort controllers.

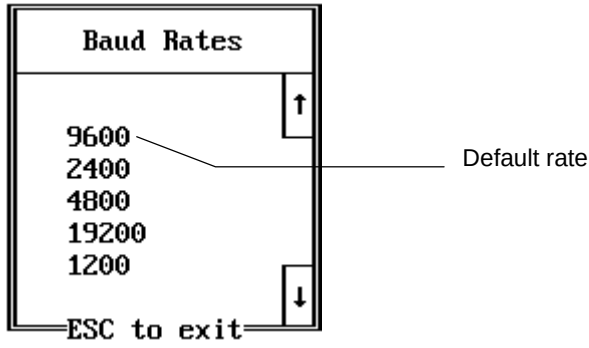
If you are using a ThruGlass controller, you cannot change the baud rate using Microcal.

Using the Baud Rate Option

▶ To reset the baud rate:

1. Select Baud Rate from the Main menu.

   A dialog box lists the supported baud rates. The default baud rate for all MicroTouch controllers is 9600.



2. Select the baud rate that you want and press Enter.

   Microcal closes the Baud Rates dialog box, sets the controller to the new baud rate, and updates the information in the Status box.

Testing the Monitor Video

The Color Bars option and the Color Purity option let you test the monitor video.

Caution: You do not need to use the Color Bars and Color Purity options unless you are assembling or repairing touchscreen monitors.

Any time you disassemble a monitor to install a touchscreen or to repair another monitor component, use these commands to test that the video output is still functioning properly. If the video does not function properly, there is a problem with the monitor hardware. Possible explanations are as follows:

- You forgot to connect all wires or failed to connect the wires properly.
- You bent one or more pins on the CRT.
- You did not install the video board correctly.
- The video board is bad.

Your initial test verifies that the video functioned properly before you did any work on the monitor. You can also compare your results with the results you get after you install the touchscreen.

Note: The Color Bars and Color Purity options test the video output of the monitor. These options *do not test* the touchscreen.

Color Bars

When you select the Color Bars option, Microcal displays 16 bars that span the color spectrum from black to white.

When examining the colors, check the following items:

- Look at each color. Check that each color matches the description below the bar.
- Look at the edges of each color bar. Check that a color does not bleed at the edge or spread into other colors.
- Use the left and right arrow keys to change the color of the border around the edge of the screen. Check that the color is the same around the entire screen edge.

If you notice some problems, try adjusting the contrast and brightness controls on the monitor. These controls help optimize color convergence.

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

▶ To exit from Color Bars and return to the Main menu, press Esc.

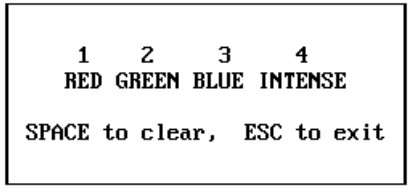
Color Purity

Every monitor has three electron guns (or signals) that send the primary colors – red, green, and blue – to the screen. The Color

Purity option lets you test that each electron gun works properly. You can test each primary color individually. You can also test combinations of these colors to produce the same 16 colors shown in the Color Bars option.

The advantage of the Color Purity option is that the color fills the screen. You can check a color for a consistent appearance and saturation across the screen.

When you select the Color Purity option, Microcal fills the screen with black and displays the following dialog box:



▶ To use the Color Purity option, press the following keys:

- To toggle the dialog box on and off, press the space bar.
- To toggle a particular color gun on or off, press the appropriate numeric key (1, 2, or 3). Angled brackets, for example <1>, indicate the color gun is on.
- To toggle the intensity of the selected color, press 4.

Table 13 shows 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, such as the Text button or terminating switches, are

set properly. For more information on these controls, refer to the documentation on 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 a bad video indicates a hardware problem with the monitor, not the touchscreen.

▶ To exit from Color Purity and return to the Main menu, press Esc.

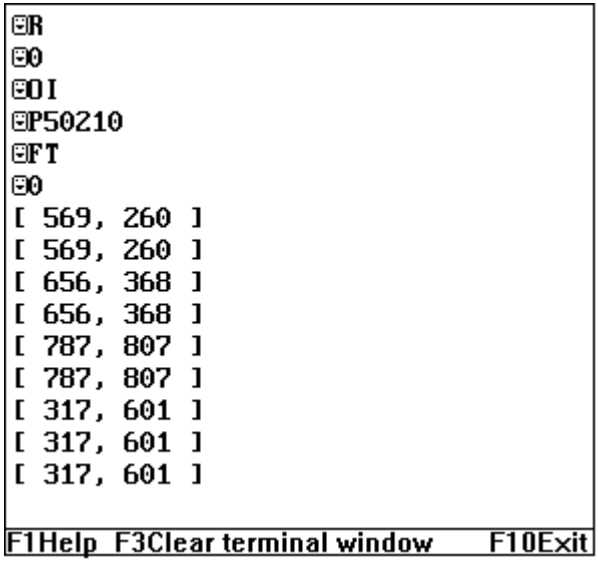
Table 13. Testing Colors with Color Purity

Color	Red	Green	Blue	Intense
Black	Off	Off	Off	Off
Gray	Off	Off	Off	On
Blue	Off	Off	On	Off
Light Blue	Off	Off	On	On
Green	Off	On	Off	Off
Light Green	Off	On	Off	On
Cyan	Off	On	On	Off
Light Cyan	Off	On	On	On
Red	On	Off	Off	Off
Light Red	On	Off	Off	On
Magenta	On	Off	On	Off
Light Magenta	On	Off	On	On
Brown	On	On	Off	Off
Yellow	On	On	Off	On
Light Gray	On	On	On	Off
Light White	On	On	On	On

Using Terminal Emulation Mode

Use Terminal Emulation mode to send firmware commands directly to the touchscreen controller and to view touch position data sent from the controller.

