TimeWand® II
Communications & Application Builder™

For DOS Computers

GCO# 855

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Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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.

If this equipment has an FCC ID number affixed to the equipment, then the unit meets the limits for a U.S. Federal Communications Commission Class B computing device and the following information applies.

FCC Notice: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by disconnecting and reconnecting the equipment, the user is encouraged to try to correct the interference by one or more of the following measures.
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.

Table of Contents

Overview

Welcome to the TimeWand II Communications & Application Builder Software for DOS. With this software you can communicate between a TimeWand II and a computer, and you can design application programs specific to your data collection needs.

TimeWand II Communications & Application Builder Software for DOS consists of this manual and one disk.

This manual contains four chapters and ten appendixes.

Chapter 1 is an introduction to TimeWand II and includes quick start sections on using a TimeWand II with the software.

Chapter 2 is an overview of the TimeWand II Communications & Application Builder Software for DOS. It includes descriptions of the software's screens, menu commands, buttons, and so on.

Chapter 3 contains information on building applications and includes stepping you through building a sample security application.

Chapter 4 contains additional information on the TimeWand II bar code reader and bar codes.

The appendixes contain:

- a list of bar code vendors and programs
- diagrams of the Recharger/Downloader cable pin-outs
- information on the TimeWand II Raw Scan File format
- information on 2TRNSFER.EXE and TW2OS303.SYM
- information on CONVERT2.EXE
- TimeWand II modem diagram
- information on Automatic Recharge Management for the TimeWand II batteries
- TimeWand II NiCad battery notes
- the TimeWand II specifications
- and sample application bar codes

Chapter 1

Getting Started

Introduction to TimeWand II Communications & Application Builder for DOS

Welcome to the TimeWand II Communications & Application Builder Software for DOS computers. This software program allows you to use a TimeWand® II with a DOS computer.

TimeWand II Communications & Application Builder Software is used to build TimeWand II applications and to program TimeWand IIs for reading and storing bar codes. This software transfers the bar code data to the computer from the TimeWand II and saves the data as a text file on the computer's hard disk.

This software allows you to design the format of the bar code data file so that the data can be imported into various database programs.

Equipment Needed

You need the following equipment and software to operate the TimeWand II Communications & Application Builder Software for DOS computers:

- DOS compatible computer with a minimum of 640K RAM and a hard disk
- MS/PC DOS (Version 2.0 or greater)
- TimeWand II (with 64K, 128K, or 320K memory)
- TimeWand II Recharger/Downloader Station (single or multiple unit)
- Serial Port Cable Assembly (either 25-pin (TWC-001) or 9-pin (TWC-008) — connects computer to TimeWand II Recharger/Downloader Station)
- TimeWand II Communications & Application Builder Software for DOS (1 disk)
- Application software (such as a database or spreadsheet)

Introduction to TimeWand II

TimeWand II opens a vast new range of applications to your computer system. Before describing the TimeWand II Communications & Application Builder software, we want to acquaint you with the TimeWand II. The TimeWand II combines durability and programmability in a versatile and powerful data collector.

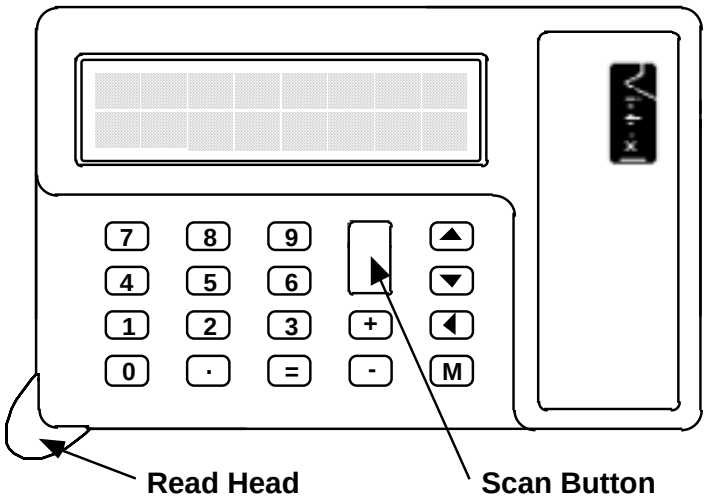


Figure 1-1 TimeWand II

The TimeWand II features include:

- 32-character display
- Cast-metal case
- Protected read head
- Display scrolling capability
- Built-in serial port
- Alphanumeric keypad
- Near-visible, visible, or infrared optics
- Scans all popular bar code symbologies
- Replaceable nickel-cadmium (NiCad) battery pack
- Time-limited battery recharging
- 64K, 128K, or 320K memory

TimeWand II is extremely portable: it measures a compact 4.1 x 2.6 x 0.6 inches and weighs only six ounces. It records both the bar code information and the date and time each bar code is scanned.

The TimeWand II has a serial port (Figure 1-2) at the opposite corner from the read head. A TimeWand II communicates with the computer and is also recharged through its serial port.

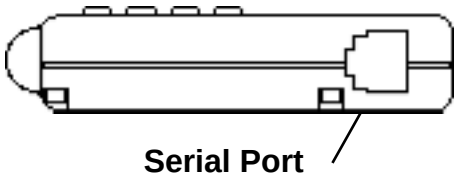


Figure 1-2 TimeWand II Serial Port

To communicate with a computer, the TimeWand II's serial port is plugged into a Recharger/Downloader Station connected to the computer's serial port. The TimeWand II software can then send programs to the wand or transfer the collected data from the wand.

The TimeWand II serial port also allows you to connect the TimeWand II's optional LED scan light or TouchLink™ Button reader to a TimeWand II. The TouchLink Button reader reads Touch Memory buttons.

TimeWand II has a 19-button alphanumeric keypad (Figure 1-3). The largest and most commonly used key on the keypad is the scan button.

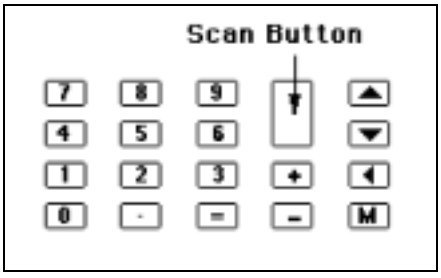


Figure 1-3 TimeWand II Keypad

Scanning a bar code with a TimeWand II requires pressing the scan button while sweeping the read head across a bar code. After a successful scan, the TimeWand II beeps and the characters represented by the bar code appear on the display.

Before you can scan a bar code with a TimeWand II, there are three things you must do to the unit:

1. Install the battery pack.
2. Reset the TimeWand II.
3. Program the TimeWand II.

The following sections describe how to:

- Install the TimeWand II battery pack
- Connect the Recharger/Downloader Station to the computer
- Install the TimeWand II Communications & Application Builder for DOS software to the computer's hard disk
- Reset the TimeWand II
- Program the TimeWand II
- Scan bar codes
- Transfer the bar code data to the computer
- View the data file
- Recharge the TimeWand II

This chapter also contains instructions on:
• entering alpha characters,
• additional information on using the keypad,
• and instructions on resetting a programmed TimeWand II.

Note: This chapter will typically show only one method of performing a task. Complete information on performing these same tasks and others, including complete information on the screens and menu commands, is provided in Chapter 2.

Help screens are also included. To open a Help screen, press the <F1> key. To close the Help screen, press the <Esc> key.

The next section steps you through installing the battery pack.

Installing TimeWand II Battery Pack

To provide you with optimum battery performance, the TimeWand II battery pack is packaged separately.

Replacement battery packs for TimeWand IIs are available (Videx Part # TWB-000). Please note the following caution when replacing a TimeWand II battery pack.

Warning!

Removing the battery pack from a TimeWand II clears the program and the data from the wand. It is important to transfer any needed data from a TimeWand II before removing the battery pack.

The following steps direct you on installing the battery pack. Please read steps 1–4 before installing the battery pack.

1. Remove the battery pack and the screw from the package. (Note: Do not allow any metal or conductive object to come in contact with the exposed battery surfaces.)

2. Notice the tab on the battery pack. See Figure 1-4. This tab must slide in under the back case of the TimeWand II for the battery pack to fit properly.

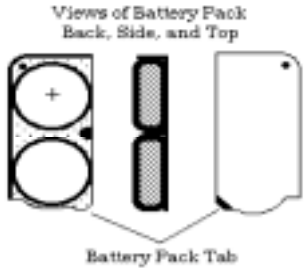


Figure 1-4 TimeWand II Battery Pack

3. To insert the battery pack, press the battery pack down onto the exposed springs on the back of the TimeWand II. (You should hear three beeps.) Slide the battery pack tab under the TimeWand II back cover.

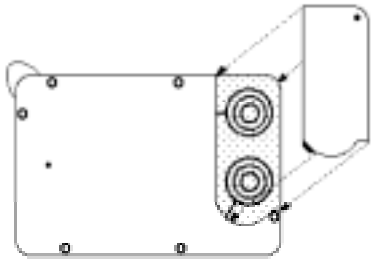


Figure 1-5 Inserting TimeWand II Battery Pack

4. Hold the battery pack in place and insert the screw into the corner hole. Tighten the screw snugly, but not too tight.

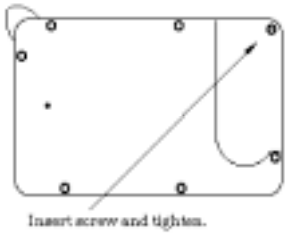


Figure 1-6 Tighten Corner Screw

Warning!

After the batteries are installed, and before the TimeWand II is programmed, it is in Monitor Mode. If the wand is left out of the recharger/downloader for more than five hours, while in Monitor Mode, the batteries will fully discharge and may become damaged. It is important to place the TimeWand II in the recharger/downloader while it is in Monitor Mode

TimeWand II Recharger/Downloader Stations

The TimeWand II Recharger/Downloader Station serves two functions:
1) recharging the TimeWand II's NiCad batteries, and
2) allowing the TimeWand II to communicate with the computer.

Videx provides two Recharger/Downloader Stations for the TimeWand II: a single unit and a multiple unit. The multiple unit holds up to four TimeWand IIs. For larger applications, two or more multiple Recharger/Downloader Stations may be connected in series to one computer (see page 136 for more information).

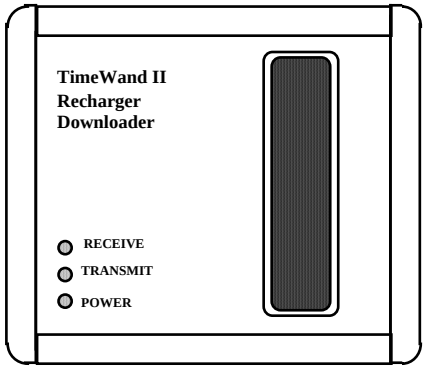


Figure 1-7 Single Recharger/Downloader Station - Top View

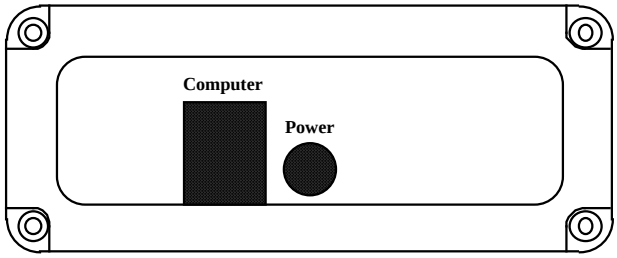


Figure 1-8 Single Recharger/Downloader Station - Side View

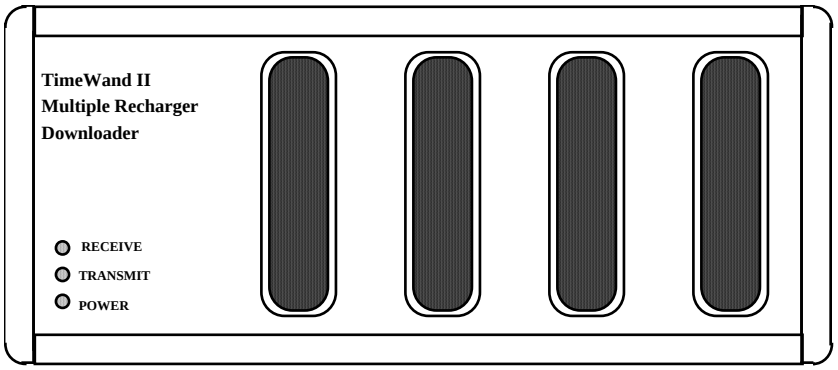


Figure 1-9 Multiple Recharger/Downloader Station - Top View

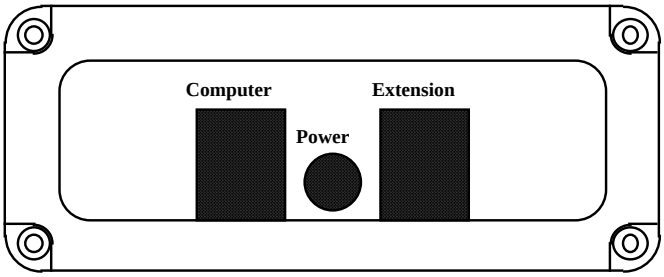


Figure 1-10 Multiple Recharger/Downloader Station - Side View

Each Recharger/Downloader Station (also referred to as a recharger/downloader) has a **Power** light, a **Transmit** light, and a **Receive** light. When the **Power** light is on, it indicates that the power connection to the recharger/downloader is good. The **Transmit** and **Receive** lights blink alternately during TimeWand II programming and data transfer. The **Receive** light blinks when the computer signals the recharger/downloader and the **Transmit** light blinks when the TimeWand II signals the recharger/downloader.

Connecting the Recharger/Downloader Station to Your Computer

The following steps describe how to connect a TimeWand II Recharger/Downloader Station to the computer's serial port for communication between the wand and a computer. Shut down your computer before connecting the Recharger/ Downloader Station to the serial port.

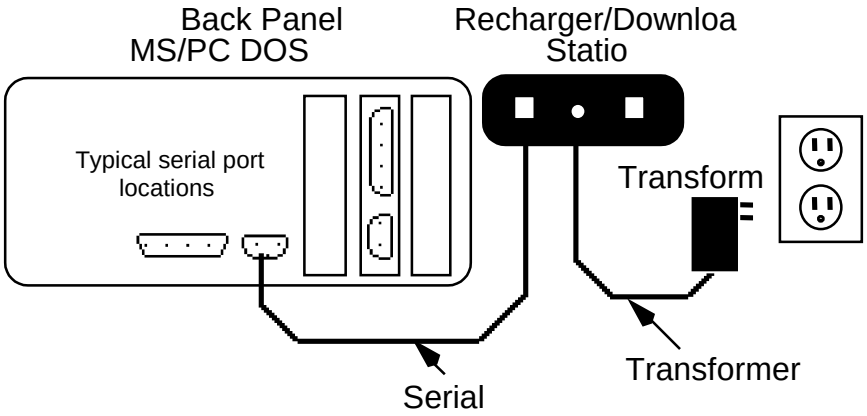


Figure 1-11 Recharger/Downloader Station Connections

1. Shut down the computer.

2. Plug the Recharger/Downloader Station transformer plug (Output: 12 VDC 300 mA) into an electric outlet.

3. Insert the other end of the transformer cable into the center socket marked "Power" on the back of the Recharger/Downloader Station. See Figure 1-11.

4. Check that the **Power** light on the Recharger/Downloader Station is lit.

5. Connect the serial port connector of the serial port cable to your computer's com port. (Note: The computer's com ports are always a male connector.)

6. Connect the RJ-11 plug of the serial port cable (TWC-001 or TWC-008) to the “Computer” port of the Recharger/ Downloader Station. (Note: The “Extension” port on a multiple unit is used to connect more than one recharger/ downloader to a computer serial port. See page 136 for more information.)

7. Restart the computer.

Warning!

Do not connect the TimeWand II or Recharger/Downloader Station to a telephone line. This could damage the TimeWand II.

Installing TimeWand II Communications & Application Builder for DOS Software

Before using the TimeWand II software, it must be installed onto the computer's hard drive.

We recommend that you make a backup copy of the TimeWand II Communications & Application Builder for DOS software disk and place the original disk in a safe storage place.

The symbol **C>** used in the following example represents the DOS prompt. The symbol **<Enter>** represents pressing the computer's Enter key. The symbol **<space>** represents pressing the computer's space bar. The symbol **<Esc>** represents pressing the computer's Esc or Escape key.

1. Insert the back-up copy of TimeWand II Communications & Application Builder software disk into your 3½" disk drive.

2. Go to a DOS prompt for the disk drive that contains the TimeWand II Install disk. For example, to go to the A drive DOS prompt (A:>), type the following:

   a: <Enter>

   Your screen should now look like this:

   A:\>

3. To install the software, type INSTALL followed by a directory path and name at the DOS prompt. This is the directory where the software will be installed. For example, to install the software to a directory named **TW2** on the C drive you would type the following:

   INSTALL C:\TW2

   The DOS command line should look like this:

   A:\> INSTALL C:\TW2

4. Press <Enter>. If the directory does not exist, it will be created by the install program and the TimeWand II Communications & Application Builder software will be installed in the directory.

   Note: If the directory exists and contains an older version of the TimeWand II Communications & Application Builder software, the install program will upgrade the appropriate files.

5. Remove the back-up copy of TimeWand II Communications & Application Builder software disk from the 3½" drive.

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 as follows.

```
Files = 20
Buffers = 8
```

These are the 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 and type the following at the DOS prompt:

cd <Enter>

Then type the following at the next DOS prompt:

type config.sys <Enter>

Your screen should look like this:

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

The **config.sys** file's contents are displayed on the screen. If it does not contain the files and buffers statements, you may add them using a text editor, or use the **fixconf** batch file we provide by typing the following at the DOS prompt:

cd\TW2 <Enter>

Then at the next DOS prompt type:

fixconf <Enter>

Your screen should look like this:

```
C>cd\TW2
C>fixconf
```

7. After completing Step 6 you need to reboot your computer. To reboot your computer, turn it off and then back on.

This example uses “TW2” for the directory name. You may use any name you choose by substituting your preferred name for “TW2” in the previous steps.

TimeWand II Communications & Application Builder Set Up

The following steps describe how to use the TimeWand II Communications & Application Builder software to set up your computer and TimeWand II. The Recharger/Downloader Station should be connected to the computer’s serial port. If it is not, see page 16 for instructions on connecting the Recharger/Downloader Station to the computer.

8. To run TimeWand II Communications & Application Builder, type the following at the DOS prompt:

   cd\TW2

9. To enter the Main Menu screen, type the following at the DOS prompt:

   TW2.exe <Enter>

10. A screen appears on your monitor displaying “Checking computer system environment. One moment please.” This is followed by the TimeWand II Communications & Application Builder Main Menu screen. See Figure 1-12.

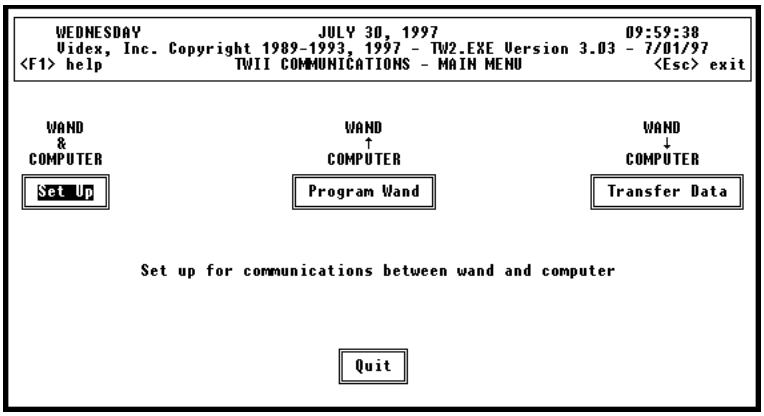


Figure 1-12 Main Menu Screen

The Main Menu screen consists of four choices: Set Up, Program Wand, Transfer Data, and Quit. Any of the arrow keys will move the cursor through the choices on the Main Menu screen, or you may type the first letter of your choice to access the screen.

11. To enter the Set Up screen, highlight the Set Up choice and press <Enter> or type an **S**. This takes you to the Wand Set Up screen. See Figure 1-13.

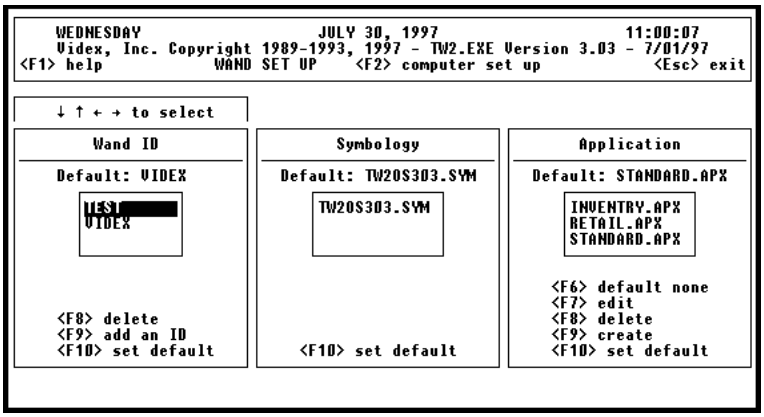


Figure 1-13 Wand Set Up Screen

The Wand Set Up screen has the following defaults: Wand ID = VIDEX, Symbology = TW2OS303.SYM, and Application = STANDARD.APX. We will use these defaults for now. Changing the defaults is discussed in Chapter 3.

12. Press <F2> to take you to the Computer Set Up screen. See Figure 1-14.

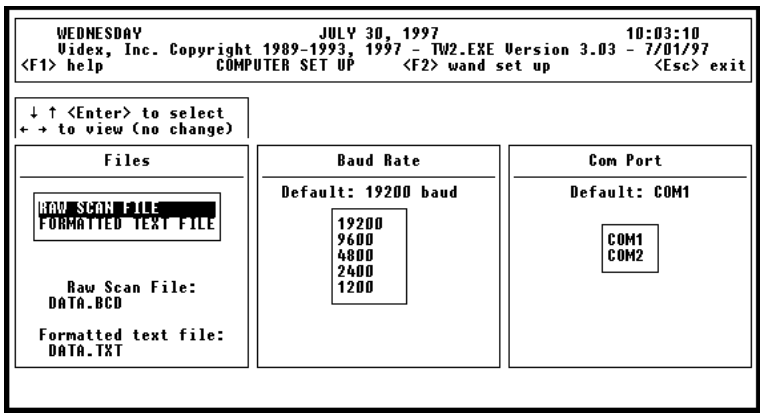


Figure 1-14 Computer Set Up Screen

The Computer Set Up screen has the following defaults: Raw Scan File = DATA.BCD, Formatted Text File = DATA.TXT, Baud Rate = 19200 baud, and Com Port = COM1. (“Com port” or “com” is the abbreviated term for communication port or serial port.) We will use the preceding defaults for now. However, if you need to use COM2 instead of COM1 for communicating with the TimeWand II, press the right arrow key until the Com Port window is selected. Press the down arrow key to select COM2, then press <Enter>. This selects COM2 as the default com port.

13. Press <Esc> to exit the Set Up screens and return to the Main Menu screen. Next, we will program the TimeWand II.

Programming the TimeWand II

Before using the TimeWand II for the first time, it must be programmed.

Programming the TimeWand II is transferring the information that the wand needs to operate properly from the computer to the TimeWand II. This information includes the wand ID, the symbology program, and the application that controls the prompts and the sequence of the bar codes.

Programming the TimeWand II involves two steps: initializing and loading an application. Initializing the TimeWand II involves resetting the TimeWand II and loading it with the symbology file and a wand ID.

The following procedures describe how to program a TimeWand II:

14. At the Main Menu screen, press the right arrow key to select Program Wand. Press <Enter> to take you to the Program Wand screen. See Figure 1-15.

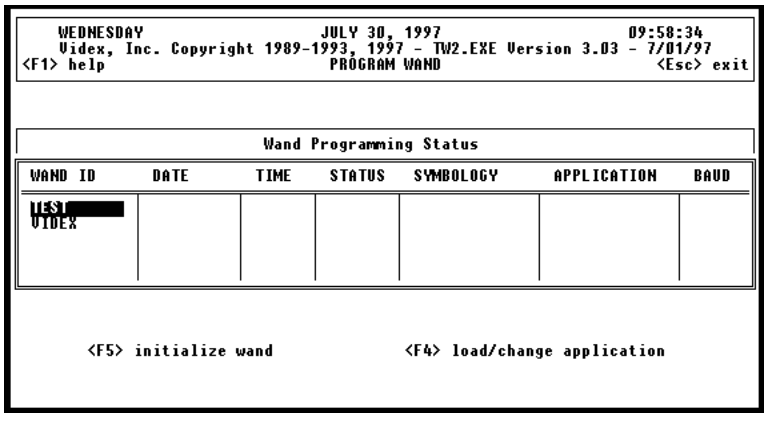


Figure 1-15 Program Wand Screen

15. Press <F5> to initialize the TimeWand II. The default settings to be transferred to the TimeWand II are displayed. Press <F5> again.

16. The screen displays “Reset your TimeWand II and plug it in.”

Resetting a TimeWand II

17. Reset the TimeWand II. DO NOT PRESS ANY KEYS ON THE TIMEWAND II AFTER RESETTING THE WAND. If you inadvertently press a key, reset the wand again.

A wand must be reset before it can be programmed. To reset a TimeWand II, use the reset hole located on the back case (Figure 1-16).

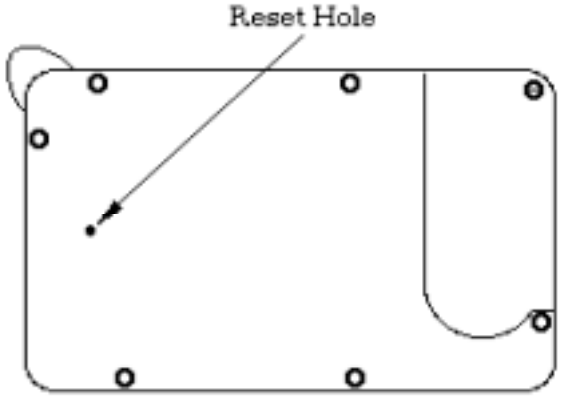


Figure 1-16 TimeWand II Reset Hole

To reset an unprogrammed TimeWand II, gently insert the end of a straightened paper clip into the reset hole. Press until you feel and hear the click of the small dome switch located beneath the reset hole; you will hear three beeps. The three beeps signify a reset, meaning the memory is cleared and the TimeWand II is ready to be programmed. If you do not hear three beeps, your TimeWand II battery pack may not have a charge. If this happens, place the wand into the Recharger/Downloader Station for at least an hour, and then try again to reset it.

If the battery pack is charged, the display reads as follows:

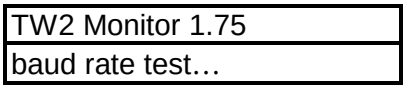


Figure 1-17 TimeWand II Display - Reset

Do not press any of the wand's keys while its display shows **baud rate test...**; doing so causes the wand's baud rate to be set to 9600. If this happens, reset the wand again before you program it.

18. Insert a reset TimeWand II into the Recharger/Downloader Station. Press any key on the computer keyboard to start initialization.

19. The TimeWand II display reads "loading..." while it is being initialized. The TimeWand II beeps after it has completed loading the symbology file. It then begins loading the STANDARD.APX default application. When it is finished, the TimeWand II display flashes "STANDARD.APX loaded" followed by the charge status.

20. A box on the computer screen displays, "The wand has been programmed. Press any key to continue." Press any key on your computer keyboard to return to the Program Wand screen.

21. Press <Esc> to return to the Main Menu screen.

22. Remove the TimeWand II from the recharger/downloader.

Scanning With the TimeWand II

23. Press the scan button on the TimeWand II. The display now reads “SCAN ANY BARCODE.”

To scan a bar code, press and hold the scan button while lightly passing the read head across the bar code. The read head must contact the bar code. If the scan is successful, the characters represented by the bar code appear on the display and you hear an audible beep.

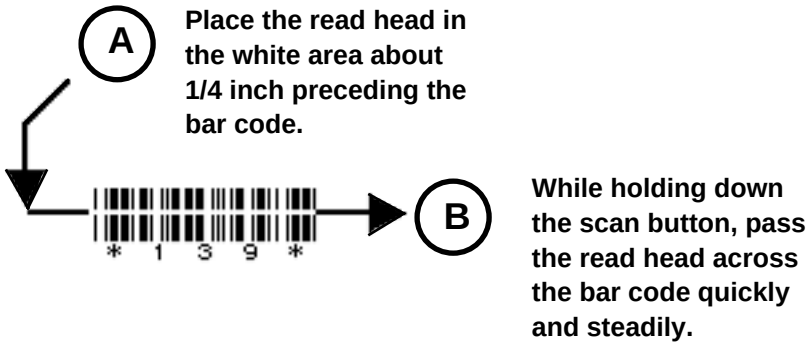


Figure 1-18 Scanning a Bar Code

Start your scan in the white area in front of the bar code. This area is the “quiet zone” and allows the TimeWand II to correctly recognize the first bars of the bar code. When scanning a bar code, use a quick motion. You cannot scan too fast for a TimeWand II, but it is possible to scan too slowly. Use about the same speed that you use to strike a match. Experiment to find the speed and angle that works best for you. Release the scan button between scans to preserve the battery charge.

TimeWand II is a contact bar code reader; this means that the read head must contact the bar code during the scan. However, the TimeWand II need only contact the bar code; there is no need to apply pressure. The contact should be only enough for the read head to pass lightly across the bar code.

Scanning Key Points

- Hold wand perpendicular to bar code.
- Begin scan in white area preceding bar code.
- Read head must contact bar code.
- Keep scan button pressed during scan.
- Use a quick scanning motion, similar to striking a match.
- Use a light scanning pressure.
- Release scan button between scans.

24. Scan some of the following Code 3 of 9 bar codes by pressing the scan button and lightly sweeping the read head across the bar codes. Be sure to start the scan in the white space preceding the bar code and end the scan in the white space following the bar code. If the scan is successful you hear a beep; the display shows “SCAN ANY BARCODE” on the top line and what was scanned on the bottom line. If the scan is unsuccessful, you hear a short chirp and the display reads “PLEASE SCAN AGAIN.”

Figure 1-19 Sample Bar Codes

25. After scanning the bar codes, use the up and down arrow keys on the TimeWand II to view the scanned data.

Transferring Data From the TimeWand II

26. At the Main Menu screen, press the right arrow key until Transfer Data is selected. Press <Enter>. This takes you to the Transfer Data screen.

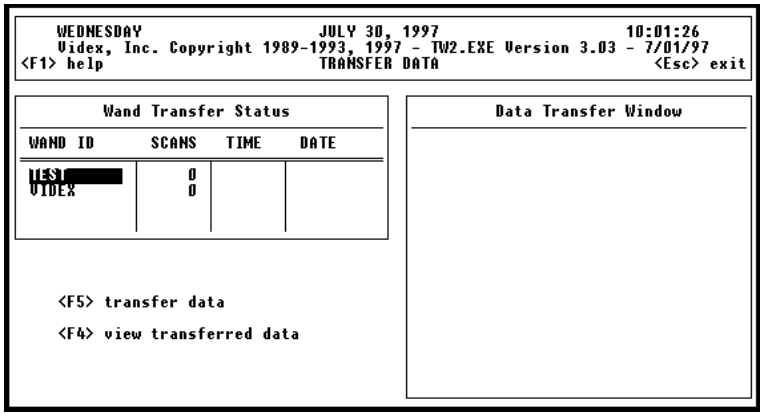


Figure 1-20 Transfer Data Screen

27. Insert your TimeWand II into the Recharger/Downloader Station. Verify that the **Power** light is lit and that the computer cable is still connected. Press the scan button. The message “Power connected” flashes on the TimeWand II display followed by the charge status message. If you do not press the scan button, the message should automatically appear within 60 seconds.

28. Press <F5> to transfer data. A screen appears that provides options for the Scan Data file and the Output File. These options are discussed in detail in Chapter 2.

29. Press <F5> again. A box displaying “Looking for Wand ID: VIDEX” appears. Once the computer completes the connection with the TimeWand II, the message changes to “Transferring Wand ID: VIDEX.” The display on the TimeWand II reads “TRANSFERRING NOW” while the bar code information is being transferred to the computer.

30. After the information has been transferred, the display on the TimeWand II reads “DOWNLOAD COMPLETE.” The TimeWand II display tells you how many scans were transferred. Another message automatically follows on the TimeWand II display that reads “WAND CLEARED ## SCANS.” The # signs represent the number of scans transferred. The computer continues to search for any other wand IDs listed in the Wand Transfer Status window. This search continues for 70 seconds, or you may press <Esc> to stop the search.

31. The scans that were transferred appear at the Data Transfer Window. It may take a couple of minutes for the scanned data to appear in the Data Transfer Window.

32. After viewing your scanned data, press <Esc> twice to return to the Main Menu screen.

33. From the Main Menu screen, you may exit the TimeWand II Communications & Application Builder software by either pressing the “Q” key or highlighting the Quit box and pressing <Enter>.

34. You have now successfully installed the battery pack, reset the wand, programmed the wand, scanned bar codes, and transferred the data from the wand.

    We recommend that you recharge the TimeWand II before using it for a task. The following section has instructions on recharging a TimeWand II.

Recharging a TimeWand II

Your TimeWand II has an internal rechargeable NiCad battery pack. A common pattern of use for a TimeWand II is 8 hours of use followed by 16 hours of recharging. A charge normally lasts for 8 hours of moderate use and may last for several days under light use. Frequent use requires that the TimeWand II be recharged daily.

To prolong the battery life, the display blanks within five seconds of non-use. To refresh the display, press the scan button.

The TimeWand II software has a charge management feature that automatically controls the recharge cycle; this allows the batteries to recharge as quickly as possible without overcharging.

To recharge a programmed TimeWand II:

1. Insert the wand into the Recharger/Downloader Station.
2. Make sure the **Power** light on the recharger/downloader is lit.
3. Press the scan button; the "Power connected" message appears on the wand's display followed by the charge state.
4. Let the wand charge until the display shows 100% charge.

A TimeWand II estimates how much charge time is required by keeping track of the last time it was in the recharger/ downloader and the amount of use it's had since being removed from the recharger/downloader. You can determine the amount of battery charge left in a programmed TimeWand II and the approximate time required to bring it to a full charge by pressing the **M** and **left arrow** keys simultaneously. When a TimeWand II is placed in the recharger/downloader, the batteries are charged at a standard rate for the estimated amount of time and then the charge drops to a trickle charge to maintain full capacity without overcharging the batteries.

See Appendix G for more information on Automatic Recharge Management and Appendix H for additional information on TimeWand II batteries.

Resetting a Programmed TimeWand II

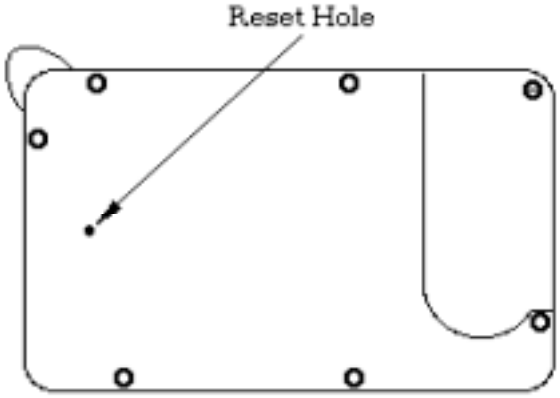


Figure 1-21 TimeWand II Reset Hole

To reset a programmed TimeWand II, press and hold the scan button while gently inserting the end of a straightened paper clip into the reset hole. Press until you feel and hear the click of the small dome switch located beneath the reset hole and remove the paper clip; release the scan button. The display should read “Please reset 0.” Now, press and release the reset switch with the paper clip, but do not hold the scan button down; you will hear three beeps. The three beeps signify a reset, meaning the memory is cleared and the TimeWand II is ready to be programmed. If you do not hear three beeps, your TimeWand II battery pack may not have a full charge. If this happens, recharge the wand for at least an hour, and then try to reset it again.

If the battery pack is charged, the display reads as follows:

TW2 Monitor #.##
baud rate test...

The # signs represent the version number of the Monitor program. The Monitor program resides in the permanent memory of a TimeWand II and allows a TimeWand II to perform its basic functions. The version number of the Monitor program may change as new versions of the software are released.

Warning!

A reset permanently clears ALL of the data and the program in a TimeWand II. DO NOT perform a reset on a programmed TimeWand II that contains necessary data. Transfer the data first, and then you may perform the reset. After a wand is reset, it must be programmed before it can be used.

Do not press any of the wand's keys while its display shows **baud rate test...**; doing so causes the wand's baud rate to default to 9600. If you do press a key on a TimeWand II while it is in this mode, the wand's display changes to:

TW2 Monitor 1.75
READY, baud=9600

Note: As you press and hold down a key on a reset wand, the hexadecimal value of the key displays on the first line of the display. For example, pressing the scan button causes the following display:

0804

If the reset wand is in the recharger/downloader when you press the scan button, the display shows the hexadecimal value of the key on the first line and the letters CHG on the second line.

If the wand does get set to a baud rate of 9600, reset the wand before you try to program it. To reset the wand, gently insert the end of a straightened paper clip into the reset hole. Press until you feel and hear the click of the small dome switch located beneath the reset hole and you hear three beeps. The TimeWand II is then ready to be programmed. A wand's display should appear as follows after the wand has been reset and before it is programmed.

TW2 Monitor 1.75
baud rate test...

The wand automatically sets its baud rate to match the baud rate of the TimeWand II Communications & Application Builder software when you program the wand.

After a TimeWand II is programmed, DO NOT reset the wand until its data has been transferred to the computer. Resetting the wand permanently clears all of the data and the program from the TimeWand II.

TimeWand II Keypad

TimeWand II has a 19-button alphanumeric keypad (Figure 1-22). The TimeWand II keypad provides additional features by pressing the following keys.

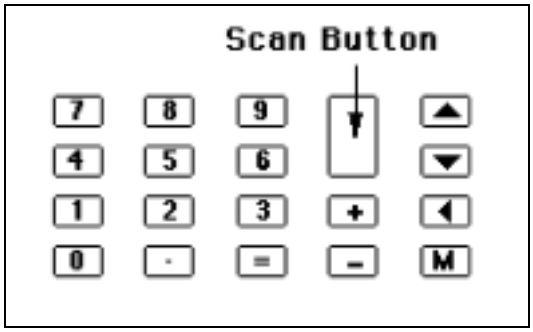


Figure 1-22 TimeWand II Keypad

Pressing the **+** key prompts you for the next field to scan and displays the current date and time.

