TouchProbe® Communications

for DOS Computers

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If this equipment is operated from the same electrical wall circuit as other pieces of equipment and erratic operation of the unit occurs, it may be necessary to shut off other equipment or power the unit from a dedicated electrical circuit.

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Reorient the receiving antenna.
Relocate the computer with respect to the receiver.
Move the computer away from the receiver.
Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

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Foreword

This manual is for the TouchProbe Communications for DOS Computers software. This software enables you to configure the TouchProbe to read from or write to Touch Memory buttons, and then transfer the data from the TouchProbe to the computer and store the data as an ASCII text file.

The TouchProbe Communications software has four menus: **File**, **Settings**, **TouchProbe**, and **About**. The following tables briefly describe each menu command.

File Menu

Open Data File	Displays the contents of the data file.
Set Data File Path	Enables user to specify data filename and path.
Append to Data File Overwrite Data File	Toggle command—enables user to append to or overwrite data in data file.
Exit	Exits program.

Settings Menu

Communications	Enables user to select serial port for communication, either com port 1 or com port 2, and the baud rate.
Display	Switches the display between text and graphics modes (EGA/VGA only).
Data Format	Enables user to specify the data file tab length.

TouchProbe Menu

Add Probe ID	Enables user to add TouchProbe IDs to list.
Delete Probe ID	Enables user to delete TouchProbe IDs from list.
Configure Probe	Enables user to configure TouchProbe to read and/or write to Touch Memory buttons.
Review Probe Configuration	Enables user to view TouchProbe configuration.
Load Text into Probe	Enables user to transfer text from the computer to the TouchProbe.
Transfer Data from Probe	Transfers to the computer a record of everything the TouchProbe read and everything the TouchProbe wrote. Stores this data as an ASCII text file using the filename and path specified under the **File - Set Data File Path** menu choice.

About Menu

About	Displays the version number of the software.

If you have any comments or questions on the TouchProbe or this software, please contact the Videx Technical Support Department at (541) 758-0521 or fax (541) 752-5285.

Chapter 1

Introduction to TouchProbe

This chapter contains:

- Introduction to the TouchProbe, TouchProbe Downloader Station, and the TouchProbe Communications software.

- Introduction to touch technology and Touch Memory buttons.

- Instructions on connecting the TouchProbe Downloader Station to the computer.

Introduction to TouchProbe Communications

This software package, "TouchProbe Communications for DOS," along with a TouchProbe, TouchProbe Downloader Station, and Touch Memory buttons, combine to make a dependable and durable data collection system.

"TouchProbe Communications for DOS" allows you to configure a TouchProbe to communicate with Touch Memory buttons. Touch Memory buttons (also known as iButtons) are stainless steel, coin-shaped data containers that hold information and transfer the information with a touch. A Touch Memory button can be either a read-only button or a read/write button. A TouchProbe can be configured to read the read-only buttons, and to read from or write to the read/write buttons.

When the TouchProbe's data is transferred to the computer, it is stored in an ASCII text file named **DATA.TMD**. This text file is also appended to a file named **HISTORY.TMD**, which is a history file of all data transferred from TouchProbes.

The ASCII text file can be imported into an application software program, such as a database or spreadsheet, for data processing. The application software program must be able to import an ASCII text file. All processing of the transferred data is done with the application software.

The TouchProbe Communications software:

- Configures the TouchProbe with a variety of read and write options for collecting and storing button data.

- Transfers the collected data from the TouchProbe to the computer.

- Stores the transferred data on the computer as an ASCII text file.

Equipment You Will Need

You will need the following equipment and software for a complete TouchProbe data collection system:

- DOS or Windows computer with a minimum of 640K RAM and a hard disk

- MS/PC DOS (Version 2.0 or greater)

- TouchProbe

- TouchProbe Downloader Station

- Touch Memory buttons

- Serial Port cable assembly—connects computer to TouchProbe Downloader Station

- Videx TouchProbe Communications software for DOS (1 disk)

- Application software for data processing (The application software must be able to import an ASCII text file. Processing of the data is done with the application software.)

To communicate with a TouchProbe by modem, you also need:

- TouchProbe Downloader Plus

- Remote Modem cable assembly—connects modem to TouchProbe Downloader Plus

- Two modems

TouchProbe

The durable and easy to use TouchProbe communicates with Touch Memory buttons. After the TouchProbe is configured, it can collect data with a touch of a button.

Key Ring

End Cap

Figure 1-1

Indicator Light

Contact

TouchProbe

To communicate with a Touch Memory button, place the TouchProbe contact over the button—the round rim of the button helps guide the TouchProbe for easy alignment. With a momentary touch, the TouchProbe communicates with the button and stores the data into the TouchProbe's memory. The TouchProbe emits an audible beep and the indicator light flashes with each successful read.

If you are writing to a button, the TouchProbe emits a series of chirping sounds followed by a double beep.

The TouchProbe is shipped with a 9-volt replaceable battery. The TouchProbe can use either a lithium or alkaline 9-volt battery. A lithium battery lasts approximately two years and an alkaline battery lasts about one year. Exact battery life depends upon actual use. A lithium back-up battery maintains the data and program during battery replacement.

If the TouchProbe indicator light stays on after touching a button, or if the TouchProbe does not communicate with a button that it is configured to communicate with, replace the 9-volt battery.

Battery Replacement

Videx has manufactured three different types of TouchProbes: the original cast metal TouchProbe, the plastic case TouchProbe, and the new extruded metal TouchProbe.

The basic steps for replacing the battery are the same for all units:

1. Remove battery cover.

2. Unhook old battery from battery clip.

3. Attach new battery-to-battery clip.

4. Replace battery cover.

However, the steps to remove the battery cover vary slightly for each unit.

The following instructions provide more detail for replacing the batteries in each type of TouchProbe.

Extruded Metal Case TouchProbe Battery Replacement

1. Use a 3/32" hex wrench to remove the two screws from the end cap.

2. Remove the end cap.

3. Unhook the battery clip from the 9-volt battery.

4. Remove the 9-volt battery from the TouchProbe battery chamber.

5. Insert the new 9-volt battery into the battery chamber.

6. Connect the battery clip to the new battery.

7. Reinstall the end cap.

8. Insert the end cap screws into the end cap and tighten.

Plastic Case TouchProbe Battery Replacement

1. Use a 1/16" hex wrench to remove the hex screw located near the key ring.

2. Remove the battery cover and key ring.

3. Unhook the 9-volt battery from the battery clip.

4. Remove the 9-volt battery from the TouchProbe battery chamber.

5. Connect the battery clip to the new battery.

6. Insert the new 9-volt battery into the battery chamber.

7. Reinstall the key ring and battery cover.

8. Reinstall and tighten the hex screw.

Cast-Metal Case TouchProbe Battery Replacement

1. Use a 5/64" hex wrench to remove the two screws and retaining nuts located near the key ring.

2. Gently pull on the key ring to remove the key ring and end cap.

3. Unhook the battery clip from the 9-volt battery.

4. Remove the 9-volt battery from the TouchProbe battery chamber.

5. Insert the new 9-volt battery into the battery chamber.

6. Connect the battery clip to the new battery.

7. Reinstall the end cap and key ring.

8. Reinstall the two retaining nuts and screws.

The lithium back-up battery preserves the information in the TouchProbe during battery replacement.

Touch Memory Buttons

A Touch Memory button (also known as an iButton) is a memory chip housed in a stainless steel container. The stainless steel container protects the memory chip and also provides an electrical path for communication. The top of the button is connected to the enclosed memory chip circuit, and the bottom and sides of the button provide a signal ground. When a TouchProbe touches a Touch Memory button, the top and the sides of the button are connected and an electrical path is established. Through this path, data is transferred at up to 16,000 bits per second.

All Touch Memory buttons contain a unique serial number (12 hexadecimal digits) that is programmed into the button at the factory. The serial number is unalterable and uniquely identifies each button.

The table below lists the five different Touch Memory buttons supported by this software:

Touch Memory Buttons				
Button Type	Read or Read/ Write(R/W)	48 Bit Serial #	R/W Memory Size (Bits)	Max. Data Rate
DS1990	Read	Y	0	16 kbps
DS1991	Read	Y	1,152	16 kbps
DS1992	R/W	Y	1,024	16 kbps
DS1993	R/W	Y	4,096	16 kbps
DS1994	R/W	Y	4,096	16 kbps

Table 1-1 Touch Memory Button Data

A DS1990 button is a read-only button. A DS1991 is a read/write button; however, this software version treats it as a read-only button. DS1992, DS1993, and DS1994 buttons are read/write buttons. (Throughout this documentation you will see the Touch Memory button types referred to by their number only, without the preceding DS.)

A Touch Memory button can be attached to virtually anything by using an adhesive backing, a mounting bracket, or a key ring.

TouchProbe Downloader Station

The TouchProbe Downloader Station is a communication station that allows information to be exchanged between the TouchProbe and the computer. The TouchProbe Downloader Station is also referred to as a "downloader." The downloader is connected to the serial port (com port) of your computer with a serial port cable.

The downloader has a **Power** light, a **Transmit** light, and a **Receive** light. When the **Power** light is on, it indicates that the downloader is connected to electricity. The **Transmit** and **Receive** lights blink during TouchProbe configuration and data transfer.

The following section describes how to connect the TouchProbe Downloader Station to the computer.

Connecting the TouchProbe Downloader Station to the Computer

We recommend that you turn your computer off while connecting your TouchProbe Downloader Station to the serial port. (The serial ports on a DOS computer are commonly referred to as com ports.)

1. Plug the TouchProbe Downloader Station transformer (Output: 12 VDC 300 mA) into an electric outlet. Insert the other end of the transformer cable into the center socket labeled "Power" on the back of the downloader. Check that the **Power** light on the downloader is lit.
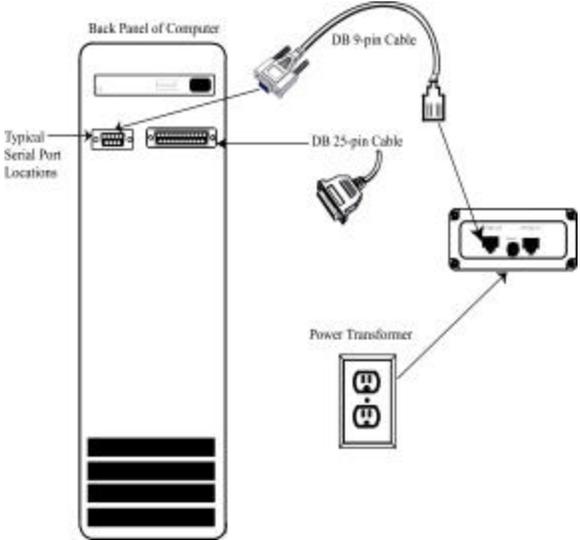

Figure 1-2 TouchProbe Downloader Station Connections

2. Connect the RJ-11 plug of the serial port cable to the "Computer" socket of the downloader, and connect the other end of the cable to com port 1 of your computer.

    (If you prefer to use com port 2 for communicating with the TouchProbe, connect the serial port cable to com port 2 and see the instructions on page 27 to set the communications to com port 2.)
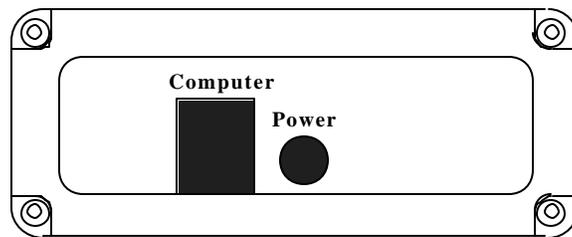

Figure 1-3 View of TouchProbe Downloader Station Sockets

Warning!

Do not connect the TouchProbe Downloader Station to a telephone

line. This could damage the unit.

TouchProbe Downloader Plus

Videx manufactures a special downloader called a TouchProbe Downloader Plus. The TouchProbe Downloader Plus allows communication between a TouchProbe and computer via modem. See Appendix G for information on using the TouchProbe Downloader Plus.

Make a Backup Disk

Before you begin the next chapter, make a copy of your TouchProbe Communications software disk. Place the original disk in a safe place.

Chapter 2

TouchProbe - Getting Started

This chapter contains:

- Instructions on copying the TouchProbe Communications software onto the hard disk of your computer.

- A quick-start exercise that introduces configuring the TouchProbe, reading Touch Memory buttons, and transferring the data.

Copy the TouchProbe Communications Software onto the Computer's Hard Disk

To use your TouchProbe Communications program, you need to first copy the software onto your hard disk. Attempting to run the software from a floppy disk results in program errors since its storage space is limited. A general rule is that the software requires free hard disk space equal to the size of the software. The software displays a warning message if hard disk space is low.

In the following example, we create a directory for the software called "TOUCH." You may use another name for the directory by simply substituting your preferred name for "TOUCH" in the following steps. <Enter> symbolizes pressing the computer's Enter key. <Space> symbolizes pressing the computer's space bar.

1. Make a backup of the TouchProbe Communications software disk if you have not already done so. Put the original disk in a safe storage place, and use your backup disk in the following steps.

2. Insert the backup copy of the TouchProbe Communications software disk into your 'A' disk drive.

3. At the DOS prompt, enter the following: **md\TOUCH** <Enter>. The "md" means "make directory." Your screen should look like this:
    <div align="center">C:\>md\TOUCH</div>

4. Log on to the new directory by entering the following at the DOS prompt: **cd\TOUCH** <Enter>. The "cd" means "change directory." Your screen should look like this:
    <div align="center">C:\>cd\TOUCH
C:\TOUCH></div>

5. Copy the files from the disk by entering the following at the DOS prompt: **copy** <space> **a:*.*** <Enter>. Your screen should look like this:

    C:\TOUCH>copy a:*.*

    This copies all the files from the TouchProbe Communications software disk in drive 'A' to the TOUCH directory on the hard disk.

6. There must be a file called **config.sys** in the root directory of your hard disk. The root directory is the directory that comes up when you first turn on your computer. The **config.sys** file must contain a files statement and a buffers statement. For example:

    Files = 20
    Buffers = 8

    These are minimum settings for files and buffers. To see if there is a proper **config.sys** file in your hard disk, log on to the root directory by entering the following at the DOS prompt: **cd** <Enter>; then at the next DOS prompt enter: **type config.sys** <Enter>. Your screen should look like this:

    C:\>cd
    C:\>type config.sys

    The contents of the **config.sys** file are displayed on the screen. If it does not contain the files and buffers statements, you may add them using a text editor.

The installation of TouchProbe Communications onto your hard disk is now complete. The next section acquaints you with the TouchProbe Communications software with a quick-start exercise.

If you have not connected your downloader to the computer's serial port, do so now. See pages 10–11 for instructions on connecting the TouchProbe Downloader Station to your computer.

Quick-Start Exercise

Before proceeding further, we will acquaint you with the TouchProbe Communications software via a quick-start exercise.

1. To use the TouchProbe Communications software, type **cd\touch** <Enter> at the DOS prompt. Then type **touch** <Enter> at the next DOS prompt. Your screen should look like this:

    > **C:\>cd\touch**
    > **C:\TOUCH>touch**

2. The TouchProbe Communications menus appear.

3. The **File** menu is highlighted; press the <Enter> key to view the **File** menu. The **File** menu allows you to view the data file, change the name and location of the data file, and exit the program.
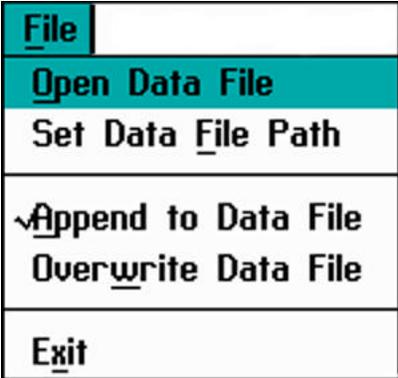

Figure 2-1 File Menu

4. Press the right arrow key <u>twice</u> to select the **TouchProbe** menu.
    The **TouchProbe** menu allows you to add and delete IDs, configure
    the TouchProbe, review the configuration setting, load text into the
    TouchProbe, and transfer data from the TouchProbe.

```
┌─────────────────────────────────┐
│ TouchProbe │                    │
├─────────────────────────────────┤
│ Add Probe ID                    │
│ Delete Probe ID                 │
├─────────────────────────────────┤
│ Configure Probe                 │
│ Review Probe Configuration      │
├─────────────────────────────────┤
│ Load Text into Probe            │
├─────────────────────────────────┤
│ Transfer Data from Probe        │
└─────────────────────────────────┘
```

Figure 2-2 TouchProbe Menu

5. Use the up and down arrow keys to choose **Add Probe ID** from
    the **TouchProbe** menu. When the **Add Probe ID** command is
    highlighted, press the <Enter> key.

6.   The **Add Probe ID** dialog box appears.
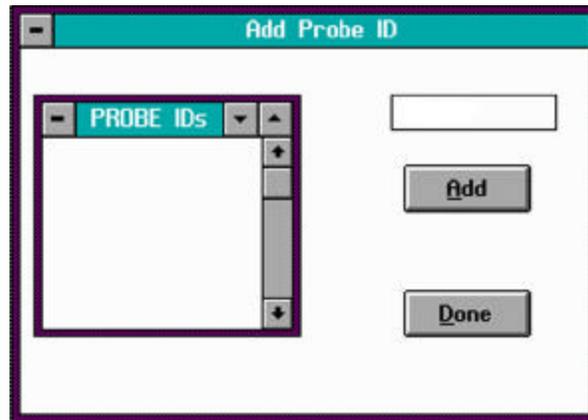
Figure 2-3 Add Probe ID Dialog Box

Each TouchProbe must be given a probe ID. The probe ID may consist of up to ten alphanumeric characters. You may use any alphanumeric characters, and the probe ID may be from one to ten characters in length. Note: Lowercase letters are automatically converted to uppercase.

7. Enter a probe ID of 12345 at the blinking cursor. (You may use any ID number, but we will use "12345" in this example.)
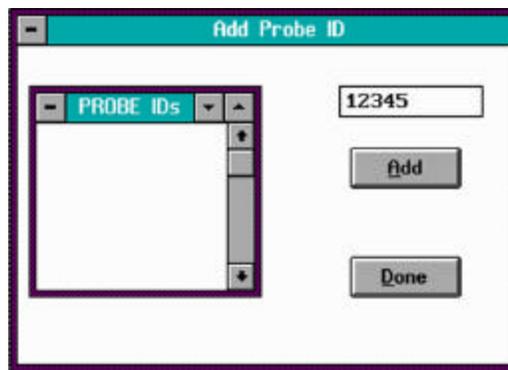

Figure 2-4 Add Probe ID Dialog Box

Press the <Tab> key to highlight the **Add** button. Press the <Enter> key. The probe ID is added to the **Probe IDs** box on the left and the **Add Probe ID** dialog box is ready for another probe ID entry. Press the <Tab> key twice or until the **Done** button is highlighted. Press the <Enter> key.

8. Press the <Enter> key to open the **TouchProbe** menu. Choose **Configure Probe** from the **TouchProbe** menu by pressing the down arrow key until it is highlighted and then pressing <Enter>, or by pressing the **C** key on the computer keyboard.
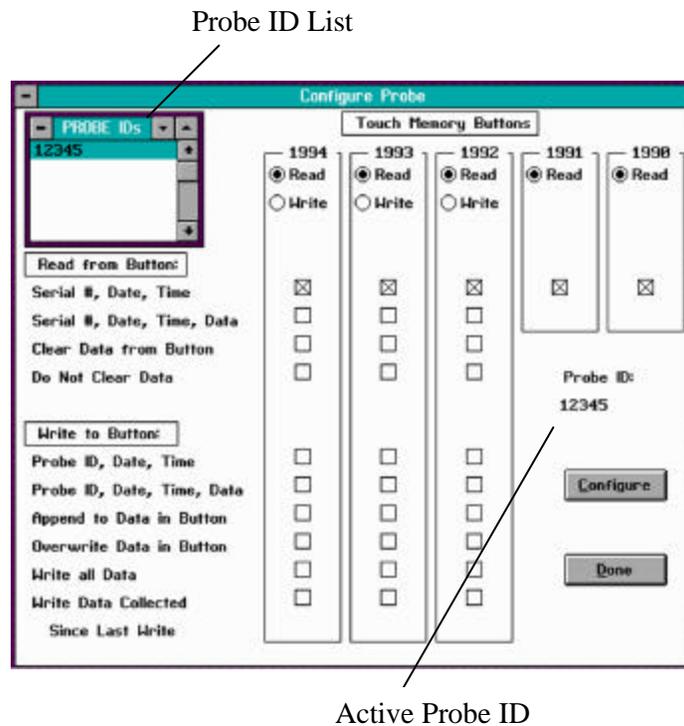
Probe ID List

Figure 2-5 Configure Probe Screen

Active Probe ID

The **Configure Probe** screen appears. The probe ID entered in Step 7 is in the **Probe IDs** list and is shown as the active **Probe ID**. The software is shipped with the configure options set to **Read** for each button type. We will use these default settings for now. See the **Configure Probe** section that begins on page 33 for detailed information on the screen and the available options.