▶ To access Terminal Emulation mode, press F4.



You must enter commands in all uppercase characters. When you press Enter, Microcal sends the command to the touchscreen controller at the current baud rate. For a description of the available firmware commands, refer to the *Touch Controllers Reference Guide*.

A response may indicate the controller successfully executed the command, may report the output identity of the controller, or may display the X, Y coordinate position of your touch on the screen.

How Terminal Mode Displays Characters

Carriage returns and line feed characters are not displayed but will move the cursor. Carriage returns also cause a line feed.

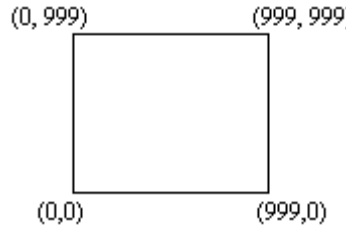
Characters with an ASCII value of less than 32 or greater than 127 appear as characters in the IBM-PC extended character set. It may be useful to obtain a copy of the IBM character set.

How Terminal Mode Displays Touch Coordinates

Touching the screen when in Terminal Emulation mode results in the display of the X, Y screen position.

The touchscreen controller outputs data in format tablet (binary). However, displaying the X, Y screen position as binary output is not useful. Therefore, the Microcal Terminal Emulation program automatically converts the binary data to decimal format and displays the X, Y coordinate using a scale of 0 – 999.

For a properly calibrated controller, the lower left corner of the touchscreen is at [0, 0]. The upper right corner of the touchscreen is at [999, 999]. The following illustration shows the X, Y position returned when you touch the corners of the screen.



Some earlier touchscreen controllers support several data formats. If you are using these controllers, send a Format Decimal command to change the controller's output format. After the controller is in Format Decimal, touching the screen displays the X, Y coordinate using a scale of 0 – 999 as described above.

Keys Available When Using Terminal Emulation Mode

Table 14 lists the keys you can press when using Terminal Emulation mode.

Table 14. Keys for Terminal Emulation Mode

Press …	To …
F1	Display help information.
F3	Clear the information in the terminal window.
F10	Exit from Terminal Emulation mode.

Setting the Video Mode

Before changing the video mode, check the Status box to determine the video card detected as well as the video mode currently in use.

▶ To change the video mode, press F5. Each time you press F5, the Status box displays the new video mode. Continue to press F5 until the desired video mode is displayed in the Status box.

The available video modes are as follows:

- CGA
- EGA color
- VGA color
- TEXT color

If you change the video mode, be sure to adjust the controller frequency. Also calibrate the touchscreen again because the display areas for the various video modes are different.

Resetting Microcal

▶ To reset Microcal to its *initial state*, press F6.

When you reset Microcal to its initial state, the system

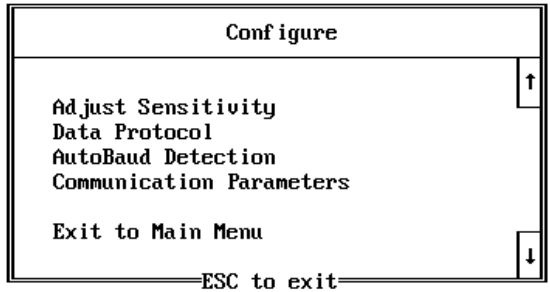
- Resets all menu options
- Sets the communication settings to the defaults
- Sets the Status box to Search not activated

You need to select the Find Touchscreen option before you can select other Microcal options.

Configuration Settings

Depending on the type of touchscreen controller attached to your system, Microcal may include a Configure menu.

The Configure menu lets you change the following settings: sensitivity, data protocol, AutoBaud detection (and baud rate), and communication parameters.



Adjusting the Sensitivity

MicroTouch sets the sensitivity of each touchscreen controller during the manufacturing process. The default sensitivity is optimal for most touch applications.

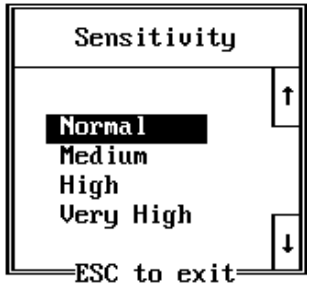
However, you may want to adjust the touch sensitivity for differences in systems and touchscreen implementations.

Note: If you are using a ThruGlass controller, you cannot use Microcal to adjust the controller's sensitivity. Instead, you must use the ThruGlass control panel. For more information, refer to Chapter 3.

To adjust the touchscreen controller sensitivity:

1. Select Configure from the Microcal Main menu.
2. Select Adjust Sensitivity.

   The Sensitivity menu appears.



3. Select a sensitivity setting and press Enter.

Data Protocol

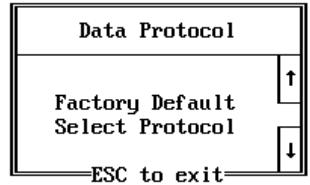
The data protocol defines how the controller sends information to and receives information from the PC. The default protocol is format decimal and mode stream.

The Data Protocol option lets you select the format and mode for how the controller communicates with the touchscreen. When the setting is entered, the change occurs immediately.