Pressing the **-** key enters a dash (a minus sign).

Pressing the **=** key after data entry accepts keypad, scanpad, and default value entries.

Pressing the **Scan Button** refreshes the display and allows the TimeWand II to scan a bar code.

Pressing the **up arrow** key scrolls back through the data stored in the TimeWand II.

Pressing the **down arrow** key scrolls forward through the data stored in the TimeWand II.

Pressing the **backspace** (left arrow) key deletes characters entered by keypad or scanpad on the current entry, if used before the **=** key is pressed to accept the entry.

Pressing the **up arrow** and **M** keys at the same time deletes the last entry.

Pressing the **M** and **left arrow** keys at the same time shows the amount of battery charge remaining. See Appendix E for additional information.

If your application uses the NOALPHA templates (default), the alpha keys are not available, and pressing the **M** key will display the remaining memory and the wand ID. If your application uses the ALPHA templates, pressing the **M** key puts the wand into alpha mode and displays a left arrow that allows you to select alpha characters from the keypad. Subsequent presses of the **M** key display center and right arrows for alpha entry. Another press of the **M** key displays how much memory (decimal value) is left in the TimeWand II and the wand ID. See the following section for instructions on using the ALPHA and NOALPHA templates.

Using the ALPHA and NOALPHA Templates

To access the alpha characters from the keypad, you must:

1. Type ALPHA at the TW2 directory DOS prompt (this runs the ALPHA batch file).
2. Recompile the application you are using in the TimeWand II.
3. Reload the recompiled application into the wand.

The software is shipped with the NOALPHA templates selected. To change to the alpha templates, enter ALPHA at the DOS command line. This runs the ALPHA batch file, and any applications that are created or recompiled will use the ALPHA templates (allowing the alpha keys to be used).

To change back to the NOALPHA templates, enter NOALPHA at the DOS command line. This runs the NOALPHA batch file, and any applications that are created or recompiled will use the NOALPHA templates (not allowing the alpha keys to be used). Note: You must recompile an application after switching templates.

Installing the Alpha Keypad Overlay

The TimeWand II Alpha Keypad overlay displays the alpha characters and symbols that are available when the wand is in alpha mode. A TimeWand II Alpha Keypad overlay is included with your TimeWand II.

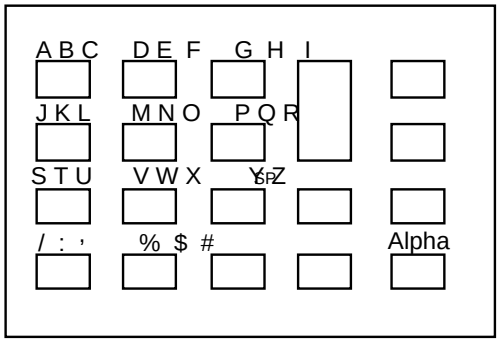


Figure 1-23 TimeWand II Alpha Keypad Overlay

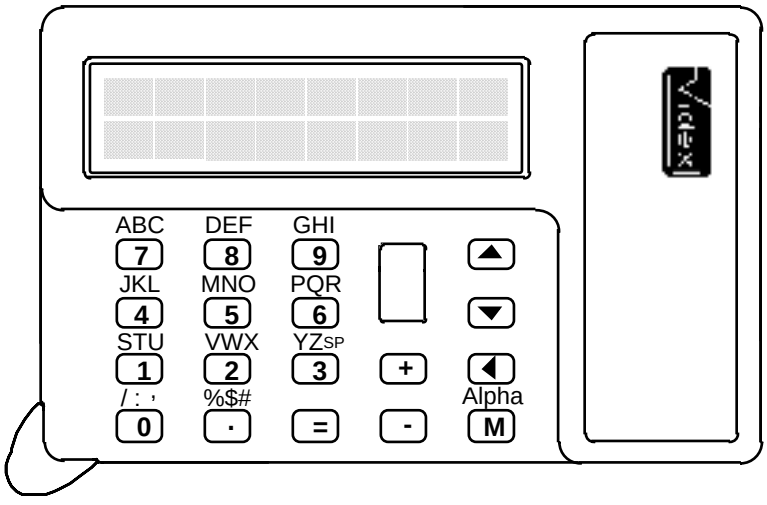


Figure 1-24 TimeWand II with Alpha Keypad Overlay

To install the overlay on the TimeWand II:

1. Be sure that the keypad surface of the TimeWand II is free of dust or dirt. You may want to use a dry cotton swab to clean between the keys. (Caution: Do not use liquid to clean the TimeWand II keypad; you may cause damage to the internal electronics.)

2. Remove one half of the overlay backing to expose the adhesive. Remove the areas on the overlay where the TimeWand II keys will be located.

3. Carefully place the exposed half of the overlay over the keys on the TimeWand II, and lightly press down along the edge of the overlay to hold it in place on the keypad.

4. Remove the other half of the overlay backing. Be sure that the key areas on this half of the overlay are also cleared.

5. Lay the overlay over the keys and press in place. (You may want to use a cotton swab or pencil eraser to press the overlay in place between the keys and to remove any air pockets between the overlay and the wand.)

Entering Alpha Characters

Before you can enter alpha characters with the keypad, you must access the ALPHA templates and recompile your application. To access the ALPHA templates:

1 Type ALPHA at the TW2 directory DOS prompt (this runs the ALPHA batch file).

2. Recompile the application by completing the following steps:

   - Highlight the application at the WAND SET UP screen.
   - Press <F7> to edit the application.
   - Press <Enter> to open the EDIT APPLICATION screen.
   - Press <F6> to recompile the application.
   - Press <Esc> to close the EDIT APPLICATION screen.

3. Load the wand with the recompiled application.

Alpha entry is controlled by the **M** key on the TimeWand II keypad. Pressing the **M** key puts the wand in alpha mode.

Press the **M** key on the TimeWand II; an arrow appears on the TimeWand II display (Figure 1-25). Each press of the **M** key cycles the arrow through three positions: left, center, and right. Press the **M** key once more; the wand returns to numeric mode and the display shows the wand ID and remaining memory. Press the **M** key once more and the alpha arrow pointing to the left is again displayed.

When the arrow is pointing to the left, a TimeWand II keypress enters the alpha character above and to the left of the key. For example, pressing the 7 key enters an A, pressing the 8 key enters a D, pressing the 9 key enters a G, and so on.

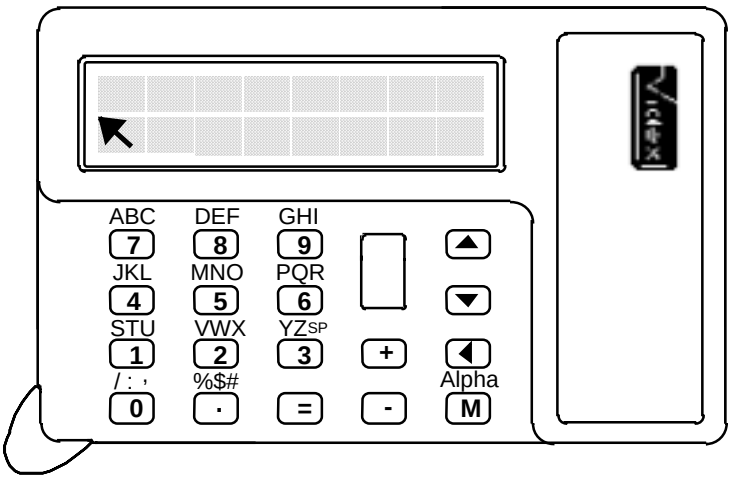


Figure 1-25 TimeWand II Display/Alpha Entry

If the arrow is pointing to the center (Figure 1-26), pressing a TimeWand II key enters the alpha character above and center of the key. For example, pressing 7 enters a B, pressing 8 enters an E, pressing 9 enters an H, and so on.

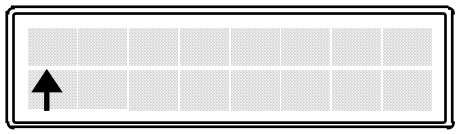


Figure 1-26 TimeWand II Display/Alpha Entry

If the arrow is pointing to the right (Figure 1-27), pressing a TimeWand II key enters the alpha character above and to the right of the key. For example, pressing 7 enters a C, pressing 8 enters an F, pressing 9 enters an I, and so on.

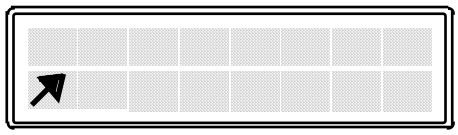


Figure 1-27 TimeWand II Display/Alpha Entry

After entering an alpha character, the wand automatically returns to numeric mode. You may also return the wand to numeric mode by pressing the scan button or the backspace or left arrow key. Pressing the **M** key returns the wand to alpha mode.

You may delete the last keyed-in characters by pressing the **left arrow** key.

To store the entered characters as a single record in the TimeWand II's memory, press the **=** key.

The **-** key on the TimeWand II keypad has no characters printed above this key, but you may use this key to enter characters when the wand is in alpha mode. The - key is set to enter a - (minus sign) in the right and left positions, and a + (plus sign) in the center position.

If you do not want the alpha feature, you can remove it by:

1. Typing NOALPHA at the TW2 directory DOS prompt (this runs the NOALPHA batch file).
2. Recompiling the application you are using in the TimeWand II.
3. Loading the recompiled application into the wand.

You can also enter data by using a bar code scanpad (Figure 1-28). The scanpad allows you to enter alpha characters whether or not your wand is in ALPHA mode.

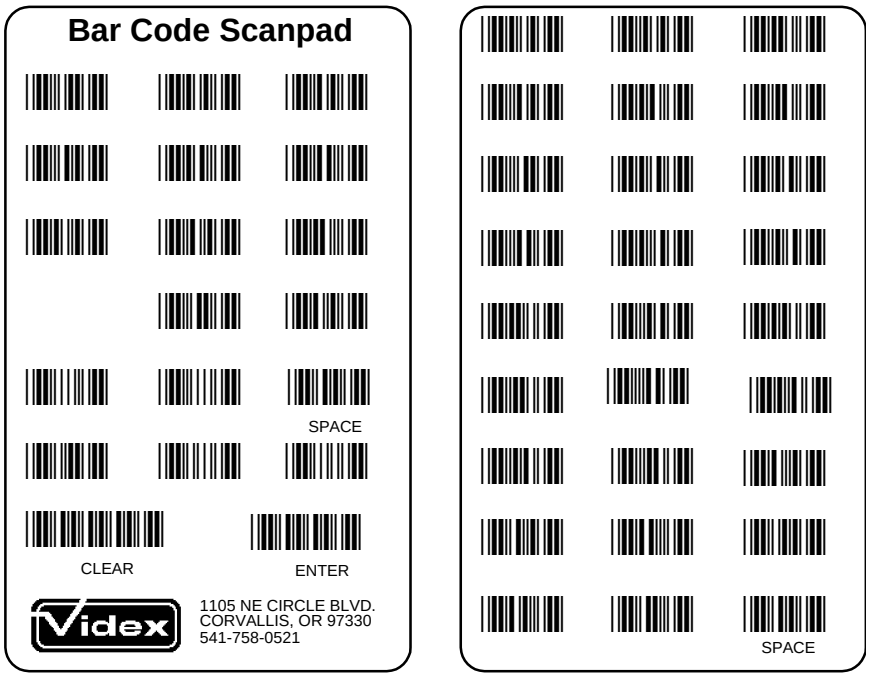


Figure 1-28 Illustration of Bar Code Scanpad

You can mix single character bar codes, like those on the scanpad, with the characters on the keypad.

For example:

Pressing the **4** key, followed by scanning  from the scanpad, followed by pressing the **2** key appears on the display as:

4A2

Press the TimeWand II's **=** key or scan **ENTER** from the scanpad to accept the entry. If you make an error, scan **CLEAR** from the scanpad to delete the entire entry, or press the **left arrow** key to correct any single-character entries made. The TimeWand II treats all one-character bar codes as if they were entered by the TimeWand II keypad.

Note: The **CLEAR** bar code on the scanpad consists of three space characters and the **ENTER** bar code consists of two space characters.

Go to Chapter 2 for detailed information on the TimeWand II Communications & Application Builder for DOS program.

Notes:

Chapter 2

TimeWand II Communications & Application Builder for DOS Reference

This chapter provides a reference on the operation of the TimeWand II Communications & Application Builder software for DOS. The basic functions of the software are explained in detail.

TimeWand II Communications & Application Builder for DOS Overview

TimeWand II Communications & Application Builder for DOS builds applications for a TimeWand II and provides communication between the TimeWand II and the computer.

The communication features allow you to program the wand and transfer the data file from the wand to the computer.

Programming the wand involves *initializing the wand* and loading it with an application.

Initializing the wand is resetting the TimeWand II, placing it in the recharger/downloader, and loading it with a *wand ID* and *operating system symbology program*.

A wand ID is a unique name or number (up to ten characters) that you assign to the TimeWand II.

The operating system symbology program is the fundamental operating system program for the TimeWand II.

After a TimeWand II is programmed, it can then scan and store bar codes. After scanning the bar codes, the wand is inserted into the recharger/downloader and the data is transferred to the computer. The data is stored in an ASCII text file. The text file is converted into a raw scan file or a formatted text file for import into application programs.

Using TimeWand II Communications & Application Builder for DOS

For instructions on installing the software onto your hard disk, refer to Chapter 1.

The main program for the TimeWand II Communications & Application Builder software is called TW2.EXE. The program is run by logging on the proper directory and typing the following at the DOS prompt:

TW2 <Enter>

Certain keys on the computer keyboard are especially important because they are used extensively throughout the software.

In general, you use the arrow keys to move the cursor and highlight the desired item, then press <Enter> to make a selection. You may also type the first letter of the item instead of using the arrow keys.

When prompted to make an entry, type the entry and press <Enter>. The <Esc> key is used throughout the software as an “escape” key; it allows you out of whatever screen you get into.

The function keys (<F1> - <F10>) are also used frequently. You are prompted as to their use. Sometimes you are prompted to press the same function key several times in order to perform a given task. It is not necessary to press <Enter> after pressing a function key.

In general, <F9> is used for create and add functions, <F8> is used for delete functions, and <F7> is used for edit functions.

The <F1> key is the help key. Pressing <F1> brings up a help screen which explains the operation of the software at that point.

When in doubt, press <F1> or <Esc>.

The software consists of six screens. Below is a diagram which shows how the screens relate to each other and how you may navigate among them:

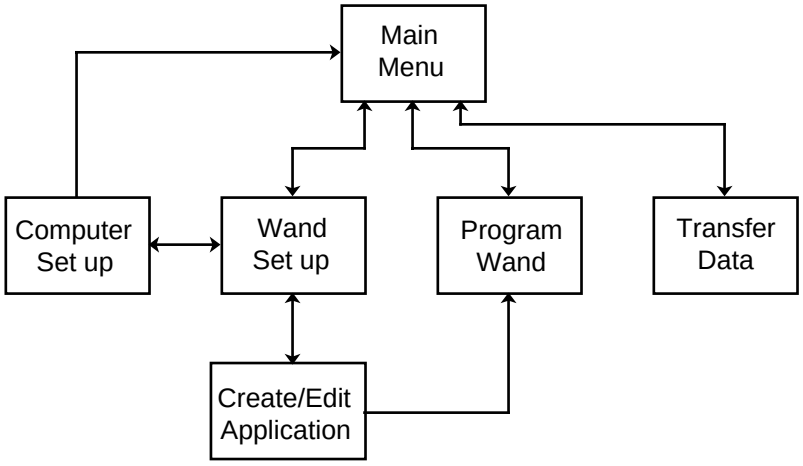


Figure 2-1 Screen Diagram

Main Menu Screen

The first screen on the software is the Main Menu screen (Figure 2-2). From the Main Menu screen, the user can access the Set Up screens, the Program Wand screen, the Transfer Data screen, or Quit the program by either highlighting the selection and pressing <Enter> or by typing the first letter of the selection.

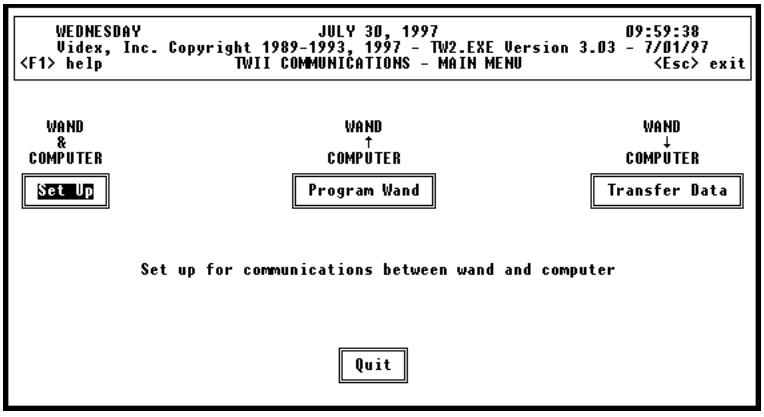


Figure 2-2 Main Menu Screen

At the top of the screen the date, time, copyright notice, version number/date, and screen title are displayed. Also a reminder of the use of the <F1> and <Esc> keys is displayed.

Set Up Screens

The Set Up screens enable you to prepare the wand and computer for communications. It enables you to create custom applications for your TimeWand II and to designate the default settings for the communications process, such as wand ID, symbology, application, baud rate, com port, and output filename/destination.

The software is shipped with the following defaults:

WAND SET UP:
- Wand ID = VIDEX
- Symbology = TW2OS303.SYM
- Application = STANDARD.APX

COMPUTER SET UP:
- Raw Scan File = DATA.BCD
- Formatted Text File = DATA.TXT
- Baud Rate = 19200
- Serial Port = COM1

The Set Up functions are accessed from two screens: the Wand Set Up screen and the Computer Set Up screen. You can toggle between the two screens with the <F2> key.

Wand Set Up Screen

The Wand Set Up screen (Figure 2-3) is divided into three windows. Use the left and right arrow keys to move the cursor through the three windows. (Note: The window's contents do not appear on the screen until the cursor is moved into the window with the arrow keys.)

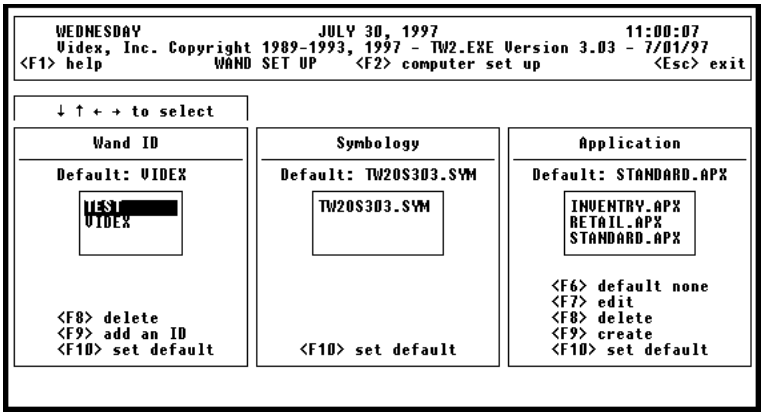


Figure 2-3 Wand Set Up Screen

Wand ID Window

The Wand ID window maintains the list of wand IDs. A wand ID is a unique name or number assigned to a TimeWand II. The ID may consist of up to ten alphanumeric characters. Alpha characters are automatically converted to uppercase. The program prevents duplicate ID entries.

Each TimeWand II must be programmed with a unique ID. Transferring data from two or more wands in a multiple recharger is impossible if any of the wand IDs are the same. You may verify a wand's ID by pressing the TimeWand II's **M** key.

The default ID is displayed at the top of the window. This ID appears as the default when programming the TimeWand II. (When programming the TimeWand II, it **is** possible to program the wand with an ID other than the default. The default ID setting is merely for your convenience in programming the TimeWand II.)

To change the default, use the arrow keys to highlight the desired ID and then press <F10>.

To add an ID, press the <F9> key. You are prompted to enter the new ID. Enter the ID and press <Enter>. The new ID is added to the list and becomes the default ID.

To delete an ID, use the arrow keys to highlight the ID and press <F8>. Deleting an ID in the Wand ID window causes the programming and transfer status information for that ID (seen under the Program Wand and Transfer Data screens) to be deleted. The default ID cannot be deleted.

Warning!

Once a TimeWand II has been deleted from the Wand ID list, you cannot download that TimeWand II to the computer unless the ID is added back to the Wand ID list.

Symbology Window

The TimeWand II must be loaded with its TW2OS303.SYM operating system symbology program before it can read the bar codes.

The different types of bar codes, such as Code 3 of 9, Interleaved 2 of 5, UPC, EAN, and Codabar, are called bar code symbologies. The TW2OS303.SYM symbology program enables a 64K, 128K, or 320K TimeWand II to automatically discriminate among Code 3 of 9, Interleaved 2 of 5, UPC, EAN, Codabar, and Code 128 bar codes.

The last three digits of the operating system symbology program filename will change as new versions are released. The current symbology program will always start with **TW2OS** and end with a **.SYM** extension.

Application Window

With an application, you can specify the prompts on the TimeWand II's display and the sequence in which bar codes are scanned. In order to do this, an application must be created on the computer, compiled on the computer, and then loaded into the TimeWand II.

The Application window on the Wand Set Up screen enables you to create new applications, edit existing applications, compile applications, and delete old applications. Completed applications, after they have been compiled, are stored in files with a .APX extension. The software is shipped with sample applications which have already been compiled.

The default application of STANDARD.APX is shown at the top of the window. To change the default, highlight the application of your choice and press <F10>. When programming the TimeWand II, it **is** possible to program the wand with an application other than the default. The default

application setting is merely for your convenience. If you wish to program a TimeWand II without an application, set the default to "None" by pressing <F6>.

To create a new application, press the <F9> key and enter the name for the application. The Create/Edit Application screen then appears. The Create/Edit Application screen and building an application are explained in detail in Chapter 3.

To delete an application, highlight the application and press the <F8> key. Deleting an application erases the files for that application from the disk. (Note: You cannot delete an application if it is the default application. You must first change the default to another application before you can delete the application.)

Warning!

Deleting an application erases all of the files for that application from the hard disk. Use the delete function with caution.

To edit an existing application, highlight the application and press the <F7> key. The Create/Edit Application screen for that application then appears.

Computer Set Up Screen

From the Wand Set Up screen, press <F2> to go to the Computer Set Up screen. The Computer Set Up screen (Figure 2-4) enables you to change the defaults for the computer's communication settings. The Computer Set Up screen is divided into three windows. Use the left and right arrow keys to move the cursor through the three windows. (Note: The window's contents do not appear on the screen until the cursor is moved into the window with the arrow keys.)

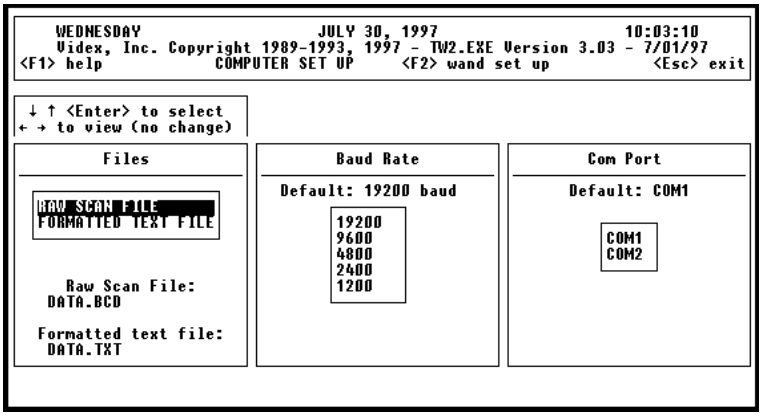


Figure 2-4 Computer Set Up Screen

Files Window

The Files window specifies the destinations and names of the ASCII text files received from the TimeWand II. The path name for these files can be up to 21 characters in length. When transferring data from the TimeWand II, you specify the format of either a "raw scan file" or a "formatted text file." The names and destinations of these data files are specified here. For more information on these data files, see the section on the Transfer Data Screen beginning on page 59.

Baud Rate Window

The Baud Rate window specifies the baud rate at which the computer and TimeWand II communicate. The software uses a default of 19200 baud. To change the default, use the arrow keys to highlight the desired baud rate and press <Enter>. Note: The TimeWand II's baud rate is set when the wand is programmed. After programming, all communication with the TimeWand II must occur at the same baud rate.

Com Port Window

The Com Port window specifies the default serial (Com) port that is used to communicate with the TimeWand II. The software uses COM1 by default. To change the default to COM2, use the arrow keys to highlight COM2 and press <Enter>. Only COM1 and COM2 are supported.

Program Wand Screen

The TimeWand II must be programmed before it can read bar codes. It is just like a computer, in that it must have a program within it to tell it what to do. The files needed to program a TimeWand II are stored on the computer's hard disk.

Programming the wand means loading the TimeWand II with the information it needs to operate properly. This information includes the wand ID, the symbology program, and the application that controls the prompts and the sequence of the bar codes.

Programming the TimeWand II involves two steps: initializing the TimeWand II and loading it with an application.

Initialization involves resetting the TimeWand II, and then loading it with a symbology file and a wand ID. Initializing a TimeWand II is like formatting a floppy disk: it must be done before the wand can store data and it only needs to be done once (unless you change the operating system symbology program). Any data stored in a programmed wand is lost if the wand is reprogrammed before the data is transferred.

A TimeWand II, once initialized, can read and store bar codes and then transfer them to the computer. The TimeWand II's only prompt is "Please scan" and the bar codes are accepted in any sequence.

Once programmed with an application, the TimeWand II displays prompts and accepts bar codes as directed by the application. For information on creating an application, refer to the Building Applications section beginning on page 75.

When programming the TimeWand II, certain defaults are available. The factory settings for these defaults are:

WAND SET UP:
- Wand ID = VIDEX
- Symbology = TW2OS303.SYM
- Application = STANDARD.APX

COMPUTER SET UP:
- Raw Scan File = DATA.BCD
- Formatted Text File = DATA.TXT
- Baud Rate = 19200
- Serial Port = COM1

These defaults can be changed in the Set Up screens.

The Program Wand screen (shown in Figure 2-5) is accessed from the Main Menu screen.

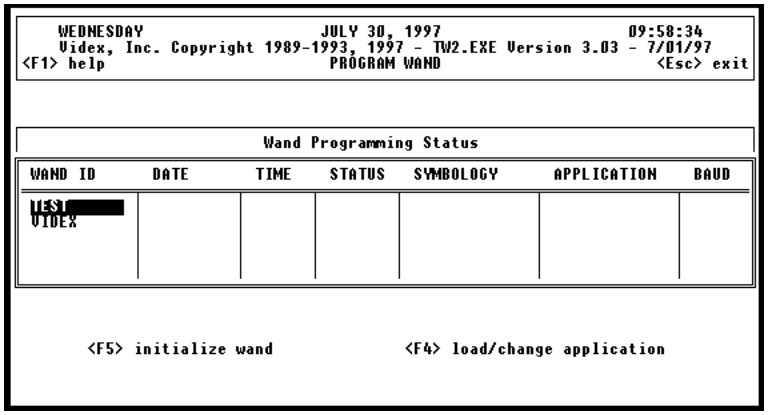


Figure 2-5 Program Wand Screen

The screen area entitled “Wand Programming Status” lists the following information for each wand ID: date and time of last programming, the status as to whether the wand was successfully programmed, and the symbology, application, and baud rate with which the wand was programmed.

Inside the “Wand Programming Status” area, there is a cursor which can be moved around with the arrow keys. It is not necessary to use the cursor to highlight the wand ID you wish to program. The cursor is there merely to give you the ability to scroll the list inside the box if the list of IDs gets too long for it to be seen at one time.

To initialize a TimeWand II, press <F5>. A box with the default settings for Wand ID, Symbology, and Application appears. These settings may be changed by highlighting one of them and pressing <Enter>. Another window with choices for that setting appears. Use the arrow keys to highlight your choice and press <Enter>. The default setting is **temporarily** changed to the setting you specify.

When you are satisfied with the communications settings, press <F5> to proceed with the initialization of the TimeWand II. You are prompted to reset the TimeWand II, insert it into the recharger/downloader, and press any key on the computer keyboard. **When initializing a TimeWand II, it is VITAL that you have only one TimeWand II inserted into the recharger/downloader at a time.** The computer tries for 20 or 30 seconds to communicate with the TimeWand II. Once communication has been established between the wand and the computer, the initialization process begins and the TimeWand II displays “Loading...”. The TimeWand II then flashes “SYM loaded” and/or “APX loaded” followed by the charge status when the initialization process is completed. After the wand is initialized, the Wand Programming Status box on the screen is updated.

The <F4> key enables you to load an application or change the application that is loaded in a previously initialized TimeWand II. When you press <F4>, a window appears warning you that any data in the wand will be lost when the application is loaded. If there is any data in the TimeWand II, transfer it to the computer before you load the new application. The ID and Application settings can be changed by highlighting the parameter and pressing <Enter>. Another window displaying choices for that parameter appears. Highlight your choice and press <Enter> to select it.

Press <F4> to proceed with the loading of the designated application. After the application is loaded, the Wand Programming Status is updated.

Transfer Data Screen

Bar code data stored in the TimeWand II is transferred to the computer through the serial port and stored in an ASCII file on the computer's hard disk.

When transferring data from the TimeWand II, certain defaults are available. The factory settings for these defaults are:

COMPUTER SET UP:
- Raw Scan File = DATA.BCD
- Formatted Text File = DATA.TXT
- Baud Rate = 19200
- Serial Port = COM1

The Raw Scan File and Formatted Text File parameters refer to the names of the ASCII text files in which the data is stored when it is transferred from the TimeWand II. These defaults can be changed in the Computer Set Up screen.

The Transfer Data screen is accessed from the Main Menu screen. The Transfer Data screen is shown in Figure 2-6.

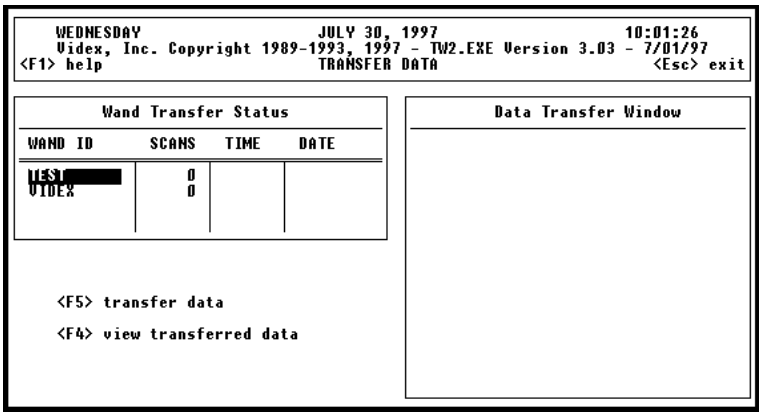


Figure 2-6 Transfer Data Screen

At the left side of the screen is a table entitled “Wand Transfer Status.” The table shows transfer information for each wand ID (the date and time of the last transfer and the number of scans transferred). There is a cursor which can be moved around inside the box using the arrow keys. It is not necessary to use the cursor to highlight the wand ID from which you wish to transfer data. The cursor is there merely to give you the ability to scroll through the list inside the box if the list gets too long for it to be seen at one time.

The box on the right side of the screen, entitled “Data Transfer Window,” displays the ASCII text file of data transferred from the TimeWand II. (The Data Transfer Window only displays the first 10K of the file). Press <F4> to see the text file that contains data from the last transfer.

To transfer data, insert the TimeWand II into the recharger/ downloader. Press the scan button to “wake up” the wand. (The wand automatically wakes up by itself within 60 seconds if you do not press a button.) After awakening, the TimeWand II display flashes “Power Connected” followed by the charge status.

Press the <F5> key, and a menu box appears at the lower-right portion of the screen. By using the arrow keys, you may move the cursor between the two menu choices: “Scan data” and “Output file.”

Highlight the “Scan data” choice and press <Enter>. By using the arrow keys, you may move the cursor between the two choices for scan data: “Append scans” and “Erase previous scans.” These choices refer to the data that was previously transferred and stored on the hard disk. When data is transferred from the wand to the computer, it is stored in an ASCII text file. (The file's name and path are specified under the Computer Set Up screen.) Subsequently, when new data is transferred, some decision must be made whether the new data should be appended onto the end of the existing text file, or whether the new data should overwrite (and erase) the existing file. Highlight your preference and press <Enter> to select it.

Highlight the “Output file” choice and press <Enter>. Using the arrow keys, you can move the cursor between the two choices: “Raw scan file” and “Formatted text file.” Selecting “Raw scan file” produces an ASCII text file with the following format:

```
H  19970905110839   00  VIDEX
19970905102552  00  C23
19970905102552  00  TW008
19970905102552  00  KC44
19970905102553  00  55
19970905102553  00  KC77
19970905102553  00  61
19970905102554  00  C28
19970905102554  00  TW016
19970905102554  00  KC55
19970905102554  00  32
19970905102555  00  KC71
19970905102555  00  110
19970905102556  00  KC7
19970905102556  00  58
T  000
```

A further explanation of the “Raw scan file” format can be found in Appendix C.

To easily import your data into application software, you may wish to select “Formatted text file.” The formatted text file arranges your data in a tabular format, which allows easier import of your data into other programs. Highlight “Formatted text file” and press <Enter>. A menu box appears allowing you to define the parameters used to format the data: delimiter, quote marks, wand ID, and date and time stamp. Highlight the parameter you wish to change and press <Enter>. Another window with choices for that parameter appears. Highlight the choice you want and press <Enter> to select it. Press <Esc> when you are satisfied with the format.

A comma-delimited formatted text file would look like this:

```
C23, TW008, KC44, 55
C23, TW008, KC77, 61
C28, TW016, KC55, 32
C28, TW016, KC71, 110
C28, TW016, KC45, 69
C28, TW016, KC7, 58
C28, TW008, KC88, 62
C28, TW008, KC45, 151
```

Press <F5> again to transfer the data from the TimeWand II. If you have specified “Erase previous scans” you receive a warning message that the file containing the previous scans will be erased. Press <F5> again to proceed with the transfer.

The program goes through the list of wand IDs, one at a time, trying to communicate with each one. When a connection with a TimeWand II is established, the program instructs the TimeWand II to transfer its data. After the transfer, the TimeWand II’s clock is set to match the computer’s clock, and the wand’s data is cleared. The computer continues to go through the list of wands for approximately 70 seconds, or until the <Esc> key is pressed, or until data has been transferred from all of the wands in the list.

Once the transfer is complete, the data is processed and stored in an ASCII text file. The first 10K of the ASCII text file is displayed in the Data Transfer Window. You may use the arrow keys to scroll through and view the data. Press the <Esc> key to leave the Data Transfer Window and return the cursor to the Wand Transfer Status box. At that time, the transfer status of the wands is updated. Press <Esc> again to return to the Main Menu screen.

The raw scan file is appended to a file called **HIST.BCD**, which is a history file of all scan data transferred from TimeWand IIs. The HIST.BCD file provides a back-up copy or history of all of the data transferred to the computer. This file needs to be managed because, in the process of appending data each time TimeWand IIs are transferred, the file can grow quite large.

The following flow chart diagram illustrates how TimeWand II Communications & Application Builder handles the TimeWand II data files during the transfer process.

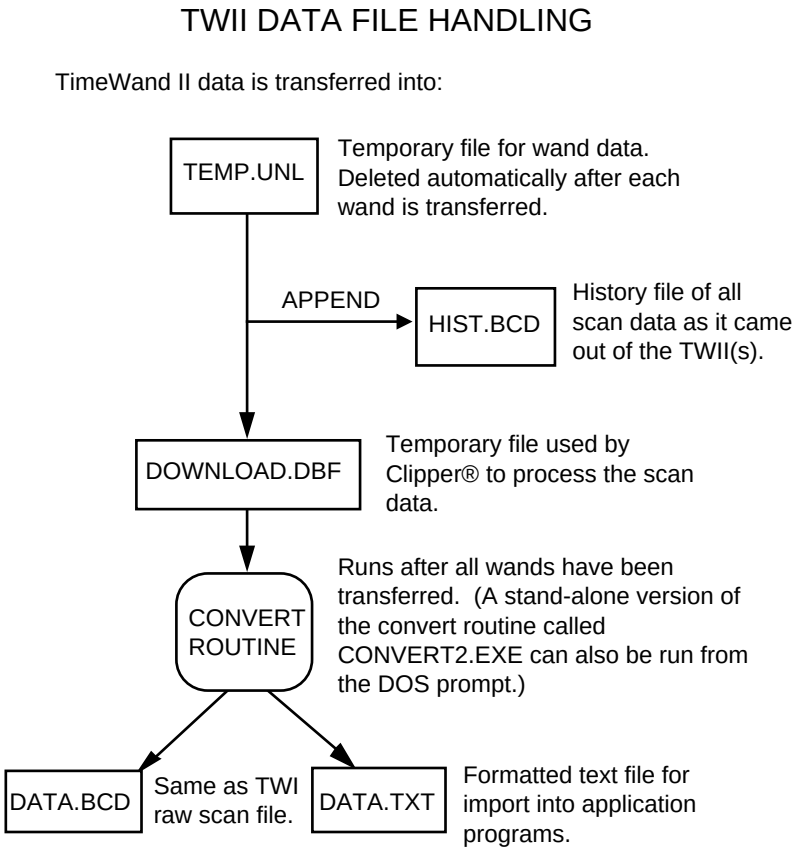


Figure 2-7 TimeWand II Data File Handling

Quit

The last choice on the Main Menu screen is Quit. It is very important that you quit the program properly before turning off or rebooting the computer. Terminating the computer abnormally can cause the loss or corruption of important program and data files.

Chapter 3

Building TimeWand II Applications

Applications

TimeWand II applications provide additional control over the data collection process. The primary purpose of an application is to collect data and create a data file with the collected data. What distinguishes one application from another is the *way* it collects data.

When creating an application, there needs to be something unique about the bar codes or entry for each step; this allows the TimeWand II to know that the criterion has been met to advance to the next step.

