TouchWare for OS/2

User's Guide

MicroTouch®

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TouchWare for OS/2, Version 3.4
Microcal Diagnostic Utility, Version 6.2

Contents

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, which include 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 to customize your touchscreen for your working environment
- 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 that the MicroTouch touchscreen has been installed and connected 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 open, modify, and save files using the basic text editor which is part of the OS/2 operating system.

If you need to learn more about these tasks, refer to the manuals and diskettes that came with your OS/2 operating system and computer.

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 OS/2.

This chapter describes how to

- View the most current information about your version of TouchWare
- Install the touchscreen software
- Test your touchscreen for proper operation
- Uninstall the touchscreen software

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?

TouchWare is a set of software drivers and tools that are necessary for proper operation of your touchscreen. The drivers allow the touchscreen to work with any application you choose to run on your system. The software tools allow you to customize the operation of the touchscreen for your particular environment, maintain optimum performance, and troubleshoot problems, should they arise.

TouchWare for OS/2 includes the following components:

- Touchscreen driver
- Touchscreen control panel
- Pen Configuration utility
- Microcal Diagnostic utility (DOS only application)
- Online help

Touchscreen Driver

TouchWare includes a touchscreen driver for OS/2. The driver is the software that the system uses to communicate with the touchscreen.

The touchscreen driver enables you to use the MicroTouch touchscreen with any applications running in the OS/2 environment. Applications can use touch (finger or touch pen) input without any program modifications.

Touchscreen Control Panel

You use the Touchscreen control panel to set your preferences for the touchscreen. For example, you can select whether

- The touch action occurs when you touch the screen or when you lift your finger (or touch 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 touchscreen operating frequency, and define where the cursor appears relative to your touch (Offset).

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 touch pen, your finger, or both. You only need to use this utility if your touchscreen uses a TouchPen controller.

Microcal Diagnostic Utility

Microcal is a DOS-based diagnostic utility that you can use to test the operation of the touchscreen.

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, or use the terminal emulator to send firmware commands directly to the touchscreen controller. For more information on Microcal, refer to Chapter 4.

ReadMe File

The ReadMe file contains the latest information about TouchWare. This includes enhancement and summary information, as well as any last minute changes and updates.

Online Help

TouchWare includes online help for configuring and using the touchscreen. Help information can be accessed by selecting the Help button displayed in the various touchscreen dialog windows and control panel, or by selecting one of the Help icons in the MicroTouch Touchscreen desktop folder.

System Requirements

The minimum system requirements for installing TouchWare for OS/2 and using the MicroTouch touchscreen are as follows:

- A MicroTouch touchscreen using an SMT2, SMT3, TouchPen, or PC Bus touchscreen controller
- OS/2 operating system version 3.0 or later
- An available serial port (or 16-bit ISA expansion slot if installing a PC Bus touchscreen controller)

Caution: It is a requirement of the OS/2 operating system that you must connect the touchscreen to the next available serial port in sequence. For example, if COM1 and COM2 are already being used in your system, then the touchscreen must be assigned to COM3.

- 3 Mb of available hard disk space
- A keyboard (for installation, configuration, and running Microcal)

In addition, MicroTouch recommends:

- A mouse (for installation and configuration)
- A DOS boot disk (if the OS/2 dual boot feature for DOS is not installed on your system) which includes a basic text editor

Viewing the ReadMe File

The TouchWare diskette includes a ReadMe text file, which contains product summary information and the latest information about TouchWare for OS/2.

Before you install the TouchWare software, check the ReadMe file for any last minute changes and updates. You can view the ReadMe file using any text editor, or use the procedure which follows.

Note: The ReadMe file can also be viewed after TouchWare has been installed by selecting the MicroTouch ReadMe icon in the touchscreen desktop folder.

▶ To view the ReadMe file:

1. Insert the TouchWare for OS/2 diskette into a disk drive.
2. Open an OS/2 command window.
3. Enter the following command:

   MORE<A:\README.TXT (or **B:\README.TXT**, depending on your drive)
4. Press the space bar to view subsequent screens, or press Ctrl+C to exit.

▶ To print a copy of the ReadMe file:

1. Insert the TouchWare for OS/2 diskette into a disk drive.
2. Open an OS/2 command window.
3. Enter the following command:

   COPY A:\README.TXT LPT1(or **B:\README.TXT**, depending on your drive)

Before You Install TouchWare for OS/2

Prior to installing the touchscreen software, you should

- Uninstall any previous touchscreen software that is not a version of TouchWare from MicroTouch
- Select the correct COM port for the touchscreen

Uninstalling Previous Touchscreen Software

TouchWare for OS/2 can be installed over previous versions of TouchWare. However, you must uninstall any previous version of touchscreen software that is not a version of TouchWare from MicroTouch. Refer to the uninstall instructions that came with that product.

If you are currently using the TouchBase OS/2 driver, complete the following procedures to remove it from your system.

▶ To remove the TouchBase driver:

1. Using a text editor, make the following changes to your CONFIG.SYS file:

   Delete the following line entry:

   DEVICE=C:\TOUCH\T2driver.SYS

   Delete the STYPE=T2DRIVR$ switch from the end of your mouse driver statement. For example:

   DEVICE=C:\OS2\BOOT\MOUSE.SYS STYPE=T2DRIVR$

   should be

   DEVICE=C:\OS2\BOOT\MOUSE.SYS

2. Delete all files in the TouchBase directory **C:\TOUCH**.
3. Delete the directory **C:\TOUCH**.
4. Delete the following files from the C:\OS2 directory:
   - T2driver.ini
   - T2calib

5. Delete the TouchBase desktop icons:
   - T2SETUP
   - T2driver reference

   Select and drag each icon to the desktop shredder, or select each icon and press Delete.

6. Shut down and reboot your system.

Selecting the COM Port

Make sure that the touchscreen is connected to a serial COM port. The touchscreen is a serial input device. You can connect the touchscreen in one of the following ways:

- To a serial communication (COM) port on your computer.
- To the connector on a MicroTouch PC Bus touchscreen controller card. The PC Bus touchscreen controller has a serial communications port built into it.

Note: When the touchscreen controller card is installed, the touchscreen must be connected to it. Do not connect the touchscreen to any other serial port in your computer.

When selecting a COM port for your touchscreen, keep the following items in mind:

- COM1 is usually paired with IRQ4. COM2 is usually paired with IRQ3.
- A serial mouse typically uses COM1 and IRQ4. If you also have a mouse installed on your system, make sure you do not specify the same COM port and IRQ for the touchscreen.
- The touchscreen *must be* connected to the *next* available COM port in sequence (1-2-3-4) in your system. For example, if COM1 and COM2 are already being used in your system, then the touchscreen must be assigned to COM3. If only COM1 is being used, then the touchscreen must be assigned to COM2.

- If you installed the MicroTouch PC Bus touchscreen controller card, use the jumpers on the card to set the port and interrupt to the *next* available COM port and IRQ number in sequence in your system. The default settings on the PC Bus touchscreen controller are COM3 and IRQ4. Be sure the information in the Touch Screen Location dialog box displayed during Setup matches the settings you are using on the PC card.

  If you install a mouse on COM1 and are using the PC Bus touchscreen controller default settings, there will be an IRQ conflict. Be sure that the mouse and controller are using different COM ports and IRQs.

- If you installed the MicroTouch PC Bus touchscreen controller and configured it to use COM8, you can not use Microcal to test the operation of your touchscreen. The Microcal Diagnostic utility only searches for the touchscreen on COM1 – COM7.

- The COM port addresses used by TouchWare for OS/2 are shown in Table 1. The address of the serial port you are using for the touchscreen must match the address listed for the corresponding COM port.

Table 1. COM Port Addresses

COM Port	Address	COM Port	Address
COM1	3F8	COM5	2E0
COM2	2F8	COM6	2F0
COM3	3E8	COM7	3E0
COM4	2E8	COM8	3F0

The port base addresses for COM1 – COM4 are defined standard addresses. There are no defined standard addresses for COM5 – COM8. The addresses listed have been defined specifically for TouchWare.

Installing TouchWare for OS/2

You run the Setup program in an OS/2 command window to install TouchWare. Setup copies all touchscreen files to your hard disk and configures your system for a touchscreen.

Once you begin Setup, follow the instructions displayed on the screen. Online help is available during the setup process.

What Setup Does

During the installation process, the Setup program performs the following tasks:

- Creates a backup copy of the CONFIG.SYS file.

  Setup copies the contents of the CONFIG.SYS file to a backup file named CONFIG.MTS before making any changes. This backup file allows you to restore the configuration of your system to the state prior to installing the touchscreen software.

- Modifies the CONFIG.SYS file.

  The Setup program adds information to your CONFIG.SYS file. This information defines the settings for the OS/2 touchscreen driver.

  If you specified that you would be using a mouse with the touchscreen, Setup adds the mouse driver setting to the mouse driver line in the CONFIG.SYS file.

- Creates or modifies the STARTUP.CMD file.

  The Setup program creates the STARTUP.CMD file, if it does not already exist. The Setup program adds the following line to the file:

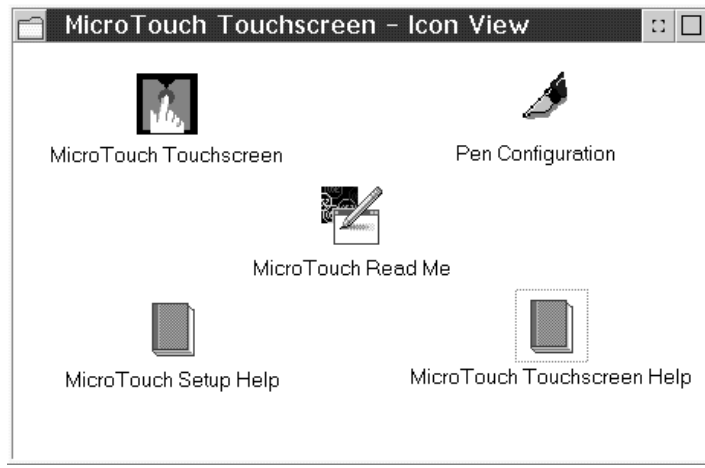
  ***disk drive*:*directory*\TOUCHINI**

  This command line runs the TOUCHINI.EXE utility program when you boot the system.

Most touchscreen parameters that you modify in the touchscreen control panel are stored in the CONFIG.SYS file. Some touchscreen parameters, such as double-click speed and area, are stored in the system profile. When you boot the system, the TOUCHINI.EXE program reads the touchscreen parameters from the system profile and loads them into the control panel.

- Creates a MicroTouch Touchscreen folder on your desktop.

  Setup creates a MicroTouch Touchscreen program folder. The folder includes icons for the touchscreen control panel, the Pen Configuration utility, the ReadMe file, and the online help.



- Installs a copy of the Microcal Diagnostic utility onto your hard drive. You must complete the Setup program before you can use Microcal.

Running the Setup Program

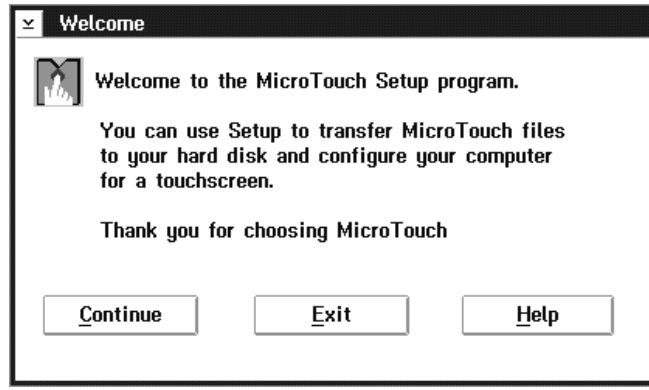
▶ To install the touchscreen software:

1. Make sure the touchscreen is connected properly to a serial COM port on your computer.
2. Close all applications including the Dual Boot window if it is open.
3. Insert the *TouchWare for OS/2* diskette into a disk drive.

4. Open an OS/2 command window.
5. Enter the following command:

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

   Setup first loads its initialization files. It then displays a Welcome screen followed by a series of dialog boxes requesting information required to configure the touchscreen.



6. Follow the instructions displayed on the screen. Make your selections carefully when answering questions to complete the installation. If you need more information on the installation dialog boxes, refer to the following sections or the online help.