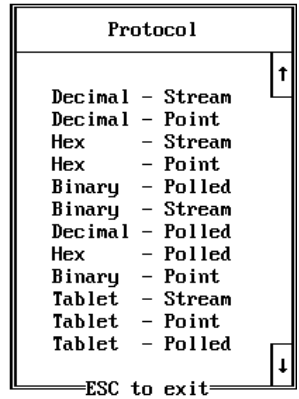
▶ To set the protocol:

1. Select Configure from the Microcal Main menu.
2. Select Data Protocol.

   A dialog box prompts for confirmation that you want to change the controller's default format and mode.
3. Type **Y**. The following menu appears:



4. Select one of the following options:
   - To return to the default setting of format decimal and mode stream, choose Factory Default.
   - To set a new protocol, choose Select Protocol to open the Protocol menu.



5. Highlight the desired protocol and then press Enter to save the highlighted format and mode as the new data protocol.

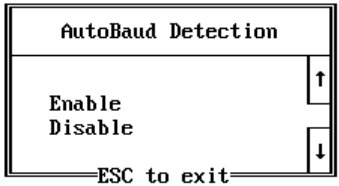
The list of available protocols varies depending on your touchscreen controller.

Note: If you select a Tablet format, you must also set the controller's communication parameters to N, 8, 1.

AutoBaud Detection and Disabling

AutoBaud detection is available in some MicroTouch controllers, but may not be supported in future products.

MicroTouch recommends that you disable the AutoBaud feature and manually set the baud rate.

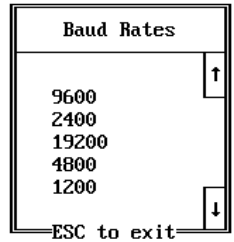


Note: Before setting the baud rate, check "Setting the Baud Rate" earlier in this chapter for information on controller restrictions and matching the controller and touchscreen driver baud rates.

▶ To reset the controller to a specific baud rate:

1. Select Configure from the Microcal Main menu.
2. Select AutoBaud Detection.
3. Select Disable and press **Y** to confirm.

   Microcal displays a list of baud rates from 1200 to 19200.



4. Select the baud rate and press Enter.

When you select a new baud rate, the system locks the baud rate that the controller must use. Disabling the AutoBaud feature lets the controller automatically reset itself when power is applied at the redefined baud rate. To lock in the baud rate, power down the system for 10 seconds and then restart.

You may need to enable AutoBaud detection for certain applications to work. If you enable the AutoBaud feature, Microcal polls the controller and gets the default setting.

Communication Parameters

The communication parameters define the method of communications between the controller and the RS-232 serial port. The communication parameters define the following items:

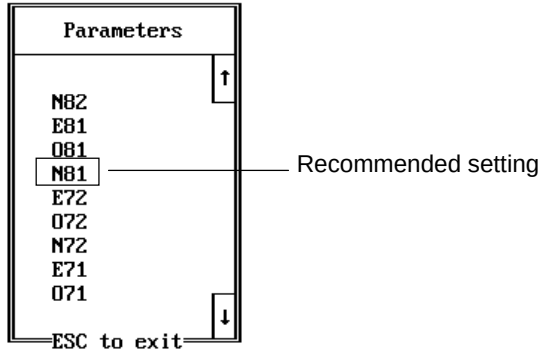
- Type of parity (N=none, E=even, and O=odd)
- Number of data bits (7 or 8)
- Number of stop bits (1 or 2)

When changing the communication parameters, keep in mind the following rules:

- If you are using Format Tablet, you must use N81.
- The touchscreen driver must be using the same communication parameters as the touchscreen controller. The Windows touchscreen driver uses N81.

▶ To change the default communication parameters:

1. Select Configure from the Microcal Main menu.
2. Select Communication Parameters. The following menu appears:



3. Highlight the parameters you want and then press Enter.

   The controller stores the changes in non-volatile memory. Therefore, your changes remain in effect until you change them again.

Microcal Command Options

When you enter the Microcal command, you have several options for specifying the COM port and communication parameters being used by the touchscreen. For example, you can load Microcal to go right to the correct COM port for the touchscreen, without the usual polling.

For a list of Microcal startup options, access the DOS command prompt and enter the following command:

MICROCAL /?

The syntax for the Microcal command is as follows:

MICROCAL [[/**A***nnnn*] [/**B***nnnnn*] [/**C***n*] [/**D***n*] [/**I***nn*] [/**P***c*] [/**S***n*]] | [/**M**]

The command options are:

Option	Purpose	Valid Entries	Default
/**A***nnnn*	Port base address	200H – 3F8H	3F8H
/**B***nnnnn*	Baud rate	1200, 2400, 4800, 9600, 19200	9600
/**C***n*	COM port	1 – 7	1
/**D***n*	Data bits	7 or 8	8
/**I***nn*	Interrupt request number	2, 3, 4, 5, 7, 9, 10, 11, 12, 15	4
/**P***c*	Parity	N=none, E=even, O=odd	N
/**S***n*	Stop bits	1 or 2	1
/**M**	Mouse port	N/A	N/A

When specifying command options, note the following items:

- Port base address and IRQ number override COM port selection.
- IRQ2 and IRQ9 are the same on an AT-class PC.

Quitting Microcal

▶ To exit from Microcal and return to the DOS prompt:

1. Access the Microcal Main menu.
2. Select Exit to DOS.

Additionally, you can press Esc to exit from any option or menu. Pressing Esc returns to the previous menu. If you are accessing the Main menu, pressing Esc exits from Microcal. Microcal always prompts for confirmation before exiting from the diagnostic utility.

C H A P T E R 6

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 phone Help Desk, Internet, and online Bulletin Board. For more information on technical support, refer to the “About This Manual” section at the beginning of this document.