TimeWand II applications are software files that contain instructions for a wand. A TimeWand II application can be loaded into a wand that is programmed with an operating system symbology program. The application file works in conjunction with the operating system symbology program and allows control of the display prompts and sequence of data entry. Cross-reference files, such as part numbers and their descriptions, may be built into an application for easy validation of data input.

Building Applications Discussion

Following is an explanation of the theory and principles behind a TimeWand II application. This explanation is intended to give you a deeper understanding of applications and how to build them.

An application consists of a set of “fields” arranged in a hierarchy. Fields in a hierarchy are best explained with an example. If you were building an inventory application to count the items contained in bins at different warehouses, you could build this application using four fields: Warehouse, Bin #, Item #, and Quantity. We want the user to first scan a bar code representing the Warehouse, then the Bin #, then the Item #, then the Quantity. If there are multiple items in the bin, you want the user to scan Item # and Quantity repeatedly for each item in the bin. When the user completes a bin, you want them to scan the next Bin #, then the Item #s in that bin and their Quantities. When the user completes a warehouse, you want them to scan the next warehouse, its bins, items, and quantities, and so on.

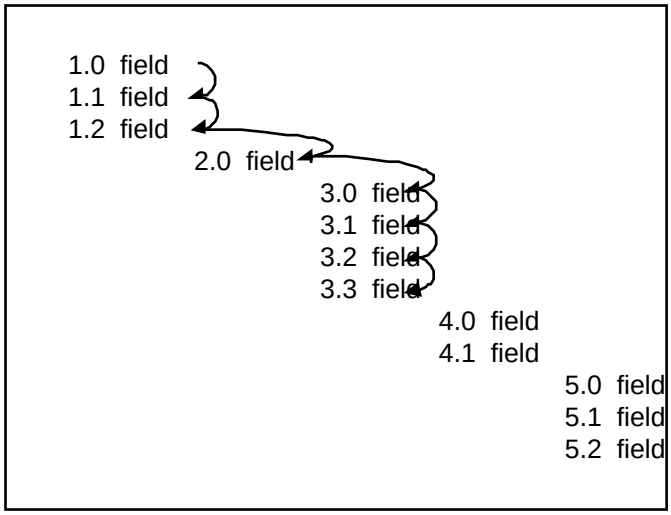
In order to get good data, you want the user to scan the fields in their proper sequence. For instance, you do not want the user to scan an Item # without first scanning a preceding Warehouse or Bin #. Also, you do not want the user to scan a Bin #, then scan a Quantity without identifying the Item #.

Fields in a TimeWand II application follow a set of hierarchical rules which require the user to scan items in their proper sequence. These rules are explained below.

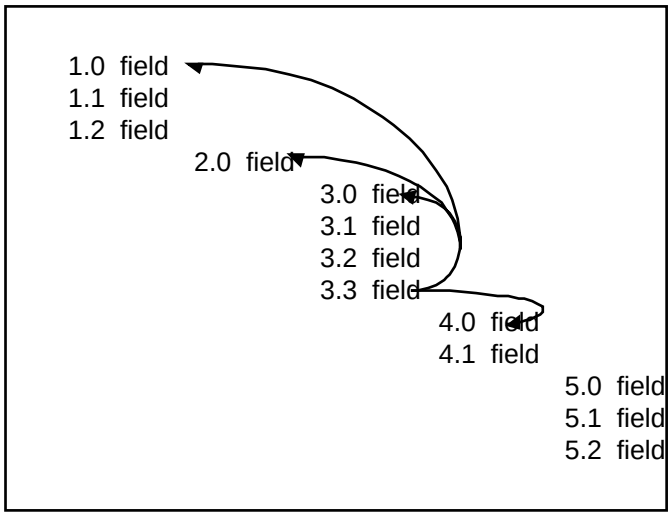
Each field is assigned a level number. Level numbers start with 1.00. These level numbers determine in what sequence the fields are scanned. Several fields may be assigned to the same level by using the tenths and hundredths of the level number.

The user is required to begin by scanning the first field on level 1. All of the fields on the level must be scanned. After all of the fields on the level have been scanned, the user can scan the first field on the next level, or scan the first field on any of the previous levels.

For example, after scanning down to the bottom of level 3:



The user could scan these fields:



Note: The user **could not** scan the field(s) on level 5 unless all of the fields on level 4 were scanned first, because the user cannot skip any levels while moving down the hierarchy.

In the inventory example, INVENTRY.APX, we assign Warehouse a level number 1.0, Bin # a level number 2.0, Item # a level number 3.0, and Quantity a level number 3.1. This prevents scanning out of sequence because the hierarchy forces the user to start on level 1 and prevents any skipping of levels while going down the hierarchy. It also forces the user to scan or key in a Quantity for each Item #, because after an Item # is scanned (the first field on level 3), all of the fields on level 3 must be scanned.

The application screen for the INVENTRY.APX application looks like this:

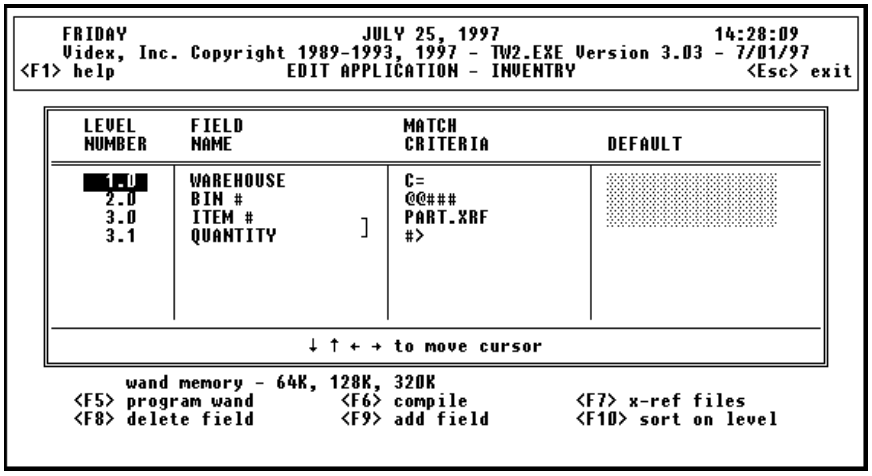


Figure 3-1 INVENTRY.APX Application Screen

The application, once entered into the Create/Edit Application screen, must be “compiled” into a form that the TimeWand II can understand. Compiled applications are stored in files with a .APX extension. To compile an application, press the <F6> key. When the application is compiled and loaded into the TimeWand II, each field name appears on the first line of the display as a prompt.

INVENTRY.APX has already been created and compiled and is included with the software.

Below are Code 3 of 9 bar codes for this application. Once you have learned how to program your TimeWand II, you may wish to program the TimeWand II with INVENTRY.APX and scan these bar codes to get a feel for how applications work.

Warehouse:

Bin #:

Item #:

After scanning the Item #, pressing the scan button prompts you to scan the quantity. Use the numeric keys (followed by the **=** key) on the TimeWand II to enter a quantity.

Now scan:

Bin #:

Item #:

Use the numeric keys (followed by the = key) on the TimeWand II to enter a quantity.

Now scan:

Warehouse:

Bin #:

Item #:

Use the numeric keys (followed by the **=** key) on the TimeWand II to enter a quantity.

You may also wish to scan a few bar codes out of sequence to see how the application reacts. For instance, scan Warehouse, then Item #. You will see that you are unable to skip any levels while going down the hierarchy.

Again, the <Esc> key takes you from the Create/Edit Application screen to the Wand Set Up screen.

The TimeWand II Communications & Application Builder for DOS software includes three complete applications: **INVENTRY.APX**, **RETAIL.APX**, and **STANDARD.APX**. The following sections describe each application. Appendix J contains sample bar codes that can be used with these applications.

INVENTRY.APX Application

The **INVENTRY.APX** application (Figure 3-2) is a four-field inventory application that records the warehouse, the bin number, the item number, and the quantity of items. This type of application is useful for inventory applications of almost any type; it can also be customized to keep track of items going to various locations, to locate items, and so on.

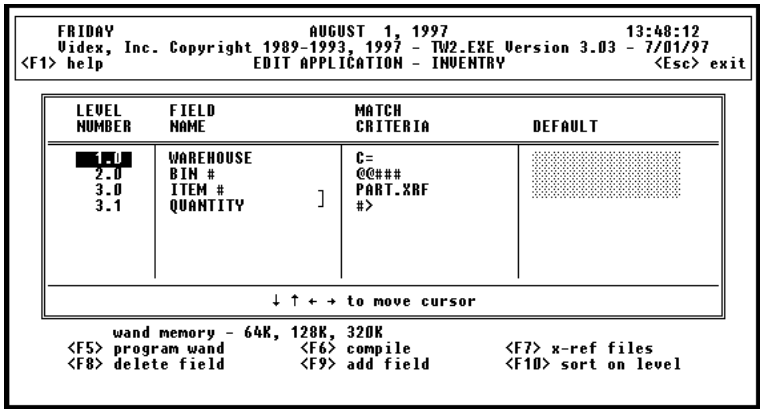


Figure 3-2 INVENTRY.APX Application

The **INVENTRY.APX** application requires the following:

1. A warehouse entry must be entered first; the entry must begin with a C. This field belongs to Level 1.
2. A Bin# entry must be entered next; the entry must be two alpha characters followed by three numeric characters. This field belongs to Level 2.
3. An Item# entry for an item in the bin must be entered; the entry must be contained in the PART.XRF cross-reference file. This field belongs to level 3.
4. And the quantity of items must be entered; the quantity entry must be composed of numeric characters. This field also belongs to level 3.

The Item# and the quantity both belong to level 3; this means that when an Item# entry is made, a quantity entry must follow.

RETAIL.APX Application

The **RETAIL.APX** application (Figure 3-3) is a three-field application that records the customer, the part code, and the quantity of parts. This type of application is useful for recording transactions of almost any type; it can be customized to ship items, record orders, inventory, storage locations, and so on.

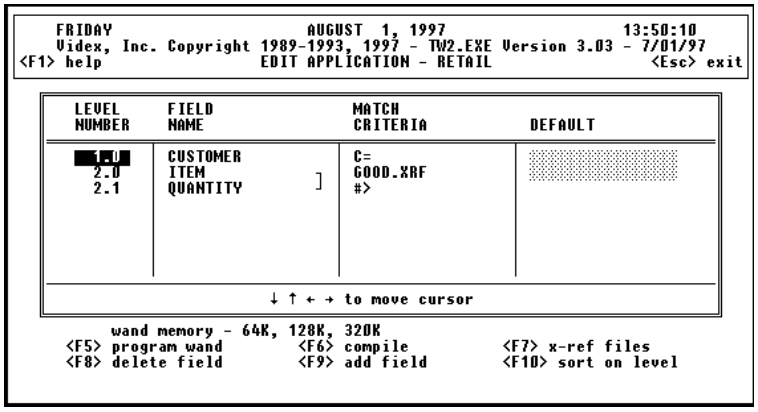


Figure 3-3 RETAIL.APX Application

The RETAIL.APX application requires the following:

1. A CUSTOMER entry must be entered first; the entry must begin with an C. This field belongs to Level 1.
2. An ITEM entry must be entered; the entry must be contained in the GOOD.XRF cross-reference file. This field belongs to level 2.
3. And the QUANTITY of each item must be entered; the quantity entry must be composed of numeric characters. This field also belongs to Level 2.

The ITEM and QUANTITY fields both belong to level 2; this means that if an ITEM entry is made, a QUANTITY entry must follow.

STANDARD.APX Application

The **standard** application (Figure 3-4) is a one-field application that accepts any data. This type of application is useful when strict control of data entry is not required.

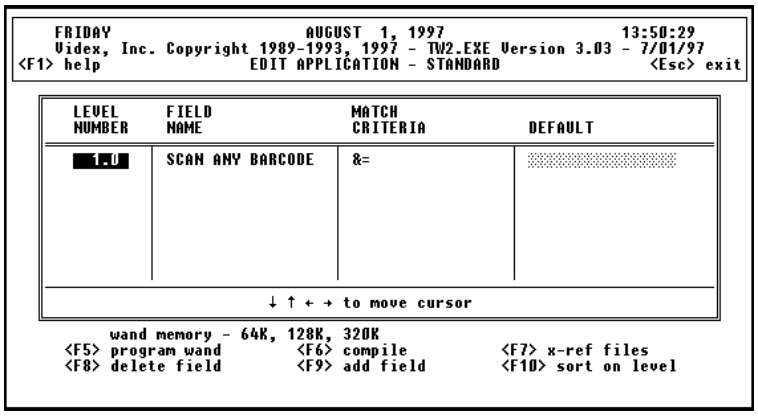


Figure 3-4 Standard Application - Edit Application Screen

The standard application will accept any entry; it has no special requirements.

Building Applications

Discussion

The two screens used to edit and build applications are the Wand Set Up screen and the Create/Edit Application screen.

The Wand Set Up screen has an application window that lists the current applications. To edit an application, press <F7> and the application will be displayed in the Create/Edit Application screen. To create a new application, press <F9> and the software will step you through building a new application.

The Wand Set Up screen and the Create/Edit Application screen are discussed in detail in the following sections on pages 76–86. Beginning on page 87 is a section that steps you through building a sample application.

Wand Set Up Screen

The Wand Set Up screen (Figure 3-5) contains the Wand ID, Symbology, and Application windows.

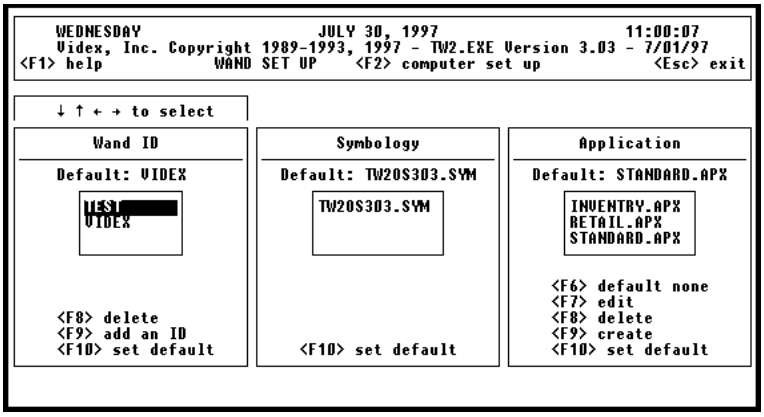


Figure 3-5 Wand Set Up Screen

Wand ID Window

The Wand ID window maintains the list of wand IDs. A wand ID is a unique name or number assigned to a TimeWand II.

The default ID is displayed at the top of the window. This ID appears as the default when programming the TimeWand II. To change the default, use the arrow keys to highlight the desired ID and then press <F10>.

To add an ID, press the <F9> key. To delete an ID, highlight the ID and press <F8>. The default ID cannot be deleted.

Symbology Window

The Symbology window lists the current TimeWand II operating system symbology program. The TimeWand II must be programmed with its operating system symbology program before it can read bar codes.

Application Window

The Application window lists the existing applications. The default application is shown at the top of the window. To change the default, highlight the application of your choice and press <F10>. If you wish to program a TimeWand II without an application, set the default to "None" by pressing <F6>.

To edit an existing application, highlight the application and press the <F7> key. The software asks you to verify that you want to edit the file. Press <Enter>, and the Create/Edit Application screen for the application appears.

To delete an application, highlight the application and press the <F8> key. Deleting an application erases the files for that application from the disk.

Warning!

Deleting an application erases all of the files for that application from the hard disk. Use the delete function with caution.

To create a new application, press the <F9> key and enter the name for the application. The Create/Edit Application screen appears. The Create/Edit Application screen and building an application are explained in the following sections.

Create/Edit Application Screen

The Create/Edit Application screen (Figure 3-6) is where applications are created and edited. You can create an application to control the sequence of the entries and to control the prompts that appear on the wand's display.

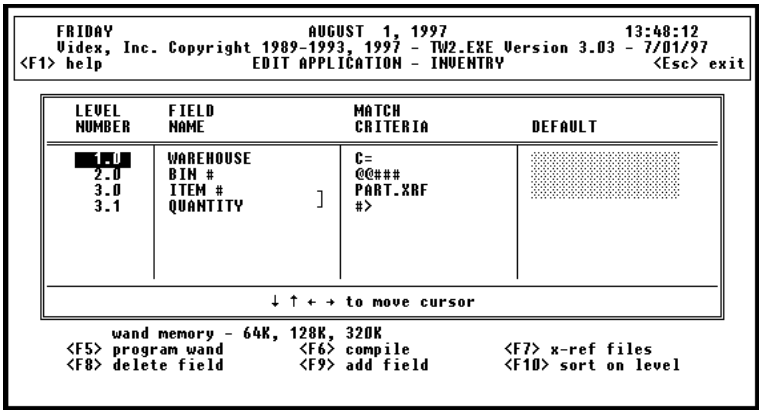


Figure 3-6 Create/Edit Application Screen

The first step in creating an application is to add the fields. To add a field, press the <F9> key. You are then prompted to enter the field name. The field name may be any alphanumeric combination up to 16 characters in length. The field name will be used as the prompt on the TimeWand II display for that field.

After adding a field name, it is necessary to specify the level number for that field. The level number determines the sequence in which the fields are scanned. To specify a field's level number, use the arrow keys to highlight the Level Number for that field, press <Enter>, type the level number, and press <Enter> again. The <F10> key sorts the fields according to their level numbers.

When the TimeWand II reads a bar code, it must be able to discern which field of the application the bar code belongs to;

this is the purpose of the Match Criteria column. The TimeWand II compares the entry with the match criteria specified for each field.

The menu choices which appear when specifying the match criteria help you build the pattern(s) you need. The use of those menus can be mastered with experimentation. The match criteria may consist of either a pattern of letters and/or numbers, **or** a list of bar codes in a cross-reference (.XRF) file. When specifying the matching criteria, the "X-REF File" menu choice enables you to specify a cross-reference file as the matching criteria.

The Default column lists the default entry for the field. Note: The first field in a level cannot have a default.

The <F6> key compiles the application. **Each application must be compiled before it can be loaded into the TimeWand II.** Before an application is compiled, it exists only as ASCII text which you can see on your computer screen. When it is compiled, it is translated into a Hex format that the TimeWand II can understand. Compiled applications are stored in files that have a .APX extension. If there are any errors in the compilation process, they appear in the Compile Application window. **All errors must be corrected before the application can be compiled successfully and loaded into the TimeWand II.**

The <F8> key deletes a field. Highlight the field you wish to delete and press <F8>.

The <F5> key is merely a short-cut from the Create/Edit Application screen to the Program Wand section of the program.

The <Esc> key takes you back to the Wand Set Up screen.

The following section describes the different columns in the Create/Edit Application screen.

LEVEL NUMBER Column

This column lists the level number. The level number represents the order of data entry that is enforced when using the application. Level numbers start with 1.00. The level number determines in what order the fields are scanned. Several fields may be assigned to the same level by using the tenths and hundredths of the level number.

If more than one field belongs to the same level number, then when data for the first field in the level is entered, data for all the other fields in the level must also be entered. Data must be entered consecutively for all fields in a particular level.

FIELD NAME Column

This column lists the field names for the application. A field name can be up to 16 characters of text. The field name will serve as the prompt that appears on the wand's display during each scan step.

MATCH CRITERIA Column

This column lists the match criteria for the field. The match criteria can be a match pattern composed of standard characters, token characters, or a combination of both; the name of a cross-reference file; or no pattern (which accepts any entry).

When an entry is made, the wand verifies that the data meets the specific criteria. The match criteria creates a filter for the data being entered during each scan step. The filter gives you greater control over the data collection process.

When you enter the Match Criteria column and press <Enter>, you are given a choice of the match criteria listed in the following table:

Match Criteria	Description
BEGINS WITH	User input must begin with the entered text.
LENGTH	User input must be the given number of characters long.
MATCH EXACTLY	User input must exactly match the entered text.
PATTERN	User input must match the match pattern. See pages 82–84 for information on TimeWand II match patterns.
X-REF FILE	User input must be contained in a cross-reference file.
NO PATTERN	User input can be any data.

The following sections describe the various Match Criteria.

BEGINS WITH

If you choose **BEGINS WITH** for the match criteria, the software prompts you to enter the bar code's starting character. The user input must begin with the character entered in the box.

LENGTH

If you choose **LENGTH** for the match criteria, the software prompts you to enter the length of the bar code and whether the bar code is alphabetic, numeric, or alphanumeric. The length and type of the user input must equal the length and type entered. MATCH EXACTLY

If you choose **MATCH EXACTLY** for the match criteria, the software prompts you to enter the exact match for the bar code entry. The user input must exactly match the entered text.

PATTERN

If you choose **PATTERN** for the match criteria, the software prompts you to enter a TimeWand II match pattern for the bar code entry. A TimeWand II pattern describes the acceptable entries. A powerful new feature of the software is the ability to use multiple match patterns. When using multiple match patterns, the patterns must be separated by semicolons.

TimeWand II match patterns are explained in the following section.

TimeWand II Match Patterns

A TimeWand II match pattern is a series of letters, numbers, and token characters. Five characters are used as token characters to create a match pattern. These characters are:

#	a number [0–9] must be in this position
@	a letter [a..z, A..Z] must be in this position
&	any character must be in this position
=	the rest of the string can be any characters or no character
>	the rest of the string must be numbers [0..9] or no character

The left angle bracket character (<) is used as a NOT operator. When this character is placed in front of a match pattern it means “an entry that does NOT match the following is acceptable.”

The semicolon (;) is used as an OR operator. When this character is placed between match patterns, it means “an entry that matches any of these patterns is acceptable.”

These are the actual characters your entries may contain:

A..Z 0..9 space + - / % . $

You can create many different types of match patterns by using both the token characters and the actual characters to describe the acceptable entries. The following table (continued on the next page) contains examples of TWII match patterns:

Pattern	**Accepts**
E=	any entry that starts with the letter E
<E=	any entry that does not start with the letter E
E>	any entry that starts with the letter E and is followed only by numbers
M=	any entry that starts with the letter M
S>	any entry that starts with the letter S and is followed only by numbers
K0003	the entry must match K0003 exactly
<K0003	the entry must NOT match K0003
Z###$	any five-character entry that starts with a Z followed by three numbers followed by a dollar sign ($)
@@##	any four-character long entry that begins with two alpha characters followed by two numbers
#>	any entry of at least one or more numbers
AAA=	any entry that begins with AAA
AA#A	a four-character long entry with A in the first, second, and fourth positions and a number in the third position

Pattern	Accepts
AA@A	a four-character long entry with A in the first, second, and fourth positions and a letter in the third position
AA&A	same as previous entry, but with any character in the third position
A=;E=;H=	any entry that starts with the letter A, E, or H
A>;####	any entry that starts with the letter A and is followed only by numbers, or an entry consisting of four numbers
S002;S003	the entry must match S002 or S003 exactly
B=;S>;AG-67	the entry must start a B followed by any or no characters, or start with an S followed only by numbers, or match AG-67 exactly

X-REF FILE

If you choose X-REF FILE for the match criteria, the software prompts you to select or create a cross-reference file. Cross-reference files fill two functions: they serve as a list of valid entries for the specified field, and they cause the entry's cross-reference file description to be displayed when the entry is made.

If you use cross-reference files in your application, the <F7> key enables you to manage the files. The <F7> key enables you to create or edit the contents of the files, and to delete entire cross-reference files. When you press the <F7> key, a window opens and shows the existing cross-reference files.

To create a new cross-reference file, press the <F9> key and enter the name you wish to call the file. Another window opens where you may enter the cross-reference file records. Press <Esc> when you are done.

To add entries to an existing cross-reference file (edit), highlight the desired cross-reference file and press <F7>.

A window showing the contents of the cross-reference file opens and allows you to make your entries. Press <Esc> when you are done. All changes to a cross-reference file are saved automatically, and the cross-reference file is automatically sorted on the bar code entry.

To delete a cross-reference file, highlight it and press <F8>. Deleting a cross-reference file erases the entire file from the disk, making it unavailable for all applications. Use the delete function with care.

Warning!

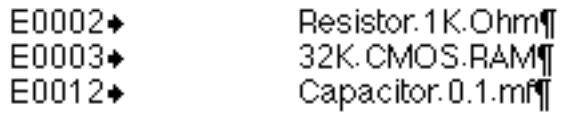
Deleting a cross-reference file erases it from the disk and makes it unavailable for use in other applications. Use the delete function with caution.

Cross-reference files are standard ASCII text files. As such they can be created and edited by text editors and database programs. The Bar Code entry can be up to 23 characters long, and the Description can be up to 16 characters long.

The format for cross-reference files is:

Bar Code Tab (ASCII character 9) Description <cr/lf>

Here is an example of a list of parts in a cross-reference file called **PART.XRF:**



The bold arrow represents the tab character, and the paragraph sign represents a carriage return and line feed.

If a cross-reference file is changed, the applications using it must be recompiled and loaded into the TimeWand II before the changes take effect.

The maximum number of entries in one cross-reference file is approximately 1000. This number also depends on the number of cross-reference files in your application and the amount of RAM in your TimeWand II.

Cross-reference files cannot contain matching patterns. Cross-reference files may only contain valid bar codes and their descriptions.

Press <Esc> to close the cross-reference file window.

NO PATTERN

If you choose **NO PATTERN** for the match criteria, any entry is acceptable for the field.

DEFAULT Column

This column holds a default entry. A default entry is an entry that is automatically supplied when the application prompts for a field. A default may be specified for any field which is not the first field on a level. If a default is specified for a field, the TimeWand II suggests the default, which can be accepted by pressing the **=** key on the TimeWand II. The default can be rejected by pressing the backspace key on the TimeWand II until it is deleted. Another entry or scan can then be made for that field.

Note: The first field in a level cannot have a default.

If a field has a default value, the application program will prompt with the field name on the top line of the wand's display, and show the default value on the second line of the display. To accept the default value, press the = key on the wand's keypad. If instead, you make another entry, the new entry will replace the default value.

You can use the wand's backspace key to edit the default entry one character at a time. You can return a default entry to its default of <none> by selecting the cell and pressing <Delete> or by following the tips in the **Default Entry** dialog box.

Building an Application

This section steps you through building a sample application. We will build a security application that could be used by a security guard to record what locations are checked, what time they are checked, and their status. We can build this application with three fields. The first field will identify the guard, the second field will identify the location and the time it was checked, and the third field will report the status of the location. In creating this application, we will also show you how to build a cross-reference file to use for the location's status.

1. To access the application files, you must select Set Up from the Main Menu screen to enter the Wand Set Up screen.

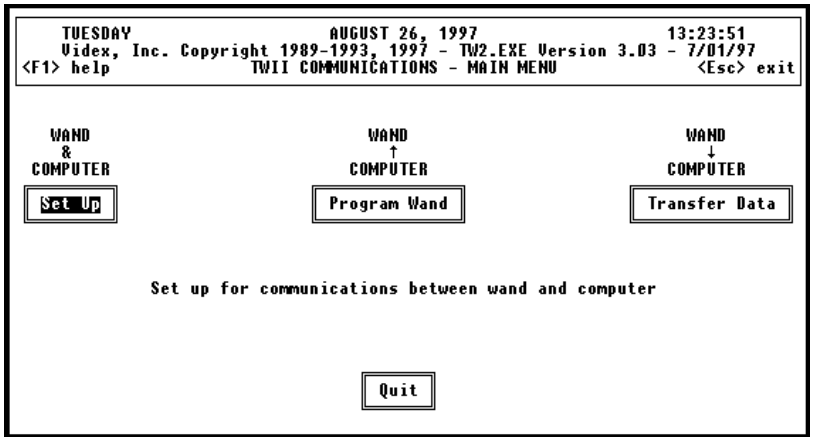


Figure 3-7 Main Menu Screen - Set Up

2. Use the right arrow key to activate the application section of the Wand Set Up screen (Figure 3-8).

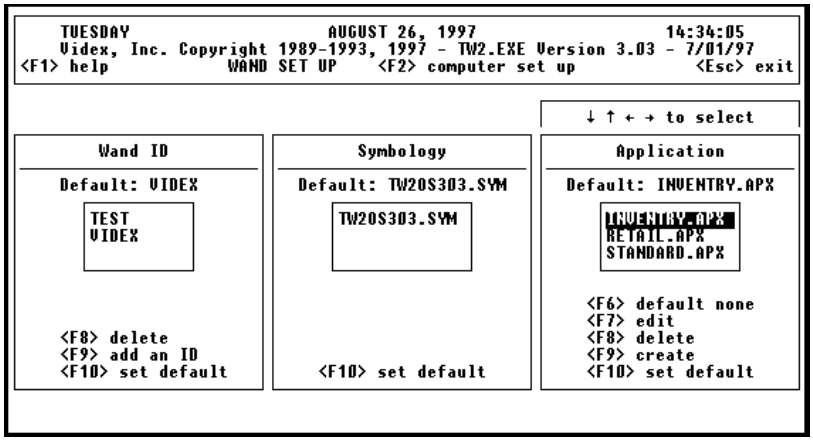


Figure 3-8 Wand Set Up Screen - Application Section Active

3. Press <F9> to create a new application.

4. A Create Application box appears (Figure 3-9); this is where the name of the application is entered. The name is limited to eight characters.

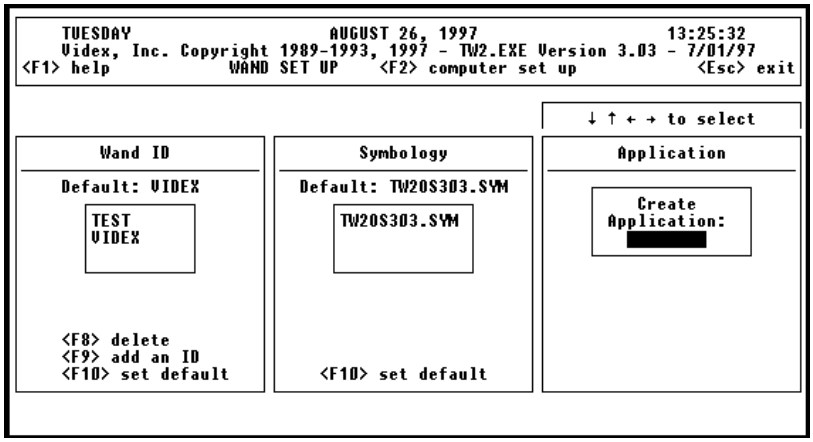


Figure 3-9 New Application Name Box

5. Type **Security** (Figure 3-10) and press <Enter>.

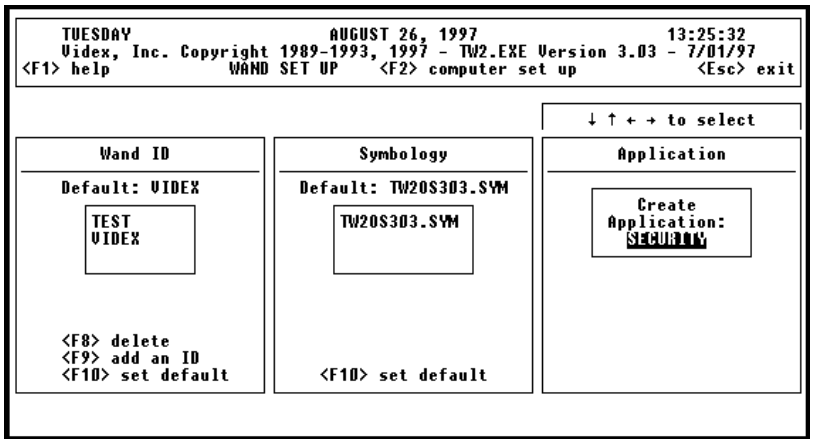


Figure 3-10 Enter Application Name

6. The Create Application screen for building the Security application appears (Figure 3-11).

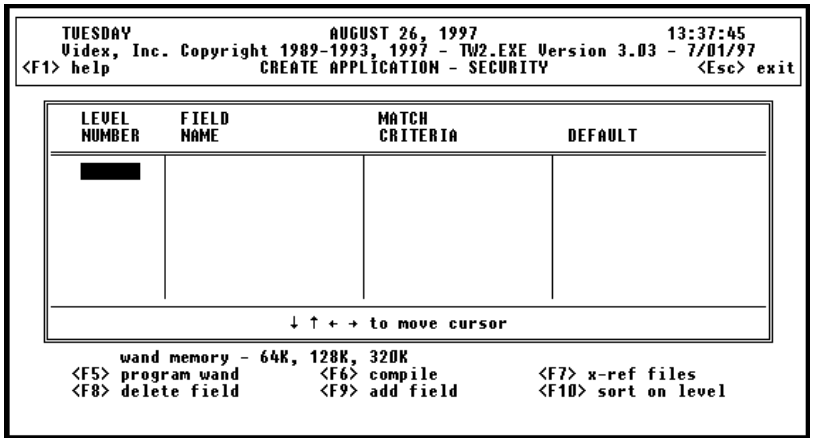


Figure 3-11 Create Security Application Screen

7. Press <F9> to add a field. An Add Field Name box appears (Figure 3-12).

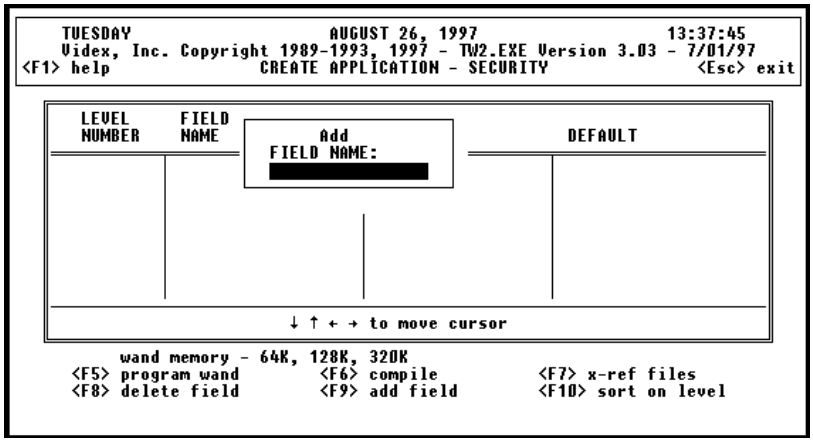


Figure 3-12 Create Application Screen - Add Field

8. Type Guard (Figure 3-13).

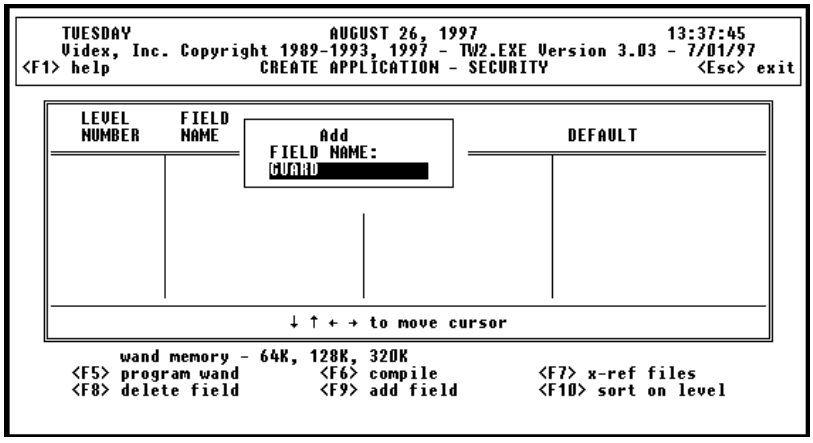


Figure 3-13 Create Application Screen - Type Guard

9. Press <Enter>. The field name is entered in the Field Name column and the field is given a level number of 0.0 by default (Figure 3-14).

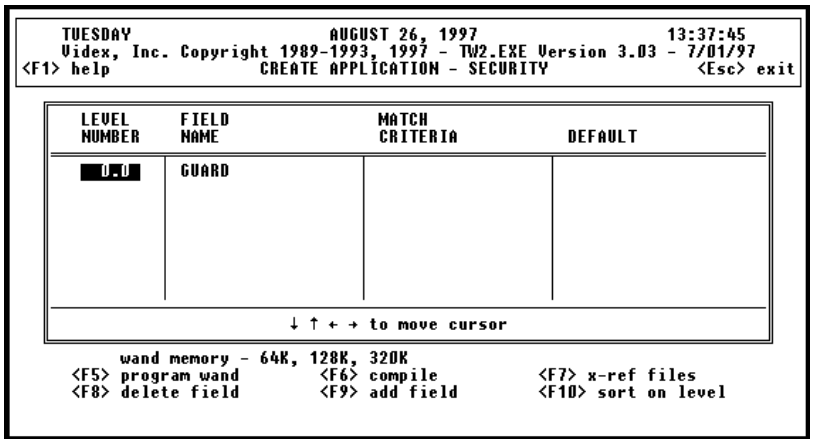


Figure 3-14 Create Application Screen - Field Added

10. Press <Enter> to edit the level number (Figure 3-15).

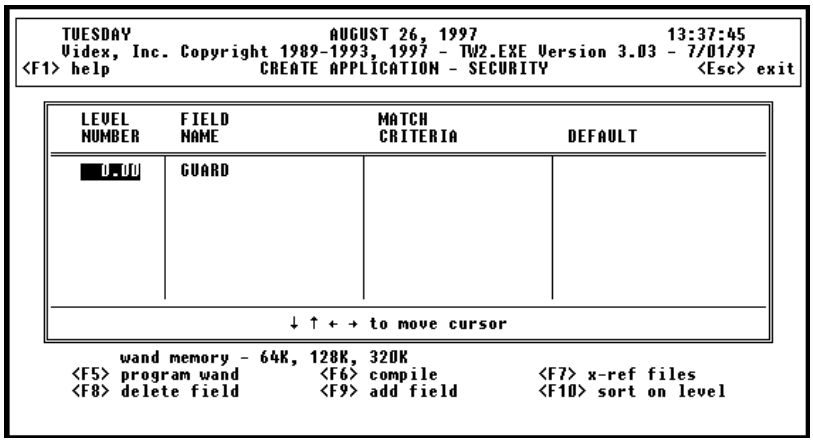


Figure 3-15 Edit Level Number

11. Type **1.0** (Figure 3-16).

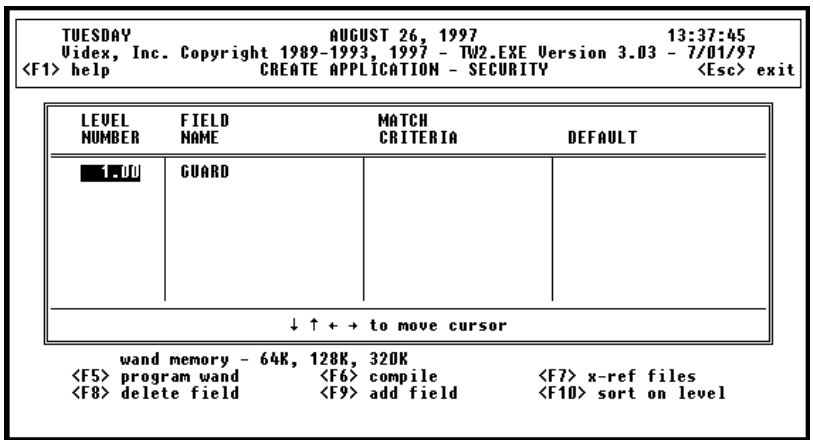


Figure 3-16 Changing Level Number

12. Press <Enter> to save the edit (Figure 3-17). (Note: The Default column is filled because the first field in a level cannot have a default entry.)