9.   Insert your TouchProbe into the downloader.

10. Press the <Tab> key until the **Configure** button is selected and then press the <Enter> key, or type **Alt C**.

11. The software begins to configure the TouchProbe.

12. After the configuration process is completed, a message appears on
     the screen to inform you if the TouchProbe has been properly
     configured.

     If the TouchProbe was not configured, press the <Enter> key to
     remove the message from the computer screen. Verify that all of
     the cable connections to the TouchProbe Downloader Station and
     the computer are secure, and that the TouchProbe is properly
     inserted into the downloader. Repeat Step 10.

     If the TouchProbe was successfully configured, press the <Enter>
     key to remove the message from the computer screen and continue
     to Step 13.

13. Remove the TouchProbe from the downloader.

14. Read a few Touch Memory buttons. To read a button, place the
     TouchProbe contact over a Touch Memory button—the round rim
     of the button helps guide the TouchProbe for easy alignment. The
     TouchProbe emits an audible beep and flashes its red LED each
     time you successfully read a button.

15. Reinsert the TouchProbe into the downloader.

16. Select **Transfer Data from Probe** from the **TouchProbe** menu by
     pressing the down arrow key until the **Transfer Data from Probe**
     command is highlighted and then press the <Enter> key, or press the
     T key from the computer keyboard.

17. The **Transfer Data** window appears. See Figure 2-6. The probe ID is displayed in the **Probe IDs** list on the left side of the **Transfer Data** window and also after **Probe ID:** at the center of the **Transfer Data** screen. Press the <Tab> key to highlight the **Transfer** button and then press the <Enter> key.
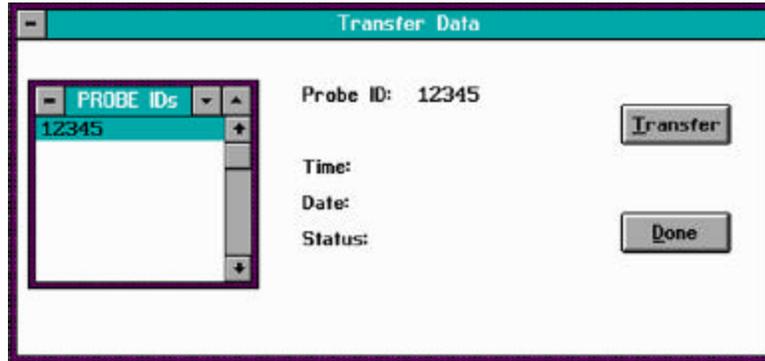

Figure 2-6 Transfer Data Window

18. The software begins looking for the TouchProbe.

19. When the software locates the TouchProbe, it transfers the TouchProbe's data.

20. When the transfer process is completed, the **DATA.TMD** file opens, allowing you to view the data.

21. Press the <Esc> (Escape) key to close the **DATA.TMD** file. The **Transfer Data** window shows the time, date, and status of the transfer.

22. To close the **Transfer Data** window, press the <Tab> key to select the **Done** button and then press the <Enter> key, or press the <Esc> key.

23. To exit the TouchProbe Communications software, choose **Exit** from the **File** menu.

If you have followed the previous steps, you have successfully configured the TouchProbe, read Touch Memory buttons, and transferred the data to

the computer. Go to Chapter 3 for additional information on the
TouchProbe Communications software.

Chapter 3

TouchProbe Learning Guide

This chapter provides detailed information on the operation of the TouchProbe Communications software. The basic functions of the software and its menu commands are explained in detail.

Menu Introduction

The communications software has four menus: **File**, **Settings**, **TouchProbe**, and **About**.

After initial start-up of the software, press the <Enter> key to open the menus for viewing. Use the right and left arrow keys to navigate among the four menus. To activate a menu command, use the up and down arrow keys to choose the command. When the command is highlighted, press the <Enter> key to activate the command. Each menu command contains a bold or underlined letter; you may also activate a command by pressing the appropriate letter from the computer keyboard when the menu is open.

Menu commands typically open windows and dialog boxes. Use the <Tab> key to move the cursor through the available choices in the window or dialog box. When your choice is highlighted, press the <Enter> key. You may always exit a window or screen by pressing the <Esc> (Escape) key.

File Menu

The **File** menu contains the **Open Data File** and **Set Data File Path** commands, the **Append** and **Overwrite Data File** toggle command, and the **Exit** command.
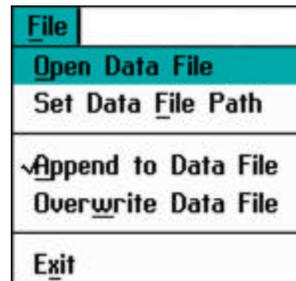

Figure 3-1 File Menu

File Menu - Open Data File Command

The **Open Data File** command lets you view the data file.

When you choose the **Open Data File** command, the data file is opened for viewing only. If you want to edit the data, use a text editor to open the data file.

File Menu - Set Data File Path Command

The **Set Data File Path** command allows you to assign the location of the data file.

The **Set Data File Path** command displays the name of the current data file. It also allows you to create a new data file, either in the current directory or another directory.

If you enter another name at the **Set Data File Pathname** dialog box, a new file is constructed using the new name. The new file is used for data transfer. The old file still exists, and may be used for data transfer by entering the original filename back into the **Set Data File Pathname** dialog box.

To save the changes made at the **Set Data File Pathname** dialog box, press the <Tab> key to highlight the **OK** button and press <Enter>. If you make changes and do not want to save them, press the <Tab> key until the **Cancel** button is highlighted and press <Enter>, or press <Esc>.

If no changes have been made, you can close the **Set Data File Pathname** dialog box by highlighting either the **OK** or **Cancel** button and pressing the <Enter> key, or by pressing <Esc>.

File Menu - Append to Data File/Overwrite Data File Toggle Command

The **Append to Data File** and the **Overwrite Data File** toggle command allows you to either append the data being transferred to the data file, or to overwrite the data file with the data being transferred. An asterisk or checkmark appears before the selected command. The software is shipped with the **Append to Data File** command selected.

To select the overwrite command, choose the **Overwrite Data File** command from the **File** menu. The checkmark then appears before the **Overwrite Data File** command.

File Menu - Exit Command

Choose the **Exit** command, or type an **x** when the **File** menu is open to quit the TouchProbe Communications software.

Settings Menu

The **Settings** menu contains the **Communications**, **Display**, and **Data Format** commands.
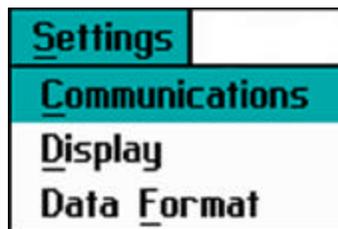
Figure 3-2 Settings Menu

Settings Menu - Communications

When the **Communications** command is selected, the **Communications Settings** window appears. This window shows the current serial port and baud rate settings selected for communication and allows you to change the settings.

The software is shipped with the defaults set to Com1 and 19200 baud. The selected settings are indicated by a dot before the setting and they are also listed at the top of the screen. See Figure 3-3.

Use the <Tab> key to cycle through **Baud Rate**, **Serial Port**, and the **OK** and **Cancel** buttons. Use the up and down arrow keys to select a different baud rate or serial port setting. Select the **OK** button and press <Enter> to save any changes made, or select the **Cancel** button and press <Enter> to cancel any changes made. You may also press <Esc> to close the **Communications Settings** window without saving any changes.
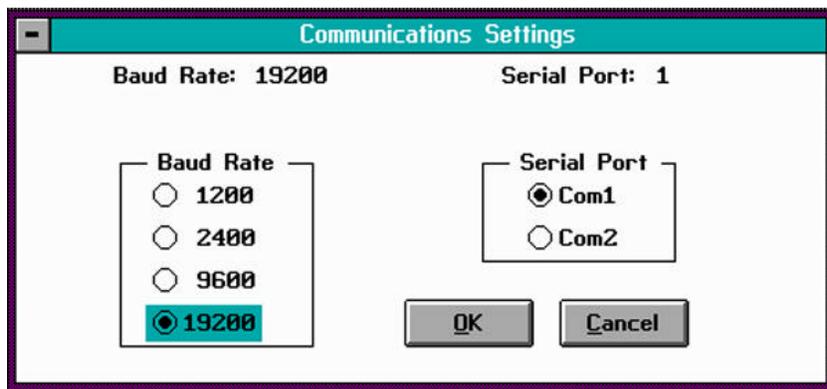
Figure 3-3 Communications Settings Window

To use com port 2 for TouchProbe communications, connect the serial port cable to com port 2. Open the **Communications Settings** window by choosing **Communications** from the **Settings** menu and pressing the <Enter> key. When the **Communications Settings** window appears, press the <Tab> key until **Com1** is highlighted, then press the down arrow key to select **Com2**. The number next to **Serial Port:** changes to a **2**, and the indicating dot appears before **Com2** (see Figure 3-4). Press the <Tab> key to select the **OK** button and press <Enter>. The **Communications Settings** window closes and the software now uses com port 2 for TouchProbe communications.
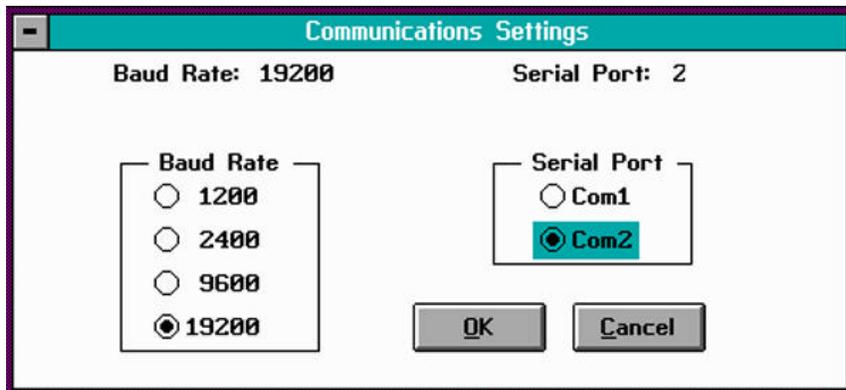

Figure 3-4 Communications Settings - Com2 Selected

Settings Menu - Display

The **Display** command allows you to switch the display between text and graphics modes. An EGA/VGA monitor is required for graphics mode.

If you are using an EGA/VGA monitor, the display defaults to graphics mode. If you would prefer to use text mode, enter **Touch /T** at the DOS prompt. The program then opens in text mode.


Settings Menu - Data Format

The **Data Format** command allows you to set the data file tab length. This command is useful for complex data files or in cases where the data file needs to be compatible with a TimeWand raw scan file. (See Appendix C for additional information on complex data files.)

When the **Data Format** command is selected, a dialog box is displayed that allows you to specify the number of spaces per tab.

TouchProbe Menu

The **TouchProbe** menu contains the **Add Probe ID** and **Delete Probe ID** commands, the **Configure Probe** and **Review Probe Configuration** commands, the **Load Text into Probe** command, and the **Transfer Data from Probe** command.
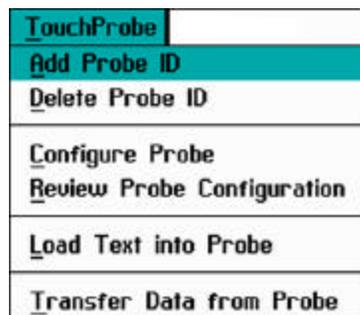
Figure 3-5 TouchProbe Menu

TouchProbe Menu - Add Probe ID/Delete Probe ID

The software maintains a list of probe IDs. The **Add Probe ID** and the **Delete Probe ID** commands allow you to add and remove probe IDs from this list.

Add Probe ID

To add a probe ID, choose **Add Probe ID** from the **TouchProbe** menu.
When the **Add Probe ID** command is highlighted, press the <Enter>
key. The **Add Probe ID** dialog box appears.
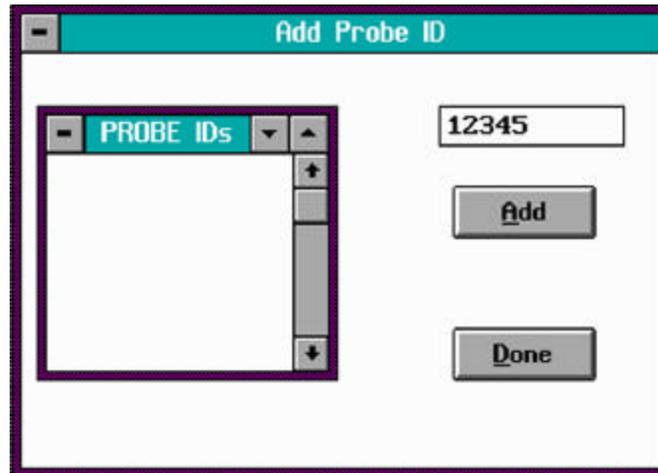
Figure 3-6 Add Probe ID Dialog Box

Enter a probe ID. You may use any alphanumeric characters, and the
probe ID may be up to ten characters in length.

After entering the probe ID, press **Alt A** or press the <Tab> key until the
Add button is highlighted and then press the <Enter> key. The probe ID
is added to the **Probe ID** box on the left and the **Add Probe ID** dialog
box is ready for another probe ID entry. To close the **Add Probe ID**
dialog box, press **Alt D** or press the <Tab> key until the **Done** button is
highlighted and then press the <Enter> key.

Delete Probe ID

To delete a probe ID, choose **Delete Probe ID** from the **TouchProbe** menu. The **Delete Probe ID** dialog box appears. Select the probe ID you wish to delete and press **Alt D** or press the <Tab> key until the **Delete** button is selected and then press <Enter>. The selected probe ID is deleted. To close the **Delete Probe ID** dialog box, press **Alt C** or press the <Tab> key until the **Close** button is selected and then press <Enter>.

TouchProbe Menu - Configure Probe

The **TouchProbe** menu contains the **Configure Probe** and **Review Probe Configuration** commands.

When the **Configure Probe** command is selected, the **Configure Probe** screen is displayed. The **Configure Probe** screen shows the configure settings for the TouchProbe. The configure settings are defaulted to **Read** for each type of Touch Memory button. The 1990 and 1991 buttons are read-only buttons, and **Read** is the only option available for either of these buttons. The 1992, 1993, and 1994 buttons are read/write buttons; you may configure the TouchProbe to either read or write to any of these three buttons.

To access the **Configure Probe** screen, select the **Configure Probe** command from the **TouchProbe** menu by either highlighting the command and pressing <Enter>, or by pressing the **C** key on the computer keyboard when the **TouchProbe** menu is open. The **Configure Probe** screen appears.
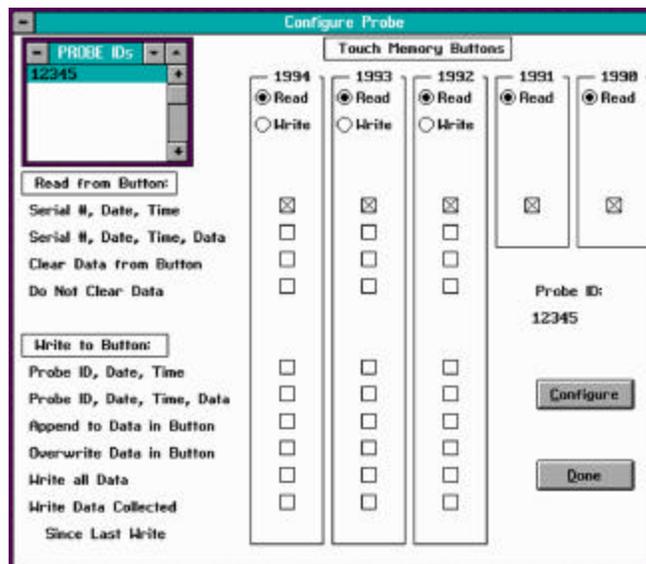

Figure 3-7 Configure Probe Screen

The **Configure Probe** screen allows you to select various options for
configuring the TouchProbe. Use the <Tab> key and up and down arrow
keys to navigate through the **Configure Probe** screen. You may select
an option by highlighting the option and pressing the <Enter> key.

The top left corner of the **Configure Probe** screen contains a list of all
probe IDs that have been added (see Figure 3-8). Use the up and down
arrow keys to cycle through the probe IDs. When a probe ID is
highlighted, it becomes the active ID and this ID number is also displayed
at the lower right of the screen under **Probe ID:**. The configuration
setting for the active probe ID is displayed in the **Configure Probe**
screen.

Probe ID List
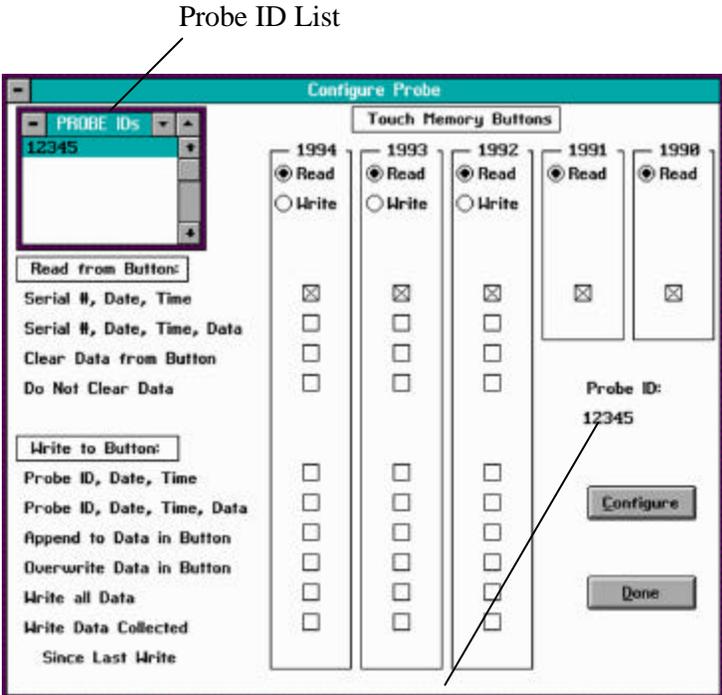
Active Probe ID

Figure 3-8 Configure Probe Screen - Probe ID

The **Configure Probe** screen uses a default of **Read Serial #**, **Date**,
Time for each button type. If a TouchProbe is configured with this

setting, the TouchProbe is able to read the serial numbers of DS1990, DS1991, DS1992, DS1993, and DS1994 Touch Memory buttons. The date and time that a button is read is also recorded in the TouchProbe's memory with the serial number of the button.

Configure Probe Screen - Read and Write Options

There are two sets of options available for configuring a TouchProbe; there is a set of options for reading a button and a set of options for writing to a button.

When configuring a TouchProbe to communicate with a read/write button, you must select either **Read** or **Write** for each read/write button type. A TouchProbe cannot be configured to both read and write to the same type of a read/write button.

