SOFTERM 2
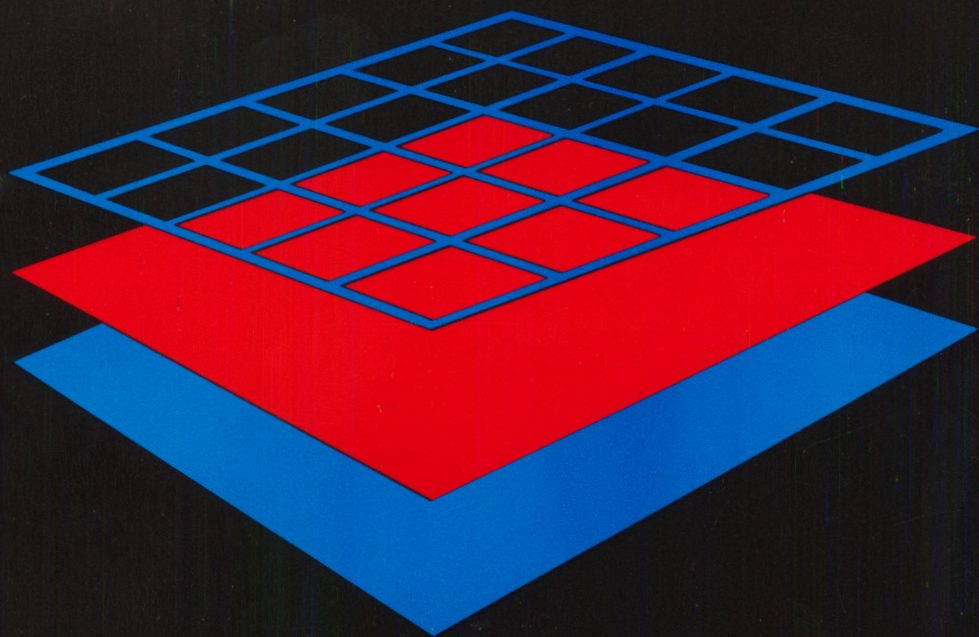## COMMUNICATIONS

APPLE®][

Terminal Communications
File Transfer
   DOS, CP/M®, PASCAL
Terminal Emulation

SOFTRONICS

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SOFTERM 2
COMMUNICATIONS

USER'S GUIDE
Revision 1.01

Apple®] [
- Terminal Communications
- File Transfer
    DOS, CP/M® PASCAL
- Terminal Emulation

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Chapter 1
Introduction

How to Use this Manual

This user's guide has been prepared to help you learn to use the Softerm program easily and quickly. Chapter 1 includes an introduction to Softerm as well as a basic tutorial on using its features. Chapters 2 through 5 consist of a detailed technical reference on all Softerm functions including examples of how they are used. The chapters contained in the user's guide are organized in the following manner:

Chapter 1 contains an overview of the Softerm program, information about your equipment needs, installation instructions for the 2 or 3-key hardware keyboard expander included with the Softerm program, and a tutorial designed to allow first time users to quickly configure Softerm and use its basic features with a minimum of effort.

Chapter 2 is a detailed description of terminal setup including how to configure and use the Softerm program with your Apple II, II Plus or IIe.

Chapter 3 is a description of the online terminal operation mode with details of Softerm functions including disk utilities, keyboard macros, sending and capturing files in terminal mode, use of the phone directory for automatic dialing, and program utilities for auxiliary operations such as patching the main Softerm program or specifying special configuration changes and additions.

Chapter 4 provides a detailed description of the file transfer capabilities and modes supported by Softerm. These modes when set up and used properly allow Softerm to communicate with and transfer files to and from almost any computer.

Chapter 5 describes the terminal emulations which are included with the Softerm program. Softerm 1 contains a standard TTY compatible terminal emulation with user-definable functions. Softerm 2 includes exact terminal emulations of many popular CRT terminals which may be specified when configuring Softerm 2. However, Softerm 2 is capable of emulating almost any CRT terminal available. Contact Softronics for information on additional terminal emulations not currently provided with Softerm 2.

The best way to learn how to use the Softerm program is to try it. Experimenting with Softerm features will help you answer most of your questions. Entering odd data and characters will not hurt the computer or the Softerm program. However, diskettes should be handled gently, keeping them away from magnetic fields, dirt, and liquids.

Overview: The "Soft Terminal"

Softerm is a powerful and flexible terminal emulation program that operates on an Apple II, II Plus, or IIe personal computer and is provided in two versions depending on the user's requirements. **Softerm 1** provides basic terminal communications to a variety of host computers, timesharing services, and information services such as *The Source*, *CompuServe* and the *Dow Jones News/Retrieval*. **Softerm 2** includes all features of Softerm 1 and provides an *exact* look-alike for many popular CRT terminals. Softerm 2 enables applications written for a specific CRT terminal to operate with an Apple system transparently and without programming changes. Special function keys, sophisticated editing features, and local printer capabilities of the terminals emulated by Softerm 2 are fully supported. A wide range of CRT terminal emulations supporting both *conversational* and *block* modes are provided with Softerm 2 transforming the Apple computer into the most versatile and intelligent terminal system available.

Softerm incorporates an advanced file manager which provides compatibility with DOS 3.3, CP/M, and Pascal disk formats for all file operations including file transfer, and at speeds up to 5 times faster than standard Apple DOS. With built-in disk utilities, local file transfer, and numerous editing options, Softerm is also a powerful file utility program.

Softerm is provided on two *copyable* DOS 3.3 format diskettes—a *system* diskette which when booted automatically runs the Softerm program, and a *configuration* diskette containing configuration files which allow the user to select hardware and software options and generate tailored terminal configurations. The configuration diskette contains files for each terminal emulation and hardware option supported by Softerm. This modular arrangement allows new terminal emulations and hardware drivers to be provided to Softerm users as they become available through the unique Softronics *Online Update Service*.

Softerm 1 and 2 include a *keyboard expander* which provides 2 or 3 additional keys to the Apple keyboard. The additional keys function as **SHIFT** keys and allow all Softerm and terminal emulation keyboard functions to be performed in a single keystroke when used in combination with the main keyboard. Since all Softerm functions are initiated using the keyboard expander, the Apple keyboard can be used transparently including all **CTRL** and **SHIFT** combinations.

Unlike most other intelligent terminal programs, Softerm operates at speeds up to 9600 bits per second. Softerm allows an Apple system to be direct connected locally to a host computer for maximum baud rates or remotely through standard manual or auto-dial modems. Softerm is written entirely in 6502 assembly language for fast response and efficient operation. It augments the Apple personal computer by providing terminal communications, file transfer, and terminal emulation in a sophisticated intelligent terminal program.

Softerm executes on any Apple II, II Plus, or IIe system with 48K memory and an Apple II Disk drive. Autostart ROM is *not* required. You can use either a standard TV set or video monitor for display using standard Apple video or any of the supported 80 column boards. An asynchronous serial interface is required for either direct connection to another computer system or a modem. Optional equipment includes a printer connected to a serial or parallel interface and a clock board.

Although a printer is not required to utilize Softerm, many features are available which can use a printer connected to either a parallel or serial interface. These include printing of a setup screen for configuration documentation, printing the current screen in terminal mode, concurrent receive to print from the communications line, and printing a file from disk. Softerm can support any interface and printer through standard firmware, but simultaneous reception of data and printing requires an interface for which Softerm has a specific driver. Otherwise, reception of data and printing will alternate.

Softerm's speed and flexibility offer a wider range of host computer uses. With the Softerm program it's easy to adjust your terminal configuration to match host computer requirements including character size, baud rate, stop bits, parity and pacing control using XON/XOFF and DTR.

Softerm's many advanced features make it easy to communicate with other computers. Full or half duplex operation and buffering of both keyboard input and received data insure that no information is lost during terminal operation. Your Apple II becomes a highly adaptable terminal for full support of your system.

Some functions, such as clear screen, scroll and erase to end of line, take longer than a single character transmission time. In this case, Softerm buffers the serial input data in a *ring* buffer. If this buffer becomes full, Softerm automatically signals the host computer to suspend its output, either by dropping the Data Terminal Ready modem line or by transmitting a user definable XOFF character. This technique is known as *pacing*. Serial output from Softerm is processed concurrently with any serial input activity. Thus, for command sequences received from the host system that evoke a terminal response, the output begins immediately after the reception of the command, regardless of any additional serial input.

In addition to providing full support for a wide selection of available 80-column video boards for the Apple computer, Softerm allows the standard Apple 40-column video to be utilized by displaying the low 40 columns (1-40) or the high 40 columns (41-80) selected by a keystroke. Softerm will also automatically select the appropriate 40-column display containing the cursor if no serial input is received or keyboard activity occurs for approximately 1 second.

Softerm also supports lower case adaptors and keyboard enhancers if present and the standard one-wire shift key modification. Upper or lower case may be displayed in inverse video if lower case is not available.

Softerm enables you and your Apple II to transfer files to and from larger computers and other personal computers. You can *download* information from large host computers to your personal computer, placing the data on diskette for processing or printout. You can send or receive information between your personal computer and others including text files, program files, and binary files.

The terminal operation mode includes the capability to simultaneously capture data to disk or print. Both a *transparent* mode which captures all data received and a *line* mode which captures each line on the screen after it is displayed are provided. A send file function allows data to be transmitted from disk as if it were typed on the keyboard.

Softerm offers a variety of file transfer modes supporting DOS, CP/M, and Pascal disk formats flexible enough to match any host computer requirement. Softerm provides both *local* and *line* file transfer options. Local file transfers allow a disk file to be displayed, printed, or copied to another file. Line file transfers allow data to be transferred to and from the communications line. Local disk files may be transmitted to a remote computer system, and received data may be printed or written to a local disk file.

The local file transfer capabilities allow Softerm to function as a *file utility program* while maintaining communications with a host computer system. Text files can be displayed or printed, allowing the user to verify the contents of the file before it is transferred to the host computer or after it has been received. Local file transfer also allows copying of files on a disk in Drive 1 in one format such as CP/M to a disk in Drive 2 in the same or a different format such as Pascal providing a complete format conversion capability. A selection of *edit options* such as tab expansion and removing unwanted characters which are available in the local and line file transfer modes compensate for the variations in data formats used by host computers.

The line file transfer capabilities provided by Softerm allow files to be transferred to and from larger computers and other personal computers. Three protocols are provided which allow the flexibility to transfer almost any type of file between Softerm and a host computer.

The *character protocol* provides maximum flexibility for text file transfers. Transmitting files using the character protocol can be accomplished in a streaming or simple block mode depending on how the various options provided are selected. Transmit options include user-definable fixed or variable block size, end of block terminator and acknowledge character strings, end of block delay, and character echo wait. Receiving files using character protocol provides a *line capture* mode in which all data received is considered part of the file transfer.

The *XMODEM protocol* is compatible with the standard CP/M User's Group protocol for binary file transfers and allows any type of file to be transferred to or from systems using the CP/M operating system.

The *Softrans protocol* is an intelligent protocol designed specifically for asynchronous file transfers between computer systems. Any type file may be transferred using the Softrans protocol which provides automatic binary encoding and decoding, CRC-16 error checking with automatic retransmission, and data compression to enhance line utilization. A FORTRAN 77 source program is supplied with Softerm which is easily adaptable to any host computer to allow communications with Softerm using the Softrans protocol.

Softerm file transfer utilizes an easy to use command language which allows simple definition of even complex multiple-file transfers with handshaking. Twenty-three high-level commands are included which may be executed interactively or from a file transfer macro command file which has been previously entered and saved on disk.

Softerm supports automatic dialing in both terminal and file transfer modes. Dialer drivers are included for many popular modems and serial interfaces with integral modem and dial capability. The *Softerm Phone Book* allows frequently used numbers to be accessed by user-assignable name from disk and specifies the serial interface parameters to be used such as speed, parity, the number of data bits and stop bits.

Many additional user-oriented features are included in Softerm making it a powerful tool for your data communications needs. For example, *keyboard macros* allow you to send frequently-used sequences of characters easily, a *print screen* function allows you to print the current contents of your screen to your local printer, and user-specified automatic answerback are standard Softerm capabilities. Softerm even allows disk commands such as INIT, RENAME, and DELETE to be executed allowing convenient file maintenance. All Softerm options and configurations are specified using a menu-driven setup mode featuring formatted data entry and editing.

What You Need

To use the Softerm program, you will need the following components:

- Your Apple II, II Plus, or IIe with at least 48K of memory.
- The Apple Disk II Disk Drive.
- An asynchronous serial interface for connecting to another computer system or a modem.
- Optionally, an 80 column board so that a full 80 columns of information may be displayed. Softerm allows operation with the standard 40 column Apple display, however, we recommend use of an 80 column board in order to take full advantage of Softerm's capabilities.
- Optionally, a printer connected to a serial or parallel interface. A printer is not required to utilize Softerm, but many features are available which can use a printer to enhance terminal operation.
- Optionally, a clock board to utilize the file transfer schedule and logging features.
- The Softerm system and configuration diskettes, contained in the special compartment in the front cover of the Softerm packaging.
- A TV set or other video monitor. The 80 column boards normally require a monochrome video monitor and cannot use a TV set connected through an RF modulator.

Note: Autostart ROM is *not* required. A CP/M compatible processor board is *not* required to use the Softerm file capabilities to access CP/M compatible disks.

Getting Started

Softerm is provided on two copyable DOS 3.3 format diskettes. The *system* diskette when booted automatically runs the Softerm program. The *configuration* diskette contains configuration files which allow the user to select hardware and software options and generate tailored terminal configurations. Both diskettes are *reversible*, and contain information on the back side as well as the front. The back side of the system diskette for both Softerm 1 and 2 contains the Softrans protocol FORTRAN 77 source program which may be transferred to the user's host computer to allow file transfers using the Softrans protocol. The back side of the configuration diskette for Softerm 1 contains nothing. The back side of the configuration diskette for Softerm 2 contains specific CRT terminal emulation files.

Backing Up the System and Configuration Diskettes

Before attempting to use the Softerm program, backup copies of the Softerm system and configuration diskettes should be made. The following procedure can be used:

1. Boot the Apple DOS 3.3 System Master Diskette.
2. Run the *COPYA* program.
3. Remove the DOS System Master and insert the Softerm System Diskette label side up.
4. Copy the front (label) side of the Softerm System Diskette to a backup diskette.
5. Remove the Softerm System Diskette, flip it over and insert it label side down.
6. Copy the back side of the Softerm System Diskette to a backup diskette.
7. Remove the Softerm System Diskette and insert the Softerm Configuration Diskette label side up.
8. Copy the front (label) side of the Softerm Configuration Diskette to a backup diskette.
9. Remove the Softerm Configuration Diskette.

If the backup procedure is being performed for Softerm 1, it is complete after step 9. If the backup procedure is being performed for Softerm 2, steps 10 through 12 should also be performed.

10. Insert the Softerm Configuration Diskette label side down.
11. Copy the back side of the Softerm Configuration Diskette to a backup diskette.
12. Remove the Softerm Configuration Diskette.

Once the backup procedure is complete, either the original or backup diskettes at the user's option should be stored in a safe, dry place, free from magnetic interference.

Installing the Softerm Keyboard Expander

Softerm 1 and 2 include a *keyboard expander* which provides 2 or 3 additional keys to the Apple keyboard. The additional keys function as **SHIFT** keys and allow all Softerm and terminal emulation keyboard functions to be performed in a single keystroke when used in combination with the main keyboard. Each keyboard expander consists of a printed circuit board, cable, and a 2 or 3-key keypad which must be installed before using the Softerm program. Softerm 1 uses a 2-key keypad and Softerm 2 uses a 3-key keypad.

This section provides step-by-step instructions for installing the keyboard expander circuit board. We recommend you read all of the instructions first to acquaint yourself with the overall procedure. Then perform each step with care, exactly as described.

Handling Precautions
Always handle the computer and its components carefully, as you would any electrical or electronic device. Removing or replacing parts while the power is on can damage the computer or create a shock hazard.

Hold the keyboard expander printed circuit board by its edges to avoid contaminating it with oil from your hands. Be especially careful to avoid touching the gold edge-connector on the bottom of the board.

Keyboard Expander Circuit Board Installation
The Softerm keyboard expander circuit board mounts in any peripheral connector slot *except 0* in the back of the Apple II computer. When the Softerm program is executed, it automatically determines in which slot the keyboard expander has been installed.

Use the following procedure to install the keyboard expander circuit board and keypad:

1. Remove the keyboard expander circuit board and attached keypad from the pouch contained in the Softerm package.
2. Set the Apple II POWER switch to OFF.
3. Set all external power switches to OFF (display monitor, printer, etc.).
4. Ensure that there is nothing on the top cover of the computer.
5. With your Apple computer positioned so the keyboard is directly in front of you, grasp the cover under the rear lip at each corner, and pull the cover up gently until it pops loose.
6. Slide the cover back and remove it from the computer.
7. Locate an available peripheral interface slot other than slot 0.

8. Align the keyboard expander circuit board in the selected slot so that the edge connector is directly over the mating connector in the slot. The component side should face the right side of the chassis and the keypad connector cable should extend towards the front of the Apple.

9. Press the circuit board down into the mating connector using steady, but firm pressure.

10. Remove the peel-off covering on the back of the 2 or 3-key keypad exposing the adhesive coating and place the keypad on the right side of the Apple keyboard next to the **RETURN** key. Align the keypad so that the cable extends into and towards the back of the chassis and the **S1** key is towards the front of the computer.

11. Route the cable over the forward lip of the chassis and place any excess cable inside the chassis leaving sufficient slack so that the top cover can be replaced without requiring undue stress on the cable.

12. Carefully place the top cover back on the computer. Slide the forward edge of the cover under the forward lip of the chassis making sure the keypad cable lays flat and wraps-around the forward edge of the cover as it is inserted.

13. Press the rear portion of the cover down until the corners pop back into place.

14. Reinstall any peripheral cables removed and set external option power switches to ON.

Now the Softerm program is ready for use. Checkout of the keyboard expander consists of bringing up Softerm and using it. However, before turning on your Apple II system, the user is advised to read the remaining sections of the introduction.

Using the Softerm Keyboard Expander

The Softerm 1 keyboard expander provides an additional 2 keys to the Apple keyboard while the Softerm 2 keyboard expander provides an additional 3 keys. These keys are labeled as **S1** and **S2** for Softerm 1 and **S1**, **S2**, and **S3** for Softerm 2. The **S1**, **S2**, and **S3** keys are used like the **SHIFT** key on a typewriter or the standard Apple keyboard, i.e., by holding it down while you type the key with the character you want.

Another key that you operate much like the **SHIFT** is the key marked **CTRL** (for CONTROL). When you are told to type **CTRL C**, for example, you must hold down the **CTRL** key while you press **C**. Release the **CTRL** key after you've released the **C** key.

All Softerm special functions are performed in a single keystroke using the **S1**, **S2**, and **S3** keys in combination with other keys on the keyboard. For example, **S1 1** is used to execute the Softerm Disk Utilities by pressing the **S1** key in combination with the **1** key. Other functions may require a multiple key combination such as **S1 S2 A** which executes the keyboard macro identified by the **A** key. Since all Softerm functions are initiated using the keyboard expander, the Apple keyboard can be used transparently including all **CTRL** and **SHIFT** key combinations.

Many of the functions required to emulate specific terminals by the Softerm 2 program will require the use of the Softerm keypad to provide a specific function. A complete description of these functions can be found in Chapter 3 of this user's guide on terminal operation.

Using the SHIFT Key

If the Apple II, II Plus, or IIe system displays both upper and lower case characters, a *shift* function must be available to indicate when upper or lower case characters are desired. Softerm includes a software shift function which uses the combination of **S1 L** to cause a switch to the other case. Softerm also supports the Apple IIe **SHIFT** key, and keyboard enhancers for the Apple II or II Plus which provide a hardware shift key function. The standard *one wire* shift key modification which connects the **SHIFT** key to the game connector push button input 3 (Memory location $C063) is also provided for. Additional options are provided for support of 80-column video boards which support a special shift key modification.

Softerm allows all 128 ASCII character codes to be generated from the Apple keyboard in terminal mode. A table of ASCII character codes and the required keystroke to generate them may be found in Appendix C.

Handling of Diskettes

A word of caution about the handling of diskettes—you can't be too careful with diskettes! Each diskette is a small, magnetically coated plastic disk, sealed in a protective square plastic cover. Through the oval cutout in the square cover, you can see the magnetic surface of the actual diskette.

Never Touch the Exposed
Magnetic Surface

with your fingers or any implement. Protect the diskette from dust by storing it in the proper sleeve it comes in. Keep it at least six inches from magnetic fields such as those generated by a TV. Extremes of temperature (such as in a car trunk on a warm day) could destroy a diskette, and you would lose your data, or your Softerm program. Don't bend, staple, or write on the square plastic cover with a hard pen or pencil (use only soft felt tip pens).

Loading the Softerm Program

To load Softerm, first make sure that your video monitor or TV set is connected, your disk drive hooked up, and that the Apple is plugged in. Note: never touch the inside of your Apple, its interface cards, or external connections while the power is on.

Assuming that your Apple is off (the POWER light at the left corner of the keyboard will be unlit) follow these instructions:

1. Turn your video monitor or TV set ON.
2. Open the door of drive 1 by lifting up on it and gently insert your Softerm System Diskette label side up with the label entering last. Close the drive door by pushing down on it until you here it click shut.
3. Turn the power switch at the left rear corner of your Apple ON.

The Apple II will beep, the Disk II will whir and click, the IN USE light will come on, and shortly thereafter you will see the Softerm Logo screen and copyright notice.

Pressing any key during the initial boot will cause the display of the logo screen to be bypassed. After a few seconds, the screen will clear, and the Disk II will continue to whir and click as the Softerm program continues to load into memory. The following message is displayed on the screen as the Softerm configuration setup routines are loaded:

LOADING: SOFTERM SETUP

When the Softerm program has been completely loaded, the following screen is displayed:

```
                    SOFTERM 2
                    REVISION 1.00
        OPTION:   6 VOLUME 0    DRIVE 1 SLOT 6

                  1 — DISK UTILITIES
                  2 — LOAD CONFIGURATION
                  3 — LOAD DEFINITION MODULES
                  4 — EDIT OPTIONS
                  5 — SAVE CONFIGURATION
                  6 — EXIT SETUP

        ********* CURRENT CONFIGURATION *********
        CONFIGURATION NAME: SOFTERM.INIT
        TERMINAL EMULATION:
        SERIAL I/O DRIVER:
        DISPLAY DRIVER:
        PRINTER DRIVER:
        DIALER DRIVER:
        CLOCK DRIVER:
```

Softerm will automatically attempt to load the default configuration file *SOFTERM.INIT*, and the **CURRENT CONFIGURATION** information displayed on the screen will be filled in if this file is successfully loaded. If the file *SOFTERM.INIT* does not exist, the message **FILE NOT FOUND** is displayed. Pressing the **ESC** key will clear the error message. Other errors may occur during the loading of these files from the configuration diskette such as **I/O ERROR** and the appropriate error message will be displayed. All types of errors must first be cleared by pressing the **ESC** key before the Softerm program will continue.

Once the Softerm program has been successfully loaded, the cursor is positioned to the *OPTION:* selection on the main setup menu.

If the drive starts whirring but doesn't stop, wait for about 15 seconds (it won't hurt the drive). Then press the key marked **RESET**. In a few seconds the drive will stop and the IN USE light will go out. Open the drive door and remove the program diskette. Make sure that you inserted it properly—label side up, label in last. Reinsert the diskette and close the drive door. Turn the Apple off and then on again. If your efforts prove unsuccessful after a few tries, see your dealer.

Using DOS, CP/M, and Pascal Files

Softerm incorporates an advanced file manager which provides compatibility with DOS, CP/M, and Pascal disk formats for all file operations including file transfer at speeds up to 5 times faster than standard Apple DOS. Softerm contains its own operating system and does not use Apple DOS, CP/M, or Pascal operating systems but instead includes a file manager capable of reading and writing the disk formats used by these operating systems. It is also not necessary to have any additional hardware such as a CP/M compatible processor board in order to use the Softerm file capabilities.

Many of the screens displayed in Softerm for functions which use file operations will include data entry fields for the *VOLUME*, *DRIVE*, and *SLOT*. The *SLOT* number and *DRIVE* number specify the physical slot and drive numbers as used with standard Apple DOS. However, the *VOLUME* number takes on a special meaning within Softerm and is used to identify the type of disk format being used. The following table defines how the *VOLUME* number is used:

VOLUME	Disk Format
0–254	Apple DOS 3.3 Volume Number
CPM	CP/M-80 Version 2.2
PAS	Apple Pascal 1.1, UCSD 4.1

The Softerm System and Configuration diskettes are in Apple DOS format, and all files relating to Softerm configurations use Apple DOS format only.

Generating a Softerm Configuration

The Softerm program uses a menu-driven, formatted fill-in-the-blank method of specifying the terminal emulation and hardware configuration. Softerm 1 includes the built-in terminal emulation *SOFTERM.TERMINAL*. Softerm 2 allows the terminal emulation to be selected from a range of popular conversational and block mode CRT terminals. Before Softerm can be used, the hardware configuration of the user including the asynchronous serial interface, printer interface, 80-column board, and auto-dial modem must be entered. Once a configuration has been completely specified, it can be saved in a configuration file which can become the default configuration, or used only when required. A detailed explanation of this process can be found in Chapter 2 on terminal setup.

In order to generate a useable new configuration, the following steps must be taken:

1. **Define the Configuration**. Included with Softerm is a diskette labeled *Softerm Configuration Diskette*. For each configuration option Softerm supports, there is a corresponding file on the configuration diskette. The Softerm 1 Configuration Diskette contains all hardware configuration files on the front side of the diskette. The Softerm 2 Configuration Diskette contains hardware configuration files on the front side of the diskette, and terminal emulation files on the back side of the diskette. Since Softerm 1 includes the built-in terminal emulation *SOFTERM.TERMINAL*, the back side of the diskette is not used. In order to generate a useable Softerm configuration, a file corresponding to each hardware and software option including terminal emulation, serial I/O interface, 40- or 80-column video display, printer interface, clock interface, and automatic dialer interface for use with auto-dial modems must be loaded.

2. **Edit Configuration Options**. Each file or module loaded from the configuration diskette includes options which may be edited according to the user's specific requirements. Each of the options has a default value corresponding to the most frequently used selection. It is usually only necessary to edit these options if the user has hardware which is not in the normal slot for that type of board, or if the host computer communications parameters do not match the default values used by the Softerm program. This tutorial will identify only the options most likely to require editing. However, all Softerm configuration options are explained in detail in Chapter 2.

3. **Save the Configuration**. Once the completed configuration is ready, it should be *saved* on the Softerm System Diskette so that the configuration process does not have to be repeated each time Softerm is used. If the user configuration is saved on the system diskette using the filename *SOFTERM.INIT*, it will be automatically loaded each time the system diskette is booted. Otherwise, the configuration may be saved using any legal filename and loaded as required using the *LOAD CONFIGURATION* option.

Using Softerm Keyboard Functions

While generating a Softerm configuration, certain keyboard functions may be utilized during data entry and editing of configuration parameters. These functions are similar to operations provided by most text editor or word processing programs. Many of the functions require the use of the Softerm keypad and the **S1** key in combination with other keys on the Apple keyboard. The following table summarizes the keyboard functions which may be used while entering and editing a configuration:

Keyboard Function Table

Keyboard Function	Description
RETURN	Accept Field
→	Cursor Right
←	Cursor Left
ESC	Clear Error Messages
	Lead-in for Special Character
	Entry in Strings
S1 RETURN	Accept Screen, Display Next
S1 →	Field Tab Forward
S1 ←	Field Tab Backward
S1 B	Cursor to Beginning of Field
S1 D	Delete Character
S1 E	Erase to End of Field
S1 I	Toggle Insert Mode
S1 L	Shift Lock Toggle
S1 N	Cursor to End of Field
S1 O	Display Other Half (40-column)
S1 Q	Truncate Field
S1 R	Restore Field to Original Contents
S1 X	Cancel and Restore Field
S2 1	Print Screen with Form Feed
S2 2	Print Screen without Form Feed

Softerm Configuration Setup Menu

Each time the Softerm program is booted, the following option menu will be displayed on the screen:

```
                    SOFTERM 2
                    REVISION 1.00
    OPTION:    6 VOLUME O    DRIVE 1 SLOT 6

               1 — DISK UTILITIES
               2 — LOAD CONFIGURATION
               3 — LOAD DEFINITION MODULES
               4 — EDIT OPTIONS
               5 — SAVE CONFIGURATION
               6 — EXIT SETUP

    ******** CURRENT CONFIGURATION *********
    CONFIGURATION NAME: SOFTERM.INIT
    TERMINAL EMULATION:
    SERIAL I/O DRIVER:
    DISPLAY DRIVER:
    PRINTER DRIVER:
    DIALER DRIVER:
    CLOCK DRIVER:
```

Pressing the **RETURN** or **6** key to exit setup will cause the error message **CONFIGURATION IS INCOMPLETE** to be displayed. Until the configuration has been completely specified, Softerm cannot be used in terminal mode. Pressing the **ESC** key will clear error messages and allow the Softerm program to continue.

Defining the Configuration

Entering a **3** to select the *LOAD DEFINITION MODULES* Option will cause the following menu to be displayed:

```
                    SOFTERM 2
                    REVISION 1.00
        LOAD:     7 VOLUME O   DRIVE 1 SLOT 6
                  1 — TERMINAL EMULATION
                  2 — SERIAL I/O DRIVER
                  3 — DISPLAY DRIVER
                  4 — PRINTER DRIVER
                  5 — DIALER DRIVER
                  6 — CLOCK DRIVER
                  7 — QUIT

        ******** CURRENT CONFIGURATION *********
        CONFIGURATION NAME: SOFTERM.INIT
        TERMINAL EMULATION:
        SERIAL I/O DRIVER:
        DISPLAY DRIVER:
        PRINTER DRIVER:
        DIALER DRIVER:
        CLOCK DRIVER:
```

Remove the Softerm System Diskette from Drive 1 and insert the Softerm Configuration Disk. Terminal emulation files are contained on the *back* side of the Softerm 2 Configuration Diskette, and the diskette should be inserted *label side down* when loading a terminal emulation file. All hardware configuration files are located on the front side of the Softerm 1 and 2 Configuration Diskettes, and the diskette should be inserted *label side up* when loading hardware configuration files.

Selecting any of the *LOAD:* options will position the cursor to the corresponding field in the *CURRENT CONFIGURATION* area of the display. Enter the appropriate filename corresponding to your hardware configuration or terminal emulation required. Softerm 1 contains the built-in terminal emulation *SOFTERM. TERMINAL* and if this option is selected the error message **YOU CAN'T DO THAT** will be displayed. Refer to the configuration tables in Chapter 2 for a complete listing of all valid terminal emulations, serial I/O drivers, display drivers, printer drivers, dialer drivers, and clock drivers.

If the corresponding filename to your hardware configuration does not appear in the configuration tables, you can select the *DISK UTILITIES* option on the Softerm main menu and perform a *CATALOG* function on the Softerm Configuration Diskette. Hardware configuration files are located on the front side of the diskette and terminal emulation files are located on the back side of the configuration diskette.

Terminal emulation filenames have the same name as the corresponding terminal being emulated. Serial I/O drivers usually reflect the manufacturer and name of the asynchronous serial interface and have the filename extension *.SIO*. For example, the filename *APPLE SUPER.SIO* refers to the Apple Super Serial Interface card. Display driver filenames directly correspond to the name of an 80-column board except for standard built-in capabilities. For example, the filename *VIDEOTERM* is used for the Videx Videoterm 80-column board while *APPLE40* and *APPLE IIE.80* refer to built-in Apple computer capabilities.

Printer driver filenames correspond to the manufacturer and name of either a serial or parallel interface and have the filename extension *.PIO*. All of the serial interfaces Softerm supports for asynchronous communications can also be used for interfacing a printer. If there is no printer included in the configuration, the filename *NULL.PIO* is used. If no specific printer driver is available for the user's hardware, and the hardware is not directly compatible with the Apple parallel printer interface and the *APPLE PRINT.PIO* driver, the filename *FIRMWARE.PIO* can be used. However, using the firmware driver for printing does not permit *simultaneous* printing while data is being received from the communications line.

Dialer driver filenames correspond to the name of an auto-dial modem and have the filename extension *.DIAL*. For example, the filename *SMARTMODEM.DIAL* is used for both the Hayes Smartmodem 300 and 1200. If a direct connection or manual modem is being used, the filename *NULL.DIAL* is used. Clock driver filenames correspond to the manufacturer and name of a clock board and have the filename extension *.CLK*. If there is no clock board in the configuration, the driver *NULL.CLK* is used.

Once all configuration driver filenames have been selected and loaded, entering **7** for the *LOAD:* option will return to the main Softerm menu.

Editing Configuration Options

Softerm 1 and 2 contain a series of data entry screens which allow options associated with the program, terminal emulation, and hardware configuration to be specified. These options default to the most commonly used values and generally require very little editing. Only the most likely options to require editing will be covered in the introductory tutorial. A detailed description of all options and their effect on the configuration may be found in Chapter 2.

While editing options all of the previously described keyboard functions may be used. The **RETURN** key is used to accept the current field and may also be used to move forward through the fields on a particular screen. The → and ← keys may be used to move the cursor within a particular field, and the **S1** → and **S1** ← keys may be used to position forwards and backwards through the fields on a screen. Once a screen has been completely edited, the **S1 RETURN** key may be entered to accept the current screen and display the next.

Entering **4** to select the *EDIT OPTIONS* option will cause the following screen to be displayed:

```
============ SYSTEM  PARAMETERS ============
CHARACTER DELAY O    HALF  DUPLEX      N
USE INVERSE      1    RCV XON/XOFF      N
ANSWERBACK

====== TERMINAL EMULATION PARAMETERS ======
PACE CTRL: DTR   N    XON/XOFF          Y
CR AFTER LF      Y    LF AFTER CR       N
RETURN = CR(O), LF(1) OR CR/LF(2)       O
AUTO LINE WRAP   Y    PAGE MODE         N
HOST XON         $11 HOST XOFF          $13
```

SYSTEM PARAMETERS are Softerm options which are *global* to the operation of Softerm and not necessarily dependent on a particular configuration. The most likely system parameter to require editing is the **HALF DUPLEX** option. The **RCV XON/XOFF** option is used only in special configurations used for file transfer and should *not* be set for terminal communications. The terminal emulation parameter **PACE CTRL: XON/XOFF** is normally set for terminal communications with a host computer and allows Softerm to pace the incoming received characters to match its data handling capability.

The system parameter **HALF DUPLEX** indicates whether or not the terminal should operate in the half duplex mode instead of full duplex mode. In full duplex mode data entered on the keyboard is transmitted to the remote system without being displayed or processed locally. The remote system or host computer must *echo back* the characters if they are to be processed and displayed. In half duplex mode, data entered on the keyboard is transmitted to the remote system as well as being processed and displayed locally. The user should check the requirements of the host computer before setting this option. Most information services such as THE SOURCE and CompuServe operate in the full duplex mode. If half duplex is set, and the host computer is full duplex, characters entered on the keyboard will be displayed *twice*. Entering a **Y** for this field indicates half duplex operation while a **N** indicates full duplex operation.

TERMINAL EMULATION PARAMETERS define standard options associated with the various terminal emulations provided by Softerm. These include specification of the pacing control method, automatic line feed after carriage return, automatic line wraparound, page or scroll mode, characters transmitted by the **RETURN** key, and the XON/XOFF character codes.