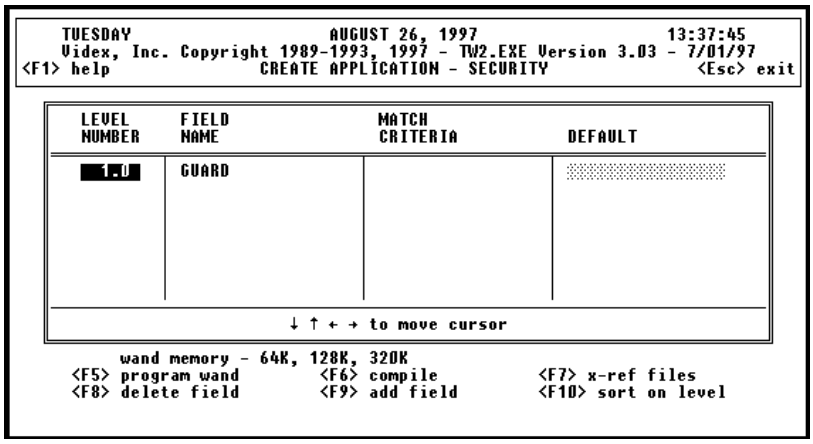


Figure 3-17 Level Number Changed

13. To add the next field, press <F9> and type **Location** in the Add Field Name box (Figure 3-18).

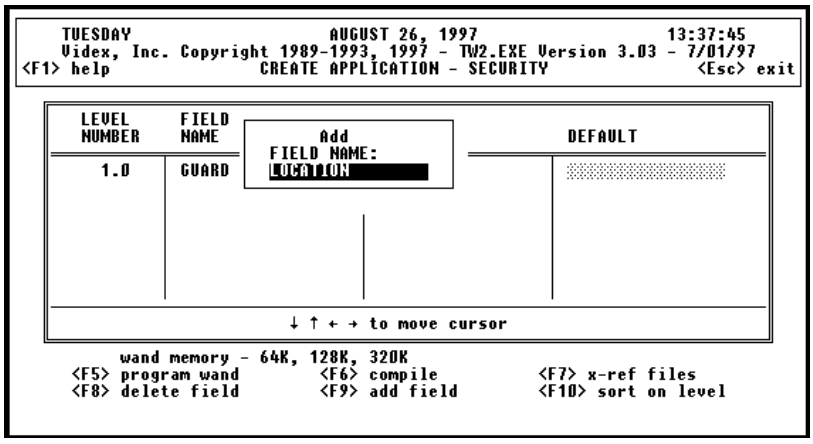


Figure 3-18 Add Second Field

14. Press <Enter> to add the Location field (Figure 3-19). The field name is entered in the Field Name column and the field is given a level number of 0.0 by default.

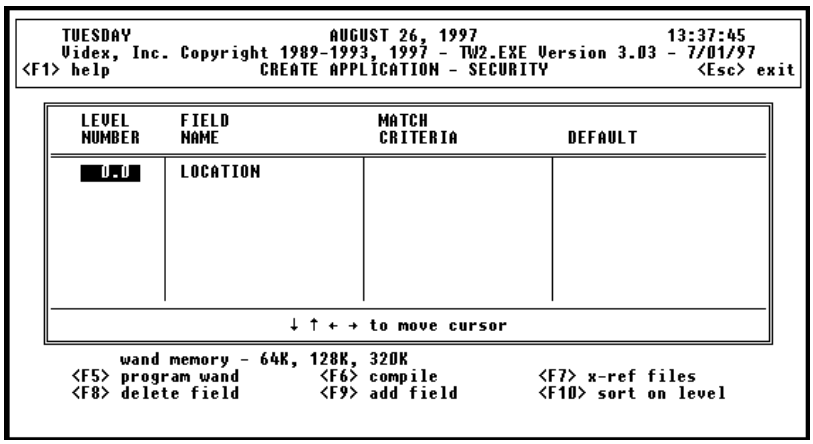


Figure 3-19 Second Field Added

15. Press <Enter> to edit the level number (Figure 3-20).

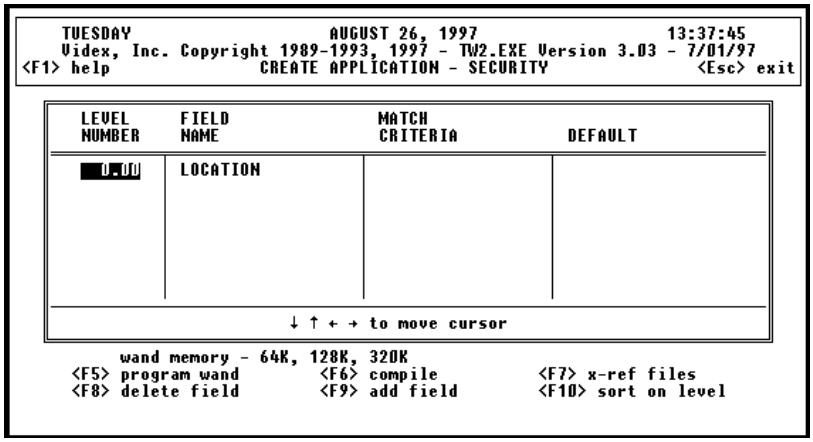


Figure 3-20 Edit Level Number

16. Type **2.0** (Figure 3-21).

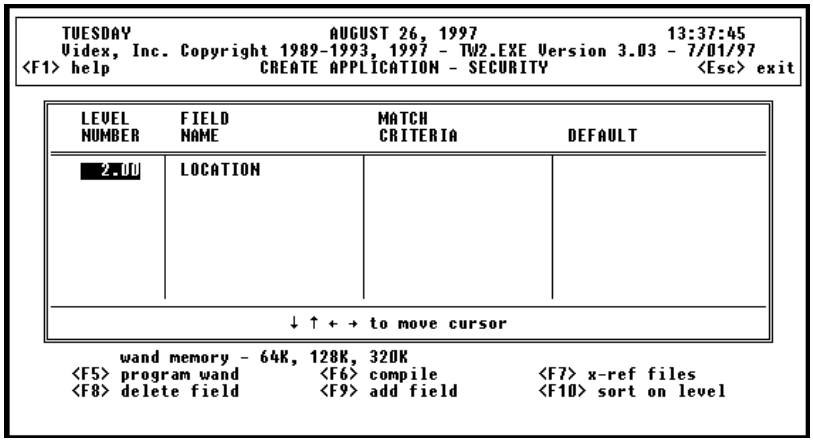


Figure 3-21 Changing Level Number

17. Press <Enter> to save the edit (Figure 3-22). (Note: This field's Default column is also filled because the first field in a level cannot have a default entry.)

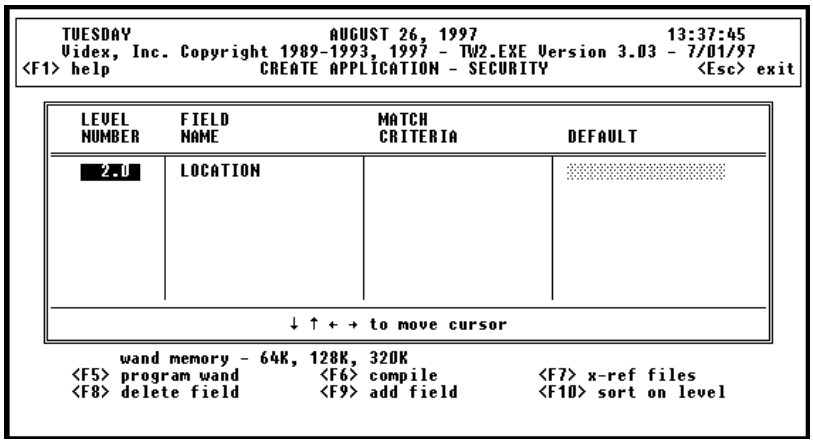


Figure 3-22 Level Number Changed

18. Press <F9> once more to enter the final field. Type **Status** in the Add Field Name box (Figure 3-23).

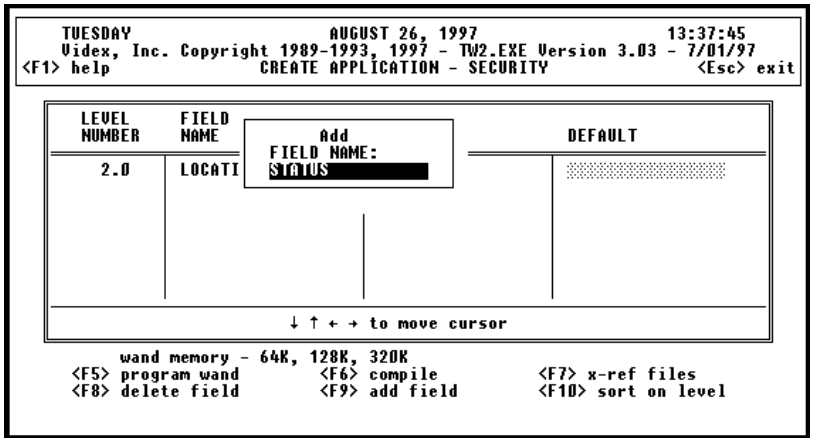


Figure 3-23 Add Last Field

19. Press <Enter> to add the Status field (Figure 3-24). The field name is entered in the Field Name column and the field is given a level number of 0.0 by default.

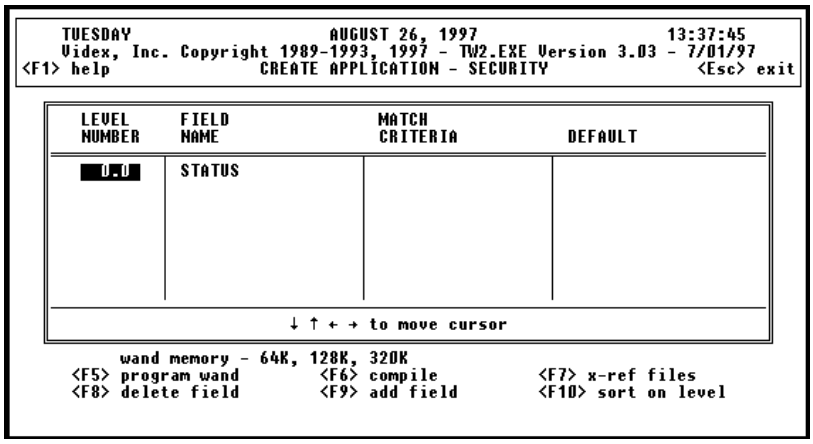


Figure 3-24 Last Field Added

20. Press <Enter> to edit the level number (Figure 3-25).

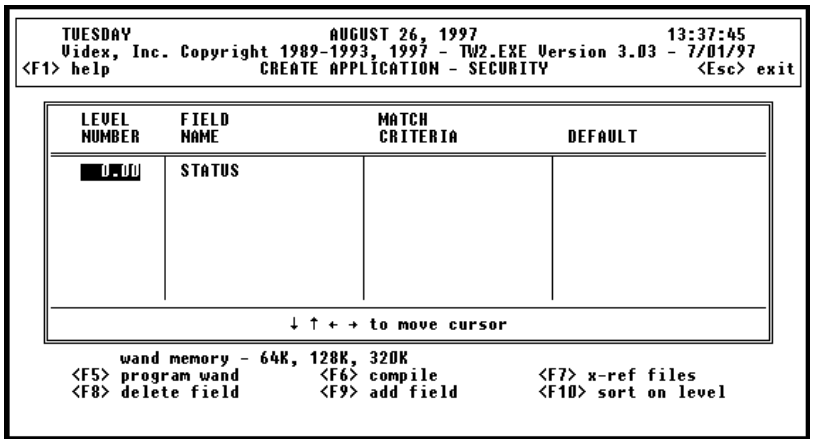


Figure 3-25 Edit Level Number

21. Type **2.1** (Figure 3-26).

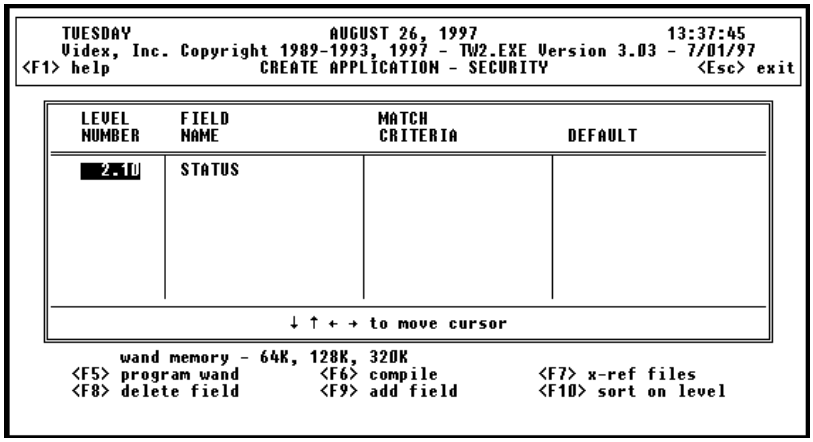


Figure 3-26 Changing Level Number

22. Press <Enter> to save the edit (Figure 3-27). (Note: This field's Default column is not automatically filled because it is not the first field in a level. This field can have a default entry.)

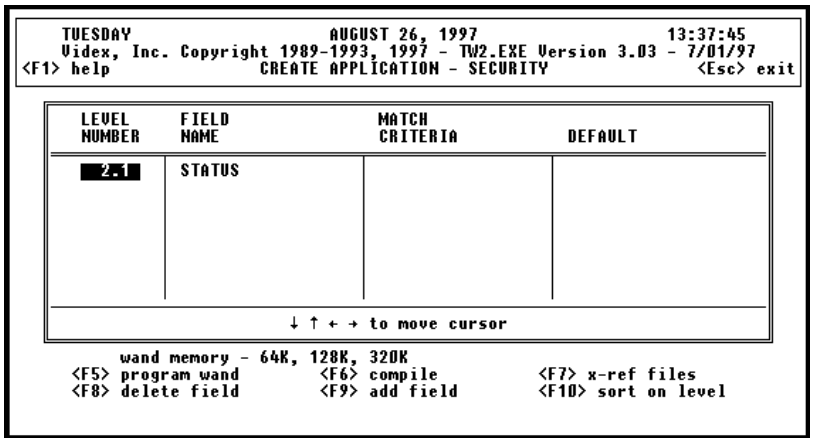


Figure 3-27 Level Number Changed

23. Press <F10> to sort the fields (Figure 3-28).

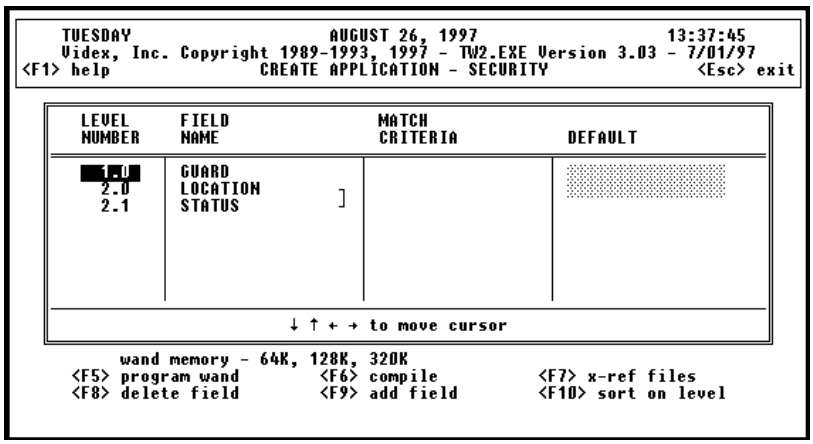


Figure 3-28 Fields Sorted

24. Use the arrow keys to move the cursor to the GUARD field's Match Criteria column (Figure 3-29).

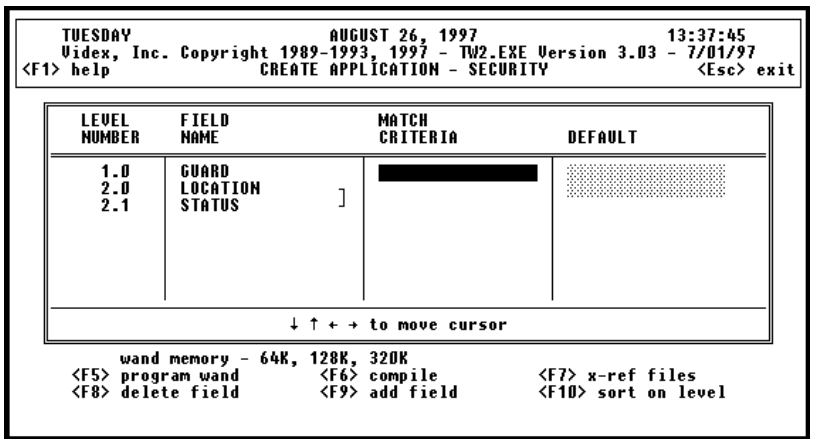


Figure 3-29 GUARD Field Match Criteria Column

25. Press <Enter> and the Match Criteria choices are displayed.

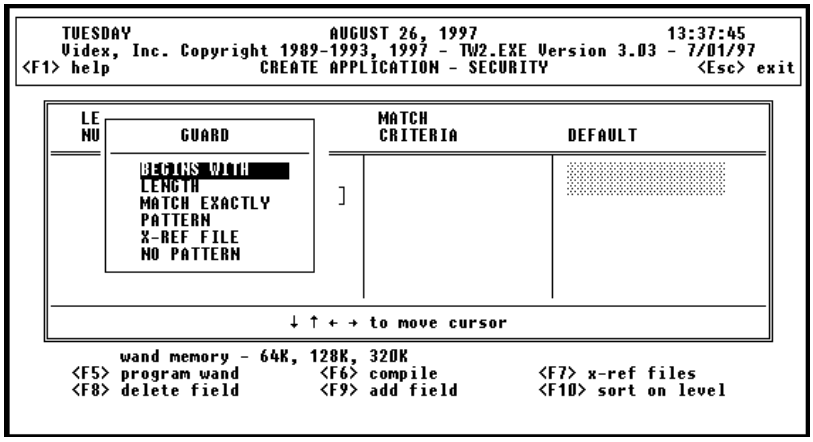


Figure 3-30 GUARD Match Criteria Choices Displayed

26. To select a Match Criteria choice, use the up and down arrow keys to select the criteria and press <Enter>. In this example we want the BEGINS WITH match criteria for this field, so you only need to press <Enter> when BEGINS WITH is highlighted. The GUARD dialog changes to **Barcodes begin with:** (Figure 3-31).

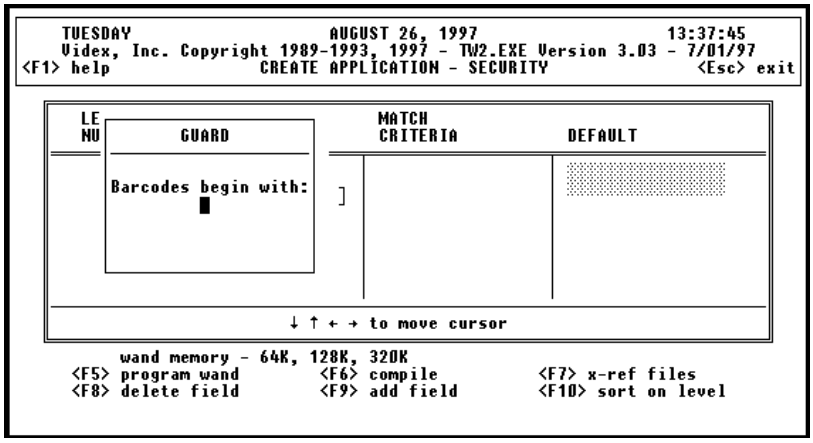


Figure 3-31 GUARD Field Begins With...

27. The bar codes we are using to identify the guards begin with the letter G. Type a **G** (Figure 3-32).

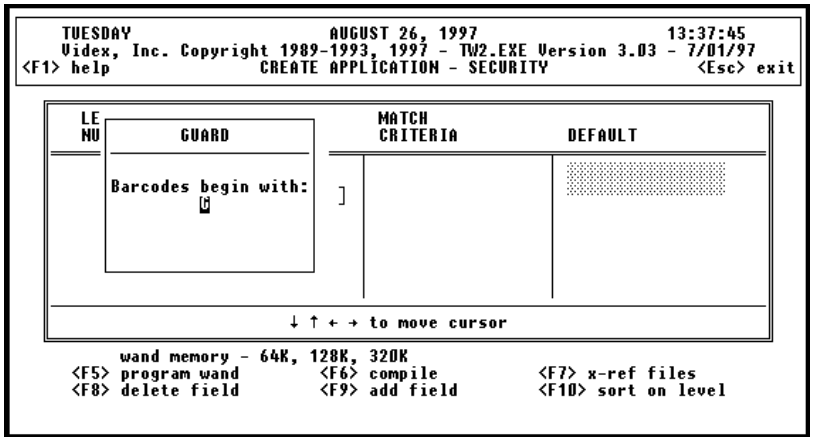


Figure 3-32 GUARD Field Begins With G

28. Press <Enter> and the software displays the match criteria as a pattern (Figure 3-33).

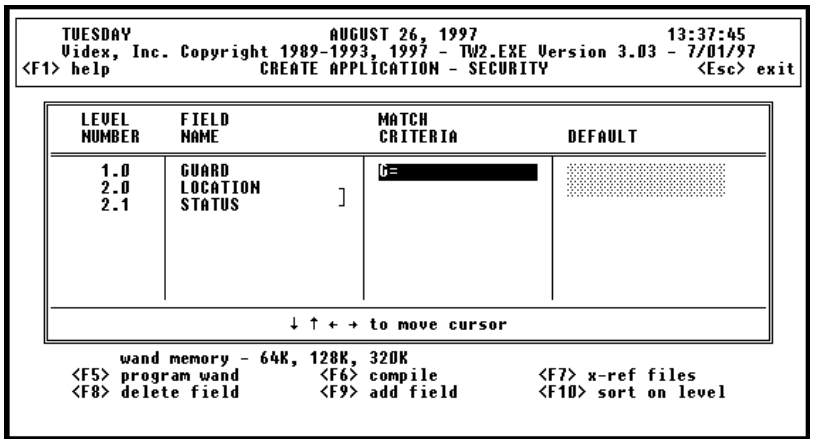


Figure 3-33 GUARD Field Match Criteria

29. Use the down arrow key to move the cursor to the LOCATION field's Match Criteria column (Figure 3-34).

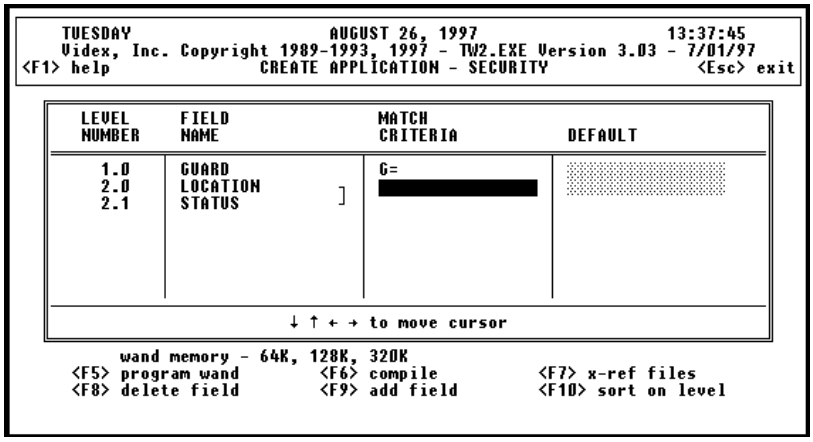


Figure 3-34 LOCATION Field Match Criteria Column

30. Press <Enter> and the Match Criteria choices are displayed (Figure 3-35).

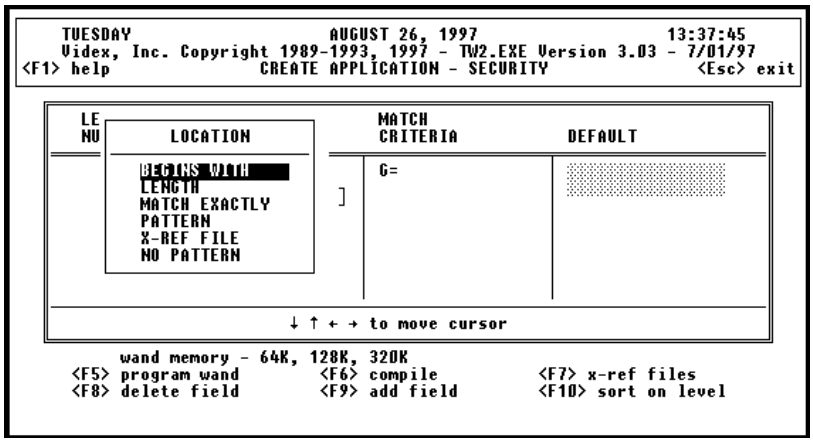


Figure 3-35 LOCATION Match Criteria Choices Displayed

31. In this example, we want the BEGINS WITH match criteria for this field, so you only need to press <Enter> when BEGINS WITH is highlighted. The LOCATION dialog changes to **Barcodes begin with:** (Figure 3-36).

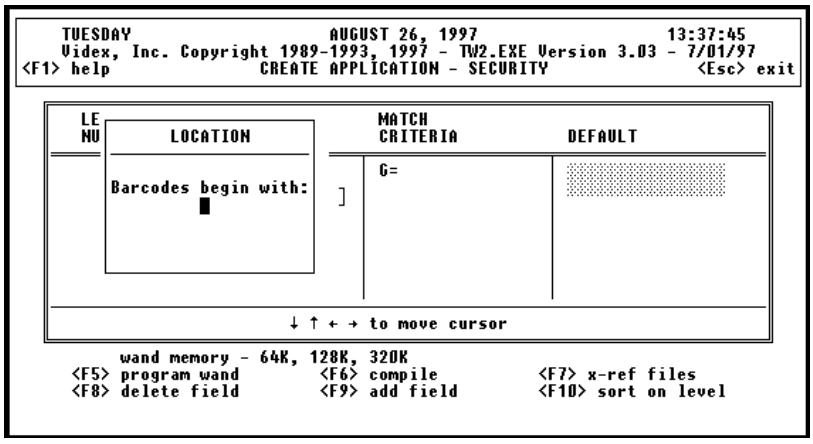


Figure 3-36 LOCATION Field Begins With...

32. The bar codes we are using to identify the locations begin with the letter D. Type a **D** (Figure 3-37).

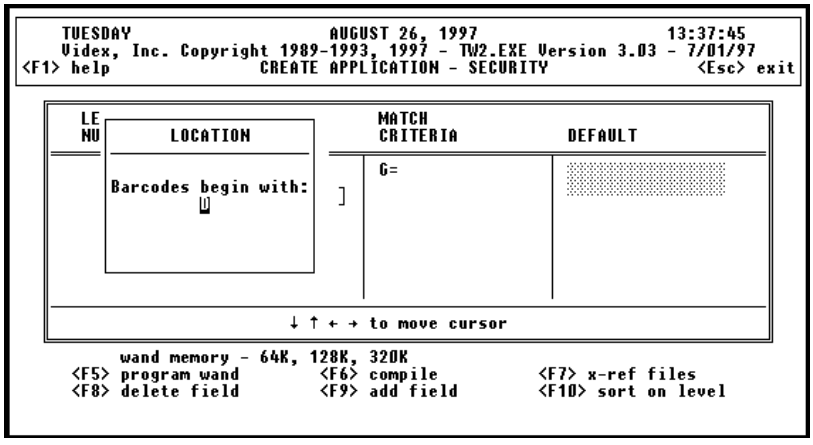


Figure 3-37 LOCATION Field Begins With D

33. Press <Enter> and the software displays the match criteria as a pattern (Figure 3-38).

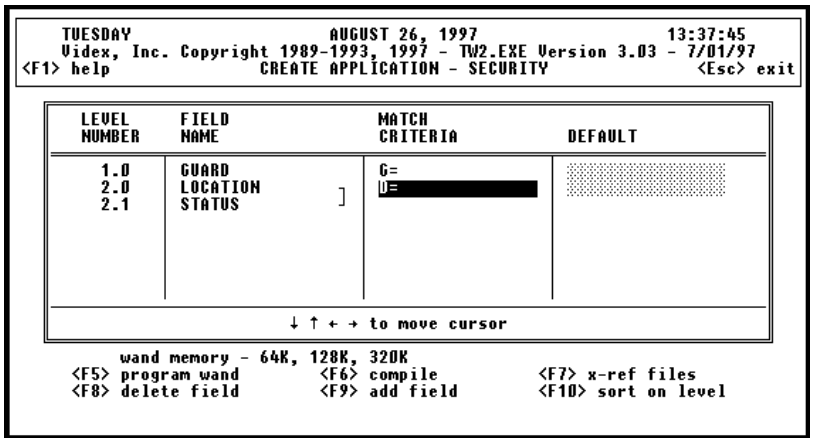


Figure 3-38 LOCATION Field Match Criteria

34. Use the down arrow key to move the cursor to the STATUS field's Match Criteria column (Figure 3-39).

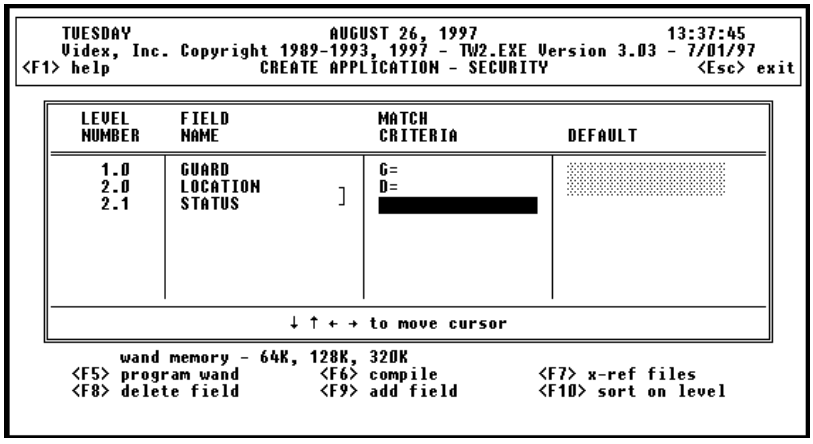


Figure 3-39 STATUS Field Match Criteria Column

35. Press <Enter> and the Match Criteria choices are displayed (Figure 3-40).

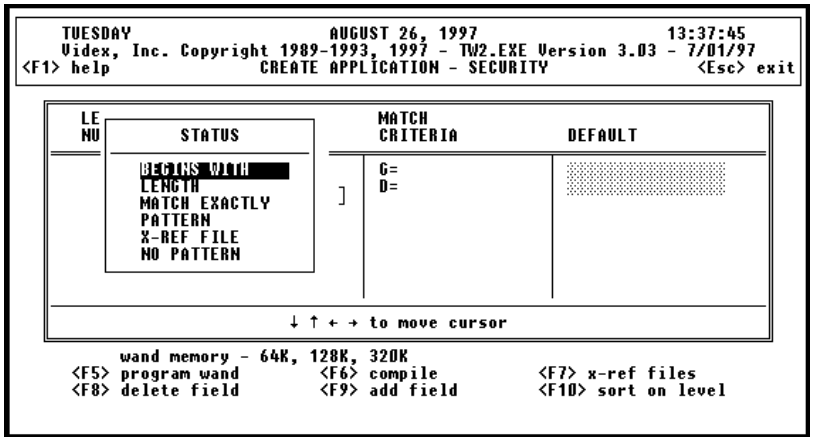


Figure 3-40 STATUS Match Criteria Choices Displayed

36. For this field we will create and use a cross-reference file. Use the down arrow key to select the X-REF FILE match criteria (Figure 3-41).

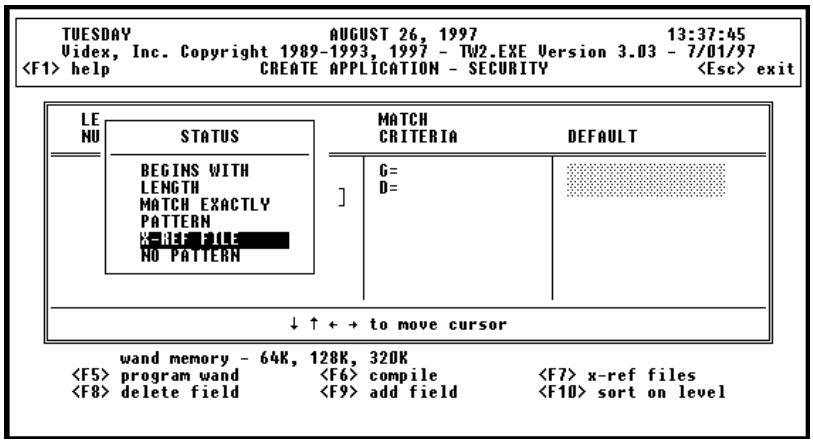


Figure 3-41 STATUS Match Criteria - X-REF FILE

37. Press <Enter> and the available cross-reference files are listed in the STATUS dialog (Figure 3-42).

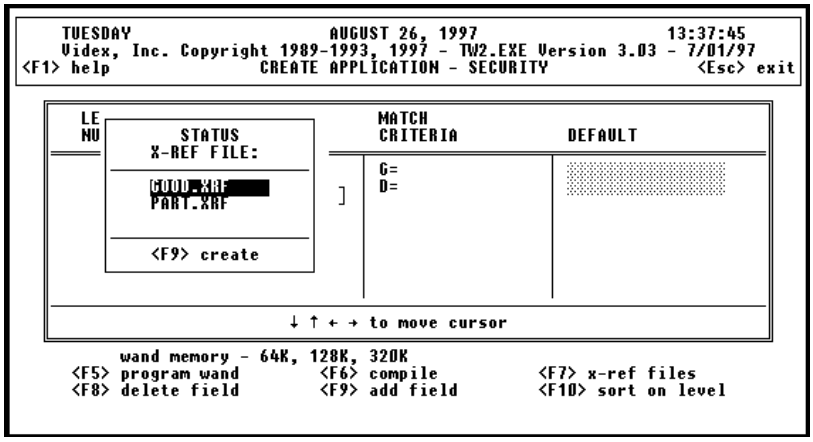


Figure 3-42 STATUS X-REF Files

38. Since we will be creating our own cross-reference file, press <F9> and the STATUS dialog will prepare to create a new cross-reference file (Figure 3-43).

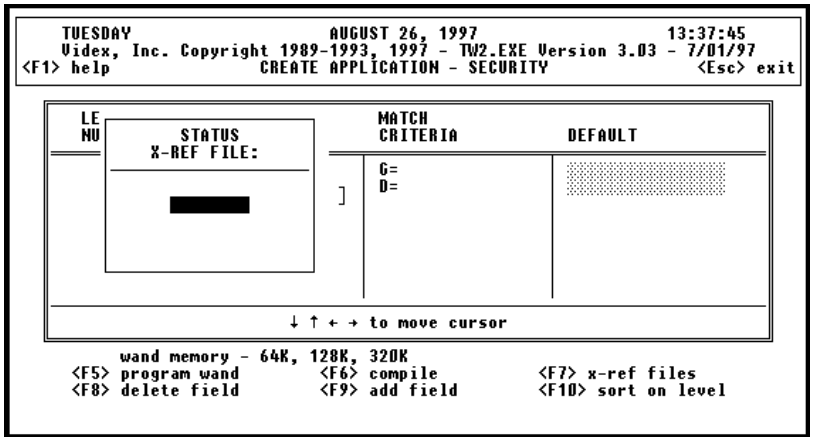


Figure 3-43 STATUS Field Create X-REF File

39. Type STATUS for the name of the cross-reference file (Figure 3-44).

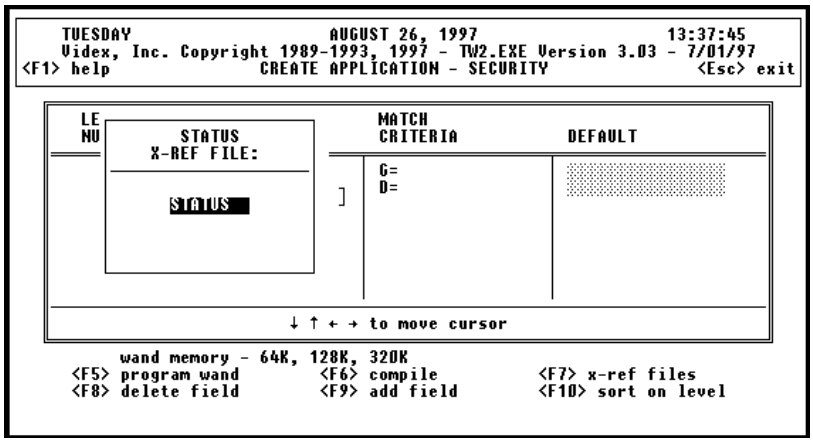


Figure 3-44 STATUS Field Cross-Reference File

40. Press <Enter>. The .XRF extension is automatically added to the filename and an area for entering the cross-reference file appears (Figure 3-45).