Write Options   Read Options
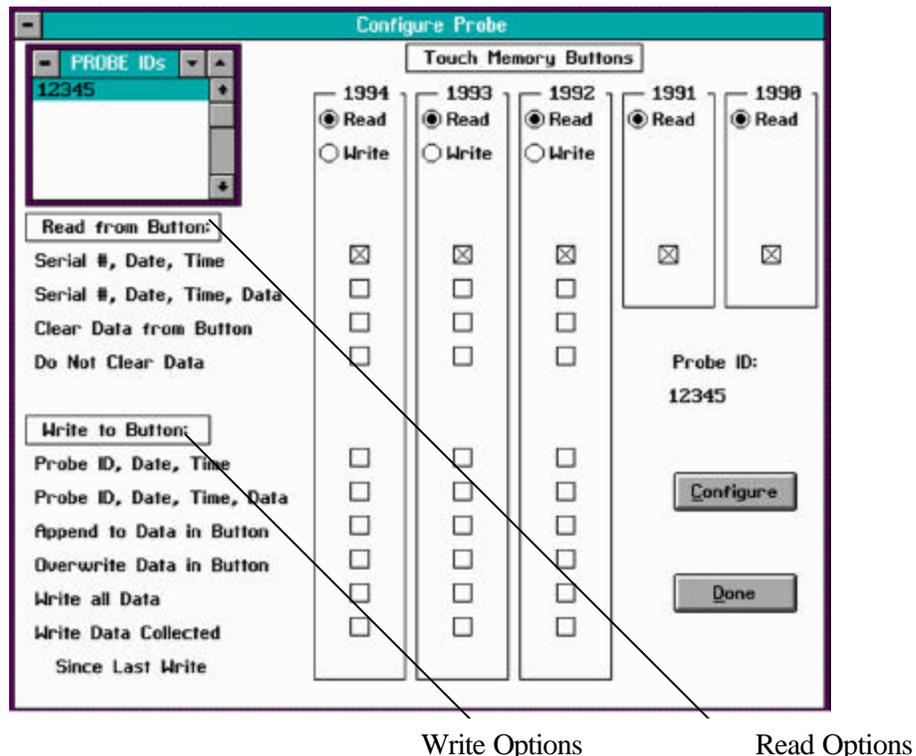
Figure 3-9 Configure Probe Screen - Read/Write Options

At the **Configure Probe** screen, use the <Tab> key to cycle through the **Probe ID** list, the five different button types, the **Configure** button, and the **Done** button.

To change the options for a button, press the <Tab> key until the button type is highlighted, then use the up and down arrow keys to navigate through the various option boxes. To select an option, highlight the box next to the option and press the <Enter> key or the <Space bar>. A checkmark appears in the box next to the selected option.

Configure Probe Screen - Read Options

The **Read** options for a button are:

> **Read from Button: Serial #, Date, Time**
> **Read from Button: Serial #, Date, Time, Data**

The **Read** option of **Serial #, Date, Time, Data** has two sub-options: **Clear Data from Button** and **Do Not Clear Data**.

1990 and 1991 buttons are read-only buttons. These buttons contain a unique serial number and do not have memory space for additional data; therefore, the read option of **Serial #, Date, Time** is the only option available for 1990 and 1991 buttons.

1992, 1993, and 1994 buttons are read/write buttons, and besides a unique serial number, they also contain additional memory space for storing data. The **Read** option of **Serial #, Date, Time, Data** is an additional **Read** option for read/write buttons. When this option is configured into a TouchProbe, the TouchProbe records the serial number of the button, the time and date the button is touched, and any data contained in the button. If the **Read** option of **Serial #, Date, Time, Data** is selected, either the **Do Not Clear Data** option or the **Clear Data from Button** option must also be selected. If the **Do Not Clear Data** option is selected, the TouchProbe reads the data and the data remains in the button. If the **Clear Data from Button** option is selected, the TouchProbe clears the data from the button after verifying that the data was read correctly.

Configure Probe Screen - Write Options

The two main **Write** options for writing to a button are:

> **Write to Button: Probe ID, Date, Time**
> **Write to Button: Probe ID, Date, Time, Data**

The **Write** option of **Probe ID, Date, Time** writes the probe ID and the date and time of the write to the button. The **Write** option of **Probe ID, Date, Time, Data** writes the probe ID, the date and time, and the data contained in the TouchProbe to a read/write button. This enables the TouchProbe to read serial numbers of buttons, and then write and store the serial numbers in read/write buttons.

When one of the **Write** options is selected, you must also choose either the **Append to Data in Button** option or the **Overwrite Data in Button** option. If **Append to Data in Button** is selected, the TouchProbe's data is added to the button's data when the TouchProbe writes to a button. If **Overwrite Data in Button** is selected, the data contained in the button is replaced by the data in the TouchProbe when the TouchProbe writes to the button.

The **Write** option of **Probe ID, Date, Time, Data** has two sub-options: **Write all Data** and **Write Data Collected Since Last Write**. One of these sub-options must be selected when using the **Write** option of **Probe ID, Date, Time, Data.** If you choose the option **Write all Data**, the TouchProbe writes all of its collected data to the button each time you write to a button. If **Write Data Collected Since Last Write** is selected, the first time the TouchProbe writes to a button, all of the TouchProbe's collected data is written to the button. The next time the TouchProbe writes to a button, it only transfers the data collected since the last write to a button.

Configure Probe Screen - Configure

A TouchProbe must be configured before it can store and transfer Touch Memory button data.

To configure a TouchProbe, press the <Tab> key until the **Configure** button is selected and then press the <Enter> key, or type **Alt C**. Insert the TouchProbe into the downloader.

The software begins to configure the TouchProbe. After the TouchProbe has been configured, the screen displays the status of the configured TouchProbe. Remove the TouchProbe from the downloader.

TouchProbe Menu - Review Probe Configuration

When the **Review Probe Configuration** command is selected, the **Review Probe Configuration** screen appears. When a TouchProbe is configured, a record is kept on the computer of the TouchProbe's configuration. The **Review Probe Configuration** screen shows the configuration settings recorded on the computer for the TouchProbe.

The **Query Probe** button asks the TouchProbe how it is configured and then displays the ID number and configuration setting.

To query a TouchProbe, place the TouchProbe into the downloader. Press the <Tab> key until the **Query Probe** button is highlighted, then press <Enter>. The probe ID and the configuration setting for the TouchProbe are displayed.

TouchProbe Menu - Load Text into Probe

The **Load Text into Probe** command allows you to load text into the
TouchProbe. The TouchProbe must be configured before you can load
text into the TouchProbe. You may enter up to 250 characters of text into
a TouchProbe. This text can then be written to read/write buttons.

Loading text into a TouchProbe enables you to send textual information
from the computer to the TouchProbe, then from the TouchProbe to a
read/write button. The text may then be read as data from that button.

When you transfer the data from the TouchProbe, all data is cleared from
the TouchProbe, including the text.

Main Header

H 20000129090419 00 12345

Load Text
into Probe   H 20000129072238 03
                   T 03
Data Lines   (Text entered into probe)
                 T 000

Main Tailer
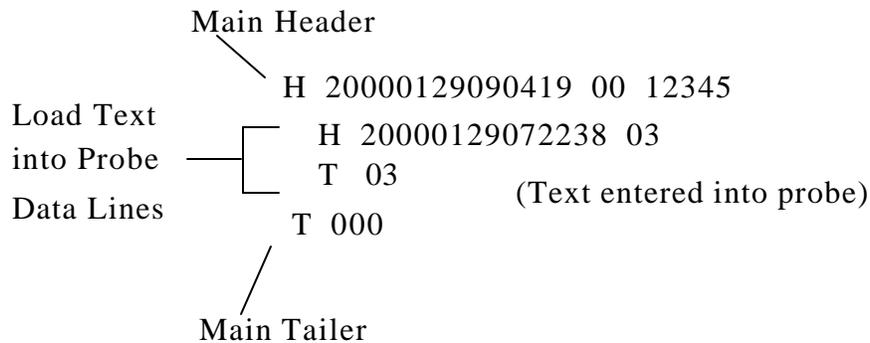
Figure 3-10 Load Text Into Probe Data File

Text loaded into the TouchProbe is displayed in the data file as three
lines: a **Load Text into Probe Header**, the text, and a **Load Text into
Probe Tailer**.

The **Load Text into Probe Header** begins with a capital **H** followed by
the date and time the text was loaded into the TouchProbe, followed by a
03. The 03 is the origin code for loading text into the TouchProbe. The
next data line is the text entered into the TouchProbe followed by the
Load Text into Probe Tailer. The **Load Text into Probe Tailer**
begins with a capital **T** followed by the 03 origin code. See pages 43–46
for additional information on the TouchProbe data file.

TouchProbe Menu - Transfer Data from Probe

The **Transfer Data from Probe** command allows you to transfer the data from the TouchProbe.

To transfer data from a TouchProbe, select **Transfer Data from Probe** from the **TouchProbe** menu by pressing the down arrow key until the **Transfer Data from Probe** command is highlighted and then press the <Enter> key, or press the **T** key from the computer keyboard. The **Transfer Data** window appears.
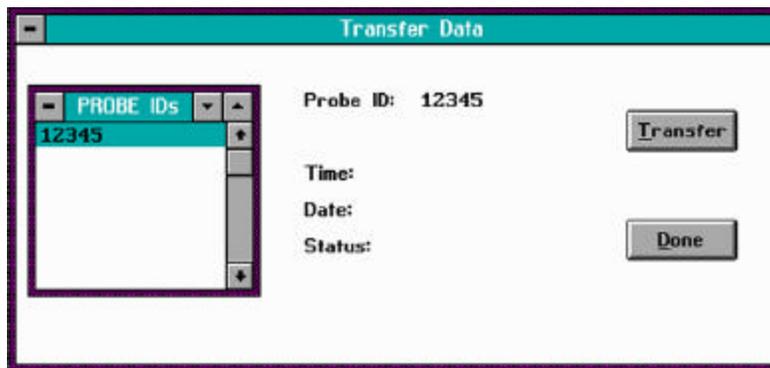
Figure 3-11 Transfer Data Window

The probe IDs that have been added are displayed in the **Probe ID** list on the left side of the **Transfer Data** window. The selected or active probe ID is shown after **Probe ID:** at the center of the **Transfer Data** window. Use the up and down arrow keys to select the probe ID you want to transfer. After selecting the probe ID, press the <Tab> key to highlight the **Transfer** button and then press the <Enter> key. The software begins looking for the TouchProbe. When the software locates the TouchProbe, it transfers the TouchProbe's data.

At the completion of the transfer process, the **DATA.TMD** file opens allowing you to view the data. Press the <Esc> key to close the **DATA.TMD** file.

The **Transfer Data** window displays the time, date, and status of the transfer. The status field displays **GOOD** if the data was transferred properly. If any problems occur during data transfer, an error status message is displayed. See Table 3-1 for the definitions of the various status messages. If an error status message is displayed, the data is not cleared from the TouchProbe, and you may attempt to transfer the data again. The data is not cleared from the TouchProbe until a **GOOD** transfer status is received.

Status Message	Definition
GOOD	Data transferred and cleared from TouchProbe.
ERRBIN	Data transferred, but could not be translated from binary to ASCII. Data not cleared from TouchProbe.
ERRTRAN	Error transferring data. Data not cleared from TouchProbe.
NO RESPONSE	TouchProbe did not respond. Data not cleared from TouchProbe.
NOT CLEARED	Data transferred correctly, but not cleared from TouchProbe.

Table 3-1 Transfer Status Messages

About Menu

The **About** menu contains the **About** command. Choose the **About** command to display the version number of the software.

TouchProbe Data File

The TouchProbe's data is transferred and saved to the computer disk as an ASCII text file. This text file is named **DATA.TMD**, and is also referred to as a data file. The TMD extension stands for T̲ouch M̲emory D̲ata. The **DATA.TMD** file appears on the computer screen after data transfer. You may edit the **DATA.TMD** file with a text editor. You need to import the data file into an application program for data processing.

Figure 3-12 shows an example data file for a TouchProbe (probe ID 12345) configured to read the serial number of Touch Memory buttons.

```
                              Main Header

   H   20000129090419    00  12345
       20000129090314    31  00000004859F
       20000129090318    31  0000000B7303
       20000129090320    31  0000000B72DA
       20000129090403    31  00000004859F      Button
       20000129090404    31  0000000B7303      Data
       20000129090406    31  0000000B72DA
       20000129090410    31  0000000B715C
       20000129090412    31  0000000B6081
   T   000
                        Main Tailer
```

Figure 3-12 Example TouchProbe Data File - Read Buttons

Figure 3-12 is a simple data file consisting of a **Main Header**, a **Main Tailer**, and button data from read-only 1990 Touch Memory buttons. The lines of data between the **Main Header** and the **Main Tailer** data lines represent individual button reads.

The **Main Header** appears as the first line of the data file. The **Main Header** identifies the TouchProbe and the date and time the TouchProbe's data was transferred. The **Main Header** can be identified by a "00" origin code. The button data identifies which button was read by serial number and button type.

The **Main Tailer** is the last data line of the transferred data.

Main Header

Following are the definitions for the various parts of the **Main Header**. (Refer to Figure 3-12.)

1. All Headers begin with a capital "**H**" before the line of data. The **Main Header** contains a "00" at the origin code location. The **Main Header** indicates the beginning of the data transferred from a single TouchProbe.

    H   20000129090419 00 12345

2. This indicates the year the data was transferred.

    H   **2000**0129090419 00 12345

3. This indicates the month and day the data was transferred.

    H   2000**0129**090419 00 12345

4. This indicates the time that data was transferred. A 24-hour representation indicates the hour, minutes, and seconds the file was transferred.

    H   20000129**090419** 00 12345

5. This is the **Main Header** origin code. The "00" indicates a transfer to the computer.

    H   20000129090419 **00** 12345

6. This is the probe ID of the transferred TouchProbe.

H   20000129090419 00 **12345**

Button Data

Following are the definitions for the various parts of the button data.
(Refer to Figure 3-12.)

1. This indicates the year the button was read.

    20000129090314 31 00000004859F

2. This indicates the month and day the button was read.

    2000**0129**090314 31 00000004859F

3. This indicates the time the button was read. A 24-hour
    representation indicates the hour, minutes, and seconds the button
    was read.

    20000129**090314** 31 00000004859F

4. This is the button origin code. This number indicates what type of
    button was read. Table 3-2 shows the button origin codes and the
    button types they represent.

    20000129090314 **31** 00000004859F

Origin Code	Button Type
31	1990
32	1991
38	1992
36	1993
34	1994

    Table 3-2 Button Origin Codes

5. This is the serial number of the Touch Memory button. It is always a
    12-digit hexadecimal number.

    20000129090314 31 **00000004859F**

Main Tailer

Following is the definition of the **Main Tailer**. (Refer to Figure 3-12.)

1. The **Main Tailer** begins with a capital "T" followed by three zeroes. The **Main Tailer** indicates the end of the data transferred from a TouchProbe.

<u>**T000**</u>

If you are using the TouchProbe to read the serial number of Touch Memory buttons, your data file will be similar to the one shown in Figure 3-12. However, if you are writing to buttons or reading data from buttons, the data file can become quite complex. See Appendix C for information on data files produced from a TouchProbe configured to write to read/write buttons and read data from read/write buttons.

NOTES:

NOTES:

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NOTES:

Appendix A

Hardware Specifications

Contents

TouchProbe Specifications

Weight:	4.0 oz (113 g) Plastic case 5.8 oz (164 g) Cast-metal case 5.1 oz (146 g) Extruded-metal case
Dimensions:	5.2" x 1.6" x 0.8" (132 x 42 x 23 mm)
Physical:	Plastic or metal case; key ring
Storage Temperature:	-4° to 130° F (-20° to 54° C) alkaline -40° to 140° F (-40° to 60° C) lithium
Operating Temperature:	-4° to 130° F (-20° to 54° C) alkaline -40° to 140° F (-40° to 60° C) lithium
Visual:	LED flash after successful read or write
Audio:	18 tone patterns including good read and memory almost full
Memory:	128K battery-backed RAM
Memory capacity:	5000 button ID reads
Battery:	9-volt alkaline or lithium; 9-volt alkaline included, but you can use a 9-volt lithium
Battery Life:	The 9-volt alkaline battery provides up to 1 year of charge, while a 9-volt lithium battery provides up to 2 years of charge; exact battery life depends upon actual use
Battery Backup:	A lithium backup battery provides up to ten years of data retention
Serial Communications:	Baud rate 1200 to 19.2 k

TouchProbe Downloader Stations Specifications

Size:	4.0" x 4.0" x 1.8" (102 x 102 x 46 mm)
Weight:	Standard Downloader: 7.3 oz (207 g) Downloader Plus: 7.4 oz (210 g)
Number of TouchProbes:	Holds 1 TouchProbe
Indicator Lights:	Power, Transmit, and Receive
Connection Sockets:	Computer and Power
Serial Communications:	Standard RS-232; baud rate 1200 to 19.2k
Power Supply Transformer:	120 volt (60 Hz) Input: 120 VAC, 60 Hz, 7 W Output: 12 VDC 300 mA Plug Polarity: − ——⊙—— + 220 volt (50 Hz) Input: 220 VAC, 50 Hz, 9 W Output: 12 VDC, 300 mA, 3.6 VA Plug Polarity: − ——⊙—— +

Touch Memory Button Specifications

Read-Only Button Specifications

Button Type:	DS1990
Physical:	Memory chip stored inside button-shaped, water-resistant, stainless steel case
Dimensions:	3 mil button: 0.642" diameter x 0.126" height (16.3 x 3.2 mm) 0.682" diameter mounting flange (17.3 mm) 5 mil button: 0.642" diameter x 0.23" height (16.3 x 5.9 mm) 0.682" diameter mounting flange (17.3 mm)
Weight:	3 mil button: 0.057 oz (1.6 g) 5 mil button: 0.08 oz (2.3 g)
Operating Temperature:	-40° to 185° F (-40° to 85° C)
Battery:	None
Data Storage:	Unique 12 character serial number (read-only)

Read/Write Button Specifications

Button Types:	DS1991*, DS1992, DS1993, DS1994
Physical:	Non-volatile memory chip stored inside button-shaped, water-resistant, stainless steel case
Dimensions:	0.642" diameter x 0.23" height (16.3 x 5.9 mm) 0.682" diameter mounting flange (17.3 mm)
Weight:	0.12 oz (3.4 g)
Operating Temperature:	-4° to 158° F (-20° to 70° C)
Battery:	Lithium
Data Storage:	Up to 4K-bit read/write memory plus unique 12-character serial number (read-only)
Clock:	Real-time
Life Span:	10 years of data retention

*Note: This software version provides read-only capability for DS1991 read/write buttons.

Appendix B

Cable Configurations

Contents

Note on Signal Direction Convention:
RS-232 signal wires are given names that stay with the same wire as it goes between the two devices being connected. Signals that imply a direction, such as "Receive Data," are named from the perspective of the "Terminal" (DTE) device and may therefore appear to be backward in terms of signal direction when applied to the "Modem" (DCE) device on the other end of the cable. In the lists of pin assignments in this section, an indication of signal direction from the point of view of the device to which the connector is attached has been included in addition to the signal name.

TWC-001 Cable — 25 Pin Serial Port Cable

The cable used to connect the 25 pin serial port of a DOS computer to the downloader is shown in Figure B-1.

RJ-11 modular connector plugs into the OmniWand RS-232 (RJ-11) serial port module.

DB25S female connector plugs into the computer.
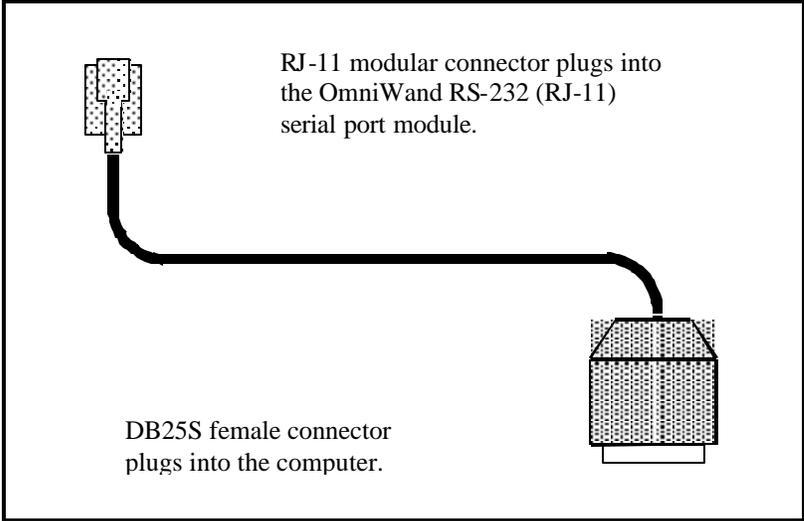
Figure B-1 25 Pin Serial Port Cable

Figure B-2 shows the pin configuration for the DB25S connector in relationship to the RJ-11 modular connector.