Troubleshooting Tips and Tools

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

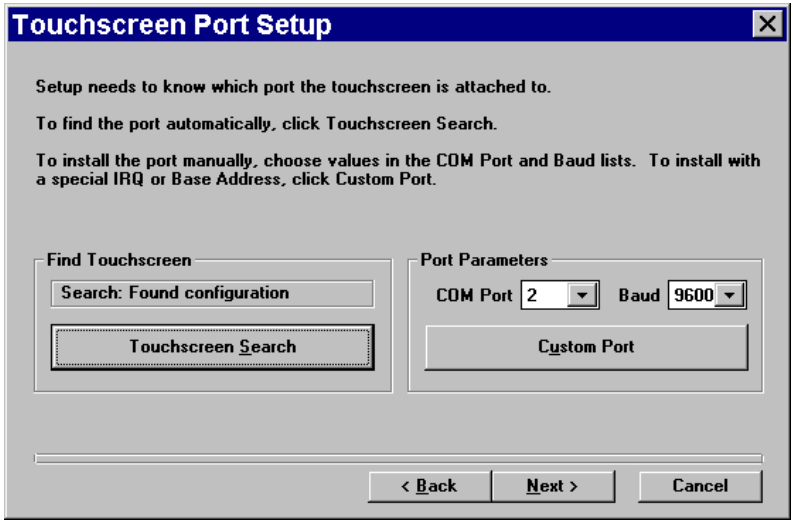
For cursor adjustments, you may need to calibrate the touchscreen, define a cursor offset, or adjust the controller's frequency.

Use the Microcal Diagnostic utility to locate the touchscreen controller and test the touchscreen. For more information on Microcal, refer to Chapter 5.

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

▶ To correct the communication settings:

1. Run Microcal.
2. Note the COM port, IRQ, and baud rate settings being used by the touchscreen controller. The Microcal Status box displays this information.
3. Install TouchWare again and make sure you specify the correct communication settings.



Common Problems

This section lists common problems experienced by users working with the touchscreen software.

Problem: **Cannot activate items by tapping the touchscreen.**
Use the Touchscreen control panel to reset the double-click speed. If you tap slowly, be sure to set the double-click speed to slow in order for the second tap to register with the system.

For more information on making these adjustments, refer to Chapter 2.

Problem: **Cannot operate 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 or IRQ creates device conflicts. Additionally, the touchscreen must have a unique IRQ. The touchscreen cannot share an IRQ with another device.

Problem: **Cursor does not display on the screen after starting Windows.**
May indicate that some files have been corrupted or altered, or that the setup has been changed. Possible explanations are as follows:

- Check that the TOUCH.DRV file (that is, the touchscreen driver for Windows) has not been moved from the directory used at installation.
- Review how you installed the software for the Windows touchscreen driver. If you specified that you are using a mouse with the touchscreen, but do not have a mouse connected to your computer, the cursor will not display on the screen. You can either connect a mouse or load the MTSMOUSE.DRV.
- Open the Windows touchscreen control panel and make sure the Cursor Off option is not selected.
- Review the Windows Setup before starting the program and make sure the MicroTouch touchscreen is selected as the mouse device.

Problem: **Cursor does not move properly in a DOS touch application.**
Recalibrate the touchscreen. For more information on how to calibrate the touchscreen, refer to Chapter 2.

If the problem still exists after you recalibrate, check the video mode being used by the monitor. If the monitor is using a non-standard video mode, you need to define the actual image area of the touchscreen. For more information, refer to the ReadMe file.

Problem: **Cursor does not reach out to the edges of the screen.**
Try recalibrating 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 Horizontal Offset option in the Windows Touchscreen control panel. For more information on offsets, refer to Chapter 2.

Problem: **Cursor is jittery.**
You need to adjust the frequency level of the controller.

Problem: **Cursor jumps or bounces suddenly across the screen**
The touchscreen receives more than one touch simultaneously. When you touch the screen, be sure to point and touch with one finger only. Keep your other fingers away from the touchscreen.

Problem: **DOS touchscreen driver does not load.**
Open the AUTOEXEC.BAT file and look for other drivers that are automatically being loaded when you start your computer. Make sure no other driver uses the same COM port as the touchscreen. To load the DOS touchscreen driver, enter the DOSTOUCH command at the DOS prompt. You can also add a command line to the AUTOEXEC.BAT file to automatically load the driver when you start your computer. For more information, refer to Chapter 1.

Problem: **Lines are not straight and smooth.**
You need to adjust the frequency level of the controller.

If you can obtain a good performance at many frequencies, choose the highest frequency to obtain optimum performance. In general, a higher frequency produces a stronger signal.

Problem: **Sluggish performance of touch**

- Systems that cannot handle higher data rates from the pen may result in degraded pen performance. To improve performance on these systems, select a slower baud rate.
- The controller baud rate must equal the baud rate used by the designated COM port and touchscreen driver. To change the baud rate used by the touchscreen driver, edit the SYSTEM.INI or the DOSTOUCH.INI files. To change the baud rate used by the controller, use the Microcal utility.
- With specific video cards, you may notice finger touch performance lagging behind when using a pen controller. In Windows 95 this relates to the video card drivers. Lowering the baud rate will improve performance.

Problem: **Windows does not run after installing the TouchWare software.**
Indicates that there is no MOUSE.DRV file on your PC. This problem may occur when you upgrade the TouchWare 3.0 software.

In TouchWare 3.0, the touchscreen driver replaced the mouse driver. However, with the latest software release, the touchscreen and the mouse work in conjunction with one another. The Setup program defines the mouse driver as MOUSE.DRV in the SYSTEM.INI file. If you are using a different mouse driver, Windows cannot run because it is trying to load the MOUSE.DRV file. To correct this problem, you can edit the SYSTEM.INI file and specify the correct mouse driver. If you are not using a mouse, enter MTSMOUSE.DRV (the MicroTouch cursor display driver for Windows) in the SYSTEM.INI file.

```
[boot]
mouse.drv=C:\MTS\TOUCH\MTSMOUSE.DRV
```

Error Messages

This section lists the error messages you may receive when installing TouchWare or using the Touchscreen or ThruGlass control panels. The messages are listed in alphabetical order.