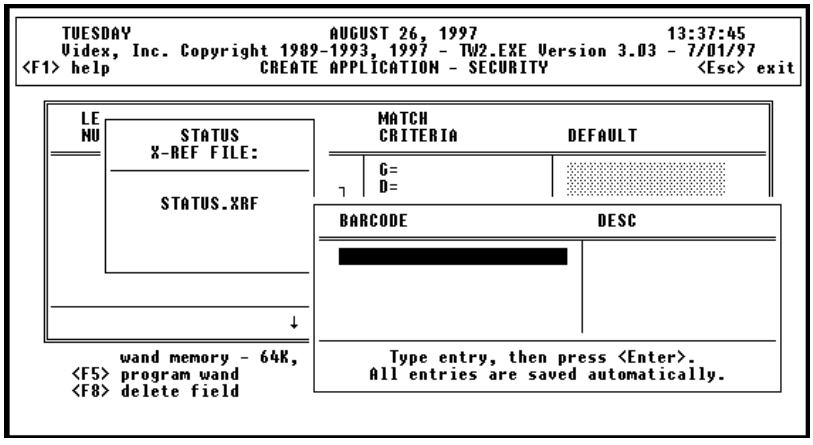


Figure 3-45 STATUS Cross-Reference File

41. In the following steps we will enter the following data for our STATUS cross-reference file:

S91	Locked
S92	Unlocked
S93	Called Police
S94	Passed
S95	Maintenance Reqd

42. Type **S91** and press <Enter> (Figure 3-46).

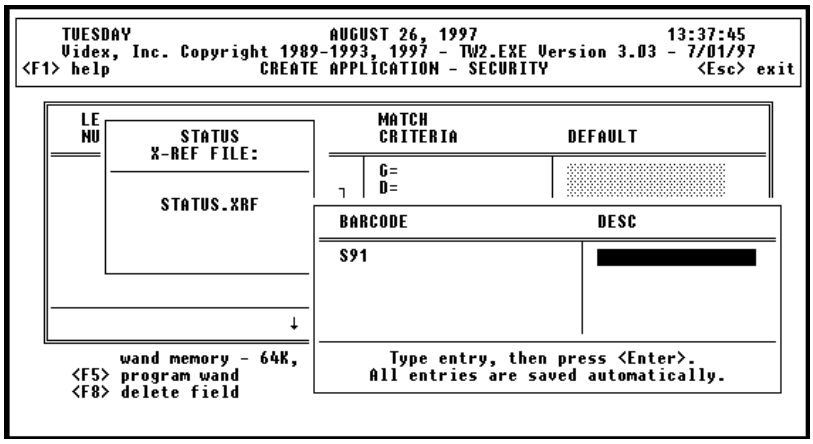


Figure 3-46 Enter S91

43. Type **Locked** and press <Enter> (Figure 3-47).

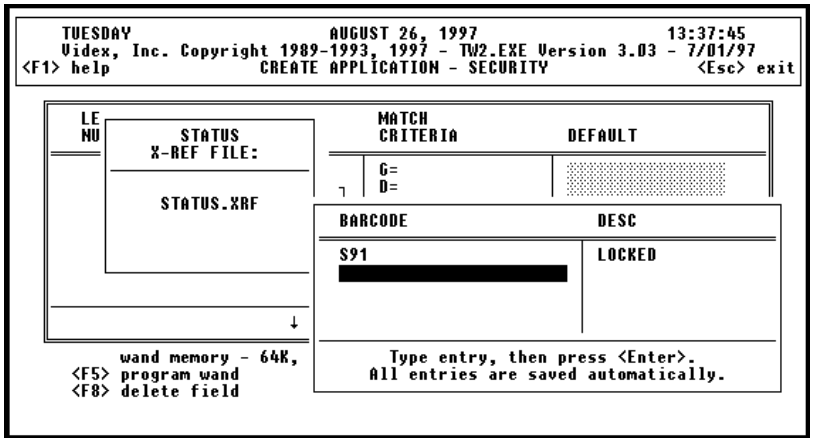


Figure 3-47 Enter Locked

44. Type **S92** and press <Enter> (Figure 3-48).

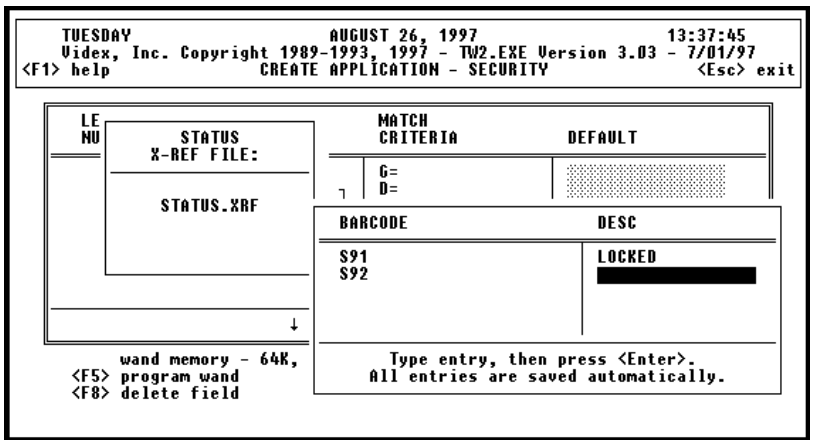


Figure 3-48 Enter S92

45. Type **Unlocked** and press <Enter> (Figure 3-49).

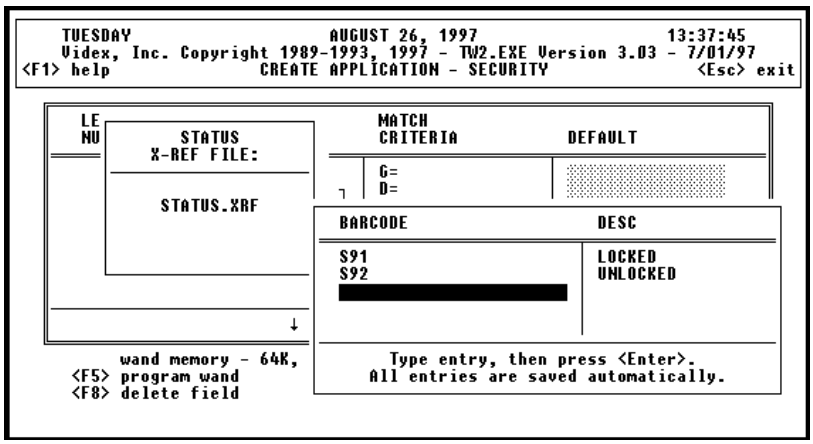


Figure 3-49 Enter Unlocked

46. Type **S93** and press <Enter> (Figure 3-50).

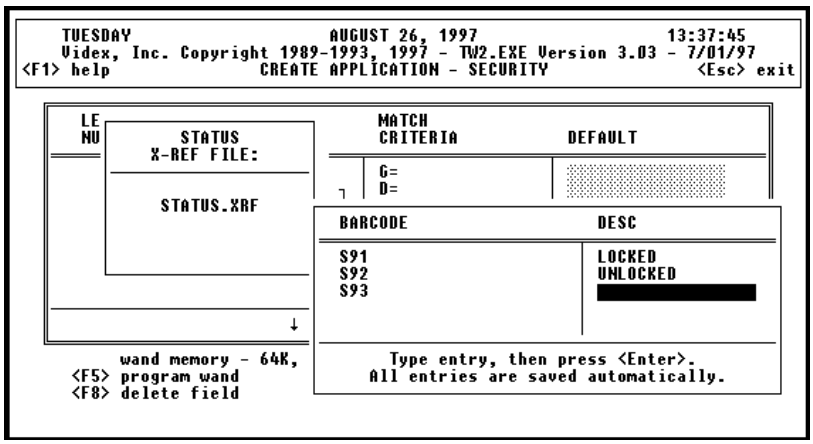


Figure 3-50 Enter S93

47. Type **Called Police** and press <Enter> (Figure 3-51).

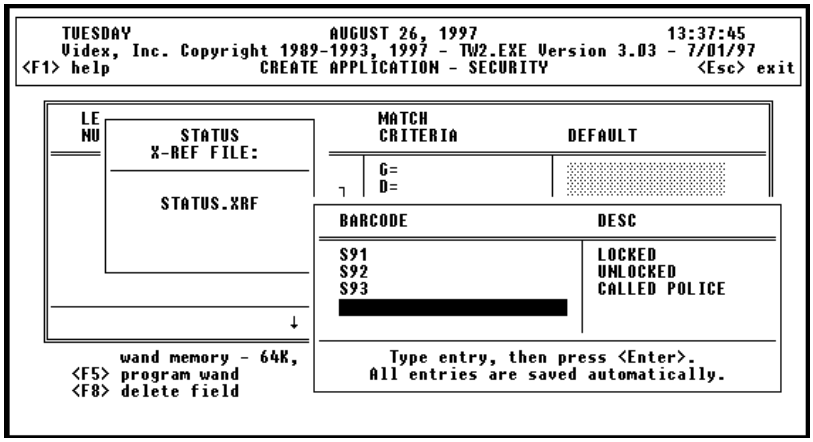


Figure 3-51 Enter Called Police

48. Type **S94** and press <Enter> (Figure 3-52).

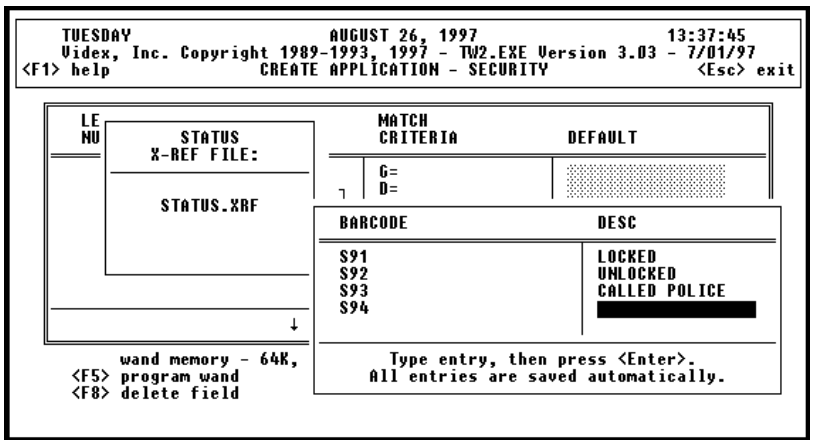


Figure 3-52 Enter S94

49. Type **Passed** and press <Enter> (Figure 3-53).

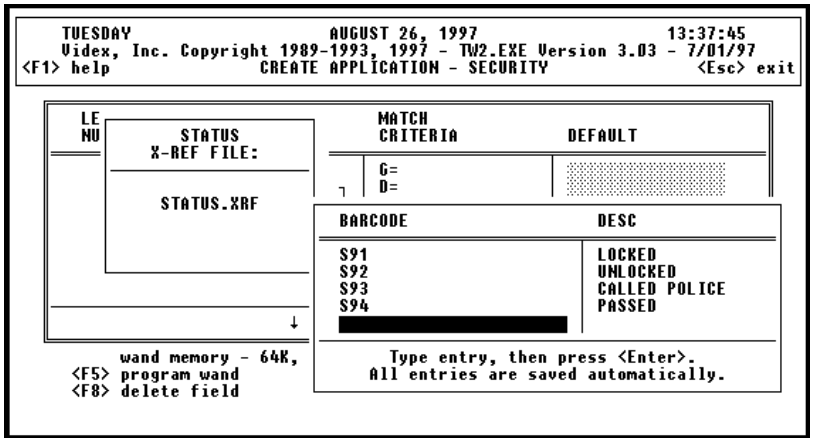


Figure 3-53 Enter Passed

50. Type **S95** and press <Enter> (Figure 3-54).

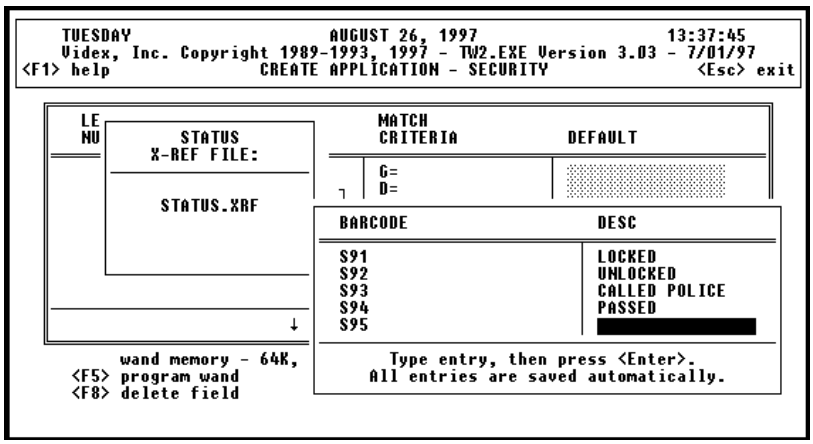


Figure 3-54 Enter S95

51. Type **Maintenance Reqd** and press <Enter> (Figure 3-55).

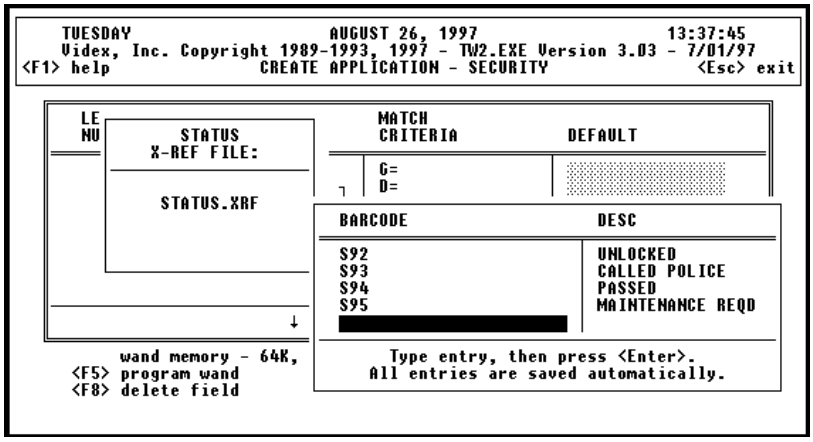


Figure 3-55 Enter Maintenance Reqd

52. Press <Escape> to close and save the cross-reference file (Figure 3-56).

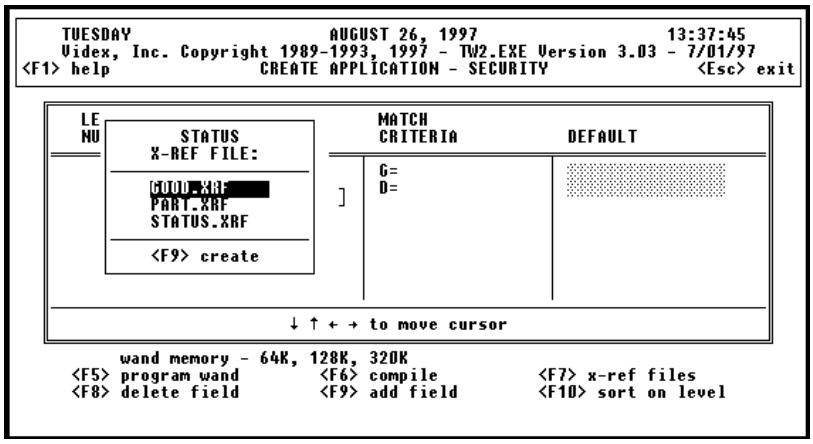


Figure 3-56 Save Cross-Reference File

53. Use the down arrow key to select the STATUS.XRF file (Figure 3-57).

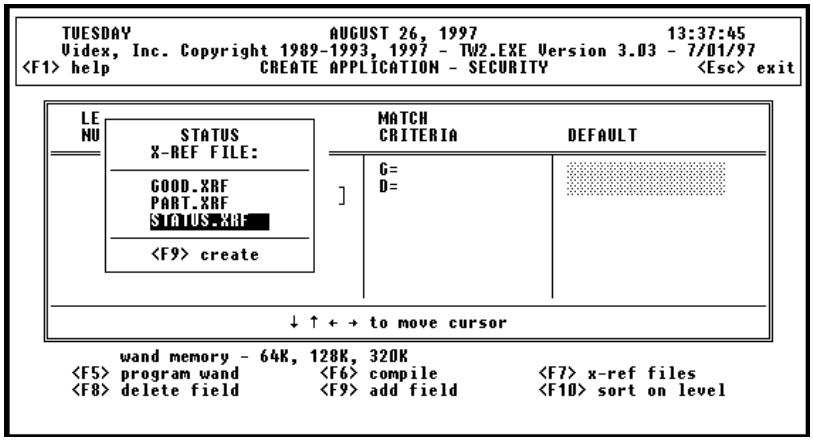


Figure 3-57 Select STATUS.XRF File

54. Press <Enter> to use the selected STATUS.XRF file for the STATUS field Match Criteria (Figure 3-58).

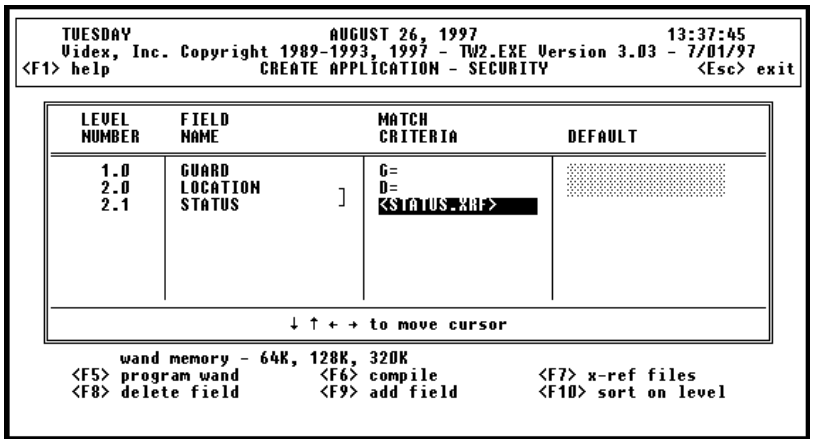


Figure 3-58 STATUS Field Match Criteria

55. Use the right arrow key to move the cursor to the STATUS field's default column (Figure 3-59).

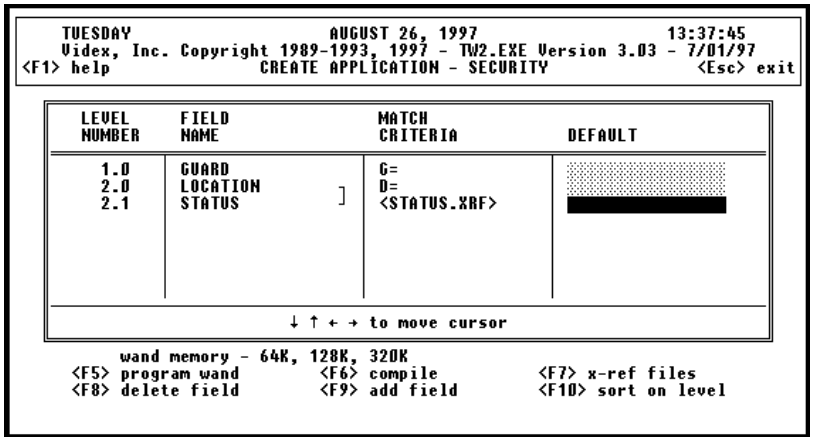


Figure 3-59 STATUS Field Default Column

56. Press <Enter> to edit the field and type **S91** (Figure 3-60).

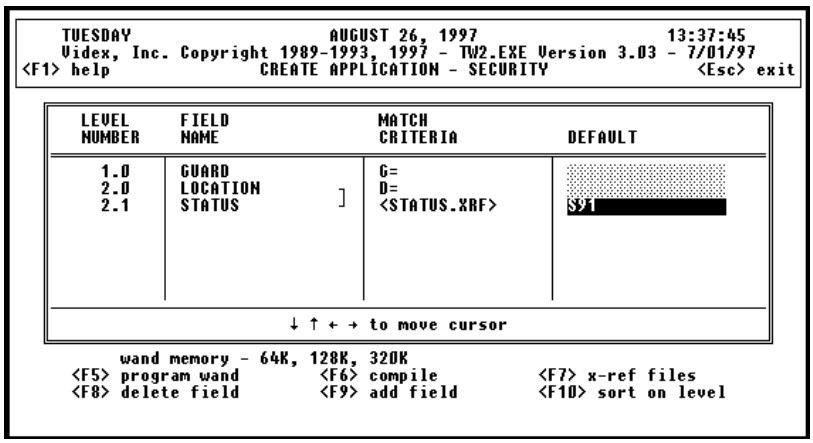


Figure 3-60 STATUS Field Default Entered

57. Press <F6> to compile the application. The application must be compiled before it can be used by a TimeWand II.

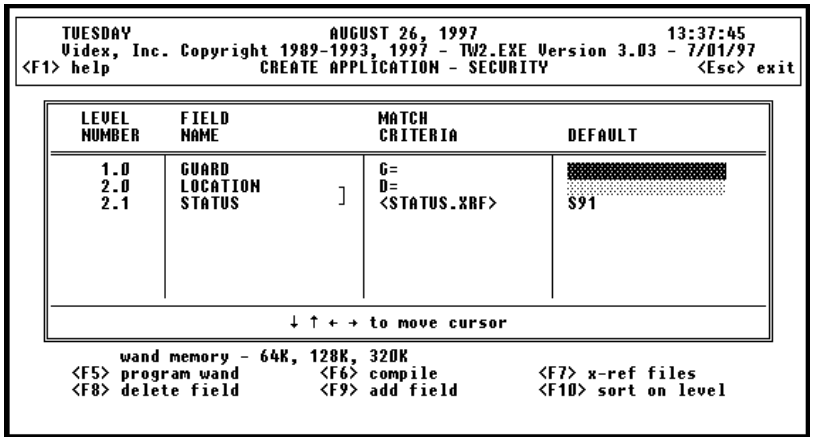


Figure 3-61 SECURITY Application Compiled

58. Press <Esc> to close the Create Application screen and return to the Wand Set Up screen (Figure 3-62).

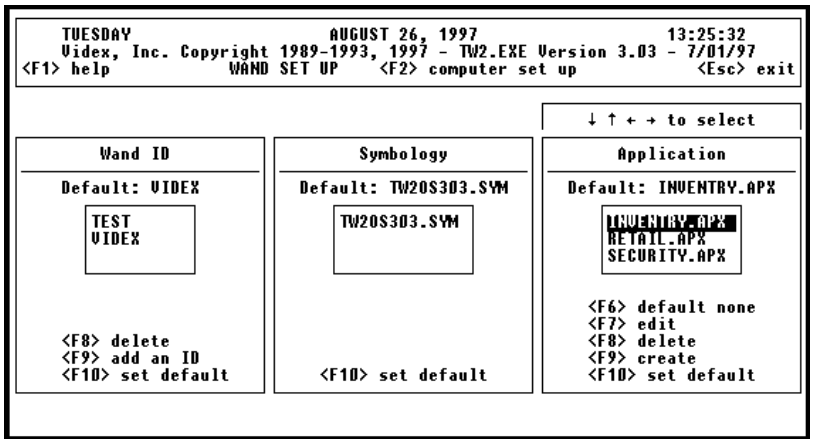


Figure 3-62 Wand Set Up Screen

59. Use the down arrow key to highlight the SECURITY.APX application (Figure 3-63).

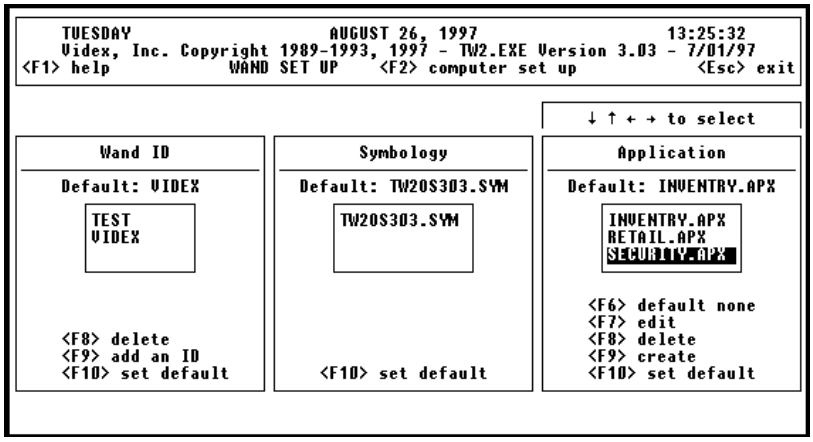


Figure 3-63 Wand Set Up Screen - Select SECURITY.APX

60. Press <F10> to make the SECURITY.APX application the default application (Figure 3-64). The name of the default application is displayed above the application choices.

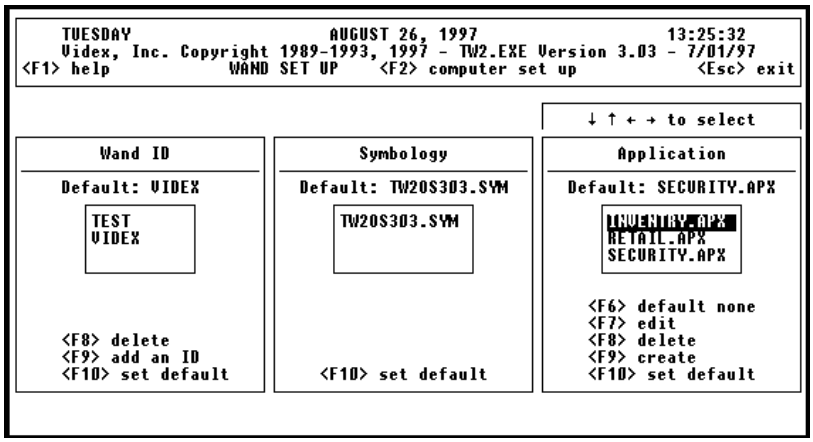


Figure 3-64 SECURITY.APX is Default Application

61. Press <Esc> to exit the Wand Set Up screen and return to the Main Menu screen (Figure 3-65).

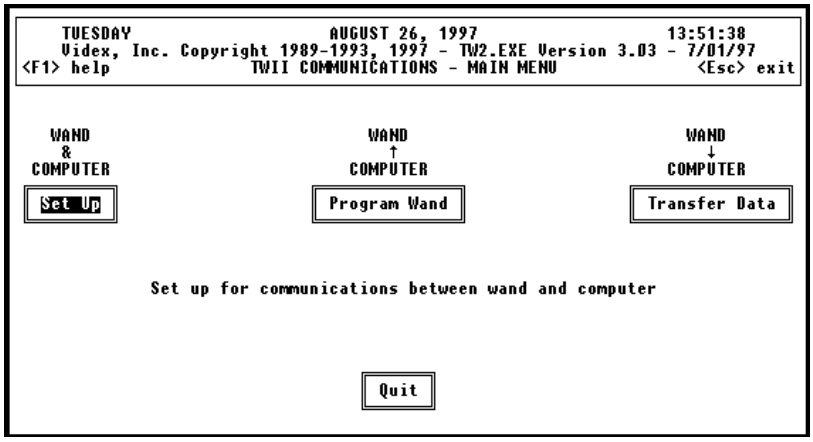


Figure 3-65 Main Menu Screen

62. Type a **P** to go to the Program Wand screen (Figure 3-66).

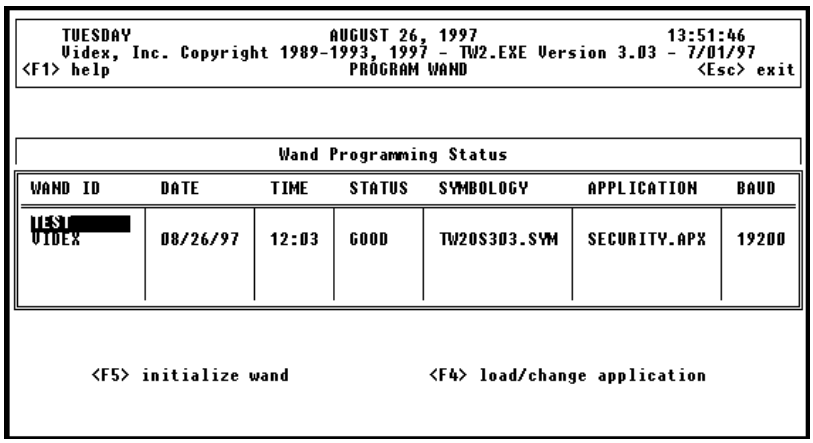


Figure 3-66 Program Wand Screen

63. Insert your TimeWand II into the Recharger/Downloader Station.

64. Use the down arrow to select the **VIDEX** wand ID at the Program Wand screen (Figure 3-67).

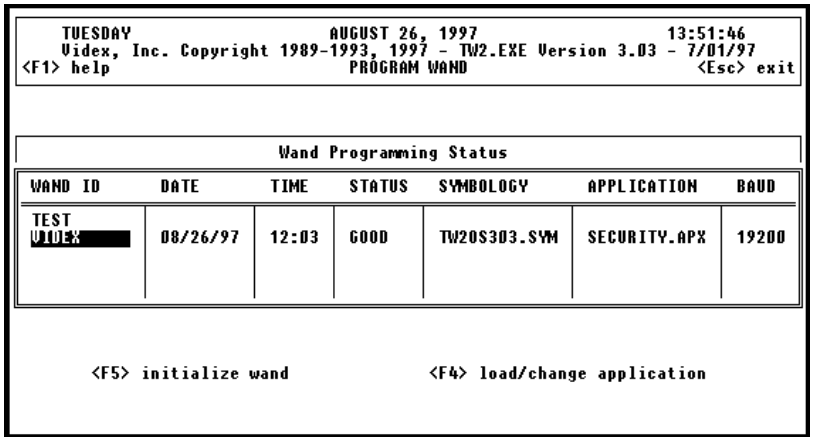


Figure 3-67 Program Wand Screen - Select Wand ID VIDEX

65. Press <F4> to load the wand with the SECURITY.APX application (Figure 3-68). A warning is displayed that the data is about to be cleared when the application is changed.

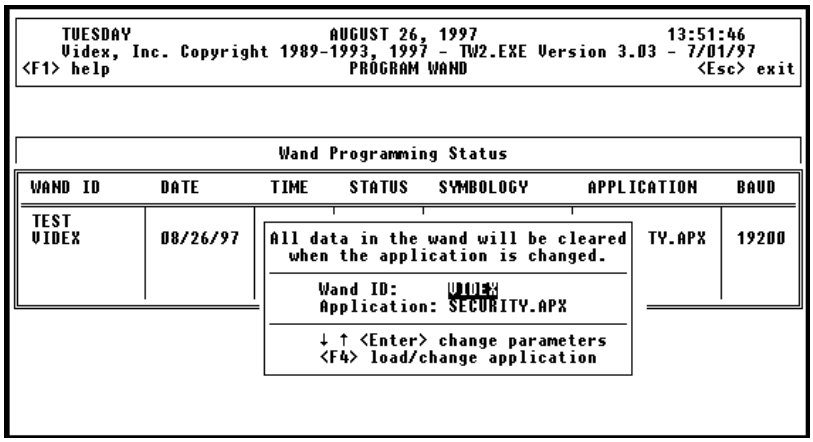


Figure 3-68 Program Wand Screen - Load/Change Application Warning

66. Press <F4> again to load the application into the wand (Figure 3-69).

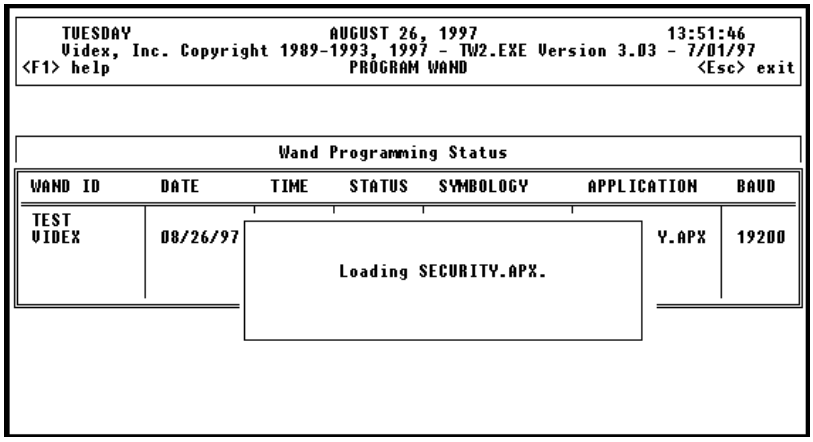


Figure 3-69 Program Wand Screen - Loading SECURITY.APX Application

67. A message is displayed when the application is loaded into the wand (Figure 3-70). Press any key to clear the message from the screen.

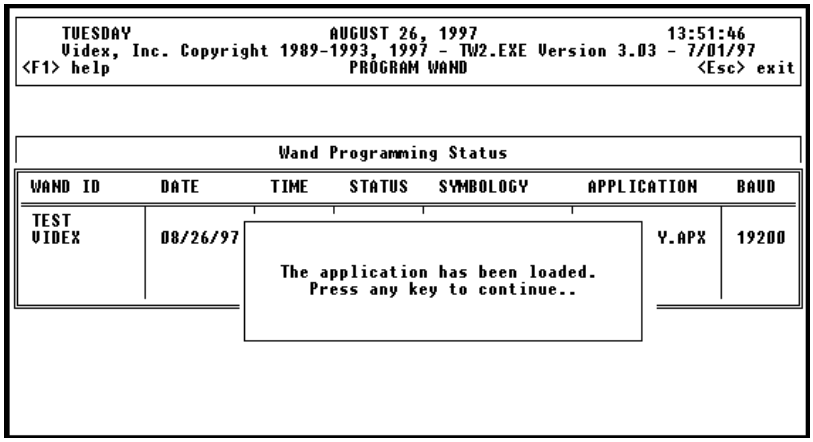


Figure 3-70 Program Wand Screen - Application Loaded Message

68. The date, time, and status of the wand programming are updated at the Program Wand screen (Figure 3-71).

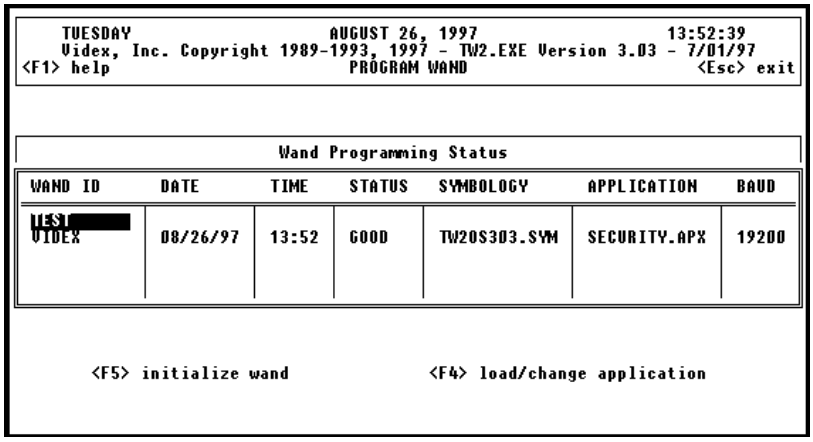


Figure 3-71 Program Wand Screen

69. Press <Esc> to exit the Program Wand screen and return to the Main Menu screen (Figure 3-72).

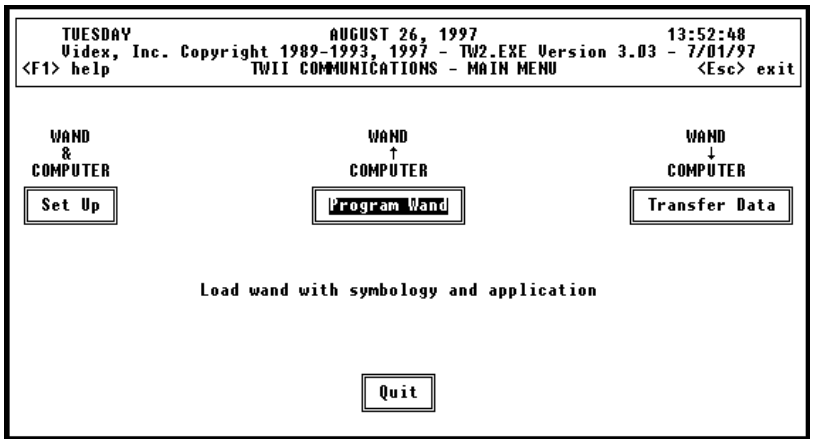


Figure 3-72 Main Menu Screen

70. Remove the TimeWand II from the recharger/downloader.

71. Scan the following SECURITY.APX application bar codes. The first line of the display will show you what type of bar code to scan. First scan a Guard bar code, then a Location bar code, and then a Status bar code. To enter the Status default of S91, press the TimeWand II's = key when **STATUS S91?** appears on the wand's display

Guard # Bar Codes


Location # Bar Codes


Status Bar Codes


Locked


Unlocked


Called Police


Passed


Maintenance Reqd

Figure 3-73 Sample SECURITY.APX Application Bar Codes

If the scan is successful, you hear a beep and the scanned data is displayed on the bottom line. If the scan is unsuccessful, you hear a short chirp and the display tells you that you did not scan the right bar code

72. After scanning the bar codes, use the up and down arrow keys on the TimeWand II to view the scanned data.

73. Type a **T** to go to the Transfer Data screen (Figure 3-74).

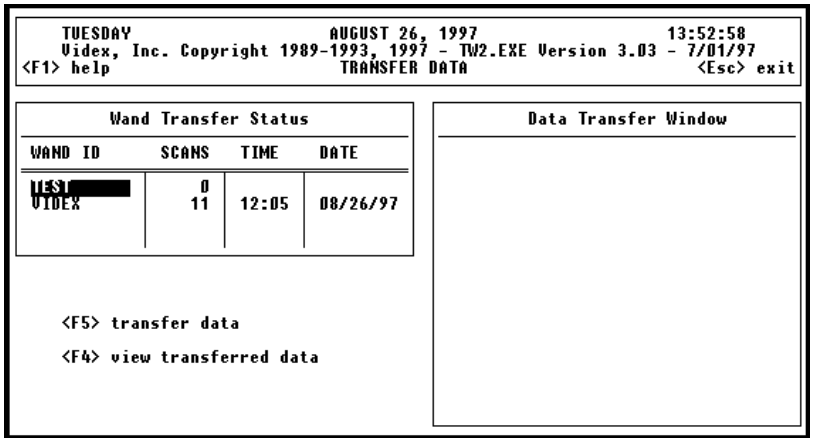


Figure 3-74 Transfer Data Screen

74. Insert your TimeWand II into the Recharger/Downloader Station. Verify that the **Power** light is lit and that the computer cable is still connected. Press the scan button. The message “Power connected” flashes on the TimeWand II display followed by the charge status message. If you do not press the scan button, the message should automatically appear within 60 seconds.