TWC-001 Cable — 25 Pin Serial Port Cable

View from mating side of DB25S female connector.

View from mating side of RJ-11 modular connector.
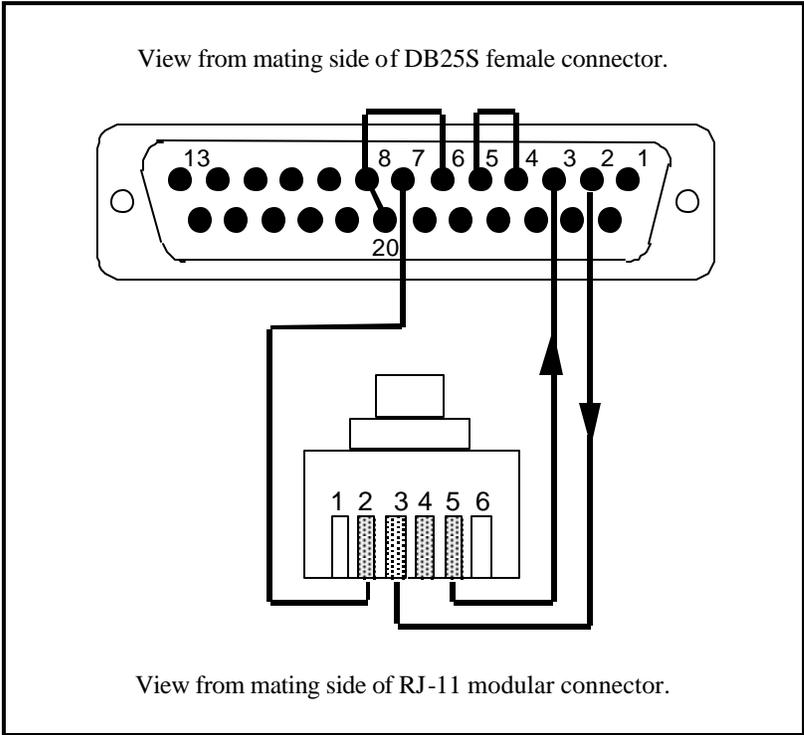
Figure B-2 25 Pin Serial Port Cable Pin Configuration

25 Pin Connector Assignment

2   TXD Transmit Data (Out)
3   RXD Receive Data (In)
4   RTS Request to Send (Out)
5   CTS Clear to Send (In)
6   DSR Dataset Ready (In)
7   Ground
8   DCD Carrier Detect (In)
20 DTR Data Terminal Ready (Out)

Modular Pin Assignment

2   Ground
3   TXD (In)
5   RXD (Out)

TWC-008 Cable — 9 Pin Serial Port Cable

The cable used to connect the 9 pin serial port of a DOS computer to the downloader is shown in Figure B-3.

RJ-11 modular connector plugs into the Downloader Station socket marked "Computer."

DB9S female connector plugs into the computer.
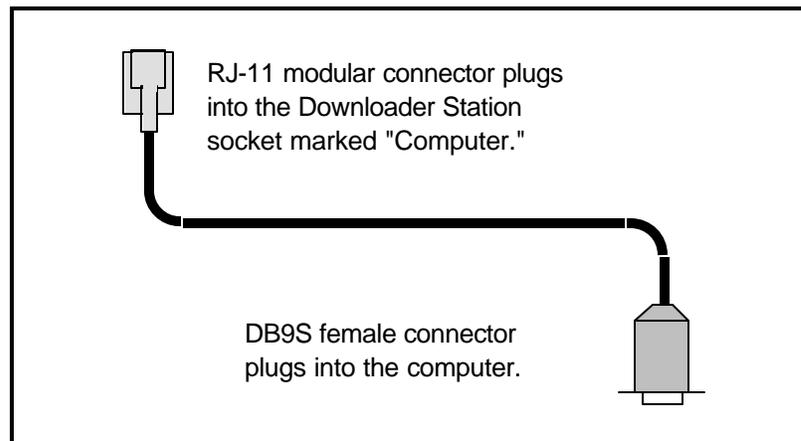
Figure B-3 9 Pin Serial Port Cable

Figure B-4 shows the pin configuration for the DB9S connector in relationship to the RJ-11 modular connector.

TWC-008 Cable — 9 Pin Serial Port Cable

View from mating side of DB9S female connector.

View from mating side of RJ-11 modular connector.
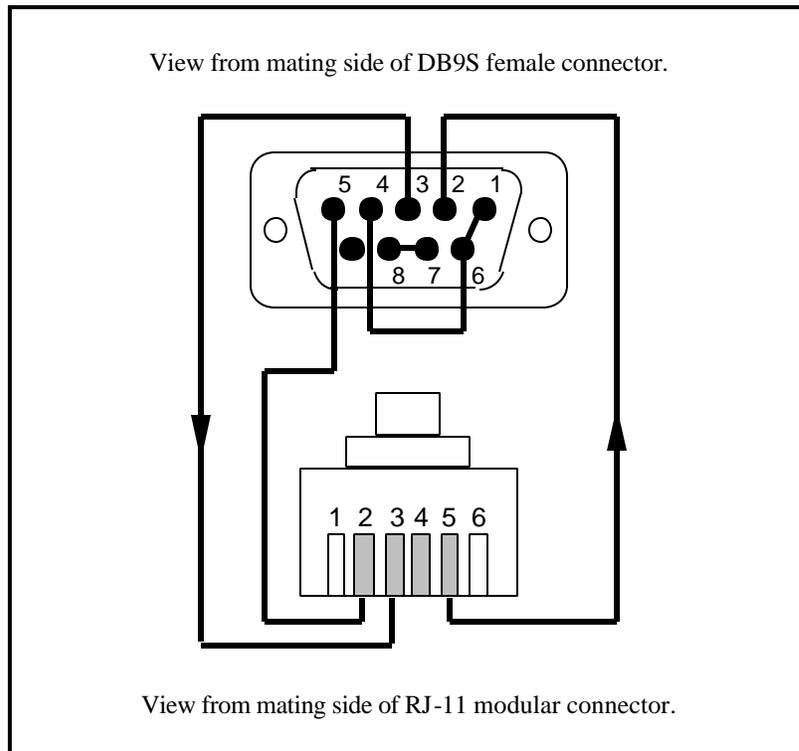
Figure B-4 9 Pin Serial Port Cable Pin Configuration

9 Pin Connector Assignment	**Modular Pin Assignment**
1 DCD Carrier Detect (In)	
2 RXD Receive Data (In)	2 Ground
3 TXD Transmit Data (Out)	3 TXD (In)
4 DTR Data Terminal Ready (Out)	5 RXD (Out)
5 Ground	
6 DSR Dataset Ready (In)	
7 RTS Request to Send (Out)	
8 CTS Clear to Send (In)	

TWC-003 Cable — Remote Modem to TouchProbe Downloader Plus Cable

The cable used to connect a modem to the TouchProbe Downloader Plus at the remote modem location is shown in Figure B-5. See Appendix G for information on using the TouchProbe Downloader Plus.

RJ-11 modular connector plugs into the Downloader PLUS socket marked "Computer."

DB25P male connector plugs into the modem.
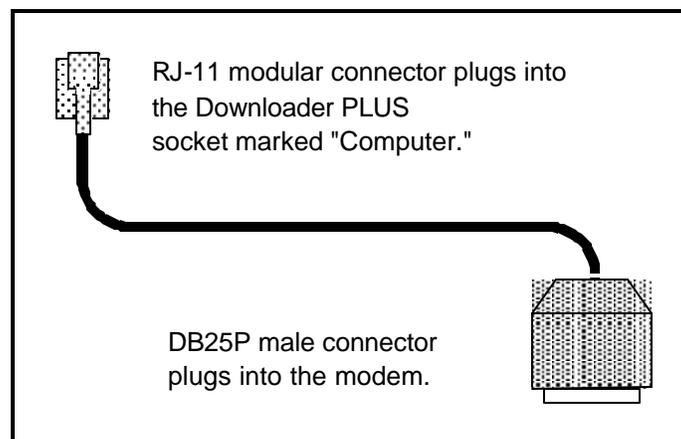
Figure B-5 Remote Modem Cable

Figure B-6 shows the pin configuration for the DB25P connector in relationship to the RJ-11 modular connector.

TWC-003 Cable — Remote Modem to TouchProbe Downloader Plus Cable

View from mating side of DB25P male connector.

View from mating side of RJ-11 modular connector.
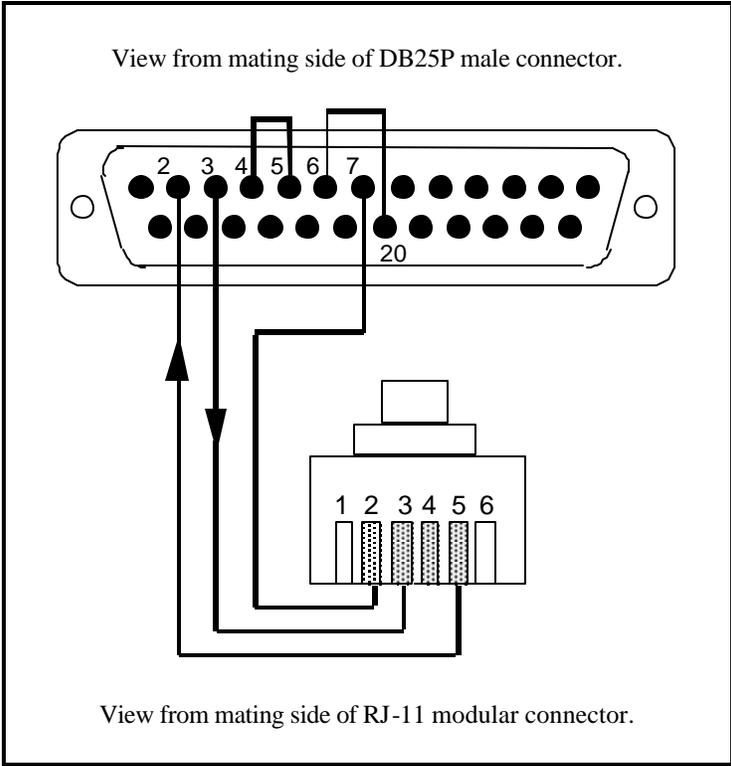
Figure B-6 Remote Modem Cable Configuration

25 Pin Assignment

2   TXD Transmit Data (In)
3   RXD Receive Data (Out)
4   RTS Request to Send (In)
5   CTS Clear to Send (Out)
6   DSR Dataset Ready (Out)
7   Ground
20   DTR Data Terminal Ready (In)

Modular Connector Pin Assignment

2   Ground
3   RXD (In)
5   TXD (Out)

Notes:

Appendix C

TouchProbe Data File

Contents

TouchProbe Data File

The TouchProbe's data is transferred and saved to the computer disk as a data (ASCII text) file. This data file is named **DATA.TMD**. You will need to import the data file into an application program for data processing.

Figure C-1 shows an example data file for a TouchProbe (probe ID 12345) configured to read the serial number of Touch Memory buttons.

```
                        ⟋ Main Header
  H   20000129090419    00  12345
      20000129090314    31  00000004859F  ┐
      20000129090318    31  0000000B7303
      20000129090320    31  0000000B72DA
      20000129090403    31  00000004859F        Button
      20000129090404    31  0000000B7303   ├─   Data
      20000129090406    31  0000000B72DA
      20000129090410    31  0000000B715C
      20000129090412    31  0000000B6081  ┘
  T   000
                  ╲ Main Tailer
```

Figure C-1 Example TouchProbe Data File - Read Buttons

Figure C-1 is a simple data file consisting of a **Main Header**, a **Main Tailer**, and button data from read-only 1990 Touch Memory buttons. The lines of data between the Main Header and the **Main Tailer** data lines represent individual button reads. This is a fairly simple data file to import into an application program for data manipulation.

However, when a TouchProbe is configured to read data from or write data to a read/write button, the data file can become very complex. See Figure C-2. A complex data file contains a variety of **Headers** and **Tailers** as well as additional information regarding appending and overwriting data. To import a data file of this complexity into an application program requires some expertise in data processing.

```
                              Main Header

   H    20000129132422      00  12345
        20000129132353      31  00000004859F  ──┐─ Button
        20000129132356      31  0000000B7303     Data
        20000129132357      31  0000000B7302
        20000129132359      31  0000000B715C  ──┘
        H 20000129132408  34  000000012430  W+ ── Read/Write Button Header
          H 20000129132408 01  12345          ── Append/Overwrite Header
          T  12345
          T  000000012430  W+       ── Append/Overwrite Tailer
   T 000
                                        ── Read/Write Button Tailer
      Main Tailer
```

Figure C-2 Example Complex TouchProbe Data File - Read and Read/Write Buttons

Data File Definitions

Following are definitions for the various parts of a TouchProbe data file. Refer to Figure C-2.

Main Header

The **Main Header** and the **Main Tailer** bracket the data that was transferred from the TouchProbe.

The **Main Header** appears as the first line of the data file.

Main Header Origin Code

H   20000129132422 00 12345

Probe ID

Figure C-3 Example Main Header

The **Main Header** identifies the TouchProbe and the date and time the TouchProbe's data was transferred. The **Main Header** can be identified by a "00" origin code.

Following are the definitions for the various parts of the **Main Header**. (Refer to Figures C-2 and C-3.)

1. All Headers begin with a capital "**H**" before the line of data. The **Main Header** indicates the beginning of the data transferred from a single TouchProbe.

    H   20000129132422 00 12345

2. This indicates the year the data was transferred.

    H   **2000**0129132422 00 12345

3. This indicates the month and day the data was transferred.

    H   2000**0129**132422 00 12345

4. This indicates the time that data was transferred. A 24-hour representation indicates the hour, minutes, and seconds the file was transferred.

    H   20000129**132422** 00 12345

5. This is the **Main Header** origin code. The "00" indicates a transfer to the computer.

    H   20000129132422 **00** 12345

6. This is the probe ID of the transferred TouchProbe.

    H   20000129132422 00 **12345**

Read/Write Button Header

The **Read/Write Button Header** and the **Read/Write Button Tailer** bracket the data that was read from a read/write button or that was written to a read/write button.

The **Read/Write Button Header** appears in the data file when you write to a read/write button and when data is read from a read/write button. There is not a **Read/Write Button Header** for a read/write button if you are using the **Read** option **Serial #, Date, and Time**.

Read/Write Button Header Notation

Button Origin Code

H   20000129132408 34 000000012430 W+

Button Identification Number
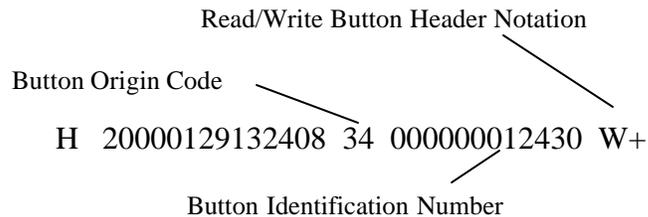
Figure C-4 Example Read/Write Button Header

The **Read/Write Button Header** contains the button origin code, the serial number of the read/write button, and the date and time the button was touched. A **Read/Write Button Header** can be identified by the **R** or **W** notation at the end of the **Header** data line. An **R** signifies that the data in the button is being read, and a **W** signifies that data is being written to the button. There is also a plus sign (+) or a minus sign (-) following the **R** or **W**. An **R+** means that the data remains in the button after the read, and a **R-** means that the data is cleared from the button after the read. A **W+** means that the data is being appended to the read/write button, and a **W-** means that the data is overwriting any data in the read/write button.

Following are the definitions for the various parts of the **Read/Write Button Header**. (Refer to Figures C-2 and C-4.)

1. The **Read/Write Button Header** begins with a capital "**H**," as do all Headers. The **Read/Write Button Header** indicates the beginning of communication with a read/write button. The **Read/Write Button Header** can be identified by the **W+**, **W-**, **R+**, or **R-** notation at the end of the data line.

    H 20000129132408 34 000000012430 W+

2. This indicates the year the read/write button was touched.

    H **2000**0129132408 34 000000012430 W+

3. This indicates the month and day the read/write button was touched.

    H 2000**0129**132408 34 000000012430 W+

4. This indicates the time the button was touched. A 24-hour representation indicates the hour, minutes, and seconds.

    H 20000129**132408** 34 000000012430 W+

5. This is the **Read/Write Button Header** origin code. The **34** indicates a DS1994 button. A **38** indicates a DS1992 button and a **36** indicates a DS1993 button.

    H 20000129132408 **34** 000000012430 W+

6. This is the serial number of the read/write Touch Memory button. It is always a 12-digit hexadecimal number.

    H 20000129132408 34 **000000012430** W+

7. This is the **Read/Write Button Header** notation. A **W+** indicates that the button is being written to and the data is being appended to the button's data. A **W-** indicates that the button is being written to, and any data contained in the button will be overwritten by the new data. An **R+** indicates that the button is being read and the data remains in the button after the read. An **R-** indicates that the button is being read and all the data is cleared from the button after the read.

    H 20000129132408 34 000000012430 **W+**

Append/Overwrite Header

Append/Overwrite Origin Code

H   20000129132408 01 12345

Probe ID
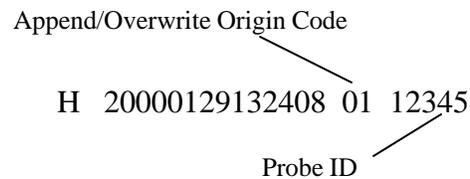
Figure C-5 Example Append/Overwrite Header

Each line of data between the **Read/Write Button Header** and **Tailer** is the information contained in the read/write button. Following a **Read/Write Button Header** is an **Append/Overwrite Header**. The **Append/Overwrite Header** and **Tailer** are stored in the read/write button each time the button is written to. The **Append/Overwrite Header** and **Tailer** bracket the data written to the button by the TouchProbe. More than one **Append/Overwrite Header** and **Tailer** may appear between the **Read/Write Button Header** and **Tailer**.

The **Append/Overwrite Header** contains a **01** or **02** in the origin code location. The **01** means that the data was appended to the button's data, and a **02** means that the data overwrote any data in the button. The **Append/Overwrite Header** also contains the date and time of the touch, and the probe ID of the TouchProbe that communicated with the read/write button.

Following are the definitions for the various parts of the
Append/Overwrite Header. (Refer to Figures C-2 and C-5.)

1. The **Append/Overwrite Header** begins with a capital **H**. This
    Header gives information as to the date and time the read/write
    button was touched, whether the data was appended to or overwrote
    the button's data, and the probe ID.

    H   20000129132408 01 12345

2. This indicates the year the button was touched.

    H   **2000**0129132408 01 12345

3. This indicates the month and day the button was touched.

    H   2000**0129**132408 01 12345

4. This indicates the time the button was touched. A 24-hour
    representation indicates the hour, minutes, and seconds.

    H   20000129**132408** 01 12345

5. This is the **Append/Overwrite Header** origin code. A 0**1** indicates
    an append to the read/write button and a **02** indicates an overwrite
    of the data in the read/write button.

    H   20000129132408 **01** 12345

6. This is the probe ID of the TouchProbe that communicated with the
    read/write button.

    H   20000129132408 01 **12345**

Button Data

If a TouchProbe is configured with the **Read** option **Serial #, Date, Time** for a button, the read is shown as a single data line. We refer to a data line of this type as "button data." Following are the definitions for the various parts of the button data. (Refer to Figures C-2 and C-6.)