Error: **Incorrect WinTgCal.INF**
The ThruGlass touchscreen type is incorrect. Open the ThruGlass control panel and specify the correct touchscreen type. For more information, refer to Chapter 3.

Error: **Invalid touchscreen destination path**
You used an incorrect format when specifying the destination path. Be sure to include a backslash (\ ) before a directory name.

Error: **MicroTouch Mouse Emulator not installed**
You tried to open the DOS Touchscreen control panel (DOSPANEL.EXE), but the DOS touchscreen driver is not loaded. To load the DOS touchscreen driver, enter the DOSTOUCH command at the DOS prompt. You can also add a command line to the AUTOEXEC.BAT file to automatically load the driver when you start your computer. For more information, refer to Chapter 1.

Error: **Pen controller not found.**
You tried to set the pen mode, and either your pen or your 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 in your system, review the installation procedures and verify all hardware is properly connected.

Error: **Please use the ThruGlass control panel to change frequency settings.**
You tried to adjust the ThruGlass controller and controller frequency using the touchscreen control panel. Use the ThruGlass control panel to adjust the frequency.

Error: **The controller is not responding. This might indicate that your port assignment is incorrect or that the controller is not a MicroTouch ThruGlass controller.**
You tried to open the ThruGlass control panel and one of the following situations exist:

- You do not have a ThruGlass controller attached to your system.
- The hardware is not properly connected. Check the serial port and ThruGlass controller cable connections. Check that the ThruGlass controller cable does not have any kinks and that connector pins are not bent.
- You specified the wrong COM port, IRQ number, or baud rate when you installed TouchWare. Rerun the Setup program and specify the correct communication settings.

Error: **Touch LOCKED OUT at this frequency due to noise level.**
You cannot use the touchscreen at this frequency. There is too much interference (noise). Use the mouse or the shortcut keys to change to a different frequency or to reset the controller and touchscreen to the factory default settings.

Error: **Unable to communicate with the touchscreen**
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.
- 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
- Table 15 later in this chapter 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 you specified the correct COM port, IRQ number, and baud rate when you install the touchscreen software. Try running Microcal and searching all communication ports. If Microcal cannot find the Touchscreen controller, the controller is not connected to the system or you specified the wrong communication parameters during setup. Rerun the Setup program and specify the correct communication settings.

Error: **Unable to locate the installation log file "C:\mts\touch\deisl1.isu". Uninstallation will not continue.**

During the software installation, TouchWare creates a DEISL1.ISU log file. This file contains the instructions necessary to uninstall TouchWare. Do not delete the DEISL1.ISU file. The program cannot uninstall TouchWare if the log file is deleted.

Error: **Windows x.x is running in 386 Enhanced mode.**
****** Device not found ******

You can run the DOS touchscreen driver from a full-screen DOS session within Windows. However, the Windows touchscreen driver cannot be running. Error message reads: "Windows x.x is running in 386 Enhanced mode. Device not found."

This means either the Windows Touchscreen driver is loaded or the COM port/IRQ designations are incorrect.

Error: **You cannot perform this function when touch is locked.**
You tried to open a ThruGlass control panel while the touchscreen is not working due to one of the following:

- The ThruGlass touchscreen type is not set. Use the ThruGlass control panel to specify the touchscreen type and adjust the frequency.
- The frequency setting does not work with the touchscreen. Use the ThruGlass control panel to change to a different frequency, and then try opening the control panel again.

Error: **You cannot run more than one instance of the ThruGlass control panel or other configuration applications.**
You tried to use more than one MicroTouch utility at the same time. Close any open MicroTouch utilities before trying to use another.

Error: **You must exit Touch Terminal before you can resume control panel operation.**
You tried to reopen the ThruGlass control panel while the touch terminal is still open. Exit from the touch terminal before trying to reopen the control panel.

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.

Status Light on the Controller

Some touchscreen controllers have a light-emitting diode (LED) that provides the status of the touchscreen unit and monitors several diagnostic features in the unit.

If you are experiencing problems with the touchscreen, be sure to check the LED for status information. Refer to Table 15.

Table 15. LED Status Information

Status of LED	Meaning
Bright	Indicates one of the following conditions: • Power has been applied to the controller, but communication with the controller has not been started. • Controller has been initialized and the sensor is being touched.
Continuously Dim	Indicates the controller received a Reset command.
Blinking	Indicates the power-on self-test failed. A blinking status light usually indicates there is a problem with the controller hardware, such as a RAM error, ROM error, or NOVRAM error. Contact MicroTouch for additional information.

A P P E N D I X A

Settings, Commands, and System Files

This chapter defines the touch driver settings stored in the system files. It also describes other ways to access the Touchscreen control panel.

Touchscreen Driver Settings

You can define settings for the touchscreen by using the Touchscreen control panel. TouchWare stores the touchscreen settings in several system files. The system files contain information that defines your working environment. Windows, DOS, and applications use the information stored in system files.

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

- If you make changes to the Windows Touchscreen control panel, TouchWare saves all changes, except double-click speed, in the SYSTEM.INI file. For Windows 95, TouchWare saves the double-click information in the system registry. For Windows 3.1, TouchWare saves the double-click information in the WIN.INI file.
- When you specify the ThruGlass touchscreen type in the ThruGlass control panel, the system saves the information in the SYSTEM.INI file.
- If you make changes to the DOS Touchscreen control panel, TouchWare saves your changes in the DOSTOUCH.INI file.