75. Press <F5> to transfer data. The Scan data and Output file screen appears (Figure 3-75). We will use **Erase Previous Scans** and **Raw Scan File** in this example.

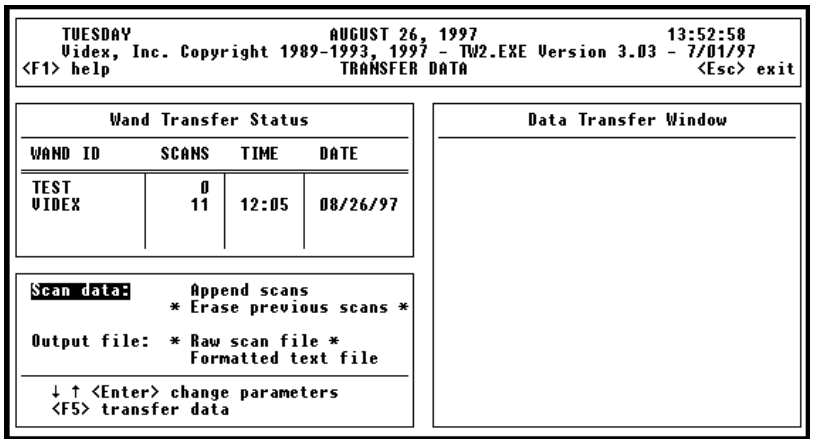


Figure 3-75 Transfer Data Screen Options

76. Press <F5> again. Since we chose **Erase previous scans**, a warning message is displayed that the previous scans in the DATA.BCD file are about to be erased (Figure 3-76).

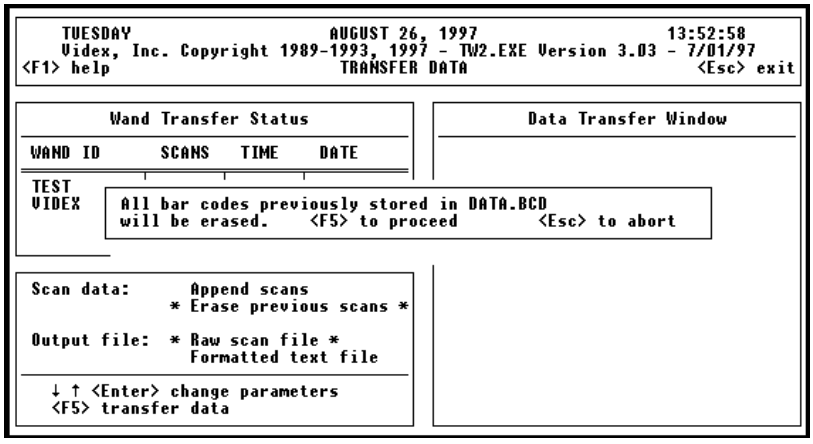


Figure 3-76 Transfer Data Screen Warning

77. Press <F5> again to proceed with the transfer (Figure 3-77). A box displaying “Looking for Wand ID: VIDEX” appears. Once the computer completes the connection with the TimeWand II, the message changes to “Transferring Wand ID: VIDEX.” The display on the TimeWand II reads “TRANSFERRING NOW” while the bar code information is being transferred to the computer.

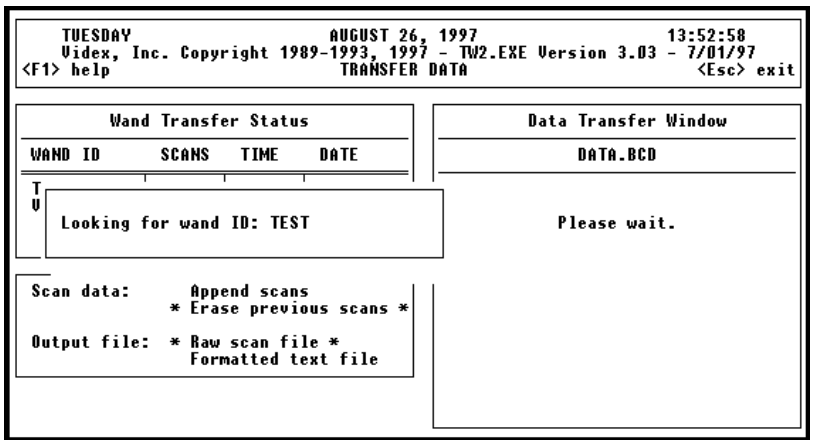


Figure 3-77 Transfer Data Screen

78. After the information has been transferred, the display on the TimeWand II reads “DOWNLOAD COMPLETE.” The TimeWand II display tells you how many scans were transferred. Another message automatically follows on the TimeWand II display that reads “WAND CLEARED ## SCANS.” The # signs represent the number of scans transferred. The computer continues to search for any other wand IDs listed in the Wand Transfer Status window. This search continues for 70 seconds, or you may press <Esc> to stop the search.

79. The scans that were transferred appear at the Data Transfer Window (Figure 3-78). It may take a couple of minutes for the scanned data to appear in the Data Transfer Window.

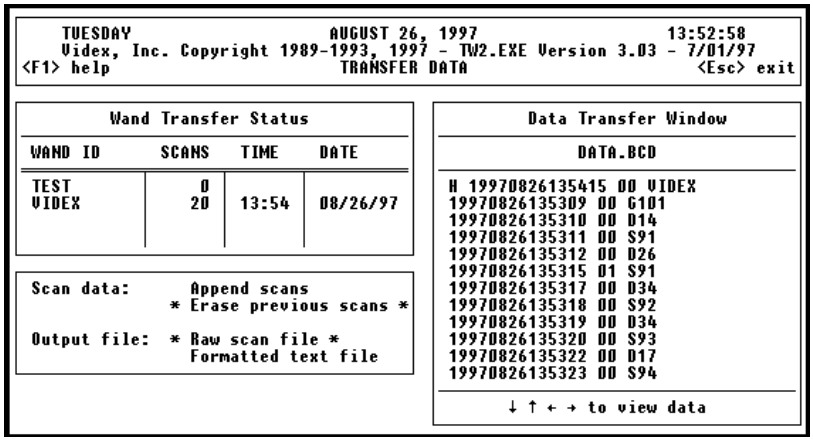


Figure 3-78 Transferred Data Displayed

80. After viewing your scanned data, press <Esc> to clear the Data Transfer window (Figure 3-79).

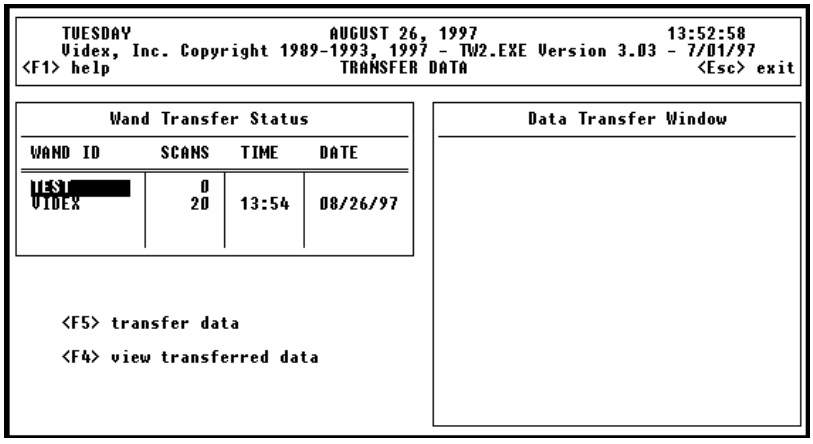


Figure 3-79 Transfer Data Screen

81. Press <Esc> again to exit the Transfer Data screen and return to the Main Menu screen (Figure 3-80).

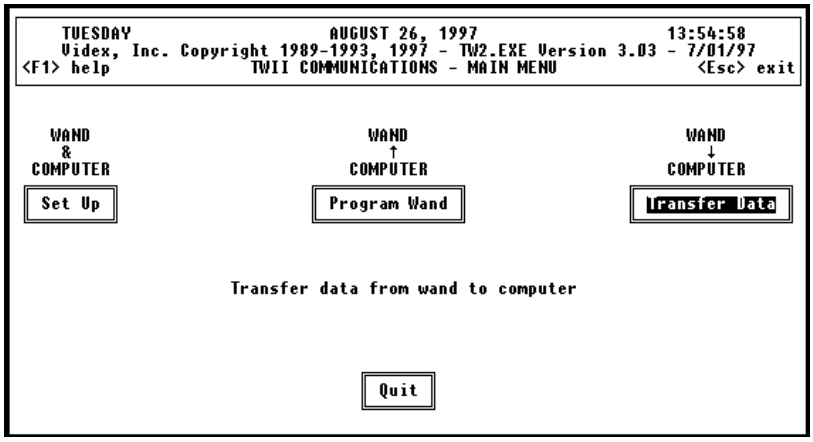


Figure 3-80 Main Menu Screen

82. From the Main Menu screen, you may exit the TimeWand II Communications & Application Builder software by either typing a **Q** or highlighting **Quit** and pressing <Enter>.

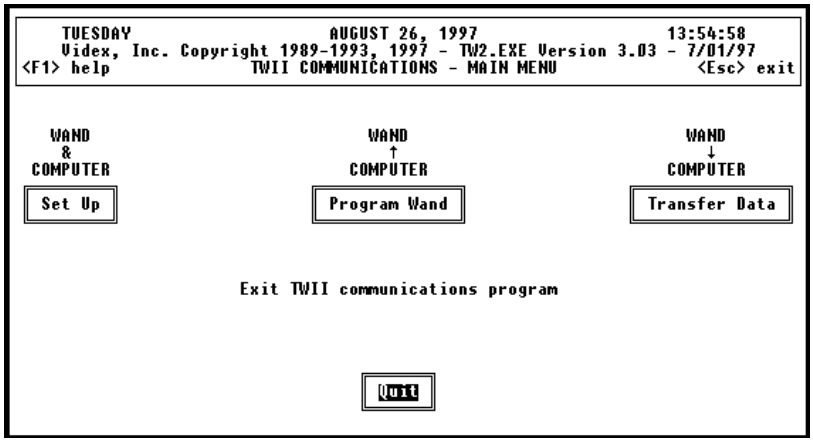


Figure 3-81 Quit Program

83. You have now successfully built an application and cross-reference file, compiled the application, loaded the application into the wand, scanned a sample security round, transferred the data to the computer, and viewed the transferred data.

The next chapter provides additional information on the TimeWand II and bar codes.

Chapter 4

TimeWand II Reference

This chapter is a reference for your TimeWand II. It has additional information about the operation of the TimeWand II and the use of bar codes.

TimeWand II Memory

TimeWand II is available with either 64K, 128K, or 320K of memory. Some of the memory in the TimeWand II is used to store the programs that allow the wand to operate properly.

A TimeWand II with 128K (K = 1024 characters) of memory has enough room for over 5900 five-digit Code 3 of 9 symbology bar code scans to be kept in memory before it is necessary to transfer the data to your computer. This is equivalent to one scan every five seconds for eight hours. The number of scans that can be stored depends of course on the length of the bar codes, but there are also other variable factors. The time and date information recorded with each scan takes more or less room depending on the length of time since the last scan. An average is about eight characters (or "bytes") for each bar code scanned.

A TimeWand II with 320K of memory has enough room for over 21,000 five-digit bar code scans. Because some of the memory in the TimeWand II is used to store the program that gives it the ability to scan bar codes, the 64K version can only store approximately 880 scans. The data capacity of the wand is reduced by application programs, particularly those with cross-reference files. The remaining data-storage memory as well as the wand ID can be checked by pressing the **M** key.

The number of scans that can be stored in a wand can be approximated with the formula:

$$\text{Approximate Scans} = \frac{\text{Characters (bytes) of Memory}}{(\text{Characters in bar code}) + 8}$$

TimeWand II Clock

The TimeWand II's built-in clock is set to the same time as the computer which is used to program or transfer data from the TimeWand II. For the TimeWand II clock to be correct, it is important that the date and time on the computer are set correctly when communicating with a TimeWand II.

When a bar code is scanned successfully, the date and time of the scan are recorded along with the bar code itself. This timekeeping feature makes it possible for you to use a database, spreadsheet, or other program to calculate beginning, ending, and intervals of time.

Each time you transfer data from a TimeWand II or program a TimeWand II, the clock is automatically set. Transferring data from a TimeWand II at least once a week will keep its clock values correct within ten seconds of the computer's clock.

TimeWand II Read Head

TimeWand II is available with either a standard 700 nanometer (nm) near-visible light read head or optional 820 nm infrared or 655 nm visible light read heads.

A 700 nm read head falls at the very edge of the visible light range. It can read the widest variety of bar codes; it can read some masked bar codes, some high-density bar codes, and some direct thermal printed bar codes.

A 655 nm read head is in the visible light range. Bar codes printed with a variety of printers, including direct thermal, can be read by this read head. The 655 nm read head may also read other bar codes where contrast has been a problem, such as bar codes printed by an ink-jet printer.

An 820 nm read head is in the infrared light range, not visible to the human eye. This read head reads all masked bar codes, and frequently reads higher density bar codes than the other read heads. An 820 nm read head reads bar codes printed by a variety of printers, but not direct thermal printed bar codes.

All three read heads read thermal transfer printed bar codes. The following table shows which optics work best for various printing methods.

Bar Codes	**Visible Optics** 655 nm	**Near-Visible Optics** 700 nm	**Infrared Optics** 820 nm
Direct Thermal			
Thermal Transfer			
Laser Printed			
Ink-Jet Printed			
Higher Density❶			❷
Clear Laminated❸			
Opaque Laminated❸		❷	

❶ Bar codes with smallest dimension less than 0.0075".
❷ Can read some bar codes of this type; testing recommended before purchase.
❸ Maximum laminate thickness is 5 mils; 3 mils is recommended.

We recommend using the standard 700 nm read head for a TimeWand II unless you have a special need for one of the optional read heads.

The read head is protected by a sapphire scan tip which keeps the read head clean and protects it from damage.

Recharging the TimeWand II

Your TimeWand II comes equipped with a rechargeable NiCad battery pack. A common pattern of use for the TimeWand II is 8 hours of use followed by 16 hours of recharging. A charge normally lasts for 8 hours of moderate use and may last for several days under light use.

The TimeWand II software has a charge management feature that automatically controls the recharge cycle, allowing the batteries to recharge as quickly as possible without overcharging. The TimeWand II estimates how much standard charge it requires by keeping track of the last time it was in the recharger/downloader and the amount of use it has received. You can determine the amount of charge left in your programmed TimeWand II and the approximate time required to bring it to a full charge capacity by pressing the **M** and **left arrow** keys simultaneously. When the wand is placed in the recharger/downloader, the batteries are charged at a standard rate for the estimated amount of time and then the charge drops to a trickle charge to maintain full capacity without overcharging the batteries.

After the TimeWand II is programmed, it is able to switch automatically to a low-power mode. Before it is programmed, while it is in Monitor Mode and the display reads “TW2 MONITOR 1.75,” it is not able to switch to a low-power mode and therefore drains the batteries in about five hours. When working with an unprogrammed wand, be sure to program it promptly, or remove the battery pack until you are ready to program it. (Note: 1.75 is a version number and may change with future software updates.)

To recharge your programmed TimeWand II:

1. Make sure the Recharger/Downloader Station’s **Power** light is on, and insert the wand into the slot.
2. Press the scan button; the “Power connected” message appears on the display followed by the charge state.

3. Let the wand charge until its display shows 100% Charge. If the display shows 100% Charge while in the recharger/ downloader, but shows Low Power when removed from the recharger/downloader, replace the TimeWand II battery pack. When the batteries are at the end of their life, the charge status will display 100% Charge when the wand is in the recharger/downloader; but when the wand is removed from the recharger/downloader, the display will show Low Power. The charge estimate is based on time, NOT on the actual charge capacity of the batteries.

If you are not using your TimeWand II for an extended period of time, such as a week or more, remove the battery pack before storing it. This keeps the battery pack from discharging too deeply. Be sure to recharge and reprogram your TimeWand II when you are ready to use it again.

In the event that the TimeWand II's batteries become drained to the point of not operating, follow the procedures described in the detailed troubleshooting section at the end of this chapter and in Appendix H.

Replacement battery packs for the TimeWand II are available. Please note the following caution when replacing the TimeWand II battery pack.

Caution:

Removing the battery pack from the TimeWand II clears all of the data and the program from the TimeWand II. Be sure to transfer the data from the TimeWand II before replacing the battery pack.

See Appendix G for more information on Automatic Recharge Management and Appendix H for additional information on TimeWand II NiCad batteries.

Using Multiple TimeWand IIs

The single Recharger/Downloader Station for TimeWand II charges one wand at a time. If you use more than one TimeWand II, you can purchase a multiple Recharger/Downloader Station which holds up to four TimeWand IIs for data transfer and recharging. The multiple Recharger/Downloader Stations can be connected in series to provide as many recharging positions as are required, all connected to a single computer serial port. Each multiple recharger/downloader in the series must be connected to a power outlet. The limit on the number of multiple recharger/downloaders in a series is normally determined by practical considerations rather than the hardware. Cable length between recharger/downloaders is limited to 50 ft. The connections are shown in Figure 4-1.

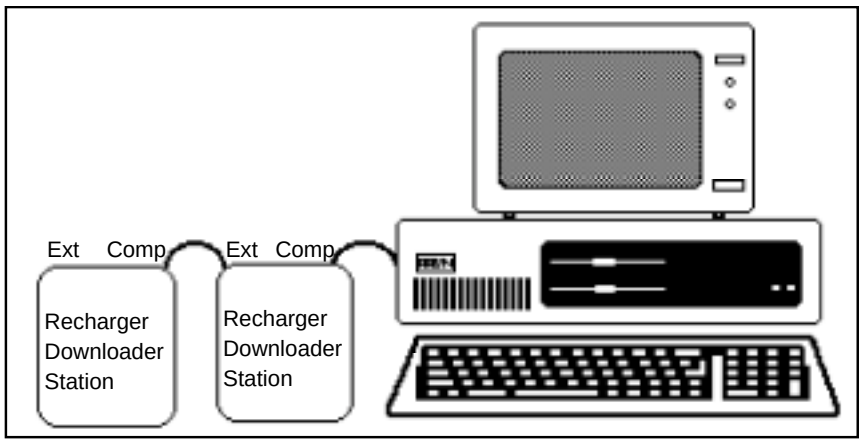


Figure 4-1 Recharger/Downloaders in Series

Connect the first multiple recharger/downloader to the computer. See page 16 for instructions. To add additional multiple Recharger/Downloader Stations, connect one end of an interconnect cable (TWC-006) into the “Extension” socket of the multiple recharger/downloader that is connected to the computer. Connect the other end of the interconnect cable into the “Computer” socket on the next multiple recharger/

downloader. Continue the same pattern of connection for each additional unit.

Single Recharger/Downloader Stations cannot be connected in series because they do not have an “Extension” socket. However, a single Recharger/Downloader Station can be used at the end of the series, since only the “Computer” socket is needed for the last recharger/downloader station in a series.

The series arrangement allows you to transfer data from more than one TimeWand II in a single transfer process. To avoid losing data and other problems when using multiple Recharger/Downloader Stations, you need to be aware of the following cautions:

Caution:
Do not attempt to program more than one TimeWand II at a time in a multiple recharger/downloader set up. The TimeWand IIs will not be damaged, but they will not be properly programmed.
The data transfer process may take several minutes for each wand. Do not interrupt the process by disconnecting a TimeWand II or aborting the program or you may lose data. The system is designed to avoid data loss, but observing this caution provides added protection.

- Each of the TimeWand IIs used in a multiple recharger/ downloader arrangement must be configured and have a unique wand ID. Each of these wand IDs should appear in the **Wand ID** column at the software's Program and Transfer screens.

- After all the TimeWand IIs are inserted into the multiple Recharger/Downloader Stations, the data transfer process can be started. The order of data transfer is the order of the wands in the transfer list. However, some circumstances can change the order. When a wand is first inserted into the recharger/downloader, it may not immediately recognize the presence of external power because it is in a state of "sleep." This is a normal part of its operation. Every 60 seconds, it automatically "wakes up" and checks to see if anything is happening. It recognizes the external power and flashes the message "Power connected," and then displays the charge status. If data transfer is started before the first wand in the list is awake, there is no response when the computer calls out its ID. The computer then continues down the list looking for a wand that is awake. The order of data transfer is therefore unpredictable. If the order of transferring data from several wands is important, you should insure that the first wand is awake; you can press its scan button before you start the transfer process. The other wands usually wake up while the first is being transferred. If the amount of data in the wands is small, you should wake up all the wands before starting the transfer.

- Do not remove any of the TimeWand IIs from the recharger/downloaders, quit the TimeWand II Communications & Application Builder program, or shut down your computer until the transfer process is complete. After the transfer is complete, you can view the data by opening the data file.

To avoid losing data, we suggest that you do not interrupt the data transfer process. Do not remove the TimeWand II from the recharger/downloader until this process is completed. However, if you should inadvertently remove a TimeWand II while it is in the process of transferring data, the TimeWand II software displays a message that it was unable to communicate with the wand and then continues to try to transfer the data from all of the other wands in the transfer list. The data in the wand, which was interrupted, will not clear and can be transferred after the other wands have completed their data transfer.

Key Points on Using Multiple TimeWand IIs

- Each TimeWand II must have a unique wand ID.
- When programming, insert only one TimeWand II in the recharger/downloader at a time.
- The wand IDs of all TimeWand IIs used with a computer must be listed in the software's Wand ID column.
- Data is not cleared from a TimeWand II until all the data is correctly transferred to the computer.
- Do not interrupt the data transfer process.

Bar Code Scanpad

The Bar Code Scanpad is provided with the TimeWand II. It is a card that contains printed Code 3 of 9 bar codes assigned to numbers, letters, and symbols.

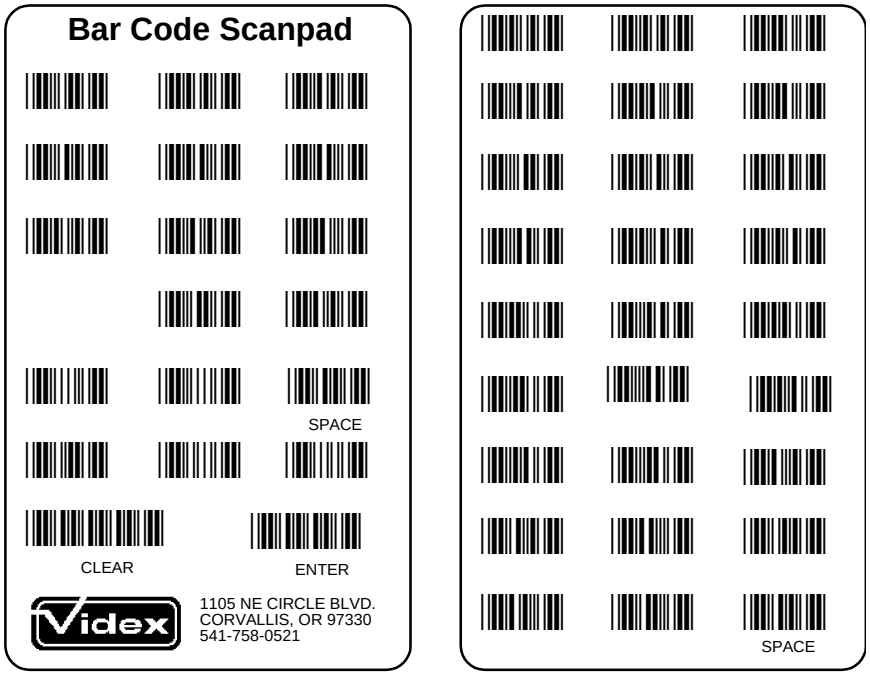


Figure 4-2 Bar Code Scanpad

You can scan the individual numbers, letters, and symbols on the scanpad to enter any bar code. This provides another method, besides the TimeWand II keypad, of manually entering characters when you encounter a bar code that is torn, damaged, or otherwise unreadable.

To use the scanpad to enter a bar code, scan each of the characters in proper sequence and then scan **ENTER**, or press the TimeWand II **=** key. For example, to enter the bar code number AG-352, scan the letters A and G, then the dash from the other side. Follow with the numbers 3, 5, 2, and then **ENTER** from either the **=** key on the wand or the Bar Code Scanpad. The TimeWand II makes a short beep after each character entry and makes a standard good-read beep for **ENTER**. The standard beep indicates that collective scanpad scans or keypad presses were recorded as a single bar code in the TimeWand II memory. The data is not time stamped for scanpad entries until you scan **ENTER** or press the TimeWand II **=** key.

If you decide not to make an entry after starting to scan some of the numbers or letters on the scanpad, you can remove these entries by scanning **CLEAR** before you have scanned **ENTER**. Individual characters can be erased by pressing the backspace key on the TimeWand II. Any manually keyed characters that have not been entered are also cleared when a bar code of two or more characters is scanned.

Bar Code Reference

Where to Get Bar Codes

Printed sheets of high quality “peel-off” labels containing various bar codes are readily available from the vendors listed in Appendix A. The bar codes can be organized in many different ways to meet the requirements of numerous applications. It is important that high-quality bar code labels be used for best reading results.

Bar Code Optimum Size

Bar code size can be specified by the width of the narrow bars and spaces, which should be equal to each other. Videx recommends that you use bar codes with this narrow element width equal to 15 thousandths of an inch. This size corresponds to about 5 bar code characters per inch. Be sure to include the start and stop characters when calculating characters per inch. Good performance cannot be guaranteed with a narrow element width of less than 10 thousandths of an inch. However, the TimeWand II can usually read good-quality, high-contrast bar codes with narrow elements of 8.5 thousandths of an inch (9 characters per inch). It usually cannot read bar codes with minimum dimensions of 5 thousandths or less.

0.015 narrow element width

Bar Code Symbologies

There are many different bar code symbologies. The following chart shows some of the most commonly used symbologies.

Bar Code	Uses	Description
Code 3 of 9	Auto parts, labels for sorting, Dept. of Defense, purchasing, and supply control	The most popular industrial and government bar code symbology. Reliable. Variable length bar code with both numeric and uppercase letters.
Interleaved 2 of 5	Industry, cartons of food, labels for sorting, and supply control	A popular industrial bar code symbology. This is a numbers only code and requires an even number of digits to make a legal code.
EAN	European product code	European retail code symbology.
UPC	Universal Product Code; grocery, drug, and medical goods	A food and drug retail market symbology. This is a variable length code.
Codabar	Medical sample control, photo processing, and libraries	Used for Red Cross blood banking. This is a variable length code.
Code 128	Shipping/receiving, inventory	A popular high-density bar code symbology. Variable length with upper and lowercase letters, all ASCII control characters, and all numeric entries.

Figure 4-3 Bar Code Symbologies

Before you use a TimeWand II, you should identify the type of bar code symbology you are using. TimeWand IIs can be programmed to read all of the listed symbologies and to store the type of bar code (Origin of Data number) with each scan.

TimeWand II Maintenance and Troubleshooting

- Do not expose your TimeWand II to temperatures in excess of 120°F (for example a car dashboard on a sunny day, or any direct sunlight for extended periods).
- Do not allow the TimeWand II to get wet. Being caught occasionally in a light shower won't cause any problems if you wipe the wand off promptly and allow it to dry. Avoid immersion, long-term exposure to high humidity, or regular exposure to rain.

If You Have Trouble

If your TimeWand II does not sound a "good read" tone when you scan a bar code and you are sure that the TimeWand II has a good battery charge, one or more of the following things may be wrong:

- The bar codes may be an unreadable bar code symbology (see the chart on page 143).
- The scan may be improperly performed. The scan should be made at a steady, moderately fast speed; the scan should start well within the white space preceding the code and should sweep completely through the bar code without going off the top or bottom of the bar code.
- The bar code contrast or printing quality may be inadequate. See the detailed troubleshooting section on bar code quality for further information.
- The bar code may be smeared or otherwise unreadable.
- The TimeWand II's battery pack may need replacement.
- The TimeWand II may have an internal component malfunction.
- You may be attempting to use an incorrect or non-functional user application.

Detailed Troubleshooting

Check Power: Before you attempt to recharge a wand that is completely discharged, you should try to insure that power is actually available to it. First make sure that the transformer is plugged into a working electric outlet and the **Power** light on the recharger/downloader is on. Press and hold any button on the TimeWand II; the letters "CHG" should appear on the second line of the display. If you do not get this indication, power is not reaching the recharger/downloader's connector. If you have access to a test voltmeter, you can use it to measure the voltage on the connector pins. The pin nearest the edge of the connector is the negative side, and the voltage should be about 18 volts DC.

In the case of a wand **with data still in it,** do NOT assume that failure to respond is an indication of data loss until you have been able to verify the presence of power. You should verify that the electric outlet is working by testing it with another electric device such as a radio or lamp and recheck everything. If there is no response from the wand after leaving it in the recharger/downloader for one hour, contact the Videx Technical Support Department for advice.

Data is Lost: When the battery voltage gets low the TimeWand II will not operate, preserving what is left of the battery power for a short time. In some cases this means that your data is still intact even though the wand has quit working because of a low battery. Since the battery eventually gets low enough to erase the memory, do not delay in transferring the data and recharging the wand. Promptly transferring the data after it is collected is the best way to prevent the possibility of data loss due to battery discharge.

If you have attempted to recharge a wand, with no response for two minutes, and you have **verified that power is available** at the recharger/downloader's connector, it is likely that the data has been lost due to excessive discharge of the batteries or malfunction of the wand. A reset and recharge often returns it to proper operation. If the data is difficult or impossible to reconstruct, contact the Videx Technical Support Department for assistance.

Check Cable, Serial Hardware, and Resident Software: If there is no response from the serial port, there are several possible causes. First check that all connections are securely connected. Try removing and inserting the TimeWand II into the recharger/downloader a few times. If there is still no response from the serial port, try using the same serial port with another piece of equipment and software that has worked before. A modem or direct connection to another computer with two-way communication is ideal, but a printer verifies at least outbound communication. If this test verifies that the serial port is functioning properly, there are two candidates for the cause of the problem. The first is the cable. If you have another cable of the same type, substitute it and run the tests again. If you have access to an ohmmeter or continuity checker, test the cable continuity using the cable diagrams in Appendix B. If you have none of these resources, contact the Videx Technical Support Department.

Another possibility to consider is software interference from resident software modules. The large variety of these resident programs presents many opportunities for problems. First try removing all of them from your system. Check your AUTOEXEC.BAT file to make sure you catch them all. Device drivers installed in a CONFIG.SYS file can also cause problems. One way to be sure is to rename these two files so you can restore them easily, construct a minimum CONFIG.SYS using FIXCONF.BAT, and reboot the system. Try running the software in this bare system. If it runs now and did not before, there is a software conflict. Try adding the resident software back one program at a time. When the problem reappears, it pinpoints the program causing the problem. If the offending program has an unload option, you may be able to load it last and remove it whenever you need to use the TimeWand II software.

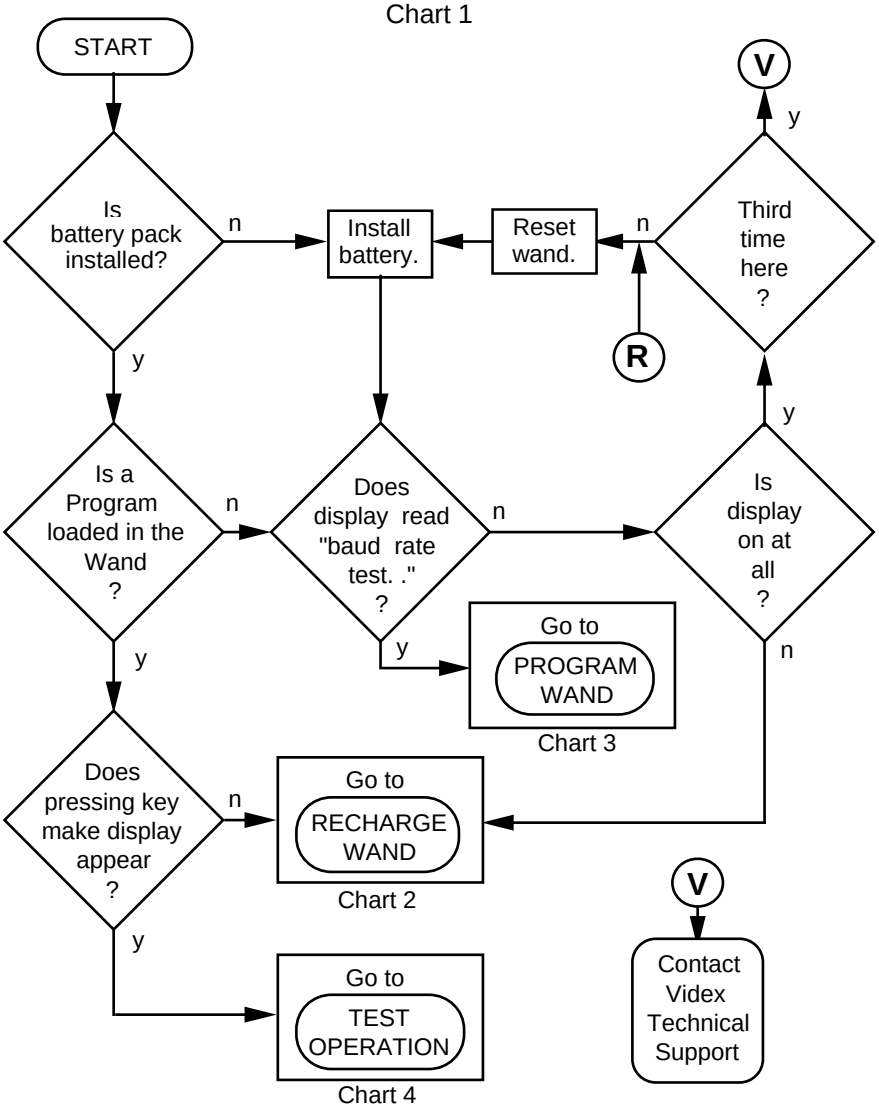
Bar Code Quality: Bar code symbols of poor quality reduce the read rate or in extreme cases are unreadable. Quality includes such elements as good contrast, clean printing, and correct dimensions.

Contrast may be difficult to evaluate. The background must appear white and the code elements must appear black when illuminated by the light of the read head. This is particularly difficult to judge when you are using the optional infrared read head. Some types of ink do not appear black in infrared light and some types of paper, notably directly-printed thermal paper, do not produce good contrast in infrared light even though they do appear to have good contrast in visible light. A good test of contrast is to make a normal-sized, clean photocopy of the bar code with the density adjusted so the copy appears identical to the original. If the TimeWand II reads the copy but not the original, it is very likely that there is not enough contrast in the original. The standard visible light read head is less sensitive to contrast changes with wavelength, but may also have difficulty reading bar codes printed on thermal paper. The same photocopy test can be used. A worn impact printer ribbon can also cause loss of contrast. Any inked ribbons used to print bar codes must be renewed promptly when code darkness begins to diminish.

The printing must be clean and have the correct dimensional relationships. Ragged edges, white specks in the bars, and black specks in the spaces or quiet zones at the beginning and end of the bar code reduce the reading performance. The narrow bars should be the same width as the narrow spaces, and likewise for the larger elements. The ratios between bars of different widths should be the values specified by the appropriate standard. Although the operating system symbology program can compensate for a certain amount of deviation from nominal values, extreme deviation from the standards produces unreadable bar codes.