Many of the specific terminal emulations provided with Softerm 2 include additional parameters unique to the type of terminal. These options if necessary are presented as an additional screen after the standard option screens. The *SOFTERM.TERMINAL* terminal emulation built in to Softerm 1 includes a function definition screen which allows the user to define emulation functions by assigning control character sequences to standard functions such as clearing the screen. A complete description of the *SOFTERM.TERMINAL* emulation can be found in Chapter 5.

After editing of the system parameters and terminal emulation parameters is complete, entering **S1 RETURN** will cause the following screen to be displayed:

```
=========== SERIAL I/O DRIVER ===========
BITS/CHARACTER   8    # OF STOP BITS  1
PARITY           O    SPEED           5
SLOT #           2    PORT #          N/A
MODEM CONTROL    Y

============= DISPLAY DRIVER =============
UPPERCASE ONLY   N/A INVERSE LC      N/A
INVERSE UC       N/A CURSOR DEF      1
SHIFT KEY TYPE   O   SLOT #          3
SPECIFY CRTC PARAMETERS              N
```

The **SERIAL I/O DRIVER** provides the communications interface between Softerm and the remote computer system. Softerm automatically initializes serial interface boards which are software programmable to the values specified in terminal setup. These values should be set to match boards on which options are set by jumpers or switches. The user should refer to Appendix A for specific information on serial I/O interface boards supported by Softerm.

The serial I/O driver parameters must match the communications characteristics of the host computer in order for Softerm to operate properly. The usual settings for these parameters when communicating with information services such as THE SOURCE and CompuServe are 8 bits/character, 1 stop bit, no parity and speed of 300 or 1200 baud. Another common setting for many host computers is 7 bits/character, 1 stop bit, and even parity.

The serial I/O option **BITS/CHARACTER** indicates the number of binary information data bits contained in each character. The value of this option can be either a 7 or 8. This will almost always be 7 if parity is used and 8 if no parity is used.

The serial I/O option **# OF STOP BITS** is the number of bits which should be appended to each character to facilitate synchronization. The value of this option can be either a 1 or 2. This setting is usually dependent on the requirements of the host computer system but usually is 1.

The serial I/O option **PARITY** indicates whether or not and what type of parity is desired. Parity is used as a method of error detection. The following table indicates the legal values for this field and the resulting parity option:

Value	Parity
0	No Parity
1	Odd Parity
2	Even Parity
3	Mark Parity
4	Space Parity

The serial I/O option **SPEED** indicates the transmission speed in bits per second of the communications link between Softerm and the host computer. The following table defines the values which may be entered and the corresponding transmission speed in bits per second:

Value	Speed
0	50
1	75
2	110
3	134.5
4	150
5	300
6	600
7	1200
8	1800
9	2000
10	2400
11	3600
12	4800
13	7200
14	9600

Some serial I/O interfaces restrict the choice to fewer speeds. Refer to Appendix A for specific information.

The serial I/O option **SLOT** # indicates in which Apple slot number the *physical* controller board is located. The legitimate entry values for this field are 1–7.

The serial I/O option **PORT** # will not be applicable to most controller boards. However, some boards have more than one interface available for communications. An example of this is the Bit 3 Computer *Dual Comm Plus*. In this case you must enter a 1 or 2 to indicate which *port* will be used for serial communications. See Appendix A for *port* # specification.

The **DISPLAY DRIVER** provides the 40- or 80-column video interface for the Softerm terminal emulation. In addition to providing full support for a wide selection of available 80-column video boards for the Apple computer, Softerm allows the standard Apple 40-column video to be utilized by displaying the low 40 columns (1-40) or the high 40 columns (41-80) selected by a keystroke. Softerm will also automatically select the appropriate 40-column display containing the cursor if no serial input is received or keyboard activity occurs for approximately 1 second.

The display driver option **SHIFT KEY TYPE** indicates which type of shift key modification has been made to the standard Apple. The following table indicates the legal values and the type of shift key indicated:

Value	Shift Key Type
0	None or Keyboard Enhancer or IIe
1	1-Wire Modification from shift key to push button input 3 (PB3)
2	Special 80-column video board connection

Therefore if no modification has been made, or there is a built-in shift capability such as on the Apple IIe, or the modification is *invisible* to the Softerm program such as with a keyboard enhancer, the value entered should be 0. If the user has installed the popular 1-Wire shift key modification, the value entered should be 1. If the user has made a special modification to connect the shift key to the 80-column video board, the value entered should be 2.

The display driver option **SLOT** # indicates which Apple slot number the *physical* 80-column video board is installed. This option is not applicable to users who do not have 80-column boards. Some boards may have slot limitations. The user should refer to Appendix B for specific information on 80-column boards.

After editing the serial I/O and display driver options, entering a **S1 RETURN** will cause the following screen to be displayed:

```
================ PRINTER DRIVER ================
SLOT #            1    PORT #           2
SERIAL PORT PARAMETERS:
BITS/CHARACTER   7    # OF STOP BITS   1
PARITY           1    SPEED            7
USE XON/XOFF     N    FILL CHARACTER   $00
FILL AFTER CR    O    FILL AFTER LF    O
FILL AFTER FF    O

PARALLEL PORT PARAMETERS:
STROBE LOW       N/A ACKNOWLEDGE LOW N/A
HIGH BIT SET     N

PRINT OPTIONS:
INVERSE DATA     N    LF AFTER CR      Y
UPPERCASE ONLY   N    HARDWARE FF      Y
PAGE LENGTH      66   PAGE SKIP COUNT 6
# COLUMNS        80   FOLD LONG LINES Y
INIT STRING
```

The **PRINTER DRIVER** provides the capability to utilize print functions within the Softerm program. These options including printing a screen, printing a local file from disk, and printing data as it is received from the communications line. The printer driver options define not only interface specifications, but also print formatting specifications.

Softerm supports both serial and parallel interfaces for printers. The printer driver option screen is divided into sections for serial and parallel port parameters as well as print formatting options. The user should refer to Appendix A for specific information on serial and parallel interface boards supported by Softerm. The most likely printer driver options to require editing are **SLOT #**, **PORT #**, and **INIT STRING**. If a serial interface is being used, insure that the serial port parameters and particularly the bits/character, number of stop bits, parity, and speed match the printer being used.

The printer driver option **SLOT #** indicates in which Apple slot number the *physical* controller board is located. The legal entry values for this field are 1—7

The printer driver option **PORT #** will not be applicable to most controller boards. However, some boards have more than one interface available on the board. An example of this is the Mountain Computer *CPS Multifunction Board*. In this case entering a 1 would indicate the *serial* interface, and entering a 2 would indicate the *parallel* interface. Refer to Appendix A for additional information on serial and parallel interface boards supported by Softerm.

The printer driver option **INIT STRING** allows the user to define a *string* of ASCII character codes which can be used to *initialize* the printer. This string may contain up to 48 characters including control codes. The **INIT STRING** is transmitted to the printer any time a print function is performed in Softerm. Thus this function may be used to set form length, line spacing, tab stops, character font, or any feature available on the printer.

```
================= DIALER DRIVER =================
TOUCH TONE DIALING?                        Y
================= CLOCK DRIVER ==================
SLOT #         4
CURRENT TIME   06/15/83 10:25:42
```

The dialer driver allows remote phone connections to be established and dialed automatically with the appropriate hardware. Softerm includes a built-in phone directory which may be accessed when it is desired to establish a remote connection. Touch tone or pulse dialing may be indicated as the default when not explicitly specified.

The dialer driver option **TOUCH TONE DIALING?** allows either *touch tone* or *pulse* dialing to be used by default. Some phone exchanges may support only one of the two types and the user should check with the local phone company to determine how this option should be set.

The clock driver allows the date and time of an optional clock board to be set and used in file transfer operations for event logging and scheduled file transfers. To set the clock, or read the current time, position the cursor to the clock driver **SLOT #** option. Enter the physical slot number from 1 to 7 which contains the clock board. The current date and time will be displayed in the fields provided on the screen. To set or correct the current date and time displayed, position the cursor to the field which needs to be changed, and enter the correct information. It is not necessary to enter the complete date or time in order to effect a change.

After editing of the dialer driver parameters and clock driver parameters is complete, entering **S1 RETURN** will return to the Softerm setup menu unless the terminal emulation being used includes additional parameters unique to the type of terminal. When using Softerm 1, or the *SOFTERM.TERMINAL* terminal emulation, a *terminal function definition* screen is displayed. When using Softerm 2, if there are additional parameters unique to the type of terminal, a terminal emulation parameter screen will be displayed. A complete description of the *SOFTERM.TERMINAL* and other specific terminal emulations and features can be found in Chapter 5.

Saving the Configuration

Once the completed configuration is ready, it should be *saved* on the Softerm System Diskette. If the user configuration is saved on the system diskette using the filename *SOFTERM.INIT*, it will be automatically loaded whenever the System Diskette is booted. The configuration may also be saved using any other filename of the user's choice and loaded as required after the System Diskette has been booted using the *LOAD CONFIGURATION* option.

Entering a **5** to select the **SAVE CONFIGURATION** option will cause the cursor to be positioned to the *CONFIGURATION NAME:* field in the current configuration area of the screen. The user may enter a new configuration name, or simply edit the existing name using the Softerm editing keys. If a new name is entered, and the new name is shorter than the existing name, entering **S1 Q** will truncate the remainder of the field and accept the data entered in the field. Then pressing the **RETURN** key will cause the current configuration to be saved using the name currently displayed. If this file already exists on the disk, the message **DELETE EXISTING FILE?** will be displayed. Entering a **Y** will cause the existing file to be deleted and the new configuration will be written to disk.

Online Terminal Operation

The online mode of terminal operation is initiated from the main Softerm menu by pressing the **RETURN** key to select the default *EXIT SETUP* option or by entering a **6** to select the option. The screen is cleared and the display driver specified is initialized and the cursor is positioned to the home position at row 0, column 0. If an 80-column board is being used which has software controlled switching to 80-column mode, Softerm automatically switches from 40-column to 80-column display. If a manual switch must be used to switch to 80-column mode, it should be toggled at this time.

The serial I/O interface is initialized and all programmable characteristics such as line speed, parity, and stop bits are automatically set by Softerm. If the serial interface uses jumpers or switches to determine these settings, they should be set before the online mode of terminal operation is initiated.

If an auto-dial modem such as the Hayes Smartmodem is being used, Softerm will initialize it by sending a string of characters to it at this time. Be sure the modem is turned on and connected to the serial interface since Softerm cannot continue until the initialization string has been sent to the modem. If the cursor fails to appear on the screen, this may be an indication that Softerm is unable to initialize the modem for some reason.

Communications is enabled by asserting the *DTR* (data terminal ready) and *RTS* (request to send) RS232 control signals on the serial interface. If pacing is controlled by the use of XON/XOFF characters according to the terminal emulation setup parameters, an XON character will be transmitted.

The Softerm program is now in the online terminal operation mode and ready to begin terminal communications with another computer system. If Softerm is directly connected to the computer system using a cable, or a leased communications line and modem is being used, terminal communications can proceed immediately. If a dial-up modem is being used, a *connection* must first be established.

Once terminal communications has been established, Softerm may be operated and will function exactly as the CRT terminal being emulated. However, many additional capabilities are available to the Softerm user which are not available to the CRT terminal user.

Using the Keyboard

The standard Apple keyboard functions in the online terminal mode exactly as the keyboard on a communications terminal. As keys and key combinations are pressed, the corresponding ASCII code for the character is transmitted to the host computer. The **SHIFT** and **CTRL** keys operate normally, and all character codes which can be generated by the standard Apple keyboard are transmitted transparently to the host computer.

All Softerm special functions, terminal emulation functions, and transmitting character codes which cannot be entered on the standard Apple keyboard, are executed using the Softerm *keyboard expander*. The Softerm 1 keyboard expander consists of two keys labeled **S1** and **S2**. The Softerm 2 keyboard expander consists of three keys labeled **S1**, **S2**, and **S3**. These keys function in a similar fashion to the **SHIFT** key and are used in combination with other keys on the standard Apple keyboard to initiate Softerm extended capabilities.

The following table summarizes the Softerm extended capabilities initiated using the Softerm keyboard expander:

Key	Function
S1 1	Disk Utilities
S1 2	Dial Utilities
S1 3	Local File Transfer
S1 4	Line File Transfer
S1 5	Define Keyboard Macros
S1 6	Terminal Setup
S1 7	Program Utilities
S2 1	Print Screen with Form Feed
S2 2	Print Screen without Form Feed
S2 3	Capture Transparent to Print
S2 4	Capture Line Mode to Print
S2 6	Copy Screen to Disk
S2 7	Capture Transparent to Disk
S2 8	Capture Line Mode to Disk
S2 9	Transmit File

The following table summarizes terminal emulation functions initiated using the Softerm keyboard expander:

Key	Function
S1 →	Cursor Right
S1 ←	Cursor Left
S2 →	Cursor Down
S2 ←	Cursor Up
S1 ↑	Cursor Up (Apple IIe)
S1 ↓	Cursor Down (Apple IIe)
S1 CTRL B	Boot
S1 CTRL B n	Boot from Slot n
S1 CTRL R	Soft RESET
S1 ESC	Transmit DEL Character
S1 A	Send Answerback Message
S1 B	Erase to End of Screen
S1 C	Clear Screen
S1 E	Erase to End of Line
S1 H	Home Cursor
S1 K	BREAK
S1 L	Shift Toggle
S1 N	New Line
S1 O	Display Other Half (40-Column)
S1 Q	Resume Display
S1 S	Stop Display
S1 V	View Terminal Status
S1 W c	Wait for character c
S1 Z n	Delay n Seconds (0-9)
S1 S2 id	Execute Keyboard Macro
S1 S2 c	Transmit Control Character c ($00-$1F)

Softerm allows all 128 ASCII character codes to be generated from the keyboard. Most codes can be generated with a single keystroke in combination with the **SHIFT** and **CTRL** keys. Appendix C contains a complete table listing all ASCII character codes and how they are generated from the keyboard. The following table summarizes how to generate special characters which cannot normally be entered directly on the Apple Keyboard:

Key	Character Transmitted
S1 ,	[
S1 .	]
S1 /	\
S1 ;	`
S1 :	|
S1 -	__
S1 <	{
S1 >	}
S1 *	@
S1 =	~
S1 ?	^
S1 +	FS ($1C)
S1 0	US ($1F)
S1 ESC	DEL ($7F)

Additional terminal emulation and special function keys are defined for each specific terminal emulation provided with Softerm 2. Refer to Chapter 5 on terminal emulation for information on specific terminals.

Displaying Terminal Status

Softerm includes a *terminal status display* initiated from the keyboard which displays information relating to the current state of the terminal and what options are active. This display is initiated by entering **S1 V** while in the online terminal mode and the status is displayed on the last row of the screen. Information previously displayed on this row is temporarily saved while the status is displayed and restored when the status is cleared. While the status is displayed, pressing specific keys allow various modes to be toggled. To return to the online terminal mode after displaying the status enter **S1 V** or **S1 X**. The following information may be displayed on the status line depending on the state of the terminal:

ONLINE Indicates Softerm is ready for terminal communications with a host computer. Entering **L** while this status is displayed will toggle Softerm to the **LOCAL** mode. Since the *DTR* signal is lowered when Softerm is switched to the local mode, toggling to local mode can be used to *hangup* or disconnect a dial-up modem.

LOCAL Indicates Softerm is not ready for terminal communications with a host computer but is in the local mode. Data may be entered and displayed on the screen in the local mode even though there is no connection to a remote computer. Entering **L** while this status is displayed will toggle Softerm to the **ONLINE** mode.

FULL DUPLEX Indicates Softerm is currently operating in the full duplex mode. Characters entered at the keyboard are transmitted to the remote system without being displayed or processed locally. Entering **D** while this status is displayed will toggle Softerm to the **HALF DUPLEX** mode.

HALF DUPLEX Indicates Softerm is currently operating in the half duplex mode. Characters entered at the keyboard are transmitted to the remote computer as well as being processed and displayed locally. Entering **D** while this status is displayed will toggle Softerm to the **FULL DUPLEX** mode.

CARRIER Indicates that Softerm currently has a *connection* and the *DCD* (data carrier detect) signal is being received from the modem.

CAPTURE OFF Indicates that none of the *capture* modes to print or disk are currently active.

CAPTURE PRINT Indicates that either a capture transparent to print has been initiated by the **S2 3** key or a capture line mode to print has been initiated by the **S2 4** key and is currently active. In this mode, data received and processed during online terminal operation is also concurrently printed. Several of the terminal emulations provided with Softerm 2 include a *printer pass through* feature which allows the host computer to activate the capture to print mode.

CAPTURE DISK Indicates that either a capture transparent to disk has been initiated by the **S2 7** key or a capture line mode to disk has been initiated by the **S2 8** key and is currently active. In this mode, data received and processed during online terminal operation is also concurrently captured in memory and subsequently written to disk.

TRANSLATE ON Indicates that the *keyboard translate* feature is currently enabled and character codes defined in the user keyboard translate table are being translated to the specified keyboard function. This table is defined using the Softerm Program Utilities which are accessed by entering **S1 7** in the online terminal mode. Refer to Chapter 3 on terminal operation for additional information in using the program utilities. Entering **T** while this status is displayed will toggle Softerm to the **TRANSLATE OFF** mode.

TRANSLATE OFF Indicates that the **keyboard translate** feature is currently not enabled. Character codes defined in the user keyboard translate table will *not* be translated to the specified keyboard function and will be transmitted exactly as entered. Entering **T** while this status is displayed will toggle Softerm to the **TRANSLATE ON** mode.

MM/DD/YY HH:MM:SS Indicates current date and time. **C** toggles to **CONNECT:** time.

CONNECT: HH:MM:SS Indicates elapsed time since connection was established. **C** toggles to current date and time.

Connecting to a Host Computer

Softerm uses the communications interface standard *EIA RS232-C* which specifies the interface between a terminal also referred to as a *DTE* (data terminal equipment) and a modem also referred to as a *DCE* (data communications equipment). This standard allows for a remote connection of a terminal to a host computer using a modem and a leased or dial-up telephone line.

Softerm may also be used by using a local direct connection to the host computer using either *modem eliminators* or a special *direct connect cable* so that standard modems are not required. There is usually a limit on the distance over which a direct connect cable can be used, and the specifications of the serial interface should be checked before attempting a direct connection using a cable.

Additional information on the serial interface cards supported by Softerm and communications interfacing guidelines may be found in Appendix A.

Dialing a Number

If Softerm is being used with a modem and a dial-up telephone line, a connection must first be established before Softerm can be used in the online terminal mode. Softerm may be used with any type of modem, manual or auto-dial, and includes a built-in phone directory called the *SOFTERM PHONE BOOK* which may be used in conjunction with *dialer drivers* provided with Softerm for many popular auto-dial modems. If Softerm does not include a dialer driver for the type of auto-dial modem you are using, dialing a number can still be accomplished from the keyboard using the normal method specified for the modem being used. The Softerm dialer drivers provide an automatic interface to the dialing method normally executed from the keyboard when using auto-dial modems. When using the keyboard to intitiate dialing sequences with auto-dial modems, Softerm *keyboard macros* can also be used to simplify dialing sequences.

In order to **manually dial** a phone number and establish a connection, the following steps should be taken:

1. Display the Softerm terminal status using the *S1 V* keyboard function. Insure that the **ONLINE** status is indicated. If the status indicates **LOCAL**, use the **L** key to toggle Softerm to the online mode.

2. If the modem being used provides more than one speed selection such as 300 or 1200 baud for a Bell 212A compatible modem, insure that the proper speed has been selected to match the current Softerm serial interface *SPEED* parameter. Usually there is a high speed button or switch for operation at 1200 baud.

3. If the modem has a *TALK/DATA* button or switch, insure that it is in the talk position before dialing is initiated.

4. Take the telephone handset used in conjunction with the modem *off hook*, and dial the desired number.

5. If the number dialed has an *auto-answer* modem, you should hear a high-pitched tone indicate that the remote modem is ready to begin data transmission. If the number dialed is manual answer, the remote operator must first place the remote modem in *data* mode before the high-pitched tone will be heard. Once you hear the high-pitched tone, place the local data set in the *data* mode using the *TALK/DATA* switch on the modem. Then replace the telephone handset in its cradle.

6. To insure that a connection has been established, display the Softerm terminal status by entering a **S1 V** on the keyboard. If a connection has been properly established, the **CARRIER** indication should be present on the status line. Clear the status by entering **S1 V** or **S1 X** and begin terminal communications. Follow the procedures required by the computer system being accessed to initiate an interactive terminal session.

If you are planning to automatically dial numbers directly from the keyboard, the compatibility of the modem with the serial interface you are using should be checked. Many serial interfaces will not transmit characters unless the *DCD* signal is present. This usually means that an *option* or *switch* in the modem must be set to provide this signal continuously. This will be indicated by the presence of the **CARRIER** status when Softerm terminal status is displayed. However, if the carrier signal is continuously present, Softerm cannot determine if or when a disconnect condition has occurred.

In order to **automatically dial** a phone number directly from the keyboard and establish a connection, the following steps should be taken:

1. Display the Softerm terminal status using the **S1 V** keyboard function. Insure that the **ONLINE** status is indicated. If the status indicates **LOCAL**, use the **L** key to toggle Softerm to the online mode.

2. Enter the appropriate command to the modem to dial a number. For example, on a Hayes Smartmodem a dialing sequence could be **ATTD19016836850** followed by a **RETURN**. Depending on the firmware in the particular modem, when the call is completed, a message should be displayed indicating that terminal communications can proceed.

Softerm includes a *Dial Utilities* option which allows the maintenance of a user phone directory called the *SOFTERM PHONE BOOK* and provides the capability to automatically dial phone numbers from the directory if the current configuration includes a *dialer driver* for the auto-dial modem in use. The Softerm dial utilities may be accessed from the online terminal mode by entering the **S1 2** keyboard function. Refer to Chapter 3 on terminal operation for a complete description of the dial utilities and instructions on dialing a number from the *SOFTERM PHONE BOOK*.

Using Keyboard Macros

Softerm includes a keyboard macro facility which allows a predefined string of characters to be *substituted* as keyboard input for a key. The primary use for keyboard macros is to allow often used keyboard sequences to be transmitted to the host computer using minimal effort.

The **S1 S2** keys in combination with a *single character id* are used to invoke a keyboard macro. The single character id may be any character other than a control character, space, or lowercase alpha (a-z). The **S1 S2** keys in combination with a control character code less than $20 allow that character to be transmitted directly, even if the keyboard translate option is active for that character.

If the character code entered in combination with the **S1 S2** keys matches a currently defined keyboard macro id, the characters contained in the keyboard macro string are *substituted* in the keyboard input stream as if they were actually entered from the keyboard. The characters are processed as normal keyboard input according to the current mode of Softerm, online full or half duplex communications, or local operation.

A special capability is provided in conjunction with keyboard macros to allow automatic startup and execution of Softerm without operator intervention. Whenever Softerm is executed, Softerm checks the disk for a file named *SOFTERM.AUTO*. The file *SOFTERM.AUTO* is a standard keyboard macro file which may be created using the keyboard macro utilities. If the *SOFTERM.AUTO* file exists on the disk when Softerm is executed, the program will automatically begin online terminal operation and execute the first keyboard macro entry defined in the *SOFTERM.AUTO* keyboard macro file.

Softerm keyboard macros are defined using keyboard macro utilities accessed by entering the **S1 5** keyboard function in the online terminal mode. Refer to Chapter 3 on terminal operation for a complete description of keyboard macros, their definition and use.

Printing the Screen

Softerm includes a built-in function which allows the contents of the current screen to be printed at any time during online or local terminal operation. The screen may be printed either with or without a *form feed* character appended to the end of printing.

To print the current screen with a form feed, enter **S2 1**. To print the current screen without a form feed, enter **S2 2**.

Softerm screen formats such as menus, configuration parameter displays, and data displays such as *CATALOG* output or local file transfer output may also be printed by entering **S2 1** or **S2 2**.

Copying a Screen to Disk

Softerm includes a built-in function which allows the contents of the current screen to be printed into a disk file at any time during online or local terminal operation. To copy the current screen to disk, enter **S2 6**, and the last row of the screen will be *temporarily* replaced with the following screen format:

```
S6 D1 V0    FILE:
```

Enter the *filename* of the file into which the screen is to be copied. The *RETURN* key or **S1** ← and **S1** → left and right arrow positioning keys may be used to position the cursor to the *slot*, *drive*, or *volume* fields. The *volume* field specifies the disk format to be used with **0-254** indicating an Apple DOS volume number, **PAS** indicating Pascal format, and **CPM** indicating CP/M format.

Once the filename, slot, drive, and volume have been specified, enter **S1 RETURN** to copy the current screen to disk. Each row on the screen is written to the disk file with a carriage return and line feed appended just as if the screen were being printed.

Concurrent Printing of Terminal Interaction

Softerm includes the capability to simultaneously print received data as it is displayed in the online terminal mode. This feature is useful for logging all or parts of interactive terminal sessions with a host computer. When enabled, **CAPTURE PRINT** is indicated in the Softerm terminal status displayed using the **S1 V** keyboard function.

Softerm provides two modes for concurrent printing of displayed or received data. The first mode is called the *transparent* mode and is enabled by entering the **S2 3** keyboard function. In the transparent mode, all data received is simultaneously sent to both the display and printer. Using this mode allows even 132 column printing to be accomplished even though the screen display is 80 columns. If terminal emulation function sequences such as cursor positioning control codes are received, they are sent to the printer as well as the display. This may cause strange behavior by the printer even though these characters are properly interpreted by the terminal emulation before being displayed. This mode is terminated by entering **S2 3** to toggle the operation off, or by any function which causes Softerm to leave the online terminal mode such as accessing the disk utilities menu.

The second mode of concurrent printing is called *line* mode and is enabled by the **S2 4** keyboard function. In the line mode all data received is first processed by the terminal emulation and displayed. Whenever the cursor is moved from the current row being displayed, that row is sent to the printer with a carriage return and line feed character appended. This mode allows the terminal emulation to first interpret the characters received, and then print the line from the display. However, since lines are actually printed from the display, this mode is limited to 80 character print lines. This mode is terminated by entering **S2 4** to toggle the operation off, or by any function which causes Softerm to leave the online terminal operation mode.

Capturing Terminal Interaction to Disk

Softerm includes the capability to simultaneously capture received data to disk as it is being displayed in the online terminal mode. This feature is useful for saving part or all of interactive terminal sessions with a host computer for later processing. When enabled, **CAPTURE DISK** is indicated in the Softerm terminal status displayed using the **S1 V** keyboard function.

Two types of capture modes are provided by Softerm which operate in a similar manner to the concurrent printing modes. The *transparent* capture mode is enabled by entering the **S2 7** keyboard function. In this mode, all data received is captured and subsequently written to a user specified disk file. Data is not written to the disk file until the capture mode is toggled off by entering **S2 7**, the capture buffer becomes temporarily full, or by any function which causes Softerm to leave the online terminal operation mode.

The *line* capture mode is enabled by entering the **S2 8** keyboard function. In this mode, all data received is first processed by the terminal emulation and displayed. Whenever the cursor is moved from the current row being displayed, that row is captured with a carriage return and line feed character appended, and subsequently written to a user specified disk file. Data is not written to the disk file until the capture mode is toggled off by entering **S2 8**, the capture buffer is temporarily full, or by any function which causes Softerm to leave the online terminal operation mode.

If the capture buffer becomes full during online terminal mode, communications with the host is temporarily suspended using the specified pacing method such as XON/XOFF, and the current contents of the capture buffer are written to disk. Communications is automatically resumed after the capture buffer has been saved.

When either a **S2 7** or **S2 8** keyboard function is entered, the last row of the screen is *temporarily* replaced with the following screen format:

```
S6 D1 V0    FILE:
```

Enter the *filename* of the file into which data received is to be captured. The **RETURN** key or **S1** ← and **S1** → left and right arrow positioning keys may be used to position the cursor to the *slot, drive,* or *volume* fields. The *volume* field specifies the disk format to be used with **0-254** indicating an Apple DOS volume number, **PAS** indicating Pascal format, and **CPM** indicating CP/M format.

Once the filename, slot, drive, and volume have been specified, enter **S1 RETURN** to initiate the disk capture mode. Entering **S1 V** to display the Softerm terminal status will now indicate that the capture mode is active by displaying **CAPTURE DISK** on the status line.

Sending Files from Disk

Softerm includes the capability to transmit data contained in a disk file in the online terminal mode. Data in the file is transmitted *exactly* with no additional interpretation, just as if it were entered from the keyboard. To initiate the transmitting of a disk file, enter the **S2 9** keyboard function. The last row of the screen is *temporarily* replaced by the following screen format:

```
EOB=$0D   EOB DELAY 0    CHAR DELAY 0
```

This screen contains 3 fields and allows an *end of block character*, *end of block delay*, and *character delay* to be specified. The end of block character can be specified as any ASCII character code in the range $00–$7F. The end of block delay is specified as a number from 0–99 to indicate the delay in one-tenth second increments. Thus a value of 10 would indicate a 1 second delay. The character delay is specified as a number from 0–255 to indicate the delay in increments of one character time at 19,200 bps or 520 microseconds. When editing of these fields is complete, entering **S1 RETURN** will cause the following screen format to be displayed on the last row:

S6 D1 V0   FILE:

Enter the *filename* of the file which is to be transmitted. The **RETURN** key or **S1** ← and **S1** → left and right arrow positioning keys may be used to position the cursor to the *slot, drive,* or *volume* fields. The *volume* field specifies the disk format to be used with **0-254** indicating an Apple DOS volume number, **PAS** indicating Pascal format, and **CPM** indicating CP/M format.

Once the filename, slot, drive, and volume have been specified, enter **S1 RETURN** to initiate the transmitting of the specified file. The file will begin transmitting immediately and after the last character of the file has been transmitted, the message **END OF TRANSMIT** is displayed. Pressing the **ESC** key will clear the message and resume normal online terminal operation.

Automatic Logon and File Transfers

Softerm file transfers are controlled by a high-level *command language* which may be executed interactively or from a macro command file which has been previously entered and saved on disk. The use of file transfer macros allow file transfer and logon sequences to be pre-defined and executed automatically when required.

When a file transfer macro command file is executed, each command is read from the disk file and executed as required. The operation of file transfer macro command files is very similar to the Apple DOS EXEC file operation. Softerm includes a special editor for creating, entering, and editing file transfer command files. The command language consists of 23 command *verbs* and associated parameters. For example, commands which might be used in an automatic logon sequence to a host computer are *DIAL* which is used to automatically dial the phone number of the host computer, *XMIT:WAIT* which is used to transmit a string of characters and wait for a reply, and *CONVERSE* which is used to terminate the macro and switch to the online conversational mode of terminal communications.

To further simplify an automatic logon or file transfer process, a keyboard macro can be defined to actually execute the file transfer macro file. In this manner, a complete logon sequence can be executed in a single keystroke.

The file transfer command language also includes *SEND* and *RECEIVE* commands for transmitting and receiving files. Three protocols are provided which allow the flexibility to transfer almost any type of file between Softerm and a host computer. The *character* protocol with user-definable characteristics provides maximum flexibility for text file transfers. The CP/M User's Group standard *XMODEM* protocol may be used for text or binary file transfers with systems using the CP/M operating system. The intelligent *Softrans* protocol can be used to transfer any type file and provides automatic binary encoding and decoding, error detection and automatic retransmission, and data compression to enhance line utilization. Files transmitted and received using Softerm file transfer protocols may be in any of the supported disk formats including Apple DOS, CP/M, and Pascal.

A complete description of Softerm file transfer protocols and command language can be found in Chapter 4. The user should study this chapter before attempting to use the more sophisticated file transfer techniques and file transfer macro command files.

Hanging Up

Once an interactive terminal session is complete, the connection to the host computer should be broken if a dial-up modem is being used. Many host computer system will automatically disconnect when the user logs off the system. If a disconnect condition is detected by Softerm, the message **CONNECTION BROKEN** will be displayed. Pressing the **ESC** key will clear the message and allow terminal operation to continue.

If the host computer system does not automatically disconnect at the end of a terminal session, and a manual modem is being used, the *DATA/TALK* switch or button should be placed in the *TALK* position, and the handset should be removed from the cradle and replaced in order to hangup and break the connection. If an auto-dial modem is being used, enter **S1 V** to display the terminal status. While the status is displayed, enter **L** to toggle Softerm from the **ONLINE** mode to **LOCAL**. This will cause the *DTR* signal to be lowered and the connection to be broken. After a few seconds Softerm can be returned to the **ONLINE** mode if additional terminal communications is desired.

Networks and Information Services

Softerm 1 and 2 can be used not only with various host computers and timesharing services, but also with a variety of national information services. CompuServe Information Service, Dow Jones News/Retrieval Service, and THE SOURCE, America's Information Utility are popular information services.

The informations services are contacted by first accessing a nationwide communications network. Three such networks are Tymnet, GTE Telenet, and CompuServe Network Services. Dow Jones and THE SOURCE are accessed through the Tymnet and GTE Telenet networks. CompuServe is contacted through its own network access number or in some areas using the Tymnet or GTE Telenet networks.

Logging in to Tymnet

The standard procedure for logging into Tymnet is described here. A company providing a host computer may issue special instructions for accessing a specific host system. If in doubt about the log-in procedure for a particular host, contact the company that operates the host.

When you have connected to the network, Tymnet will display the message **PLEASE TYPE YOUR TERMINAL IDENTIFIER**. Enter an **A** in response to this request. Tymnet will display the number of the remote access node to which you are connected, followed by the number of your port on the node **NNNN-PPP**, and will request that you log in by displaying **PLEASE LOG IN:**. Type your user name and a carriage return. You may need to provide additional information about your terminal by entering one or more control characters before typing your user name. Tymnet will then display **PASSWORD:**. Enter your password and a carriage return. Passwords are not displayed at full duplex terminals for security reasons. Tymnet will then display an acceptance message, such as a ;, or **HOST IS ONLINE**, to indicate that you are connected to the host computer.

Logging in to Telenet

Dial the Telenet access number, and once you are connected, type two carriage returns for full duplex operation. If half duplex operation is desired, type carriage return, semicolon, carriage return. Telenet will respond with a network herald followed by your terminal port address and prompt you to enter your terminal model by displaying **TERMINAL=**. Type **D1** followed by a carriage return. In response to the Telenet prompt character @, type **C** for connect, followed by a space and the network address of your computer, and a carriage return. You will than be connected to the specified host computer system through the Telenet network.

Using Softerm with THE SOURCE

THE SOURCE, America's Information Utility offers both communications and information services. THE SOURCE provides nearly 800 services including:

- UPI News Service with keyword search capability.
- SOURCEMAIL system to send/receive messages to/from other subscribers.
- Classified ad bulletin boards with more than seventy-five categories.
- Stocks, bonds, money market and mutual funds trading activity on the New York, American, and OTC exchanges.
- Electronic travel service, airline schedules, restaurant reviews, and movie reviews.
- Electronic games, puzzles and educational drills.

Softerm enables you to access THE SOURCE easily via the Telenet or Tymnet communication networks. The Softerm System Diskette contains an example automatic logon macro command file *SOURCE.LOGON* which may be edited to use the correct phone number, user id, and password. THE SOURCE is normally accessed using 8 data bits, 1 stop bit, and no parity at either 300 or 1200 baud.

User assistance is available from Customer Support day and night at 800-336-3330 or 703-734-7540 in Virginia.