All .INI files are text files that you can open, view, edit, and save using any editor or word processor that reads ASCII text files. The operating system reads the settings when the driver loads into memory.

Caution: Be careful when making changes to a .INI file or to the system registry. Making incorrect entries in these files may prevent Windows from operating.

Double-Click Settings in WIN.INI or System Registry

The Double-Click Speed setting affects both the touchscreen and the mouse. You can change the double-click speed by using the Touchscreen control panel or the Mouse control panel. Altering the double-click speed for the touchscreen also changes the setting for the mouse, and vice versa.

For Windows 95, TouchWare stores the double-click speed, height, and width values in the system registry.

For Windows 3.1, TouchWare stores the double-click speed, height, and width values in the WIN.INI file.

DoubleClickSpeed=550
DoubleClickWidth=32
DoubleClickHeight=24

To change the speed of a double-click, you can use the Touchscreen control panel. When you save your changes, TouchWare automatically writes the new double-click speed information to the system registry (Windows 95) or the WIN.INI file (Windows 3.1).

To change the height and width of a double-click, you must edit the system registry (Windows 95) or the WIN.INI file (Windows 3.1).

For more information on modifying the height and width of a double-click, contact MicroTouch technical support.

Settings in the SYSTEM.INI File

When you install the Windows touchscreen driver, TouchWare automatically adds the following lines to the SYSTEM.INI file.

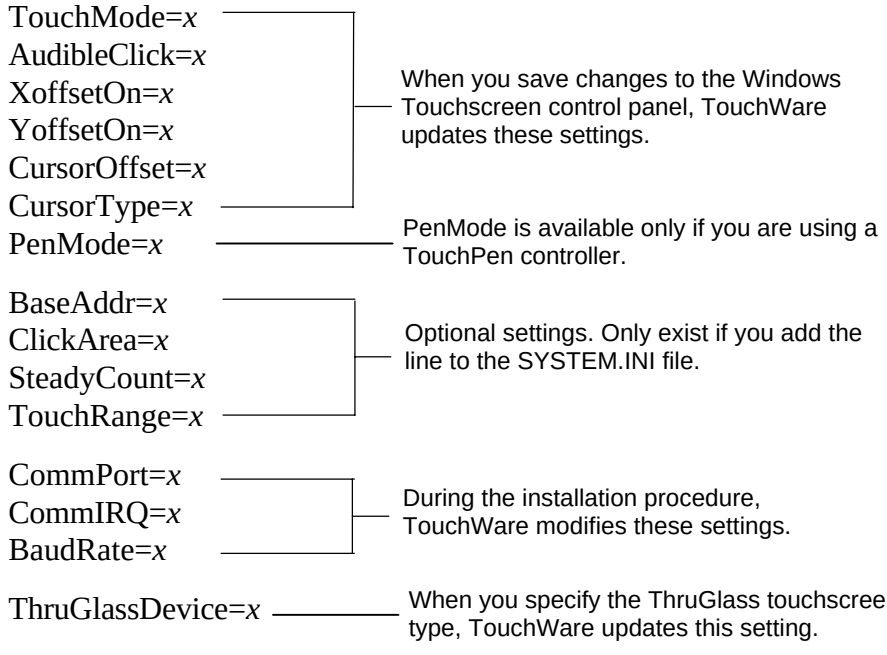
[boot]
drivers=mmsystem.dll touch
mouse.drv=c:\mts\touch\mtsmouse.drv (only if you are not using a mouse with the touchscreen.)

[boot.description]
mouse.drv=MicroTouch Touchscreen Vx.x

[drivers]
touch=c:\mts\touch\touch.drv

[386Enh]
device=c:\mts\touch\touch.386

[Windows Touch Screen]

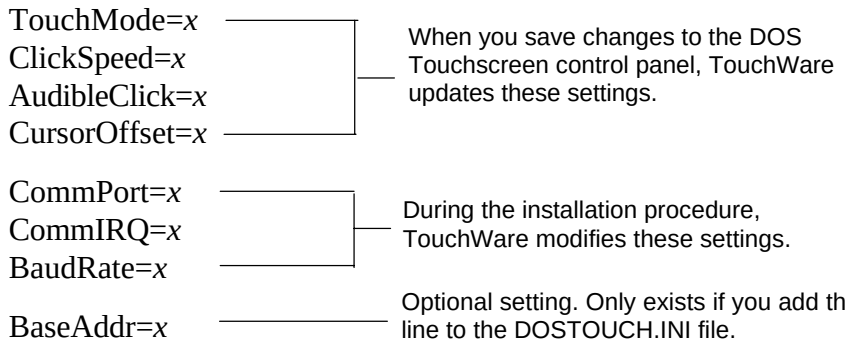


Refer to Table 16 for a list of allowable values for each setting.

Settings in the DOSTOUCH.INI File

When you install the DOS touchscreen driver, TouchWare creates the DOSTOUCH.INI file with the following lines:

[DOS Touch Screen]



Refer to Table 16 for a list of allowable values for each setting.

Additionally, the DOSTOUCH.INI file supports settings for defining non-standard video display modes. For more information on these settings, refer to the ReadMe file.

Allowable Values for Touch Driver Settings

Table 16 lists the touchscreen settings along with the default and allowable values. The syntax for each setting is the name of the setting, followed by an equal sign (=), and a value for that setting.

Note that there are no spaces allowed in the setting names before the equal sign. Also, setting names are not case sensitive.