Button Origin Code

20000129132353 31 00000004859F

Button Serial Number
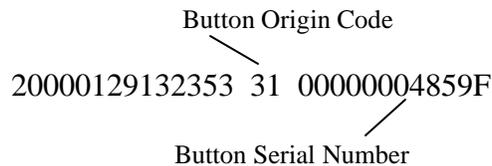
Figure C-6 Example Button Data

1. This indicates the year the button was read.

    20000129132353 31 00000004859F

2. This indicates the month and day the button was read.

    2000**0129**132353 31 00000004859F

3. This indicates the time the button was read. A 24-hour representation indicates the hour, minutes, and seconds the button was read.

    20000129**132353** 31 00000004859F

4. This is the button origin code. This number indicates what type of button was read.

    20000129132353 **31** 00000004859F

Table C-1 shows the button origin code and the button type they represent.

Origin Code	Button Type
31	1990
32	1991
38	1992
36	1993
34	1994

Table C-1 Button Origin Codes

5.   This is the Touch Memory button's serial number. It is always a 12-digit hexadecimal number.

20000129132353 31 **00000004859F**

Append/Overwrite Tailer

The **Append/Overwrite Tailer** marks the end of a write to a read/write button.

Probe ID

T 12345
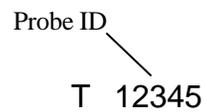
Figure C-7 Example Append/Overwrite Tailer

The **Append/Overwrite Tailer** contains the probe ID of the TouchProbe communicating with the read/write button.

Following are the definitions for the various parts of the **Append/Overwrite Tailer**. (Refer to Figures C-2 and C-7.)

1.   The **Append/Overwrite Tailer** begins with a capital **T**.

<u>**T**</u>   12345

2.   This is the probe ID of the TouchProbe that wrote to the read/write button.

T   <u>**12345**</u>

Read/Write Button Tailer

The **Read/Write Button Tailer** identifies the end of a read or write to a read/write button.

Read/Write Button Tailer Notation

T 000000012430 W+

Button Serial Number
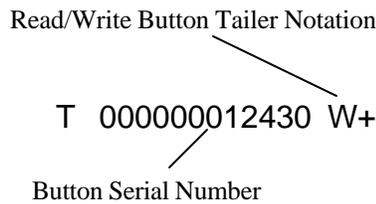
Figure C-8 Example Read/Write Button Tailer

The **Read/Write Button Tailer** contains the same notation (**R+**, **R-**, **W+**, and **W-**) that is used in the corresponding **Read/Write Button Header**. The **Read/Write Button Tailer** contains the serial number of the read/write button.

Following are the definitions for the various parts of the **Read/Write Button Tailer**. (Refer to Figures C-2 and C-8.)

1. The **Read/Write Button Tailer** begins with a capital **T**. This **Tailer** indicates the end of a write to a read/write button or a read of data from a read/write button. There is a **W+**, **W-**, **R+**, or an **R-** at the end of the **Read/Write Button Tailer**; this notation also appears at the end of the corresponding **Read/Write Button Header**.

    T   000000012430 W+

2. This is the serial number of the read/write Touch Memory button. It is always a 12-digit hexadecimal number.

    T   **000000012430** W+

3.   This is the **Read/Write Button Tailer** notation. There is either a **W+**, a **W-**, an **R+**, or an **R-**. A **W+** indicates that the button is being written to and the data is being appended to the button's data. A **W-** indicates that the button is being written to, and any data contained in the button is overwritten by the new data. An **R+** indicates that the button is being read and the data remains in the button after the read. An **R-** indicates that the button is being read and all the data is cleared from the button after the read. The lines between the **Read/Write Button Header** and **Tailer** are the data contained in the read/write button.

<p align="center">T   000000012430 <u>W+</u></p>

Main Tailer

<p align="center">T   000</p>

<p align="center">Figure C-9 Example Main Tailer</p>

The **Main Tailer** indicates the end of data transfer from the TouchProbe to the computer.

Following is the definition of the **Main Tailer**. (Refer to Figures C-2 and C-9.)

1.   The **Main Tailer** begins with a capital **T** followed by three zeroes.

<p align="center"><u>**T000**</u></p>

Example One - Write to Button Data File

Figure C-10 shows the configuration setting for a TouchProbe (probe ID 12345). This configuration setting results in a complex data file. The data file is shown in Figure C-11.

The TouchProbe is configured to read 1990, 1991, 1992, and 1993 buttons, and to write and append the probe ID and date and time of touch to a 1994 read/write button.
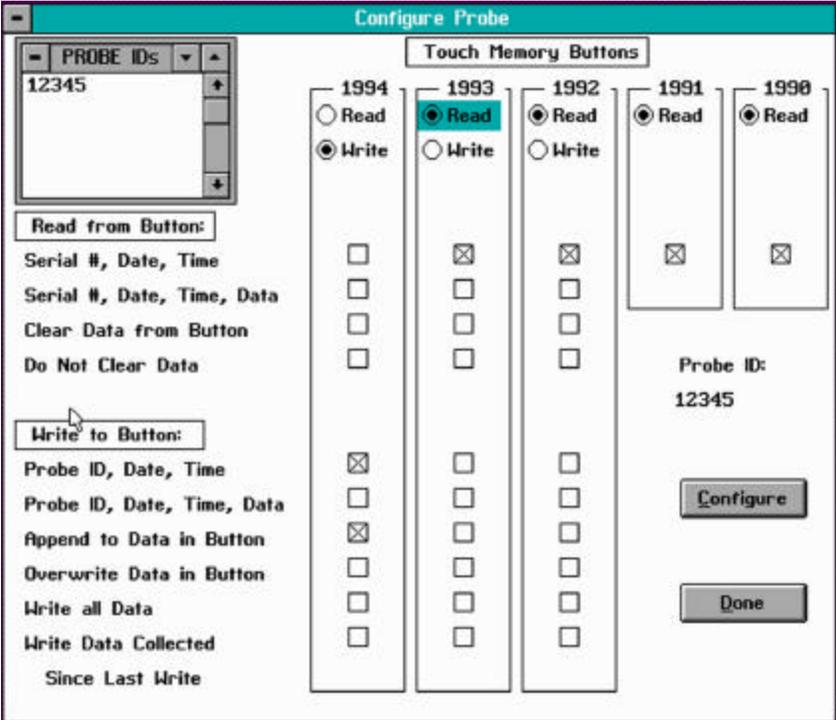
Figure C-10 Configuration Setting for Figure C-11 Data File

The left side of Figure C-11 shows the relationship between the corresponding Headers and Tailers.

The data file shows that TouchProbe #12345 touched 1990 read-only buttons #4859F, #B7303, #B7302, and #B715C. TouchProbe #12345 then touched a 1994 read/write button #12430, and appended the probe ID, date, and time of touch to the read/write button.

```
                          Main Header

       H   20000129132422    00  12345              Read/Write Button Header
          20000129132353    31  00000004859F
          20000129132356    31  0000000B7303
          20000129132357    31  0000000B7302
          20000129132359    31  0000000B715C
          H 20000129132408  34  000000012430  W+
            H 20000129132408 01  12345              Append/Overwrite Header
            T 12345
          T 000000012430  W+                        Append/Overwrite Tailer
       T 000
                                                    Read/Write Button Tailer
      Main Tailer
```

Figure C-11 Example TouchProbe Data File - Read and Read/Write
Buttons

Example Two - Write Data to Button/Read Data from Button Data File

Following is an example of a data file for a TouchProbe that has been configured to read the serial numbers of 1990, 1991, and 1993 buttons, to read the serial number and data from 1992 buttons, and to write its probe ID and data to 1994 buttons. Figure C-12 shows the **Configure Probe** screen with this configuration setting and Figure C-13 shows the data file.
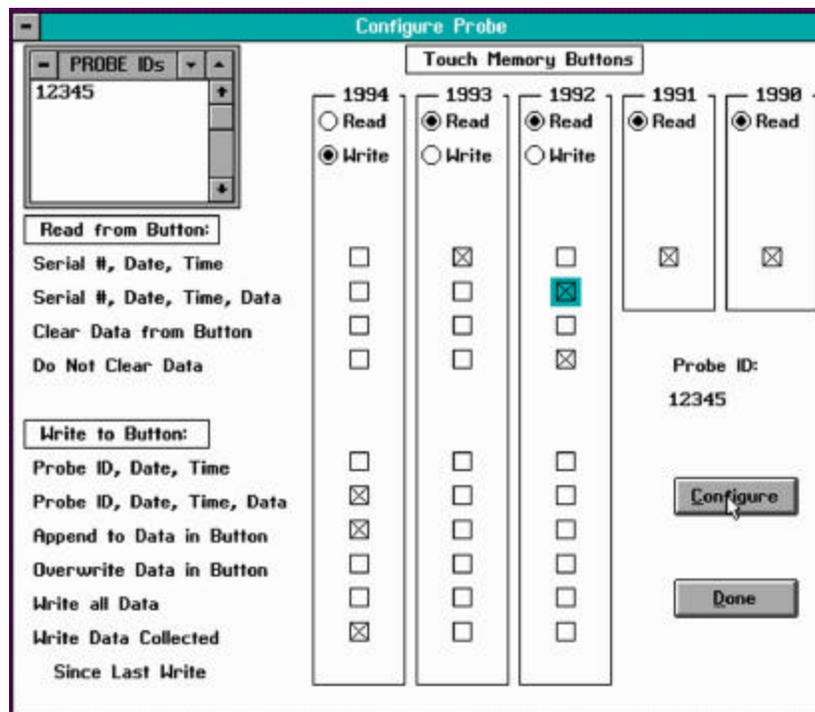
Figure C-12 Configuration Setting for Figure C-13 Data File

```
1    H 20000212154326 00 55333                          1
2      20000212094217 31 0000000B6081                   2
3      20000212095827 36 0000000269C2                   3
4     ┌H 20000212103242 34 000000011434 W-              4
5       ┌H 20000212103242 02 55333                      5
6         20000212094217 31 0000000B6081                6
7         20000212095827 36 0000000269C2                7
8       └T 55333                                         8
9     └T 000000011434 W-                                 9
10    ┌H 20000212105650 38 00000003FA41 R+              10
11      ┌H 20000211172229 01 12345                      11
12        20000211163215 31 00000004949F                12
13        20000211170821 31 0000000B715C                13
14      └T 12345                                         14
15      ┌H 20000211185148 01 22334                      15
16        20000211183121 31 00000004949F                16
17        20000211184024 32 00000007325B                17
18      └T 22334                                         18
19    └T 00000003FA41 R+                                19
20      20000212110958 32 000000073C7B                  20
21      20000212114302 31 0000000B715C                  21
22    ┌H 20000212121807 34 000000011526 W-              22
23      ┌H 20000212121807 02 55333                      23
24        20000212105650 38 00000003FA41                24
25        20000212110958 32 000000073C7B                25
26        20000212114302 31 0000000B715C                26
27      └T 55333                                         27
28    └T 000000011526 W-                                28
29   T 000                                              29
```

━━━━━━ Main Header & Tailer
────── Read/Write Button Header & Tailer
────── Append/Overwrite Header & Tailer

Figure C-13 Data File

Button Origin Codes

31	1990 button
32	1991 button
38	1992 button
36	1993 button
34	1994 button

Read/Write Button Header & Tailer Notations

R-	Read read/write button, clear data
R+	Read read/write button, leave data
W-	Write to read/write button, overwrite data
W+	Write to read/write button, append data

Header Origin Codes

00	Transfer to computer *(Main Header)*
01	Append data to button *(Append/Overwrite Header)*
02	Overwrite data in button *(Append/Overwrite Header)*
03	Load data to TouchProbe from computer *(Send Text to Probe Header)*

Table C-3 Data File Notations

Figure C-13 shows a data file from a TouchProbe configured with the settings in Figure C-12. The data lines are numbered along both sides of Figure C-13 to provide a reference to the following description. The number at the beginning of the definition corresponds to the number at the beginning and end of the data line.

1. **Main Header:** TouchProbe #55333 transferred data to computer on 2/12/2000 at 3:43:26 P.M.

2. Button data: TouchProbe #55333 touched 1990 button #0000000B6081 on 2/12/2000 at 9:42:17 A.M.

3. Button data: TouchProbe #55333 touched 1993 button #0000000269C2 on 2/12/2000 at 9:58:27 A.M.

4. **Read/Write Button Header:** TouchProbe #55333 wrote its data to 1994 button #000000011434 on 2/12/2000 at 10:32:42 A.M. The data being written overwrites any data previously contained in the button. Lines 5–8 are being written to the button.

5. **Append/Overwrite Header**: This is the first line of data written to the 1994 button #000000011434. TouchProbe #55333 touched the 1994 button on 2/12/2000 at 10:32:42 A.M.; the probe ID and data overwrote any data in the 1994 button.

6. Button Data: This is the button data read in line 2 that is being written to the 1994 button #000000011434.

7. Button Data: This is the button data read in line 3 that is being written to the 1994 button #000000011434.

8. **Append/Overwrite Tailer**: This is the last line of data written to the 1994 button #000000011434 by TouchProbe #55333.

9. **Read/Write Button Tailer**: This signifies the end of the write to 1994 button #000000011434.

10. **Read/Write Button Header**: TouchProbe #55333 read the serial number and data of 1992 button #00000003FA41. The data (lines 11 - 18) remained in the button after the read.

11. **Append/Overwrite Header**: This is the first line of data being read from the 1992 button #00000003FA41. This line signifies that TouchProbe #12345 wrote and appended its data (lines 12 and 13) to the 1992 button #00000003FA41 on 2/11/2000 at 5:22:29 P.M.

12. Button Data: TouchProbe #12345 touched 1990 button #00000004949F on 2/11/2000 at 4:32:15 P.M.

13. Button Data: TouchProbe #12345 touched 1990 button #0000000B715C on 2/11/2000 at 5:08:21 P.M.

14. **Append/Overwrite Tailer**: This is the last line of data that TouchProbe #12345 wrote to 1992 button #00000003FA41.

15. **Append/Overwrite Header**: This line signifies that TouchProbe #22334 wrote and appended its data (lines 16 and 17) to 1992 button #00000003FA41 on 2/11/2000 at 6:51:48 P.M.

16. Button Data: TouchProbe #22334 touched 1990 button #00000004949F on 2/11/2000 at 6:31:21 P.M.

17. Button Data: TouchProbe #22334 touched 1991 button #00000007325B on 2/11/2000 at 6:40:24 P.M.

18. **Append/Overwrite Tailer**: This is the last line of data that TouchProbe #22334 wrote to 1992 button #00000003FA41. This is also the last line of data read by TouchProbe #55333 from 1992 button #00000003FA41.

19. **Read/Write Button Tailer**: This signifies the end of the read from 1992 button #00000003FA41. The data read remains in the button.

20. Button Data: TouchProbe #55333 touched 1991 button #000000073C7B on 2/12/2000 at 11:09:58 A.M.

21. Button Data: TouchProbe #55333 touched 1990 button #0000000B715C on 2/12/2000 at 11:43:02 A.M.

22. **Read/Write Button Header**: TouchProbe #55333 writes its data (lines 23–27) collected since its last write to 1994 button #000000011526. This data overwrites any data already in the 1994 button #000000011526. The data was written to the button on 2/12/2000 at 12:18:07 P.M.

23. **Append/Overwrite Header**: This is the first line of data written to 1994 button #000000011526 by TouchProbe #55333 on 2/12/2000 at 12:18:07 P.M.

24. Button Data: This is the 1992 button #00000003FA41 touched in lines 10–19 on 2/12/2000 at 10:56:50 A.M.

25. Button Data: This is the 1991 button #000000073C7B touched in line 20 on 2/12/2000 at 11:09:58 A.M.

26. Button Data: This is the 1990 button #0000000B715C touched in line 21 on 2/12/2000 at 11:43:02 A.M.

27. **Append/Overwrite Tailer**: This is the last line of data written to the 1994 button #000000011526 by TouchProbe #55333.

28. **Read/Write Button Tailer**: This signifies the end of the write to 1994 button #000000011526.

29. **Main Tailer**: This signifies the end of the data transfer from the TouchProbe #55333 to the computer.

NOTES:

Appendix D

Glossary

alphanumeric: Consisting of both letters and numbers.

Alt key: The Alt key gives the other key new meaning depending upon the software being used. Used like a shift key; hold it down while you press another key.

ASCII: A standard code for representing characters as binary numbers, used on most computers and printers. ASCII stands for American Standard Code for Information Interchange.

ASCII text file: A computer file containing only ASCII characters.

baud rate (bits per second (bps)): A measurement that describes the speed of data transmission between two pieces of equipment.

buffers statement: A statement that resides in the config.sys file that assigns memory for temporary data storage.

config.sys file: A file that resides in the root directory of the hard disk that provides operational information to the computer.

configure: To give instructions to the TouchProbe via a computer, so that the TouchProbe operates in a particular way.

data file: A computer file containing data stored on a computer disk.

default: A preset setting or value. A default option is an assumption the computer makes unless it is given other specific instructions.

directory: A list of the files stored on a disk.

disk drive: A computer component that reads and writes to a floppy disk.

DOS (Disk Operating System): A program that allows the computer to manage the storage of information on disks and to make use of compatible software.

DOS prompt: A symbol (usually C:\>) that appears on the computer screen to signal to the user that the computer is ready to receive input.

downloader: A device used to transfer data between the TouchProbe and the computer; also known as TouchProbe Downloader Station.

Downloader Plus: A device used to transfer data between the TouchProbe and the computer via modem. See Appendix G for information.

file: See **data file**.

floppy disk: A small flexible disk on which computer data can be stored; has limited storage capacity.

hard disk: A rigid magnetic storage medium that can store large amounts of text. May be either internal or external to the computer.

hexadecimal: A number system with a base of 16.

highlight: The act of selecting an option or command. Refers to the inverse display when selecting an option or command.

LED: The acronym LED stands for Light Emitting Diode. An LED device will light up when the proper current passes through it. The scan indicator on the TouchProbe is an LED.

probe ID: An identification name or number assigned to a TouchProbe by the computer.

RJ-11 connector: Telephone-style connector. The RJ-11 connector on the serial cable inserts into the downloader "Computer" socket.

root directory: The main directory of a disk containing files and/or sub-directories.

serial: To transmit data serially is to transmit it one bit at a time over a single wire.

serial number: Unique number programmed into a Touch Memory button at the factory.

serial port: A connector or port on the computer that allows you to connect an external device to the computer, so that the computer and the device can communicate.

serial port cable: The cable used to provide communication between the downloader and the computer. This cable has a serial port connector (9- or 25-pin) at one end and an RJ-11 connector at the other end.

text editor: An editing program which enables you to edit ASCII text files.

toggle command: A command that gives you two or more choices, and one of the choices <u>must</u> be selected.

TouchProbe ID: An identification name or number assigned to a TouchProbe by the computer.

transfer: Send data from the TouchProbe to the computer by use of the downloader and the communications software.

VDC: <u>V</u>oltage <u>D</u>irect <u>C</u>urrent. Abbreviation for direct current voltage.

Notes:

Appendix E

TouchProbe Command Line Communications

Contents

TouchProbe Command Line Communications

Videx provides software tools that enable application developers and programmers to seamlessly integrate TouchProbe communications software with custom application software. One of these software tools is a command line communications program for the TouchProbe called **TRANSFER.EXE**. This appendix contains information on **TRANSFER.EXE** version 3.01. **TRANSFER.EXE** is included with the TouchProbe Communications Software for DOS.

TRANSFER.EXE is a small, executable program that enables the user to load configurations into the TouchProbe and transfer data from the TouchProbe. The transferred data is stored as an ASCII text file. **TRANSFER.EXE** can be run from the DOS prompt, from within a batch file, or from within your own application program. It can be run in a "quiet mode" (using the **-q** parameter) where it will not produce any output to the screen, making it easy to integrate into application program user interfaces.

TRANSFER.EXE can be distributed freely. However, to ensure that application software is properly supported and identified, **TRANSFER.EXE** must be implemented with the **-q** parameter so that the Videx name does not appear anywhere in the user interface. C source code for **TRANSFER.EXE** is also available.