Using Softerm with CompuServe

The CompuServe Information Service is located in Columbus, Ohio and offers a variety of services including:

- News retrieval from newspapers and newswires.
- Current and historical financial information, corporate profiles, and electronic banking.
- Entertainment—theater, book, movie and restaurant reviews, interactive electronic games, advice columns, and trivia tests.
- Electronic mail service for sending messages to other CompuServe users—nationwide.
- Home information—a variety of specialized publications, plus facts on nutrition, gardening, home decorating, and education, including an electronic encyclopedia and electronic shopping.
- Personal computing services including software exchange, programming languages, word processing, and business programs.

Softerm enables you to access the CompuServe Information Network using the CompuServe Network or Tymnet or Telenet as required. The Softerm System Diskette contains an example automatic logon macro command file *COMPUSERVE.LOGON* which may be edited to use the correct phone number, host name, user id, and password. The CompuServe Information Service is normally accessed using 8 data bits, 1 stop bit, and no parity at either 300 or 1200 baud.

User assistance is available from CompuServe Customer Service at 800-848-8990 or 614-457-8650 in Ohio.

Using Softerm with Dow Jones News/Retrieval

Dow Jones News/Retrieval brings you up-to-the-minute news and information, providing a convenient and productive tool in daily business decisions. It is for anyone with an interest in the news and the economy, whether it be managing information for business or following the stock market for personal investments. News/Retrieval offers over fifteen data bases including:

- Business and Economic News.
- Dow Jones Quotes featuring current and historical quotes and historical Dow Jones averages.
- Financial and Investment Services
- General News and Information including an on-line encyclopedia, World Report with constantly updated national and foreign news, Sports and Weather Report, Wall $treet Week transcripts, and Movie Reviews.

The Dow Jones News/Retrieval service may be accessed through one of two communication networks—Telenet and Tymnet. The Softerm System Diskette contains an example automatic logon macro command file *DOW JONES.LOGON* which may be edited to use the correct phone number and password. The Dow Jones News/Retrieval Service is normally accessed using 8 data bits, 1 stop bit, and no parity at 300 or 1200 baud.

User assistance is available from the Customer Service Hotline at 800-257-5114 or 609-452-1511 in New Jersey and Canada.

Chapter 2
Terminal Setup

Introduction

The Softerm program uses a menu-driven, formatted data entry method
of specifying the terminal configuration to be emulated as well as the
hardware configuration to be utilized. Initially, these menus and data
entry screens are displayed in Apple 40-column video. Once a configura-
tion has been completely specified and executed, returning to the setup
mode to reconfigure will utilize the currently active display driver which
may be Apple 40-column video or any of the available display drivers for
supported 80-column video boards. However, when an attempt is made
during setup to change the current display driver, the display is returned
to standard Apple 40-column video until the new configuration is
executed. If a new configuration is saved using the default configura-
tion filename *SOFTERM.INIT* which utilizes a display driver other than
standard Apple 40-column video, then the initial setup screen is *still*
displayed using Apple 40-column video until the configuration has been
executed by *exiting* the setup mode.

The purpose of the Softerm terminal setup mode is to allow the termi-
nal configuration and options to be completely specified and the results
saved in a configuration file which can become the default configura-
tion for Softerm, or an optional configuration file which can be loaded
and executed whenever needed. For example, Softerm may be configured
with different terminal emulations for access to various host computer
systems with different terminal requirements. Separate Softerm config-
urations may be generated for access to host computers at different trans-
mission speeds and line characteristics. Different Apple hardware con-
figurations may result in separate configuration files being saved.

As many separate configurations may be saved as required. In order to
specify a complete configuration for online terminal operation, several
parameters must be specified including *configuration name, terminal
emulation, serial IO driver, display driver, printer driver, dialer driver,*
and *clock driver*. Each of the main parameters in the configuration defi-
nition have many options which have initial default values and may be
edited through formatted data entry screens in the setup mode.

Softerm is provided on two copyable DOS 3.3 format diskettes. The *system* diskette when booted automatically runs the Softerm program. The *configuration* diskette contains configuration files which allow the user to select hardware and software options and generate tailored terminal configurations. Both diskettes are *reversible*, and contain files on the back side as well as the front. The back side of the System Diskette for both Softerm 1 and 2 contains the Softrans protocol FORTRAN 77 source program which may be transferred to the user's host computer to allow file transfers using the Softrans protocol. The back side of the Configuration Diskette for Softerm 1 contains nothing. The back side of the Configuration Diskette for Softerm 2 contains specific CRT terminal emulation files.

Setup Keyboard Functions

In the terminal setup mode, certain keyboard functions are utilized during data entry and editing of configuration parameters. Note that these functions are similar to functions available during actual online terminal operation but their operation is *unique* in the formatted data entry mode. These keyboard functions are also used during online terminal operation whenever a Softerm extended function is used and Softerm menus and data entry screens are displayed.

Keyboard Function	Description
RETURN	Accept Field
$\rightarrow$	Cursor Right
$\leftarrow$	Cursor Left
ESC	Clear Error Messages
	Lead-in for Special Character Entry in Strings
S1 RETURN	Accept Screen
S1 $\rightarrow$	Field Tab Forward
S1 $\leftarrow$	Field Tab Backward
S1 B	Move to Beginning of Field
S1 D	Delete Character
S1 E	Erase to End of Field
S1 I	Insert Character Mode
S1 L	Shift Toggle
S2 L	Shift Lock
S1 N	Move to End of Field
S1 O	Display Other Half (40 Column)
S1 Q	Truncate Field
S1 R	Restore Field
S1 X	Cancel
S2 1	Print Screen with Form Feed
S2 2	Print Screen without Form Feed

Reset

The **RESET** key if used during the setup mode will cause an immediate return to the Softerm setup menu.

Accept Field

The **RETURN** key is utilized as an *accept field* key and if entered will accept the current data in a data entry field and will position the cursor to the next data entry field. If the cursor is in the last data entry field of the current screen format, entering a **RETURN** will accept the field and position the cursor to the first data entry field in the the current screen format. *All* data in the current data entry field is accepted when a **RETURN** is entered regardless of the position of the cursor. Thus if the field already contains data such as a default value, entering a **RETURN** accepts the current data and positions the cursor to the next field.

The **RETURN** key may also be used to clear error messages displayed in inverse video on the last row of the screen.

Accept Screen

The **S1 RETURN** key is utilized as an *accept screen* key and if entered will accept *all* data entry fields in the current screen format. This will cause the next screen format to be displayed or the function for which data is being entered to be executed.

Cursor Right

The → key is utilized as a *non-destructive space* key when entering or editing data within a data entry field. Using this key the cursor may be moved over existing data to the position at which editing is required in a data entry field.

Field Tab Forward

The **S1** → key is utilized as a *field tab forward* key and will position the cursor to the first position of the next data entry field. If the cursor is currently positioned in the last data entry field of the current screen format, entering **S1** → will cause to the cursor to *wraparound* to the first data entry field in the current screen format. The RETURN key must be used to continue to the next data entry screen in the terminal setup mode.

The **S1** → key also performs the *accept field* function when entered in a field after the field has been edited.

Cursor Left

The ← key is utilized as a *non-destructive backspace* key when entering or editing data within a data entry field. Using this key the cursor may be backspaced over existing data to the position in a data entry field where editing is required.

Field Tab Backward

The **S1** ← key is utilized as a *field tab backward* key and will position the cursor to the first position of the previous data entry field. If the cursor is currently positioned in the first data entry field of the current screen format, entering **S1** ← will cause the cursor to *wraparound* to the last data entry field in the current screen format.

The **S1** ← key also performs the *accept field* function when entered in a field after the field has been edited.

Clear Error Messages, Lead-in

The **ESC** key is utilized as an *error message clear* key and a *lead-in* key for special character entry in strings. Error messages which occur during terminal setup are displayed on the last row of the screen and may be cleared by entering **ESC**.

In order to enter a special function key such as **RETURN** in a string entry field, you must enter an **ESC** followed by the **RETURN**. The **RETURN** instead of causing an accept field function to be performed will be included in the data and displayed as an inverse ↑**M**. **ESC** may be used with any Softerm function key which is used to perform a special function and cannot normally be entered as data.

Move to Beginning of Field

The **S1 B** key is utilized as a *cursor to beginning of field* function key. If an **S1 B** is entered, the cursor will be positioned to the first character position of the current data entry field.

Delete Character

The **S1 D** key is utilized as a *delete character* function key. If the **S1 D** key is entered at any character position in a data entry field, the character at the position is deleted and all characters to the right of the cursor position will move one position to the left.

Erase to End of Field

The **S1 E** key is utilized as an *erase to end of field* function key. If the **S1 E** key is entered at any character position in a data entry field, the character at the cursor position and all remaining characters in the field are erased. Characters preceding the current cursor position in the field are unaffected.

Insert Character Mode

The **S1 I** key is utilized as an *insert mode* function key. Entering an **S1 I** while editing a data entry field will toggle the insert mode on. If a key is entered at the current cursor position while the insert mode is active, the current character at the cursor position and all remaining characters in the field to be shifted one character position to the right. The new character is then displayed at the current cursor position and the cursor will advance to the next character position. Characters shifted past the end of the data entry field are lost.

Entering a **S1 I** function key while the insert mode is active will toggle the insert mode off and characters entered will replace the character at the current cursor position. The insert mode is automatically terminated when editing of the field is complete and a function such as **RETURN** which accepts the current field is entered.

Shift Toggle

The **S1 L** key is utilized as a software *shift toggle* which switches the current *case* from upper to lower or lower to upper for all subsequently keyed characters.

Shift Lock

The **S2 L** key is utilized to provide a *shift lock* function which changes the current *case* to upper for all subsequently keyed characters.

Move to End of Field

The **S1 N** key is utilized as a *cursor to end of field* function key. If entered, the **S1 N** function key will position the cursor to the character position after the last data character in the current data entry field. If the field has been completely entered, the cursor is positioned to the first character position of the next data entry field.

Display Other Half

The **S1 O** key is utilized to switch from columns 1-40 to columns 40-80 or vice-versa if standard Apple 40-column video is being used and the *APPLE40* display driver has been configured in terminal setup.

Truncate Field

The **S1 Q** key is utilized as a *truncate field and accept* function key. If entered, the **S1 Q** key will erase the character at the current cursor position and all remaining characters in the field, and accept the current field as if a **RETURN** had been entered. The cursor will be positioned to the first character position of the next data entry field.

Restore Field

The **S1 R** key is used as a *restore field to original contents* function key. If **S1 R** is entered after partially editing a data entry field, the field will be restored to its original contents. The cursor will be positioned to the first character position of the current data entry field.

Cancel

The **S1 X** key is utilized as a *cancel and restore field* function key during terminal setup data entry and editing. If executed while editing a data entry field, the field is restored to its previous contents and the current function is canceled. The cursor will be positioned to the previous menu for further action.

The **S1 X** key may also be used to clear error messages displayed in inverse video on the last row of the screen.

Print Screen

The **S2 1** and **S2 2** keys are utilized as a *print screen* function keys. These keys may be used at any time the cursor is *flashing* during the terminal setup process or on any Softerm extended function screen to print the current contents of the screen to the printer using the currently defined printer driver. This allows a permanent *hard copy* record of the configuration definition and parameter values to be printed.

Entering **S2 1** will print the current screen with a form feed. Entering **S2 2** will print the current screen without a form feed.

If the current configuration does not have a printer specified, then this function is disallowed and if attempted the message **CONFIGURATION IS INCOMPLETE** is displayed. If the current configuration has *NULL.PIO* specified as printer driver indicating no printer is available, the function is disallowed and the message **NO PRINTER** is displayed. The **ESC** function key must be used to clear the error condition in order to continue the setup process.

Entry of Special Characters

Softerm allows all 128 ASCII character codes to be generated from the keyboard. Most codes can be generated with a single keystroke in combination with the **SHIFT** and **CTRL** keys. Appendix C contains a complete table listing all ASCII character codes and how they are generated from the keyboard. The following table summarizes how to generate special characters which cannot normally be entered directly on the Apple II keyboard:

Character	Keyboard
[	S1 ,
]	S1 .
\	S1 /
`	S1 ;
|	S1 :
—	S1 -
{	S1 <
}	S1 >
@	S1 *
~	S1 =
^	S1 ?
FS ($1C)	S1 +
US ($1F)	S1 0
DEL ($7F)	S1 ESC

Setup Data Entry and Editing

Menus and Data Entry Formats

The Terminal Setup mode, through a series of *menus* and fill-in-the-blank *data entry formats*, allows a Softerm specific terminal configuration to be defined. A menu is a set of options itemized numerically from which the user must select. This is accomplished by entering the number of the desired option and pressing the **RETURN** key if necessary. The resulting operation after selecting an option from a menu may be that another option menu is displayed or a data entry format with default values appears. A menu normally has a default choice displayed and if the user wishes to select the default choice, only a **RETURN** need be entered.

A data entry format consists of a series of fill-in-the-blank data entry fields into which data may be entered and edited. There are several types of data entry fields used in the Softerm setup formats.

Numeric Fields

A numeric field is utilized where an all numeric item is required. A numeric field may be either *decimal* or *hexadecimal*; hexadecimal values and fields are preceded by a $ character. No characters other than 0-9 are allowed in a decimal numeric field or 0-9 and A-F in a hexadecimal numeric field; if an attempt is made to enter other characters, the Apple will "beep" indicating the character is invalid.

A numeric field may also have an upper and lower limit known as a *range* with which the entered numeric data is compared. If the entered numeric data is not within the valid range for the field, the error message **OUT OF RANGE** is displayed. An **ESC** key must be entered to clear the error and the field in error will be restored to its *previous* contents and the cursor is positioned to the beginning of the field.

Yes or No Fields

A second type of field utilized is a *Yes or No* field. This type of field requires that a **Y** be entered to indicate a *YES* response and a **N** be entered to indicate a *NO* response. If an attempt is made to enter a character other than Y or N, the Apple will "beep" indicating the character is invalid.

ASCII String Fields

A third type of data entry field utilized is an ASCII *string* field. This type of field permits the entry of any ASCII character code including non-displayable control codes. Non-displayable control codes will be indicated in the entry field by displaying a "↑" followed by a displayable character in inverse video which is usually generated using the **CTRL** key in combination with the displayable character. Some control codes such as **RETURN** will require that an **ESC** character precede their entry as a *lead-in* to allow these characters to be entered into a string field.

Entering Keypad Functions in Data Entry Fields

Softerm function keys generated using the Softerm keyboard expander keypad may also be entered in ASCII string fields. The keypad keys are represented in a data entry field by a % followed by a number from 1 to 7 in inverse video representing the combination of the **S1**, **S2**, and **S3** keys pressed. Many function keys which use the Softerm keypad require the entry of an **ESC** key as a lead-in character to allow their entry into fields. The following table defines the key combinations and the resulting display in string data entry fields:

Keypad	Data in String
S1	%1
S2	%2
S1 S2	%3
S3	%4
S1 S3	%5
S2 S3	%6
S1 S2 S3	%7

Editing Data Entry Fields

If the data entry field is completely filled with entered data, then the field is usually automatically terminated when the last character position is entered. Filename fields are an exception to this and must be terminated by entering a **RETURN**. Otherwise, if a field is only partially entered, a field accept function such as a **RETURN** must be entered to terminate the field. Once a field is terminated, any field validation such as a range check is performed and the cursor is automatically positioned to the next data entry field. The **S1** $\rightarrow$ and **S1** $\leftarrow$ keys may be used to skip forwards and backwards field to field within a data entry format on a single screen. Some data entry formats may consist of multiple screens. If this is the case, a **S1 RETURN** may be entered and will cause the next screen of data entry fields to be displayed. The cursor will be positioned to the first data entry field on the new screen.

Many data entry fields in the Softerm setup configuration formats will be *not applicable* to the specific configuration being edited. If this is the case, a **N/A** will be displayed in these entry fields and the cursor will not stop on these fields. The user should not be concerned with any field which has a **N/A** displayed for its contents.

Softerm Setup Menu

Each time the Softerm program is booted, the following option menu will be displayed on the screen:

```
                    SOFTERM 2
                    REVISION 1.00
    OPTION:    6    VOLUME 0    DRIVE 1 SLOT 6
               1—DISK UTILITIES
               2—LOAD CONFIGURATION
               3—LOAD DEFINITION MODULES
               4—EDIT OPTIONS
               5—SAVE CONFIGURATION
               6—EXIT SETUP

    ******** CURRENT CONFIGURATION *********
    CONFIGURATION NAME: SOFTERM.INIT
    TERMINAL EMULATION:
    SERIAL I/O DRIVER:
    DISPLAY DRIVER:
    PRINTER DRIVER:
    DIALER DRIVER:
    CLOCK DRIVER:
```

The default selection for this menu is *6—EXIT SETUP* which terminates the setup mode and initiates online terminal operation. The current configuration is displayed in the lower half of the display screen and indicates which drivers for the serial I/O interface, automatic dialer interface, 40- or 80-column video display, clock board, and printer interface, as well as the terminal emulation are loaded.

Initially, the *SOFTERM.INIT* file loaded from the Softerm Configuration Diskette has none of the above drivers specified and will *not* execute. If an attempt to *EXIT SETUP* is made without having specified all parts of the configuration, the error message **CONFIGURATION IS INCOMPLETE** is displayed. The **ESC** key must then be pressed to clear the error message and allow the setup mode to continue.

Changing Volume, Drive, and Slot

The default *VOLUME, DRIVE*, and *SLOT* parameters used for terminal setup functions are displayed on the Softerm setup menu and may be changed by using the **S1** → and **S1** ← keys to position the cursor to the appropriate field before an option is selected. Since the Softerm System and Configuration diskettes are in DOS 3.3 format, if **PAS** or **CPM** is entered for the *VOLUME*, the error message **DISK TYPE MUST BE DOS** will be displayed. Softerm configurations cannot be loaded from or saved to a disk type other than DOS.

Generating a Softerm Configuration

The Softerm program uses a menu-driven, formatted fill-in-the-blank method of specifying the terminal emulation and hardware configuration. Softerm 1 includes the built-in terminal emulation *SOFTERM.TERMINAL*. Softerm 2 allows the terminal emulation to be selected from a range of popular conversational and block mode CRT terminals. Before Softerm can be used, the hardware configuration of the user including the asynchronous serial interface, printer interface, 80-column board, auto-dial modem, and clock must be entered. Once a configuration has been completely specified, it can be saved in a configuration file which can become the default configuration, or used only when required.

In order to generate a useable new configuration, the following steps must be taken:

1. **Define the Configuration**. Included with Softerm is a diskette labeled *Softerm Configuration Diskette*. For each configuration option Softerm supports, there is a corresponding file on the Configuration Diskette. The Softerm 1 Configuration Diskette contains all hardware configuration files on the front side of the diskette. The Softerm 2 Configuration Diskette contains hardware configuration files on the front side of the diskette, and terminal emulation files on the back side of the diskette. Since Softerm 1 includes the built-in terminal emulation *SOF-TERM.TERMINAL*, the back side of the diskette is not used. In order to generate a useable Softerm configuration, a file corresponding to each hardware and software option including terminal emulation, serial I/O interface, 40- or 80-column video display, printer interface, and automatic dialer interface for use with auto-dial modems must be loaded using the *3—LOAD DEFINITION MODULES* option.

2. **Edit Configuration Options**. Each file or module loaded from the Configuration Diskette includes options which may be edited according to the user's specific requirements. Each of the options has a default value corresponding to the most frequently used selection. It is usually only necessary to edit these options if the user has hardware which is not in the normal slot for that type of board, or if the host computer communications parameters do not match the default values used by the Softerm program. Softerm configuration options may be edited by selecting *4—EDIT OPTIONS* on the Softerm setup menu.

3. **Save the Configuration**. Once the completed configuration is ready, it should be *saved* on the Softerm System Diskette using the *5—SAVE CONFIGURATION* option so that the configuration process does not have to be repeated each time Softerm is used. If the user configuration is saved on the System Diskette using the filename *SOFTERM.INIT*, it will be automatically loaded each time the system diskette is booted. Otherwise, the configuration may be saved using any legal filename and loaded as required using the *LOAD CONFIGURATION* option.

Setup Menu Options

The following paragraphs will cover each option of the Softerm setup menu in detail.

1—Disk Utilities

The disk utilities option allows a selection of disk commands to be executed without exiting the Softerm program. These include *INIT DISK-ETTE, CATALOG, DELETE, RENAME, LOCK,* and *UNLOCK.* Since these commands are also available in the online terminal operation mode, the utilization of this option is covered in detail in Chapter 3 on Terminal Operation.

2—Load Configuration

If the *LOAD CONFIGURATION* option is selected, the cursor is positioned to a string data entry field in the ***** *CURRENT CONFIGURATION* **** area in the lower portion of the display just to the right of the label *CONFIGURATION NAME:*. A previously saved configuration may be loaded by entering a filename and pressing the **RETURN** key. Softerm configuration names have the identical requirements and restrictions of standard Apple DOS filenames.

If this option has been chosen accidentally, **S1 X may be pressed which will restore the contents of the** *CONFIGURATION NAME:* field and return the cursor to the *OPTION:* selection in the menu without affecting the current configuration.

Before the new configuration is loaded, the currently active display driver is deactivated and display mode returns to the standard Apple 40-column display. This mode remains in effect through the remainder of the setup session.

If the requested configuration file does not exist, the error message **FILE NOT FOUND** is displayed. This is a standard DOS type error message and the user should refer to *The DOS Manual* for a complete description of this and other DOS type errors which may occur. File I/O error messages are also briefly described in Appendix D of this manual on error messages.

If the configuration file loaded requires a corresponding file to be loaded into the language card (16K RAM) to support an extended terminal emulation or other features, it will be automatically loaded by Softerm. The filename of the language card extension file will be the filename of the requested configuration with a -LC appended to the end. If for some reason this file cannot be loaded, the message **UNABLE TO LOAD: FILENAME-LC** will be displayed on row 22 and a DOS type error message will be displayed on row 23.

Another type of error can occur when the filename entered is a valid DOS filename on disk, but it is not actually a Softerm configuration file. In this case the error message **FILE TYPE MISMATCH** is displayed. Pressing the **ESC** key will clear this message and return the cursor to the function select. If a **I/O ERROR** occurs during the loading of a configuration file, the complete configuration will be cleared after pressing the **ESC** key to clear the error condition. Thus any previous configuration is cleared out by the failure to read the new configuration.

Once the requested configuration is successfully loaded, the cursor is repositioned to the *OPTION:* selection for further action. At this time the user can select *4—EDIT OPTIONS* if any changes to this configuration are required, or select *6—EXIT SETUP* if it is desired to execute the loaded configuration and initiate online terminal operation.

3—Load Definition Modules

If the *LOAD DEFINITION MODULES* option is selected, the following menu is displayed:

```
                     SOFTERM 2
                     REVISION 1.00
        LOAD:     7    VOLUME O    DRIVE 1 SLOT 6
                  1—TERMINAL EMULATION
                  2—SERIAL I/O DRIVER
                  3—DISPLAY DRIVER
                  4—PRINTER DRIVER
                  5—DIALER DRIVER
                  6—CLOCK DRIVER
                  7—QUIT

        ******** CURRENT CONFIGURATION *********

        CONFIGURATION NAME: SOFTERM.INIT
        TERMINAL EMULATION:
        SERIAL I/O DRIVER:
        DISPLAY DRIVER:
        PRINTER DRIVER:
        DIALER DRIVER:
        CLOCK DRIVER:
```

The default option for the load definition modules menu *7—QUIT* will return to the previous setup menu for further action. This option may be selected by simply pressing the **RETURN** key. Each option in the load definition modules menu will be covered individually including the valid filenames for each driver or emulation in the following paragraphs.

Load: Terminal Emulation

If the option *1—TERMINAL EMULATION* is selected, the cursor is positioned to the string entry field just to the right of the label *TERMINAL EMULATION:* in the ***** *CURRENT CONFIGURATION* ***** area of the display. Softerm 1 contains the built-in terminal emulation *SOF-TERM.TERMINAL* and if this option is selected, the error message **YOU CAN'T DO THAT** will be displayed.

The following table defines the filenames which may be entered in this field and the type of emulation provided.

Softerm Terminal Emulation Filename Table

Filename	Type of Emulation
ADDS REGENT 20	ADDS Regent Series Model 20
ADDS REGENT 25	ADDS Regent Series Model 25
ADDS REGENT 40	ADDS Regent Series Model 40
ADDS REGENT 60	ADDS Regent Series Model 60
ADDS VIEWPOINT	ADDS Viewpoint
DATAPOINT 3601	Datapoint Datastation 3601
DEC VT52	Digital Equipment VT52
DEC VT100	Digital Equipment VT102
DGC D200	Data General Dasher D200
HAZELTINE 1400/1410	Hazeltine Model 1400 or 1410
HAZELTINE 1500	Hazeltine Model 1500
HAZELTINE 1520	Hazeltine Model 1520
HONEYWELL VIP7205	Honeywell Model VIP7205
HONEYWELL VIP7801	Honeywell Model VIP7801
HONEYWELL VIP7803	Honeywell Model VIP7803
HP 2622A	Hewlett Packard 2622A
IBM 3101-1X	IBM 3101 Models 10, 12, 13
IBM 3101-2X	IBM 3101 Models 20, 22, 23
LSI ADM-3A	Lear Siegler ADM-3A
LSI ADM-5	Lear Siegler ADM-5
SOFTERM.TERMINAL	TTY Compatible Emulation
TELEVIDEO 910	TeleVideo Model 910
TELEVIDEO 925	TeleVideo Model 925
TELEVIDEO 950	TeleVideo Model 950

If this option has been chosen accidentally, **S1 X** may be pressed which will restore the contents of the *TERMINAL EMULATION:* field and return the cursor to the "LOAD:" selection in the menu without affecting the current configuration. If the requested terminal emulation file does not exist, the error message **FILE NOT FOUND** is displayed and the **ESC** key must be pressed to clear the error message and continue the setup procedure.

Some terminal emulations provided with Softerm require the use of a 16K RAM card in order to provide all terminal functions. These emulations will include a separate program module which is loaded into the 16K RAM area. The name of the program module, if it exists, will be of the form *FILENAME.FUNC*, where *FILENAME* is one of those listed previously. If an extended memory function module is required for the emulation but cannot be loaded, the message **UNABLE TO LOAD: FILENAME** followed by a DOS type error message will be displayed on rows 22 and 23. If Softerm cannot find a 16K RAM card, the message **EMULATION REQUIRES LANGUAGE CARD** is displayed. Use the **ESC** to clear the error.

Another type of error can occur when the filename entered is a valid DOS filename on disk, but it is not actually a Softerm terminal emulation file. In this case the error message **FILE TYPE MISMATCH** is displayed. Pressing the **ESC** key will clear this message and return the cursor to the *LOAD:* selection.

If an *I/O ERROR* occurs during the loading of a terminal emulation file, the *TERMINAL EMULATION:* entry field will be cleared after pressing the **ESC** key to clear the error message. Thus any previous terminal emulation specified is cleared out by the failure to read the new terminal emulation file.

Once the requested terminal emulation file is successfully loaded, the cursor is repositioned to the *LOAD:* selection for further action. At this time if any further definition modules are required to complete the configuration, the appropriate selection can be made. Otherwise, pressing the **RETURN** key will return to the main setup menu.

Additional information on specific terminal emulations including features supported and not supported may be found in Chapter 5 of this user's guide.

Load: Serial I/O Driver

If the option *2—SERIAL IO DRIVER* is selected, the cursor is positioned to the string entry field just to the right of the label *SERIAL IO DRIVER:* in the ***** *CURRENT CONFIGURATION* ***** area of the display. The following table defines the filenames which may be entered in this field and the respective serial interface and manufacturer.

Softerm Serial Interface Filename Table

Filename	Serial Interface
ALS DISPATCHER.SIO	ALS Dispatcher Serial Interface
APPLE COMM.SIO	Apple Communications Card
APPLE SUPER.SIO	Apple Super Serial Interface
APPLIE SUPER.SIO	Apple Super Serial Interface
	Microtek SV-622C Serial Interface
APPLE-CAT II.SIO	Novation Apple-CAT II
BASIS 108.SIO	Basis 108 Serial Interface
CCS 7710.SIO	California Computer Systems
	Serial I/O 7710-1 and 7710-2
DUAL-COMM PLUS.SIO	Bit 3 Computer Dual Comm Plus
INTRA PSIO.SIO	Intra Computer PSIO
MICROMODEM.SIO	Hayes Microcomputer Products
	Micromodem II
MICROMODEM IIE.SIO	Hayes Microcomputer Products
	Micromodem IIe
MCI CPS.SIO	Mountain Computer CPS
	Multifunction Board
	(Clock, Parallel, Serial)
MULTI-TECH MODEM II.SIO	Multi-Tech Modem II
SSM ASIO.SIO	SSM Microcomputer Products
	ASIO Serial I/O Interface
SSM AIO.SIO	SSM Microcomputer Products
	AIO Serial/Parallel Interface
SSM AIO II.SIO	SSM Microcomputer Products
	AIO II Serial/Parallel Interface
SSM MODEMCARD.SIO	SSM Microcomputer Products
	ModemCard
VERSACARD.SIO	Prometheus VERSAcard
VIDEX PSIO.SIO	Videx PSIO Parallel/Serial I/O

Loading some of the above serial I/O drivers will also automatically reflect internal corresponding *dialer drivers*. For example, loading *MICROMODEM.SIO* will cause *MICROMODEM.DIAL* to appear next to the label *DIALER DRIVER:* and loading *APPLE-CAT II.SIO* will cause *APPLE-CAT II.DIAL* to appear as the dialer driver. Attempting to load a different dialer driver after serial interface drivers with internal dialer drivers have been loaded will cause the message **DIALER DRIVER IS PART OF SERIAL DRIVER** to be displayed and the attempted load is aborted. Error conditions which may occur during the loading of the serial I/O driver are processed identically to those encountered in option *1—TERMINAL EMULATION* described earlier. Remember that the **ESC** key is used to clear *all* error messages.

Once the requested serial I/O driver file is successfully loaded, the cursor is repositioned to the *LOAD:* selection for further action. At this time if any further definition modules are required to complete the configuration, the appropriate selection can be made. Otherwise, pressing the **RETURN** key will return to the main setup menu.

Additional information on specific serial I/O interfaces, their character-
istics and default parameter settings, may be found in Appendix A of
this user's guide.

Load: Display Driver

If the option *3—DISPLAY DRIVER* is selected, the cursor is positioned
to the string entry field just to the right of the label *DISPLAY DRIVER:*
in the ***** *CURRENT CONFIGURATION* ***** area of the display. The
following table defines the filenames which may be entered in this field
and the respective video interface and manufacturer.

Softerm Video Interface Filename Table

Filename	Video Interface
APPLE40	Apple Standard 40-column
APPLE IIE.80	Apple IIe 80-column Textcards
BASIS 108.80	Basis 108 internal 80-column
FRANKLIN ACE.80	Franklin 80-column
FULL-VIEW 80	Bit 3 Computer FULL VIEW 80 80-column
MAGNUM 80	Microtek MAGNUM 80 80-column
OMNIVISION	Computer Stop OMNIVISION 80-column
SMARTERM	Advanced Logic Systems SMARTERM 80-column
SMARTERM II	Advanced Logic Systems SMARTERM II 80-column
STB-80	STB Systems STB-80 80-column
SUPERVISION	Techcom Enterprises SUPERVISION 80-column
SUP'R'TERM	M & R Enterprises SUP'R'TERMINAL 80-column
ULTRATERM	Videx ULTRATERM 80-column
VIDEOTERM	Videx VIDEOTERM 80-column
VIEWMAX 80	Micromax VIEWMAX 80 80-column Applied Engineering VIEWMASTER
VISION 80	Vista Computer VISION 80 80-column
WIZARD 80	Wesper Micro Systems WIZARD 80 80-column

Before a new display driver is loaded, the currently active display driver is deactivated and display mode returns to standard Apple 40-column video. This mode remains in effect for the remainder of the setup session. Error conditions which may occur during the loading of the display driver are processed identically to those encountered in option *1—TERMINAL EMULATION* described earlier.

Once the requested display driver file is successfully loaded, the cursor is repositioned to the *LOAD:* selection for further action. At this time if any further definition modules are required to complete the configuration, the appropriate selection can be made. Otherwise, pressing the **RETURN** key will return to the main setup menu.

Additional information on specific 80-column video interfaces, their characteristics and default parameter settings, may be found in Appendix B of this user's guide.

Load: Printer Driver

If the option *4—PRINTER DRIVER* is selected, the cursor is positioned to the string entry field just to the right of the label *PRINTER DRIVER:* in the ***** *CURRENT CONFIGURATION* ***** area of the display. The following table defines the filenames which may be entered in this field and the respective serial or parallel interface and manufacturer.

Softterm Printer Interface Filename Table

Filename	Printer	Interface
ALS DISPATCHER.PIO	Advanced Logic Systems Dispatcher Serial Interface	
APPLE COMM.PIO	Apple Communications Card	
APPLE DUMPLING-GX.PIO	Microtek Apple Dumpling-GX Printer Interface	
APPLE PRINT.PIO	Apple Parallel Printer Interface	
	Epson APL Printer Interface	
	Tymac PPC-100 Printer Interface	
APPLE SERIAL.PIO	Apple Serial Interface Card	
APPLE SUPER.PIO	Apple Super Serial Interface	
	Microtek SV-622 Serial Interface	
BASIS 108.PIO	Basis 108 Serial or Parallel Interface	
CCS 7710.PIO	California Computer Systems Serial I/O 7710-1 and 7710-2	
CCS 7720.PIO	California Computer Systems 7720 Parallel Interface	
CCS 7728.PIO	California Computer Systems 7728 Centronics Printer	
DUAL-COMM PLUS.PIO	Bit 3 Computer Dual Comm Plus	
FIRMWARE.PIO	Configuration has printer interface without specific Softerm driver	
† GRAPPLER+.PIO	Orange Micro Grappler+ Interface	
GRAPPLER.PIO	Orange Micro Grappler Interface	
INTRA PSIO.PIO	Intra Computer PSIO	
MCI CPS.PIO	Mountain Computer CPS Multifunction Board (Clock, Parallel, Serial)	
MICRO BUFFER II.PIO	Practical Peripherals Micro Buffer II	
NULL.PIO	Configuration has no printer	
PKASO.PIO	Interactive Structures PKASO Interface	
SSM AIO.PIO	SSM Microcomputer Products AIO Serial/Parallel Interface	
SSM AIO II.PIO	SSM Microcomputer Products AIO II Serial/Parallel Interface	
SSM APIO.PIO	SSM Microcomputer Products APIO Parallel Interface	
SSM ASIO.PIO	SSM Microcomputer Products ASIO Serial I/O Interface	
VERSACARD.PIO	Prometheus VERSAcard Serial/Parallel Interface	
VIDEX PSIO.PIO	Videx PSIO Parallel/Serial Interface	
WIZARD BPO.PIO	Wesper Micro Wizard-BPO	

Terminal Setup

If the configuration being used has a printer, but is using a printer interface not *specifically* supported by Softerm, then *FIRMWARE.PIO* should be loaded as the printer driver. Softerm will then print using the standard Apple method with the COUT routine. Thus if the printer controller being used is compatible with standard Apple printing methods, it should work with Softerm. If the printer controller firmware also writes data printed to the video display, unpredictable results will occur if the *APPLE40* display driver is being used.

However, Softerm cannot *simultaneously* receive and print using this type of printer driver. Thus the firmware driver will alternate receive and print, while the specific printer drivers listed above allow simultaneous receive and print. The one exception to this is the *Apple Serial Interface* which due to the method of its operation prevents Softerm from allowing simultaneous receive and print.