Table 16. Touchscreen Settings

Setting	Description	Allowable Values
TouchMode	Sets the touch mode, which defines the touch actions that equate to mouse click, double-click, and drag events.	1 = Desktop 2 = Drawing (default) 0 = Button (Windows) 3 = Button (DOS)
AudibleClick	Sets whether to generate a beep when a touch event occurs.	0 = Off 1 = On touchdown (default) 2 = On liftoff
XoffsetOn	Sets whether the horizontal offset is on.	For Windows only. 0 = No (default) 1 = Yes
YoffsetOn	Sets whether the vertical offset is on.	For Windows only. 0 = No 1 = Yes (default)
CursorOffset	Defines the vertical distance between your touch and the position of cursor on the screen.	0 – 512 (units in 2048ths) For Windows, the default is 50. For DOS, the default is 25.
CursorType	Sets whether to display the cursor on the screen.	For Windows only. 0 = Display the cursor (default) 1 = Do not display the cursor
ClickSpeed	Sets the double-click speed.	For DOS only. For Windows, TouchWare automatically writes the new double-click speed information to the system registry (Windows 95) or the WIN.INI file (Windows 3.1). 0 – 7 A total of 8 speeds, where 0 is the slowest speed and 7 is fastest speed. Default is 4.

Setting	Description	Allowable Values
ClickArea	Defines the tap area for touch modes.	For Windows only. To change the height and width of a double-click, you must edit the system registry (Windows 95) or the WIN.INI file (Windows 3.1). 0 – 512 (units in 2048ths) Default is 175.
PenMode	Sets the pen mode.	For Windows and TouchPen controllers. 1 = Pen Only 2 = Finger Only 3 = Pen or Finger (default)
SteadyCount	Defines the delay for desktop mode.	For Windows only. 0 – 100 (units in points) Default is 24.
TouchRange	Defines the amount of monitor interference filtered from the touch values. You may want to adjust this setting if the cursor is unsteady.	For Windows only. 0 – 15 (units in 2048ths) Default is 4.
CommPort	Sets the serial communication port that the touchscreen uses.	1 – 8. Default is 1.
CommIRQ	Sets the number of the interrupt request (IRQ) that handles interrupts from the communication port.	2, 3, 4, 5, 7, 9, 10, 11, 12, 15 Default is 4.
BaudRate	Sets the communication rate.	2400, 4800, 9600, 19200 Default is 9600.
BaseAddr	Overrides the expected base I/O address of the serial communication (COM) port.	Must be specified as a decimal value. Refer to Table 17 for a list of standard addresses.
ThruGlass Device	Sets the ThruGlass touchscreen type.	17” bonded 19-610 17” bonded 33-4200 10” laminated 33-4201

Base Address Settings

The Base Address (BaseAddr) setting overrides the standard address location at which the touchscreen driver expects to find the communication port specified by the CommPort setting.

Table 17 lists the standard addresses for each COM port. You can also specify a non-standard address if used by your configuration.

Note that the table lists the address in both decimal and hexadecimal. However, when specifying the address in the .INI files, you *must* specify the address as a decimal value.

Table 17. Standard Base Addresses

COM Port	Decimal Address	Hexadecimal Address	COM Port	Decimal Address	Hexadecimal Address
COM 1	1016	3F8	COM 5	736	2E0
COM 2	760	2F8	COM 6	752	2F0
COM 3	1000	3E8	COM 7	992	3E0
COM 4	744	2E8	COM 8	1008	3F0

Options When Loading the DOS Touchscreen Driver

To define the settings for the DOS touchscreen driver, you can use the DOS Touchscreen control panel or edit the DOSTOUCH.INI file.

Additionally, you can define settings directly on the command line when you use the DOSTOUCH command to load the DOS touchscreen driver. Settings specified on the command line override settings in the control panel and the DOSTOUCH.INI file.

Table 18 describes the options you can use with the DOSTOUCH command.

Table 18. Options for the DOSTOUCH Command

Option	Description and Valid Entries
/?	Lets you view the complete syntax of the DOSTOUCH command.
OFF	Unloads or disables the DOS touchscreen driver. The driver can be unloaded *only* if it is the last memory resident program that was loaded. If not, it will simply disable itself, but remain in memory.
/COM*#*	Specifies the serial communication port used by the touchscreen. When using the DOSTOUCH command, the valid COM ports are 1 to 4 only. The default is /COM1. If you want to use COM ports 5 to 8, you must specify the correct COM port in the DOSTOUCH.INI file. Optionally, you can define the following communication parameters when you use the /COM option: ,*baud* — Specifies the communication rate. Valid entries are 2400, 4800, 9600, and 19200. The default is 9600. ,*data-format* — Sets the communication parameters. Valid entries are as follows: N81 — no parity, 8 data bits, and 1 stop bit (default). N82 — no parity, 8 data bits, and 2 stop bits. E81 — even parity, 8 data bits, and 1 stop bit. O81 — odd parity, 8 data bits, and 1 stop bit.
/IRQ*#*	Specifies the number of the interrupt request (IRQ). Valid entries are 2–5, 10–12, and 15. The default is 4.
/BAS*:#*	Specifies the base I/O address of the COM port. Refer to Table 17 for a list of standard addresses.

Direct Access to Calibration

You can directly access calibration without opening the Touchscreen control panel. The executable for the Windows control panel is WINPANEL.EXE. The executable for the DOS control panel is DOSPANEL.EXE.

Each executable has a /C option that makes only the calibration screen available on execution.