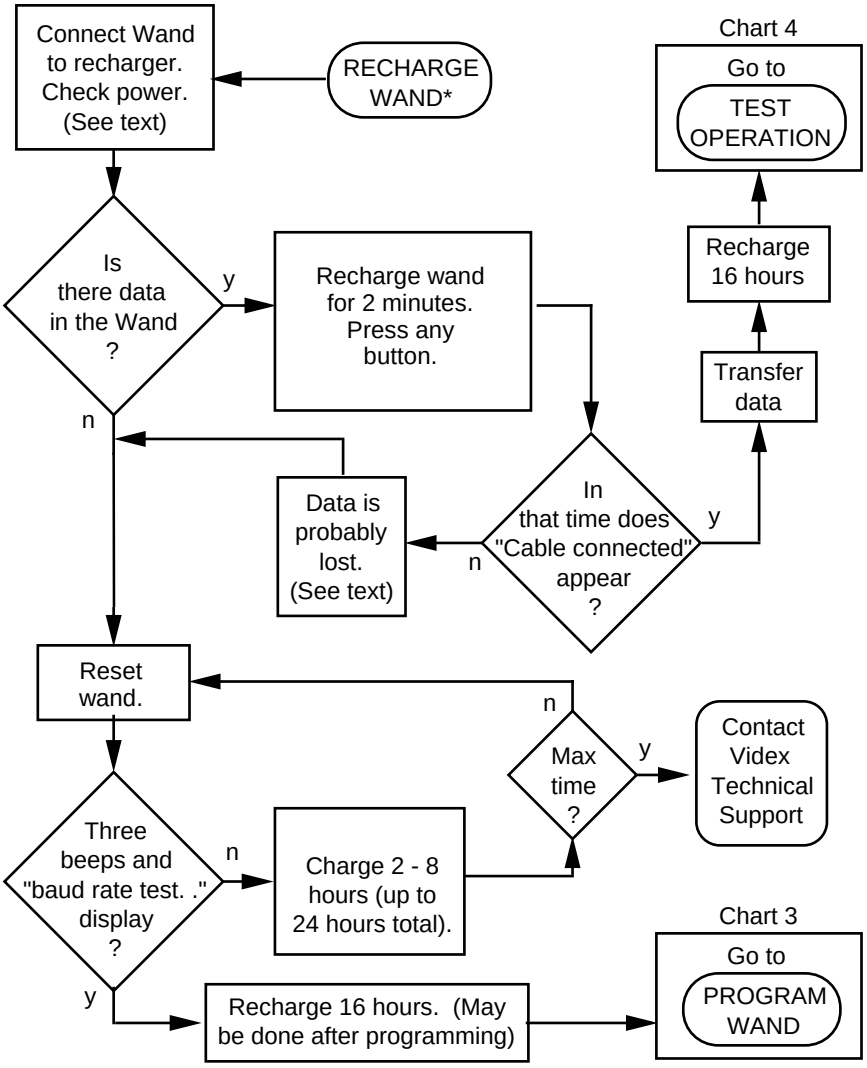
TROUBLESHOOTING

Chart 1

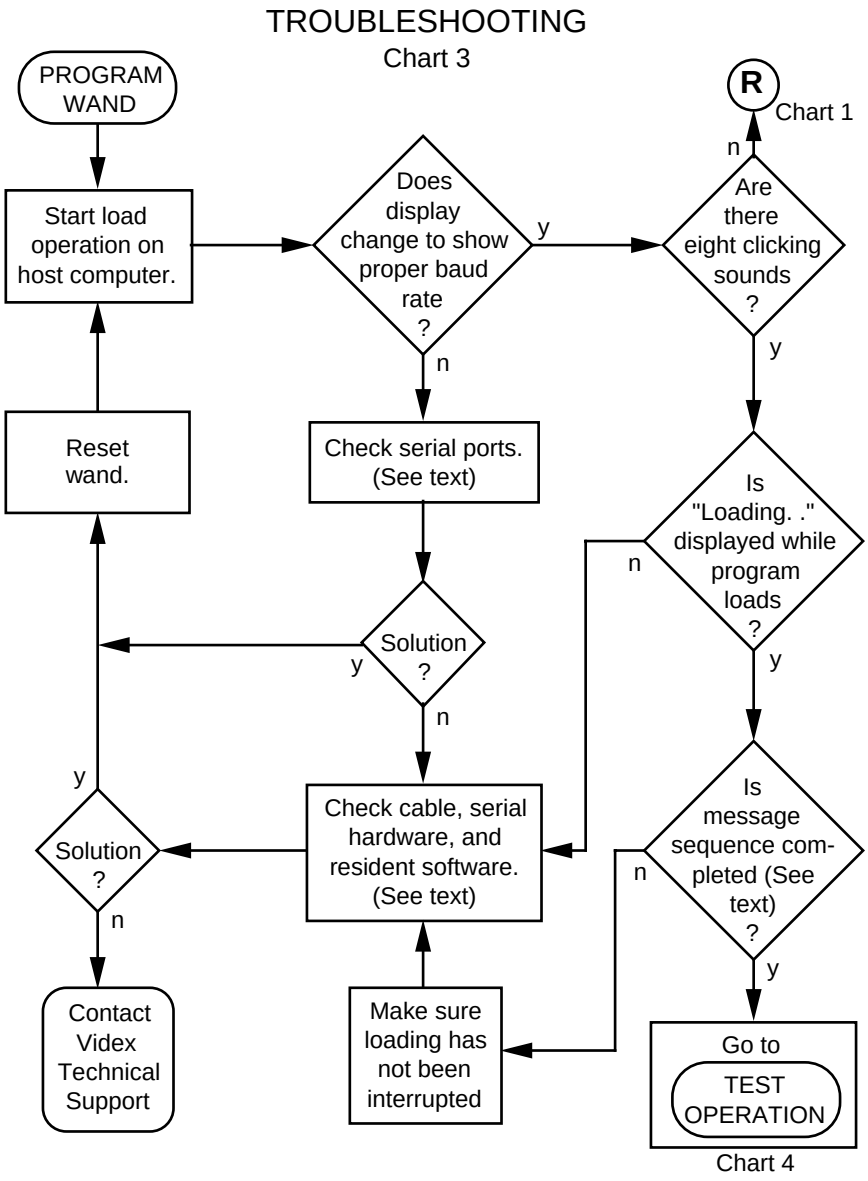


TROUBLESHOOTING

Chart 2

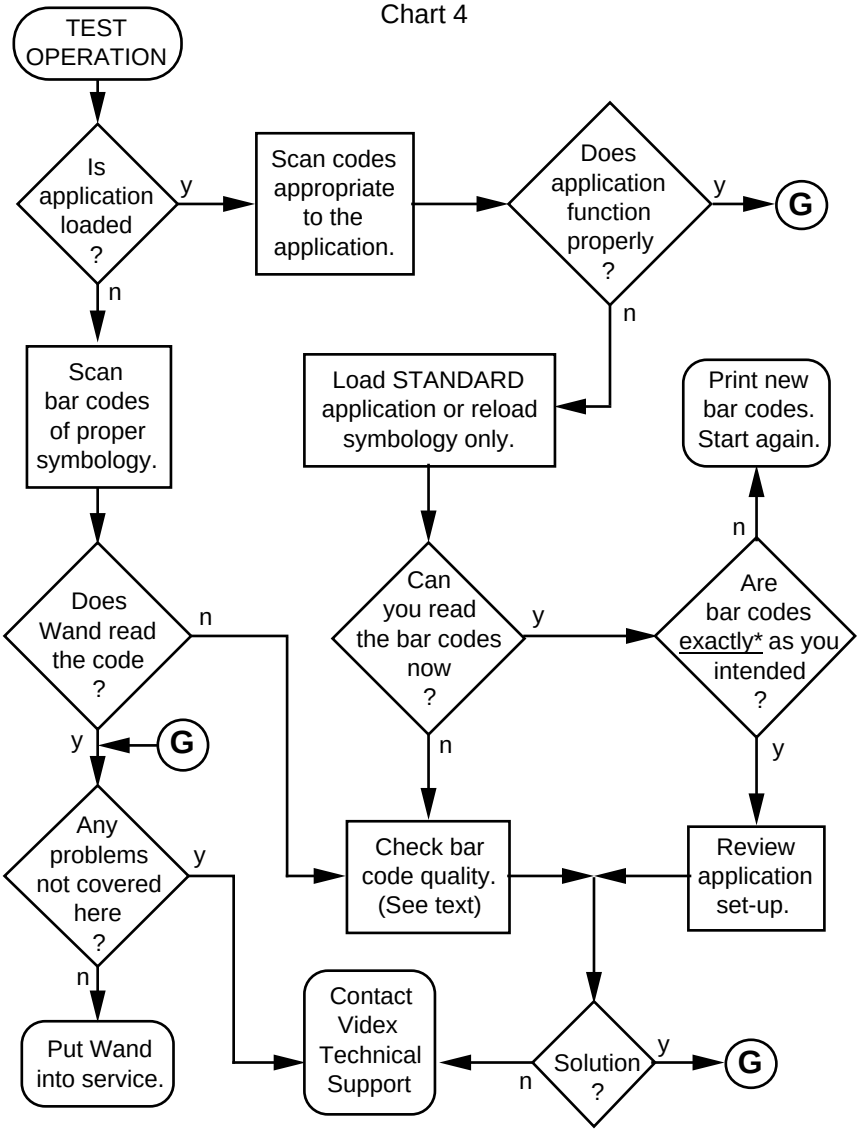


* This recharge procedure only for wands not operating correctly.


TROUBLESHOOTING
Chart 3
PROGRAM WAND
Start load operation on host computer.
Does display change to show proper baud rate ?
y
n
R
Chart 1
n
Are there eight clicking sounds ?
y
Reset wand.
Check serial ports. (See text)
Is "Loading. ." displayed while program loads ?
n
y
Solution ?
y
n
y
Solution ?
Check cable, serial hardware, and resident software. (See text)
n
Is message sequence com-pleted (See text) ?
y
Contact Videx Technical Support
Make sure loading has not been interrupted
Go to
TEST OPERATION
Chart 4

TROUBLESHOOTING

Chart 4



* Watch especially for leading or embedded spaces.

Appendixes

Notes:

Appendix A

Bar Code Vendors & Programs

Contents

Bar Code Vendors

Advanced Barcode & Label Technologies
5356 Five Forks Trickum
Lilburn, Georgia 30047
Phone: (770) 925-4834
(800) 321-3653
Fax: (770) 921-5849
Web site: www.ablt.com

Computype
2285 W. County Rd. C
St. Paul, Minnesota 55113
Phone: (800) 328-0852
Fax: (651) 633-5580
Web site: www.computypeinc.com

Data 2, Inc.
Sales Office
1099 Essex
Richmond, California 94801-2185
Phone: (510) 232-6200
(800) 227-2121 Outside California
Fax: (510) 235-2176
Web site: www.data2.com

D&K Laminex, **Inc**. *(Suppliers of ID badges)*
8350 Arrowridge Blvd.
Charlotte, NC 28273
Phone: (800) 438-8850
Fax: (704) 679-8453
Web site: www.laminex.com

Express, Inc. *(Suppliers of ceramic and steel bar codes)*
9235 Trade Place
San Diego, CA 92126
Phone: (800) 382-2323
(858) 549-9828
Fax: (858) 549-8708
Web site: www.expresscorp.com

Identatronics *(Suppliers of ID badges)*
425 Lively Blvd.
Elk Grove, Illinois 60007
Phone: (847) 437-2654
(800) 323-5403
Fax: (847) 437-2660
Web site: www.identatronics.com

Metalcraft *(Variety of materials available)*
149 Fourth St. SW
Mason City, Iowa 50401
Phone: (800) 437-5283
Fax: (515) 423-8898
Email: metalcraft@idplate.com
Web site: www.idplate.com

Watson Label Products
3684 Forest Park Blvd.
St. Louis, Missouri 63108
Phone: (314) 652-6715
Fax: (314) 652-8135
Web site: www.wlp.com

Bar Code Printing Programs

BarCode Labeler II *(Windows and Macintosh versions available)*
Videx, Inc.
1105 N.E. Circle Blvd.
Corvallis, Oregon 97330
Phone: (541) 758-0521
Fax: (541) 752-5285
Email: sales@videx.com
Web site: www.videx.com

Note: A laser printer is recommended for printing bar codes from a computer.

Notes:

Appendix B

Cable Pin Out 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 — Computer to Recharger/Downloader Station (25-Pin)

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

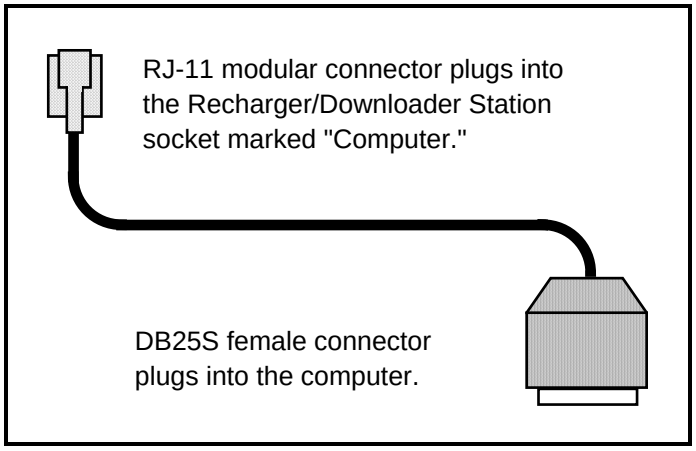


Figure B-1 25-Pin Serial Port Cable

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

Computer to Recharger/Downloader Station Cable (25-Pin)

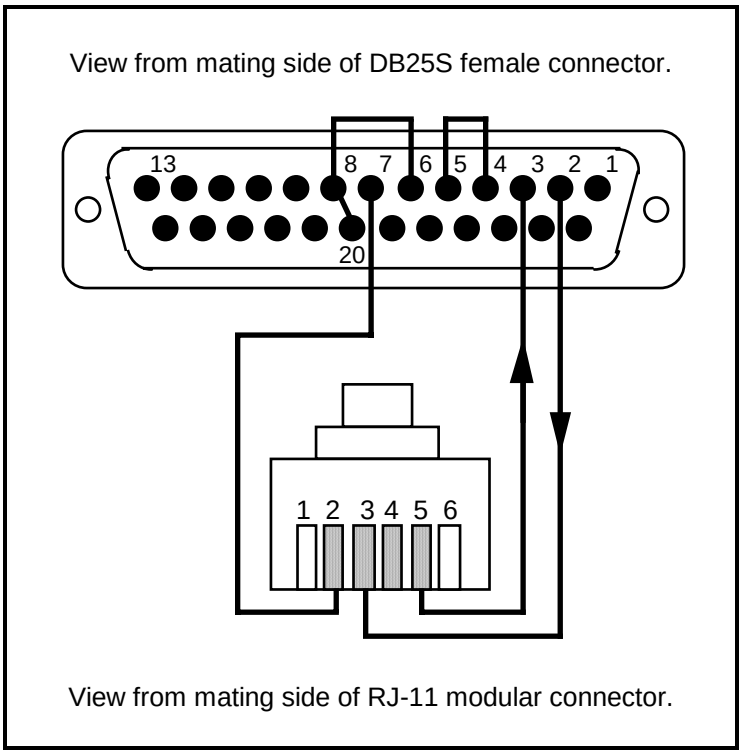


Figure B-2 25-Pin Serial Port Cable Configuration

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

TWC-008 Cable — Computer to Recharger/Downloader Station (9-Pin)

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

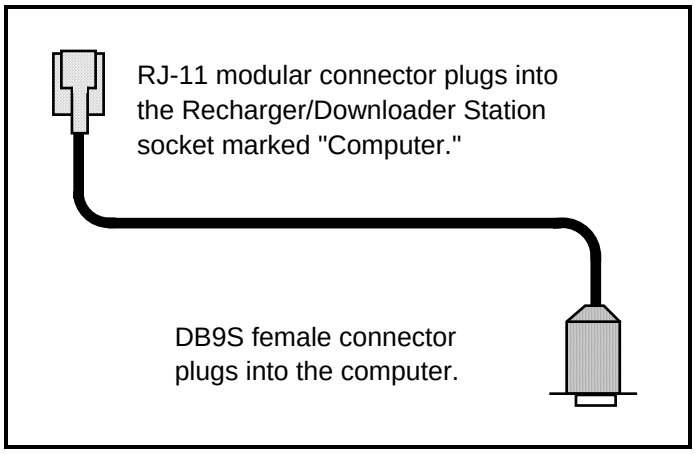


Figure B-3 9-Pin Serial Port Cable

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

Computer to Recharger/Downloader Station Cable (9-Pin)

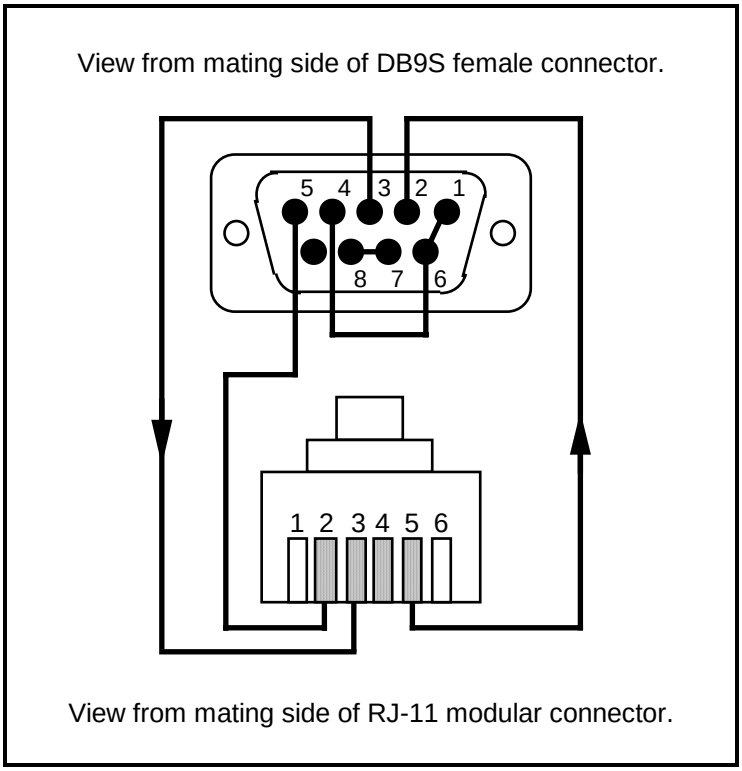


Figure B-4 9-Pin Serial Port Cable Configuration

9-Pin Assignment

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

Modular Connector Pin Assignment

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

TWC-002 Cable — Host Modem to Multiple Recharger/Downloader Station

The cable used to connect a modem to the multiple recharger/downloader at the host modem location is shown in Figure B-5.

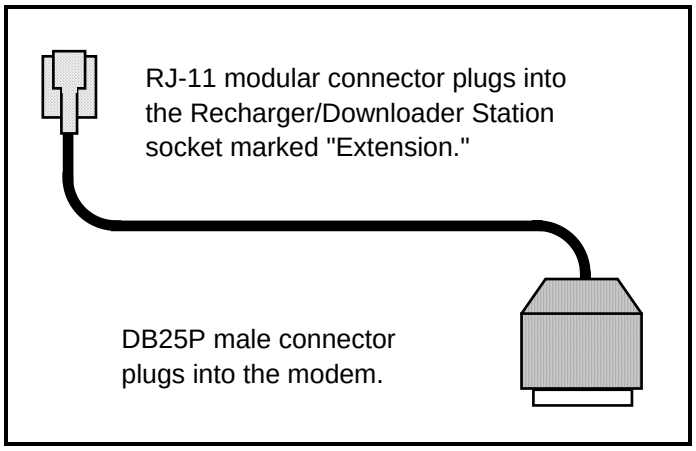


Figure B-5 Host Modem Cable

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

Host Modem to Multiple Recharger/Downloader Station Cable

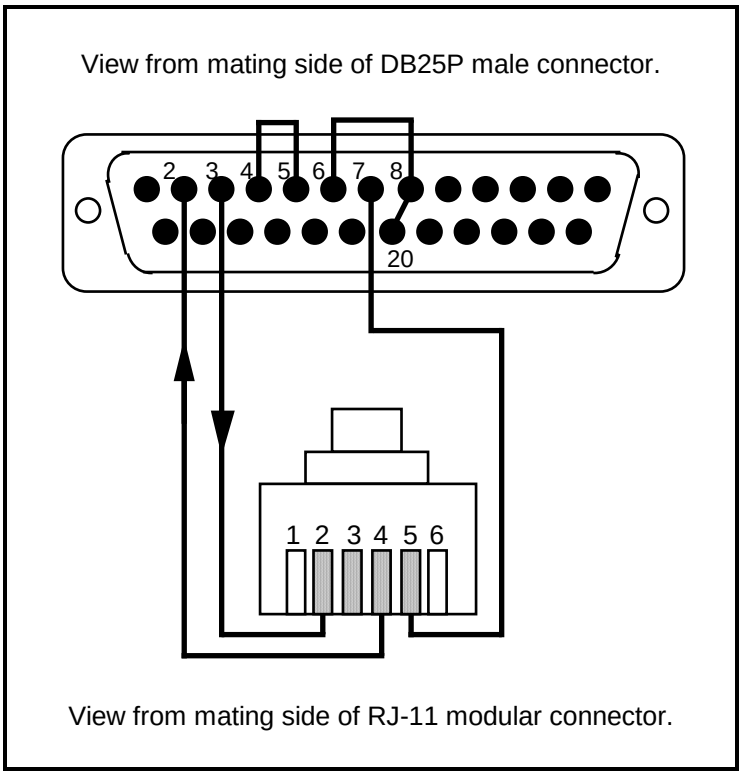


Figure B-6 Host Modem Cable Configuration

25-Pin Assignment

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

Modular Connector Pin Assignment

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

TWC-003 Cable — Remote Modem to Recharger/Downloader Station

The cable used to connect a modem to the recharger/downloader at the remote modem location is shown in Figure B-7.

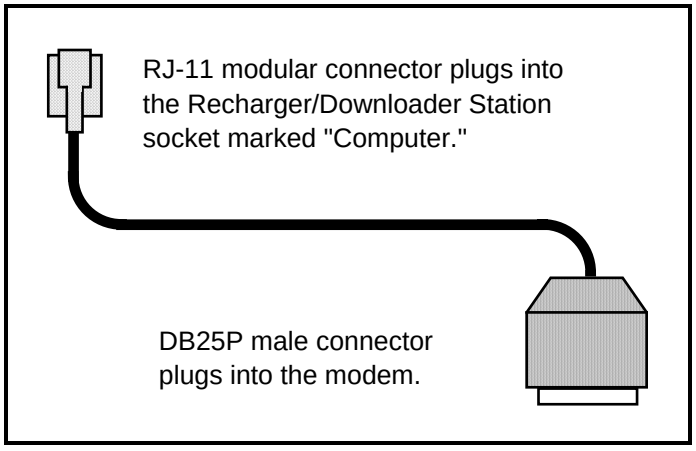


Figure B-7 Remote Modem Cable

Figure B-8 shows the pin configuration for the DB25P connector in relation to the RJ-11 modular connector.

Remote Modem to Recharger/Downloader Station Cable

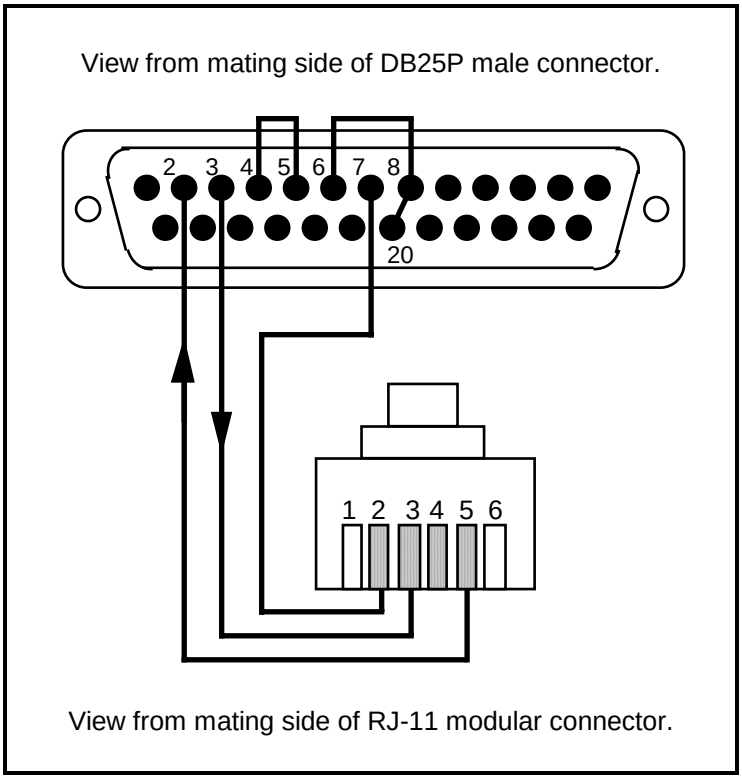


Figure B-8 Remote Modem Cable Configuration

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
8 DCD Carrier Detect (Out)
20 DTR Data Terminal Ready (In)

Modular Connector Pin Assignment

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

TWC-006 Cable — TimeWand II Multiple Recharger/Downloader Station Interconnect

This is the cable used to series connect multiple Recharger/ Downloader Stations. Each recharger/downloader should be connected to its own power transformer. The cable is a standard telephone extension cable. The TWC-006 interconnect cable available from Videx is approximately eight inches long. The maximum length recommended for an interconnect cable is fifty feet. See page 136 for instructions on using an interconnect cable.

Figure B-9 shows the pin configuration for the RJ-11 modular connectors at both ends of this cable.

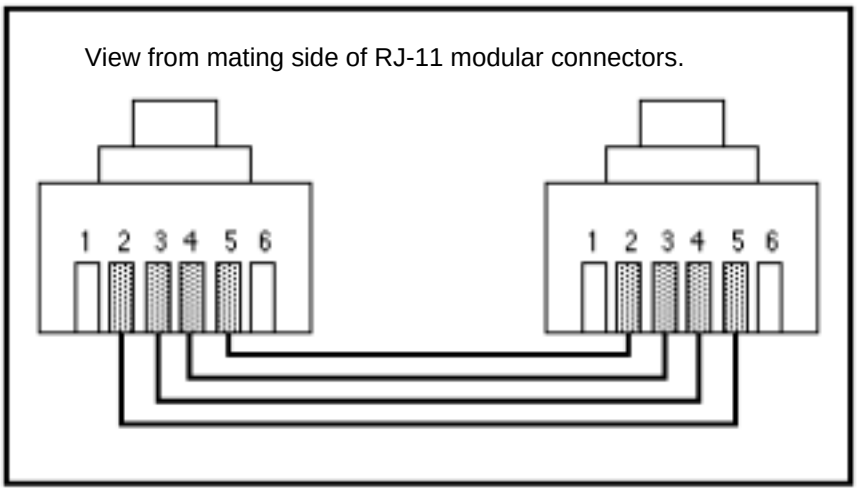


Figure B-9 Interconnect Cable

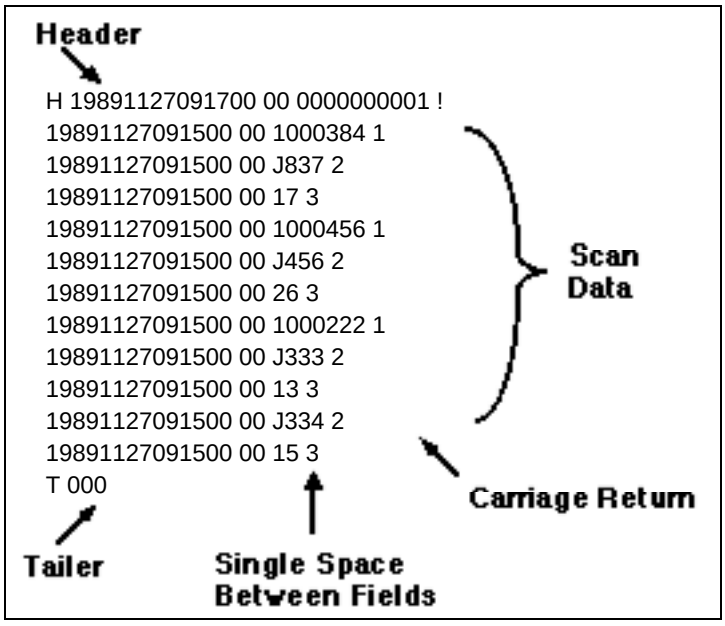
Appendix C

TimeWand II Raw Data File Format

Contents

Raw Data File Format

Data transferred from a TimeWand II is saved on your disk as a raw data file and as a formatted text file. The raw data file data can be viewed using a text editor. This raw data file has not been formatted by a database program or by a file manager program. The following illustration shows data in a raw data file from transferring a single TimeWand II programmed with an application:



The Header appears as the first line in the transferred data. The Header identifies the TimeWand II and the time of the transfer. The "!" after the Header shows that the TimeWand II contained an application.

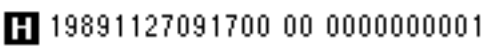
If an application has been programmed into the TimeWand II, the scan data has a space followed by the scan step number after each bar code. This information is useful when separating the data into fields.

The Tailer marks the end of the transferred data from the TimeWand II. Each line of data between the Header and the Tailer represents individual data entries.

The Header

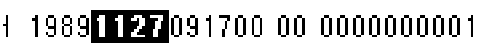
The following illustrations show highlighted portions of the Header and define these parts.

1. The Header always begins with a capital **H** before the line of data. It indicates the beginning of the data transferred from a single TimeWand II.



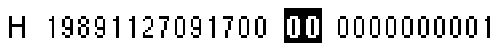
2. This indicates the year the data file was transferred.

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

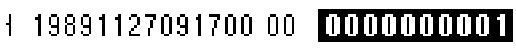


4. This uses 24-hour time to indicate the hour, minutes, and seconds the data file was transferred.

5. This is the source code. The code is currently undefined in the Header but may be used in the future.



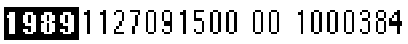
6. This is the wand ID belonging to the TimeWand II. The wand ID contains up to 10 alphanumeric characters.



The Data

The following illustrations highlight and define the different portions of the data.

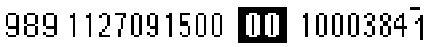
1. This indicates the year the data was entered.



2. This indicates the month and the day the data was entered.

3. This indicates the hour, minutes, and seconds (24-hour) that the data was entered.

4. This number is the Origin of Data and indicates the type of data entered. Bar code symbologies and Touch Memory buttons have their own Origin of Data numbers. See the tables on the following page for a list of the Origin of Data numbers.



5. This is the entered data; it can be from a bar code scan, keypad entry, or button touch. The data may be of varied length and may also include spaces.

6. This portion of the data line is fixed in length.

The following table defines the Origin of Data for the following bar code symbologies:

Bar Code Symbology	Origin of Data
Complete Code 3 of 9 bar code	00
Bar code scanpad or TimeWand II keypad entry	01
UPC A or E bar code	02
Interleaved 2 of 5 bar code	03
Codabar bar code	04
EAN/JAN bar code	06
Code 128 bar code	10

The following table shows the family code and the Origin of Data for some of the Dallas Semiconductor Touch Memory buttons:

Button	Family Code (Hexadecimal)	Origin of Data
DS1990A	01	31
DS1991	02	32
DS1992	08	38
DS1993	06	36
DS1994	04	34
DS1995	0A	40
DS1996	0C	42
DS1982	09	39
DS1985	0B	41
DS1986	0F	45
DS1920	10	46

The Origin of Data for a Touch Memory button is derived by taking the Dallas Semiconductor's hexadecimal family code number, converting it to a decimal number, and adding 30. For example: The Dallas Semiconductor DS1920 button has a family code of 10. 10 hexadecimal is equal to 16 decimal; add 30, and you arrive at an Origin of Data of 46.

The Tailer

The Tailer always begins with a capital **T** before the line of data. It indicates the end of the data transferred from a single TimeWand II.

Appendix D

2TRNSFER.EXE and TW2.EXE Version 3.03

Following is a list of the files that have been updated or added to TW2.EXE version 3.03 and a brief description of their features:

Updated Software Files

TW2OS303.SYM - Replaces operating systems AUTO64.SYM, AUTO128.SYM, and AUTO320.SYM. It also supports the Code 128 symbology. Adds ink spread correction to Code 128. Adds support for year 2000 and past. Serves 64K, 128K, and 320K TimeWand IIs. This operating system uses approximately 51K of memory in a TimeWand II. (Note: Owners of 32K TimeWand IIs must continue to use the version of software previously provided.)

2BUILD.EXE - Replaces TABLEBLD.EXE and TBLD320.EXE. Adds support for the '<' (not) operator from a rule file by creating event matches NOTLIST and NOTEQUAL. (Note: '<' (not) is an operator character used at the beginning of a TimeWand II match pattern to create a match pattern of "not the following..." For example, the match pattern **E=** means that any entry beginning with an E is acceptable, but the match pattern **<E=** means that an entry beginning with an E is not acceptable.)

2COMPILE.EXE - Replaces SMBUILD.EXE, SM128.EXE, and SM320.EXE. Adds support for the NOTLIST and NOTEQUAL event matches generated by 2BUILD.

2TRNSFER.EXE - Replaces DLOAD2.EXE. Adds support for COM3 and COM4. Adds support for the year 2000 and beyond.

ALPHATMP.*, NOALPHATMP.*, and TEMPLATE.* - Application Builder templates. The data variables in the dictionary files have been updated to accept scans of up to 50

characters. First and second column entries are reversed to facilitate the new convention of indicating current state number before event type.

ALPHA.BAT, and NOALPHA.BAT. - Batch files to switch templates between alpha key support and no alpha key support. The software is shipped with the NOALPHA templates selected. To change to the alpha templates, enter ALPHA at the DOS command line. To change back to the NOALPHA templates, enter NOALPHA at the DOS command line. Note: You must recompile the application after switching templates.

TW2.EXE - Calls 2TRNSFER.EXE to download wand for year 2000 support. Generates and supports applications with *.APX extensions. Calls 2BUILD and 2COMPILE utilities. Reduces conventional memory requirement by approximately 50K. Removes need to add NOVCPI parameter to EMM386.EXE NOEMS.

CONVERT2.EXE - (Version 3.03) Updated to support year 2000 and beyond. Removes need to add NOVCPI parameter to EMM386.EXE NOEMS.

Compatibility with older versions

Version 3.03 of TW2.EXE and 2TRNSFER.EXE are compatible with all previous versions of TimeWand II symbologies and applications. This means that you may use TW2.EXE version 3.03 to load any previously existing applications (*.APL, *.128, or *.320 programs) into a TimeWand II that has been programmed with the appropriate *.SYM program. TW2OS303.SYM will run applications compiled with *.128 or *.320 extensions, but applications with an .APL extension must be recompiled as .APX applications before being used on a TimeWand II.

Batch files and other applications which run DLOAD2.EXE should be modified to run 2TRNSFER.EXE.

2TRNSFER version 3.03 Command Line Parameters

```
Videx TimeWand II Transfer Utility
2TRNSFER   v3.03 MS-DOS
Separate with spaces but NOT between keyletter and
argument. (* = Must use 1 of these - others optional)

-a <appl file>[.ext]   Application to load.
-b <Baud rate>         Baud rate for opening wands.
                       (default: 19200)
-c                     Disables clearing wand after data
                       transfer.
-d <search Delay>      Delay time to look for wands.
                       (default: 61 seconds)
-e <status file>       Error & status information.
                       (default: none written)
-f                     Shift to fast (57600) baud for all
                       functions.
-g <options file>      Configure only, from specified file.
                       (use with -i)
-i <id>                *Specifies ID to initialize.
                       (REQUIRES -g or -s)
-k [dec. ASCII code]   Disables (blank) or sets key for
                       aborting operations.
"-l <n><string>"       Send string to LCD line <n> BEFORE
(l) "-m <n><string>"   data transfer or after (m) transfer.
                       Use quotes if string has blanks.
-n <max # wands>       Number of IDs in -w file. (only
                       required when > 50 IDs)
-o <output file>       Output file for transferred data.
                       (default: screen)
-p <com port #>        Default: com port 1
                       (accepts 1, 2, 3, or 4)
-q                     Quiet: no display of version or
                       progress messages.
-r                     Instruct modem to call remote site.
-s <OS file>[.ext]     Operating System to load.
                       (REQUIRED if -i and no -g)
-t                     Disables setting TimeWand II's time.
-u <modem setup>       Modem setup string.
                       (default: "AT V1 Q0 E0 X1")
-w <id file>[.ext]     *Text file of wand ID(s) for data
                       transfer: <WandID><cr/lf>
-x <Xref file>[.ext]   Separately load compiled cross-
                       reference (X-REF) file .
-y                     Use binary protocol to load
                       application file.
```

Configuration Options with 2TRNSFER.EXE and TW2OS303.SYM

These configuration options can be set in an ACTION table using the SETOPTION command. They can also be changed from the host interface using the "O" command or loaded automatically when the wand is programmed. See the section on page 195 for information on the "O" command. Defaults with a dagger (†) have been changed from versions before 3.03.

Option	Number	Range	Default
Enable Alpha keyboard	1	0-1	1

To enable this option, applications must be created using the alpha templates that implement alpha keyboard entry. The TimeWand II operating system checks this option before setting an alpha mode.

Use OS-level charge, drain, and touch messages 2 0-1 1

By default, messages for charge level, the battery drain program, and the prompt to read a Touch Memory Button are generated in English by the OS when this option is enabled. If it is disabled, register events are generated instead so the application can post the message. Messages disabled with this option should be replaced by action routines and called from the event file as a result of one of the register events below. Consult the TimeWand II Programming Tools manual for information about trapping events and programming action command routines.

REGISTER event match when option 2 is OFF	Internally generated message when option 2 is ON (default)	Comments

SHOWCHG	ppp% Charge Left Recharge hh:mm hr	
TOUCHID	(Touch a Button)	Displayed on second line only
DRAIN	Draining Battery Any Key Escapes	

Option	Number	Range	Default
Beep at data file start or end	3	0-1	1

When scrolling through recorded data with the up and down arrow keys, the operating system causes the unit to beep when the user tries to scroll past the first or last record. This option disables that beep.

Enable sound effects during battery drain 4 0-1 1

During the battery drain routine (see TimeWand II Application Tools), the TimeWand II emits repeating click or beep. Setting this option to '0' disables the beep.

Read ID from any Touch Memory Button 5 0-1 0

Setting this option to '1' enables the TimeWand II to read the ID and origin code of a Dallas Semiconductor Touch Memory Button. (Requires the TimeWand II TouchLink accessory, Videx part number TLK-000.)

Enable Keyboard entry 6 0-1 1

Enables the keyboard for data entry. When the keyboard is disabled, all other keys (i.e., scan, scroll, enter…) continue to function normally.

Enable Scanpad entry 7 0-1 1

Enables using the scanpad for data entry. When the scanpad is disabled, the TimeWand II ignores single character scans.

Read Code 3 of 9 8 0-1 1

Enables reading Code 3 of 9 symbology bar codes. When Code 3 of 9 is disabled, the TimeWand II cannot decode Code 3 of 9 symbology bar codes and a BADSCAN event is generated causing a "PLEASE SCAN AGAIN" message.

Option	Number	Range	Default

Read Interleaved 2 of 5 9 0-1 1

Enables reading Interleaved 2 of 5 symbology bar codes. When Interleaved 2 of 5 is disabled, the TimeWand II cannot decode I 2 of 5 bar codes and a BADSCAN event is generated causing a “PLEASE SCAN AGAIN” message.

Read UPC/EAN 10 0-1 1

Enables reading UPC and EAN symbology bar codes. When UPC/EAN is disabled, the TimeWand II cannot decode UPC or EAN symbology bar codes and a BADSCAN event is generated causing a “PLEASE SCAN AGAIN” message.

Read CODABAR 11 0-1 1

Enables reading CODABAR symbology bar codes. When CODABAR is disabled, the TimeWand II cannot decode CODABAR symbology bar codes and a BADSCAN event is generated causing a “PLEASE SCAN AGAIN” message.

Read Code 128 12 0-1 1

Enables reading Code 128 symbology bar codes. When Code 128 is disabled, the TimeWand II cannot decode Code 128 symbology bar codes and a BADSCAN event is generated causing a “PLEASE SCAN AGAIN” message.

Read Code 93 13 0-1 0

Code 93 requires a special version of the TimeWand II operating system. Contact the Videx Technical Support Department for information about the Code 93 software.