If the configuration being used has no printer, then *NULL.PIO* should be specified as the printer driver. Any attempt to use a print function in setup or online terminal operation will result in the message **NO PRINTER** being displayed.

Error conditions which may occur during the loading of the printer driver are processed identically to those encountered for option *1—TERMINAL EMULATION* described earlier. **ESC** is used to clear error conditions.

Once the requested printer driver file is successfully loaded, the cursor is repositioned to the *LOAD:* selection for further action. At this time if any further definition modules are required to complete the configuration, the appropriate selection can be made. Otherwise, pressing the **RETURN** key will return to the main setup menu.

Additional information on specific serial and parallel I/O interfaces, their characteristics and default parameter settings, may be found in Appendix A of this user's guide.

Load: Dialer Driver

If the option *5—DIALER DRIVER* is selected, the cursor is positioned to the string entry field just to the right of the label *DIALER DRIVER:* in the ***** *CURRENT CONFIGURATION* ***** area of the display. The following table defines the filenames which may be entered in this field and the respective auto-dial hardware supported.

Softterm Dialer Interface Filename Table

Filename	Hardware Interface
APPLE-CAT II.DIAL*	Novation Apple-CAT II
DATEC 212.DIAL	Datec 212 Auto-dial Modem
MICROMODEM.DIAL*	Hayes Microcomputer Products Micromodem II
MICROMODEM IIE.DIAL	Hayes Microcomputer Products Micromodem IIe
MULTI-TECH MODEM II.DIAL*	Multi-Tech Modem II
MULTI-TECH MT212C.DIAL	Multi-Tech MT212C Auto-dial Modem
NEC N212BR.DIAL	NEC 212 Auto-dial Auto-logon Modem
NULL.DIAL	No automatic dial capability available in configuration
RACAL-VADIC VA212.DIAL	Racal-Vadic VA212 Auto-dial Modem
RIXON R212A.DIAL	Rixon R212A Intelligent Modem
SMARTMODEM.DIAL	Hayes Microcomputer Products Smartmodem
SSM MODEMCARD.DIAL*	SSM ModemCard
UDS 212A/D.DIAL	Universal Data Systems 212A/D Auto-dial Modem
USR AD 212A.DIAL	US Robotics Auto-dial 212A
VEN-TEL MD212 PLUS.DIAL	Ven-Tel MD212 Plus Auto-dial Modem

Note: Filenames marked with * are built-in to the serial I/O interfaces and are loaded automatically.

If the configuration being supported has no automatic dial capability, then *NULL.DIAL* should be specified as the dialer driver. The *Softterm Phone Book* may be used and maintained even without automatic dial capability. However, if the *Dial* option of the *Softterm Dial Utilities* is used during online operation, and *NULL.DIAL* has been specified as the dialer driver, the message **DIAL: number** is displayed and Softterm waits for the number to be dialed manually. Once a connection has been established, pressing the **ESC** key allows terminal operation to continue.

Error conditions which may occur during the loading of the dialer driver are processed identically to those encountered for option *1—TERMINAL EMULATION* described earlier. The **ESC** key is used to clear error messages and resume menu selection or data entry.

Once the requested dialer driver file is successfully loaded, the cursor is repositioned to the *LOAD:* selection for further action. If all definition modules have been specified for the current configuration, the **RETURN** key may be pressed to return to the main setup menu. Otherwise, the appropriate selection should be made to complete loading of desired current configuration definition modules.

Load: Clock Driver

If the option *6—CLOCK DRIVER* is selected, the cursor is positioned to the string entry field just to the right of the label *CLOCK DRIVER:* in the ***** *CURRENT CONFIGURATION* ***** area of the display. The following table defines the filenames which may be entered in this field and the respective clock interface and manufacturer.

Softerm Clock Interface Filename Table

Filename	Clock Interface
CCS 7424.CLK	California Computer Systems 7424 Clock Card
MBI APPLETIME.CLK	MBI Appletime Clock Card
MCI CPS.CLK	Mountain Computer CPS Board (Clock, Parallel, Serial)
+ NULL.CLK	No Clock Card in Configuration
THE CLOCK.CLK	Mountain Computer The Clock
THUNDERCLOCK PLUS.CLK	Thunderware Thunderclock Plus
VERSACARD.CLK	Prometheus VERSAcard

Error conditions which may occur during the loading of the clock driver are processed identically to those encountered in option *1—TERMINAL EMULATION* described earlier. Use the **ESC** key to clear any error messages.

Once the requested clock driver is successfully loaded, the cursor is repositioned to the *LOAD:* selection for further action. At this time if any further definition modules are required to complete the configuration, the appropriate selection can be made. Otherwise, pressing the **RETURN** key will return to the main setup menu.

Additional information on specific clock interfaces and their characteristics may be found in Appendix A of this user's guide.

4—Edit Options

If the *EDIT OPTIONS* option is selected, the following data entry screen is displayed:

```
============ SYSTEM PARAMETERS ============
CHARACTER DELAY 0    HALF DUPLEX      N
USE INVERSE     1    RCV XON/XOFF     N
ANSWERBACK

====== TERMINAL EMULATION PARAMETERS ======
PACE CTRL: DTR  N    XON/XOFF         Y
CR AFTER LF     Y    LF AFTER CR      N
RETURN = CR(0), LF(1) OR CR/LF(2)     0
AUTO LINE WRAP  Y    PAGE MODE        N
HOST XON        $11 HOST XOFF        $13
```

This is the first in a series of 4 data entry screens which allow options associated with the overall system, serial I/O driver, dialer driver, display driver, terminal emulation, clock driver, and printer driver to be specified. If this option is selected *before* all of the configuration definition modules have been specified, the error message **CONFIGURATION IS INCOMPLETE** is displayed and the user must first complete the current configuration before options can be edited.

The data entry formats will contain *default values* for the configuration definition modules specified which can be left as they are or edited through data entry. In the paragraphs that follow, each option will be explained as to its meaning and use in the Softerm program. Refer to the chapter covering terminal emulations and appendices covering serial, parallel, clock, and 80-column video interfaces for additional information.

When editing in the data entry formats, remember that the **S1** → and **S1** ← permit forward and backward movement between fields in a data entry format. The **RETURN** key is used to accept the current field and move forward to the next field. The **S1 RETURN** is used to accept the current screen and display the next screen in a series of data entry screen formats. The **S1 X** key may be used to cancel the edit options function and return to the terminal setup main menu.

System Parameters

System parameters are Softerm options which are *global* to the entire operation of Softerm and not necessarily dependent on any particular configuration. The following options or system parameters are currently defined in the Softerm program.

Character Delay

The system parameter *CHARACTER DELAY* option allows an adjustable *delay* between characters transmitted on the communications line. Its value may be 0 which indicates no delay up to a value of 255 for a maximum delay. Each increment in value causes an additional increment of delay of approximately 1 character time at a baud rate of 19,200 or 520 microseconds. This option could be used when the host computer or receiving end of transmissions from Softerm are not able to accept characters as fast the actual line speed allows.

Rcv XON/XOFF

The system parameter *RCV XON/XOFF* indicates the capability of the host computer or remote system to generate XON and XOFF characters while Softerm is transmitting to that system. Thus this option should be set if Softerm is to perform *resume/suspend* operations in response to XON and XOFF characters received from the host or remote system. Since most terminals do not have the capability to generate XON and XOFF characters, this option should be set to **N** for most terminal communications and terminal emulation applications to host computers. This option should be set to **Y** only in configurations used for communications between Softerm and a host computer or remote system which generates XON and XOFF characters for pacing.

XON and XOFF are utilized as start/stop characters to *pace* the flow of characters between two devices. If the XON and XOFF character codes used by the host correspond to terminal functions other than start/stop in the terminal emulation, unpredictable results may occur. This option should be used with *extreme caution* and should be set only if it is a requirement of the host or remote computer system. This is a *Yes or No* field and a **Y** should be entered to indicate Yes and an **N** should be entered to indicate No to this option.

Half Duplex

The system parameter *HALF DUPLEX* indicates whether or not the terminal should operate in half duplex mode instead of full duplex mode. In full duplex mode data entered on the keyboard is transmitted to the remote system without being displayed or processed locally. The remote system or host computer must *echo back* the characters if they are to be processed and displayed. In half duplex mode, data entered on the keyboard is transmitted to the remote system as well as being processed and displayed locally. Thus no *echo back* operation by the host computer is required. The user should check the requirements of the host computer before setting this option. If half duplex is set, and the host computer is full duplex, characters entered on the keyboard will be displayed and processed *twice*. This is a *Yes or No* field and a **Y** should be entered to indicate Yes for half duplex and an **N** should be entered to indicate No for full duplex.

Use Inverse

The system parameter *USE INVERSE* allows the user to specify whether or not *inverse video* is used for characters displayed in inverse video mode. Entering a value of **0** indicates that inverse video is not used in either online or offline modes. Softerm is in the *online* mode whenever terminal communications is active with a host computer. Softerm is in the *offline* mode whenever a Softerm extended capability like Terminal Setup or Disk Utilities is being used.

Entering a value of **1** indicates that inverse video is not used in the online terminal communications mode, but is used in the offline Softerm function mode. This option is useful if the inverse mode of a display driver has a limited character set and thus *corrupts* the original character, such as APPLE40. Many Softerm menus and data entry screens have fields which will display in inverse video. Entering a value of **2** allows inverse video to be used in both the online and offline modes. This is the default value for this parameter.

Entering a value of **3** or **4** allow the inverse video attribute available on all Apple 80-column board to be used in place of the *low or high intensity* video attribute in the online terminal communications mode. Entering a value of **3** will cause Softerm to substitute the inverse video attribute whenever the *low intensity* attribute is specified. Spaces with the low or high intensity video attribute will *not* appear in inverse when option **3** or **4** is specified.

Entering any other value will cause the error message **OUT OF RANGE** to be displayed.

Answerback String

The system parameter *ANSWERBACK STRING* is a string of ASCII character codes transmitted when an answerback function request is received when Softerm is emulating a terminal which uses this function, or when the manual answerback function key **S1 A** provided as a standard Softerm capability is pressed. Both displayable and non-displayable ASCII character codes may be included in an answerback string. Remember that non-displayable codes will be indicated by a ↑ followed by the appropriate displayable character in inverse video. The answerback string can contain up to 30 actual characters. As a maximum of 55 display positions (35 on APPLE40) are available, if there are numerous control codes in the string, the last part of the string may not be viewable (since it takes two screen positions to display control codes).

Terminal Emulation Parameters

The terminal emulation is the type of terminal which Softerm provides using the Apple II computer and a video display. Several options are provided with Softerm to enhance the use of these terminal emulations and provide additional flexibility. Refer to Chapter 5 for additional information on the terminal emulations provided with Softerm and corresponding defaults for the terminal emulation options which follow.

Pace Ctrl: DTR

The terminal emulation parameter *PACE CTRL: DTR* allows the Data Terminal Ready signal from the serial interface to be used as a pacing control. Thus when Softerm is ready to receive characters from the communications line, the DTR signal would be raised.

If Softerm were in the local mode, or if its receive buffer were full and characters could no longer be received, the DTR signal would be lowered. This allows Softerm to *pace* the incoming received characters to match its data handling capability.

Since this option is a *Yes or No* option, entering a **Y** will indicate that pacing is to be controlled by raising and lowering the DTR signal. This option may be appropriate when the Apple computer and serial interface are *directly* connected to the host computer system locally, rather than using a communications modem. If this option is selected for pacing, the *XON/XOFF* option should not be selected.

Pace Ctrl: XON/XOFF

The terminal emulation parameter *XON/XOFF* allows the transmitting of start (XON) and stop (XOFF) characters to be used as a pacing control. Thus when Softerm is ready to receive characters from the communications line, an XON character would be transmitted. If Softerm were in the local mode, or if its receive buffer were full and characters could no longer be received, an XOFF character would be transmitted. This allows Softerm to *pace* the incoming received characters to match its data handling capability.

Since this option is a *Yes or No* option, entering a **Y** will indicate that pacing is to be controlled by transmitting XON and XOFF characters. This option is appropriate when the Apple computer and serial interface are connected to the host computer system either locally or using a modem and communications line. If this option is selected for pacing, the *DTR* option should not be selected. The specific option chosen depends on the communications hardware and the host system software.

CR after LF

The terminal emulation parameter *CR AFTER LF* indicates that when a line feed (LF) character is received, a carriage return (CR) function is *also* automatically performed. Therefore if this option is selected by entering a **Y**, whenever a LF character is received the cursor will be positioned to the first column of the next row as if a CR character had also been received.

LF after CR

The terminal emulation parameter *LF AFTER CR* indicates that when a carriage return (CR) is received, a line feed (LF) function is *also* automatically performed. Therefore if this option is selected by entering a **Y**, whenever a CR character is received the cursor will be positioned to first column of the next row as if a LF character had also been received.

Auto Line Wrap

The terminal emulation parameter *AUTO LINE WRAP* allows the user to select whether or not the cursor automatically moves to the first character position in the next line, after it reaches the 80th position. This parameter is sometimes referred to as *Automatic New Line*. If this option is selected by entering a **Y**, entering data in the 80th position will move the cursor to the beginning of the next line. If data is entered in the last position of the bottom line, scrolling will occur automatically if scrolling is enabled. If this option is *not* selected (by entering an **N**), the cursor does not advance to the first position in the next line, but stays at the 80th position. Additional data entered or received will *overwrite* the display position but otherwise be processed normally.

Page Mode

The terminal emulation parameter *PAGE MODE* allows the user to select the *scrolling* mode of the terminal. If this option is selected by entering a **Y**, scrolling is *disabled* and functions which normally cause scrolling will leave the cursor on the bottom row or cause a wraparound to the top row depending on the terminal emulation selected. If **N** is entered for this option, scrolling is *enabled* and scrolling is performed when required as defined by the terminal emulation selected.

Return = CR(0), LF(1) or CR/LF(2)

The terminal emulation parameter *RETURN CR(0), LF(1) OR CR/LF(2)* allows the user to select the character code generated when the **RETURN** key is pressed. If a value of 0 is entered for this option, a carriage return (CR) character is sent to the host computer whenever the **RETURN** key is pressed. If a value of 1 is entered, a line feed (LF) character is sent to the host computer whenever the return key is pressed. If a value of 2 is entered, both a carriage return (CR) and a line feed (LF) character are sent to the host computer. Since many terminals use a *New Line* key as the enter key in place of *Carriage Return*, setting this option to LF allows the **RETURN** key on the Apple to simulate the *New Line* key.

Host XON

The terminal emulation parameter *HOST XON* allows the start or XON pacing control character which the host computer expects to receive to be defined. Any hexadecimal character code between $00 and $7F may be specified. A number outside this range will cause a range error message to be displayed.

Host XOFF

The terminal emulation parameter *HOST XOFF* allows the stop or XOFF pacing control character which the host computer expects to receive to be defined. Any hexadecimal character code between $00 and $7F may be specified.

Serial I/O and Display Parameters

When editing of *System Parameters* and *Terminal Emulation Parameters* are completed, the **S1 RETURN** key may be entered and the following screen will be displayed:

```
============== SERIAL I/O DRIVER ==============
BITS/CHARACTER  8    # OF STOP BITS  1
PARITY          O    SPEED           5
SLOT #          2    PORT #          N/A
MODEM CONTROL   Y

============== DISPLAY DRIVER ==============
UPPERCASE ONLY  N/A INVERSE LC      N/A
INVERSE UC      N/A CURSOR DEF      1
SHIFT KEY TYPE  O   SLOT #          3
SPECIFY CRTC PARAMETERS            N
```

This is the second in a series of 4 data entry screens which allow options associated with the current configuration to be edited. After completing this screen, the user should use the **S1 RETURN** key to continue to the third screen. A **S1 X** may be entered to return control to the main setup screen.

Serial I/O Driver

The serial I/O driver provides the communications interface between Softerm and the remote computer system. Some of the serial I/O driver options may be shown as N/A (not applicable). This is because these options must be set *on the board* or are not available on the particular interface used. Refer to Appendix A for specific information on serial I/O interface boards supported by Softerm and corresponding defaults for the serial I/O options which follow.

Bits/Character

The serial I/O option *BITS/CHARACTER* indicates the number of binary information data bits contained in each character. The value of this option can be either a 7 or 8. Entry of any other value will cause the error message **OUT OF RANGE** to be displayed. This will almost always be 7 if parity is used and 8 if no parity is used.

of Stop Bits

The serial I/O option *# OF STOP BITS* is the number of bits which should be appended to each character to facilitate synchronization. The value of this option can be either a 1 or 2. Entry of any other value will cause the error message **OUT OF RANGE** to be displayed. This setting is usually dependent on the requirements of the host computer system.

Parity

The serial I/O option *PARITY* indicates whether or not and what type of parity is desired. Parity is used as a method of error detection. An extra bit (the parity bit) is added to the code for each character. When using even parity, the sum of all the one bits in the character is even; when using odd parity, the sum is odd. A computer can detect errors by checking for the correct parity in each unit of data received. The following table indicates the legal values for this field and the resulting parity option:

Value	Parity
0	No Parity
1	Odd Parity
2	Even Parity
3	Mark Parity
4	Space Parity

A value of **0** for no parity is entered when 8 bits/character has been specified. A value of **1–4** for odd, even, mark, or space parity is entered when 7 bits/character has been specified. Entering any other value will cause the error message **OUT OF RANGE** to be displayed.

Speed

The serial I/O option *SPEED* indicates the transmission speed in bits per second of the communications link between Softerm and the host computer. The following table defines the values which may be entered and the corresponding transmission speed in bits per second:

Value	Speed
0	50
1	75
2	110
3	134.5
4	150
5	300
6	600
7	1200
8	1800
9	2000
10	2400
11	3600
12	4800
13	7200
14	9600

Any other value entered will cause the error message **OUT OF RANGE** to be displayed.

Some serial I/O interfaces restrict the choice to fewer speeds. Refer to Appendix A for specific information.

Warning: The *SPEED* parameter must be set properly even if the transmission speed is set by jumpers or switches on the hardware. This parameter is used for Softerm internal timing and is essential for proper operation.

Slot

The serial I/O option *SLOT #* indicates in which Apple slot number the *physical* controller board is located. The legitimate entry values for this field are 1—7 and any other value entered will cause **OUT OF RANGE** to be displayed.

Warning: If the slot number is incorrectly specified, unpredictable results may occur including failure of the program.

Port

The serial I/O option *PORT #* will not be applicable to most controller boards. However, some boards have more than one interface available for communications. An example of this is the Bit 3 Computer *Dual Comm Plus*. In this case you must enter a 1 or 2 to indicate which *port* will be used for serial communications. See Appendix A for *port #* specification.

Modem Control

The serial I/O option *MODEM CONTROL* indicates whether or not communications will be using a modem. This allows Softerm to monitor the *carrier* signal to determine if a connection actually exists. If carrier is present in the online terminal communications mode, displaying the Softerm terminal status using the **S1 V** key will indicate **CARRIER**. If there has been a connection and it is lost for more than several seconds, the error message **CONNECTION BROKEN** will be displayed.

Display Driver

The display driver provides the 40- or 80-column video interface for the Softerm terminal emulation. Some of the display driver options may be shown as N/A (not applicable). The options involving upper and lower case are not applicable to the 80-column boards supported which all have upper and lower case characters available. Refer to Appendix B for additional information on 80-column video interface boards supported by Softerm and corresponding defaults for the display driver options which follow.

Uppercase Only

The display driver option *UPPERCASE ONLY* is applicable only to standard Apple 40-column video. Some standard Apples have been modified either with a lowercase adapter (LCA) or a keyboard enhancer which provide lowercase characters.

Since this is a *Yes or No* option, the user should enter a **Y** if no lowercase adapter or keyboard enhancer is present, and an **N** if a lowercase adapter or keyboard enhancer has been installed.

Inverse LC

The display driver option *INVERSE LC* is applicable only to standard Apple 40-column video. If the user does *not* have a lowercase adapter or keyboard enhancer, and entered **Y** for the *UPPERCASE ONLY* option, but wants lowercase characters to appear in inverse video, then this option should be set to **Y**. If the user desires uppercase characters in inverse video, the option *INVERSE UC* should be set. Otherwise, this option should be set to **N**.

Inverse UC

The display driver option *INVERSE UC* is applicable only to standard Apple 40-column video. If the user does *not* have a lowercase adapter or keyboard enhancer, and entered **Y** for the *UPPERCASE ONLY* option, but wants uppercase characters to appear in inverse video, then this option should be set to **Y**. If the user desires lowercase characters in inverse video, the option *INVERSE LC* should be set. Otherwise, this option should be set to **N**.

Cursor Def

The display driver option *CURSOR DEF* allows the definition or type of cursor to be specified. The following table defines the legal values for this option and the type of cursor which will result:

Value	Type of Cursor
1	Blinking, block
2	Blinking, half-block
3	Blinking, underscore
4	Non-blinking, block
5	Non-blinking, half-block
6	Non-blinking, underscore

Any other value entered will result in the error message **OUT OF RANGE** being displayed. The *APPLE40* Apple 40-column video driver only supports a block cursor, either blinking or non-blinking. Values of 1, 2, or 3 entered will result in blinking block cursor and values of 4, 5, or 6 entered will result in a non-blinking block cursor for the Apple 40-column display.

The *SMARTERM* 80-column video driver only supports the blinking cursor types 1, 2, and 3. Refer to Appendix B for specific information on 80-column video boards.

Shift Key Type

The display driver option *SHIFT KEY TYPE* indicates which type of shift key modification has been made to the standard Apple. The following table indicates the legal values and the type of shift key indicated:

Value	Shift Key Type
0	None or Keyboard Enhancer
1	1-Wire Modification from shift key to push button input 3 (PB3)
2	Special 80-column video board connection

Therefore if no modification has been made, or the modification is *invisible* to the Softerm program such as with a keyboard enhancer or an Apple IIe, the value entered should be 0. If the user has installed the popular 1-Wire shift key modification, the value entered should be 1. If the user has made a special modification to connect the shift key to the 80-column video board, the value entered should be 2.

Slot

The display driver option *SLOT #* indicates which Apple slot number the *physical* 80-column video board is installed. This option is not applicable to users who do not have 80-column boards. The legal values for this option are 1−7 and attempting to enter any other value will result in a range error. Some boards may have slot limitations. The user should refer to Appendix B for specific information on 80-column boards.

Warning: If the slot number is incorrectly specified, unpredictable results may occur including failure of the program.

Specify CRTC Parameters

The display driver option *SPECIFY CRTC PARAMETERS* allows the horizontal and vertical timing registers and the cursor start and end registers of the 80-column video boards to be adjusted if required. This may be necessary depending on the operational characteristics of the board such as *character size* (5 X 7, 7 X 9 etc.), the *revision level* of the board, and the *bandwidth* of the monitor used.

The default values for these parameters contained in the display drivers supplied with Softerm should *not* be edited unless the video presentation is *unacceptable*. If adjustments are required to these parameters, the user should enter **Y** indicating *Yes* for this parameter. An additional data entry screen will be displayed which allows the CRTC parameters to be edited. Once editing of the CRTC parameter screen is complete, the user is returned to the current screen so that editing of other Softerm options may continue.

Refer to *Appendix B* on 80-column video interface boards for additional information on editing of the CRTC parameters.

Printer Driver Parameters

When editing of the *Serial IO Driver* and *Display Driver* options are completed, the **S1 RETURN** key may be entered and the following screen will be displayed:

```
================ PRINTER DRIVER ================
SLOT #           1    PORT #            2
SERIAL PORT PARAMETERS:
BITS/CHARACTER   7    # OF STOP BITS   1
PARITY           1    SPEED            7
USE XON/XOFF     N    FILL CHARACTER   $00
FILL AFTER CR    0    FILL AFTER LF    0
FILL AFTER FF    0
PARALLEL PORT PARAMETERS:
STROBE LOW       N/A ACKNOWLEDGE LOW N/A
HIGH BIT SET     N
PRINT OPTIONS:
INVERSE DATA     N    LF AFTER CR      Y
UPPERCASE ONLY   N    HARDWARE FF      Y
PAGE LENGTH      66   PAGE SKIP COUNT 6
# COLUMNS        80   FOLD LONG LINES Y
INIT STRING
```

This is the third in a series of the 4 standard data entry screens which allow options associated with the current configuration to be edited. After completing this screen, the user should use the **S1 RETURN** key to continue to the fourth screen. A **S1 X** may be entered to return control to the main terminal setup menu.

Printer Driver

The printer driver provides the capability to utilize print functions within the Softerm program. These options include printing a screen, printing a local file from disk, and printing data as it is received from the communications line. The printer driver options define not only interface specifications, but also print formatting specifications. The printer driver parameter screen is segmented into areas which define the printer driver *SLOT #* and *PORT #*, serial port parameters, parallel port parameters, and print options. If the printer board provides only one type of interface such as serial, then the parallel port parameters will not be applicable. The *PORT #* option selects the interface used when the printer board includes multiple interfaces. Refer to Appendix A for specific information on serial and parallel interface boards supported by Softerm and corresponding defaults for the printer driver options which follow.

Slot

The printer driver *SLOT #* indicates in which Apple slot number the *physical* controller board is located. The legal entry values for this field are 1−7 and any other value entered will cause **OUT OF RANGE** to be displayed.

Warning: If the slot number is incorrectly specified, unpredictable results may occur including failure of the program.

Port

The printer driver *PORT #* will not be applicable to most controller boards. However, some boards have more than one interface available on the board. An example of this is the Mountain Computer *CPS Multifunction Board*. In this case entering a 1 would indicate the *serial* interface, and entering a 2 would indicate the *parallel* interface. Refer to Appendix A for additional information on serial and parallel interface boards supported by Softerm.

Serial Port Parameters

The following parameters are applicable only to serial interface boards or multifunction boards on which a serial interface has been selected by the *PORT #* option.

Bits/Character

The serial port parameter *BITS/CHARACTER* indicates the number of binary information data bits contained in each character. Refer to the section covering the Serial I/O Driver options for a complete description.

of Stop Bits

The serial port parameter *# OF STOP BITS* is the number of bits which should be appended to each character to facilitate synchronization. Refer to the section covering the Serial I/O Driver options for a complete description.

Parity

The serial port parameter *PARITY* indicates whether or not and what type parity is desired. If the high order bit of the data transferred to the printer must be specifically set or clear, this can be accomplished by setting either *mark* or *space* parity. Refer to the section covering the Serial I/O Driver options for a complete description.

Speed

The serial port parameter *SPEED* indicates the transmission speed in bits per second of the communications link between Softerm and the printer. Refer to the section covering the Serial I/O Driver options for a complete description.

Use XON/XOFF

The serial port parameter *USE XON/XOFF* indicates whether or not the printer being used on the system controls the *pacing* of data by transmitting start (XON) and stop (XOFF) characters. Many printers when connected using serial interfaces support this feature. It is particularly useful when the transmission speed being utilized exceeds the throughput capability of the printer. Enter a **Y** for this option if XON and XOFF characters can be expected from the printer.

Fill Character

The serial port parameter *FILL CHARACTER* defines the ASCII character code which is utilized to *pad* certain functions to provide pacing control for non-intelligent printers which do not support start/stop (XON/XOFF) protocol. A fill character is usually a character such as a null (00) which is ignored by the printer. Fill characters may be sent after carriage returns (CR), line feeds (LF), and form feeds (FF) to provide time for these functions to be completed before additional print data is transmitted. The number of fill characters transmitted is defined by the serial port parameters *FILL AFTER CR, FILL AFTER LF,* and *FILL AFTER FF*. The fill character may be specified as any ASCII character code in the range $00 to $7F.

Fill After CR

The serial port parameter *FILL AFTER CR* specifies the number of *fill* characters defined by the *FILL CHARACTER* option to be transmitted to the printer after a carriage return (CR) is transmitted. The value for this option should be in the range 0–254.

Fill After LF

The serial port parameter *FILL AFTER LF* specifies the number of *fill* characters defined by the *FILL CHARACTER* option to be transmitted to the printer after a line feed (LF) is transmitted. The value for this option should be in the range 0–254.

Fill After FF

The serial port parameter *FILL AFTER FF* specifies the number of *fill* characters defined by the *FILL CHARACTER* option to be transmitted to the printer after a form feed (FF) is transmitted. The value for this option should be in the range 0–254.

Parallel Port Parameters

The following options are applicable only to parallel interface boards or multifunction boards on which a parallel interface has been selected by the *PORT #* option.

Strobe Low

The parallel port parameter *STROBE LOW* allows the user to specify the *polarity* of the parallel interface *strobe* signal which tells the printer when data is ready to be transferred. The printer monitors the strobe line, if it detects a transition in the state of the line (from low to high or vice-versa), it is informed that the parallel interface has data to send. In order for this *handshake* to function, you must determine which direction the transition must follow (low-to-high or high-to-low).

On many parallel interface boards, a *jumper* is used to set the polarity of the strobe signal. However, if the interface supports software control of the strobe line, the user should determine which polarity is required for his printer, and then enter **Y** for a low-to-high transition and enter **N** for a high-to-low transition. Refer to Appendix A for specific information on parallel interfaces.

Acknowledge Low

The parallel port parameter *ACKNOWLEDGE LOW* allows the user to specify the *polarity* of the *ACKNOWLEDGE* or *BUSY* signal which tells the parallel interface when the printer is ready to accept data. Usually a printer which uses the *ACKNOWLEDGE* line uses a low-to-high transition or *rising edge* detection whereas a printer which uses the *BUSY* line will use a high-to-low transition or *falling edge* detection.

Many parallel interfaces provide a *jumper* on the interface board to select either the *ACKNOWLEDGE* or *BUSY* line or the polarity of the signal. However, if the parallel interface supports software control of the *ACKNOWLEDGE* signal, the user should first determine which polarity is required for his printer, and then enter a **Y** for a low-to-high transition or **N** for a high-to-low transition. Refer to Appendix A for specific information on parallel interfaces.

High Bit Set

The parallel port parameter *HIGH BIT SET* indicates whether or not the high order bit of the eight-bit characters transferred using a parallel printer interface should be set. If the high order bit should be set (binary 1), enter **Y** for this option. If the high order bit should be clear (binary 0), enter an **N** for this option. Refer to your interface and printer documentation to determine the proper setting of this option for your particular interface and printer.

Print Options

The following options apply to both serial and parallel printer interfaces and allow formatting control of print data.

Inverse Data

The printer driver option *INVERSE DATA* causes the characters sent to the printer to be *inverted*. As each character of data is sent to the printer, the binary 1 bits in the character are changed to 0 and the binary 0 bits in the character are changed to 1. Since it is uncommon for most printers to require inverted data, this option is normally set to **N**. If the printer being used requires inverted data, this option should be set to **Y**.

LF after CR

The printer driver option *LF AFTER CR* indicates whether or not the software should automatically generate a line feed (LF) after each carriage return (CR) in the data being printed. If the data being printed already includes line feeds after carriage returns, additional line feeds are *not* inserted if this option is set. Some printers automatically perform a line feed after receiving a carriage return and others do not. If a line feed after carriage return is desired, enter **Y** for this option. If line feeds are not required, enter **N** for this option.

Uppercase Only

The printer driver option *UPPERCASE ONLY* indicates whether or not the printer has the capability to print lowercase characters. If the printer cannot print lowercase characters, enter **Y** for this option. Softerm will then convert all lowercase characters to upper before they are transferred to the printer. Otherwise, enter **N**.

Hardware FF

The printer driver option *HARDWARE FF* indicates whether or not the printer has the capability to form feed when sent the ASCII character code $0C (FF). If the printer has the capability to do form feeds, enter **Y** for this option. Otherwise, enter **N**.

Page Length

The printer driver option *PAGE LENGTH* allows the user to specify the length in number of lines of the forms being used in the printer. The page length in conjunction with the page skip count prevents printing on the *creases* when using continuous forms. The page length also allows Softerm to perform *software form feeds* when the printer does not have a hardware form feed capability. Page length may be specified from 3 to 255 lines.

Page Skip Count

The printer driver option *PAGE SKIP COUNT* indicates how many lines are to be *skipped over* when printing a page on the printer. Thus the number of lines which will be printed on a page is the *difference* between page length and page skip count. The page skip count in conjunction with page length prevents printing on the *creases* when using continuous forms. The value entered for page skip count must be between 0 and 255. If a value of 0 is entered, automatic paging is suppressed.

Columns

The printer driver option *# COLUMNS* defines the number of columns available on the printer. Its value may range from 0 to 255. If 0 is specified, no checking is performed.

Fold Long Lines

The printer driver option *FOLD LONG LINES* indicates whether print lines longer than the number of columns defined should be *truncated* or *folded*. Folding specifies that the long print line be printed first on one line up to the number of columns available, and then the remainder be printed on the next line. Truncation specifies that the remainder not be printed. Enter **Y** for this option if folding is desired or **N** if long print lines are to be truncated.

Init String

The printer driver option *INIT STRING* allows the user to define a *string* of ASCII character codes which can be used to *initialize* the printer. This string may contain up to 40 characters including control codes. The *INIT STRING* is transmitted to the printer any time a print function is performed in Softerm. Thus this function may be used to set form length, line spacing, tab stops, character font, or any feature available on the printer.

Dialer and Clock Driver Parameters

When editing of the printer driver parameters is completed, the **S1 RE-TURN** key may be entered and the following screen will be displayed:

```
============ DIALER DRIVER ============
TOUCH TONE DIALING                    Y
============ CLOCK DRIVER ============
SLOT #        4
CURRENT TIME  06/15/83 10:25:42
```

This is the fourth and final in a series of the 4 standard data entry screens which allow options associated with the current configuration to be edited. If any special options are available for the current terminal emulation, such as the terminal function definitions for the *SOFTERM.TERMINAL* emulation, a data entry screen for those options is displayed next. Refer to Chapter 5 on specific terminal emulations for information on terminal emulation options.

After completion of the last screen, pressing the **S1 RETURN** key or **S1 X** will return control to the main terminal setup menu. The configuration should now be ready to execute, but before exiting to online terminal operation, the user should first save the new configuration as a precaution.

If the configuration is saved using filename *SOFTERM.INIT*, this configuration becomes the *default* configuration and the next time Softerm is booted will be automatically loaded. The *5—SAVE CONFIGURATION* option of the main setup menu is described in detail later in this chapter.

Dialer Driver

The dialer driver allows remote phone connections to be established and dialed automatically with the appropriate hardware. Softerm includes a built-in phone directory which may be accessed when it is desired to establish a remote connection. The following option is available in Softerm dialer drivers.

Touch Tone Dialing?

The dialer driver option *TOUCH TONE DIALING?* allows either *touch tone* or *pulse* dialing to be utilized as the default selection for phone numbers in the *SOFTERM PHONE BOOK*. Phone numbers can explicitly specify the type of dialing regardless of the setting of this option. Some phone exchanges support only one of the two types and the user should check with the local phone company to determine how this option should be set.

Clock Driver

The clock driver provides an interface to time and calendar date clock boards for use with the file transfer capabilities provided by Softerm. Using the clock, file transfers can be scheduled to execute at a specific date and time. The file transfer logging capability is extended so that each entry in the log contains a date and time stamp. Using Softerm terminal setup, the date and time may be verified and set if necessary. Initially the date and time are displayed as **00/00/00 00:00:00** or the value last saved in the current configuration until the *SLOT #* parameter has been specified. The following options are available in Softerm clock drivers.

Slot

The clock driver option *SLOT #* indicates which Apple slot number in which the *physical* clock interface card is installed. The legal values for this option are 1−7 and attempting to enter any other value will result in a range error. When the slot number is entered, the *CURRENT TIME* field which contains both date and time will be displayed according to the current setting of the clock.