Specifying the Communication Settings

Setup will attempt to use the communications settings from any previous touchscreen installation by checking the CONFIG.SYS file. If Setup finds previous touchscreen settings, the Touchscreen Location dialog box will be displayed. The previous touchscreen settings are shown.

If Setup does not find any previous touchscreen installation, the following dialog box is displayed:

You can choose to enter the settings yourself, or to let Setup search for the touchscreen and determine the correct settings.

▶ Select **Yes** if you want Setup to determine the touchscreen communication settings.

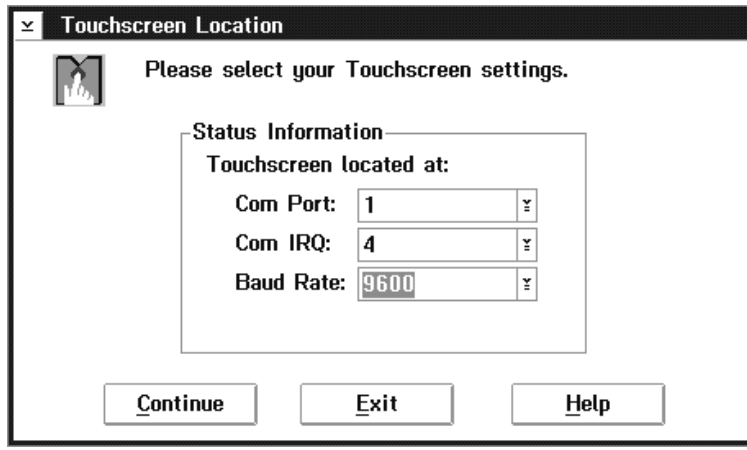
Note: The search for the touchscreen may take up to five minutes. If you know the COM settings for your touchscreen, you should select **No** and enter the settings in the Touchscreen Location dialog box that follows.

Setup attempts to locate the touchscreen by searching the communication ports. Setup will search COM1 – COM4, using the N72 and the N81 protocols at both 9600 and 19200 Baud. If Setup finds the touchscreen, the settings are stored.

If the Setup program does not find the touchscreen, the following default communication settings are used:

- COM Port: 1
- COM IRQ: 4
- Baud Rate: 9600

When Setup has finished searching, the touchscreen COM settings are displayed in the Touchscreen Location dialog box.



To enter or change a value, click on the down arrow located at the right of each parameter box and select the correct setting from the menu.

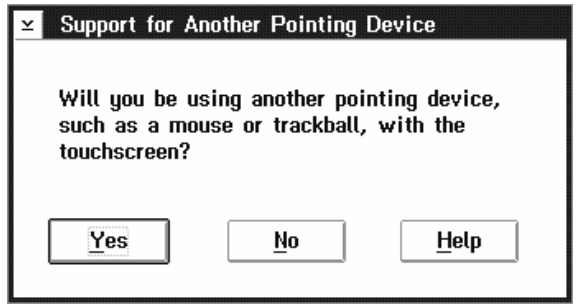
If you are using a TouchPen controller, the optimum baud rate depends on your application and your system. The default baud rate is 9600, however you might find that your system works better at 19200.

Note: Changing the baud rate during Setup only changes the rate at which the touchscreen driver communicates. It does not change the baud rate of the touchscreen controller. You must make sure the touchscreen driver and the touchscreen controller are set to the same baud rate. The default for all MicroTouch controllers is 9600 baud. If you select a baud rate other than 9600 for the touchscreen driver during installation, the touchscreen will not be able to communicate with your computer. You must then use Microcal to change the baud rate of the touchscreen controller to be the same rate as the driver. Refer to “Changing the Baud Rate” later in this chapter for additional information on changing the baud rate of your touchscreen.

Once you have verified that the COM settings are correct, select Continue to proceed with the installation program.

Using Other Pointing Devices with the Touchscreen

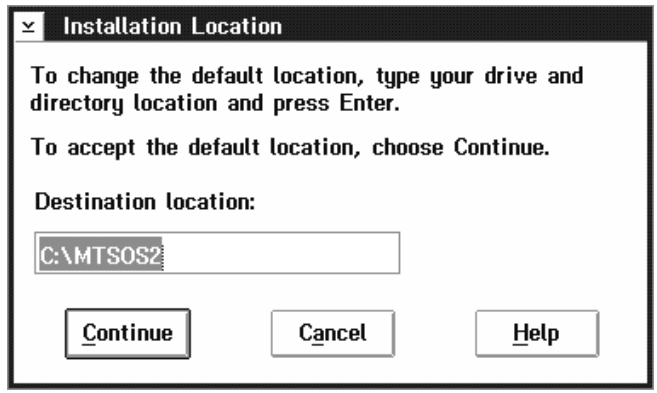
In order to install the drivers correctly, Setup needs to know whether you will be using another pointing device, such as a mouse, in conjunction with the touchscreen. The pointing device must be mouse compatible.



- If you are using another pointing device with the touchscreen, select Yes. Setup modifies the CONFIG.SYS file, signaling the mouse driver to route mouse messages through the touchscreen driver, which enables you to use the mouse with the touchscreen.
- If you are not using another pointing device, select No.

Specifying the Location for the Touchscreen Files

In the Installation Location dialog box, enter the path and directory where you want to install the touchscreen files. The default is C:\MTSOS2.



You can specify any path. If the directory does not exist, Setup will automatically create it.

If you select Cancel, the Setup program will terminate without modifying your system.

Completing the Installation

After the software has been installed on your hard drive, the Installation Complete dialog box appears.

Note: Error messages may be displayed when you start your system. This is normal, and does not affect the operation of your system. However, you can prevent these messages from appearing by following the procedure described in "Error Messages During Startup" later in this chapter. This information is also available by selecting Help in the Installation is Complete dialog box.

▶ To complete the software installation:

1. Select OK in the Installation is Complete dialog box.
2. In the OS/2 command window, type EXIT and press Enter. The command window will close.
3. Remove the installation disk.
4. Select Shut down from the desk top menu to reboot your system.

The touchscreen driver is loaded and initialized with the values you specified during installation.

Error Messages During Startup

When you start your system with TouchWare for OS/2 installed, two error messages similar to the following may be displayed:

- COM.SYS device driver was not installed
- VCOM.SYS device driver was not installed

This is normal, and does not affect the operation of your system. The TouchWare driver is used to control the COM ports for the touchscreen and mouse. The OS/2 drivers COM.SYS and VCOM.SYS are not required and are not installed during system boot.

You can simply press Enter at each error message to continue booting your system. Or, you can edit your CONFIG.SYS file to prevent these messages from occurring.

▶ To prevent the error messages from occurring:

1. Open your CONFIG.SYS file using a text editor.
2. Find the line which contains COM.SYS. For example:

   DEVICE=C:\OS2\BOOT\COM.SYS
3. Remark out this line by typing REM at the beginning of the line. For example:

   REM DEVICE=C:\OS2\BOOT\COM.SYS
4. Find the line which contains VCOM.SYS. For example:

   DEVICE=C:\OS2\MSDOS\VCOM.SYS
5. Remark out this line by typing REM at the beginning of the line. For example:

   REM DEVICE=C:\OS2\MSDOS\VCOM.SYS
6. Save the file and exit. When you boot your system, the two error messages will no longer be displayed.

Note: If you uninstall the touchscreen software, you must remove the REM statements from these two lines for your system to function properly.

Checking Touchscreen Operation

After you install the software and reboot your system, you should check the touchscreen for proper operation.

▶ To check the touchscreen:

1. Touch the center of the screen.
2. Check that the cursor is located underneath your finger.
3. Drag your finger across the screen and check that the cursor follows your touch.
4. Move your finger to each corner and edge of the screen. Check that the cursor follows your finger.

Note: If you are using a TouchPen controller and touch pen, repeat the above check using the pen.

This completes the installation of TouchWare for OS/2. Proceed to Chapter 2 to

- Calibrate your touchscreen prior to use
- Customize the operation of your touchscreen to suit your particular application

Changing the Baud Rate

The touchscreen controller and the touchscreen driver must both be set to the same baud rate for the touchscreen to communicate with your system. The default baud rate for both is 9600. To change the baud rate of your touchscreen, you must

- Change the baud rate of the touchscreen driver
- Change the baud rate of the touchscreen controller

Touchscreen Driver

The baud rate of the touchscreen driver is specified during the installation of TouchWare for OS/2. To change the baud rate, you must re-install TouchWare by running Setup.

When the Touchscreen Location dialog box is displayed, change the driver baud rate by selecting a new value. Complete the installation.

Note: The baud rate of the touchscreen driver can also be changed without running Setup by modifying the CONFIG.SYS file. Using a text editor, open CONFIG.SYS and find the DEVICE= line containing MTOUCH.SYS. Edit the baud rate by changing the variable BAUD=(rate) to the new value. Reboot your system for the change to take effect.

Touchscreen Controller

The baud rate of the touchscreen controller is set with the Microcal Diagnostic utility. Microcal is a DOS-based utility and cannot be run directly under OS/2. Refer to Chapter 4 for information on how run Microcal.

Refer to “Setting the Baud Rate” in Chapter 4. Select the correct baud rate from the list displayed, and exit Microcal. Reboot your system into the OS/2 operating system.

Uninstalling TouchWare

There is no automatic uninstall program included with TouchWare for OS/2. To uninstall TouchWare, you must complete the following procedures:

- Restore the CONFIG.SYS system file to its configuration prior to installing TouchWare
- Remove TOUCHINI.EXE from your startup file
- Remove the TouchWare files and directory
- Remove the touchscreen program folder and icons

Note: After uninstalling TouchWare, you must reboot your system for the changes to take effect.

Restoring the CONFIG.SYS File

To restore your system file to the configuration prior to the installation of TouchWare, perform one of the following procedures:

- Restore the previous version of CONFIG.SYS.

  Use this procedure if you have not installed additional software, and have not modified the CONFIG.SYS file since you installed TouchWare.

- Edit the current version of CONFIG.SYS.

  Use this procedure if you have installed additional software, or have modified the CONFIG.SYS file since you installed TouchWare.

▶ To restore the previous CONFIG.SYS file:

1. Open an OS/2 command window.

2. Rename the current CONFIG.SYS file. For example:

   C:\REN CONFIG.SYS CONFIG.OLD

3. Rename the previous version of the CONFIG file. For example:

   C:\REN CONFIG.MTS CONFIG.SYS

When you restart your system, it will boot into the configuration prior to the installation of TouchWare.

▶ To edit the current version of CONFIG.SYS:

1. Open your CONFIG.SYS file using a text editor.
2. Find the line which contains MTOUCH.SYS. For example:

   DEVICE=C:\MTSOS2\MTOUCH.SYS SERIAL= ...

3. Remove this line, or remark it out by typing REM at the beginning of the line. For example:

   REM DEVICE=C:\MTSOS2\MTOUCH.SYS SERIAL= ...

4. Find the line which contains STYPE=MTOUCH$. This is a switch which was added to your mouse driver. For example:

   DEVICE=C:\OS2\BOOT\MOUSE.SYS STYPE=MTOUCH$

5. Remove the STYPE=MTOUCH$ switch from the statement. For example:

   DEVICE=C:\OS2\BOOT\MOUSE.SYS

   Or you can move the switch to the next line and remark it out:

   DEVICE=C:\OS2\BOOT\MOUSE.SYS

   REM STYPE=MTOUCH$

6. If you previously disabled COM.SYS, find the line which contains the remarked out COM.SYS. For example:

   REM DEVICE=C:\OS2\BOOT\COM.SYS

7. Re-enable this driver by removing the REM at the beginning of the line. For example:

   DEVICE=C:\OS2\BOOT\COM.SYS

8. If you previously disabled VCOM.SYS, find the line which contains the remarked out VCOM.SYS. For example:

   REM DEVICE=C:\OS2\MSDOS\VCOM.SYS

9. Re-enable this driver by removing the REM at the beginning of the line. For example:

   DEVICE=C:\OS2\MSDOS\VCOM.SYS

10. Remove all references to the directory where TouchWare was installed. You can do this by doing a search for all occurrences referencing the *path*:*directory* you specified during the installation of the touchscreen software. Remove each occurrence.

    For example, using the text editors find/search command, locate all occurrences of C:\MTSOS2 (the default *path*:*directory*):

    SET BOOKSHELF=C:\OS2\BOOK;C:\MTSOS2;C:\ ...