If you have any questions or suggestions, please contact the Videx Technical Support department at telephone number (541) 758-0521, fax number (541) 752-5285, by email at support@videx.com, or visit our web site at http://www.videx.com.

TRANSFER.EXE

TRANSFER.EXE is run from the command line by entering the filename **TRANSFER** followed by certain parameters. These parameters are explained below:

-b \<baud rate\>   Sets the communication baud rate. Range 300–19200. Default: 19200.

-c   Disables clearing data from the TouchProbe after download. Default: Clear data.

-d \<download time\>   The length of time in seconds that the computer attempts to communicate with TouchProbes by calling out the probe IDs over the serial port (0 = forever). If a download time is specified, the program transfers data only once from each TouchProbe in the list. The program terminates once the time has expired or after each of the probes in the list has been transferred. Default: 30 seconds

-i <ID file>   List of TouchProbe IDs which are allowed to be transferred. Maximum of 256 IDs. Format: <probe ID><cr/lf> -or- <probe ID> <,> <button config strings (space delimited)><cr/lf> Only data from one TouchProbe is downloaded each time the program is run.

The ID list is used to validate an encountered TouchProbe. If a TouchProbe ID that is not in the ID list is encountered the program quits with an error.

Button configuration strings are sent to the TouchProbe after the transfer of data. Note: If the TouchProbe is already configured, it is not necessary to resend button configurations.

To download any TouchProbe omit the "-i" parameter from the command line. Omitting the "-i" parameter is equivalent to specifying a file list containing just "0000000000" and will download any TouchProbe.

-k   Disables ability to terminate program on key press.

-l <text file>   File containing text to load into TouchProbe's data area for writing to read/write buttons.

-m [<setup>] [~<dial>]

        Attach to modem; this parameter is required when using a modem and a TouchProbe Downloader Plus to transfer data. For host-initiated transfer (**TouchProbe Answers**) you must supply the dial string. The program will always send a hang up command to the modem to insure that it is not left off the hook if the communication does not terminate normally.

-o \<output file\>	Data transferred from the TouchProbe is put into this file. Default: Screen.
-p \<com port #\>	Default: 1 (accepts 1, 2, 3, or 4).
-q	Disables display of version, copyright information, and progress messages.
-s \<status file\>	Writes status to file with the following format: \<date/time\>,\<probe ID\>, \<status #\>, \<cr/lf\> Status numbers are defined on page 98. Default: None written.
-t	Disables setting TouchProbe's clock.
-v [\<filename\>]	Verbose mode: Detailed progress message generated for communication. Messages can be sent to a file by placing the filename immediately after the **-v** parameter.
-x \<#\>	Number of spaces per tab in indented raw scan file.
-z	Translate without transfer.

Example

Command line to transfer data from a list of TouchProbes, store the data in an ASCII file called **DATA.TMD**, and record the status in **STAT.TXT**:

TRANSFER -iPROBES.TXT -oDATA.TMD -sSTAT.TXT -d30

Note: In this example, the list of probes to transfer is stored in an ASCII file called **PROBES.TXT**. This ASCII file must be created by the developer. It is not necessary to use the filename **PROBES.TXT**. Any valid DOS filename can be used.

Input File

The input file is an ASCII text file containing the probe IDs to transfer.

The file format is:

<probe ID><cr/lf>

   -or-

<probe ID><,><button config strings (space delimited)><cr/lf>

The probe IDs are case sensitive.

Output File

The **-o** parameter creates an output file in which the data from the TouchProbe is stored. If the file already exists, it appends the transferred data to the bottom of the file. The format of the output file is shown below. (For tab information, see **-x** parameter on page 95.)

```
                                                            Probe ID
Beginning of File    Date and Time of Transfer
(Main Header)        to Computer

         H    20000129090419        00  12345
              20000129090314        31  00000004859F
              20000129090318        31  0000000B7303
              20000129090320        31  0000000B72DA
              20000129090403        31  00000004859F
              20000129090404        31  0000000B7303
End of File   20000129090406        31  0000000B72DA
(Main Tailer) 20000129090410        31  0000000B715C
              20000129090412        31  0000000B6081
         T    000
                                Button Origin Code    Button Data

    Date and Time of Button Touch
```

Figure E-1 TouchProbe Output File Format

History File

Maintaining a history file of all of the data is a valuable practice. This can be easily accomplished after running **TRANSFER.EXE** by using the DOS Copy command to append the output file to a history file. For example, with an output file called **DATA.TMD** and a history file called **HIST.TMD**, the syntax of the DOS copy command would be:

COPY HIST.TMD + DATA.TMD HIST.TMD

Status File

The **-s** parameter creates a status file with status numbers for each probe ID. The status file is overwritten each time the program runs. The status numbers are listed below:

000   Transfer successful, no errors
001   Time error
002   Config error
003   Retry error
004   Binary file open error
005   Binary file not valid
006   Invalid record type
007   No end record
008   Corrupt record error
009   Invalid ID record
010   Invalid record size
011   Binary file read error
012   Output write error
013   Error clearing data from TouchProbe

Error File

If any errors occur while **TRANSFER.EXE** is running, the error
messages are written to a file called **TRANSFER.ERR**. This error file
is overwritten each time the program runs. You should check this file
each time after running **TRANSFER.EXE** to be certain that no errors
occurred.

0	SUCCESS_EXIT	"Operation was successful"
2	USER_CANCEL	"User cancelled the operation"
3	PARAM_ERROR	"One of the parameters is incorrect"
4	TIMEOUT_ERROR	"Communications have timed out"
5	NOTINLIST_ERROR	"Probe's ID is not in the list of IDs"
6	SERIAL_ERROR	"Error opening serial port"
7	MODEM_ERROR	"Did not get expected response from modem"
8	FILE_ERROR	"Error reading from or writing to a file"
10	MEMORY_ERROR	"Ran out of memory"

NOTES:

Appendix F

Writing a Download Program for TouchProbe

Contents

Introduction

This section is useful to software developers and programmers who want to use the TouchProbe with a computer other than MS/PC DOS or Macintosh.

Videx, Inc. offers TouchProbe Communications software for DOS and Macintosh computers. These software packages provide excellent working examples of the download process. The purchase price of the software includes the license fee for incorporating the download code into your own program. Videx has written TouchProbe download programs using C. The C language source code is available upon request with purchase of the TouchProbe Communications software.

This appendix contains information that will help you write a download program for a host computer/operating system not currently supported by Videx download software.

The TouchProbe Configuration Application Program Interface section contains the protocol for communicating with a TouchProbe.

TouchProbe Configuration Application Program Interface

Configuring the TouchProbe

The TouchProbe supports commands that enable it to be configured to work in different application environments.

1) Host Mode

To communicate with the TouchProbe, it must be placed in Host mode. Host mode is entered by sending a BREAK character to the TouchProbe. A BREAK character is defined as a logical '0' signal with a duration of at least 350 milliseconds. The TouchProbe remains in Host mode for one second. If it receives no serial communication during this time, it times out.

Using the standard TouchProbe Downloader, the BREAK character is initiated by the TouchProbe Communications software (i.e., Videx programs **TOUCH.EXE** or **TRANSFER.EXE**).

The original Videx TouchProbe Downloader Plus with the button on top, contains an internal software program, triggered by the button, that sends a BREAK character and then automatically unlocks the TouchProbe with a special ID number.

2) Communications

Communications with the TouchProbe must be initiated when it is in Host mode. When a TouchProbe is placed in the downloader, communications to the downloader occur in simplex mode. The communications parameters used should be eight bits per byte, no parity, and one stop bit (N-8-1). Initial speed is 19200 baud, but this can be changed once host mode is entered.

3) Commands

The general command format is:

        <command> [space] [<parameter>] <end-of-line>

<command> is the one character command.

[space] is an optional space character (ASCII 32).

[<parameter>] is an optional parameter string if applicable.

<end-of-line> is the terminating sequence, and can be either <LF> or <CR><LF>, where CR is ASCII 13 and LF is ASCII 10.

A description of each command and the TouchProbe's response are listed on the following pages. The TouchProbe will not respond to any commands until it has been unlocked using the Unlock command. Once unlocked, the TouchProbe will respond to an unknown command with "Huh?"

Issue the command without a parameter to query the TouchProbe for a current setting.

Note: Commands are case sensitive.

Commands on the following pages that are denoted with an asterisk[*] are for use with a TouchProbe Downloader Plus only.

Command	Description
A[*]	Selects the answer/originate mode when the TouchProbe is placed in a TouchProbe Downloader Plus:

A0 - Disables modem functions
A1 - ANSWER mode[*] (Data transfer must begin within
    255 seconds after the TouchProbe Downloader
    Plus unlocks the TouchProbe in this mode)
A2 - ORIGINATE mode[*]
Default: 1 – ANSWER mode

AR*x*[*]   Directs the TouchProbe Downloader Plus to answer a
call from the host after a TouchProbe has been
successfully downloaded. The default behavior (AR = 0)
is that if a TouchProbe is successfully downloaded then
the TouchProbe Downloader Plus will flash a green
Power light and will ignore a ring indicator received from
the modem. Otherwise, if AR = 1 the TouchProbe
Downloader Plus will process the ring indicator.

Default: 0
Range: 0 or 1

AZ*x*[*]   Defines whether the TouchProbe must be downloaded
and cleared of its data before the TouchProbe
Downloader Plus will flash a green **Power** light to
indicate a successful transfer. AZ = 0 indicates that data
must be cleared to enable that condition; AZ = 1
indicates that the TouchProbe Downloader Plus may
indicate a successful download even if data is not
cleared.

Default: 0
Range: 0 or 1

Command	Description
B	Requests the TouchProbe's current configuration flags. Returns as follows:

H <date/time stamp> FF <ID>
B*ffccppss*
.
.
.
B*ffccppss*
T 000

Command	Description
BC	Clears all button configurations.
B*ffccppss*	Sets configuration flags 'cc' for button type 'ff.' This button type has 'pp' partitions of size 'ss' if applicable. Maximum number of configurations is 256.

The '**B***ffccppss*' command is the workhorse command for customizing the operation of the TouchProbe. Its operation is described below:

> *ff* = family code
> *cc* = configuration byte
> *pp* = # of partitions of storage (ignored)
> *ss* = size of each partition (ignored; hardcoded @ 32 bytes (0x20))

The *pp* and *ss* fields must be passed but their values are ignored.

ff	**Description**
'FF'	Global configuration options.

Possible values for *cc* (configuration byte):
00 - Does not attempt to read "foreign" or undefined buttons (default)
01 - Attempts to read "foreign" buttons.

'FE'	Download configuration option.

Possible values for *cc* (configuration byte):
02 - Downloads all records stored in memory (default)
01 - Downloads only records since last download

'*xx*'	Button family code. These button family codes are supported by the TouchProbe:

01 = 1990 button
02 = 1991 button
08 = 1992 button
06 = 1993 button
04 = 1994 button

Possible values for *cc* (configuration byte) for each of the button family codes:

```
76543210 (bit positions)
|||||||--read from button (0), or write to button (1)
||||||---write data since last write (0), or write all data (1)
|||||----type not configured (0), or type is configured (1)
||||-----(not used)
||||------append (0) or overwrite (1) data
|||-------clear (0) or don't clear (1) data when read
||--------store date/time (0) or date/time/data (1)
|---------ignore button (0), or act according to other bits (1)
```

(The configuration byte will default to A4H (10100100). This reads the button serial number and type for unconfigured buttons.)

Command	Description
C	Requests the TouchProbe's ID. The TouchProbe responds with an ASCII string of up to ten characters representing its ID.
C_xxxxxxxxxx_	Sets the TouchProbe's ID to '_xxxxxxxxxx_'. May be up to ten characters.
D	Requests packet download data from TouchProbe. Transfer protocol is defined in the TouchProbe Download Packet Protocol Definition available from Videx, Inc.
D_yyyymmddhhmmss_	Same as **D** command, but downloads all data stored since specified date.
F	Requests the amount of free memory (in bytes) in the TouchProbe.
G	Locks the TouchProbe. The TouchProbe locks itself automatically if allowed to power down due to a timeout. Default time out is 60 seconds of no serial port activity. Time out value may be set for the current session with the **P** command.

Command	Description
G_password_	Locks the TouchProbe with a specified password. On a subsequent unlock, this password must be specified after the probe ID but before the line terminator.

Example:
I_xxxxxxxxx_<space>password<end-of-line>

(Note: A "backdoor" is provided, as in the **I** command. The TouchProbe will always accept a field of ten ASCII zeroes. If the probe ID is known, but not the password, the string 'I<IDstring> 0000000000' will unlock the TouchProbe. If the probe ID and the password are unknown, 'I0000000000 0000000000' will unconditionally unlock any TouchProbe.)

H*_xxx_ — Sets the number of modem dial attempts (retries) when the TouchProbe is in originate mode. Range is 0–255. A retry is attempted whenever a string matching any of the commands **M3** through **M5** (error codes) is received from the modem.

Default: 1

HR*_xxx_ — Sets the number of minutes to wait before retrying a dial operation.

Default: 240 (minutes)
Range: 0–255 (0 = no retry)

Command	Description
I*xxxxxxxxxx*	Unlocks the TouchProbe with ID *xxxxxxxxxx*. A "backdoor" ID of '0000000000' unlocks any TouchProbe in the event its ID is not known. The TouchProbe responds with 'TP*xxx*' where *xxx* is the revision level of the software running on the TouchProbe. This is followed by a space, the probe ID, and a <cr><lf> sequence. This command should be given within one second after putting the TouchProbe into Host mode. See also the **P** command and the **G** command.
L	Requests the data set that has been loaded into the TouchProbe.
L*<data>*	Loads a data set into the TouchProbe's storage area. The TouchProbe wraps the data in an appropriate Header/Tailer pair. Up to 256 characters may be stored. The TouchProbe must first be configured to write the data set to read/write buttons. The data set is cleared when the TouchProbe is downloaded or when it receives a new button configuration set with the **B** command. Raw data with embedded carriage returns or line feeds should be enclosed in double quotation marks (e.g., L "this <cr> is raw data <lf>").

M Commands*

The **M** commands are command strings or messages for communications between the TouchProbe and modem or between the TouchProbe Downloader Plus and the modem. The following characters have special meaning and are translated as shown before they are sent to the modem.

Character	Description
~	Imposes approximately 1 second pause before sending next character
		Carriage return (ASCII 13)
`	Line feed (ASCII 10)

Command	**Description**
M0**<string>*	Initialization string to send to the modem when the TouchProbe is in Answer mode.

> Default: |~AT&FE0|
> Range: 1–80 characters

| **M1**[*]*<string>* | Initialization string to send to the modem when the TouchProbe is in Dial (originate) mode. |

> Default: |~AT&FE0|
> Range: 1–80 characters

| **M2**[*]*<string>* | Dial string sent when the TouchProbe is in Dial mode. |

> Default: |~ATDTxxx-xxxx|
>   Range: 1–60 characters

Command	Description
M3[*] *\<string\>*	Modem BUSY string. This string should match whatever the modem sends back when the line is busy. When the TouchProbe receives a match to this error code, it triggers a retry. (See the **H** command). Note that a substring match will work, but the substring should be long enough to uniquely identify the modem's result code.

Default: BUSY
Range: 1–20 characters

M4* *\<string\>*	Modem NO DIALTONE string. This string should match whatever the modem sends back if it detects no dial tone when it goes off hook. When the TouchProbe receives a match to this error code, it triggers a retry. (See the **H** command) Note that a substring match will work, but the substring must be long enough to uniquely identify the modem's result code.

Default: NO DIALTONE
Range: 1–20 characters

M5[*] *\<string\>*	Modem NO CARRIER string. This string should match whatever the modem sends back when the connection fails. When the TouchProbe receives a match to this error code, it triggers a retry. (See the **H** command). Note that a substring match will work, but the substring should be long enough to uniquely identify the modem's result code.

Default: NO CARRIER
Range: 1–20 characters

M6[*] *\<string\>*	Modem hang-up command. This string is sent to the modem to terminate a call.

Default: ~~+++~~ATH|
Range: 1–20 characters

Command	Description
M7[*] *\<string\>*	Modem OK string. This string should match whatever the modem sends back when it successfully executes a command. The TouchProbe Downloader Plus attempts to match this string after sending a modem initialization string. Note that a substring match will work, but the substring must be long enough to uniquely identify the modem's result code.

Default: OK
Range: 1–20 characters

M8[*] *\<string\>*   Modem CONNECT string. This string should match whatever the modem sends back when it successfully connects to another modem. The TouchProbe attempts to match this string after sending the M2 modem dial string. If no match is received after a 60-second period it triggers a retry. (See the **H** command). Note: A substring match will work, but the substring must be long enough to uniquely identify the modem's result code.

Default: CONNECT
Range: 1–20 characters

Command	Description
M9[*] *\<string\>*	Modem RING string. This string should match whatever the modem sends back as a ring indicator. The TouchProbe Downloader Plus responds to this string when a TouchProbe in Answer mode is inserted. Note that a substring match will work, but the substring must be long enough to uniquely identify the modem's result code.

Default: RING
Range: 1–20 characters

Note: When you want the TouchProbe Downloader Plus to answer after more than one ring, begin the string with #\<number of rings\> where number of rings may be from 1–9.

Example: #4RING (answers after four rings)

MA[*] *\<string\>*	Modem Answer command. The TouchProbe Downloader Plus sends this string when it receives the correct number of rings and if a TouchProbe in Answer mode is inserted.

Default: ATA|
Range: 1–20 characters

Command	Description
P*xxx*	Sets the TouchProbe's Host mode inactivity time-out to *xxx* seconds. When the TouchProbe first enters Host mode the inactivity time-out is set to one second. The inactivity time-out resets to 60 seconds after a successful unlock (**I** command). Application software desiring a longer inactivity time-out may use the **P** command to reset it. It should set this soon after unlocking the TouchProbe before it times-out. Valid values are 0–255 seconds. A value of zero sets 256 seconds. The Host mode inactivity time-out is set only for the current session. The **P** command can influence battery life because the TouchProbe consumes substantially more power in Host mode than in Sleep mode. (Approximately 26 mA vs. 6 µA)
Q*xx*	Sets a delay (in tenths of seconds) between button reads. Default value is 5 (½ second). A value of zero disables the delay. The delay may be used to minimize "double hits" when reading from or writing to a button. This setting can influence battery life because the TouchProbe processor is active during the delay and consumes substantially more power. (Approximately 26 mA vs. 6 µA)

Command	Description
R*n*	Sets the baud rate to be used the next time Host mode is entered. The default baud rate is 19200. Values for *n* may be:

> 0 = 300
> 1 = 600
> 2 = 1200
> 3 = 2400
> 4 = 4800
> 5 = 9600
> 6 = 19200

Command	Description
S*tt*	Requests the tune sequence currently configured for event *tt*.
S*ttnndd...*	Sets event *tt* to tune sequence *nndd*, where *nn* is the note to play, and *dd* is the duration in 10ms intervals. Range for both note and duration is 0-99. The *nndd* parameters may be passed up to 10 times to create the desired "tune" (i.e., S04011003080715 sets event 4 to 3 notes).

Events defined in TP131 are:

Event #	Event	Tone Sequence
00	good read	[1610]
01	bad read (timeout while reading)	[0440]
02	good write	[1610][0003][1610]
03	bad write (timeout while writing)	[0420][0003][0420]
04	memory near full	[1103][0903][0003][1103][0903] [0003][1103][0903][0003]
05	memory full	[1115][0030][0540]
06	nothing to do (empty, no config, etc.)	[0720]
07	unknown or unconfigured button type	[0303][0503][0303][0503][0303] [0503][0303][0503][0303][0503]
08	download complete	[0103][0503][0803][1303][0103] [0503][0803][1303]
09	memory corrupt or coldboot	[2302][2102][1902][1602][1402] [1102][0902][0702][0402][0202]
10	button erase	[1008][0001][1208][0001][1608]
11	download in progress	[1401]
12	transfer in progress 'click'	[1001]
13[*]	TouchProbe recognized by TouchProbe Downloader Plus	[1010][2010]
14[*]	dialing phone	[1005][1505][2005]
15[*]	answering phone	[1003][2003][1003]
16[*]	connected to remote	[1003][2010][1003][2010]
17[*]	failed to connect to remote	[1030]
18[*]	remote communication finished (received 'G' command)	[0503][1303][0503][1303][0503] [1303]

[*] functions supported only by TouchProbe Downloader Plus

Command	Description
S*tt*	Requests the tune sequence currently configured for event *tt*.
T	Requests a reading from the TouchProbe's internal clock. The TouchProbe responds with an ASCII string of the form '*yyyymmddhhmmss*'.
T*yyyymmddhhmmss*	Sets the TouchProbe's internal clock.
Z	Clears all data in the TouchProbe. This command must be repeated 3 times within a period of 3 seconds before the TouchProbe will perform the action.