Warning: If the slot number is incorrectly specified, unpredictable results may occur including failure of the program.

Current Time

The clock driver option *CURRENT TIME* displays the current date and time in month/day/year and hours/minutes/seconds format whenever the *SLOT #* is entered and allows the current setting to be modified. The date and time are divided into individual fields corresponding to the month, day, and year for the date and the hours, minutes, and seconds for the time. The cursor positioning keys **S1** → and **S1** ← or the **RETURN** key may be used to position to the individual field requiring modification. The date and time are set each time one of these fields is modified so that it is not necessary to enter the complete date and time.

Setting of the time may not be available in the Softerm clock driver for some clock boards. Refer to Appendix A for information concerning limitations of clock drivers for specific clock boards.

5—Save Configuration

If the *SAVE CONFIGURATION* option is selected, the cursor is positioned to a string data entry field in the ***** *CURRENT CONFIGURATION* ***** area in the lower portion of the display just to the right of the label *CONFIGURATION NAME:*. The current configuration may be saved by entering a legal DOS filename and pressing the **RETURN** key. Softerm configuration names have the identical requirements and restrictions of standard DOS filenames.

If the user configuration is saved on the Softerm System Diskette using the filename *SOFTERM.INIT*, it will be automatically loaded whenever the System Diskette is booted. The configuration may also be saved using any other filename of the user's choice and loaded as required after the System Diskette has been booted using the *LOAD CONFIGURATION* option.

If the configuration saved includes an extended terminal emulation or other feature which requires a language card (16K RAM), a second file is used to save the language card configuration area. The filename of this file will be the requested filename with a *-LC* appended to the end. If the original filename is longer than 26 characters, it will be truncated to 26 characters before the *-LC* extension is added. The language card extension file will be automatically loaded whenever the corresponding configuration file is loaded.

If this option is selected *before* all the configuration modules have been specified, the error message **CONFIGURATION IS INCOMPLETE** is displayed and the user must first complete the current configuration before it can be saved.

If this option has been chosen accidentally, **S1 X** may be pressed which will restore the previous contents of the field and return the cursor to the *OPTION:* selection in the menu without causing a *save* operation.

If the entered configuration filename already exists, the query **DELETE EXISTING FILE?** will appear at the bottom of the display. Entering an **N** or pressing **RETURN** indicates that you do *not* wish to delete the file. The cursor will return to the *OPTION:* selection for further action. If **Y** is entered for the delete existing file query, the old file with the same filename will be deleted and the current configuration will be written to disk.

If a I/O error occurs during the *saving* of a configuration file, the appropriate error message will be displayed. Pressing the **ESC** key will clear the error message and return the cursor to the *OPTION:* selection. The current configuration is not affected by the error, and the save function may be repeated after correcting the disk problem.

If a **DISK FULL** error occurs during the saving of a configuration, the resulting file on disk contains only a *partial* configuration which will not execute properly. This file should be deleted and either sufficient space should be created on the current disk to allow the configuration to be saved, or a new disk should be used.

Once the configuration is successfully saved, the cursor is repositioned to the *OPTION:* selection for further action. At this time, the user can select *6—EXIT SETUP* if it is desired to execute the current configuration and initiate online terminal operation.

6—Exit Setup

If the *EXIT SETUP* option is selected, the current configuration is initialized, the display screen is cleared, and Softerm initiates online terminal operation.

If all configuration definition modules have not been specified, the error message **CONFIGURATION IS INCOMPLETE** is displayed. After pressing the **ESC** key to clear the error message, the user must specify the missing configuration modules before attempting to exit the setup mode.

Refer to Chapter 3 for additional information on terminal operation.

Chapter 3
Terminal Operation

Introduction

The online mode of terminal operation is initiated from the main Softerm menu by selecting the exit option either by pressing **RETURN** or by entering a 6. Online terminal operation is then *initialized* by performing the following steps:

1. The display is initialized using the display driver for 40- or 80-column video in the current configuration and the display screen is cleared with the cursor initially positioned to Row 0 Column 0. If an 80-column board is being used which has software controlled switching to 80-column mode, Softerm automatically switches form 40-column to 80-column display. If a manual switch must be used to switch to 80-column mode, it should be toggled at this time.

2. The serial I/O interface is initialized and all *programmable* characteristics such as line speed, parity, stop bits are automatically set by Softerm. If the serial interface uses jumpers or switches to determine these settings, they should be set before the online mode of terminal operation is initiated.

3. If an auto-dial modem such as the Hayes Smartmodem is being used, Softerm will initialize it by sending a string of characters to it at this time. Be sure the modem is turned on and connected to the serial interface since Softerm will not be able to continue until the initialization string has been sent to the modem. If the cursor fails to appear on the screen, this may be an indication that Softerm is unable to initialize the modem for some reason.

4. Communications is enabled by asserting the *DTR* (data terminal ready) and *RTS* (request to send) RS-232 control signals if available and if *pacing* is controlled by the use of XON and XOFF (start/stop) characters according to the terminal emulation setup parameters, an XON character is transmitted.

The Softerm program is now in the online terminal operation mode and ready to begin terminal communications with another computer system. If Softerm is directly connected to a local computer system using a cable, terminal communications can proceed immediately assuming the local computer system is available and ready to process data from/to Softerm. If Softerm is being utilized with modems and a *leased* communications line, terminal communications can also proceed immediately. If Softerm is being utilized with a *dial-up* communications line, a *connection* must first be established. This may be accomplished through a manual dialing procedure using a telephone, or if the appropriate hardware is included on the system to support automatic dialing, the connection may be automatically established using the *Softerm Phone Book* and dialer driver. Once a connection has been established, terminal communications can proceed.

Users should refer to documentation on their individual modems for dialing procedures and instructions on establishing remote connections. Users with automatic dialers available which Softerm supports should refer to the section on the Softerm *dialer utilities*.

Once terminal communications has been established, Softerm may be operated and should function exactly as the CRT terminal being emulated. However many additional capabilities are available to the Softerm user which are not available to the CRT terminal user. These additional capabilities are accessed through Softerm *function keys* and in some cases *menus* and *data entry formats* associated with these function keys. These functions are consistent throughout the various emulations provided by Softerm so that the user does not have to remember different Softerm function keys for each emulation used.

Chapter 3 includes information and instructions on all Softerm internal functions and additional capabilities except for *File Transfer* which is covered in detail in Chapter 4.

Softerm Keyboard Functions

In the terminal operation mode, certain keyboard functions are utilized to perform standard functions associated with terminal emulation, and others are used to access Softerm additional capabilities. All Softerm special functions, terminal emulation functions, and entry of character codes which cannot be entered on the standard Apple keyboard are executed using the Softerm *keyboard expander*. The Softerm 1 keyboard expander consists of two keys labeled **S1** and **S2**. The Softerm 2 keyboard expander consists of three keys labeled **S1**, **S2**, and **S3**. These keys function in a similar fashion to the **SHIFT** key and are used in combination with other keys on the standard Apple keyboard to initiate Softerm extended capabilities.

Some Softerm keyboard functions have more than one use depending on whether the function is executed in online terminal communications or in a menu or special data entry format for a Softerm extended capability. Whenever a special Softerm extended capability is utilized such as the *disk utilities*, Softerm is placed in an *offline* mode.

Offline Keyboard Operation

Throughout this manual, references are made to the *offline* mode during which certain Softerm extended capabilities such as disk utilities may be performed. This is *not* the same as local mode. The offline mode implies the terminal is processing some other function rather than received data from the host computer or transmit (keyboard) data for the host computer. However the serial interface is disabled, and data may not be received from the host computer when offline functions are being performed.

When an offline function is executed, the serial interface transmits an XOFF character if pacing is controlled by XON/XOFF, drops the *RTS* (request to send) signal, and drops the *DTR* (data terminal ready) signal if pacing is controlled by *DTR*. Dial-up lines normally use XON/XOFF pacing control since dropping *DTR* would cause a disconnect to occur. When the offline function is complete, Softerm automatically enables the serial interface, asserts the *RTS* and *DTR* signals, and transmits an XON character to the host computer if required. Going offline when using a dial up connection does *not* break the connection.

Certain keyboard functions may be utilized during data entry and editing of parameters for Softerm extended functions in the offline mode. These functions are similar to operations performed by most text editor or word processing programs. Many of the functions require the use of the Softerm keypad and the **S1** and **S2** keys in combination with other keys on the Apple keyboard. The following table summarizes the keyboard functions which may be used while entering and editing data in the offline mode:

Keyboard Function	Description
RETURN	Accept Field
→	Cursor Right
←	Cursor Left
ESC	Clear Error Messages
	Lead-in for Special Character
	Entry in Strings
S1 RETURN	Accept Screen, Display Next
S1 →	Field Tab Forward
S1 ←	Field Tab Backward
S1 B	Cursor to Beginning of Field
S1 D	Delete Character
S1 E	Erase to End of Field
S1 I	Toggle Insert Mode
S1 L	Shift Toggle
S2 L	Shift Lock
S1 N	Cursor to End of Field
S1 O	Display Other Half (40-column)
S1 Q	Truncate Field
S1 R	Restore Field
	to Original Contents
S1 X	Cancel and Restore Field
S2 1	Print Screen with Form Feed
S2 2	Print Screen without Form Feed

The keyboard functions used in the offline mode are identical to the keyboard functions used in generating a configuration in terminal setup. Chapter 2 on terminal setup contains a complete description of these keyboard operations.

Online Keyboard Operation

The standard Apple keyboard functions in the online terminal mode exactly as the keyboard on a communications terminal. As keys and key combinations are pressed, the corresponding ASCII code for the character is transmitted to the host computer. The **SHIFT** and **CTRL** keys operate normally, and all character codes which can be generated by the standard Apple keyboard are transmitted transparently to the host computer.

Softerm 1 features a built-in TTY compatible terminal emulation *SOFTERM.TERMINAL* and Softerm 2 allows various specific terminal emulations including *SOFTERM.TERMINAL* to be specified in terminal setup. Softerm provides a standard set of terminal emulation keyboard functions which apply to most conversational CRT terminals and the *SOFTERM.TERMINAL* emulation if terminal function definitions are defined. Extended terminal emulation keyboard functions for specific block mode and editing terminal emulations provided with Softerm 2 are described in Chapter 5.

All terminal emulation keyboard functions are initiated using the Softerm *keyboard expander.* The standard terminal emulation keyboard functions are provided using keypad keys **S1** and **S2** in combination with other keys on the Apple keyboard. Extended terminal emulation keyboard functions provided with the specific emulations included with Softerm 2 use keypad keys **S1**, **S2**, and **S3** in combination with other keys on the Apple keyboard.

The following table summarizes terminal emulation functions initiated using the Softerm keyboard expander:

Key	Function
S1 →	Cursor Right
S1 ←	Cursor Left
S2 →	Cursor Down
S2 ←	Cursor Up
S1 ↑	Cursor Up (Apple IIe)
S1 ↓	Cursor Down (Apple IIe)
S1 CTRL B	Boot
S2 CTRL B n	Boot from Slot in
S1 CTRL R	Soft RESET
S1 ESC	Transmit DEL Character
S1 A	Send Answerback Message
S1 B	Erase to End of Screen
S1 C	Clear Screen
S1 E	Erase to End of Line
S1 H	Home Cursor
S1 K	BREAK
S1 L	Shift Toggle
S2 L	Shift Lock
S1 N	New Line
S1 O	Display Other Half (40-Column)
S1 Q	Resume Display
S1 S	Stop Display
S1 V	View Terminal Status
S1 W c	Wait for character c
S1 Z n	Delay n Seconds (0-9)
S1 S2 id	Execute Keyboard Macro
S1 S2 c	Transmit Control Character c ($00-$1F)

Online Keyboard Functions

The following keyboard functions are available while using Softerm in the online terminal operation mode.

RESET

The **RESET** key is used in the online terminal operation mode as a *re-initialize* or *restart* function. Terminal operation is re-started just as if the user had just exited from the setup mode to online terminal operation. Softerm is re-initialized as described in the introduction section of this chapter. Dialer drivers are not re-initialized by **RESET** processing. Users should note that when this function is performed, any dial-up connection will *not be broken* and the current connection remains established unless the hardware serial interface removes asserted modem signals on an Apple I/O RESET. Most serial interfaces will disconnect on an I/O RESET.

Soft RESET

The **S1 CTRL R** key is used in the online terminal operation mode as an alternative to the **RESET** key. It performs the identical function of the **RESET** except that an Apple I/O RESET signal is not generated. This key should be used instead of the **RESET** key whenever an Apple I/O RESET causes a disconnect or other undesirable effects.

Boot

The **S1 CTRL B** key is provided as an *exit* from the Softerm program. If this function is executed a coldstart is performed and the system is *booted* as if the Apple II computer had just been powered on. Thus the system will boot the disk in *Slot 6 Drive 1* if this is the first slot with a disk controller board.

Boot from Slot n

The **S2 CTRL B** key followed by a numeric character from **1–7** specifying the Apple II slot number will cause the system to boot the disk controller in the designated slot. The slot number is verified to have a disk controller following Apple signature conventions.

Carriage Return / New Line

The **RETURN** key is utilized in the online terminal communications mode to provide either a *carriage return* or *new line* function depending on how the terminal emulation option *RETURN CR(0), LF(1) OR CR/LF(2)* has been specified. If CR has been specified, a $0D character code is transmitted to the host computer and if LF has been specified, a $0A is transmitted. If CR/LF has been specified, a $0D followed by a $0A character code is transmitted to the host computer.

A carriage return or new line function normally will move the cursor to the first column position of the next row on the display. If the cursor is on the last row of the display, this function usually results in a scrolling operation which moves all data up one row on the screen leaving a blank row on the bottom of the screen. However, the result of this function will vary with each type of terminal emulation.

Cursor Right

The **S1** → key is used in the online terminal communications mode to provide the *cursor right* function. If the cursor right function is defined for the terminal emulation, the appropriate character code(s) corresponding to a cursor right operation will be transmitted.

A cursor right function normally will move the cursor in a *non-destructive* manner one position to the right of the current cursor position. When executed at the last column position of a row, or at the last column position on the screen, the result depends on the terminal emulation.

Cursor Left

The **S1** ← key is used in the online terminal communications mode to provide the *cursor left* function. If the cursor left function is defined for the terminal emulation, the appropriate character code(s) corresponding to a cursor left operation will be transmitted.

A cursor left function normally will move the cursor in a *non-destructive* manner one position to the left of the current cursor position. When executed at the first column position of a row, or at the first column position on the screen, the result depends on the terminal emulation.

Cursor Up

The **S2** ← key is used in the online terminal communications mode to provide the *cursor up* function. If the cursor up function is defined for the terminal emulation, the appropriate character code(s) corresponding to a cursor up operation will be transmitted. The **S1** ↑ may be used on an Apple IIe keyboard to provide the cursor up function.

A cursor up function normally will move the cursor one row position above the current row and column position without affecting the current column. When executed on the first row of the display, the result depends on the terminal emulation.

Cursor Down

The **S2** → key is utilized in the online terminal communications mode to provide the *cursor down* function. If the cursor down function is defined for the terminal emulation, the appropriate character code(s) corresponding to a cursor down operation will be transmitted. The **S1** ↓ may be used on an Apple IIe keyboard to provide the cursor down function.

A cursor down function normally will move the cursor one row position below the current row and column position without affecting the current column. When executed on the bottom row of the display, the result depends on the terminal emulation.

Transmit DEL Character

The **S1 ESC** key is used in the online terminal communications mode to provide the *delete* or *rubout* function. If the delete function is defined for the terminal emulation, the character transmitted will be a $7F.

The result of this function normally will be that the character position one column to the left of the current cursor position is erased and the cursor is moved to that position. However, this function depends on the terminal emulation being used and the host system.

Answerback

Entering a **S1 A** will cause the *answerback string* defined in the terminal setup system parameters to be transmitted to the host computer. This allows the answerback string to be transmitted manually as opposed to the *automatic answerback* triggered by a special function received from the host computer if defined for the current terminal emulation.

Erase to End of Screen

The **S1 B** key is used in the online terminal communications mode to provide the *erase to end of screen* function. If the erase to end of screen function is defined for the terminal emulation, the appropriate character code(s) corresponding to an erase to end of screen operation will be transmitted.

An erase to end of screen function will normally erase all character positions from and including the current cursor position through the *bottom* or last character position on the screen. The cursor remains at the initial row and column position at which this function was executed.

Clear Screen

The **S1 C** key is used in the online terminal communications mode to provide the *clear screen* function. If the clear screen function is defined for the terminal emulation, the appropriate character code(s) corresponding to a clear screen operation will be transmitted.

The clear screen function normally will erase all character positions on the screen and position the cursor to the home (row 0 column 0) position.

Erase to End of Line

The **S1 E** key is used in the online terminal communications mode to provide the *erase to end of line* function. If the erase to end of line function is defined for the terminal emulation, the appropriate character code(s) corresponding to an erase to end of line operation will be transmitted.

An erase to end of line function normally will erase all character positions on the current row beginning with the current column position. The cursor remains at the initial column position at which this function was executed.

Home Cursor

The **S1 H** key is used in the online terminal communications mode to provide the *home cursor* function. If the home cursor function is defined for the terminal emulation, the appropriate character code(s) corresponding to the home cursor operation will be transmitted.

A home cursor function normally will position the cursor to row 0 column 0 of the display screen.

Break

Entering a **S1 K** will cause a *BREAK* function to be performed. This will cause an approximately 250 millisecond space (0) signal to be transmitted over the communication line to the host computer. This signal is commonly used to *abort* output or *end* a session with a timesharing service.

Shift Toggle

The **S1 L** key is used in the online terminal communications mode to provide a *shift toggle* function which changes the current *case* from upper to lower or lower to upper for all subsequently keyed characters.

The **S1 L** key results in a Softerm internal function only and no character code(s) are transmitted to the host computer.

Shift Lock

The **S2 L** key is used in the online terminal communications mode to provide a *shift lock* function which sets the current *case* to upper for all subsequently keyed characters.

The **S2 L** key results in a Softerm internal function only and no character code(s) are transmitted to the host computer.

New Line

The **S1 N** key is used as a *new line* function in the online terminal communications mode. If the new line function is used during online terminal operation, a line feed character $0A will be transmitted.

A new line function normally will move the cursor to the first column position of the next row on the display. If the cursor is on the last row of the display, this function usually results in a scrolling operation which moves all data up one row on the screen leaving a blank row on the bottom of the screen.

Display Other Half (40-column)

The **S1 O** key is used in the online terminal communications mode to switch from columns 1-40 to columns 41-80 or vice-versa if standard Apple 40-column video is being utilized and the *APPLE40* display driver has been configured in terminal setup. This allows the user to manually select which half of the display he wishes to view by always switching to the *other* half. However, if the cursor position is in the half of the 80-columns not currently displayed, after no keyboard or line activity for 1 second Softerm automatically displays the half which contains the cursor.

The **S1 O** key results in a Softerm internal function only and no character code(s) are transmitted to the host computer.

Resume Display

The **S1 Q** key is used in the online terminal communications mode to provide the *start display* function. It is used in conjunction with the **S1 S** key to allow the terminal user to start and stop display output. Thus if display output has been *stopped* by the **S1 S** function, entering a **S1 Q** allows display output to resume.

Although the functions of **S1 Q** and **S1 S** are similar to the start/stop or XON/XOFF protocol used with the host computer, these keys provide a Softerm internal function only and do *not* transmit any character codes to the host computer. The sending of XON/XOFF characters is controlled by the serial input *ring buffer* which allows for 1200 to 2200 characters. If this buffer is filled with characters which have not been processed by Softerm, an XOFF character is sent to the host computer or *DTR* is dropped depending on the *pacing control* option of the terminal emulation parameters. When the ring buffer is able to again accept characters, an XON character is sent to the host computer or *DTR* is asserted.

Stop Display

The **S1 S** key is used in the online terminal communications mode to provide the *stop display* function. It is used in conjunction with the **S1 Q** key to allow the terminal user to start and stop display output. Entering a **S1 S** key will cause the display output to be halted after the next carriage return or cursor movement command is processed. **S1 Q** must then be entered to resume the display.

Although the function of **S1 S** and **S1 Q** are similar to the start/stop or XON/XOFF protocol used with the host computer, these keys provide a Softerm internal function only and do *not* transmit any character codes to the host computer. Refer to the **S1 Q** description for additional information.

View Terminal Status

Entering **S1 V** in the online terminal mode will cause the current terminal status to be displayed on the last row of the screen. Information previously displayed on this row is temporarily saved while the status is displayed and restored when the status is cleared. While the status is displayed, pressing specific keys allow various modes to be toggled. To return to the online terminal mode after displaying the status enter **S1 V** or **S1 X**. The following information may be displayed on the status line depending on the state of the terminal:

ONLINE Indicates Softerm is ready for terminal communications with a host computer. Entering **L** while this status is displayed will toggle Softerm to the **LOCAL** mode. Since the *DTR* signal is lowered when Softerm is switched to the local mode, toggling to local mode can be used to *hangup* or disconnect a dial-up modem.

LOCAL Indicates Softerm is not ready for terminal communications with a host computer but is in the local mode. Data may be entered and displayed on the screen in the local mode even though there is no connection to a remote computer. Entering **L** while this status is displayed will toggle Softerm to the **ONLINE** mode.

FULL DUPLEX Indicates Softerm is currently operating in the full duplex mode. Characters entered at the keyboard are transmitted to the remote system without being displayed or processed locally. Entering **D** while this status is displayed will toggle Softerm to the **HALF DUPLEX** mode.

HALF DUPLEX Indicates Softerm is currently operating in the half duplex mode. Characters entered at the keyboard are transmitted to the remote computer as well as being processed and displayed locally. Entering **D** while this status is displayed will toggle Softerm to the **FULL DUPLEX** mode.

CARRIER Indicates that Softerm currently has a *connection* and the *DCD* (data carrier detect) signal is being received from the modem.

CAPTURE OFF Indicates that none of the *capture* modes to print or disk are currently active.

CAPTURE PRINT Indicates that either a capture transparent to print has been initiated by the **S2 3** key or a capture line mode to print has been initiated by the **S2 4** key and is currently active. In this mode, data received and processed during online terminal operation is also concurrently printed. Several of the terminal emulations provided with Softerm 2 include a *printer pass through* feature which allows the host computer to activate the capture to print mode.

CAPTURE DISK Indicates that either a capture transparent to disk has been initiated by the **S2 7** key or a capture line mode to disk has been initiated by the **S2 8** key and is currently active. In this mode, data received and processed during online terminal operation is also concurrently captured in memory and subsequently written to disk.

TRANSLATE ON Indicates that the *keyboard translate* feature is currently enabled and character codes defined in the user keyboard translate table are being translated to the specified characters or keyboard function. This table is defined using the Softerm Program Utilities which are accessed by entering **S1 7** in the online terminal mode. A complete description of the user keyboard translate table may be found in this chapter in the section titled *Softerm Program Utilities*. Entering **T** while this status is displayed will toggle Softerm to the **TRANSLATE OFF** mode.

TRANSLATE OFF Indicates that the *keyboard translate* feature is currently not enabled. Character codes defined in the user keyboard translate table will *not* be translated to the specified characters or keyboard function and will be transmitted exactly as entered. Entering a **T** while this status is displayed will toggle Softerm to the **TRANSLATE ON** mode.

MM/DD/YY HH:MM:SS Indicates current date and time. **C** toggles to **CONNECT:** time.

CONNECT: HH:MM:SS Indicates elapsed time since connection was established. **C** toggles to current date and time.

Wait for Character

Entering a **S1 W** followed by a single ASCII character code will cause Softerm to wait until the specified character is received before processing additional keyboard input. This function is useful in keyboard macros for sequencing responses to the host computer and other communications sequences which require handshaking. The wait for character function can be aborted by pressing the **RESET** or **S1 CTRL R** keys.

Pause

Entering a **S1 Z** followed by a numeric character from **0—9** will cause a delay in processing equivalent to the number of seconds specified by the character following the function. Keyboard input processing is suspended until the delay has expired and then processed normally. This function is useful in keyboard macros where timing is required to properly sequence interaction with a remote computer.

Execute Keyboard Macro

The **S1 S2** keys in combination with a single character id are used in the online terminal communications mode to invoke a *keyboard macro*. A keyboard macro allows a predefined string of characters to be transmitted to the host computer or functions to be performed. Characters in a keyboard macro are interpreted as if they actually were entered from the keyboard so that even Softerm or terminal functions can be used in keyboard macros. For example, a **S1 1, 2** character sequence entered in a keyboard macro will cause the *Disk Utilities* menu to be displayed and a *CATALOG* function selected. A file transfer macro could be invoked through a keyboard macro to dial a host computer and automatically send *logon* sequences. A **S1 S2 id** sequence in a keyboard macro will cause the contents of the specified macro to be inserted in place of the **S1 S2 id** function. This technique is called *nesting*, and keyboard macros may be nested up to the limit of the size of the keyboard input ring buffer.

A keyboard macro is invoked by pressing the **S1** and **S2** keys in combination with a single character id to select the desired keyboard macro. The macro id can be any valid ASCII character code except a blank, ASCII control characters, or lowercase alpha characters (a-z). If the character code entered in combination with the **S1 S2** keys does not match a currently defined keyboard macro, the Apple will "beep" and the keyboard macro function is ignored.

A complete description of keyboard macros and how to define them may be found in this chapter in the section titled *Softerm Keyboard Macros*

Transmit Control Character ($00-$1F)

Softerm provides an alternate method of keying ASCII control characters which is available even though some of the control characters are translated to other sequences by the user keyboard translate table. Normally all ASCII control characters can be keyed directly using the **CTRL** key on the standard Apple keyboard except for **RETURN**. The **RETURN** key through an option in terminal setup can transmit either a carriage return ($0D), line feed ($0A), or both. The **S1 S2** keys when used in combination with a **CTRL** key or other key such as **RETURN** which transmit an ASCII control character, allow the control character to be transmitted regardless of other features in effect such as the user keyboard translate table. For example, if the **RETURN** key is set to transmit a line feed, **S1 S2 RETURN** can be used to transmit a carriage return.

Special Character Generation

Softerm allows all 128 ASCII character codes to be generated from the keyboard. Most codes can be generated with a single keystroke in combination with the **SHIFT** and **CTRL** keys. Appendix C contains a complete table listing all ASCII character codes and how they are generated from the keyboard. The following table summarizes how to generate special characters which cannot normally be entered directly on the Apple Keyboard:

Key	Character Transmitted
S1 ,	[
S1 .	]
S1 /	\
S1 ;	`
S1 :	|
S1 -	__
S1 <	{
S1 >	}
S1 *	@
S1 =	~
S1 ?	^
S1 +	FS ($1C)
S1 0	US ($1F)
S1 ESC	DEL ($7F)

3.14

Softerm Extended Functions and Capabilities

Softerm includes many extended features which enhance online termi-
nal operation and provide capabilities not available with conventional
terminals. These include disk utilities for convenient file maintenance,
dial utilities for maintaining a convenient built-in phone book for
dial-up connections, local file transfer for printing and copying local
files, line file transfer for uploading and downloading files with almost
any computer system, keyboard macros for defining often used user
keyboard functions to simplify terminal operation, access to terminal
setup to create or modify Softerm configurations, and program utilities
for patching the Softerm program, introducing special hardware options,
and defining special keyboard translation. In addition, terminal mode
functions for printing screens, capturing received data to print or disk,
copying screens to disk, and transmitting files from disk are provided.

The following table summarizes the Softerm extended capabilities
initiated using the Softerm keyboard expander:

Key	Function
S1 1	Disk Utilities
S1 2	Dial Utilities
S1 3	Local File Transfer
S1 4	Line File Transfer
S1 5	Define Keyboard Macros
S1 6	Terminal Setup
S1 7	Program Utilities
S2 1	Print Screen with Form Feed
S2 2	Print Screen without Form Feed
S2 3	Capture Transparent to Print
S2 4	Capture Line Mode to Print
S2 6	Copy Screen to Disk
S2 7	Capture Transparent to Disk
S2 8	Capture Line Mode to Disk
S2 9	Transmit File

Disk Utilities

The **S1 1** keyboard function is used to access the *Softerm Disk Utilities*
from the online terminal operation mode. When this function is executed,
a disk utilities menu is displayed along with data entry fields which
allow *volume, drive,* and *slot* to be specified. The disk utility functions
include *INIT DISKETTE, CATALOG, DELETE, RENAME, LOCK,* and
UNLOCK and may be used with DOS, CP/M, and Pascal disk formats.

A complete description of the disk utilities may be found in this chapter
in the section titled *Softerm Disk Utilities.*

Dial Utilities

The **S1 2** keyboard function is used to access the *Softerm Dial Utilities* from the online terminal operation mode. If Softerm is being utilized with a dial-up communications line, a connection must first be established. This can be accomplished through a manual dialing procedure, or if the appropriate hardware is included on the system to support automatic dialing, the connection may be established using the dialer driver, Softerm Phone Book, and dial utilities.

The various functions provided by the dial utilities include *add, delete, list,* and *print* entries in the Softerm Phone Book, and *dial* to establish connections. A complete description of the dial utilities may be found in this chapter in the section titled *Softerm Dial Utilities.*

Local File Transfer

The **S1 3** keyboard function is used to access Softerm local file transfer capabilities which allow local disk files to be printed, displayed, or copied. When this function is executed, the *Softerm Local File Transfer* menu is displayed which includes options for disk utilities, local, and line file transfers.

A complete description of file transfer capabilities and operation may be found in Chapter 4.

Line File Transfer

The **S1 4** keyboard function is used to setup and execute file transfers to and from remote computer systems and Softerm including *uploading* and *downloading* of files. When this function is executed, the *Softerm Line File Transfer* menu is displayed which includes options for interactive execution of file transfers, as well as creating and editing file transfer macro command files.

Keyboard Macro Setup

The **S1 5** keyboard function is utilized to access the *Keyboard Macro Setup* data entry screens. Keyboard macros are executed using the **S1 S2** keys in combination with a single character macro id in the online terminal communications mode.

A complete description of keyboard macro functions including loading, editing, and saving keyboard macro files may be found in this chapter in the section titled *Softerm Keyboard Macros.*

Terminal Setup

The **S1 6** keyboard function is used to return to the terminal setup mode. When this function is executed, the following screen is displayed:

```
            INSERT YOUR SYSTEM DISK
            PRESS RETURN WHEN READY
      VOLUME 0      DRIVE   1      SLOT 6
```

The user should insert the Softerm System Diskette or other user diskette which contains the file *SOFTERM SETUP*. The *VOLUME*, *DRIVE*, and *SLOT* parameters may be modified before pressing the **RETURN** key. To change the *VOLUME*, press the → or ← repeatedly until the volume number changes to the desired volume. A volume number of 0 indicates that any volume number is acceptable. To change the *DRIVE*, press the **D** key which will toggle the drive number between 1 and 2. To change the *SLOT*, press the **S** key which will toggle the slot number between 1 and 7.

Once the volume, drive, and slot parameters have been correctly specified, press the **RETURN** key and the *SOFTERM SETUP* file will be loaded and the *Softerm Setup Menu* will be displayed. Refer to Chapter 2 on terminal setup for additional information.

Program Utilities

The **S1 7** keyboard function is used to access the *Softerm Program Utilities*. Softerm program utilities allow patching of the Softerm program, specifying a user keyboard translate table, saving Softerm as a binary file, and introducing special hardware support.

A complete description of the program utilities may be found in this chapter in the section titled *Softerm Program Utilities*.

Print Screen

Softerm includes a built-in function which allows the contents of the current screen to be printed at any time during online or local terminal operation. The screen may be printed either with or without a *form feed* character appended to the end of printing.

To print the current screen with a form feed, enter **S2 1**. To print the current screen without a form feed, enter **S2 2**.

Softerm screen formats such as menus, configuration parameter displays, and data displays such as *CATALOG* output or local file transfer output may also be printed by entering **S2 1** or **S2 2**.

While printing in the online mode, characters entered at the keyboard are stored in the keyboard input buffer but are not processed until the print operation is complete. The serial interface is temporarily placed in the offline mode described previously until the print operation completes and no data can be received from the host computer.

If the current configuration has *NULL.PIO* specified as the printer driver indicating no printer is available, and a print screen function is attempted, the message **NO PRINTER** is displayed.

Capture to Print

Softerm includes the capability to simultaneously print received data as it is displayed in the online terminal mode. This feature is useful for logging all or parts of interactive terminal sessions with a host computer. When enabled, **CAPTURE PRINT** is indicated in the Softerm terminal status displayed using the **S1 V** keyboard function.

Softerm provides two modes for concurrent printing of displayed or received data. The first mode is called the *transparent* mode and is enabled by entering the **S2 3** keyboard function. In the transparent mode, all data received is simultaneously sent to both the display and printer. Using this mode allows even 132 column printing to be accomplished even though the screen display is 80 columns. If terminal emulation function sequences such as cursor positioning control codes are received, they are sent to the printer as well as the display. This may cause strange behavior by the printer even though these characters are properly interpreted by the terminal emulation before being displayed. This mode is terminated by entering **S2 3** to toggle the operation off, or by any function which causes Softerm to leave the online terminal mode such as accessing the disk utilities menu.

The second mode of concurrent printing is called *line* mode and is enabled by the **S2 4** keyboard function. In the line mode all data received is first processed by the terminal emulation and displayed. Whenever the cursor is moved from the current row being displayed, that row is sent to the printer with a carriage return and line feed character appended. This mode allows the terminal emulation to first interpret the characters received, and then print the line from the display. However, since lines are actually printed from the display, this mode is limited to 80 character print lines. This mode is terminated by entering **S2 4** to toggle the operation off, or by any function which causes Softerm to leave the online terminal operation mode.

If the *FIRMWARE.PIO* or *APPLE SERIAL.PIO* printer driver is specified in the configuration, printing does not occur simultaneously. Print data is buffered in memory until the memory is filled at which time the serial communications line is temporarily stopped and the data buffered in memory is printed. After the data is printed, receipt of data from the communications line is automatically resumed. Executing a **S2 3** or **S2 4** keyboard function to disable the printer will also cause the data buffered in memory to be printed.

If the current configuration has *NULL.PIO* specified as the printer driver indicating no printer is available, the capture print keyboard functions are ignored.

Copy Screen to Disk

Softerm includes a built-in function which allows the contents of the current screen to be printed into a disk file at any time during online or local terminal operation. To copy the current screen to disk, enter **S2 6**, and the last row of the screen will be *temporarily* replaced with the following screen format:

                    S6 D1 VO   FILE:

Enter the *filename* of the file into which the screen is to be copied. The *RETURN* key or **S1** ← and **S1** → positioning keys may be used to position the cursor to the *slot*, *drive*, or *volume* fields. The *volume* field specifies the disk format to be used with **0-254** indicating an Apple DOS volume number, **PAS** indicating Pascal format, and **CPM** indicating CP/M format.

Once the filename, slot, drive, and volume have been specified, enter **S1 RETURN** to copy the current screen to disk. Each row on the screen is written to the disk file with a carriage return and line feed appended just as if the screen were being printed.

Capture to Disk

Softerm includes the capability to simultaneously capture received data to disk as it is being displayed in the online terminal mode. This feature is useful for saving part or all of interactive terminal sessions with a host computer for later processing. When enabled, **CAPTURE DISK** is indicated in the Softerm terminal status displayed using the **S1 V** keyboard function.