    Remove the reference so the line looks like:

    SET BOOKSHELF=C:\OS2\BOOK;C:\ ...

11. Save the file and exit. When you restart your system, it will boot into the configuration prior to the installation of TouchWare.

Removing TOUCHINI.EXE from the Startup File

During the installation of TouchWare, the path to the touchscreen initialization program is inserted into your startup file. If you are uninstalling TouchWare, then MicroTouch recommends that you remove this path.

▶ To remove the path to TOUCHINI.EXE:

1. Open STARTUP.CMD using a text editor. This file is usually found in the root directory of your system disk (C:\).

2. Delete the line containing TOUCHINI For example:

   C:\MTSOS2\TOUCHINI

3. Save the file and exit.

Removing the TouchWare Files and Directory

The TouchWare files are located in the directory specified during the installation of the touchscreen software. Delete all files in this directory. Remove the directory.

For example:

C:\DEL C:\MTSOS2*.*

C:\RMDIR C:\MTSOS2

Removing the Touchscreen Program Icons and Folder

To finish uninstalling TouchWare, delete the program folder and icons from the desktop. You can delete the icons and program folder by using one of the two following methods:

- Select an icon. Press the Delete key.
- Select an icon. Press the right mouse button to display menu. Select Delete.
- Use the right mouse button to select and drag an icon to the desktop shredder.

Once you have deleted all of the icons, you can delete the program folder.

C H A P T E R 2

Touchscreen Control Panel

The touchscreen control panel lets you customize the operation of your touchscreen by selecting the way the cursor responds as you touch the screen and as you move your finger or touch pen.

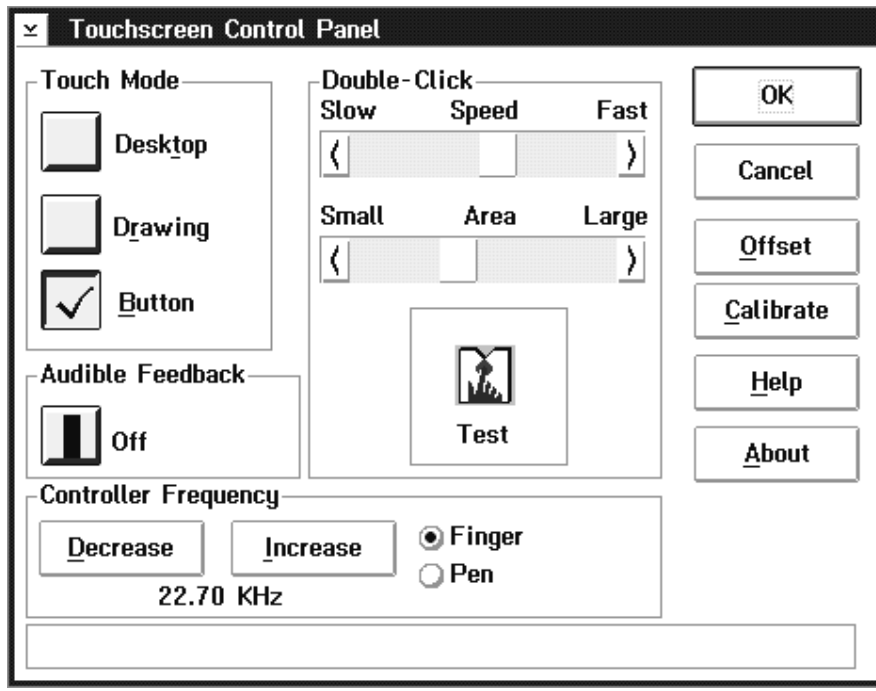
You can use the control panel to

- Select and change the touch mode
- Select whether or not you hear a beep when you touch the screen
- Change the double-click speed and double-click area
- Adjust the cursor offset
- Calibrate the touchscreen
- Adjust the touchscreen operating frequency
- View information about TouchWare

Opening the Touchscreen Control Panel

▶ To open the touchscreen control panel:

1. Open the MicroTouch Touchscreen desktop folder.
2. Double click on the MicroTouch Touchscreen icon. The control panel opens.

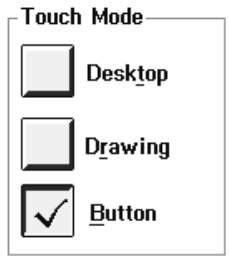


Note: Do not use the control panel if you have the OS/2 Dual Boot window open. When OS/2 Dual Boot is running, it opens and locks the CONFIG.SYS file. Changes made to the control panel cannot be saved when Dual Boot is using the CONFIG.SYS file.

Selecting a Touch Mode

Touch mode defines exactly how your touch will be interpreted by your computer. Use the Touch Mode option to specify the touch actions that equate to mouse events like clicking, double-clicking, and dragging.

There are three touch modes available:



In describing these touch modes, the following terminology is used:

- *Touch* means to place your finger or touch pen on the screen.
- *Tap* means to touch the screen and quickly lift your finger or touch pen off the screen.
- *Liftoff* means the moment you remove your touch from the screen.
- *Pen* refers to the MicroTouch touch pen.

Desktop Mode

Desktop mode is useful for general-purpose desktop applications. In this 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 (default) 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.

Summary of Touch Modes

Table 2 summarizes the events associated with each touch mode, and are valid for both finger and touch pen.

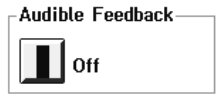
Table 2. Summary of Touch Modes

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

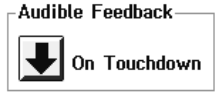
Selecting the Audible Feedback Mode

Use the Audible Feedback options to specify whether or not the system generates a beep when a touch event occurs.

Click on the button to toggle through the three available options.



Indicates the system does not produce a beep when a touch event occurs. This is the default mode.

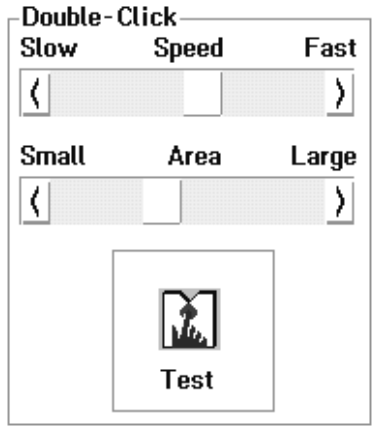


Indicates the system produces a beep when you touch the screen.

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

Adjusting the Double-Click Settings

The touchscreen control panel provides adjustments for setting the speed and touch area for a double click.



Setting the Double-Click Speed

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

A double-click occurs when you quickly touch the screen twice in the same location. When using the touchscreen, *double-click speed* is the maximum time period allowed between the first liftoff and the next touch. If the speed of your touches fall within this time period, and double-click area, then a double-click occurs. In TouchWare for OS/2 this time period ranges from approximately 1000 msec (Slow) to 170 msec (Fast).

▶ To adjust the double-click speed, drag the scroll box toward Slow or Fast. 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 twice in the same location anywhere within the touchscreen control panel.

When the MicroTouch icon reverses color, the system has recognized your action as a double-click. Adjust the double-click speed as necessary.

Effects of Changing the Double-Click Speed

The double-click speed (and Area) setting is saved to the system profile. This results in the double-click speed setting simultaneously affecting both the touchscreen and the mouse in OS/2.

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.

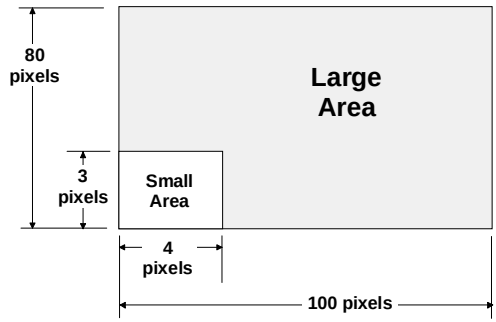
Note: The double-click speed setting affects both the touchscreen and the mouse in OS/2. You can change the double-click speed by using the Touchscreen control panel or the Mouse control panel in OS/2. However, this is not true when you are running a Windows session under OS/2. In this case, the Windows (WIN/OS2) mouse double-click setting and touchscreen double-click setting are independent of one another.

Setting the Double-Click Area

The Double-Click Area defines the maximum area in which successive touches will be recognized as occurring at the same touch point. In other words, *area* defines how close one touch must be to the next touch for your system to register the two touches as a double-click.

A double-click occurs when you quickly touch the screen twice in the same location. When using the touchscreen, *double-click area* is the maximum screen area allowed between the first liftoff and the next touch. If your touches fall within the allowed space on the screen, and within the double-click speed, then a double-click occurs.

In TouchWare for OS/2, the double-click area can range in size as follows:



▶ To adjust the double-click area, drag the scroll box toward Small or Large. You can also click the left and right arrows on the scroll box.

A smaller setting provides a narrower touch range on the screen, while a larger setting allows for more distance between the two touches. If the second touch does not occur within the area defined, the application will see two successive taps as two single clicks, rather than as a double-click.

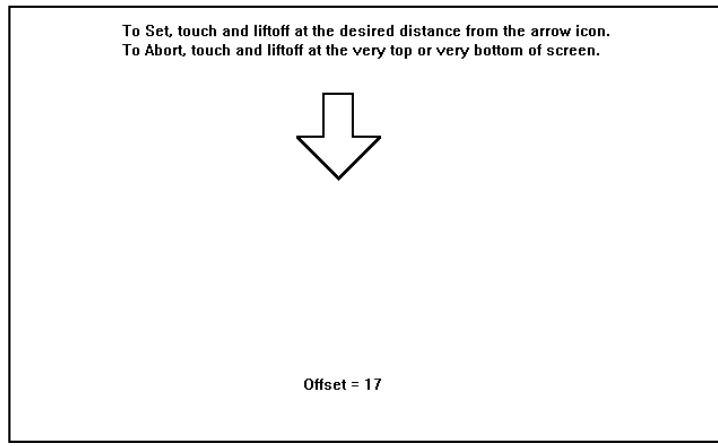
Setting the Cursor Offset

After you calibrate the touchscreen, the cursor should be located directly underneath your finger or touch pen 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 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 an offset for the cursor:

1. Open the touchscreen control panel.
2. Select Offset. The following screen appears:



3. Touch the screen at the desired distance below the tip of the arrow. The vertical distance between your liftoff position and the tip of the arrow is the offset distance. Thereafter, the cursor will be positioned above your finger or touch pen by a distance equal to the offset distance.

   After liftoff, you will automatically return to the touchscreen control panel.

   You can exit the offset routine without changing the current offset value by touching and lifting off at the very top or bottom of the screen. Also, if necessary, you can exit by simultaneously pressing Ctrl+Esc. Follow the directions on the screen. This will also close the control panel.

Note: During normal operation, as your finger or touch pen approaches the bottom edge of the screen, the cursor offset automatically decreases so that you can touch items in this area.

Calibrating the Touchscreen

Calibration is the process of aligning the touchscreen with the underlying video. Calibration defines the dimensions of the image area of the screen, determines the edge of the screen image, and locates the center of the touchscreen. You should always calibrate at the screen resolution you will be using.

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.

Note: 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 touch pen controller stores both sets of calibration data.

When You Should Calibrate

You should calibrate the touchscreen in the following cases:

- After you have initially installed your touch system
- Any time you change your video card or swap in a new monitor
- Any time the cursor does not accurately follow the movement of your finger or pen
- Any time you cannot position the cursor at the edges or corners of the screen image
- Any time you change the size or position of the video image area by adjusting the controls on your monitor
- Anytime you change the screen video resolution
- Any time you adjust the touchscreen operating frequency

How to Touch the Screen During a Calibration

Calibration requires you to touch targets which are displayed on the screen. To obtain the most accurate calibration results

- Touch each target with the fingertip of an extended finger or touch pen.
- Keep your palm and free hand away from the touchscreen and monitor.
- Touch as close to the center of the target as possible.
- Remember that the liftoff position – not the touchdown position – determines the calibration point when you calibrate the touchscreen. Therefore, if your touch position is not quite centered on the target, you can slide your finger or touch pen to the center of target, hold steady momentarily, and then lift your finger or pen off the screen.
- Hold your finger or touch pen as still as possible after you reach the final calibration location. Always lift your finger or pen straight off the touchscreen. Do not use any swiping motion during liftoff.