TouchProbe Download Packet Protocol Definition

Due to hardware constraints in the TouchProbe, all communication has to happen in simplex mode. The host starts the download by sending the Download command as specified in the TouchProbe Configuration Application Program Interface. The TouchProbe responds by sending the first data packet, and waiting for the acknowledgment from the host. If the host does not receive the first data packet within a time-out interval after sending the Download command, it should resend the Download command.

Data packets may be up to 1024 bytes in size. A positive acknowledge has to be received before the next data packet is sent. If no positive acknowledge is received within a time-out interval, the packet is resent. If a negative acknowledge is received, the packet is also resent. The number of retries of a data packet is limited, and if the limit is exceeded without receiving a positive acknowledge, the transfer is considered to have failed. End of transfer is indicated by the TouchProbe sending a data packet with the length field set to zero.

Packet Structure

Each packet starts with a 16-bit header. Each packet contains a 16-bit type field, a 16-bit sequence number starting from zero, and a 16-bit cyclic redundancy checksum. Depending on the type of packet, it may also contain a 16-bit length field, followed by 8-bit data bytes (if applicable).

The currently defined packets and their structures are:

DATA PACKET
<header|type = 1|packet-number|length|data-bytes|crc>

POSITIVE ACKNOWLEDGE
<header|type = 2|packet-number|crc >

NEGATIVE ACKNOWLEDGE
<header|type = 3|packet-number|crc >

Data Representation

Eight bit data is sent in standard RS-232 format, with a start bit, followed by eight data bits in LSB order, followed by at least one stop bit. Sixteen bit variables are sent in Big Endian format (i.e. high byte first). The Cyclic Redundancy Checksum will be calculated using the polynomial $X^{16} + X^{15} + X^2 + 1$. The packet header shall be the 16 bit number 0xFEDC.

Timing

Currently, a time-out is considered to have occurred if no positive acknowledge has been received within five seconds upon sending a data packet. If more than six such time-outs occur, the transfer is considered to have failed.

TouchProbe Download Data Format Specification

The data transferred from the TouchProbe to the host is in binary format. The transfer consists of a series of records. (In the following, CAPITAL words refer to the **typedefs.h** or **defs.h** files.) Each record is started with a record header. The header consists of:

Record Number - a two byte unsigned record number.

Record Length Field - a two byte unsigned record length (exclusive of the header).

Record Time Stamp - as described below, indicates when this record was recorded.

Record Type Field - a one byte type field indicating the format of the record.

(The above is called the P1RECHDR in the **typedefs.h** file.)

The time stamp is a four-byte value, indicating the seconds expired since 1 January, 1970 (local time). The time stamp is stored in Big Endian format.

Valid **Record Type Fields** are (the P1RECORD types in **typedefs.h**):

Probe ID Record (type = 0, P1PROBEID): This is the first record of a download. It consists of eleven bytes, containing the TouchProbe's ID.

Raw Data Record (type = 1, P1RAWDATA): The data that follows is the raw data as set with the host mode **L** command (see page 110 for more details). In the data file, this is represented as follows:

> H 20000923081534 03
> This is the raw data
> T 03

Button Record (type = 2, P1BRECORD): The data that follows is button serial number data.

End of Records (type = 255, P1SPECIAL): This indicates that there are no more records.

Button Records (type = 2) consist of the following (the P2RECHDR in **typedefs.h**):

Button Config - a one byte button configuration for this button type, as defined in the TouchProbe Communication Interface section.

Family Code - a one byte button family code, as defined by Dallas Semiconductor.

Serial Number - a six byte button serial number.

Button Record Type - indicates the type of button record that follows.

If the Button configuration indicates that there is data to be read from or written to this button type, this is followed by: Data Field - the data pertaining to this transaction.

Valid Button Record Type Fields are (the P2RECORD types in **typedefs.h**):

Raw Data (type = 1, P2RAWDATA): The data field consists of raw data bytes. This can only be a write. The data set in the most recent Raw Data Record is written to the button. (This is NOT duplicated here!)

Foreign Button Data (type = 3, P2INVDATA): The data field consists of raw data bytes. This can only be a read. The data file output should list the data as a string of hexadecimal representations of the individual bytes.

Valid Button Data (type = 2, P2VALDATA): If write, the data written is one record. If the P1RECHDR length field indicates there is data beyond the P2RECHDR, then this data is a list of two byte record numbers. If there is no data beyond the P2RECHDR, the data written to the button was the probe ID only.

If read, the data can consist of multiple data records (this is the B2RECHDR in **typedefs.h**). The record structure here is:

> **rectype** - a one byte record type
> **dlen** - a two byte length field
> **rectime** - a four byte time stamp
> **probeID** - an eleven byte probe ID string of the TouchProbe that wrote the record

Followed by the button data (if needed). Followed by a two byte CRC-16 over the whole record.

Types can be:

> **raw data** (type = 1, B2RAWDATA)
> The data is the number of bytes read from the button. This should be put in ASCII format in the data file.
>
> **Serial number list data** (type = 2, B2SNLIST)
> The data consists of lists of 4 byte time stamp, 1 byte family code, 6 bytes serial number.
>
> **Probe ID only** (type = 3, B2PROBEID)
> There is no data. The probe ID is part of the B2RECHDR !

Internal Record Structure Specification

First is the standard record header:
  2 byte **Recno**
  2 byte **Reclen**
  4 byte **Rectime**
  1 byte **Rectype**

Rectypes can be:

1. **Raw Data Record**
   Created by host manager, indicating the raw data. Is followed by the raw data bytes (a null-terminated ASCII string).

2. **Known Button Data Records**
   1 byte **Button Config** value; see pages 106–107 for more information.
   1 byte **Family Code** indicating the type of button.
   6 byte **Serial Number** of the button.

   Followed by the data records. There will be (**Reclen** - 8) bytes data. This does not need to be interpreted at read time. (See the **Memory Button Data Format Specification** section on page 122 for more information.)

3. **Unknown Button Data Records**
   1 byte **Button Config** value; see pages 106–107 for more information.
   1 byte **Family Code** indicating the type of button.
   6 byte **Serial Numbe**r of the button.

   Followed by (**Reclen** - 8) raw data bytes.

For Memory Button Writes:

First is the standard record header:
    2 byte **Recno**
    2 byte **Reclen**
    4 byte **Rectime**
    1 byte **Rectype**

Rectypes can be:
    Known Button Data
    1 byte **Button Config** value
    1 byte **Family Code** indicating the type of button
    6 byte **Serial Number** of the button
    1 byte **type** field

Allowed **types** are:
    type = 1, **Raw button data**
    Nothing else needs to be stored, since this implies that the data
    written is that of the most recent Raw Data Record.

    type = 2, **Serial number lists**
    This is followed by a number of 2 byte **Recnos**. These reference
    the records in the TouchProbe to indicate the Family Code and serial
    numbers written to the button.

    type = 3, **Probe ID only**
    Nothing else is needed because this implies the current probe ID
    was written. (Note: Probe ID changes are not tracked.)

Memory Button Data Format Specification

Memory buttons contain the following data structure:

> 2 byte number-of-records field
> 2 byte total-data-length field
> 1 byte CRC-8 over the above 4 bytes

Followed by the records, where each record consists of:

> 1 byte type field.
>
> 2 byte length field (n). This is the length of the actual data, excluding this header and the CRC-16.
>
> 4 byte time stamp.
>
> 11 byte probe ID field. This contains a null-terminated string that might be shorter than 11 bytes. In that case, the remaining bytes are undefined.

Known types are:

> type = 1, **Raw Data**: The actual data consists of n bytes
>
> type = 2, **Serial Number List**: The actual data is
> groups of   [
>   4 byte time stamp,
>   1 byte Family Code
>   6 byte Serial Number
>   ]
>
> type = 3, **Probe ID Only**: There is no actual data

2 byte CRC-16 over the preceding data, i.e. header plus actual data.

Appendix G

TouchProbe Downloader Plus

What is the Videx TouchProbe Downloader Plus?

The TouchProbe Downloader Plus is a communication station manufactured by Videx, Inc. that allows modem data transfer from TouchProbes at remote sites. The **TouchProbe Configuration Utility** is a software program that is used at the host site to configure the TouchProbe for modem communication from the remote site.

Modem communication requires the following components:

1. TouchProbe
2. TouchProbe Downloader Plus version 2.04 or later (TPD-002 or TPD-F02)
3. Serial Port Cable (TWC-001 or TWC-008)
4. Remote Modem Cable (TWC-003)
5. Modems (Qty 2)
6. TouchProbe Configuration Utility Software (3 disks)

(Complete information on the required components is located on pages 129–130.)

Modem Communication requires the following steps:

1. Run **Setup.exe** to install **TouchProbe Configuration Software** onto the computer.

2. Confirm that the TouchProbe Downloader Plus is version 2.04 or later (no button on top).

3. Connect either a TouchProbe Downloader Plus or a TouchProbe Downloader to computer with the serial port cable.

4. Insert a TouchProbe into the downloader connected to the computer.

5. Use the **TouchProbe Configuration Utility** (**probecfg.exe**) to confirm that the TouchProbe contains operating system **TP131.HEX** or a newer version.

6. Use the **TouchProbe Configuration Utility** to configure the TouchProbe.

7. Install the TouchProbe, TouchProbe Downloader Plus, remote modem cable, and modem at remote site.

8. Initialize the host site modem.

9. For actual communication, use **TRANSFER.EXE** (version 3.01 or later) to transfer data from the TouchProbe at the remote site to the computer at the host site.

(Complete information on the required steps begins on page 131.)

Components Required for Modem Transfer

The following components are required for a minimum installation:

- **TouchProbe** – The TouchProbe must have operating system **TP131.HEX** or later installed. The TouchProbe must first be configured with the **TouchProbe Configuration Utility** before it can be used for modem transfer at the remote site.

- **TouchProbe Downloader Plus (TPD-002 or TPD-F02)** – A TouchProbe Downloader Plus must be connected to the modem at the remote site for modem data transfer. You may use either a TouchProbe Downloader Plus or a standard TouchProbe Downloader to configure the TouchProbe with the **TouchProbe Configuration Utility**.

- **Videx serial port cable (TWC-001 or TWC-008)** – This is the cable that connects the TouchProbe Downloader Plus directly to a computer so that the TouchProbe can be configured with the **TouchProbe Configuration Utility**. See Figure G-1 on page 131.

- **Videx remote modem cable (TWC-003)** – This is the cable that connects the TouchProbe Downloader Plus to the modem at the remote site for modem data transfer. See Figure G-7 on page 139.

- **Two modems** – One modem for the remote site and one modem for the host site. The **TouchProbe Configuration Utility** software has default configuration settings that have been tested with U.S. Robotics Sportster, by 3Com. Best results are obtained if both the remote and the host site modems are U.S. Robotics. Contact the Videx Customer Service department for more information.

- **TouchProbe Configuration Utility** – The **TouchProbe Configuration Utility** filename is **probecfg.exe**; this software program configures a TouchProbe for modem communications. With the **TouchProbe Configuration Utility** you can:

  - Select if the data transfer is initiated at the remote site (**TouchProbe Dials Out**) or central site where the computer is located (**TouchProbe Answers**).

  - Check a TouchProbe's operating system version.

  - Send modem configuration settings to the TouchProbe.

  - Change the settings sent from the TouchProbe to the TouchProbe Downloader Plus at the remote site.

  - Change the TouchProbe's communication baud rate.

  - Create and edit configuration files that contain customized settings for different makes and models of modems.

What steps must I follow to install the TouchProbe Configuration Utility software and prepare for modem communication?

Preparing the TouchProbe and the TouchProbe Downloader Plus for modem transfer requires the following steps:

Warning
Verify that the TouchProbe Downloader Plus is compatible with this software. Older TouchProbe Downloader Plus units have a button on the top that sends a <BREAK> signal to the TouchProbe; these units are not compatible with this software. If your TouchProbe Downloader Plus is an older unit, contact the Videx Customer Service department for information on upgrading.

1. Shut down your computer and connect either a TouchProbe Downloader Plus or a standard TouchProbe Downloader directly to the computer's serial port with a Videx serial port cable (TWC-001 or TWC-008).
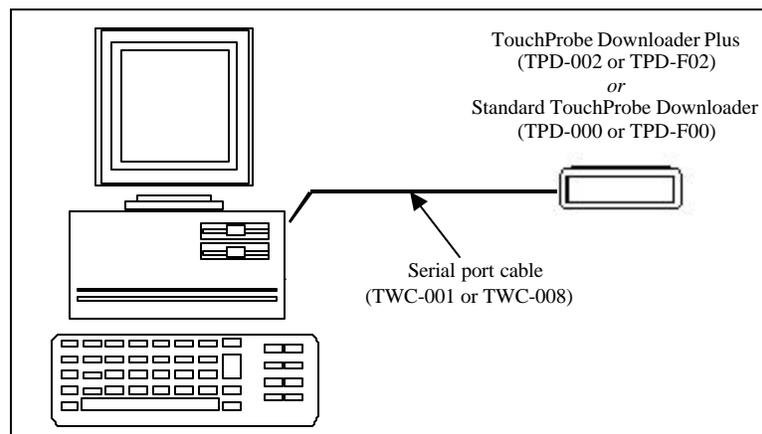
Figure G-1 Downloader Connected to Computer

2. Turn the computer on and run the **TouchProbe Configuration Utility** setup program (**Setup.exe**) to install the **TouchProbe**

Configuration Utility software onto the computer's hard drive.

3. Run the **TouchProbe Configuration Utility** (**probecfg.exe**) software. The **TouchProbe Modem Communications** screen (Figure G-2) is displayed.

Figure G-2 TouchProbe Modem Communications Screen

4. Confirm that the communications settings are correct by choosing **Communications** from the **Settings** menu.

5. The **Communications Settings** dialog box (Figure G-3) appears. Select the serial port that the TouchProbe Downloader Plus is connected to and the communication baud rate setting (default is COM1 and 19200 baud rate) and click **OK**.
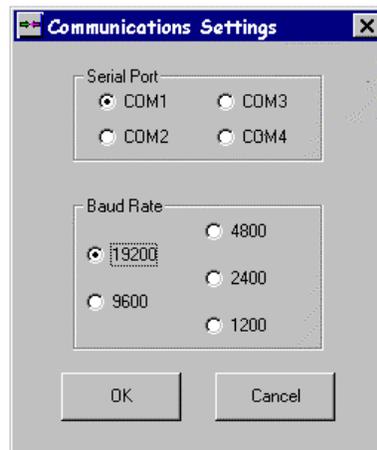
Figure G-3 Communications Settings Dialog Box

6. Insert the TouchProbe in the TouchProbe Downloader Plus. Wait until the **Power** light on the TouchProbe Downloader Plus is red and flashing. This indicates that the TouchProbe has determined that the TouchProbe Downloader Plus is not connected to the modem, and is prepared to communicate directly with the computer.

The following table describes the various **Power** light states:

TouchProbe Downloader Plus Power Light	
Color & State	**Description**
Solid Green	The TouchProbe is communicating with the modem.
Solid Yellow	The TouchProbe Downloader Plus is communicating with the TouchProbe.
Solid Red	The TouchProbe Downloader Plus is ready for the TouchProbe to be inserted.
Flashing Green (3 flashes/1 sec)	A successful data transfer has occurred.
Flashing Yellow (1 flash/3 sec)	Waiting for an incoming call (host initiated) or redial (remote initiated).
Flashing Red (1 flash/1 sec)	There has been a problem with modem communications or the TouchProbe Downloader Plus is connected directly to a computer and not to a modem. In the latter case, the TouchProbe Downloader Plus is prepared to communicate directly with the computer.

7. Click **Check Probe OS** to determine the TouchProbe's operating system version. The computer will query the TouchProbe and display its operating system version. The operating system needs to be **TP131.HEX** or later to be compatible with this software. All TouchProbes sold by Videx since March 5, 1999 have compatible operating system software. If the TouchProbe has an older operating system, contact the Videx Customer Service department for information on updating the operating system. If your TouchProbe has the correct operating system, go on to step 8.

8. Select the modem transfer mode at the **TouchProbe Modem Communications** screen (Figure G-4). You have a choice of **TouchProbe Dials Out** or **TouchProbe Answers**.

Figure G-4 Select Modem Transfer Mode

Select **TouchProbe Dials Out** (Figure G-5) for the TouchProbe at the remote site to initiate the transfer or select **TouchProbe Answers** (Figure G-6) for the computer at the host site to initiate the transfer.

If you select **TouchProbe Dials Out** (Figure G-5), the **Phone Number** input box is activated; enter the phone number to be dialed by the TouchProbe. If there needs to be a pause in the dialing of the telephone, enter one or more commas (for example 9,,5552285).

If you select **TouchProbe Answers** (Figure G-6), a text box is activated that allows entry of the number of rings (1–9) before the TouchProbe answers the telephone (default value is 1 ring).

Figure G-5 TouchProbe Dials Out

Figure G-6 TouchProbe Answers

9. Choose **Open Settings File** from the **File** menu and open the **probecfg.cfg** file. The **probecfg.cfg** file is the default configuration settings file; it has been tested successfully with U.S. Robotic s modems.

10. With the TouchProbe still inserted in the TouchProbe Downloader Plus, click **Configure Probe**. The TouchProbe is configured with the modem control settings and with the TouchProbe Downloader Plus controls. This prepares the TouchProbe to work with the TouchProbe Downloader Plus and the modem being used at the remote site. (Note: See pages 141–148 for information on the different controls for the modem and the TouchProbe Downloader Plus.)

11. Now that the TouchProbe has been configured, it is ready to collect data.

12. To transfer the data, the equipment at the remote site and the host site needs to be connected as in Figure G-7. At the remote site, connect a TouchProbe Downloader Plus, remote modem cable (TWC-003), and a modem to the remote site telephone.

13. At the host site, connect the computer and a modem to the telephone.
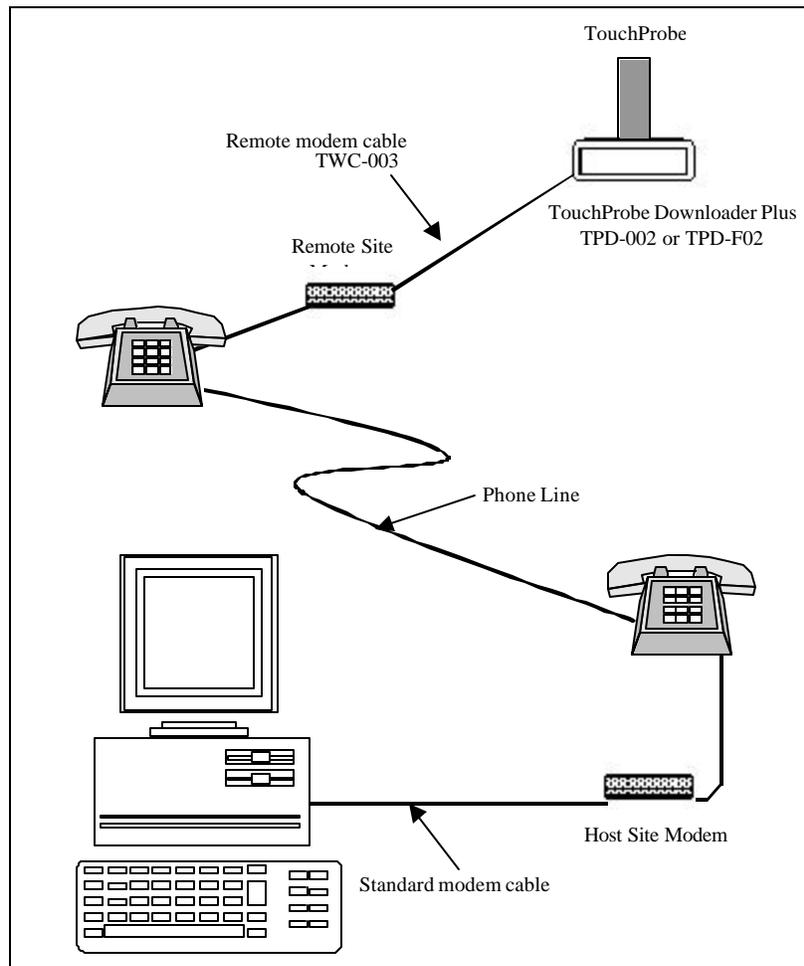
Figure G-7 TouchProbe Downloader Plus Modem Set Up

14. Determine the parameters for **TRANSFER.EXE** that will properly initialize the modem at the host site and dial it if you want the TouchProbe and TouchProbe Downloader Plus to answer. Refer to your modem's user manual for information. It is generally best to use the factory default settings, except that **echo** must be turned off.