Option	Number	Range	Default

Require valid checksum for Code 3 of 9

16 0-1 0

When this option is enabled, the TimeWand II will only decode a Code 3 of 9 bar code if it has a valid modulo 43 symbol check character. The check character is determined as follows:

1. Assign a numerical value to each data character in the symbol as shown in the table below.
2. Sum the numerical values for all of the data characters, and divide the sum by 43.
3. The remainder obtained in step 2 is the value of the check character shown in the table.

An example follows the table for the message “code 39” in code 3 of 9.

Character Values for Modulo 3 Check Character Calculation for Code 3 of 9

Character	Value	Character	Value	Character	Value
0	0	F	15	U	30
1	1	G	16	V	31
2	2	H	17	W	32
3	3	I	18	X	33
4	4	J	19	Y	34
5	5	K	20	Z	35
6	6	L	21	-	36
7	7	M	22	.	37
8	8	N	23	SPACE	38
9	9	O	24	$	39
A	10	P	25	/	40
B	11	Q	26	+	41
C	12	R	27	%	42
D	13	S	28		
E	14	T	29		

For the data message: CODE 39
C=12, O=24, D=13, E=14, SPACE=38, 3=3, 9=9
12 + 24 + 13 + 14 + 38 + 3 + 9 = 113
113/43 = 2 with a remainder of 27

27 = R
Resultant data with check character: CODE 39R

Option	Number	Range	Default

Transmit Code 3 of 9 checksum

17 0-1 0

If this option is enabled and option 16 is enabled, the TimeWand II will place both the bar code and the check character in the scan buffer. If it is disabled but option 16 is enabled, the TimeWand II will strip the check character from the bar code data. For example:

- In the previous example, the bar code data with checksum is “CODE 39R”
- The TimeWand II will return “CODE 39R” with option 17 enabled.
- The TimeWand II will return “CODE 39” with option 17 disabled.

Enable Code 3 of 9 concatenation (leading space)

18 0-1 0

With this option enabled, if the first data character of the Code 3 of 9 bar code is a SPACE, the TimeWand II will not transmit the scan data but will store it in its scan buffer. This allows the user to combine multiple bar codes, each with a leading SPACE character which may be combined to form a single scan record. The user presses the enter key (“=”) to accept the combination scan.

Option	Number	Range	Default
Require valid checksum for Code I 2 of 5	20	0-1	0

When this option is enabled, the TimeWand II will only decode an Interleaved 2 of 5 bar code if it has a valid weighted modulo 10 symbol check character. The weighted check character is determined as follows:

1. Starting at either end of the string of data characters, multiply all of the odd position characters by 3.
2. Sum the products obtained in step 1, along with the remaining even position data characters, and divide the sum by 10.
3. If the remainder obtained in step 2 is 0, the value of the check digit is 0. Otherwise subtract the remainder from 10. The result of this subtraction is the check digit.
4. Append the check digit to the end of the data.

For example:

Data Digits 4 3 8 2 7 Weights 3 1 3 1 3 Weighted Sum = (3X4) + (1X3) + (3X8) + (1X2) (3X7) = 62 62/10 = 6 with a remainder of 2 10 - 2 = 8 Therefore, the check digit is 8. Data with check digit is 4 3 8 2 7 8

Option	Number	Range	Default

Transmit Code I 2 of 5 checksum 21 0-1 0

If this option is enabled and option 20 is enabled, the TimeWand II will place both the bar code and the check character in the scan buffer. If it is disabled but option 20 is enabled, the TimeWand II will strip the check character from the bar code data. For example:

- In the example above, the bar code data with checksum is “438278”
- The TimeWand II will return “438278” with option 21 enabled.
- The TimeWand II will return “43827” with option 21 disabled.

Expand UPC-E to UPC-A form 24 0-1 0†

UPC-E is a zero-suppression version of the UPC-A symbology. If this option is enabled, the TimeWand II expands the UPC-E bar code to UPC-A.

UPC-E bar code

UPC-A bar code showing same data

Transmit check character for UPC 25 0-1 1

The rightmost character in each of the symbols above is the check character for the bar code. Option 25 toggles whether the check character is to be included with the bar code data.

Option	Number	Range	Default
Transmit Country Code char for UPC-A	26	0-1	0 †

UPC symbols are a subset of the more comprehensive EAN system. EAN-13 symbols encode the first digit in the parity pattern of the characters on the left side of the symbol. For UPC codes all these characters have odd parity, which gives a zero in the EAN scheme. A UPC-A symbol is therefore equivalent to an EAN-13 symbol with a first digit of zero. This digit is the country code, since that is its function (sometimes along with the second character) in the EAN system.

Country Code transmission disabled:	
UPC-A	012300000642
	0 = number system code 1230000064 = data 2 = check character

In the bar codes above, toggling the country code character would have the following results:

Country Code transmission enabled:	
UPC-A	0012300000642
	0 = country code 0 = number system code 1230000064 = data 2 = check character

Disabling transmission of the country code character is recommended by the Uniform Code Council. To transmit the country code for a UPC-E bar code, it must first be expanded to the UPC-A form by enabling option 24.

Option	Number	Range	Default

Transmit number system character for UPC 27 0-1 1

The first digit of a 12 character UPC-A symbol typically represents the number system as well as being part of the manufacturer's identification. If this option is enabled, the TimeWand II includes the number system character with the bar code data.

Report UPC-A source as EAN 28 0-1 0†

A UPC-A symbol may be decoded with the same routine that decodes EAN-13 symbols. If this option is enabled, the TimeWand II reports the origin code from a UPC bar code as 06. If this option is disabled, it reports the origin code as 02.

Transmit check character for EAN 30 0-1 1

The rightmost character in each of the EAN symbols below is the check character for the bar code. Option 30 toggles whether the check character is to be included with the bar code data.

EAN- 8 bar code
Option 30 disabled - 0034000
Option 30 enabled - 00340007

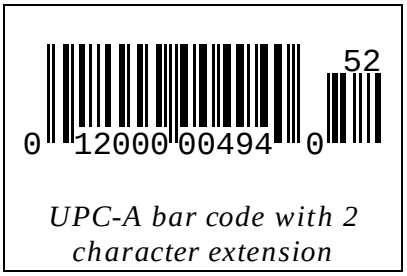
EAN-13 bar code
Option 30 disabled - 780045486123
Option 30 enabled - 7800454861232

Option	Number	Range	Default

Allow supplement with UPC or EAN

31 0-1 1

The TimeWand II will decode both 2-digit and 5-digit add-ons to UPC or EAN bar codes. Enabling this option will return the supplement data with the scan data if a supplement is detected.



UPC-A bar code with 2 character extension

EAN-13 bar code with 5 character extension

Require supplement for UPC or EAN

32 0-1 0

If this option is enabled and option 30 is enabled, the TimeWand II will not decode a UPC or EAN bar code without a supplement. Option 32 takes precedence over option 31.

Ignore any UPC or EAN supplement

33 0-1 0

If this option is enabled, the TimeWand II will decode the UPC or EAN symbol regardless of whether there is a supplement. Option 33 takes precedence over option 32.

Option	Number	Range	Default

Transmit Codabar Start and Stop characters 36 0-1 1

The Codabar symbology uses ‘A’, ‘B’, ‘C’, or ‘D’ as a start or stop character. Enabling this option will include the start and stop characters in the scan data.

Enable Inkspread correction 37 0-1 1

When bar codes are printed using toner or ink based printers, the toner or ink may “spread” beyond its intended bounds. This may cause the nominal width of the bars to exceed the nominal width of the spaces in the bar code. The TimeWand II decoding algorithm includes a correction for light to moderate instances of inkspread. This can help increase decode reliability and overall readability of certain bar codes. Enabling this option enables the inkspread correction routine.

Enable INIT Event processing in State 0 40 0-1 0

Enables processing INIT event matches (255 - new application and 254 - existing application). This feature requires a thorough understanding of the system and application templates. Therefore, it is disabled by default.

Option	Number	Range	Default
Enable external battery operation	41	0-1	0

This option allows a user to use an external battery pack. Normally the TimeWand II switches from normal (scan) mode into communications mode when external power is applied to pin 4 of its RJ-11 serial port. This would ordinarily prevent connection of an external battery pack to extend the operational time between charging the internal battery. When this option is enabled, the user may manually disable and re-enable the switch to communications mode by holding down the "+" key and pressing the "7" key. The operating system displays the current state after the toggle. The messages are "Use Ext Bat" and "Communicate." When the last message is "Use Ext Bat," the TimeWand II will not switch to communications mode even when external power is applied. The user may connect an external battery and continue data entry operations. When the last displayed message was "Communicate," all operations are completely normal and the wand will automatically switch to communications mode when placed in the recharger; that is, when external power is applied. The user must remember to manually switch to "Communicate" before attempting to transfer data.

Current drawn from the external battery pack is about 20 mA plus the operational current of the TimeWand II. The operational current may be as high as 120 mA when scanning. The constant current draw supplies the charging circuits, which are operational even when the wand circuits are asleep and even when the power switch is off. Therefore, the external battery pack should be disconnected whenever the TimeWand II is not being actively used.

Option	Number	Range	Default

Begin-charging threshold (1/10 hours)

129 0-255 0

The TimeWand II by default always begins charging when it is placed in the recharger. It drops to the lower level charge rate when the charge-needed value reaches zero. This option allows the system implementer to specify that the full charge level will not happen unless the charge-needed value is greater than the value of this option times 6 minutes or 1/10 hour. Judicious use of this setting can ensure that the rechargeable batteries are discharged as deeply as practicable for the use situation and thereby reducing memory effect and prolonging the life of the batteries.

Time until display blanks (seconds)

130 2-255 10†

After a scan or button event, the TimeWand II operating system waits a certain amount of time then blanks the display and goes to low-power mode. By default that delay time is 10 seconds. This option enables control of that time from 2 to 255 seconds.

Minimum quiet zone (ratio to smallest bar)

131 6-64 6

The quiet zone of a bar code is the clear space that precedes the start character of a bar code symbol and follows the stop character. The width of the quiet zone is expressed as a multiplier of the width of the narrow bars and narrow spaces (X-dimension). The minimum recommended quiet zone for a Code 3 of 9 symbology bar code is 10 X-dimension, that is 10 times the width of the narrow bars or narrow spaces of the bar code symbol.

For the TimeWand II, the minimum quiet zone is 6 times the width of the narrow bars. This option allows setting the minimum quiet zone ratio in the range of 6 to 64.

Option	Number	Range	Default
Response when opened by host	132	0-40, 255	255

TW2OS v. 3.03 introduces a new sign-on message that the TimeWand II sends to the host when it is opened for communication: TWIIX.xx where the X's represent the major and minor version numbers. Earlier versions of Dload2 will not communicate with a wand that responds like that. To assist with integrating into existing systems, option 132 allows modification of the sign-on message. When the option has the value 255, the message is the default given above. For values 0–20 the response is "TWII*nnn*" where *nnn* is the value of the option times 32. For example if option 132 is set to 10, the sign-on will be "TWII320," exactly the same as the original software that supported the 320K TimeWand II's. If the value is zero, the response is "TWII."

Option	Number	Range	Default

Expand range of numeric characters

133 0-5 0

When matching patterns contain “#” or “@,” the TimeWand II normally considers only the digits 0 through 9 to be “numeric.” It recognizes the digits by seeing that their ASCII code is in the range 48 to 57. It may be useful at times to consider that the decimal point, plus, minus, and comma characters are also considered numeric. Since the ASCII code of these characters falls just below that of the digits, it is possible to include them just by moving the lower bound of the numeric range of ASCII codes that are considered numeric. This option allows that modification.

The value of the option is subtracted from 48 to obtain the new lower bound of the numeric range. For example, if the value is 3, the decimal point (ASCII 46) and minus sign (ASCII 45) are considered numeric, but the comma and plus sign (ASCII 44 and 43) are not. For the purposes of pattern matching, the alphabetic symbol “@” is effectively “Not numeric” rather than strictly “Alphabetic,” so it includes all symbols not included in the expanded numeric region.

Serial communication timeout (sec)

134 1-255 20

By default, the TimeWand II uses a 20 second timeout value when it is waiting for a serial communications response from a host computer. This applies to both the RECEIVE command (see TimeWand II Application Tools manual) and to the packet download protocol. This option allows setting that timeout value within the range of 1 to 255 seconds.

Option	Number	Range	Default

Serial communication End-of-Line character

135 0-255 10

This option allows changing the character that is used by the system to recognize the end of a line that it receives from the host computer or some other device over the serial connection. The character that normally serves this purpose is the line-feed character (ASCII 10). It may sometimes be useful, particularly when using the RECEIVE command (see TimeWand II Application Tools manual) to designate a different character to indicate the end of a transmission. This option is provided for that purpose.

Caution must be exercised because the altered setting will affect all communications, including that with the host computer. Host communications will not work correctly if the setting is not for the line-feed character, so whenever this option is changed, it must be restored to the default before any normal host communications are attempted.

The following options set the minimum and maximum length of bar code for each symbology. The maximum size of a data element is limited by internal registers to 64 characters. It may also be further limited by the storage space allocated in the Dictionary file or template for any variables that must contain the data (see TimeWand II Application Tools).

Smallest Code 39 bar code accepted	136	1-64	1
Smallest I 2 of 5 bar code accepted	137	1-64	4
Smallest Codabar bar code accepted	139	1-64	1
Smallest Code 128 bar code accepted	140	1-64	1
Smallest Code 93 bar code accepted*	141	1-64	1
Largest Code 39 bar code accepted	144	1-64	64
Largest I 2 of 5 bar code accepted	145	1-64	64
Largest Codabar bar code accepted	147	1-64	64
Largest Code 128 bar code accepted	148	1-64	64
Largest Code 93 bar code accepted*	149	1-64	64

* Code 93 requires a special version of the TimeWand II operating system. Contact the Videx Technical Support Department for information about the Code 93 software.

Automatic Option Configuration

Configuration options can be set automatically when a wand is initialized. The loading program (2TRNSFER.EXE) will search for a configuration file containing commands to change options (or any other valid host command). There are several possible configuration filenames that can be used. The program looks for one of the following filenames:

1. <wandID>.opt
2. <application name>.opt
3. <symbology name>.opt
4. global.opt

The loading program can also load a specific configuration file to a specific wand that has not already been initialized. The syntax is as follows:

2TRNSFER -<wandID> -g<optfile>[.<ext>]

The program will look first for "<optfile>.ext," then for "<optfile>.opt," and then for "global.opt." The -g parameter used without an argument will always find a global option file if one exists. Similarly, if the extension is omitted, a file with the given base name and the extension ".opt" will be found.

The format for the "O" command in the configuration file is:

O 5,1

O	=	The command code
5	=	The option number
, (comma)	=	Required delimiter
1	=	Option value (for options 1-127, 0 = off, any non-zero number = on)

(Note: The example, **O 5,1** would allow the TimeWand II to read Touch Memory button serial numbers.)

Notes:

Appendix E

Explanation of CONVERT2.EXE

Videx provides software tools with the TimeWand II Communications & Application Builder software which enable applications developers and programmers to incorporate the TimeWand II directly into applications. One of these software tools is CONVERT2.EXE.

CONVERT2.EXE is an executable program which takes the raw scan file produced by the TimeWand II and converts it into a formatted ASCII text file, using the parameters the user specifies. CONVERT2.EXE can be run from the DOS prompt, from within a batch file, or from within your own application program.

CONVERT2.EXE is run from the command line by entering the file name “CONVERT2” with certain parameters. These parameters are explained below:

/s	Menu system which enables the user to specify the parameters to use in the convert process. Press <Esc> to exit the menu system. Note: Specifying a “Raw scan file” causes the TimeWand II raw scan file to be converted to a TimeWand I raw scan file.
<input file> <output file>	The input file is the TimeWand II raw scan file. The output file must not exist or CONVERT2 asks if it can be overwritten.

Example: **convert2 data.bcd data.txt**

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Appendix F

Modem Transfer Set Up Diagram

The following illustration shows you how to connect the Recharger/Downloader Station to a modem for remote data transfer.

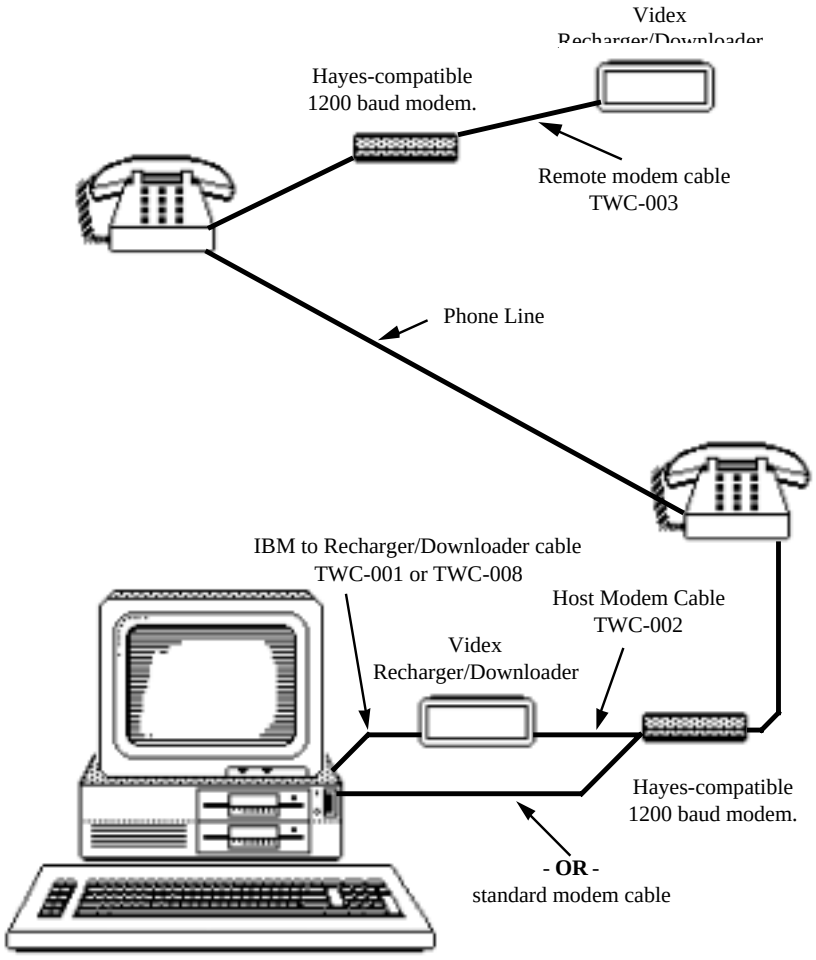

Figure F-1 Modem Transfer Set Up

Notes:

Appendix G

Automatic Recharge Management

The TimeWand II software automatically controls the recharge cycle, allowing the batteries to recharge as quickly as possible without being overcharged. The TimeWand II estimates how much standard charge it requires by keeping track of the last time it was in the recharger/downloader and the amount of use it has received. You can view an estimation of the amount of charge left in a programmed TimeWand II and how much time is required to bring it to a full charge capacity by pressing the **M** and **left arrow** keys simultaneously. When the wand is placed in the recharger/ downloader, the batteries are charged at a standard-charge rate for the amount of time the wand has estimated the batteries require. While the TimeWand II is charging, the first line of the display gives information about the charge state of the battery (in percentage) and the second line displays how much time before full charge is reached. When the batteries are fully charged, the display flashes so that the end of the standard-charge cycle is easily noticed. After the standard charge period, the charge rate reduces to a trickle charge. The batteries are able to tolerate longer periods at this reduced rate and still maintain a fully-charged state.

When a program is first loaded into a TimeWand II, the TimeWand II has no information about the true charge state of the batteries. Therefore, the standard charge time is set to an arbitrary initial value of 6.66 hours. This amount of time fully charges batteries that are 50% discharged. Even if the wand is actually fully charged when placed in the recharger/ downloader, an occasional overcharge of this amount causes no harm.

The representation of the amount of charge remaining may be somewhat different than the actual charge state of the

batteries. Therefore the charge rate display should be used only as a guide. The system is designed with a bias toward giving a little more charge than actually required so that it is unlikely you will ever be left short on charge when the system says the batteries are full. As you become more familiar with how the charge rate display fits your use pattern, the information allows you to more accurately judge how often to recharge your wand.

Setting the Default Value for Charge Needed

A utility is included with the TimeWand II Communications & Application Builder software that allows you to change the initial value of charge needed if the charge state of the batteries is known to be different from the default value of 6.66 hours. To set the charge-needed value, type the following command from the directory where the TimeWand II software is kept:

SETCHG

You are prompted for the serial communications port number and the baud rate. Insert the wand into the recharger/ downloader and enter the number of hours to charge. You can set the charge rate for several wands without re-entering the port number or baud rate. However, you must only have one wand in the recharger/downloader at a time while setting the charge-needed rate. It is possible to set the charge-needed rate to different values for each wand; they will each charge according to their own setting when placed in the recharger/downloader for recharging.

Videx can provide programming information to allow for the alteration of the charge status messages, such as a different language. Contact the Videx Technical Support Department for additional information.

The display shows 100% Charge while in the recharger/downloader, but shows Low Power when removed from the recharger/downloader.

The estimate is based on time, NOT on the actual charge capacity of the batteries. If your batteries are at the end of their life, the charge status will display 100% charge, but show Low Power when removed from the recharger/ downloader. If this happens, replace the TimeWand II battery pack.

The display showed 100% Charge, the wand was reset and reprogrammed, now it shows 50% Charge.

Each time the wand is reset all information is cleared from the wand, including the charge status. When a TimeWand II is programmed, the wand has no information about the true charge state of the batteries. Therefore, the amount of time to bring the batteries to a full charge is set to an arbitrary value of 7.0 hours. This amount of time fully charges batteries that are 50% discharged. So each time your wand is reset and reprogrammed the charge state starts at approximately 50%. Even if the batteries in your wand are fully charged, an occasional overcharge of this amount will not damage the batteries.

See Appendix H for more information on TimeWand II batteries.

Notes:

Appendix H

TimeWand II NiCad Battery Notes

Contents

TimeWand II NiCad Battery Notes

Introduction

The behavior of the NiCad battery affects the operation of the equipment it powers. The purpose of this appendix is to develop a better understanding of the unique characteristics of NiCad batteries by describing their effect on the TimeWand II. The following sections explain basic NiCad battery terms, TimeWand II terms, TimeWand II battery specifications, and correct battery charge management. The last section explores specific TimeWand II problems and their solutions.

Battery Terms

Cell	The basic unit of the battery (e.g., car batteries have six cells, “AA“ or “C” batteries have one cell each).
Battery Capacity	The amount of charge available from a battery; usually measured in milliampere-hours.
Operation Cutoff Voltage	The voltage below which the equipment cannot function. (TimeWand II operation cutoff voltage is 4.3 volts.)
Charge Rate	The rate at which current is input to the battery.
Charge-Discharge Cycle	When a battery is discharged to the cutoff voltage level and recharged to full capacity.
Trickle Charge	A battery charge current of less than 1/50th of its rated capacity. Measured in milliamperes.
Standard Charge	A battery charge current of 1/10th of its rated capacity. Measured in milliamperes.

Float Charge	When a battery is subjected to a continuous trickle charge (e.g., an uninterrupted power supply for a computer is continuously on trickle charge).
Cyclic Charge	When a battery is discharged and recharged regularly (e.g., a TimeWand II is used all day and then recharged overnight).
Overcharge	The continuation of charge after the cell is fully charged. NiCad cells are designed to reliably handle continuous overcharge at their cell specification rate; it is usually not an adverse condition.
Extended Overcharge	When the battery is overcharged for an extended period, and overheats.
Charge Temperature	The cell temperature during charging. Charge temperature has an impact on the amount of current the cell is capable of delivering. A higher cell temperature during charge reduces the battery capacity.
Deep Discharge	When the battery is discharged below the normal discharge voltage. The TimeWand II battery discharge voltage is 3.54 volts.
Cell Polarity Reversal	When a discharge is continued after a cell has reached zero volts. At this point, the positive terminal becomes negative. As the cell polarity is reversed beyond a negative 0.2 volts, the cell is damaged, but can be recharged. Repeated cell polarity reversal can damage the cell.
Voltage Depression	Sometimes called memory effect, is caused by extended overcharging. The result of this problem is a reduction of the usable capacity above the operation cutoff voltage by as much as 90%.

Battery Discharge and Voltage Depression

To understand the effects of voltage depression on the TimeWand II, examine the graph below. Figure 1 is a graphic representation of the TimeWand II battery discharge curves under various conditions. Line A represents the average battery voltage of 4.72 volts of a good, fully-charged battery. Line B represents the operation cutoff voltage (4.30 volts), which is the point below which the equipment cannot function.

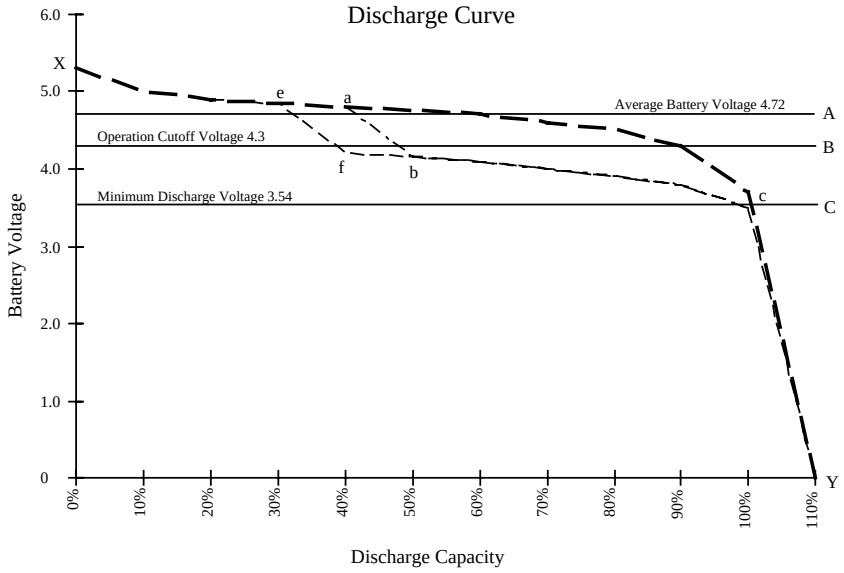

Figure H-1 Discharge Curve

Line XY is a representation of a normal discharge curve. It begins with a good, fully-charged battery at 5.3 volts and crosses over the operation cutoff voltage at 95% discharge capacity. Voltage depression can occur at any point on the normal discharge curve. In this example, voltage depression initially appears on the discharge voltage curve near the 40% discharge capacity point and is below the operation cutoff voltage at the 50% discharge point. Therefore, the discharge capacity, represented by the area of (abc), has been lost. If extended overcharging persists, the shrinkage of the discharge capacity continues as represented by area (efb) where the

voltage drops below the operation cutoff point at approximately 40% discharge capacity.

Voltage depression is reversible. It can be electrically reversed with deep cell discharging to the minimum discharge voltage of 3.54 volts (line C) and full recharging to 5.3 volts. If voltage depression has occurred, complete discharge down to a minimum discharge voltage of 3.54 volts is necessary to accomplish a restoration of the battery capacity.

TimeWand II Terms

Monitor Mode	A TimeWand II is in this mode when it has been reset and its display shows **"TW2 MONITOR 1.75, baud rate test.."**
Programmed	A TimeWand II is programmed when it has had a symbology file loaded into its memory.
Reset	The TimeWand II is reset when the internal reset switch is depressed with a paper clip through the hole on the back of the unit. It should beep three times and go into **Monitor Mode**. The TimeWand II will also reset when the battery is removed and re-installed or when a new battery is installed.

TimeWand II Battery Specifications

The NiCad battery in the TimeWand II has a **life expectancy** of approximately 2 years or 500 full charge-discharge cycles.

The TimeWand II battery is composed of four 1.2 volt cells. Its rated capacity is 110 milliampere hours. This means that the battery can deliver 110 milliamperes for an hour, 55 milliamperes for 2 hours, 27.5 milliamperes for 4 hours, and so on.

The TimeWand II uses different amounts of current depending on which state it is in. In **Monitor Mode**, it uses 20 milliamperes per hour. A fully-charged, good battery should last about 5 hours in Monitor Mode.

When the TimeWand II has been **programmed** and is asleep (scan button not pressed), it uses about 0.75 milliamperes per hour. In this situation, a fully-charged, good battery lasts about 5 days.

When the TimeWand II has been **programmed** and the scanning circuit is on (the scan button is pressed), it uses 90 milliamperes per hour. A fully-charged, good battery lasts 1 hour and 15 minutes if the scan button is continuously pressed.

The **standard charge** current is 10 milliamperes per hour and the **trickle charge** current is 1.4 milliamperes per hour. The battery low-voltage warning starts at 4.3 volts.

Correct Battery Charge Management

Use the following procedure after installing a TimeWand II battery pack.

1. Install the battery pack following the instructions included with the battery. The TimeWand II should beep three times and be in **Monitor Mode**.

2. Place the TimeWand II in a recharger/downloader and leave it in for at least 16 hours. Verify that it is charging by pressing the scan button. If it is charging, the bottom line of the display shows CHG. The battery charges at its **standard charge** rate for 16 hours and then automatically drops to a **trickle charge**. (See **Words of Caution** below.)

Words of Caution

The TimeWand II Charge Management Software, that manages the balance of standard and trickle charges, works only with a TimeWand II that is programmed.

If a TimeWand II is removed from the recharger/downloader and then put back in while still in **Monitor Mode**, the 16-hour recharge cycle starts over again. Also, if the TimeWand II is not **programmed** and left out of the recharger/downloader, it completely discharges in 5 hours. If left unprogrammed and out of the recharger/downloader for longer than 5 hours, cell reversal can take place and the battery can be damaged.

3. At the end of the 16-hour initial charge time, program the TimeWand II.

4. After the TimeWand II is programmed, its display will show **51% charge left**.

A programmed TimeWand II monitors its battery use. To get the best use from the battery, it should only be placed in the recharger/downloader to transfer data to the computer or when the recharge time is between eight and ten hours. The

recharge time is displayed when the **M** and **left arrow** keys are pressed at the same time or when the TimeWand II is put in a recharger/downloader.

Problems and Solutions

Problem 1: Low Battery

The user installs a program into a new TimeWand II. When removed from the recharger/downloader, **LOW BAT** appears on the display or the prompt quickly fades.

Cause: This usually suggests that the TimeWand II was not fully charged after it was received from the seller.

Solution:

1. Reset the unit; TimeWand II should beep three times.

2. Verify that it is in **Monitor Mode**.

3. Place the TimeWand II in a recharger/downloader that has power and leave it in for 16 hours or more. It charges at a standard rate for 16 hours; the current then decreases to a trickle charge.

4. Program the unit with a symbology and an application.

5. After the TimeWand II is programmed, its display will show **51% charge left**.

Problem 2: Voltage Depression

The user has had the TimeWand II for several months, using it for a few minutes a day and keeping it in the recharger/ downloader when it is not in use. The unit now stops working after a few minutes of scanning.

Cause: By continuous, extended overcharge of the battery, voltage depression is taking place over a major portion of the battery's discharge cycle.

Solution A: The following procedure can be used to reverse the voltage depression.

1. Reset the unit. TimeWand II should beep three times.

2. Verify that it is in **Monitor Mode**.

3. Place it in a recharger/downloader that has power and let it charge for eight hours.

4. Remove the TimeWand II from the recharger/downloader and let it sit for 5 hours. It will discharge down past the depressed voltage area, restoring the battery to its normal voltage.

Warning

To reduce the danger of polarity reversal, do not discharge the wand for more than 5 hours.

5. Reset the unit. TimeWand II should beep three times.

6. Verify that it is in **Monitor Mode**.

7. Place it in a recharger/downloader that has power and leave it for 16 hours or more. It will charge for 16 hours, then the current decreases to a trickle charge.

8. Program the TimeWand II with a symbology and an application.

9. After the TimeWand II is programmed, its display will show **51% charge left**.

Solution B: Install a new battery. Be sure all data has been transferred from the wand before proceeding.

1. Remove the slotted screw from the corner of the battery pack door.

2. Remove the battery pack.

3. Install the new battery pack. The tab on the battery pack must slide in under the back case of the TimeWand II. You may hear three beeps when the batteries contact the springs.

4. While holding the battery pack in place, replace the corner screw and tighten snugly. Do not over torque the screw or the case threads may strip.

5. If the TimeWand II does not display the message **TW2 MONITOR 1.75, baud rate test...**, reset it by inserting the end of a paper clip in the small hole in the back case and depressing the reset switch located under the hole. The TimeWand II should beep three times and display the message shown above.

6. Recharge the battery. For instructions on recharging the battery, see the "Correct Battery Charge Management" section on page 211.

7. Program the TimeWand II.

Problem 3: TimeWand II Lock-up

The TimeWand II stops working with the message **Please reset 0** on the display. It does not respond to any keypresses.

Cause: The battery voltage is too low or the signal flow has been interrupted.

Solution:

1. Reset the unit. TimeWand II should beep three times.

2. Verify that it is in **Monitor Mode**.

3. Place the TimeWand II in a recharger/downloader and leave it in for at least 16 hours. Verify that it is charging by pressing the scan button. If it is charging, the bottom line of the display shows CHG. The battery charges at its standard charge rate for 16 hours and then automatically goes to a trickle charge.

4. At the end of the 16-hour initial charge time, program the TimeWand II.

5. After the TimeWand II is programmed, its display will show **51% charge left**.

6. If the problem reoccurs, the unit should be returned to Videx for further evaluation and repair.

Problem 4: Read Head

The TimeWand II was dropped. It no longer has a satisfactory read rate.

Cause: The sapphire ball on the read head may be cracked or an electronic component may be damaged.

Solution: You can determine if the sapphire ball is broken by either close inspection with a magnifying glass or finding a crack with your fingernail. If the read head is broken, it must be returned for repair. Contact the Videx Technical Support Department for assistance.

Problem 5: Blank Display

The TimeWand II stops working and the display goes blank. The wand will not respond to any keypress.

Cause: The battery voltage is too low or the signal flow has been interrupted.

Solution:

1. Reset the unit. TimeWand II should beep three times.

2. Verify that it is in **Monitor Mode**.

3. Place the TimeWand II in a recharger/downloader and leave it in for at least 16 hours. Verify that it is charging by pressing the scan button. If it is charging, the bottom line of the display shows CHG. The battery charges at its standard charge rate for 16 hours and then automatically drops to a trickle charge.

4. At the end of the 16-hour initial charge time, program the TimeWand II.

5. After the TimeWand II is programmed, its display will show **51% charge left**.

If the problem re-occurs, the unit should be returned to Videx for further evaluation and repair. Contact the Videx Technical Support Department for assistance.

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Appendix I

TimeWand II Specifications

Contents

TimeWand II Specifications

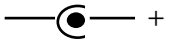
Physical:	Rugged, cast-metal case
Dimensions:	4.1" x 2.6" x 0.6" (104 x 66 x 15 mm)
Weight:	4.9 oz (139 g)
Storage Temperature:	-4° to 122° F (-20° to 50° C)
Operating Temperature:	32° to 122° F (0° to 50° C)
Humidity:	0 to 95% non condensing
Keypad:	19 operational keys; numeric or alphanumeric
Charging Time:	12-15 hours for fully drained batteries
Memory:	64K, 128K, or 320K RAM
Display:	2-line x 16-character liquid crystal display (LCD); 5 x 7 dot matrix displays 96 standard ASCII characters
Audio:	14 tone patterns including good read and key entry
Optics:	Special optical circuitry allows scanning in complete darkness or direct sunlight; 700 nm near-visible light optics is standard; 820 nm infrared and 655 nm visible optics are optional; read head is enclosed In a protective sapphire tip shield
Battery:	Rechargeable nickel-cadmium (NiCad) replaceable battery pack

Battery Life:	Provides up to 3 days charge, depending upon use; life expectancy of battery pack is 2 years or 500 full charge-discharge cycles
Serial Communications:	Packetized for error correction; built-in asynchronous RS-232 serial port, baud rates from 300 to 19.2K
Clock:	Real-time; time and date stamps each successful bar code scan
Optional LED Scan Light	Provides LED flash after successful scan; LED is installed in TimeWand II serial port

Bar Code Specifications

Scanning Speed:	3 to 30 inches per second
Resolution:	Minimum 0.0075" width of narrow bar or space (0.01" recommended)
Bar Code Symbologies:	Code 3 of 9, Interleaved 2 of 5, Codabar, Code 128, UPC, and EAN

TimeWand II Recharger/Downloader Station

Size:	Single station - 4.0" x 4.0" x 1.5" (102 x 102 x 38 mm) Multiple station - 8.6" x 4.0" x 1.5" (218 x 102 x 38 mm)
Weight:	Single station - 7.3 oz (207 g) Multiple station - 14.7 oz (420 g)
Number of Wands:	Single station - 1 wand Multiple station - 4 wands
Power Supply Adapters:	120 volt (60 Hz) Input: 120 VAC, 60 Hz, 7W Output: 12 VDC, 300 mA Plug Polarity:  220 volt (50 Hz) Input: 220 VAC, 50 Hz, 9W Output: 12 VDC, 300 mA, 3.6 VA Plug Polarity:
Indicator Lights:	Power, Transmit, and Receive
Connection Ports:	Single station - Computer, Power Multiple station - Computer, Extension, and Power
Serial Communications:	Standard RS232

Appendix J

Sample Applications Bar Codes

Contents

Inventory Application (INVENTRY.APX)

The following bar codes can be used with the INVENTRY.APX sample application.

Warehouse Bar Codes

Bin # Bar Codes

Item # Bar Codes

Resistor 1K Ohm

32K CMOS RAM

Capacitor 0.1 mf

Quantity Bar Codes










Enter

Clear

Retail Application (RETAIL.APX)

The following bar codes can be used with the RETAIL.APX sample application.

Customer Bar Codes

Item # Bar Codes

8K TimeWand

16K TimeWand

Rechg/Downloader

Multi-Control

Multi Add-on

Quantity Bar Codes










Enter

Clear

Security Application

The following bar codes can be used with the Security application created in Chapter 3.

Guard # Bar Codes




Location # Bar Codes




Status Bar Codes


Locked


Unlocked


Called Police


Passed


Maintenance Required

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