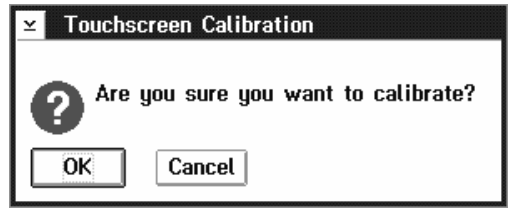
Calibration Procedure

The calibration procedure is quick and easy, and insures that the touchscreen is aligned with the underlying video image. Data from this procedure is stored within the touchscreen controller in non-volatile memory. This means that you do not need to calibrate your touchscreen each time you turn on your system.

▶ To calibrate the touchscreen:

1. Make sure that the monitor has been powered on for at least five minutes. This allows the monitor to reach it’s normal operating temperature and stabilize before you attempt to calibrate the touchscreen.
2. Open the touchscreen control panel.

3. Select Calibrate. The following dialog box is displayed.



4. Click OK to continue. A calibration target appears in the lower left corner of the screen.

5. Touch the center of the target. Make sure to follow the guidelines described previously in "How to Touch the Screen During a Calibration." Hold your touch for at least three seconds.

   When you lift your finger or pen, a second calibration target appears in the upper right corner of the screen.

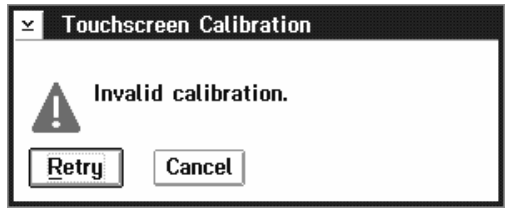
Note: The calibration routine will automatically exit if no touch is detected within 20 seconds. In this case, the current calibration values are not changed.

---

6. Touch the center of the target. Make sure to follow the guidelines described previously in "How to Touch the Screen During a Calibration." Hold your touch for at least three seconds.

   When you lift your finger or pen, TouchWare saves the new calibration values, and a calibration test screen is displayed.

If the calibration program detects touches outside an acceptable range, the following error message is displayed:



Select Retry to go back to the calibration screen, or select Cancel to exit the calibration procedure without changing current values.

Testing the Calibration

▶ To test the accuracy of your calibration:

1. Touch the screen and drag your finger or pen across the screen. Check that the cursor follows your movements.
2. Move your finger or pen to each corner and edge of the screen. Check that the cursor follows your finger or pen and reaches the edges of the screen image.

If any part of the test fails, calibrate the touchscreen again. Make sure to touch the targets carefully. It is possible that one of your touches did not register properly, or you accidentally touched the screen in the wrong place during calibration. For example, if you touch beyond the targets or into the black non-image area, you will distort the touchscreen calibration.

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

Adjusting the Operating Frequency

In general, your touchscreen is immune to any electrical noise which may be present in the monitor itself. However, sometimes this "noise" may be at the same frequency as the operating frequency of your touchscreen. This could interfere with your system and prevent it from receiving clear, quality signals when you touch the screen.

The solution to this problem is to change the operating frequency of your touchscreen.

Note: You should adjust the touchscreen operating frequency at the video resolution you will be using for your application.

When You Should Adjust the Frequency

You should adjust the operating frequency if

- The cursor is jittery or erratic when you touch the screen
- The cursor does not track (follow) your touch smoothly as you move across the screen
- You have to press hard on the screen to register a touch
- You have changed the video mode or video resolution of your monitor

Adjusting the Frequency

To obtain a clear touch signal, use the Controller Frequency option to change the operating frequency of the touchscreen. The range of adjustment varies depending upon the type of touchscreen controller you are using.

Note: If you are using both finger and a touch pen as touch input devices, then you may have to adjust the frequency for each device individually. The touchscreen operates at separate frequencies for each input device.

▶ To adjust the operating frequency of the touchscreen

1. Open the Touchscreen control panel.
2. Select Finger or Pen.
3. Select Increase or Decrease. The appropriate button will be grayed out when the touchscreen is at its frequency high or low limit.

   Note: Do not touch the screen while the controller is changing frequency. A warning message is displayed.

4. The warning message disappears. Test the new frequency as described in "Testing the New Frequency" which follows.

You should select several operating frequencies. Test your touchscreen at each frequency. If you can obtain good results at more than one frequency, choose the highest frequency in order to obtain optimum performance. In general, a higher frequency produces a stronger touch signal.

The operating frequency you select is stored in the touchscreen controller. The touchscreen will operate at the frequency you set until you change it again.

Testing the New Frequency

After adjusting the touchscreen frequency, you can test the results by

- Touching the screen and observing the cursor. It should be steady.
- Touching the screen and sliding your finger or pen across the screen. The cursor should follow (track) your touch smoothly without any hesitation.

If the cursor is jittery or erratic when you touch the screen, or if the cursor hesitates and jumps as you drag your finger across the screen, or if you have to press hard on the screen to register a touch, then you need to adjust the frequency again.

You should try several frequencies to determine the best one. There are usually several good frequencies to choose from. Select the highest good frequency. The higher frequency provides a better touch signal.

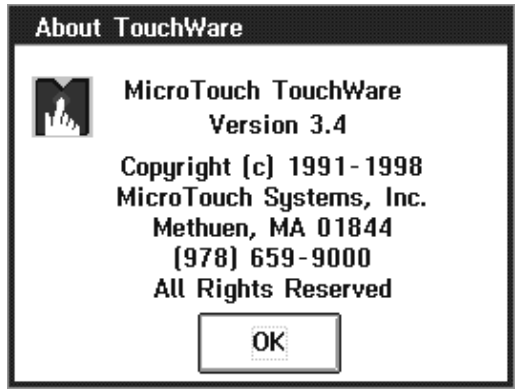
Test your touchscreen after each frequency change. If you are using both finger and touch pen as touch devices, test each device separately.

Accessing Online Help

▶ To access information about the options in the touchscreen control panel, select Help.

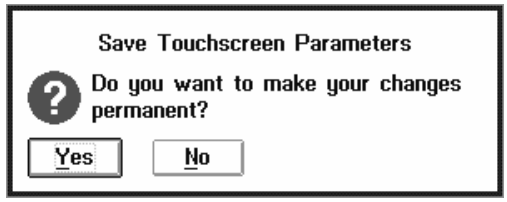
Getting Information About TouchWare

▶ To display information about TouchWare, select About.



Saving Control Panel Settings

▶ To save your touchscreen control panel settings, select OK. The following panel is displayed:



Select **Yes** if you want the changes you have made in the control panel settings to be permanent. When you start your computer, touchscreen operation uses the permanent settings.

Select **No** if you want the changes you have made in the control panel to be temporary. These changes will remain in effect for this session only. These settings will be lost when you shut down your system. When you restart your computer, touchscreen operation returns to your permanent settings.

After you have made your selection, the control panel closes.

C H A P T E R 3

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 or side of the touch monitor.

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

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

Touch Modes and the Touch Pen

The touch pen works in much the same way as finger input regardless of the touch mode selected. One advantage of using the touch pen is that it allows you to touch items on the screen with a higher degree of accuracy.

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

Pen Modes and Touch Pen Priority

The *pen mode* defines how the touch pen operates with the touchscreen. Table 3 describes the available pen modes.

Table 3. Pen Modes

Pen Mode	Description
Pen or Finger (Automatic)	The system recognizes input from both a touch 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 touch pen touches on the screen.

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

- If the system detects both touch pen and finger touches at the same time, it gives the touch 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 touch pen and you lift the pen from the screen, the system does not recognize finger (or hand) touch until after a pre-defined time delay. You cannot adjust the delay amount. For example, if you rest your hand on the screen while you write with the touch 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 touch pen lifts off, the system ignores the finger or hand until you lift off and touch the screen again.

Selecting the Pen Mode

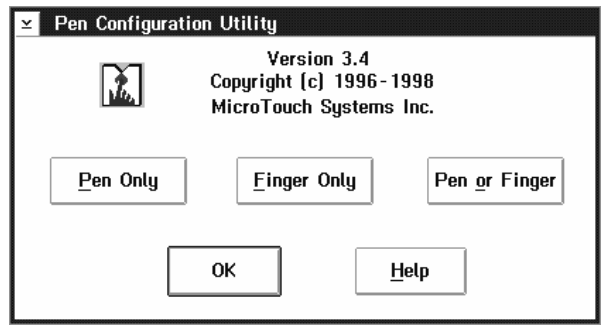
You can use one of the following methods to select the pen mode:

- Open the Pen Configuration Utility
- Issue the OS2PEN command

▶ To configure the pen mode using the Pen Configuration Utility:

1. Close the touchscreen control panel if it is open. You cannot access the pen configuration utility if the control panel is open.

2. Double click on the Pen Configuration icon in the touchscreen desktop folder. The following panel opens:



3. Select one of the pen modes. To obtain information about pen modes click on help.

Note: The mode change takes effect *immediately* upon selection, and remains in effect until you change it or reboot your system. Each time you start your system, the pen mode is *always* Pen or Finger (the default).

---

4. Select OK to close the Pen Configuration Utility.

You can also use the OS2PEN command to set the pen mode. The OS2PEN command uses the following switches to configure the pen mode:

Command Switch	Mode
/P	Pen Only
/F	Finger Only
/PF	Pen or Finger

▶ To configure the pen mode using the OS2PEN command:

1. Open an OS/2 command window.
2. Type the OS2PEN command, followed by the appropriate command switch. Be sure to specify the command path (drive and directory location). For example, to set the touchscreen for pen only mode:

   C:\MTSOS2\OS2PEN /P

3. Close the command window. The selected pen mode takes effect immediately.

Performance Considerations When Using the Touch Pen

The following settings affect the performance of a touch pen:

- Pen mode
- 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 touch pen controller checks for input from either a touch 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.

Communication Rate

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

You may find that the pen operates better with the touch pen controller set to a baud rate of 19200. Use Microcal to change the baud rate of the controller.

The baud rate used by the touchscreen driver and the controller must be identical. If you use Microcal to change the baud rate in the controller, then you will have to also change the baud rate in the touchscreen driver. This is explained in detail in Chapter 1 “Changing the Baud Rate”.

However, systems that cannot handle the higher data rates seen from the touch pen may result in degraded pen performance. To improve performance on these systems, select a lower baud rate.

Note: With some video cards, you may notice finger touch performance lagging behind when using a pen controller. 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 "Setting the Double-Click Speed" in Chapter 2.

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.

C H A P T E R 4

Microcal Diagnostic Utility

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

You can use Microcal to

- Find the touchscreen and determine the current COM settings of the touchscreen controller
- Verify that the touchscreen is communicating properly
- Calibrate the touchscreen
- Test the operation of the touchscreen and touch pen
- Adjust the frequency of the touchscreen controller
- Change the COM settings used by the touchscreen controller
- Change the video mode
- Check the monitor's video
- Access Terminal Emulation mode and enter firmware commands

Microcal Installation

MicroTouch delivers the Microcal Diagnostic utility as part of TouchWare for OS/2. When you install the TouchWare software, the Setup program automatically copies the Microcal Diagnostic utility and associated files to the hard disk. You must complete the Setup program before you can use Microcal.

The Setup program installs Microcal into the directory you specified for the touchscreen files during installation. By default, this directory is:

C:\MTSOS2

Microcal Command Line Options

By default, Microcal initially searches only COM1 and COM2 trying to find the touchscreen. If you know the port your touchscreen is using, you can specify the COM port when you open MICROCAL. 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 when searching the specified port.

The syntax for the Microcal command is as follows:

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

where [ ] indicates an optional parameter

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

* For a list of the port base addresses used by TouchWare refer to Appendix 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.

Running Microcal

Microcal is a DOS application and must be run from a DOS prompt. To run Microcal, do one of the following:

- Boot into DOS. If you have a Dual Boot system with DOS installed, you can reboot your system into DOS. You can also use a DOS boot disk.

Note: MicroTouch does not supply a DOS boot disk. The user must supply a boot disk if this method will be used to run Microcal.

- Use a DOS command window in OS/2. You must edit your CONFIG.SYS file and run Microcal in a DOS Command window within OS/2.

Booting Into DOS

▶ To boot into DOS using dual boot feature:

1. Close the touchscreen control panel. Close any other applications you have running.
2. Open an OS/2 command window.
3. Type **BOOT /DOS** and press Enter. Answer Yes (Y) to continue. Your system will reboot into DOS.
4. Move to the drive and directory that contains the Microcal files. For example:

   C:\MTSOS2

5. Type MICROCAL (plus any command line options) and press Enter. Microcal opens.
6. When you are done, refer to "Quitting Microcal and Returning to OS/2" at the end of this chapter.