Two types of capture modes are provided by Softerm which operate in a similar manner to the concurrent printing modes. The *transparent* capture mode is enabled by entering the **S2 7** keyboard function. In this mode, all data received is captured and subsequently written to a user specified disk file.

The *line* capture mode is enabled by entering the **S2 8** keyboard function. In this mode, all data received is first processed by the terminal emulation and displayed. Whenever the cursor is moved from the current row being displayed, that row is captured with a carriage return and line feed character appended, and subsequently written to a user specified disk file. Data is not written to the disk file until the capture mode is toggled off by entering **S2 7** or **S2 8**, the capture buffer is temporarily full, or by any function which causes Softerm to leave the online terminal operation mode. If the capture buffer becomes full during online terminal mode, communications with the host is temporarily suspended using the specified pacing method such as XON/XOFF, and the current contents of the capture buffer are written to disk. Communications is automatically resumed after the capture buffer has been saved.

When either a **S2 7** or **S2 8** keyboard function is entered, the last row of the screen is *temporarily* replaced with the following screen format:

S6 D1 V0   FILE:

Enter the *filename* of the file into which data received is to be captured. The **RETURN** key or **S1** ← and **S1** → positioning keys may be used to position the cursor to the *slot, drive,* or *volume* fields. The *volume* field specifies the disk format to be used with **0-254** indicating an Apple DOS volume number, **PAS** indicating Pascal format, and **CPM** indicating CP/M format.

Once the filename, slot, drive, and volume have been specified, enter **S1 RETURN** to initiate the disk capture mode. Entering **S1 V** to display the Softerm terminal status will now indicate that the capture mode is active by displaying **CAPTURE DISK** on the status line.

Transmit File

Softerm includes the capability to transmit data contained in a disk file in the online terminal mode. Data in the file is transmitted *exactly* with no additional interpretation, just as if it were entered from the keyboard. To initiate the transmitting of a disk file, enter the **S1 9** keyboard function. The last row of the screen is *temporarily* replaced by the following screen format:

EOB=$0D   EOB DELAY 0   CHAR DELAY 0

This screen contains 3 fields and allows an *end of block character, end of block delay*, and *character delay* to be specified. The end of block character can be specified as any ASCII character code in the range $00—$7F. The end of block delay is specified as a number from 0—99 to indicate the delay in one-tenth second increments. Thus a value of 10 would indicate a 1 second delay. The character delay is specified as a number from 0—255 to indicate the delay in increments of one character time at 19,200 bps or 520 microseconds. When editing of these fields is complete, entering **S1 RETURN** will cause the following screen format to be displayed on the last row:

S6 D1 VO   FILE:

Enter the *filename* of the file which is to be transmitted. The *RETURN* key or **S1** ← and **S1** → positioning keys may be used to position the cursor to the *slot, drive*, or *volume* fields. The *volume* field specifies the disk format to be used with **0-254** indicating an Apple DOS volume number, **PAS** indicating Pascal format, and **CPM** indicating CP/M format.

Once the filename, slot, drive, and volume have been specified, enter **S1 RETURN** to initiate the transmitting of the specified file. The file will begin transmitting immediately and after the last character of the file has been transmitted, the message **END OF TRANSMIT** is displayed. Pressing the **ESC** key will clear the message and resume normal online terminal operation.

Softerm Keyboard Macros

Introduction

Softerm includes a keyboard macro facility which allow a predefined string of characters to be *substituted* as keyboard input for a key. The primary use for keyboard macros is to allow often used keyboard sequences to be transmitted to the host computer using minimal effort.

The **S1 S2** keys are utilized in the online terminal communications mode to invoke a keyboard macro. The **S1 S2** keys are pressed in combination with a *single character id* to select the desired keyboard macro. The keyboard macro id character can be any valid ASCII character code except for control characters or a space. Alpha characters A−Z are restricted to uppercase only since Softerm will automatically convert lower case alpha keyboard macro ids to upper case. The **S1 S2** keys in combination with a control character code less than $20 allow that character to be transmitted directly, even if the keyboard translate option is active for that character. If the character code entered in combination with the **S1 S2** keys does not match a currently defined keyboard macro, the Apple will "beep" and the keyboard macro sequence is ignored.

If the character code entered in combination with the **S1 S2** keys matches a currently defined keyboard macro id, the characters contained in the keyboard macro string are *substituted* in the keyboard input stream as if they were actually entered from the keyboard. The characters are processed as normal keyboard input according to the current mode of Softerm, online full or half duplex communications, or local operation.

A special capability of Softerm keyboard macros allows a **S1 S2 id** sequence contained in one keyboard macro definition to reference another. The contents of the new keyboard macro will be *inserted* in place of the **S1 S2** keys and macro id character. This technique is called *nesting*, and keyboard macros may be nested up to the limit of the keyboard input ring buffer.

Softerm reserves an area of main memory to contain keyboard macro definitions. This area may contain up to 18 individual keyboard macros of a maximum 26 characters each. This area may be saved as a *keyboard macro file* and these files may be loaded and used as required during the operation of Softerm. If a complete configuration is saved using the *SAVE CONFIGURATION* option in terminal setup after keyboard macros have been loaded from a file or entered from the keyboard, the keyboard macros become a part of the saved configuration and are immediately available whenever the configuration is loaded.

Keyboard Macro Setup

The **S1 5** keyboard function in the online terminal operation mode is used to access the keyboard macro setup data entry screens. If a **S1 5** keyboard function is executed, the following screen is displayed:

```
          INSERT YOUR SYSTEM DISK
          PRESS RETURN WHEN READY

     VOLUME 0      DRIVE   1        SLOT 6
```

The user should insert the Softerm System Diskette or other user diskette which contains the file *SOFTERM KEYBOARD MACROS*. The *VOLUME, DRIVE,* and *SLOT* parameters may be modified before pressing the **RETURN** key. To change the *VOLUME*, press the → or ← repeatedly until the volume number changes to the desired volume. A volume number of 0 indicates that any volume number is acceptable. To change the *DRIVE*, press the **D** key which will toggle the drive number between 1 and 2. To change the *SLOT*, press the **S** key which will toggle the slot number between 1 and 7.

Once the volume, drive, and slot parameters have been correctly specified, press the **RETURN** key and the *SOFTERM KEYBOARD MACROS* file will be loaded and the following menu will be displayed:

```
          SOFTERM KEYBOARD MACROS
     VOLUME 0      DRIVE   1        SLOT 6
FILENAME:
OPTION:   5
          1 — DISK UTILITIES
          2 — LOAD MACRO FILE
          3 — EDIT MACROS
          4 — SAVE MACRO FILE
          5 — EXIT
```

The default selection for this menu is *5—EXIT* which returns Softerm to online or local terminal operation. This option may be selected by simply pressing the **RETURN** key. Each option in the *Softerm Keyboard Macros* menu is explained in the following paragraphs.

1—Disk Utilities

The disk utilities option allows a selection of DOS, CP/M, and Pascal disk commands to be executed without exiting the Softerm program. These include *INIT, CATALOG, DELETE, RENAME, LOCK*, and *UNLOCK*. The utilization of this option is covered in detail later in Chapter 3.

2—Load Macro File

If the option *2—LOAD MACRO FILE* is selected, the cursor is positioned to the string entry field just to the right of the label *FILE:* near the top of the display just before the option selection. The filename of a *previously saved* keyboard macro file may be entered.

If the current *VOLUME, DRIVE*, and *SLOT* displayed are not the desired values, the **RETURN** or **S1** → and **S1** ← may be used to position the cursor to the desired parameter entry field. If a disk format other than DOS is specified for the *VOLUME* parameter, the message **DISK TYPE MUST BE DOS** is displayed. Once the *VOLUME, DRIVE, SLOT,* and *FILENAME* fields have been correctly specified, pressing the **S1 RE-TURN** key will cause the desired keyboard macro file to be read into memory.

If this option has been chosen accidentally, **S1 X** may be pressed which will return the cursor to the *OPTION:* selection in the menu without affecting the current keyboard macro file in memory.

If the requested keyboard macro file does not exist, the error message **FILE NOT FOUND** is displayed. This is a standard DOS-type error message and the user should refer to *The DOS Manual* for a complete description of this and other errors which may occur. Appendix D which covers error messages also contains a brief description of disk error messages.

Another type of error can occur when the filename entered is a valid DOS filename on disk, but is not actually a Softerm keyboard macro file. In this case the error message **FILE TYPE MISMATCH** is displayed. Pressing the **ESC** key will clear this message and return the cursor to the *OPTION:* selection.

If an **I/O ERROR** occurs during the loading of a keyboard macro file, the *FILE:* entry field will be cleared. The current contents of the keyboard macro area in memory will be undefined and the previous contents are lost.

Once the requested keyboard macro file is successfully loaded, the cursor is repositioned to the *OPTION:* selection for further action. At this time, if any editing is required before the loaded keyboard macros can be used, the appropriate selection can be made. Otherwise, pressing the **RETURN** key will return to online operation.

3—Edit Macros

If the option *3—EDIT MACROS* is selected, and *no* keyboard macro file has been loaded, the following data entry screen is displayed:

```
                SOFTERM KEYBOARD MACROS
        VOLUME 0       DRIVE 1        SLOT 6
      FILENAME:
      ID   TEXT
      c    tttttttttttttttttttttttttt
```

If a keyboard macro file has been previously loaded, its filename and contents will be displayed and its contents may be edited. Refer to the section *Keyboard Macro Example* for an example of editing a previously defined keyboard macro file.

Entering a new Keyboard Macro

Once the keyboard macro edit screen is displayed, the cursor is positioned to the first *keyboard macro entry*. Each keyboard macro definition may consist of up to 18 keyboard macro entries and each keyboard macro entry consists of two data entry fields.

The process of entering and editing data in keyboard macros is similar to the data entry functions used in terminal setup. For example, the **RETURN** key may be used as a field accept to terminate an entry field, the → and ← keys are used as a non-destructive space and backspace when entering or editing data within a field, the **S1 D** key may be used to delete characters, and the **S1 I** key may be used to initiate insert mode so that characters can be inserted. The user should refer to the description of *Setup Keyboard Functions* in Chapter 2 for a complete description of keyboard functions available.

The first data entry field which must be defined for each keyboard macro entry is the single character *keyboard macro id* labeled as *ID* by which the keyboard macro will be referenced during online terminal operation. This is the *identification* character code which is entered in combination with the **S1 S2** keys when a keyboard macro is invoked. The keyboard macro id can be any ASCII character code which is not a control character or a space. Alpha characters A—Z are restricted to upper case since Softerm will automatically translate lower case Alpha keyboard macro ids to upper case when entered.

Once the keyboard macro id character has been specified for the keyboard macro entry, the cursor is automatically positioned to the *TEXT* field for entry of the associated character string to be referenced by the macro id. The text data entry field may also consist of any of the 128 available ASCII character codes which may be entered from the keyboard as well as Softerm keyboard functions which use the **S1**, **S2**, and **S3** keys.

Certain character codes used as functions during data entry cannot be entered directly into keyboard macro strings. The **ESC** key is provided so that these character codes can be inserted as data in string entry fields. For example, to enter a *carriage return* in a keyboard macro, you must enter an **ESC** followed by a **RETURN**. This code will be displayed in the keyboard macro text as a ↑**M**. **ESC** may be used with RETURN, →, ←, **S1** function keys, and even **ESC** to allow these character codes to be entered into keyboard macros.

Since characters in a keyboard macro are interpreted as if they were actually entered from the keyboard, Softerm local functions can be used in keyboard macros. For example, the character sequence **%132LISTING%1↑M3%1↑M** invokes a local file transfer to video and displays the text file *LISTING*.

Once the desired character codes have been entered in the text field of a keyboard macro entry, the entry is terminated by pressing the **RETURN** or other field accept key. The cursor is then positioned to the next *ID* field in the keyboard macro definition. If entering of the keyboard macro definition is complete, pressing **S1 RETURN** or **S1 X** will return to the Softerm Keyboard macros menu.

Before returning to the keyboard macro option menu, if a printer is included in the configuration, the keyboard macro edit screen may be printed with the **S2 1** or **S2 2** keyboard functions allowing the user to keep a hard-copy record of the keyboard macro definition. After returning to the option menu, the user may wish to save the keyboard macro definition using the *4—SAVE MACRO FILE* option before exiting to online terminal operation.

Editing Existing Keyboard Macros

The *EDIT MACROS* option may also be selected after loading a previously defined keyboard macro file, or if it is necessary to edit a previously entered keyboard macro entry. If this option is selected, the keyboard macro edit screen is displayed including the current keyboard macro entry *ID* and *TEXT* fields and the cursor is positioned to the first keyboard macro entry.

The **RETURN** and **S1** → or **S1** ← keys may be used to position the cursor to the macro id of the keyboard macro entries which require editing. Once the cursor is positioned to the correct keyboard macro id, entering a **RETURN** or an id character will position the cursor to the beginning of the corresponding text entry field. The field may then be edited using the cursor positioning and editing functions such as insert and delete character.

When editing of the text is complete, pressing the **RETURN** key will accept the current text in the keyboard macro entry and the cursor is positioned to the next keyboard macro id. The **S1 Q** function may be used to truncate the remainder of the text field from the cursor position forward and accept the remaining data.

To *delete* an existing keyboard macro entry, the cursor should be positioned to the *ID* of the keyboard macro entry to be deleted. Entering a *space* will cause the *ID* and *TEXT* fields of the keyboard macro entry to be cleared deleting the entry.

If editing of the keyboard macros is complete, pressing the **S1 RETURN** or **S1 X** keys will return to the Softerm keyboard macros menu.

4—Save Macro File

If the option *4—SAVE MACRO FILE* is selected, the cursor is positioned to the string entry field just to the right of the label *FILE:* near the top of the display just before the option selection. The current keyboard macro definition may be saved by entering a filename and pressing the **RETURN** key. If the *VOLUME, DRIVE,* and *SLOT* parameters displayed are not the desired values, the **RETURN** or **S1** → and **S1** ← keys may be used to position the cursor to the desired parameter entry field. Once the *VOLUME, DRIVE, SLOT,* and *FILENAME* fields have been correctly specified, entering **S1 RETURN** will cause the current keyboard macro definition to be saved.

If this option has been chosen accidentally, **S1 X** may be pressed which will return the cursor to the *OPTION:* selection in the menu without causing a *save* operation.

If the entered keyboard macro filename already exists, the query **DELETE EXISTING FILE?** will appear on row 22 at the bottom of the display. Entering an **N** or pressing **RETURN** indicates that you do *not* wish to delete the file. The cursor will return to the *OPTION:* selection for further action. If **Y** is entered for the **DELETE EXISTING FILE** query, the old file with the same filename will be deleted and the current keyboard macro definition will be written to disk.

If an **I/O ERROR** occurs during the *saving* of a keyboard macro file, the appropriate error message will be displayed. Pressing the **ESC** key will clear the error message and return the cursor to the *OPTION:* selection. The current keyboard macro definition is not affected by the error, and the save function may be repeated after correcting the disk problem.

Once the keyboard macro file is successfully saved, the cursor is repositioned to the *OPTION:* selection for further action. At this time, the user can select *5- EXIT* if it is desired to return to online terminal operation.

5—Exit

If the *5—EXIT* option is selected, Softerm returns to the online or local terminal operation from which the **S1 5** keyboard function was executed to initiate the keyboard macro setup mode.

Keyboard Macro Example

Included on the Softerm System Diskette is a sample keyboard macro file named *KEYBOARD MACRO.EXAMPLE*. This example file demonstrates a few of the possibilities where keyboard macros can be used to reduce the amount of keyboard input. In order to examine this keyboard macro file, the user should first insert the Softerm System Diskette in the disk drive and then enter **S1 V** to display the status, **L** to toggle to the **LOCAL** mode, and **S1 V** to return to the terminal mode. Then enter a **S1 5** to access the *Softerm Keyboard Macros* menu selection. The option *2—LOAD MACRO FILE* should be selected and *KEYBOARD MACRO.EXAMPLE* entered as the filename. Once the keyboard macro file is successfully loaded, the *3—EDIT MACROS* option should be selected and the following data entry screen will be displayed:

```
              SOFTERM KEYBOARD MACROS
          VOLUME 0      DRIVE 1      SLOT 6
      FILENAME: KEYBOARD MACRO.EXAMPLE
      ID   TEXT
      1    SIMPLE TEXT STRING
      2    STRING WITH TERMINATOR↑M↑J
      3    CATALOG %112↑M
      4    DIAL  ATTD4521710↑M
      5    LOGON NAME↑M
      6    LOGON PASSWORD↑M
      7    %35%1W:%36
      8    ABCDEFGHIJKLMNOPQRSTUVWXYZ
      9    %38%38%38%38%38%38%38%38%38%38%38%38
      N    %39%39%39%39%39%39%39%39%39%39%39%39
      F    FILESTATUS/AS/S +.SR↑J
      L    LOOP %3L
      P    PAUSE %1Z5 PAUSE %1Z5 ↑M↑J
      X    %146HOST CONNECT%1↑M
      C    %27CAPTURE%1↑M
```

The keyboard macro example file contains 15 keyboard macros which are representative of the many uses of keyboard macros. Each macro will be explained in detail in the following paragraphs.

Keyboard Macro Id 1 contains a simple text string with no terminating or other control characters. A macro of this type is used to insert characters into a line of text being entered on the terminal. This keyboard macro is invoked in the online terminal mode using a **S1 S2 1** keyboard function.

Keyboard Macro Id 2 contains a simple text string with terminating control characters. In this example the last two characters of the macro are a carriage return (↑M) and a line feed (↑J). In the online terminal mode these functions would cause a $0D and $0A character to be transmitted to the host computer. The carriage return is entered into the macro using an **ESC**, **RETURN** keyboard sequence and the line feed is entered using a **CTRL J**. This keyboard macro is invoked in the online terminal mode using a **S1 S2 2** keyboard function.

Keyboard Macro Id 3 contains a local CATALOG function executed using the *Softerm Disk Utilities*. A **S1 1** keyboard function was entered and is represented in the keyboard macro as *%11*. An explanation of the representation of keypad functions in data entry strings may be found in Chapter 2 on terminal setup. The **S1 1** function will cause the disk utilities menu to be displayed and the *2* selects the CATALOG function. The *↑M* provides a **RETURN** for the *FILENAME* template field. This keyboard macro is invoked using a **S1 S2 3** keyboard function.

Keyboard Macro Id 4 demonstrates how a phone number can be dialed from a Softerm keyboard macro using an auto-dial modem such as the Hayes Smartmodem. The string of characters *ATTD4521710* terminated with a carriage return *↑M* is transmitted to the modem which will dial the number specified when this keyboard macro is executed. This keyboard macro is invoked using a **S1 S2 4** keyboard function.

Keyboard Macro Id 5 is an example of how a logon username can be transmitted through a simple keyboard sequence. This keyboard macro is invoked using a **S1 S2 5** keyboard function.

Keyboard Macro Id 6 is an example of how a logon password can be transmitted through a simple keyboard sequence. This keyboard macro is invoked using a **S1 S2 6** keyboard function.

Keyboard Macro Id 7 is an example of how one macro can reference another. This macro is used to transmit both a logon name and password in a single keyboard sequence. The *%35* in this macro which represents a **S1 S2 5** keyboard function is replaced with the contents of Keyboard Macro Id 5 and the *%36* which represents a **S1 S2 6** keyboard function is replaced with the contents of Keyboard Macro Id 6. This macro also contains an example of a *wait for character* function. The *%1W:* which represents a **S1 W** keyboard function followed by a : character will cause keyboard input processing to be suspended until a : character is received from the host computer after the logon name is transmitted in the example. This keyboard macro is invoked using a **S1 S2 7** keyboard function.

Keyboard Macro Ids 8, 9, and N are examples of keyboard macro *nesting*. Keyboard Macro Id 8 contains a simple text string. Keyboard Macro Id 9 contains 12 references to Keyboard Macro Id 8. Keyboard Macro Id N contains 12 references to Keyboard Macro Id 9. If Keyboard Macro Id N is invoked using a **S1 S2 N** keyboard function, the text in Keyboard Macro Id 8 will be transmitted 12 X 12 times.

Keyboard Macro Id F is an example of how commonly used commands transmitted to a host computer can be accomplished with a single keystroke. Keyboard Macro Id F contains a *FILESTATUS* command used on Data General computer systems to obtain the equivalent of a *CATALOG* on the Apple computer. It may be invoked using a **S1 S2 F** keyboard function.

Keyboard Macro Id L is an example of how *looping* keyboard macros can be created. The text string *LOOP* is continually transmitted until the **RESET** or **S1 CTRL R** key is pressed since the *%3L* representing a **S1 S2 L** keyboard function in the macro will cause this macro to repeat indefinitely. This macro is invoked using a **S1 S2 L** keyboard function.

Keyboard Macro Id P demonstrates how the **S1 Z** pause keyboard function can be used in a keyboard macro. The *%1Z* represents the **S1 Z** keyboard function and the *5* indicates a delay of 5 seconds. The macro contains 2 pauses, and is terminated with a carriage return, line feed represented by ↑*M*↑*J*. This macro is invoked using a **S1 S1 P** keyboard function.

Keyboard Macro Id X is an example of how Softerm file transfer macros can be executed using keyboard macros. The *%14* sequence representing a **S1 4** keyboard function will display the *Softerm Line File Transfer* menu. The *6* selects *EXECUTE* for a file transfer macro whose filename is *HOST CONNECT*. The file transfer macro could establish a connection to the host computer, logon the user, and return to the online mode using the *CONVERSE* command. This keyboard macro is executed using a **S1 S1 X** keyboard function.

Keyboard Macro Id C demonstrates how a general-purpose capture to disk function can be implemented using a keyboard macro. The *%27* representing the **S2 7** keyboard function initiates transparent capture to disk. The *FILE:* is specified as *CAPTURE* and the *%1↑M* representing a **S1 RETURN** keyboard function is used to accept the filename and initiate the capture operation. This keyboard macro can be invoked using a **S1 S2 C** keyboard function.

Automatic Softerm Startup

Softerm includes a capability which allows Softerm to *automatically* initialize, enter the online terminal mode, and invoke a keyboard macro when Softerm is executed without any operator intervention. Whenever Softerm is executed, either by booting the Softerm System Diskette or through a DOS *BRUN SOFTERM BOOT* command, Softerm checks the disk for the file *SOFTERM.AUTO*. The file *SOFTERM.AUTO* is a standard keyboard macro file which may be created using the keyboard macro setup utilities. If the *SOFTERM.AUTO* keyboard macro file exists on the disk when Softerm is executed, the program will automatically initialize as if the user had entered **RETURN** to *EXIT SETUP* from the main Softerm menu, and execute the *first* keyboard macro entry defined in the *SOFTERM.AUTO* keyboard macro file.

Since Softerm keyboard macros allow the simulation of any type of operator input, almost any type of automatic interaction with a host computer can be accomplished using this capability. For example, the use of Softerm to upload and download data from a host computer could be incorporated into an application written in BASIC. A menu option in a user BASIC program could BRUN the Softerm program in conjunction with a *SOFTERM.AUTO* keyboard macro file. The automatically exe-cuted keyboard macro could then execute a Softerm file transfer macro which could *DIAL* a host computer, *RECEIVE* data for processing by the BASIC program, *HANGUP*, use the *CONVERSE* command to execute another keyboard macro or boot the disk using the **S1 CTRL B** command. The *HELLO* program on the disk could then process the data which was downloaded and resume the BASIC program which initiated the operation. In this manner, entirely automatic communications with other systems can be accomplished easily using disks which perform a function automatically when booted, or by incorporating the use of Softerm in an automatic mode with other applications.

Softerm Disk Utilities

Introduction

Softerm includes a *Disk Utilities* option which allows a selection of DOS, CP/M, or Pascal disk commands to be executed without exiting the Softerm program. The Softerm disk utilities may be accessed from the online terminal operation mode using the **S1 1** keyboard function and is included in the menus for other Softerm options including *Terminal Setup, Keyboard Macros, Program Utilities,* and *File Transfer.* Exiting from the Softerm disk utilities will always return to the mode or menu from which the disk utilities were accessed.

If the Softerm disk utilities are accessed either from a menu or using the **S1 1** keyboard function, the following menu is displayed:

```
              SOFTERM DISK UTILITIES

   VOLUME     DRIVE     SLOT      SPACE
     0          1         6       ?????
   OPTION:     7
              1—INIT DISKETTE
              2—CATALOG
              3—DELETE
              4—RENAME
              5—LOCK
              6—UNLOCK
              7—QUIT
```

The Softerm disk utilities menu includes a display of the current *VOLUME, DRIVE,* and *SLOT* selected as well as the *SPACE* available on the diskette. A selection of DOS, CP/M, and Pascal *housekeeping* commands is provided including *INIT DISKETTE, CATALOG, DELETE, RENAME, LOCK, and UNLOCK.*

When the disk utilities menu is displayed, the cursor is positioned to the *OPTION:* selection. The default option is *7–EXIT* so that pressing the **RETURN** key is identical to selecting the exit option. If the Volume, Slot, or Drive currently selected are not the desired values, they must be changed *before* selecting a housekeeping command to be executed. The **S1** → and **S1** ← keys may be used to position the cursor backward or forward to the desired parameter entry field.

The default values for the Volume, Drive, and Slot parameters when Softerm is initialized will be the Slot and Drive number from which Softerm is executed, and Volume 0. Once the appropriate values are entered for Volume, Drive, and Slot, the cursor should be repositioned to the *OPTION:* selection.

The **ESC** key is used to clear any error message which may occur during the execution of Softerm Disk Utilities.

Volume, Drive, Slot, and Space

The *VOLUME* number takes on a special meaning within Softerm and is used to identify the type of disk format being used. The following table defines how the *VOLUME* number is used:

VOLUME	Disk Format
0–254	Apple DOS 3.3 Volume Number
CPM	CP/M-80 Version 2.2
PAS	Apple Pascal 1.1, UCSD 4.1

Whenever disk operations are performed, Softerm checks to determine if the disk format specified matches the diskette being accessed. If the disk type specified is incorrect, the message **DISK TYPE MISMATCH** is displayed. The Softerm System and Configuration Diskettes are in Apple DOS format, and all files relating to Softerm configurations use Apple DOS format only. If a CP/M or Pascal format disk is specified for file operations relating to Softerm configurations, the message **DISK TYPE MUST BE DOS** is displayed.

The volume number of DOS format disks is assigned to a disk when it is *initialized*. All DOS commands can specify the volume number, if you wish DOS to check that the volume number on the diskette agrees with the *VOLUME* parameter. The volume number of a diskette must be in the range 1 to 254. If the incorrect volume number is specified, the error message **VOLUME MISMATCH** is displayed, and the DOS command is ignored. If a volume number of 0 is specified, no check will be made to verify that the diskette has the correct volume number. If a volume number of 0 is specified with the *INIT DISKETTE* option, a default volume number of 254 is assigned to the diskette. The *SLOT* parameter in Softerm disk utilities corresponds to the physical slot number of the disk controller to be used with disk commands. The default slot number is the one used when booting Softerm. If more than two drives are in use, then additional controllers are required. They are placed in different slots than the first controller which is usually in Slot 6. Slot numbers may be specified in the range 1–7. Using a slot number which does not contain a disk controller with a Softerm disk utility option will cause unpredictable results including failure of the program.

The *DRIVE* parameter in Softerm disk utilities corresponds to the physical drive number of the drive to be used with disk commands. The default drive number used by Softerm at initialization is Drive 1. The drive number may be specified as a 1 or a 2. Using a drive number of a non-existent diskette drive will cause the error message **I/O ERROR** to be displayed.

The *SPACE* parameter in Softerm disk utilities displays the *remaining* or number of *unused* disk sectors or blocks on the current diskette. For DOS format diskettes, this value is the number of unused 256 byte sectors. For CP/M format diskettes, this value is the number of unused 1024 byte blocks. For Pascal format diskettes, this value is the number of unused 512 byte blocks. Initially, this field will display as ????. However, once a Softerm disk utilities option is executed, the number of available disk sectors or blocks is displayed. If an error occurs during the execution of a Softerm disk utilities option, this field will be reset to question marks.

Filename Wildcard Characters

Softerm allows wildcard characters to be used in filenames specified for most disk operations performed in Softerm. The wildcard characters, equals sign (=) and question mark (?), are used to specify a subset of the filenames on a diskette, by indicating the portion of a filename which may be ignored or which may match any series of characters. The = is used whenever no confirmation of the selected filenames is required, and the ? is used when the disk operation must be confirmed for each file selected. The disk operation requested will be performed on all files whose filenames meet the subset specification.

For example, if the user wished to delete all the files on a diskette which contained the characters *TEMP*, a wildcard filename specification of =**TEMP**= could be entered for the *DELETE* filename. If the user wished to confirm each file to be deleted, the wildcard filename specification **?TEMP?** could be entered. Multiple wildcard characters may be used in a filename specification, but if a ? is used anywhere in the filename, all filenames selected by the disk operation will require confirmation.

Another example of using wildcard characters is with the *CATALOG* command. Entering a filename specification of =**.TEXT** for a Catalog operation on a Pascal format disk, would cause only text files to be displayed in the resulting Catalog list.

If a ? wildcard character is used in a filename specification, each time a filename matches the specification for the requested disk operation, the query **CONFIRM? N** will be displayed. Entering a **Y** indicates the requested disk operation is to be performed, while entering **N** or **RETURN** indicates the operation should not be performed on the current filename.

Wildcard characters may be used in filenames for Softerm disk utility functions and source file specifications for file transfers.

Disk Utilities Options

The following paragraphs will cover each option of the Softerm Disk Utilities menu in detail:

1—Init Diskette

The *1—INIT DISKETTE* option is used to *format* and *initialize* a 16-sector 35-track diskette. The diskette is initialized as a *data* diskette and if DOS format is indicated, does not include a copy of *DOS* or a *HELLO* program. The Volume, Slot, and Drive parameters should be specified before executing this option. If Volume is specified as **0**, the diskette will be initialized in DOS format with Volume number 254.

If Volume is specified as **PAS** indicating Pascal format, when the *INIT DISKETTE* option is selected, Softerm will request that a **VOLUME:** name be entered. A diskette's volume name must be 7 or fewer characters long and may not contain an equals sign (=), dollar sign ($), question mark (?), or comma (,). After the volume name has been entered, pressing the **RETURN** key will allow the initialize operation to continue.

Once the *INIT DISKETTE* option is selected for DOS or CP/M disk formats and after the volume name has been entered for a Pascal format disk, the message **INSERT YOUR DISKETTE** is displayed. The diskette to be initialized should be inserted in the designated disk drive. Pressing any key other than **S1 X** will initiate the *INIT* operation. If **S1 X** is entered, the initialize operation will be *aborted* and the cursor is returned to the option selection. Initializing the diskette will take approximately 30 seconds. After the initialize operation is complete, the cursor is returned to the option selection for further action. The *SPACE* parameter at the top of the display should indicate that 528 sectors are available for a DOS format disk, 126 blocks are available for a CP/M format disk, and 274 blocks are available for a Pascal format disk.

2—Catalog

The *2—CATALOG* option is used to display a list of all the files on the diskette selected by the current Volume, Drive, and Slot parameters. The entire catalog is read into memory so that even if multiple pages are required to display the catalog, no additional disk accessing is required during the display.

Several Softerm keyboard functions are available during the display of a Disk Catalog. **S1 X** may be used to *abort* the display of the catalog and return the cursor to the disk utilities menu. **S1 R** may be used to *restart* the display from the beginning of the catalog when the catalog consists of multiple pages. **S2 1** and **S2 2** may be used to *print* any of the screen pages displayed, with or without a form feed.

Note: The CP/M catalog displays file size as a number of 128 byte records. The *SPACE* value reflects the number of available 1K blocks (8 records = 1 block).

If filenames within the catalog contain *control characters* such as filenames entered with *inverse* or *flashing* characters, these characters are displayed in the Softerm standard control character format using the "↑" character followed by a normal displayable character. This also allows the catalog information to be printed without the control characters causing special functions to occur on many printers resulting in an unreadable or unusable printout.

If the *CATALOG* option is selected, Softerm will display a **FILENAME** request. Pressing the **RETURN** key will allow all files to be displayed from the disk directory selected by the Volume, Drive, and Slot parameters. Otherwise, a *filename specification* or template using the wildcard characters = and ? may be entered to select a subset of filenames in the directory to be displayed. The ? wildcard character functions in an identical manner to the = character and no confirmation message is displayed. When the filename specification has been entered, pressing the **RETURN** key will cause the catalog to read into memory and then displayed.

The first page of the catalog is displayed and at the bottom of the screen the message **MORE.....** or **NO MORE...** is displayed indicating whether or not additional pages of catalog information follow. If more is indicated pressing *any* non-function key will cause the next page to be displayed. **S1 X** *aborts* the display and returns to the disk utilities menu, **S2 1** or **S2 2** allow the current screen to be *printed*, and **S1 R** *restarts* the display from the beginning. If the message **NO MORE..** is displayed indicating that this is the *last* page of the catalog display, pressing any non-function key will return to the disk utilities menu.

3—Delete

The *3—DELETE* option is used to eliminate unwanted files from the currently selected diskette. The Volume, Drive, and Slot parameters should be specified before executing this option.

Once the *DELETE* option is selected, the query **FILENAME** is displayed near the bottom of the screen. Enter the filename or filename specification including wildcard characters of the file or files which are to be deleted and press the **RETURN** key. If a single filename is entered, the designated file will be deleted and the cursor is returned to the *OPTION:* selection for further action. If the filename specification contains an = wildcard character, all filenames which match the filename specification will be deleted. Extreme caution should be used since entering a single = for the filename specification will cause all files on the disk to be deleted. If the filename specification contains a ? wildcard character, Softerm will display a **CONFIRM? N** message for each file which matches the filename specification. Entering a **Y** will cause the current filename to be deleted. Entering a **N** or pressing the **RETURN** key will cause the next matching filename to be displayed without deleting the current file.

The *DELETE* option may be aborted at any time keyboard input is enabled by entering the **S1 X** keyboard function. Once the delete is in progress, a **RESET** or **S1 CTRL R** is required to abort the operation.

4—Rename

The *4—RENAME* option is used to change the name of a file on the currently selected diskette. The Volume, Slot, and Drive parameters should be specified before executing this option.

Once the *RENAME* option is selected, the query **FILENAME** is displayed near the bottom of the screen. Enter the *old filename* of the file which is to be renamed and press the **RETURN** key. All Softerm editing function keys may be used in the entry of the filename. If the filename specified includes a wildcard character, only the first file which matches the filename specification can be renamed. If the filename contains the ? wildcard character, the first file which matches must be confirmed before it is renamed.

Next the query **NEW NAME** will be displayed immediately below the **FILENAME** query. Enter the *new filename* of the file to be renamed and press the **RETURN** key. The designated file will be renamed and the cursor is returned to the *OPTION:* selection for further action.

The *RENAME* option may be aborted at any time keyboard input is enabled by pressing the **S1 X** keyboard function. Once the rename is in progress, **RESET** or **S1 CTRL R** is required to abort the operation.

5—Lock

The *5—LOCK* option is used with DOS format disks only to set the DOS *lock* attribute on a file or files on the currently selected diskette to prevent its accidental deletion. A file which has been locked cannot be renamed, deleted, or replaced in a *save* operation. The Volume, Slot, and Drive parameters should be specified before executing this option. If CP/M or Pascal disk format is specified when this command is executed, the message **INVALID COMMAND** is displayed.