15. Run **TRANSFER.EXE** (version 3.01 or later) on the host-site computer to transfer the data from the TouchProbe at the remote site. (Refer to Appendix E for information on the **TRANSFER.EXE** parameters and command line communication with the TouchProbe.)

If host-initiated transfer (**TouchProbe Answers**) is to be implemented, run the following from the DOS command line at the host computer (Note: Use the phone number at the remote site in place of #######):

c:> transfer -iid.txt -odata.tmd -mAT&FE0~ATDT####### -p1 - d30

For example, if the phone number at the remote site is 555-2285, enter the following at the DOS command line:

c:> transfer -iid.txt -odata.tmd -mAT&FE0~ATDT5552285 -p1 -d30

The **-m** parameter sends an initialization string to the modem at the host site and dials the telephone number (in this example, the telephone number is 555-2285).

If remote-initiated transfer (**TouchProbe Dials Out**) is to be implemented, it is necessary to put the modem at the host computer into auto-answer mode. This is accomplished by invoking **TRANSFER.EXE** with the following command line:

    c:> transfer -iid.txt –mAT&FE0S0 -odata.tmd -p1 -d30

Note that the **-m** parameter has a modem initialization string but no dial string.

Changing the TouchProbe's baud rate:

For most modems, the **TouchProbe Configuration Utility** default baud rate of 19200 will function as expected. However, if you are using an older type modem you will need to change the TouchProbe's baud rate to match the speed of the modem. The different modem speeds are 2400, 4800, 9600, and 19200 baud.

To change the TouchProbe's baud rate:

1. Choose **Set Baud Rate** from the **Settings** menu. The **Set TouchProbe Baud Rate** dialog box appears.

2. Insert the TouchProbe into a TouchProbe Downloader Plus connected to the computer's serial port.

3. Select a baud rate from the **Set TouchProbe Baud Rate** dialog box and click **Set Baud Rate** to send the new baud rate to the TouchProbe.

4. Check the **Reset Program Baud Rate** checkbox if you want the new baud rate to become the default communication baud rate for the **TouchProbe Configuration Utility**.

TouchProbe Configuration Settings Files

The **TouchProbe Configuration Utility** (**probecfg.exe**) sends configuration settings to the TouchProbe so that it can work properly with the modem and TouchProbe Downloader Plus at the remote site. The **TouchProbe Configuration Utility** includes a default configuration settings file (**probecfg.cfg**) that has been tested successfully with U.S. Robotics modems. Configuration settings are saved as configuration files with a **.cfg** extension and can be opened in any text editor (for example, Notepad).

Creating and Editing Configuration Settings Files

If the **TouchProbe Configuration Utility** configuration file (**probecfg.cfg**) does not work with your make and model of modem, you may need to edit the file to create a new one.

To create a new configuration file:

1. Begin by opening the **probecfg.cfg** configuration file; many of the modem controls are standard across a wide range of makes and models.

2. Determine whether you want host-initiated or remote-initiated communications. From the **TouchProbe Modem Communications** screen, select either the **TouchProbe Answers** (host-initiated) mode or the **TouchProbe Dials Out** (remote-initiated) mode; see Figure G-8.
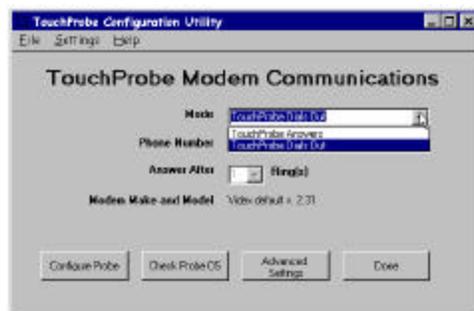
Figure G-8 Select Modem Transfer Mode

If **TouchProbe Answers** is selected, a text box is activated that allows you to enter the number of rings (1–9) before the TouchProbe answers the telephone (default value is 1 ring).

If **TouchProbe Dials Out** is selected, the **Phone Number** input box is activated; enter the phone number to be dialed by the TouchProbe. If there needs to be a pause in the dialing of the telephone, enter one or more commas (for example 9,,5552285).

3. Click **Advanced Settings;** the **Advanced TouchProbe Configuration** screen (Figure G-9) appears. This screen allows you to enter customized settings for the modem and also to enter settings to be sent to the TouchProbe Downloader Plus by the TouchProbe.
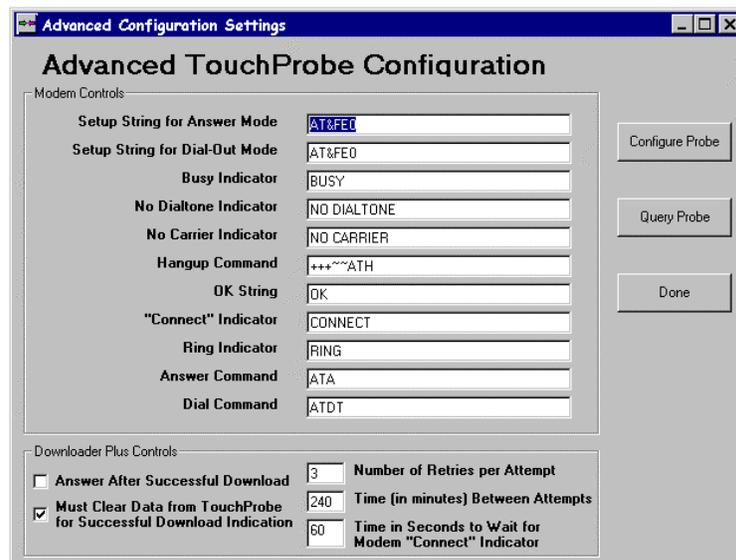
Figure G-9 Advanced TouchProbe Configuration Screen

4. After making changes to the **Advanced TouchProbe Configuration** screen, click **Done**. You will be returned to the **TouchProbe Modem Communications** main screen.

5. Choose **Save Settings to File** from the **File** menu.

6. Enter a filename and click **Save**.

7. The **TouchProbe Modem Setting** dialog box appears and asks you to enter a description of the modem and settings for this file. After entering the description, click **OK**. The description will appear on the main screen in the **Modem Make and Model** section.

Advanced TouchProbe Configuration Screen

The following sections describe the advanced modem and TouchProbe Downloader Plus controls. All of these controls can be changed by entering a string into the appropriate text window.

Advanced Settings — Modem Controls

The following modem controls need to be defined for host-initiated modem communication (**TouchProbe Answers**):

- **Setup String for Answer Mode**: The initialization string to send to the modem for host-initiated communication. The default is **AT&FE0**.

- **Ring Indicator**: The message that is sent by the modem to the TouchProbe Downloader Plus indicating an incoming call. The default is **RING**.

- **Answer Command**: The command to send to the modem to answer a ring. The default is **ATA**.

The following modem controls need to be defined for remote-initiated modem communication (**TouchProbe Dials Out**):

- **Setup String for Dial-Out Mode**: The initialization string to send to the modem for remote-initiated communication. The default is **AT&FE0**.

- **Busy Indicator**: The message that is sent by the modem to the TouchProbe Downloader Plus if it detects a busy signal. The default is **BUSY**.

- **No Dialtone Indicator**: The message that is sent by the modem to the TouchProbe Downloader Plus if it cannot detect a phone line. The default is **NO DIALTONE**.

- **Dial Command**: The string that instructs the modem to dial the phone. The default is **ATDT**.

The following modem controls need to be defined for both host-initiated (**TouchProbe Answers**) and remote-initiated communication (**TouchProbe Dials Out**):

- **No Carrier Indicator**: The message that is sent by the modem to the TouchProbe Downloader Plus if the connection is lost. The default is **NO CARRIER**.

- **Hangup Command**: The command to send to the modem to instruct it to hang up the phone. The default is **~~+++~~ATH**.

- **OK String**: The acknowledgement string sent by the modem indicating it has received and executed a command. The default is **OK**.

- **"Connect" Indicator**: The message that is sent by the modem indicating that a connection has been made. The default is **CONNECT**.

Most of these modem controls are standard across a wide variety of modem makes and models; the default values in the **TouchProbe Configuration Utility** will generally work well. The two controls that commonly need to be adjusted for different types of modems are **Setup String for Answer Mode** and **Setup String for Dial-Out Mode**. Refer to the documentation that accompanies your modem for information on these initialization strings.

To work with the TouchProbe Downloader Plus, it is generally best to use the modem's factory default settings. Best results are obtained if **echo** is turned off, and if the same make of modem is used at both the host and remote site.

Advanced Settings — TouchProbe Downloader Plus Controls

In addition to configuring the TouchProbe to work with the modem at the remote site, the **TouchProbe Configuration Utility** (**probecfg.exe**) is also used to configure the TouchProbe to send settings to the TouchProbe Downloader Plus at the remote site.

The following TouchProbe Downloader Plus controls can be set when configuring the TouchProbe:

- **Answer After Successful Download**: If this box is checked, the TouchProbe will answer the telephone, even after its data has been successfully transferred. This is true even if it is configured for normally doing remote-initiated (**TouchProbe Dials Out**) transfers. This feature can, for example, allow for after-hours reconfiguration of phone numbers or other operational parameters. The default is **OFF**.

- **Must Clear Data from TouchProbe for Successful Download Indication**: If this box is checked, the "successful download indication" (flashing green light, see page 134) is activated only if the TouchProbe data was successfully cleared after data transfer. The default is **ON**.

- **Number of Retries per Attempt**: This is the number of times that the TouchProbe will retry calling the host computer per attempt at data transfer. This control is only used for remote-initiated (**TouchProbe Dials Out**) transfer. The default is **1**.

- **Time (in minutes) Between Attempts**: This is the amount of time that the TouchProbe will wait between attempts to call the host computer. This control is only used for remote-initiated (**TouchProbe Dials Out**) transfer. The default is **240** minutes (6 hours).

- **Time (in seconds) to wait for Modem "Connect" Indicator**: This is the amount of time the TouchProbe waits for the modems to connect before hanging up the phone. This control is only used for remote-initiated (**TouchProbe Dials Out**) transfer. The default is **60** seconds.

Example: Working with US Robotics Modems

The **TouchProbe Configuration Utility** default configuration settings have been tested successfully with U.S. Robotics modems.

To use these modems:

1. Connect the TouchProbe Downloader Plus directly to the computer with a serial port cable as shown in Figure G-1 on page 131.

2. Run the **TouchProbe Configuration Utility**.

3. For host-initiated transfer, choose **TouchProbe Answers**; for remote-initiated transfer, choose **TouchProbe Dials Out** and enter the telephone number to be dialed by the TouchProbe.

4. Click **Advanced Settings** and confirm that the TouchProbe Downloader Plus controls are set as desired (see page 146).

5. Insert the TouchProbe into the TouchProbe Downloader Plus.

6. Click **Configure Probe** and wait while the TouchProbe is configured.

7. To transfer the data from the TouchProbe by modem, connect the TouchProbe, modems and computer as shown in Figure G-7 on page 138.

8. If host-initiated transfer (**TouchProbe Answers**) is to be implemented, run the following from the DOS command line at the host computer:

c:> transfer -iid.txt -odata.tmd -mAT&FE0~ATDT5552285 -p1 -d30

Where the **-m** switch is used to send an initialization string to the modem at the host site and to dial the telephone (in this example, the telephone number which is dialed is 555-2285). Refer to Appendix E for information on **TRANSFER.EXE**.

If remote-initiated transfer (**TouchProbe Dials Out**) is to be implemented, it is necessary to put the modem at the host computer into auto-answer mode. This is accomplished by invoking **TRANSFER.EXE** with the following command line:

c:> transfer -iid.txt –mAT&FE0S0=1 -odata.tmd -p1

Note that the **-m** parameter has a modem initialization string but no dial string.

Sample Batch File for Host-Initiated Downloading of Multiple TouchProbes

For host-initiated transfer of TouchProbes at multiple phone numbers from within a batch file, use the **Shift** command. The **Shift** command enables stepping through a series of parameters on the command line. Each time this command is executed, the first parameter is discarded and the second moves to first place, the third moves to second, and so on. This sample batch file demonstrates how this command can be used to transfer multiple TouchProbes. The calling syntax is:

c:> xfermany data.tmd FE0 5550521 5550522 5550533 <etc. up to 128 chars>

The batch file is as follows:

```
@echo off
rem This is an example of transferring several TouchProbes
rem at different phone numbers with a single batch file.
rem Syntax: xfermany <outfile> <setup> <phone#1> <phone#2> <etc.
rem  up to 128 chars>
if "%1"="" goto help
~~OUT=%1
if "%2"="" goto help
~~MSET=%2
:loop
shift
if "%2"="" goto quit
transfer -iids.txt -o%~~OUT% -mAT%~~MSET%~%2
goto loop
:help
echo . Syntax: xfermany <outfile> <setup> <phone#1> <phone#2>
<etc. up to 128 chars>
echo . No AT on setup; No ATDT on phone #'s
:quit
~~OUT=
~~MSET=
```

NOTES:

Appendix H

Troubleshooting Tips

If you have problems with your TouchProbe, try the following troubleshooting tips. If you continue to have problems, contact Videx Customer Service by phone at 541-758-0521, by fax at 541-752-5285, or by e-mail at support@videx.com.

I can't download data from my TouchProbe.

This is one of the most common problems reported by customers, and can be due to a variety of reasons. To narrow down the possible causes, observe whether there is activity on the Receive and Transmit LEDs on the downloader when you attempt to communicate with the TouchProbe.

I can't download data from my TouchProbe, and I see the Receive and Transmit LEDs flash when I try to communicate.

1. Verify that the serial cable, PC and base station are properly connected and that the connections are secure (refer to Figure 1-2 on page 10).
2. Be sure that you are either using a serial port cable purchased from Videx (part number TWC-008 or TWC-001), or else a serial port cable using the correct pinouts. Other serial port cables may not allow proper communication.
3. Do not use a serial port adaptor. Some adaptors will interfere with proper communication with the TouchProbe.
4. Be sure that you are using the correct ID within the software. Try using an ID of ten zeroes ("0000000000"); this ID will unlock and enable communication with any TouchProbe (provided that no other factors are interfering with communication).
5. Be sure that you are using the correct baud rate. When TouchProbes are sold or serviced by Videx, they are configured to communicate at 19200 baud. The baud rate can be changed from the Settings-Communications screen within Touch.exe (see page 27), or via   the -b switch when using Transfer.exe (see page 93). Refer to

page 153 for information on re-configuring the TouchProbe itself to communicate at a different baud rate.

6. If the TouchProbe read head is extremely dirty, that can interfere with communication. Try wiping it with a cloth, and use a q-tip or similar item to clean within the outer rim.

7. Be sure that the center pin (with a 3-sided brass-colored head) has not been removed from the socket within the downloader well.

I can't download data from my TouchProbe, and I don't see any activity on the Receive and Transmit LEDs on the Downloader.

1. Verify that you are attempting to use the correct com port number when communicating with the TouchProbe. The com port setting can be changed through the Settings-Communications screen within Touch.exe (see page 27), or via the -p switch when using Transfer.exe (see page 95).

2. Verify that the serial cable, PC and base station are properly connected and that the connections are secure (refer to Figure 1-2 on page 10).

3. Windows computers often load drivers and other software which interfere with serial communication. If you think that there might be a software conflict with the serial port, try the following:

    a) If another DOS window is open on the Windows task bar, close all windows, and then re-open the TouchProbe communication software.

    b) If you have installed a Palm or other PDA on the com port, you will need to disable it. (For a Palm, right click on the HotSync icon in the system tray, and remove the check in front of "Local".)

    c) If you have installed other devices or software which use the serial port, uninstall them via the Windows control panel.

    d) Try re-booting the computer; sometimes simply re-booting will solve a serial communication problem.

    e) Boot the computer from a DOS floppy and attempt to communicate with the TouchProbe. If you can communicate with the TouchProbe after booting from a DOS floppy, but not after booting to Windows, then Windows is installing software, which is interfering with serial communications.

*Note: If you continue to have difficulty downloading the TouchProbe,
and the TouchProbe has critical data in it, call Videx Customer Service
at 541-758-0521.*

How can I configure the TouchProbe to communicate at a different baud rate?

When TouchProbes are sold or serviced by Videx, they are configured to communicate at a baud rate of 19200. It is possible to configure the TouchProbe to communicate at other baud rates: 300, 600, 1200, 2400, 4800 and 9600. One way to change this configuration is via the TouchProbe Configuration Utility, which is provided with the TouchProbe Downloader Plus (used for modem downloading of TouchProbes, see Appendix G).

It is also possible to change the TouchProbe's baud rate by running transfer.exe from the DOS command line. To do this, run transfer.exe as described in Appendix E, but modify the ID file (for example, probes.txt in the command line example on page 96) to contain:

0000000000,Rn

where the value of n sets the new TouchProbe baud rate as follows:

n	Baud rate
0	300
1	600
2	1200
3	2400
4	4800
5	9600
6	19200

The TouchProbe's data will be downloaded, and the TouchProbe's baud rate will be set as specified by the n parameter. However, transfer.exe will then "lock up"; press the escape key to stop it from running.

Note that to communicate with the TouchProbe at a rate other than 19200, you must specify the baud rate using the -b switch (refer to page 93).

Appendix I

Error Codes

Error codes returned by transfer.exe and written to a status file (-s switch):

00   Transfer successful, no errors.

01   Time error: No prompt received after sending time set command.

02   Config error: No prompt received after sending configuration or load text command.

03   Retry error: Packet retried 8 times without successful transfer of consistent data and CRC.

04   Binary file open error: Binary file (usually temporary) image of TouchProbe memory could not be opened for translation. Possibly caused by hardware issues, but more likely because a file was requested that does not exist. Wrong name for instance.

05   Binary file not valid: Data in binary file is not consistent with required format (not a binary file).

06   Invalid record type: The record-type byte in a data record is not a number that has been defined.

07   No end record: The end of the file occurred without finding a valid "End" record.

09   Invalid ID record: An ID record encountered among the data records. Only one ID record is allowed, and it must be at the beginning of the data set.

10	Invalid record size: A button record header smaller than the required 9 bytes was encountered.
11	Binary file read error: An error reading the binary file occurred during translation. It is possible that the error occurred when the computer wrote the file (corruption or not complete).
12	Output write error: An error writing to the ASCII data file occurred during translation.
13	Error clearing data from probe: Failure to wake TouchProbe to clear data or to get a response to the clear command.

Error codes returned by transfer.exe and written to transfer.err:

0	Operation was successful
2	User cancelled the operation
3	One of the parameters is incorrect
4	Communications have timed out
5	Probe's ID is not in the list of IDs
6	Error opening serial port
7	Did not get expected response from modem
8	Error reading from or writing to a file
10	Ran out of memory

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