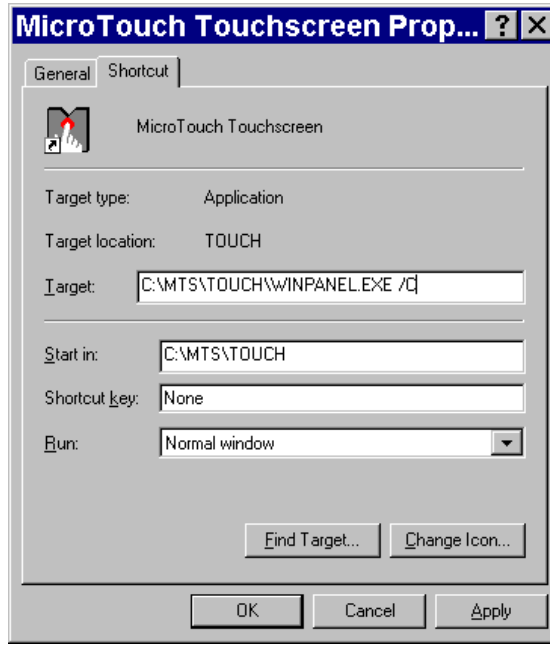
When you specify the /C option, the executable immediately opens the calibration screen, and terminates when the calibration process is completed. The /C option is useful if you want to prevent users from changing other settings in the control panel.

▶ To set up the Windows 95 Touchscreen control panel to use the /C option:

1. Click on the Start button.
2. Point to Programs, and then click Windows Explorer.
3. Open the Tools menu, point to Find, and then click Files or Folders.

   In the Named box, type **MicroTouch TouchWare** and press Enter to begin the search.
4. Select MicroTouch Touchscreen in the list window.
5. Open the File menu and choose Properties.
6. Choose the Shortcut tab.
7. Edit the information in the Target box to include the /C option. For example:

   C:\MTS\TOUCH\WINPANEL.EXE /C



▶ To set up the Windows 3.1 Touchscreen control panel to use the /C option:

1. Highlight the MicroTouch Touchscreen icon.
2. Open the File menu and choose Properties.
3. Edit the information in the Command Line box to include the /C option. For example:

   C:\MTS\TOUCH\WINPANEL /C

   You may also want to change the touchscreen icon to indicate that this is a special version of WINPANEL.EXE. Choose Change Icon to view the available icons and make a selection.
4. Select OK to save your changes and close the Program Item Properties dialog box.

▶ To force the DOS Touchscreen control panel to open the calibration screen only, enter the following command at the DOS prompt:

C:\MTS\TOUCH\DOSPANEL /C

Touchscreen Files

Table 19 lists the touchscreen files for Windows and Table 20 lists the touchscreen files for DOS.

By default, the Setup (or Install) program copies the touchscreen files into the C:\MTS\TOUCH directory. You can change the default directory during the installation process.

Table 19. Touchscreen Files for Windows

File Name	Purpose
CTL3D.DLL	System file required to uninstall TouchWare
DEISL1.ISU	Uninstall instructions; file must exist to uninstall TouchWare
DOSPANEL.EXE	Touchscreen control panel for DOS
DOSPANEL.HLP	Help file for the DOS Touchscreen control panel
DOSPEN.EXE	Pen Configuration utility for DOS
DOSTOUCH.EXE	Touchscreen driver for DOS
DOSTOUCH.INI	Initialization file for the DOS touchscreen driver
DOSTOUCH.OVL	DOS touchscreen driver overlay
MCAL.OVL	Microcal Diagnostic utility overlay
MICROCAL.EXE	Microcal Diagnostic utility
MICROCAL.HLP	Help file for the Microcal Diagnostic utility
MTCONFIG.EXE	DOS Touchscreen Configuration utility
MTS.ICO	MicroTouch Systems icon
MTSMOUSE.DRV	Cursor display driver for Windows; required only if you are *not* using a mouse with the touchscreen
MTTOUCH.HLP	TouchWare help file
QCAL.OVL	Microcal Diagnostic utility overlay
QUICKCAL.HLP	Help file for the Microcal Diagnostic utility

File Name	Purpose
README.TXT	Product information, release notes
REG32.EXE	Registry files for Windows 95
TGCAL.EXE	ThruGlass control panel for DOS
TOUCH.386	Touchscreen driver for Windows enhanced mode
TOUCH.DRV	Touchscreen driver for Windows
TOUCHDLL.DLL	A library of functions used by the Windows Touchscreen control panel
TOUCHMTS.DLL	Library of function calls
TOUCHTRM.EXE	ThruGlass terminal emulation program
TWUNINST.EXE	TouchWare uninstall utility
UNINST16.EXE	Uninstall utility
WINPANEL.EXE	Touchscreen control panel for Windows
WINPEN.EXE	Pen Configuration utility for Windows
WINTGCAL.EXE	ThruGlass control panel for Windows
WINTGCAL.HLP	Help file for the Windows ThruGlass control panel
WINTGCAL.INF	ThruGlass configuration file

Table 20. Touchscreen Files for DOS

File Name	Purpose
DOSPANEL.EXE	Touchscreen control panel for DOS
DOSPANEL.HLP	Help file for the DOS Touchscreen control panel
DOSPEN.EXE	Pen Configuration utility for DOS
DOSTOUCH.EXE	Touchscreen driver for DOS
DOSTOUCH.INI	Initialization file for the DOS Touchscreen driver
DOSTOUCH.OVL	DOS Touchscreen driver overlay
MCAL.OVL	Microcal Diagnostic utility overlay
MICROCAL.EXE	Microcal Diagnostic utility
MICROCAL.HLP	Help file for the Microcal Diagnostic utility
MTCONFIG.EXE	DOS Touchscreen Configuration utility
QCAL.OVL	Microcal Diagnostic utility overlay
QUICKCAL.HLP	Help file for the Microcal Diagnostic utility
README.TXT	Product information, release notes
TGCAL.EXE	ThruGlass control panel for DOS

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