Once the *LOCK* option is selected, the query **FILENAME** is displayed near the bottom of the screen. Enter the filename or filename specification including wildcard characters of the file or files which are to be locked and press the **RETURN** key. If a single filename is entered, the designated file will be locked and the cursor is returned to the *OPTION:* selection for further action. If the filename specification contains an = wildcard character, all filenames which match the filename specification will be locked. If the filename specification contains a ? wildcard character, Softerm will display a **CONFIRM? N** message for each file which matches the filename specification. Entering a **Y** will cause the current filename to be locked. Entering a **N** or pressing the **RETURN** key will cause the next matching filename to be displayed without locking the current file.

The *LOCK* option may be aborted at any time keyboard input is enabled by entering the **S1 X** keyboard function. Once the lock is in progress, **RESET** or **S1 CTRL R** is required to abort the operation.

6—Unlock

The *6—UNLOCK* option is used with DOS format disks only to remove the DOS *lock* attribute on a file on the currently selected diskette. The Volume, Slot, and Drive parameters should be specified before executing this option. If CP/M or Pascal disk format is specified when this option is executed, the message **INVALID COMMAND** is displayed.

Once the *UNLOCK* option is selected, the query **FILENAME** is displayed near the bottom of the screen. Enter the filename or filename specification including wildcard characters of the file or files which are to be unlocked and press the **RETURN** key. If a single filename is entered, the designated file will be unlocked and the cursor is returned to the *OPTION:* selection for further action. If the filename specification contains an = wildcard character, all filenames which match the filename specification will be unlocked. If the filename specification contains a ? wildcard character, Softerm will display a **CONFIRM? N** message for each file which matches the filename specification. Entering a **Y** will cause the current filename to be unlocked. Entering a **N** or pressing the **RETURN** key will cause the next matching filename to be displayed without unlocking the current file.

The *UNLOCK* option may be aborted at any time keyboard input is enabled by entering the **S1 X** keyboard function. Once the unlock is in progress, **RESET** or **S1 CTRL R** is required to abort the operation.

7—Exit

The *7—EXIT* option is used to *exit* the Softerm Disk Utilities mode and return to the previous menu or mode of Softerm from which the disk utilities were invoked.

Softerm Dial Utilities

Introduction

Softerm includes a *Dial Utilities* option which allows the maintenance of a *user phone directory* and includes the ability to *automatically dial* phone numbers from the directory if the current configuration contains automatic dialing capability. The Softerm dial utilities may be accessed from the online terminal operation mode using the **S1 2** keyboard function Automatic dialing capability is also provided in Softerm line mode file transfer through the use of the *DIAL* command.

If the Softerm dial utilities are accessed using the **S1 2** keyboard function, the following screen is displayed:

The user should insert the Softerm System Diskette or other user disk which contains the files *SOFTERM PHONE BOOK* and *EDIT:SOFTERM PHONE BOOK*. The file *SOFTERM PHONE BOOK* contains the user phone directory while the file *EDIT:SOFTERM PHONE BOOK* contains editing format definitions and routines for the maintenance of the user phone directory. The *VOLUME, DRIVE,* and *SLOT* parameters may be modified before pressing the **RETURN** key. To change the *VOLUME,* press the → or ← repeatedly until the volume number changes to the desired volume. A volume number of 0 indicates that any volume number is acceptable. To change the *DRIVE,* press the **D** key which will toggle the drive number between 1 and 2. To change the *SLOT,* press the **S** key which will toggle the slot number between 1 and 7.

Once the volume, drive, and slot parameters have been correctly specified, press the **RETURN** key and the *SOFTERM PHONE BOOK* and *EDIT:SOFTERM PHONE BOOK* files will be loaded. If either of these files do not exist on the diskette, the DOS error message **FILE NOT FOUND** will be displayed. Pressing the **ESC** key will clear the error message and cause the insert message to be displayed. Insert the correct disk and press the **RETURN** key to continue. Entering a **S1 X** will return to the online terminal operation mode.

Once the Softerm Phone Book and editing routines have been loaded into memory, the following menu will be displayed:

```
                    SOFTERM DIAL UTILITIES
        OPTION:     7
                    1 — DISK UTILITIES
                    2 — ADD PHONE BOOK ENTRY
                    3 — DELETE PHONE BOOK ENTRY
                    4 — LIST PHONE BOOK
                    5 — PRINT PHONE BOOK
                    6 — DIAL NUMBER
                    7 — QUIT
```

The default option for this menu is *7—QUIT* which returns Softerm to online or local terminal operation. This option may be selected simply by pressing the **RETURN** key. Each option in the Softerm Dial Utilities menu is explained in the following paragraphs.

1—Disk Utilities

The disk utilities option allows a selection of DOS, CP/M, and Pascal disk commands to be executed without exiting the Softerm program. These include *INIT, CATALOG, DELETE, RENAME, LOCK*, and *UNLOCK*. The utilization of this option is explained in the section titled *Softerm Disk Utilities* in Chapter 3.

2—Add Phone Book Entry

If the option *2—ADD PHONE BOOK ENTRY* is selected, the following data entry format is displayed:

```
        NAME:
        NUMBER:
        BITS/CHARACTER   8    # OF STOP BITS   1
        PARITY           O    SPEED            7
```

The Softerm Phone Book allows up to 50 entries consisting of an identifying *name*, the actual *phone number* to be dialed, and the *serial parameters* to be used after the connection is established. The Softerm Phone Book is maintained in *alphabetical* order according to the *NAME:* field. The cursor is initially positioned to the *NAME:* string entry field. The **RETURN** key or **S1** → and **S1** ← keys may be used to position the cursor forward or backward to the desired entry field. Following is a description of the individual fields contained in a Softerm Phone Book entry.

Name

The *NAME:* field allows a 15 character *identifier* to be assigned to each entry in the Softerm Phone Book. The name identifier must be *unique*. Once specified, the *NAME* is used in dial operations to identify the associated entry. The entries in the phone book are maintained in alphabetical order using this field. The *NAME:* entry field cannot be blank and a blank in the first character position will cancel the add mode.

Number

The *NUMBER:* field specifies the actual *phone number* to be dialed when establishing a connection. This field may contain up to 45 characters to specify the phone number, the use of pulse or touchtone dialing, wait for dial tone, and pauses. The number field can be specified in *free format* and all characters except for the characters significant to the dial operation are considered to be formatting characters and ignored. The following table lists significant characters used in the number field:

Character	Function
0-9	Numeric digits valid for pulse and touchtone dialing
*,#	Valid touchtone special characters
@	Wait for dial tone, maximum 3-second delay
+	1-second pause
P	Select Pulse dialing
T	Select Touchtone dialing

The characters *P* and *T* may be specified anywhere in the number field. If neither a *P* nor *T* is specified, dialing will default to either pulse or touchtone depending on how the dialer driver option *TOUCH TONE DIALING?* is specified. Once a *P* or *T* is used in dialing a phone number, it becomes the new default for subsequent numbers dialed.

The order of all other characters specified in the number field is significant and significant characters will be processed in the *order* that they are defined in the number field during a dial operation. The following are examples of valid number field entries:

T19017610441
@1-901-761-0441P
@ 8 + 0160 + T (901) 761-0441

Serial Parameters

The remaining fields allow the serial communications interface parameters used for establishing a connection in a dial operation to be specified. If the values displayed require modification before the entry is added to the phone book, the **RETURN** key or **S1** → or **S1** ← keys may be used to position forward or backward to the desired parameter entry field. Refer to the section titled *Serial I/O Driver* in Chapter 2 on Terminal Setup for a description of these parameters.

Once editing of the name, number, and serial parameters is complete, pressing the **S1 RETURN** key will cause the new entry to be added to the current Softerm Phone Book contained in memory. If the name entered already exists in the phone book the error message **NAME ALREADY IN PHONE BOOK** is displayed. Pressing the **ESC** key will return to the *NAME:* field. Entries added to the phone book are not updated to disk until the *7—QUIT* option is selected or a number is dialed. If adding the new entry exceeds the maximum of 50 entries allowed in a Softerm Phone Book, the message **PHONE BOOK IS FULL** is displayed and the entry is not added. If the new entry is successfully added, the cursor returns to the *NAME:* field so that another entry can be added. Press **S1 X** to return to the dial utilities menu.

3—Delete Phone Book Entry

If the option *3—DELETE PHONE BOOK ENTRY* is selected, the following data entry format is displayed:

NAME:

The cursor is positioned to the string entry field just to the right of the label *NAME:*. Enter the name identifier of the phone book entry to be deleted and press the **RETURN** key. If the entry exists in the current Softerm Phone Book contained in memory, the complete entry will be displayed and the query **CONFIRM DELETION OF ENTRY** is displayed. The default for this question is *N* so that pressing the **RETURN** key will not delete the entry. To delete the entry, enter a **Y**. After the entry is deleted, the cursor will return to the *NAME:* field so that another entry can be deleted. If no more entries are to be deleted, press the **RETURN** key or **S1 X** to return to the *OPTION:* selection of the dial utilities menu.

If the specified entry to be deleted does not exist in the current Softerm Phone Book contained in memory, the message **NAME NOT FOUND** is displayed. Pressing the **ESC** key will return to the *NAME:* field so that the operation can be retried if an error was made in specifying the name identifier.

4—List Phone Book

The option *4—LIST PHONE BOOK* allows the current contents of the Softerm Phone Book contained in memory to be viewed one entry at a time. If this option is selected, entries are displayed in alphabetical order beginning with the first entry. Pressing any non-function key will cause the next entry to be displayed. **S1 X** may be entered to return to the *OPTION:* selection of the dial utilities menu. After all phone book entries have been displayed, the cursor is automatically returned to the *OPTION:* selection of the dial utilities menu.

Entering a **S1 D** while a Softerm Phone Book entry is displayed by the *LIST PHONE BOOK* option, will cause Softerm to *dial* the number currently displayed. Refer to the *6—DIAL NUMBER* option for a description of the dialing operation.

5—Print Phone Book

If the option *5—PRINT PHONE BOOK* is selected, the contents of the current Softerm Phone Book contained in memory are printed if the current configuration includes a printer. The cursor will return to the *OPTION:* selection in the dial utilities menu automatically after the complete phone book has been printed.

If the printer driver has been specified as *NULL.PIO* the message **NO PRINTER** is displayed. Pressing the **ESC** key after this error will return to the *OPTION:* selection in the dial utilities menu.

6—Dial Number

If the *6—DIAL NUMBER* option is selected, the following data entry format is displayed:

```
     NAME:
     NUMBER:
```

The cursor is positioned to the string entry field just to the right of the label *NAME:*. If the user desires to use a number from the Softerm Phone Book, the appropriate name identifier should be entered in the *NAME:* field. Pressing the **RETURN** key will retrieve the corresponding entry from the phone book and initiate the dial operation. If no entry in the phone book is found which matches the name identifier entered, the message **NAME NOT FOUND** is displayed. Pressing an **ESC** will allow the *NAME:* field to be re-entered.

If the user does not wish to use the Softerm Phone Book, but instead enter a number directly, the **S1** → key should be used to position the cursor to the *NUMBER:* string entry field. The desired phone number should be entered and the **RETURN** key pressed. Once the number has been entered into the *NUMBER:* field, the following data entry format is displayed:

```
BITS/CHARACTER   8    # OF STOP BITS   1
PARITY           O    SPEED            7
```

This format allows the serial communications interface parameters to be adjusted if required for the dial-up connection being established. The values displayed correspond to the current serial interface parameters in use. If changes are required to any of the displayed parameters, the **RETURN** or **S1** → and **S1** ← keys may be used to position the cursor forward or backward to the desired parameter entry field. A description of these parameters can be found in Chapter 2 on Terminal Setup. Once editing of the serial parameters is complete, pressing the **S1 RETURN** key will initiate the dial operation.

If additions or deletions have been made to the current Softerm Phone Book in memory when the dial operation is initiated, the message **SAVING:SOFTERM PHONE BOOK** is displayed, the new Softerm Phone Book is written to disk, and the dial operation will continue.

Once the dial operation is initiated, Softerm checks for the presence of a dialer driver other than *NULL.DIAL* in the current configuration. If automatic dialing capability is available, Softerm will dial the requested number and when a connection has been established, return to the online terminal mode. Softerm will wait for the connection to be established as indicated by the presence of the *data carrier detect* RS232-C control signal for approximately 45 seconds. If no connection can be made within this time interval, the message **TIMEOUT, PRESS R TO REDIAL** is displayed. Pressing **R** will cause Softerm to *hangup* and *retry* the dial operation. Entering an **ESC** will return to the dial utilities menu.

Entering a **S1 X** during a dial operation will abort the dial operation and return to the dial utilities menu.

If automatic dialing capability is *not* available, the message **DIAL: NUMBER** is displayed and Softerm will wait for the connection to be manually established. Pressing the **ESC** key will initiate a search for carrier and once a connection has been made, Softerm return to the online terminal mode.

If touchtone dialing is not available, a special feature has been included in the dialer drivers to allow the use of manually generated touchtone within a phone number. For example, when using a phone system which requires a touchtone *9* to get an outside line but then allows pulse dialing, a number could be defined as *T9P5551212*. The *T* is used to indicate a series of touchtone digits and a *P* indicates pulse digits. Strings of touch tone and pulse digits may be intermixed freely. When touchtone digits are encountered when dialing, the message **TOUCH DIAL:** is displayed followed by the touchtone digits required to prompt the operator to manually dial the digits indicated. After the digits have been dialed, pressing the **ESC** key allows the remainder of the phone number to be processed.

An alternative to dialing using the *6–DIAL NUMBER* option, is the *4–LIST PHONE BOOK* option. Whenever a phone book entry is displayed using this option, dialing can be initiated by pressing the **S1 D** keyboard function. Dialing will proceed just as if the entry had been selected using the *DIAL NUMBER* option.

7–QUIT

If the option *7–QUIT* is selected, and no entries have been either added to or deleted from the current Softerm Phone Book in memory, the terminal returns to the online or local terminal operation from which the **S1 2** keyboard function was executed to access the dial utilities. If the current Softerm Phone Book contained in memory has been modified through additions or deletions, the message **SAVING: SOFTERM PHONE BOOK** is displayed, the new Softerm Phone Book is written to disk, and the terminal returns to online or local terminal operation.

Softerm Program Utilities

Introduction

Softerm includes a *Program Utilities* option which allows patching of the Softerm program, execution of utility routines, saving a new copy of the Softerm program, and saving a new configuration modified by the utility routines. The utility routines allow specification of a user keyboard translate table, and future incorporation of extended hardware features.

If the Softerm Program Utilities are accessed from the online terminal operation mode using the **S1 7** keyboard function, the following screen is displayed:

```
              INSERT YOUR SYSTEM DISK
              PRESS RETURN WHEN READY

        VOLUME 0       DRIVE  1       SLOT 6
```

The user should insert the Softerm System Diskette or other user disk which contains the file *SOFTERM PROGRAM UTILITIES*. The *VOLUME*, *DRIVE*, and *SLOT* parameters may be modified before pressing the **RETURN** key. To change the *VOLUME*, press the → or ← repeatedly until the volume number changes to the desired volume. A volume number of 0 indicates that any volume number is acceptable. To change the *DRIVE*, press the **D** key which will toggle the drive number between 1 and 2. To change the *SLOT*, press the **S** key which will toggle the slot number between 1 and 7.

Once the volume, drive, and slot parameters have been correctly specified, press the **RETURN** key and the *SOFTERM PROGRAM UTILITIES* file will be loaded. If this file does not exist on the diskette the error message **FILE NOT FOUND** will be displayed. Pressing the **ESC** key will clear the error message and cause the insert message to be displayed. Insert the correct disk and press the **RETURN** key to continue. Entering a **S1 X** will return to the online terminal operation mode.

Program Utilities Menu Options

Once the Softerm Program Utilities have been loaded into memory, the following menu will be displayed:

```
            SOFTERM PROGRAM UTILITIES
                  REVISION 1.00
     CONFIGURATION NAME: SOFTERM.INIT

     OPTION:   6    VOLUME 0    DRIVE 1 SLOT 6
               1 — DISK UTILITIES
               2 — APPLY PATCH FILE
               3 — EXECUTE UTILITY ROUTINE
               4 — SAVE SOFTERM
               5 — SAVE CONFIGURATION
               6 — QUIT
```

The revision number of the Softerm program is displayed under the Softerm Program Utilities title line. This revision number is identical to the revision number indicated on the main Softerm Setup menu displayed when Softerm is executed. The current configuration name is also displayed near the top of the screen. Between the *CONFIGURATION NAME:* field and the *OPTION:* selection, an area is reserved for the display of special messages. The messages **SOFTERM PROGRAM CHANGED** or **CONFIGURATION CHANGED** may be displayed indicating a utility routine has modified the Softerm program or configuration and a new copy should be saved.

The default *VOLUME*, *DRIVE*, and *SLOT* parameters used for program utility functions are displayed on the Softerm Program Utilities menu and may be changed by using the **S1** → and **S1** ← keys to position the cursor to the appropriate field before and option is selected. All files used by the Program Utilities are DOS format. If the *VOLUME* parameter is specified as *CPM* or *PAS*, the message **DISK TYPE MUST BE DOS** will be displayed.

The default option for this menu is *6—QUIT* which returns Softerm to online or local terminal operation. This option may be selected simply by pressing the **RETURN** key. Each option in the Softerm Program Utilities menu is explained in the following paragraphs.

1—Disk Utilities

The disk utilities option allows a selection of DOS, CP/M, and Pascal disk commands to be executed without exiting the Softerm program. These include *INIT, CATALOG, DELETE, RENAME, LOCK*, and *UNLOCK*. The utilization of this option is explained in the section titled *Softerm Disk Utilities* in Chapter 3.

2—Apply Patch File

The *2—APPLY PATCH FILE* option allows a Softronics supplied patch
file to be applied to the Softerm program. Periodically, patch files which
correct problems or provide enhancements are released by Softronics
through the Online Update Service. The patch file provided for Softerm
main program revisions is *SOFTERM.PATCH-X.YY*. The *X.YY* portion of
the filename will indicate the major and minor revision level of the
patch file and will become the new revision number displayed on the
Softerm setup menu. Occasionally other patch files will be made availa-
ble which provide optional features and enhancements. If a patch file is
in the incorrect format or specifies a different major revision level than
the Softerm program contained in memory, the message **INCOMPATIBLE
PATCH FILE** is displayed.

If the *2—APPLY PATCH FILE* option is selected, the following data entry
format is displayed:

FILENAME:

Enter the filename of the patch file to be applied and press the
RETURN key. Any changes to the *VOLUME, DRIVE*, and *SLOT* currently
displayed should be made before this option is selected. The designated
patch file is read by the program utilities and the patches are applied to
the version of Softerm currently in memory. The message **SOFTERM
PROGRAM CHANGED** will be displayed in the special message area to
indicate that the program has been modified. If no additional modifica-
tions to the Softerm program are required, the option *4—SAVE SOFTERM*
should be selected and a copy of the modified Softerm program should
be saved to disk.

3—Execute Utility Routine

The *3—EXECUTE UTILITY ROUTINE* option allows a Softronics sup-
plied utility routine which modifies the existing Softerm program or
configuration to be executed. Softerm includes a standard utility rou-
tine *UTIL:KEYBOARD TRANSLATE* which allows a keyboard translate
table to be defined by the user. Refer to the section titled *Keyboard
Translate Utility* for a complete description of this utility. Future utility
routines will allow additional disk formats including hard disk support
to be incorporated as well as special hardware devices such as
programmable keyboards and function keys.

If the *3—EXECUTE UTILITY ROUTINE* the following data entry format
is displayed:

FILENAME:

Enter the filename of the utility program to be executed and press the **RETURN** key. Any changes to the *VOLUME*, *DRIVE*, and *SLOT* currently displayed should be made before this option is selected. The designated utility program will be loaded and executed by the program utilities. All Softronics supplied utility programs will have filenames prefixed by *UTIL:*. Using the Softerm Disk Utilities selected by the *1—DISK UTILI-TIES* option, a catalog operation can be performed using the filename specification *UTIL:=* to determine what utility programs are available on the disk. Appendix F contains documentation on available program utilities except for the keyboard translate utility program which is included in this section.

4—Save Softerm

The *4—SAVE SOFTERM* option is used to save a new copy of the *SOFTERM* program file after modifications have been made using the program utilities. If a new copy of Softerm should be made due to application of a patch file or as a result of a utility routine, the message **SOFTERM PROGRAM CHANGED** will be displayed in the special message area of the program utilities menu.

If the *4—SAVE SOFTERM* option is selected, the current version of Softerm contained in memory will be written to disk using the filename *SOFTERM*. Any changes to the *VOLUME*, *DRIVE*, and *SLOT* currently displayed should be made before this option is selected.

If a new feature added to Softerm using a utility routine requires the use of a language card (16K RAM), the file *SOFTERM-LC* will also be saved which will contain the language card portion of the Softerm program. Both *SOFTERM* and *SOFTERM-LC* files must be present whenever a version of Softerm which requires the language card is executed by the *SOFTERM BOOT* program.

If the file *SOFTERM* already exists on the disk, the query **DELETE EXISTING FILE?** will appear at the bottom of the display. Entering an **N** or pressing **RETURN** indicates that you do *not* wish to delete the file. The cursor will return to the *OPTION:* selection for further action. If a **Y** is entered for the delete existing file query, the old *SOFTERM* will be deleted and a new Softerm will be written to disk.

If a I/O error occurs during the saving of the *SOFTERM* file, the appropriate error message will be displayed. Pressing the **ESC** key will clear the error message and return the cursor to the *OPTION:* selection. The current configuration is not affected by the error, and the save function may be repeated after correcting the disk problem.

If a **DISK FULL** error occurs during the saving of the *SOFTERM* file, the resulting file on disk contains only a *partial* system which will not execute properly. This file should be deleted and either sufficient space should be created on the current disk to allow Softerm to be saved, or a new disk should be used.

Once the Softerm program is successfully saved, the cursor is returned to the *OPTION:* selection for further action.

Caution: The *SOFTERM* file cannot be directly executed from disk using a BRUN command. The file *SOFTERM BOOT* must first be executed using the BRUN command which will in turn load and execute the *SOFTERM* program file. The *SOFTERM BOOT* program performs initialization functions including locating the slot which contains the Softerm keyboard expander circuit board.

5—Save Configuration

The *5—SAVE CONFIGURATION* is used to save a new copy of the current configuration after modifications have been made using the program utilities. If a new copy of the configuration should be made as a result of a utility routine, the message **CONFIGURATION CHANGED** will be displayed in the special message are of the program utilities menu. This option is equivalent to the terminal setup save configuration option described in Chapter 2.

If the *5—SAVE CONFIGURATION* option is selected, the following data entry format is displayed:

    FILENAME:

The filename of the current configuration is displayed. Press the **RETURN** key to use the configuration filename displayed or enter the filename of the new configuration and press the **RETURN** key. The modified configuration file will be written to disk. Any changes to the *VOLUME, DRIVE,* and *SLOT* currently displayed should be made before this option is selected.

If the configuration saved includes an extended terminal emulation or other feature which requires a language card (16K RAM), a second file is used to save the language card configuration area. The filename of this file will be the requested filename with a *-LC* appended to the end. If the original filename is longer than 26 characters, it will be truncated to 26 characters before the *-LC* extension is added. The language card extension file will be automatically loaded whenever the corresponding configuration file is loaded.

If the entered configuration filename already exists, the query **DELETE EXISTING FILE?** will appear on row 22 at the bottom of the display. Entering an **N** or pressing **RETURN** indicates that you do *not* wish to delete the file. The cursor will return to the *OPTION:* selection for further action. If **Y** is entered for the delete existing file query, the old file with the same filename will be deleted and the current configuration will be written to disk.

The side tab reads:

If a I/O error occurs during the *saving* of a configuration file, the appropriate error message will be displayed. Pressing the **ESC** key will clear the error message and return the cursor to the *OPTION:* selection. The current configuration is not affected by the error, and the save function may be repeated after correcting the disk problem.

If a **DISK FULL** error occurs during the saving of a configuration, the resulting file on disk contains only a *partial* configuration which will not execute properly. This file should be deleted and either sufficient space should be created on the current disk to allow the configuration to be saved, or a new disk should be used.

Once the configuration is successfully saved, the cursor is repositioned to the *OPTION:* selection for further action.

6—Quit

If the *6—QUIT* option is selected, the Softerm returns to the online or local terminal operation from which the **S1 7** keyboard function to initiate the program utilities was executed.

Keyboard Translate Utility

The Softerm keyboard translate utility routine allows the default mapping of keyboard input character processing during online terminal operation to be modified. For example, the **CTRL D** key normally transmits a $04 character when entered on the keyboard. Using the keyboard translate utility, the **CTRL D** key could be modified to access the Softerm Dial Utilities which normally requires a **S1 2** keyboard function. It could also be modified to transmit up to a 2-character sequence such as *ESC D*. Another example would be to remap the arrow keys on the Apple IIe keyboard to directly generate the character codes required for a terminal emulation instead of using **S1** key combinations.

The keyboard translate utility routine allows the function of the entire 128 character ASCII character set except for the carriage return $0D generated from the keyboard during online terminal operation to be changed. Offline operation is not affected by the keyboard translate table. Only characters entered directly from the keyboard or through simulated keyboard input such as keyboard macros are affected by the translate feature. Once the keyboard translate table has been modified using the keyboard translate utility routine, a new copy of the configuration must be saved with the modified translate table. The message **CONFIGURATION CHANGED** will be displayed in the special message area of the program utilities menu as a reminder.

The keyboard translate feature must be activated before it can be used in the online terminal operation mode. In order to view the current status of the keyboard translate feature, the **S1 V** key is used to display the current terminal status on the last row of the display. If the keyboard translate feature is off, **TRANSLATE OFF** is displayed on the status line. If the keyboard translate feature is on, **TRANSLATE ON** is displayed. Entering a **T** while the status is displayed allows the keyboard translate feature to be toggled on or off.

To use the keyboard translate utility routine, access the program utilities using the **S1 7** keyboard function. Select the *3—EXECUTE UTILITY ROUTINE* and enter *UTIL:KEYBOARD TRANSLATE* for the filename requested and press the **RETURN** key. The following data entry screen will be displayed:

```
             TRANSLATE TABLE, $00-$3F3
$00-↑@ 00 00   $15-↑U 15 00   $2B-  +  2B 00
$01-↑A 01 00   $16-↑V 16 00   $2C-  ,  2C 00
$02-↑B 02 00   $17-↑W 17 00   $2D-  —  2D 00
$03-↑C 03 00   $18-↑X 18 00   $2E-  .  2E 00
etc.
```

The first screen includes 3 columns representing the keyboard characters from $00-$3F and their respective translation. Each entry includes the keyboard character, its graphic representation, and the two character sequence to which it can be translated in the following format:

Key	Graphic	Translation
$2B	+	2B 00
$2C	,	2C 00

The first character of the translation can be in the range $00-$87. Characters in the range $00-$7F are ASCII character codes. Characters in the range $81-$87 represent combinations of the **S1, S2,** and **S3** keys used on the Softerm keyboard expander according to the following table:

Character	Key Combination
$81	S1
$82	S2
$83	S1 S2
$84	S3
$85	S1 S3
$86	S2 S3
$87	S1 S2 S3

For example to translate a **CTRL D** character to either a **S1 2** to access the dial utilities or an *ESC D* 2-character sequence, the following translation could be used:

Key	Graphic	Translation	Function
$04	↑D	81 32	S1 2—Dial Utilities
$04	↑D	1B 44	Transmit ESC D

If the second character of the 2-character translation is specified as a $00, only the first character will be transmitted. The **RETURN** key or the **S1** → and **S1** ← keys may be used to position the cursor in the keyboard translate table to an entry to be modified. Once editing of the keyboard characters in the range $00-$3F is complete, press the **S1 RETURN** key and the following data entry screen is displayed:

```
            TRANSLATE TABLE, $40-$7F
$40-  @  40  00    $55-  U  55  00    $6B-  k  6B  00
$41-  A  41  00    $56-  V  56  00    $6C-  l  6C  00
$42-  B  42  00    $57-  W  57  00    $6D-  m  6D  00
$43-  C  43  00    $58-  X  58  00    $6E-  n  6E  00
etc.
```

This screen includes 3 columns representing the keyboard characters from $40-$7F and their respective translation. This screen may be edited in the same manner as the previous screen and when editing is complete, press the **S1 RETURN** key to return to the previous screen or the **S1 X** key to return to the program utilities menu.

The current configuration contained in memory is modified by the keyboard translate utility routine and a new configuration should be saved using the *5—SAVE CONFIGURATION* option on the program utilities menu after using the keyboard translate utility. The specified keyboard translation can be used with the new configuration in the online terminal operation mode whenever it has been activated by using the **S1 V** terminal status command to turn the *TRANSLATE* feature on.

Chapter 4
File Transfer

Introduction

Softerm offers a variety of file transfer modes supporting DOS, CP/M, and Pascal disk formats flexible enough to match any host computer requirement. Softerm provides both *local* and *line* file transfer options. Local file transfers allow a disk file to be displayed, printed, or copied to another file. Line file transfers allow data to be transferred to and from the communications line. Local disk files may be transmitted to a remote computer system, and received data may be printed or written to a local disk file.

The local file transfer capabilities allow Softerm to function as a *file utility program* while maintaining communications with a host computer system. Text files can be displayed or printed, allowing the user to verify the contents of the file before it is transferred to the host computer or after it has been received. Local file transfer also allows copying of files on a disk in Drive 1 in one format such as CP/M to a disk in Drive 2 in the same or a different format such as Pascal providing a complete format conversion capability.

A selection of *edit options* available in both the local and line file transfer modes compensate for the variations in data formats used by host computers and allow files to be reformatted if required. These edit options include converting lowercase characters to upper case, adding or deleting line feeds after carriage returns, converting carriage returns to line feeds or line feeds to carriage returns, converting tabs to spaces according to specified column multiples, compressing multiple spaces to a single space, and padding blank lines, setting or clearing the high bit, removing unwanted characters, and converting files to a hex dump format for debugging.

The line file transfer capabilities allow Softerm to transfer files to and from larger computers and other personal computers. Three protocols are provided which allow the flexibility to transfer almost any type of file between Softerm and a host computer.

The *character protocol* provides maximum flexibility for text file transfers. Transmitting files using the character protocol can be accomplished in a streaming or simple block mode depending on how the various options provided are selected. Transmit options include user-definable fixed or variable block size, end of block terminator and acknowledge character strings, end of block delay, and character echo wait. Receiving files using character protocol provides a *line capture* mode in which all data received is considered part of the file transfer.

The *XMODEM protocol* is compatible with the standard CP/M User's Group protocol for file transfers and allows any type of file to be transferred to or from systems supporting a version of the MODEM or XMODEM protocol.

The *Softrans protocol* is an intelligent protocol designed specifically for asynchronous file transfers between computer systems. Any type file may be transferred using the Softrans protocol which provides automatic binary encoding and decoding, CRC-16 error checking with automatic retransmission, and data compression to enhance line utilization. A FORTRAN 77 source program is supplied with Softerm which is easily adaptable to any host computer to allow communications with Softerm using the Softrans protocol.

Softerm file transfer utilizes an easy to use command language which allows simple definition of even complex multiple-file transfers with handshaking. Twenty-three high-level commands are included which may be executed interactively or from a file transfer macro command file which has been previously entered and saved on disk. The commands which may be executed include *BREAK, CATALOG, CHAIN, CONFIGURE, CONVERSE, DIAL, END, HANGUP, LOG, MONITOR, NOLOG, ONERR, PAUSE, PROMPT, RECEIVE, REMARK, RETRIES, SCHEDULE, SEND, SPECIAL, SPEED, TIMEOUT* and *XMIT:WAIT*.

The *buffer size* available for line file transfers is approximately 8K in a 48K Apple II depending on the emulation. If a language card or 16K RAM card is available, the entire additional 16K is allocated to the file transfer buffer unless extended terminal emulations or other features which use the language card are included in the configuration. When transmitting a file from disk, as much of the file as possible is read into the file transfer buffer. Once the data in the buffer has been transmitted, the next portion of the file is read into the buffer. This continues automatically until the entire file has been transmitted.

When receiving a file transmitted to Softerm, data is received until the file transfer buffer is full. Softerm automatically sends an XOFF or lowers DTR depending on the *pacing control* option selected during terminal setup. The contents of the file transfer buffer are then written to the specified disk file, and Softerm automatically sends an XON character or raises DTR to resume reception of data. This process continues until the file has been completely received and written to disk or the file transfer is terminated by the operator or an error condition.

In the line file transfer mode, files may be received to disk or directly to the printer. If the printer driver specified in terminal setup is capable of simultaneous operation with line communications, printing will occur concurrently with the reception of data.

If the *FIRMWARE.PIO* driver has been specified, or a printer driver which is not capable of simultaneous operation with the communications line such as *APPLE SERIAL.PIO*, reception of data and printing will *alternate*, and the operation is identical to the reception of a file to disk.

Softerm includes the capability for *remote control* of line file transfers. The *MONITOR* command when executed at one computer system allows it to automatically receive files and accept requests to transmit files or even a catalog to another computer system. Files can be typed or accepted and the catalog displayed using the character protocol, XMODEM send and receive file requests can be processed, and Softrans *CATALOG*, *SEND*, and *RECEIVE* commands are automatically executed. This capability is utilized in the *Online Update Service* provided by Softronics to Softerm users.

Softerm Local File Transfer

Local File Transfer Options

The **S1 3** keyboard function is utilized to access the Softerm local file transfer capability. If a **S1 3** keyboard function is entered from the online terminal operation mode, the following menu is displayed:

```
            SOFTERM LOCAL FILE TRANSFER
    OPTION:   4
              1—DISK UTILITIES
              2—LOCAL
              3—LINE
              4—QUIT
```

The default selection for this menu is *4—QUIT* which returns Softerm to online terminal operation. This option may be selected by simply pressing the **RETURN** key. Each option on the Softerm Local File Transfer menu is explained in the following paragraphs.

1—Disk Utilities

The disk utilities option allows a selection of DOS, CP/M, and Pascal disk commands to be executed without exiting the Softerm program. These include *INIT, CATALOG, DELETE, RENAME, LOCK*, and *UNLOCK*. The utilization of this option is covered in detail in Chapter 3 on Terminal Operation.

2—Local

If the option *2—LOCAL* is selected, the following data entry screen is displayed:

```
    *************** SOURCE ***************
    VOLUME  0      DRIVE 1       SLOT 6
    FILENAME:
```

Specifying Source and Destination

Once the *** SOURCE *** data entry screen is displayed, the cursor is positioned to the string entry field just to the right of the label *FILENAME:*. Enter the *source* filename or filename specification including wildcard characters for the local file transfer and press the **RETURN** key. If a single filename is entered, only the designated file will be transferred. If the source filename specification contains an = wildcard character, the local file transfer operation will automatically repeat until all filenames which match the filename specification have been transferred. The destination and edit options used are assumed to be the same for all files and are specified only once when the local transfer is initiated. If a single = character is entered as the source filename specification, all files on the disk will be automatically transferred to the destination.

If the source filename specification contains a ? wildcard character, Softerm will display a **CONFIRM? N** message for each file which matches the filename specification. Entering a **Y** will allow the local file transfer to continue and destination and edit options to be selected for each file confirmed. Entering a **N** or pressing the **RETURN** key will cause the next matching filename to be displayed without transferring the current file.

If the Volume, Drive, or Slot currently selected are not the desired values, they must be entered *before* the **S1 RETURN** key is pressed to accept the source file information. Since the Volume field is used to specify the disk format as either DOS, CP/M or Pascal, the user should insure that the correct disk type has been selected. The **RETURN** or **S1** → and **S1** ← keys may be used to position the cursor backward or forward to the desired parameter entry field.