▶ To boot into DOS using a DOS boot disk:

1. Close the touchscreen control panel. Close any other applications you have running.
2. Select Shut down.
3. Insert your DOS boot disk into the diskette drive and press Ctrl+Alt+Del to reboot your system. Your system will reboot into DOS.
4. Move to the drive and directory that contains the Microcal files. For example:

   C:\MTSOS2

5. Type MICROCAL (plus any command line options) and press Enter. Microcal opens.
6. When you are done, refer to "Quitting Microcal and Returning to OS/2" at the end of this chapter.

Using a DOS Command Window in OS/2

Microcal is a DOS application which directly accesses the serial ports. You must free up the COM port being used by the touchscreen so that Microcal can use the COM port to communicate with the touchscreen controller. You do this by modifying your CONFIG.SYS file.

Note: Device drivers must be listed in correct order in the CONFIG.SYS file to ensure that the touchscreen and the mouse, if you have one installed, operate properly. During the TouchWare for OS/2 installation, the touchscreen and mouse device drivers are added to CONFIG.SYS in the correct order. When editing the file, be careful to maintain this order.

▶ To modify your CONFIG.SYS file:

1. Using a text editor, open the CONFIG.SYS file.
2. Find the line which contains MTOUCH.SYS.

   For example:

   DEVICE=C:\MTSOS2\MTOUCH.SYS ...
3. Insert the word "REM" at the beginning of the line.

   For example:

   REM DEVICE=C:\MTSOS2\MTOUCH.SYS ...
4. If you are using a mouse with your touch screen, find the line which contains your mouse driver.

   For example:

   DEVICE=C:\OS2\MOUSE.SYS STYPE=MTOUCH$

5. Remove the switch STYPE=MTOUCH$ from the line. The line should look similar to the following:

   DEVICE=C:\OS2\MOUSE.SYS

   Alternatively, you can move the switch STYPE=MTOUCH$ to the next line and add the word “REM” to the beginning of the line as follows:

   DEVICE=C:\OS2\MOUSE.SYS

   REM STYPE=MTOUCH$

6. Reboot your system to implement these changes.

7. Open a DOS command window in OS/2.

8. At the DOS command line prompt move to the drive and directory which contains the Microcal files. For example:

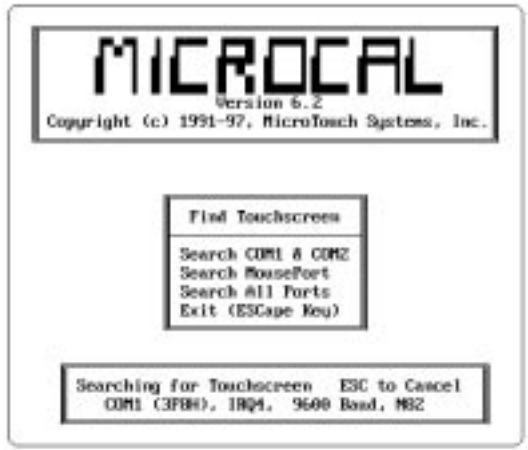
   C:\MTSOS2

9. Type MICROCAL (plus any command line options)and press Enter. Microcal opens.

10. When you are done, refer to “Quitting Microcal and Returning to OS/2” at the end of this chapter.

Searching for a Touchscreen

When Microcal opens the Find Touchscreen menu is displayed. If no command line options were specified, an automatic scan of communication ports COM1 and COM2 begins. Microcal uses all valid combinations of IRQs, baud rates, and communication settings (parity, data bits, stop bits) when searching these two COM ports.



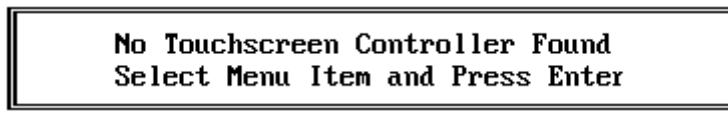
You can press Esc at any time to cancel the search for a touchscreen.

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. (Mouse port is not supported in TouchWare for OS/2.)
- Search all serial communication ports and the mouse port.

Note: Microcal will only search COM1 – COM7 addresses as defined by MicroTouch. COM8 is not searched by Microcal. If you have the touchscreen connected to COM8, Microcal will not be able to detect it.

- Exit from the Microcal utility.

▶ To select a menu item, use the cursor up and down arrow keys to highlight an option. Press Enter.

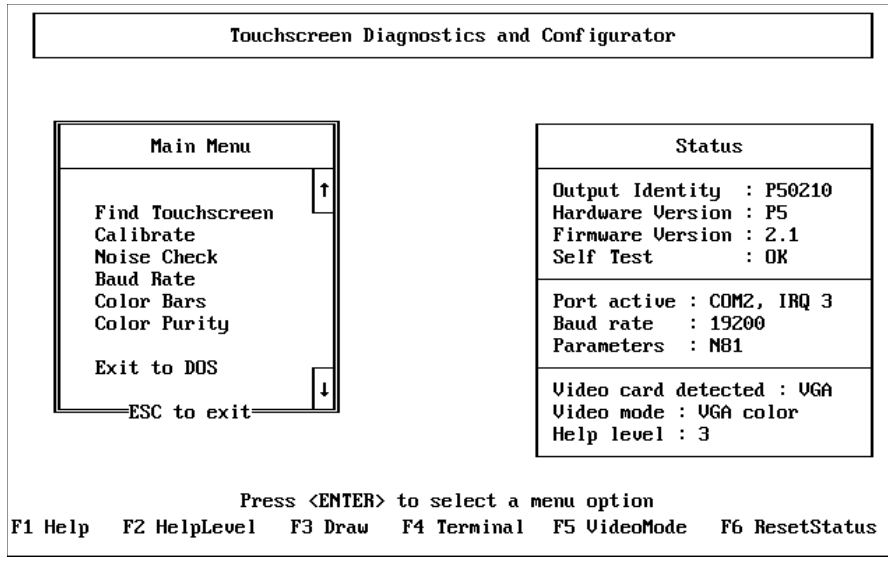
Before you repeat the search on COM1 and COM2, check to make sure the touchscreen is properly connected.

If you choose Search All Ports, Microcal scans all serial communication ports (COM1 – COM7). Microcal uses all valid combinations of IRQs, baud rates, and communication settings when searching these COM ports. 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.

Using Microcal

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

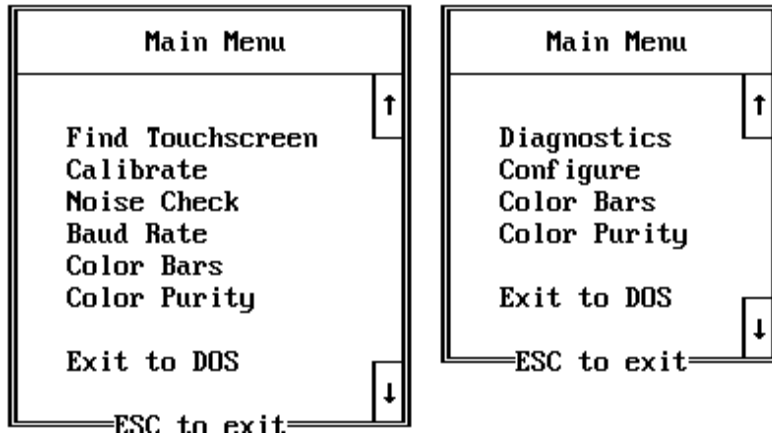


This screen has a Main menu for selecting options, a status box that reports current information about the touchscreen, and a line at the bottom that lists the available function keys.

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 item, use the cursor up and down arrow keys to highlight an option and press Enter.



- 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, type **?** 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 4 describes these keys.

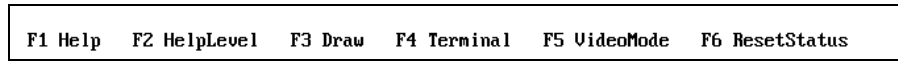


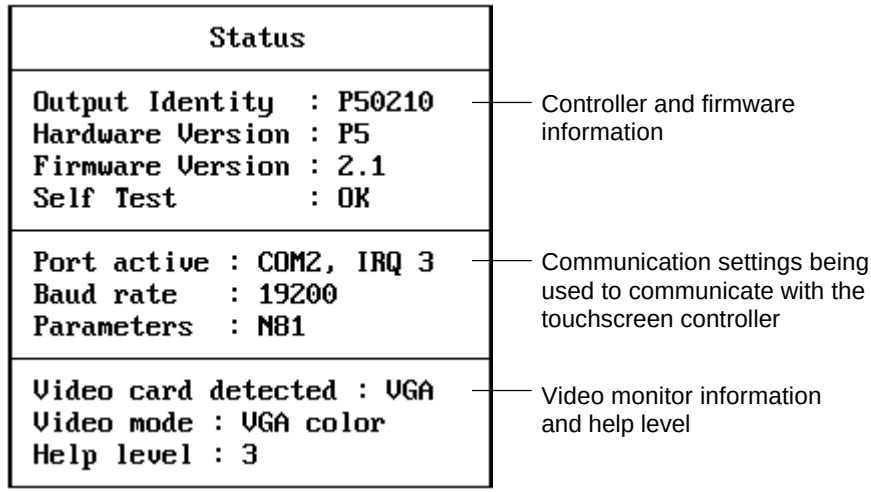
Table 4. Microcal Function Keys

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.

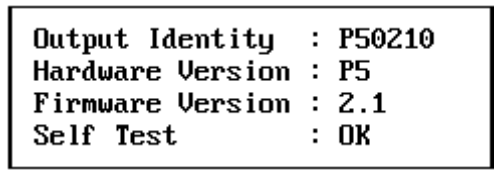
Any time you press F6 to reset the touchscreen, the Status box clears all information about the controller and its communication settings, and displays the following message:

`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 touchscreen 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)

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.

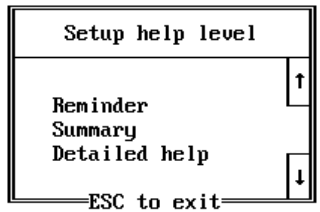
Note: If you change the video mode, you should calibrate the touchscreen again. The display area is different in each video mode.

▶ 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 5 describes each help level.

Table 5. 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) for a touchscreen; and searches the valid combinations of communication IRQs, baud rates, and data formats
- 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

Calibration is the process of aligning the touchscreen with the underlying video. Calibration defines the dimensions of the image area of the screen, determines the edge of the screen image, and locates the center 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.

Note: 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.

When You Should Calibrate

You should calibrate the touchscreen in the following cases:

- After you have initially installed your touch system
- Any time you change your video card or swap in a new monitor
- Any time the cursor does not accurately follow the movement of your finger or pen
- Any time you cannot position the cursor at the edges or corners of the screen image
- Any time you change the size or position of the video image area by adjusting the controls on your monitor
- Any time you adjust the touchscreen operating frequency

How to Touch the Screen During a Calibration

Calibration requires you to touch targets which are displayed on the screen. To obtain the most accurate calibration results

- Touch each target with the fingertip of an extended finger or touch pen.
- Keep your palm and free hand away from the touchscreen and monitor.
- Touch as close to the center of the target as possible.
- Remember that the liftoff position – not the touchdown position – determines the calibration point when you calibrate the touchscreen. Therefore, if your touch position is not quite centered on the target, you can slide your finger or touch pen to the center of target, hold steady momentarily, and then lift your finger or pen off the screen.
- Hold your finger or touch pen as still as possible after you reach the final calibration location. Always lift your finger or pen straight off the touchscreen. Do not use any swiping motion during liftoff.

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 the Touchscreen

▶ To use Microcal to calibrate the touchscreen:

1. Make sure that the monitor has been powered on for at least five minutes. This allows the monitor to reach it’s normal operating temperature and stabilize before you attempt to calibrate the touchscreen.

2. 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.

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

Note: The calibration routine can be exited by pressing Esc. In this case, the current calibration values are not changed.

4. Touch the center of the target. Make sure to follow the guidelines described previously in "How to Touch the Screen During a Calibration." Hold your touch for at least three seconds.

   When you lift your finger or pen, a second calibration target appears in the upper right corner of the screen.

5. Touch the second target. Make sure to follow the guidelines described previously in "How to Touch the Screen During a Calibration." Hold your touch for at least three seconds.

When you lift your finger or touch pen, Microcal returns to the main menu. At this point, you should test the calibration and verify that the screen is operating 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. Draw to each corner and edge of the screen. Verify that you are able to reach the full image area of the screen.
4. Press the space bar to clear the screen.
5. 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 aligned with the grid lines, and be smooth and straight.
6. Press Esc to exit the Draw program.

For more information on the keys available when using the Draw program, refer to "Using the Draw Option" later in this chapter.

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

Adjusting the Frequency

In general, your touchscreen is immune to any electrical noise which may be present in the monitor itself. However, sometimes this “noise” may be at the same frequency as the operating frequency of your touchscreen. This could interfere with your system and prevent it 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.

The solution to this problem is to change the operating frequency of your touchscreen. Changing the frequency will 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 touchscreen frequency.

When You Should Adjust the Frequency

You should adjust the operating frequency if

- The cursor is jittery or erratic when you touch the screen
- The cursor does not track (follow) your touch smoothly as you move across the screen
- You have to press hard on the screen to register a touch

Adjusting the Frequency

You can adjust the controller frequency for use with a touch pen or a finger. The optimum frequency 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 touch pen 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.

About Noise Check

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

Before you modify the operating frequency of the touchscreen, 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.

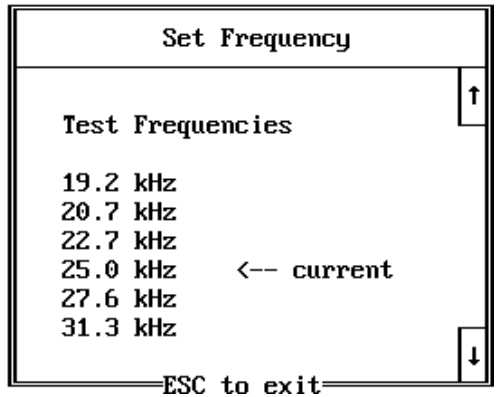
- Noise Check might be located on the Main menu.
- Noise Check might be located on the Diagnostics menu.

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

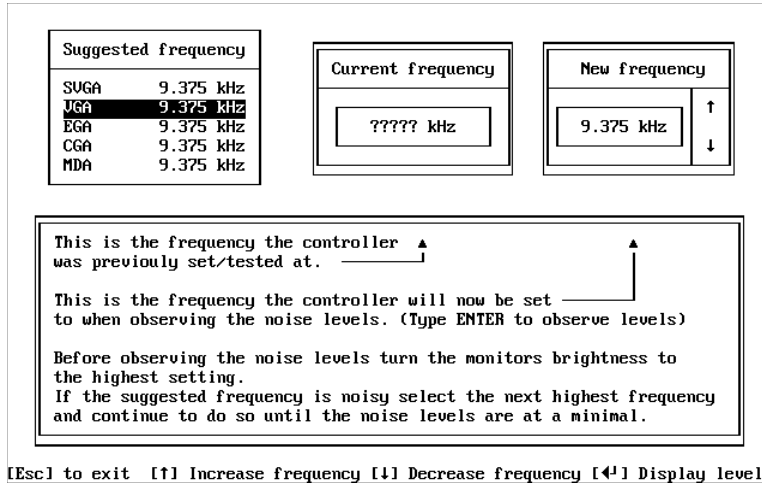
This manual refers to the noise check programs as Automatic Frequency Adjust and Manual Frequency Adjust. Instructions for using these two programs follow this section. Determine which noise check program your controller uses, and consult the appropriate instructions.

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 range 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.

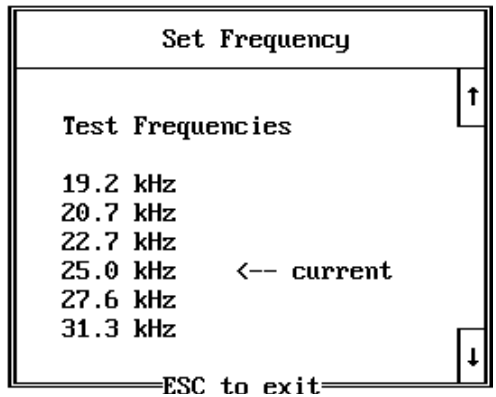
▶ To test operating frequencies and set a new frequency:

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

   If you are using a touch pen 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.

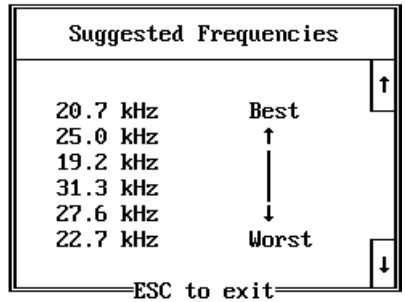
Caution: Do not touch the screen during the test. The test is measuring the amount of noise when you are not touching the screen.

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 current frequency 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 “Using the Draw Option” 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.

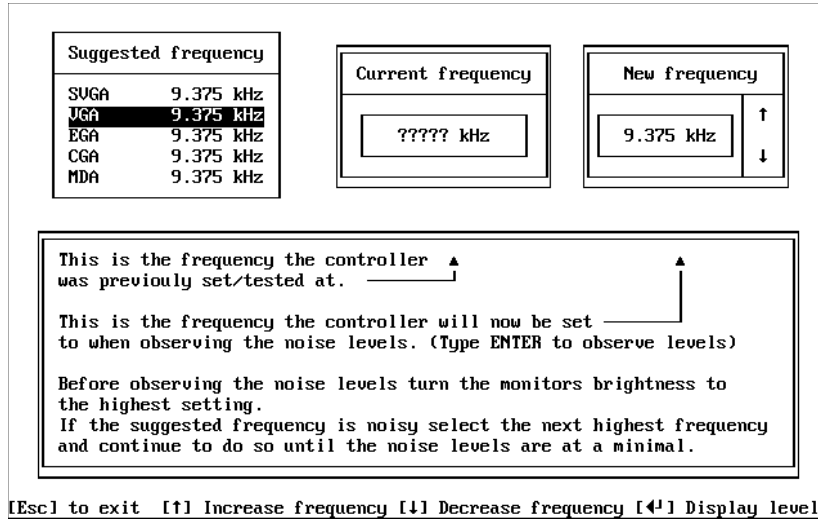
As you select, save, and test different frequencies, Microcal displays the currently saved frequency and the new frequency you are about to test. If you do not save a frequency during the edit session, the Current Frequency still displays question marks.

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:



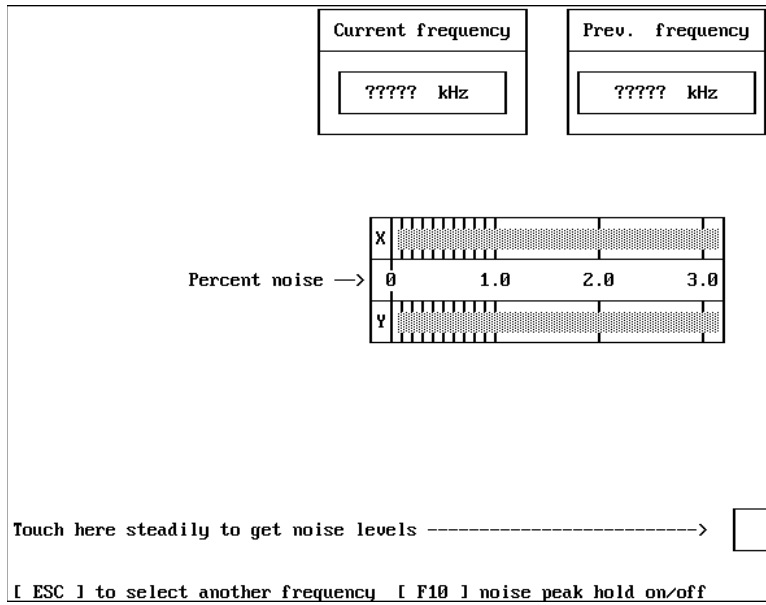
2. Use the up arrow key to increase the frequency; use the down arrow key to decrease the frequency. The New Frequency box displays the frequency you selected.

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 set 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 two options for changing the baud rate used by the touchscreen driver.

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

- You can edit the baud setting in the CONFIG.SYS file using a text editor. Find the DEVICE= line containing MTOUCH.SYS. Edit the baud rate by changing the variable BAUD= (rate) to the new value.

Refer to "Changing the Baud Rate" in Chapter 1 for a description on how to change the baud rate of your touchscreen.

Controller Restrictions

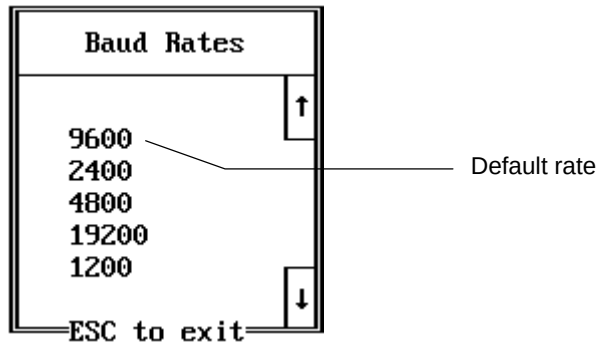
Depending on the type of touchscreen controller connected to your system, Microcal may not have a Baud Rate option on the Main menu. For these controllers, you need to use the AutoBaud Detection option on the Configure menu. You must first disable the AutoBaud feature and then set the communication rate.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

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 Touchscreen

If you are experiencing problems with the tracking and accuracy of your cursor, then you need to test your touchscreen.

There are two factors that affect the operation and accuracy of your touchscreen:

- Calibration
- Operating frequency

Using the Draw option in the following procedures will help you to determine the best course of action for correcting your touchscreen problem.

Using the Draw Option

The Draw option lets you touch the screen and draw lines, shapes, and curves. This option is useful for testing the touchscreen performance and cursor movement.

When you choose the Draw option (F3), the system displays a drawing canvas with a grid. To draw, touch the screen and drag your finger or pen. Table 6 lists the keys you can press during a drawing session.

Table 6. 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	Change the color of the drawing line. (CGA only.)
9	Change the color palette. (CGA only.)

Press …	To …
P F A	Select Pen mode. Select Finger mode. Select Automatic (Pen or 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.

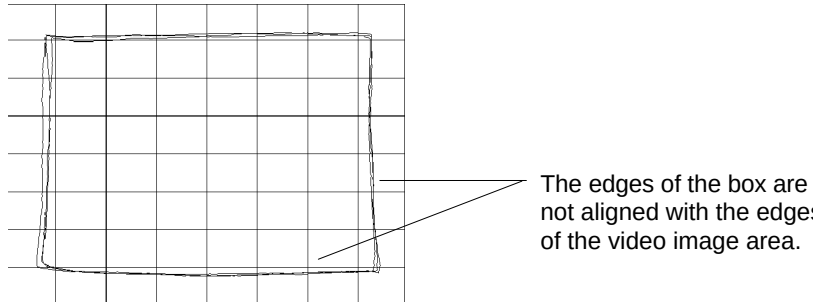
Determining the Probable Cause

▶ To test the touchscreen:

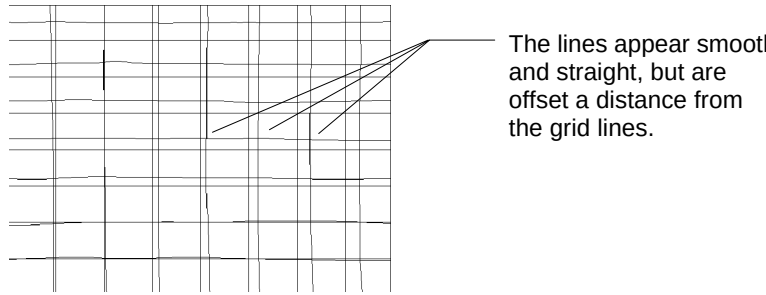
1. Open Microcal.
2. Press the F3 key to open the draw program.
3. Press the space bar to clear the screen, then press G to display the grid.
4. Move your finger or touch pen along the edges of the image area from corner to corner, making the shape of a box. Do this several times.
5. Look at the box you drew on the screen.

   Your lines should smooth and straight, and be aligned with the edges of the image area. Verify that the cursor reaches the full image area of the screen.

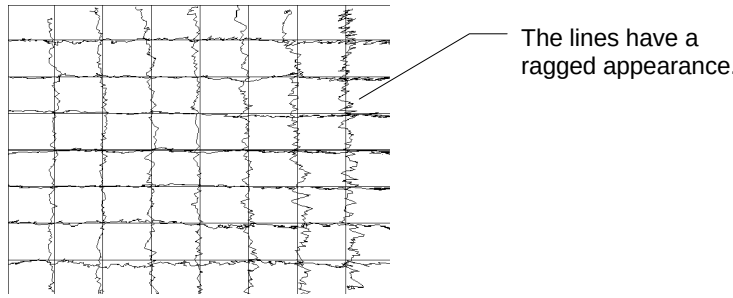
   If you cannot move the cursor to all corners and edges of the screen, then you need to calibrate the touchscreen. Refer to "Calibrating the Touchscreen Using Microcal" earlier in this chapter.



6. Press the space bar to clear the screen, then press G to display the grid.
7. Trace each of the vertical lines displayed on the screen. Your lines should follow the grid and be straight and smooth. Your lines should be similar in appearance to each other.
8. Trace each of the horizontal lines displayed on the screen. Your lines should follow the grid and be straight and smooth. Your lines should be similar in appearance to each other.
9. Look at the lines you drew on the screen.
   - If your lines are straight and smooth, but are offset a distance from the grid lines, then your touchscreen requires calibration. Refer to “Calibrating the Touchscreen Using Microcal” earlier in this chapter.



- If your lines are jagged, rough looking, or intermittent, you need to adjust the touchscreen operating frequency.



  Also, if the cursor is jittery, does not move with your finger or touch pen, or requires a hard touch to move, you need to adjust the frequency.

  Refer to “Adjusting the Frequency” later in this chapter for more information.

10. Press Esc to quit Draw.

When You Should Contact Technical Support

If you have calibrated the touchscreen and adjusted the operating frequency but are still experiencing tracking and accuracy problems with your cursor, contact MicroTouch Technical Support.

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.

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.

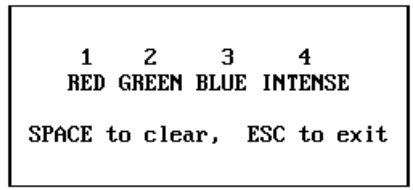
▶ To exit from Color Bars and return to the Main menu, press Esc.

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 7 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.

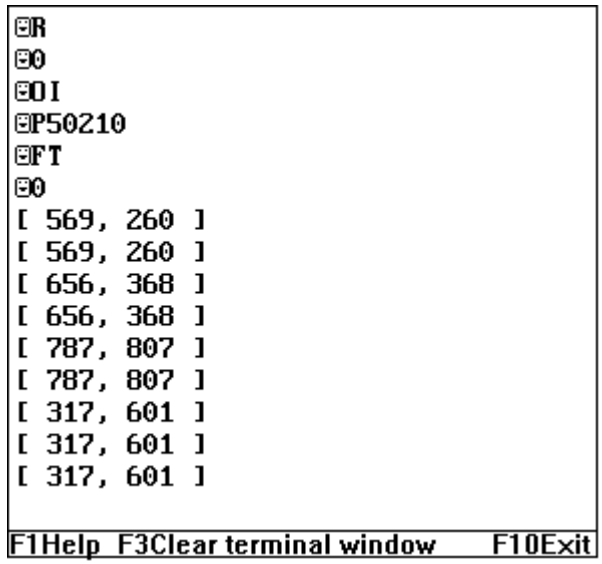
Table 7. Testing Colors with Color Purity

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.

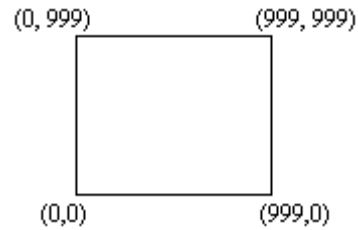
Characters with an ASCII value of less than 32 or greater than 127 appear as characters in the IBM-PC extended character set. It may be useful to obtain a copy of the IBM character set.

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

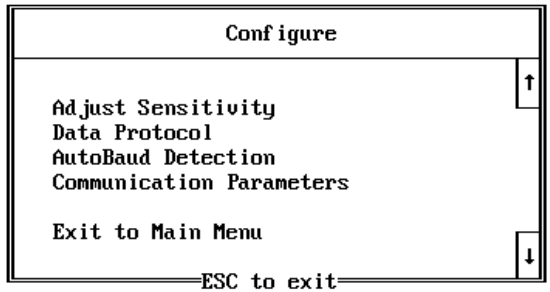
Table 8. Keys for Terminal Emulation Mode

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

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

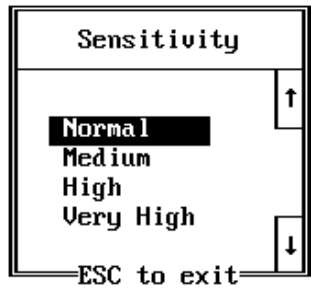
MicroTouch sets the sensitivity of each touchscreen controller during the manufacturing process. The default sensitivity is optimal for most touch applications.

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

Caution: You should only adjust the sensitivity of the touchscreen if it is necessary for proper operation. If the sensitivity is set too high or too low, you will experience erratic touchscreen operation.

▶ 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.

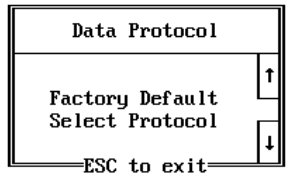
▶ To set the protocol:

1. Select Configure from the Microcal Main menu.

2. Select Data Protocol.

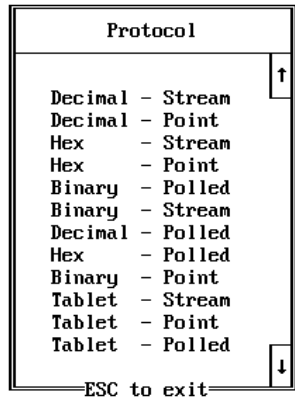
   A dialog box prompts for confirmation that you want to change the controller's default format and mode.

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.

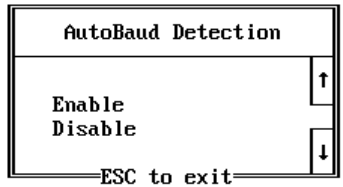
The list of available protocols varies depending on your touchscreen controller.

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.

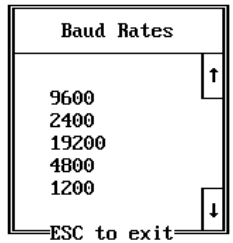


Note: Before setting the baud rate, check "Setting the Baud Rate" earlier in this chapter, and "Changing the Baud Rate" in Chapter 1, for information on controller restrictions and matching the controller and touchscreen driver baud rates.

▶ 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:

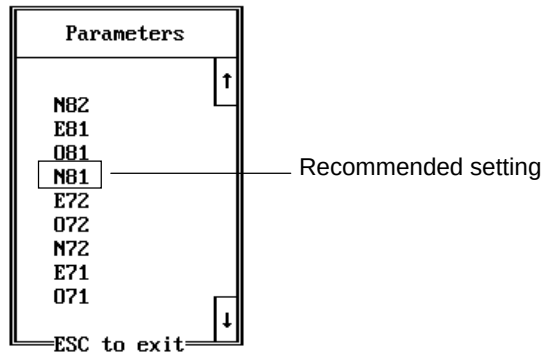
- Type of parity (N=none, E=even, and O=odd)
- Number of data bits (7 or 8)
- Number of stop bits (1 or 2)

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.

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.

Quitting Microcal and Returning to OS/2

To return to the OS/2 operating system you must

- Exit Microcal
- Exit DOS and reboot OS/2

Exit Microcal

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

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

   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 you can press Esc to exit from Microcal.

Exit DOS and Reboot OS/2

▶ If you are using the dual boot feature in OS/2:

1. Move to the OS/2 directory. For example:

   C:\OS2
2. Type BOOT \OS2 and press Enter.

   C:\OS2 BOOT /OS2
3. Type Y (yes) to "Do you want to continue? (Y/N)?" and press Enter. Your system will reboot into OS/2.

▶ If you are using a DOS boot disk:

1. Remove the DOS boot disk from the disk drive.
2. Press Ctrl+Alt+Del. Your system will reboot into OS/2.

▶ If you are running Microcal from a DOS command window in OS/2:

1. Using a text editor, open the CONFIG.SYS file. For example:

   C:\E CONFIG.SYS

   Note: You can exit the DOS command window and edit the CONFIG.SYS file from OS/2 if desired. It is only important that the CONFIG.SYS file be edited before you reboot you system. Your touchscreen will not operate correctly until you have edited this file and rebooted your system.

2. Find the line which contains MTOUCH.SYS.

   For example:

   REM DEVICE=C:\MTSOS2\MTOUCH.SYS ...

3. Delete the word “REM” at the beginning of the line.

   For example:

   DEVICE=C:\MTSOS2\MTOUCH.SYS ...

4. If you are using a mouse with your touch screen, find the line which contains your mouse driver.

   For example:

   DEVICE=C:\OS2\MOUSE.SYS

5. Add the switch STYPE=MTOUCH$ to the end of the line. The line should look similar to the following:

   DEVICE=C\OS2\MOUSE.SYS STYPE=MTOUCH$

6. Save your changes and close the text editor.

7. Type EXIT and press Enter to close the DOS command window.

8. Press Ctrl+Alt+Del to restart your system and implement these changes. Your system will boot into OS/2.

C H A P T E R 5

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 best 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

If you are experiencing problems with the touchscreen, check that all cables are connected properly and restart your system. Refer to Chapter 1.

If you are experiencing problems with your cursor, you may need to calibrate the touchscreen, define a cursor offset, or adjust the touchscreen operating frequency. Refer to Chapter 2.

If you are experiencing problems in finding your touchscreen during installation or operation. use the Microcal Diagnostic utility to locate the touchscreen controller and test the touchscreen. For information on using Microcal, refer to Chapter 4.

If your touchscreen or mouse is not working, the communication settings may be incorrect. If both devices are trying to use the same communication port or IRQ, a device conflict will result. The touchscreen cannot share an IRQ with another device. Refer to Chapter 1 and Chapter 4.

▶ 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: **Touchscreen not working. Cannot select objects on the screen, position the cursor, or use other touch features.**
May indicate that the touchscreen was not properly installed.

- Check that the touchscreen is securely connected to the correct COM port. Check that the touchscreen cable does not have any kinks and that connector pins are not bent.
- Check that the touchscreen is connected to the *next* successive COM port in your system. Refer to "Selecting the COM Port" in Chapter 1.
- 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 and reboot your system.
- Check if the touchscreen controller has a visible LED. If it does, refer to "Status Light on the Controller" later in this chapter for information on diagnosing touchscreen problems using this LED.
- Check that the PC Bus touchscreen controller (if used), is firmly seated in an expansion bus slot in your computer. The touchscreen must be connected to this controller if it is installed.
- Verify that you specified the correct COM port, IRQ number, and baud rate when you installed the touchscreen software. Run Setup again and specify the correct COM settings.
- Try running Microcal and searching all communication ports. If Microcal cannot find the Touchscreen controller, the controller may not be connected to the system, or the controller may be using COM8. Refer to Chapter 4.
- Verify that the order of touchscreen entries in the CONFIG.SYS file is correct. Refer to "Order of Device Drivers" in Appendix A.

Problem: **Cannot activate items by tapping the touchscreen.**
Your touch is not being recognized as a double-click. Use the Touchscreen control panel to adjust the double-click speed to a slower value, or the double-click area to a larger value. 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. The touchscreen cannot share an IRQ with another device.

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. Refer to Chapter 1.

Problem: **Cursor does not display on the screen after starting OS/2.**
May indicate that some files have been corrupted or altered, or that the setup has been changed.

- Check that the MTOUCH.SYS file (the touchscreen driver) has not been moved from the directory specified during installation.
- During installation, did you select "Yes" in the Other Pointing Devices dialog box with no mouse connected? Selecting "Yes" without a mouse connected disables mouse and cursor operation with the touchscreen. Run Setup again.
- Check the order of the device drivers in the CONFIG.SYS file. The mouse driver must be listed after the touchscreen driver. The touchscreen driver and mouse driver must be listed before the OS/2 driver. Refer to "Order of Device Drivers" in Appendix A.

Problem: **Cursor does not reach out to the edges of the screen.**
Try calibrating the touchscreen. When calibrating the screen, be sure you touch the center of each target firmly and precisely.

Problem: **Cursor appears jittery or erratic.**

If the cursor appears jittery when you touch the screen, or moves erratically as you move your touch across the screen, electrical "noise" from the monitor might be interfering with the touchscreen.

To stabilize the cursor, you adjust the operating frequency of the touchscreen. Refer to "Testing the Touchscreen" in Chapter 4 and "Adjusting the Frequency" in Chapter 2.

Problem: **Cursor jumps or bounces suddenly across the screen**

The touchscreen received 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: **Lines are not straight and smooth.**

Indicates that the monitor may be interfering with the touchscreen. To stabilize the cursor, you need to adjust the operating frequency of the touchscreen. Refer to "Testing the Touchscreen" in Chapter 4 and "Adjusting the Operating Frequency" in Chapter 2.

Problem: **Sluggish touch response**

- Systems that cannot handle higher data rates from the touch pen may result in degraded pen performance. To improve performance on these systems, select a lower baud rate. Refer to "Performance Considerations When Using the Touch Pen" in Chapter 3.
- With specific video cards, you may notice finger touch performance lagging behind when using a TouchPen controller. Lowering the baud rate will improve performance. Refer to "Changing the Baud Rate" in Chapter 1.

Error Messages

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

Error: **A specified device driver not installed "SYS1201 The device driver *devicedriver* specified in the DEVICE statement on line *linenumber* of the CONFIG.SYS file was not installed. Line *linenumber* is ignored."**
This is normal for COM.SYS and VCOM.SYS after the installation of TouchWare. The COM ports for the mouse and touchscreen both use the TouchWare driver. Refer to “Error Messages During Startup” in Chapter 1.

This could also indicate that device driver entries in the CONFIG.SYS file may not be in the correct order. For more information about the order of device driver entries in the CONFIG.SYS file, refer to “Order of Device Drivers” in Appendix A.

Error: **Internal error, unable to allocate memory**
The Setup program cannot allocate memory. Make sure that your system has enough base memory to run the Setup program.

Error: **Invalid target directory specified**
The target directory is invalid. The Setup program tries to create a directory if it does not exist. In this case, the target drive or directory may be write-protected, or the directory name is not syntactically correct.

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: **Not enough space on target drive**
There is not enough disk space on the specified target drive to create a target file. You must free up space on the hard drive or select a target drive which has sufficient free space available.

Error: **Output is not a compressed file**
You tried to add files to, or update files in, a library that was not compressed using the Setup program.

Error: **Pen controller not found**
You tried to set the pen mode and the error message "Pen controller not found" was displayed. This could indicate that

- The touchscreen controller you are using is not a touch pen controller
- The touchscreen controller is a touch pen controller but is not connected properly

Error: **Setup is unable to expand the support file**
After copying the ~INS0762.LIB file to a temporary location, the Setup program could not decompress the support file. Make sure there is enough free space on the drive that you're using for temporary storage.

Error: **Setup unable to copy files to temporary location**
The Setup program cannot copy the support files to a temporary location. Check to see that enough free space and appropriate write privileges are available. Make more space available and try again.

Error: **Setup unable to start installation program**
Make sure that you have a good copy of the Setup program on your source disk. Also check to see if there is enough space on the target disk.

Error: **Setup unable to store temporary files**
The Setup program is unable to find an appropriate location to copy temporary files. The Setup program searches all possible locations for free space to copy temporary files. Make at least 500KB of free disk space available and then try the installation again.

Error: **Unable to communicate with touchscreen**

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

- Check that the touchscreen is securely connected to the correct COM port. Check that the touchscreen cable does not have any kinks and that connector pins are not bent.
- Check that the touchscreen is connected to the *next* successive COM port in your system. Refer to "Selecting the COM Port" in Chapter 1.
- 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 and reboot your system.
- Check if the touchscreen controller has a visible LED. If it does, refer to "Status Light on the Controller" later in this chapter for information on diagnosing touchscreen problems using this LED.
- Check that the PC Bus touchscreen controller (if used), is firmly seated in an expansion bus slot in your computer. The touchscreen must be connected to this controller if it is installed.
- Verify that you specified the correct COM port, IRQ number, and baud rate when you installed the touchscreen software. Run Setup again and specify the correct COM settings.
- Try running Microcal and searching all communication ports. If Microcal cannot find the Touchscreen controller, the controller may not be connected to the system, or the controller may be using COM8. Refer to Chapter 4.
- Verify that the order of touchscreen entries in the CONFIG.SYS file is correct. Refer to "Order of Device Drivers" in Appendix A.

Error: **Unable to copy ~INS0762.LIB to temporary location**

The ~INS0762.LIB file is the Setup program's user-support file. You copy ~INS0762.LIB to your first distribution disk, and the Setup program automatically decompresses and copies ~INS0762.LIB to a temporary location on the user's hard disk. You will see this error message if the Setup program cannot find an acceptable temporary location where it can copy the installation support file, or if there wasn't enough free disk space to copy the files.

Make sure you have enough free disk space. Make sure that the environment variable TEMP points to a valid location with enough available disk space.

Error: **Unable to open output file**

The Setup program cannot open the output file. Make sure that the target directory and files are specified correctly.

Error: **Unable to write to output file**

The Setup program cannot write to the output file. Make sure that the output file is not read-only.

Status Light on the Controller

The touchscreen controller has a light-emitting diode (LED) built into it. The LED provides valuable information about the status of the touchscreen and controller.

If you are experiencing problems with the touchscreen, be sure to check the LED. Refer to Table 9 for an explanation of a bright, dim, and blinking LED.

Table 9. Status LED 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. • The sensor is being touched.
Continuously Dim	Indicates the sensor is not being touched.
Blinking	Indicates the power-on self-test failed. Possible errors are as follows: 1 flash per 10 seconds = RAM error 2 flashes per 10 seconds = ROM error 3 flashes per 10 seconds = A/D error 4 flashes per 10 seconds = NOVRAM error 5 flashes per 10 seconds = Analog error

When the touchscreen is operating normally, the LED will be dim. When you touch the screen, the LED will brighten. When you remove your touch, the LED will dim again.

If the cursor does not follow your touch, but the operation of the LED appears normal when you touch the screen, then you are probably experiencing a communication problem between your system and the touchscreen.

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.

APPENDIX A

Settings, Commands, and TouchWare Files

This chapter defines the touchscreen settings, commands, and files installed on your system.

Touchscreen Settings

You can select settings for the touchscreen by using the touchscreen control panel. These changes take effect immediately. Whenever you save your changes to the touchscreen control panel, the system saves the new settings to the MTOUCH.SYS driver entry in the CONFIG.SYS system file.

CONFIG.SYS is a text file that you can open, view, edit, and save using any editor or word processor that reads ASCII text files. The operating system reads this file when you start your system.

Caution: Be careful when making any changes to CONFIG.SYS. Making incorrect entries in CONFIG.SYS may prevent OS/2 from operating. Changing the order of the entries could prevent the touchscreen or the mouse (if installed) from operating.

CONFIG.SYS

This section defines the settings for the touchscreen entries in the CONFIG.SYS system file.

Order of Device Drivers

Device drivers must be listed in correct order in the CONFIG.SYS file to ensure that the touchscreen and the mouse (if installed) operate properly. During the TouchWare for OS/2 installation, the touchscreen and mouse device drivers are added to CONFIG.SYS in the correct order. When editing the file, be careful to maintain this order.

1. **DEVICE=*disk drive*:*directory*\MTOUCH.SYS …**

   This line specifies the MicroTouch touchscreen driver and the touchscreen settings.

2. **DEVICE=*disk drive*:\OS2\MOUSE.SYS STYPE=MTOUCH$**

   This line specifies that a mouse is being used in addition to the touchscreen.

   This line must be located after the touchscreen driver line. The touchscreen driver must be loaded before the mouse driver, so that the mouse works properly with the touchscreen.

3. **DEVICE=*disk drive*:\OS2\BOOT\COM.SYS**

   This line specifies the OS/2 device driver for the COM ports.

   This line must be placed after the touchscreen and mouse drivers in order for the touchscreen and mouse to work properly. By default, this driver uses COM1 or COM2 if either port is available. If this line is in front of the touchscreen and mouse drivers, it will take control of one of the COM ports needed by the touchscreen or mouse driver.

4. **DEVICE=*disk drive*:\OS2\MDOS\VCOM.SYS**

   This line specifies the DOS virtual device driver. This line must be located after the corresponding OS/2 device driver.

The four entries do not have to be placed together in CONFIG.SYS, however their order in the file must be maintained.

If you are using a mouse with the touchscreen, you may see error messages about COM.SYS or VCOM.SYS when you boot the system. The error occurs because the OS/2 device driver tries to take control of the COM ports, but they are already assigned to the touchscreen and mouse. To eliminate the error messages refer to “Error Messages During Startup” in Chapter 1.

Touchscreen Driver Settings Defined

When you install the OS/2 touchscreen driver, the Setup program automatically adds the following line to the CONFIG.SYS file:

DEVICE=*disk drive*:*directory*\MTOUCH.SYS SERIAL=COM*n* IRQ=*irq* BAUD=*baud* TOUCHMODE=*touchmode* AUDIBLECLICK=*audibleclick* OFFSET=*offset*

where:

disk drive and ***directory***	=	The location (disk and path) for the touchscreen driver files. For example: C:\MTSOS2
n	=	The serial communications port number, from 1 to 8.
irq	=	The interrupt number that the serial port is configured to use, from 3 to 15.
baud	=	The baud rate that the touchscreen driver is set to use, typically 9600. The touchscreen driver baud rate and touchscreen controller baud rate must be the same for the touchscreen to work properly.
touchmode	=	The touch mode the touchscreen is set to use; either DESKTOP, DRAWING, or BUTTON.
audibleclick	=	The touchscreen audible feedback setting; either OFF, UP, or DOWN.
offset	=	The cursor's vertical offset value, from 0 to 512.

Note: You can define settings for the touchscreen using the touchscreen control panel, or you can use a text editor to add or change touchscreen settings in the CONFIG.SYS file. Settings changed using the touchscreen control panel are sent to the driver and take effect immediately. Settings changed by editing CONFIG.SYS will not take effect until you reboot the system.

Mouse Driver Settings

During the TouchWare for OS/2 installation, if you specify that you will be using a mouse with the touchscreen, the Setup program automatically adds switch STYPE=MTOUCH$, to the mouse driver line in the CONFIG.SYS file as follows:

DEVICE=*disk drive*:\OS2\MOUSE.SYS STYPE=MTOUCH$

This line enables the mouse to work with the touchscreen.

Note: Be sure to keep the mouse driver line below the touchscreen driver line in the CONFIG.SYS file. The touchscreen driver must be loaded before the mouse driver in order for the mouse to operate.

If you do not initially specify that you will be using a mouse (or other input device) during the installation of TouchWare, you must complete the following procedures to add a mouse:

1. Install the mouse following instructions in your OS/2 system documentation and reboot the system.
2. Reinstall TouchWare for OS/2 by running Setup. During the installation, specify that you will be using a mouse with the touchscreen. When you complete the installation, reboot the system.

TouchWare Files

Table 10 lists the touchscreen files installed by Setup for TouchWare for OS/2. These files are located in the directory specified during Setup.

Table 10. Touchscreen Files for OS/2

File Name	Purpose
MTCHTRL.EXE	Touchscreen control panel for OS/2.
MTTOUCH.INF	Help file for the touchscreen control panel.
OS2PEN.EXE	Pen Configuration utility for OS/2.
MTOUCH.SYS	Touchscreen driver for OS/2.
TOUCHINI.EXE	Program to read the double-click speed and area settings from the system profile.
MTS.ICO	MicroTouch Systems icon.
MTSETUP.INF	Help file for the MicroTouch Setup program.
MCAL.OVL QCAL.OVL	Overlay files for the Microcal Diagnostic utility.
MICROCAL.EXE	Microcal Diagnostic utility.
MICROCAL.HLP QUICKCAL.HLP	Help files for the Microcal Diagnostic utility.
NAME.BMP	Bitmap for the installation logo.
README.TXT	Product information, release notes.

COM Port Base Addresses

Table 11 lists the TouchWare defined address for each COM port.

Table 11. TouchWare Defined 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

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