Refer to the section on *Softerm Disk Utilities* in Chapter 3 on Terminal Operation for a description of the Volume, Drive, and Slot parameters and the use of wildcard characters in filenames.

If this option has been chosen accidentally, or the user desires to *abort* the local file transfer operation, **S1 X** may be pressed which will return the cursor to the Softerm Local File Transfer menu.

Once the Volume, Drive, Slot, and Filename have been entered, the **S1 RETURN** should be pressed to continue the local file transfer operation. The requested file will be *opened* and the *FILE TYPE* and depending on the disk format and type of file the *ADDRESS* and *LENGTH* are displayed on the line immediately below the *FILENAME*. Pascal files will display the *TYPE* only, and no additional information is displayed for CP/M files.

The following table defines the DOS file types displayed and a description of the type of file:

DOS File Type	Description
T	TEXT File
I	INTEGER BASIC File
A	APPLESOFT BASIC File
B	BINARY File
S	S type file
R	RELOCATABLE object module file
1	NEW A type file
2	NEW B type file

If the DOS file type is *INTEGER* or *APPLESOFT*, the *LENGTH* is also displayed. If the DOS file type is *BINARY*, the *ADDRESS* and *LENGTH* are displayed.

The following table defines the Pascal file types displayed and a description of the type of file:

Pascal File Type	Description
T	TEXT
C	CODE
D	DATA
B	BAD
I	INFO
G	GRAF
F	FOTO
S	SECURITY
V	VOLUME

Once the *source* file information has been specified, the following *** *DESTINATION* *** option format is displayed:

```
************ DESTINATION *************
OPTION:    3
           1—PRINT     2—DISK
           3—VIDEO
```

If the *1—PRINT* or *3—VIDEO* option is selected, the *EDIT OPTIONS* data entry screen is displayed. Refer to the section in this chapter titled *File Transfer Edit Options* for a description of these options. If the option *2—DISK* is selected, a screen requesting *destination filename* information is displayed before the edit options. The three types of local file transfers are described in detail in the paragraphs that follow.

Local File Transfer to Video

If *3—VIDEO* is selected as the destination for a local file transfer, the *EDIT OPTIONS* data entry screen is displayed. These options allow the text to be *reformatted* as the file is transferred. Refer to the section titled *File Transfer Edit Options* for a complete description of the various options available. Once specification of the edit options is complete, a **S1 RETURN** key will initiate the display to video of the source file requested.

Once the **S1 RETURN** key has been pressed to initiate the display of the file, Softerm reads as much of the file as possible into memory to the file transfer buffer area. The screen is cleared and the first page containing up to 22 lines of the data in the file is displayed on the screen followed by the message **MORE.....** if there is *more* data to be displayed in the file and the message **NO MORE..** if there is *no more* data in the file. Pressing any non-function key will cause the *next* page to be displayed if there is more data in the file, or return to the local file transfer menu if there is no more data in the file.

If the current file transfer buffer does not contain the entire file, after displaying the last page of the first part of the file, the next part of the file is read into the file transfer buffer in memory. This process continues until the file has been completely displayed, or the file transfer is aborted.

If the file being transferred to video contains ASCII control characters in the range $00—$1F which cannot normally be displayed, the control characters appear as a "↑" followed by a displayable ASCII character. For example, a $01 character code would appear as a ↑A on the video display.

Several keyboard functions are available during a local file transfer to video when the **MORE....** or **NO MORE..** messages are displayed. Entering a **S2 1** or **S2 2** keyboard function allows the current screen to be printed with or without a form feed if the current configuration includes a printer. If *NULL.PIO* has been specified as the printer driver in terminal setup, the error message **NO PRINTER** will be displayed. Pressing the **ESC** key clears the error message and allows display of the file to continue.

Entering a **S1 R** will cause the display of the file to *restart* from the beginning of the file. If the current display is in the first file transfer buffer read into memory from the file, no additional disk accessing is required and the redisplay of the file begins immediately. If the current display is in a subsequent file transfer buffer from the file, the first part of the file will be re-read into the file transfer buffer before redisplay begins.

Entering a **S1 X** will cause the display of the file to be *aborted*. The screen is cleared and the local file transfer menu is displayed.

Local File Transfer to Disk

If the *2—DISK* options is selected as the destination for a local file transfer, the following data entry screen is displayed:

```
************ DESTINATION *************
VOLUME  0      DRIVE 1        SLOT 6
FILENAME:
```

Once the *** *DESTINATION* *** data entry screen is displayed, the cursor is positioned to the string entry field just to the right of the label *FILENAME:*. Softerm automatically displays the same filename for the destination as the source filename. If no changes are required to the destination filename, entering a **RETURN** will accept the filename currently displayed. Otherwise, enter the *destination* filename for the local file transfer and press the **RETURN** key.

If the Volume, Drive, and Slot currently selected are not the desired values, they must be changed *before* the **S1 RETURN** key is entered to accept the destination file information. Since the Volume field specifies the disk format as either DOS, CP/M, or Pascal, the user should insure that the correct disk type is selected. The **RETURN** or **S1** → and **S1** ← keys may be used to position the cursor backward or forward to the desired parameter entry field. The Volume, Drive, and Slot parameters are described in the section on *Softerm Disk Utilities* in Chapter 3.

Once the destination filename information has been entered, the **S1 RETURN** key should be pressed to continue the local file transfer operation. The requested file is *opened* and the *FILE TYPE* is displayed for DOS or Pascal format disks. Softerm allows the file type of DOS and Pascal format destination files to be changed. Entering a valid file type for the disk format specified will cause the the destination file to have the new type. If the file type entered is illegal for the disk format specified, the Apple will "beep" and the entry is ignored. If no change to the file type is required, the **RETURN** key should be pressed.

If the destination file is a DOS file type *B* indicating a binary file, Softerm will display the starting *ADDRESS* of the file in hexadecimal format. Pressing the **RETURN** key will accept the current value displayed or a new value may be entered.

If the destination filename already exists, the query **DELETE EXISTING FILE?** is displayed. The default option is **N** to *not* delete the file. If **RETURN** is pressed selecting the default option, or if **N** is entered, the file transfer option is aborted and the file transfer menu is displayed. If **Y** is entered indicating the file is to be deleted, the old file is deleted in preparation for the new file to be transferred.

Next the *EDIT OPTIONS* data entry screen is displayed. These options allow the text to be *reformatted* as the file is transferred. Refer to the section titled *File Transfer Edit Options* for a complete description of the options available.

Once specification of the edit options is complete, a **S1 RETURN** key will initiate the transfer from the source to the destination file. Softerm begins the local file transfer to disk by reading as much of the source file as possible into memory in the file transfer buffer. The data in the buffer is then written to the destination file with any editing required for the file being done in the process. Once the file transfer buffer has been written to the destination file, the next part of the source file is read into the buffer. This process continues until the source file has been completely copied to the destination file or until the file transfer is *aborted*.

Once the local file transfer to disk is complete, the file transfer menu is redisplayed for further action or the next source file which matches a wildcard filename specification will be displayed. A local file transfer to disk may be aborted by pressing the **RESET** or **S1 CTRL R** keys. If the **RESET** or **S1 CTRL R** key is pressed, the source and destination files are *closed* and Softerm returns to online terminal operation.

Local File Transfer to Print

If *1—PRINT* is selected as the destination for a local file transfer, the *EDIT OPTIONS* data entry screen is displayed. These options allow the text to be reformatted as the file is printed. Refer to the section titled *File Transfer Edit Options* for a complete description of the various options available. Once specification of the edit options is complete, a **S1 RETURN** key will initiate printing of the source file requested.

Once the **S1 RETURN** key has been pressed to initiate printing of the file, Softerm reads as much of the file as possible into the file transfer buffer area. The file will begin printing until the file transfer buffer is empty or the printing of the file completes.

Editing according to the options specified is performed as the file is printed. If the current file buffer does not contain the entire file, after the current buffer is completely printed the next buffer will be read into memory. This process continues until the file has been completely printed, or the file transfer is aborted.

The data in the print file is printed *exactly* as it exists in the source file except for any editing options specified. Formatting options selected in the printer driver parameters in terminal setup also affect the resulting printout. Any ASCII control characters in the source file will be sent to the printer and are assumed to be legitimate data or functions for the printer. Source files containing *inverse* or *flashing* data may produce unpredictable results. If the print driver specified in the configuration is *FIRMWARE.PIO*, and the firmware in the printer interface also displays the data to video as the file is printed, unpredictable results occur if the display driver in use is *APPLE40*.

Once the local file transfer to the printer is complete, the local file transfer menu is redisplayed for further action. A local file transfer to print may be aborted by pressing the **RESET** or **S1 CTRL R** key. If the **RESET** or **S1 CTRL R** key is pressed, the *source* file is closed, printing stops and Softerm returns to online terminal operation.

File Transfer Edit Options

Softerm includes a selection of *edit options* available in the local and line file transfer modes to compensate for the variations in data formats used by host computers. After the source and destination file informa-tion has been specified for a local or line file transfer, the following screen is displayed:

```
************* EDIT OPTIONS *************
LC→UC   N       CR→LF  N      LF→CR   N
ADD LF AFTER CR N    DEL LF AFTER CR N
SPACE COMPRESS  N    PAD BLANK LINES N
HI BIT SET      N    HI BIT CLEAR    N
TAB COLUMN      O    HEX DUMP        N
REMOVE        $FF     $FF    $FF    $FF
```

These edit options allow the source file to be reformatted as the file is transferred to its destination. The following paragraphs explain the effect of each editing option in detail. All of the edit options except for *TAB COLUMN* and *REMOVE* characters require a *yes* or *no* response. Yes is selected by entering a **Y** and no is selected by entering an **N**. The default value for the yes or no edit option fields is **N** if not entered. The **RETURN** or **S1** → **right arrow** and **S1** ← **left arrow** may be used to position the cursor to any of the edit options. Pressing the **S1 RETURN** terminates the editing of options and initiates the selected file transfer.

Lowercase to Uppercase

The edit option *LC→UC* if selected by a **Y** will convert all lowercase characters in the range a-z to uppercase characters A-Z as the source file is transferred to the destination.

Caution: The next four edit options affect the *carriage return* and *line feed* characters in the source file. Only one of these options should be set for a file transfer since combinations of these options produce unpredictable results.

Change CR to LF

The edit option *CR→LF* if selected by a **Y** will cause any *carriage return* (CR) characters in the source file to be changed to *line feed* (LF) characters as it is transferred to the destination. This allows files to be converted for systems which require new line characters as line separators instead of carriage returns.

Change LF to CR

The edit option *LF→CR* if selected by a **Y** will cause any *line feed* (LF) characters in the source file to be changed to *carriage return* (CR) characters as it is transferred to the destination. This allows files to be converted from systems which use new line characters as line separators instead of carriage returns.

Add LF after CR

The edit option *ADD LF AFTER CR* if selected by a **Y** will cause a *line feed* (LF) character to be inserted after each *carriage return* (CR) in the file as it is transferred to the destination. The additional line feed character is added even if the carriage return characters are already followed by one or more linefeeds. This allows a file to be changed from single to double spacing or multiple spacing if required.

Delete LF after CR

The edit option *DEL LF AFTER CR* if selected by a **Y** will cause a *linefeed* (LF) character following a *carriage return* (CR) character to be deleted from the source file as it is transferred to the destination. If multiple linefeed characters follow a carriage return, only a single linefeed will be deleted. This allows the line spacing of a file to be changed, for example, from double to single spacing.

Space Compress

The edit option *SPACE COMPRESS* if selected by a **Y** will cause any sequence of multiple space characters to be changed to a single space character as the source file is transferred to the destination.

Pad Blank Lines

The edit option *PAD BLANK LINES* if selected by a **Y** will cause any line in the source file which consists of a single *carriage return* character to be changed to a *space* character followed by a *carriage return* character as the file is transferred to the destination. This option may be necessary when using a system or communications network which discards lines consisting of a single carriage return character.

Set High Order Bit

The edit option *HI BIT SET* if selected by a **Y** will cause the high order bit of each character in the source file to be set to a binary 1 bit as the file is transferred to the destination. This option is useful for converting standard ASCII files to Apple format which requires the high bit to be set.

Clear High Order Bit

The edit option *HI BIT CLEAR* if selected by a **Y** will cause the high order bit of each character in the source file to be cleared to a binary 0 bit as the file is transferred to the destination. This option is useful for converting Apple text files which have the high order bit set to standard ASCII format.

If neither the *HI BIT SET* nor the *HI BIT CLEAR* edit options are specified, the high order bit is preserved.

Convert Tabs to Spaces

The edit option *TAB COLUMN* if specified as a non-zero value will cause an appropriate number of *space* characters to be inserted in place of a *tab* (HT) character in the source file as it is transferred to the destination. The number of spaces inserted is dependent on the value entered which defines the number of columns from one tab position to the next. The valid range for this option if selected is 1 to 9. The number of spaces inserted is equal to the number of columns from the position of the tab character to the next tab position defined by the column multiple entered.

Hex Dump

The edit option *HEX DUMP* if selected by a **Y** will cause the source file to be converted to a displayable hexadecimal dump format which appears as follows:

0000: 48 45 58 20 44 55 4D 50 0D 0A 00 00 00 00 00 00 HEX DUMP.........

Each line will display a 4 character hexadecimal address of the position in the file followed by a colon, 16 data characters from the source file in hexadecimal format, and the ASCII equivalent displayable characters. Non-displayable character codes will be shown as a period.

This option is extremely useful in debugging communications problems when interacting with a host computer system. Using the Softerm *Capture Transparent to Disk* capability initiated using a **S2 7** keyboard function, interaction with a host computer can be captured to a file on disk. Using Softerm local file transfer, the file can then be printed in hex dump format and examined.

If the hex dump option is specified, all other editing options are ignored.

Remove Characters

Softerm allows up to 4 individual character codes in the range $00 to $7F to be automatically removed while a source file is being transferred to the destination. Entering an $FF character or any character greater than $7F will be ignored by Softerm. This option is useful if a file contains unwanted formatting characters which must be removed before the data can be processed.

3—Line

If the option *3—LINE* is selected from the local file transfer option menu, the *Softerm Line File Transfer* menu is displayed. Refer to the section titled *Softerm Line File Transfer* for a complete description of these options.

4—Quit

If the *4—QUIT* option is selected from the local file transfer menu, the terminal returns to the online or local terminal operation from which the **S1 3** keyboard function was executed to access local file transfer.

Softerm Line File Transfer

Overview

A *protocol* in data communications is an agreement that certain characters or sequences of characters will be recognized as having special meaning for controlling the flow of data from one system to another. For example, entering a carriage return to terminate a line of data is effectively a simple protocol since the carriage return character has a special meaning. The terminal emulations which Softerm provides each define a *terminal protocol* which is known to systems which have the capability to interact with that type of terminal.

Several levels of protocol can exist during the interaction of two computer systems. A protocol can exist defining how data is physically exchanged between two systems. The types generally used with asynchronous terminals or systems are *character* and *block*. Character protocol allows a continuous *stream* of characters to flow between systems. The flow of data is usually controlled by either special characters defined to *start* and *stop* the flow of data or interface signals which indicate if a system is currently *ready* to receive data.

Softerm provides two *pacing* methods to control the flow of data in either terminal emulation or file transfer mode. One method uses user-definable *start/stop* or *XON/XOFF* control characters, while the other uses the *data terminal ready* (DTR) RS232-C interface signal. These options are defined in Chapter 2 on Terminal Setup.

A block mode protocol divides the continuous stream of characters into separate *blocks* of data or *messages* either of a specified size or variable length with a specified terminator, or sometimes both. Each block may require an *acknowledge* message from the receiving system before the next block can be transmitted. Depending on the sophistication of the block mode protocol, *negative acknowledge* messages can be sent which cause the last block sent to be re-transmitted. Advanced block mode protocols offer even more extensive features for error recovery, data encoding, data encryption, and data compression.

Block mode protocols are sometimes implemented as an additional level of the character protocol, so that characteristics of the character protocol such as flow control are retained. The Softerm pacing control options of XON/XOFF or DTR are utilized with all protocols provided by Softerm.

Protocols may exist at higher levels usually dependent on the application being performed by the communicating systems. For example, a BASIC interpreter may accept lines of characters terminated by carriage returns as input, transmitting a *prompt* character such as an asterisk as an indication that the next line may be entered. This is a simple form of a block protocol where the block terminator is a carriage return and the acknowledge message is an asterisk. This same protocol could be defined and used for transmitting *files* as well as interactive terminal input.

In fact, any host computer application which uses *prompt* characters and accepts delimited input strings as data actually defines a simple block mode protocol which may be used to transfer files. Of course, many host computers can also accept as well as generate a continuous stream of characters which may be *captured* in files to provide a file transfer capability.

More sophisticated protocols and file transfer techniques will require *cooperating programs* at each computer system each with knowledge of the protocol and application functions to be performed. Many sophisticated file transfer protocols have been defined, but few systems provide the capability to interact with systems of other than their own type or operating system environment.

The Softerm program provides the capability for file transfers using *character* protocol including streaming or user-definable simple block modes. The XMODEM protocol is compatible with the CP/M User's Group standard protocol for sending and receiving any type file in a block mode with error checking and recovery. The *Softrans* protocol is an intelligent *block* mode protocol including advanced features for error recovery, automatic data encoding and decoding, and data compression. A FORTRAN 77 source program *SOFTRANS.FORT* is included with Softerm which allows the Softrans protocol to be utilized with almost any host computer system. The FORTRAN 77 source program can be transferred to the host computer using a file transfer in character protocol where it can be easily adapted for use.

Additional information on the character, XMODEM, and Softrans protocols and their use with the Softerm program is contained in the sections which follow.

Character Protocol

The line file transfer capabilities provided by Softerm allow files to be transferred to and from larger computers and other personal computers. Three protocols are provided which allow the flexibility to transfer almost any type of file between Softerm and a host computer. The *character protocol* provides maximum flexibility for *text* file transfers. The XMODEM and Softrans protocols discussed later permit any type of file to be transferred in *block* mode and provide reliable error-free transmission and reception.

The character protocol may be used to both transmit and receive files using the *SEND* and *RECEIVE* commands provided in the Softerm file transfer command language. The character protocol allows files containing data comprised of the standard ASCII character set of 128 character codes from $00 to $7F to be transmitted to or received from other computer systems. When transmitting files to another computer system, the character protocol provides options for user-definable fixed or variable block size, end of block terminator and acknowledge character strings, end of block delay, and character echo wait. When receiving files, character protocol operates in a *line capture* mode so that all data received is considered as part of the file transfer.

Transmitting files using the character protocol can be accomplished in a streaming or simple block mode depending on how the various options provided are selected. If an end of block terminator string is specified, Softerm can *insert* the terminator after a specified maximum block size is transmitted if the terminator is not found in the data transmitted. If an acknowledge string is specified, Softerm will wait for the acknowledge string to be received after transmitting a terminator. If character echo wait is specified Softerm waits until each character is *echoed* back before transmitting the next character. If an acknowledge string is not specified, the file transfer will operate in a *streaming* mode until the file transfer is complete. When transmitting files in character protocol, the high bit is stripped from characters read from the source file as they are transmitted. The end of block delay permits a pause after each block before the next block is transmitted.

Receiving files using the character protocol permits an optional initialization string to be transmitted to initiate the transmission of data at the host computer system if required. A termination wait string may also be specified which if received will automatically terminate the transfer. The character protocol when receiving a file operates in the streaming or line capture mode and all received data is considered part of the file transfer.

Files received to disk are created as text files. The file type for DOS and Pascal files can be specified with the default being File Type T for DOS and TEXT for Pascal. If DOS File Type B is specified, then the starting address which will default to $0800 can also be specified. All data received is written to the file as standard ASCII text for CP/M and Pascal files, and with the high bit set for DOS files. Character protocol receive operations are terminated by a **S1 X** keyboard function entered by the operator, by the termination wait string specified, or by a timeout condition.

When transmitting files using the character protocol, it is possible to inadvertently transmit a character code which has a special meaning either to the host computer or the communications network. For example, inverse characters contained in DOS text files translate to ASCII control characters which if transmitted can potentially cause problems. The Softerm character protocol allows up to 8 character codes to be *translated* to a different character code as they are sent. This feature may be used for editing the transmitted data to a format compatible with the host computer system or to change characters which might be interpreted as special function sequences by the host computer or communications network.

The character protocol is generally used when transferring files to or from a system on which the Softrans or XMODEM protocol cannot be used or is unavailable or when it is desired to simply *capture* all data being received by Softerm. For file transfers between two Apple II computer systems, the Softrans protocol should be used since it provides greater efficiency, reliability, and convenience.

XMODEM Protocol

Softerm includes an implementation of the CP/M User's Group standard protocol known as XMODEM which may be used for uploading or downloading files to or from various remote CP/M systems that are accessible across the country. Many CP/M based bulletin board systems exist which maintain libraries of public domain software which may be transferred to a user's local system using this protocol. The largest of these systems is *CPM-Net* which is in service from 7-11 P.M. PST Monday through Friday and 24 hours daily on the weekend starting at 7 P.M. on Friday. This system may be accessed at 805-527-9321 using 300 baud, 8 data bits, 1 stop bit, and no parity.

The MODEM/XMODEM protocol was originally developed by Ward Christensen and is sometimes referred to as the Christensen protocol. The protocol operates in a block mode and allows any type of data to be transmitted imposing no restrictions on the contents of the data being transmitted. The protocol uses asynchronous transmission with 8 data bits, 1 stop bit, and no parity. Each block of data contains a SOH ($01) character, a sequential block number, the ones complement of the block number, 128 bytes of 8-bit data, and a checksum calculated by summing the other bytes of data in the block. An ACK ($06) character is transmitted to acknowledge a block received where the checksum calculated by the receiver matches the checksum transmitted by the sender and the block numbers received match the expected values. A NAK ($15) character is used to reject a block where the checksum calculated by the receiver does not match or the block numbers received do not match the expected values. Each block of an XMODEM protocol transfer is structured in the following manner:

(SOH)(BLK #)(255-BLK #)←128 DATA BYTES→(CHECKSUM)

The protocol is normally considered to be *receiver driven*. This implies that the sender is not required to automatically retransmit. The Softerm implementation works in this manner and when functioning as the sender, Softerm will time out for approximately 70 seconds waiting for a message from the receiver before aborting the transfer. When functioning as the receiver, Softerm uses a 10 second timeout period and if nothing is received from the sender, a NAK character is transmitted. The number of retries is dependent on the current value of the *RETRIES* command and is normally set to a value of 10 for XMODEM transfers. The Softerm implementation uses the ASCII CAN ($18) character to abort either the sender or receiver on error conditions. These can include an I/O error from disk, retry count exhausted, operator initiated abort, or other conditions which prevent the file transfer from continuing.

Once a file transfer is initiated using the XMODEM protocol, the receiver sends a NAK character when the 10 second timeout occurs and no data has been received. The initial NAK received by the sender signals the sender to begin transmitting the requested file. The receiver will respond with an ACK character each time a valid data block is received and a NAK character when a checksum or other error is detected and the sender will retransmit the last block. When the sender has no more data, it sends an EOT ($04) character and the receiver responds with an ACK.

The following is an example of data flow using the XMODEM protocol:

SENDER		RECEIVER
		10 second timeout
	←	NAK
SOH 01 FE data sum	→	
	←	ACK
SOH 02 FD data sum	→	bad checksum
	←	NAK
SOH 02 FD data sum	→	
	←	ACK
SOH 03 FC data sum	→	
ACK garbled	←	ACK
		10 second timeout
	←	NAK
SOH 03 FC data sum	→	
	←	ACK
EOT	→	
	←	ACK

The Softerm line file transfer commands *SEND* and *RECEIVE* are used to transfer files to and from remote systems using the XMODEM protocol. When Softerm is in the *MONITOR* mode, it can accept send and receive file requests for transfers using the XMODEM protocol from other remote systems. The Softerm implementation allows only a single file to be transferred with each command and multiple-file requests using a single command with CP/M wildcard filename characters are not allowed.

Sending files using the XMODEM protocol permits an optional initialization string to be transmitted to initiate the reception of data at the remote system if required. This string usually contains a command such as *XMODEM R FILENAME.EXT↑M* to execute the XMODEM program to receive the specified file.DOS, CP/M, or Pascal files can be transmitted using the XMODEM protocol. Data is transmitted in 8-bit format exactly as it is read from the disk.

Receiving files using the XMODEM protocol permits an optional initialization string to be transmitted to initiate the transmission of data at the remote system if required. This string usually contains a command such as *XMODEM S FILENAME.EXT↑M* to execute the XMODEM program and send the specified file. Files can be received and written to disk in DOS, CP/M, or Pascal format. The file type for files received in DOS or Pascal format can be specified with the default being File Type T for DOS and TEXT for Pascal. If DOS File Type B is specified, the the starting address which will default to $0800 can also be specified. All data received is written to the file exactly as received.

Softrans Protocol

The Softerm Softrans protocol is an intelligent protocol designed specifically for asynchronous file transfers between computer systems. Only an overview of the capabilities and operation of the protocol are presented in the user's guide. Additional information can be obtained from the FORTRAN 77 source program *SOFTRANS.FORT* included with Softerm to allow communications with various host computer systems using the Softrans protocol.

The Softrans protocol is designed to make file transfers between computer systems simple, reliable, efficient, and automatic. When using the Softrans protocol, one system becomes the *active* controller, and the other system becomes the *passive* respondent. The passive system functions in a *monitor* mode, responding to requests from the controlling system. If file transfers are done between two Apple II systems with the Softerm program, either system can function as the controlling system while the other is in monitor mode. If file transfers are done between an Apple II executing the Softerm program and a host computer executing the *SOFTRANS.FORT* program, the Apple II is always the controlling system since the *SOFTRANS.FORT* program is written to operate in monitor mode only.

The Softrans protocol is written to be as *transparent* as possible to the communications network over which it may be operated. The ASCII characters used by the protocol as control characters are not likely to have any special meaning to the communications network which could create transmission problems and are normally used for simple terminal control or data by host computer applications programs. The following table defines the control characters utilized by the Softrans protocol:

Hex	ASCII	Function
$7B	{	Start of Message
$7C	I	Toggle Encode Mode
$7D	}	Start Compress
$7E	~	Toggle ASCII High Bit Mode
$0D	CR	End of Message

All ASCII characters in the range ($00-$1F) or ($7B-$7F) in the data stream are automatically *encoded* during transmission and automatically *decoded* when received. All characters which are part of a Softrans message are in the range ($20-$7A), with a carriage return used to terminate blocks.

The Softrans protocol provides the capability to transfer files of any type and content from one system to another. Since files can contain 8-bit data, and Softrans uses the 7-bit ASCII character set, the data must be *encoded* before it can be transferred. This is accomplished by using the ASCII tilde (~) character to indicate if the high bit is on or off in subsequent data. However, even though the resulting data without the high bit is compatible with 7-bit ASCII, the control character codes in the range $00-$1F cannot be sent transparently through many communications networks. These control characters are encoded by Softrans and biased to appear as non-control characters. The ASCII vertical bar (I) character is used to indicate if subsequent data is encoded.

Some communications networks utilize other ASCII characters or character sequences which are not normally encoded by Softrans as special functions which does not allow these characters to be transparently transferred through the network. Softrans allows the user to specify up to 8 additional characters which are automatically encoded and decoded during file transfers.

The Softrans protocol also provides automatic data compression of duplicate character strings. Any sequence of 4-29 duplicate characters is compressed into a 3-character sequence using the ASCII close brace (}) character. Data compression operates within the ASCII high bit and nibble encoding modes so that all types of data are compressed. The use of data compression greatly enhances line utilization and reduces the time required to transfer many files.

The Softrans protocol operates in a block mode with a user data buffer size of 128 characters. Additional characters are added by Softerm as control information including a block sequence number and type. Each block of data begins with an ASCII open brace ({) character to indicate the *Start of Message* and terminates with an ASCII CR character to indicate *End of Message*. The 4 characters preceding the End of Message character are a 2-character cyclic redundancy check (CRC-16) encoded in the four characters which functions as a checksum for the block. Character parity is also used as a method of error detection if specified in the serial interface parameters used during the operation of Softrans.

Many different block types are used by the Softrans protocol. These include user data, file transfer control, error control and recovery, and communications control. Acknowledge, negative acknowledge, and wait acknowledge block types are included to facilitate error recovery and flow control.

Four different error detection methods are used by Softrans to provide reliable error-free file transfers. These include character parity (VRC), block checksums (CRC-16), block sequence number checking, and timeouts. Error recovery provides retransmission of blocks in which errors have been detected regulated by a user specified retry count.

In order to transmit and receive files using the Softrans protocol, one of the systems must be placed in the *monitor* mode ready to accept requests from the controlling system. When transferring files between two Apple II systems, one of the systems is placed in the monitor mode by executing the *MONITOR* command provided in the Softerm file transfer command language. When transferring files between an Apple II system and a host computer system executing the *SOFTRANS.FORT* program, the Apple II is the controlling system and the host computer is automatically in the monitor mode when *SOFTRANS.FORT* is executed.

Transmitting and receiving files using Softrans is initiated by the controlling system using the *SEND* and *RECEIVE* commands provided in the Softerm file transfer command language. When transmitting files to or receiving files from a system in the monitor mode, Softrans allows *source file information* and *destination file information* to be specified. The destination of a file can be either to a disk file on the receiving system or to the printer on the receiving system. A message is sent from the controlling system to the system in monitor mode requesting the transfer of the file. A file received from a Apple II system using Softrans is created with the same file type as the original file when the same disk format is specified. The disposition of files sent to or received from a host computer system executing the *SOFTRANS.FORT* program will depend on the implementation of Softrans at that system.

Protocol Selection

Since the XMODEM protocol is not a 7-bit ASCII protocol, it is normally used for direct system to system file transfers over dedicated or dial up communications and cannot be used through the public data networks such as GTE Telenet, Tymnet, and CompuServe. The Softrans protocol provided with Softerm operates in 7-bit ASCII and encodes binary or sensitive data so that any type data can be transferred through a public data network or any type of network which uses standard ASCII code.

The Softrans protocol also uses the CRC-16 polynomial algorithm for computing block checksums, and provides data compression to enhance line utilization. For Apple to Apple file transfers or to host computers which have adapted the Softrans FORTRAN 77 program, the Softrans protocol provides a more reliable and flexible file transfer capability. For accessing CP/M systems which have a XMODEM program available or CP/M bulletin board systems, the Softerm XMODEM provides a compatible mode for uploading and downloading files.

Command Language and Execution

Softerm line file transfers are controlled by a high-level *command language* which may be utilized in an immediate execution mode interactively or in a deferred execution mode using file transfer *macro* or command files which may contain multiple commands. The use of file transfer macros allow file transfer sequences to be pre-defined and executed automatically when required. The use of file transfer command files is described later in this section.

The file transfer command language consists of 23 command *verbs* which may require additional parameters. The following table lists the file transfer command verbs and their basic function:

FILE TRANSFER
COMMAND VERBS FUNCTION

BREAK	Transmit Break Signal
CATALOG	Receive DOS, CP/M, or Pascal CATALOG
CHAIN	Execute New Macro File
CONFIGURE	Load New Configuration
CONVERSE	Conversational Terminal Mode
DIAL	Dial a Phone Number
END	End of File Transfer Macro
HANGUP	Disconnect, Lower DTR
LOG	Begin Logging
MONITOR	Initiate MONITOR Mode
NOLOG	End Logging
ONERR	On Error—Ignore, Abort, CHAIN
PAUSE	Delay n Seconds
PROMPT	Display Operator Message
RECEIVE	Receive a File
REMARK	Comment
RETRIES	Define Retry Count
SCHEDULE	Wait Until Date, Time
SEND	Transmit a File
SPECIAL	Define Special Character Translation or Encoding
SPEED	Define Transmit Character Delay
TIMEOUT	Define Timeout Interval
XMIT:WAIT	Transmit a String, Wait for Reply

The following paragraphs describe the various command verbs and how they are used with the character, XMODEM, and Softrans protocols. Unless otherwise specified, file transfer commands may be used with any of the supported protocols. A detailed description of the parameters required for each command is included in this section and will not be separately covered in any other section.

File Transfer

In the command descriptions which follow, both editing and execution of the various commands is explained. Softerm allows commands to be entered, edited, and saved in a macro command file for deferred execution. Commands may also be entered, edited, and executed interactively. Operation is described for both the command *edit* mode where the commands are being entered and the command *execution* mode where the commands are actually executed.

Volume, Drive, Slot, and Filename

If the *VOLUME, DRIVE, SLOT,* and *FILENAME* are required for the editing or execution of a file transfer command, the following screen is displayed:

```
VOLUME  0      DRIVE 1      SLOT 6
FILENAME:
```

The cursor is positioned to the string entry field just to the right of the label *FILENAME:*. Some commands will display a default filename which may be accepted by pressing the **RETURN** key, or edited using Softerm offline editing functions such as **S1 D** to delete characters or **S1 I** to initiate insert mode. A complete description of the editing functions available can be found in Chapter 2 on terminal setup.

The **RETURN** or **S1** → and **S1** ← keys may be used to position the cursor backward or forward to any field which requires entry or editing. The *VOLUME* field is used to specify the disk format as DOS, CP/M, or Pascal. A complete description of the Volume, Drive, and Slot parameters and their use can be found in Chapter 3 on terminal operation.

Once the *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters have been correctly specified, pressing the **S1 RETURN** keyboard function will accept the currently displayed values and allow the editing or execution of the file transfer command to continue.

BREAK

The *BREAK* command causes an approximately 250 millisecond space (0) signal to be transmitted over the communication line to the host computer. This command has exactly the same effect as the **S1 K** keyboard function during online terminal operation. This signal is commonly used to abort output or end a session with a timesharing service.

The *BREAK* command requires no additional parameters when entered in the command *edit* mode or command *execution* mode.

CATALOG

The *CATALOG* command is used only with the Softrans protocol between two Apple II computer systems and assumes the remote system is in the *MONITOR* mode. It allows a CATALOG function to be performed on the remote system and the results displayed on the local system which executed the command.

If the *CATALOG* command is entered in the command edit mode or command execution mode, the following data entry format is displayed on the screen:

```
VOLUME  0     DRIVE 1       SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters and press the **S1 RETURN** keyboard function to continue. If no filename is entered, all files contained on the disk directory selected by the Volume, Drive, and Slot parameters will be displayed. Otherwise a *filename specification* or template using the wildcard characters = and ? may be entered to select a subset of filenames in the directory to be displayed. The ? wildcard character functions in an identical manner to the = character and no confirmation message is displayed.

In the command execution mode, after the parameter values have been edited and accepted, a CATALOG request message is transmitted to the remote computer system, the CATALOG function is performed at the remote system, and the resulting data is returned to the originating system for display. Once the complete CATALOG has been received by the originating system, the CATALOG is displayed and processed as if it were obtained from the local system. If logging is active, a copy of the CATALOG will be written to the log file and the CATALOG is *not* displayed. Refer to the description of the CATALOG function in Chapter 3 in the section covering *Softerm Disk Utilities* for additional information.

Once the display of the CATALOG information is complete, Softerm returns to the mode from which the *CATALOG* command is executed, either the interactive command execution mode or the file transfer macro execution mode.

CHAIN

The *CHAIN* command is used to terminate the execution of the current file transfer macro command file and to execute another. It can also be used in the command execution mode to execute a file transfer macro when executing file transfer commands interactively. It can be used within a macro command file when a single file transfer macro cannot contain all the commands required or it is desired to segment the operation of multiple file transfers. All file transfer variables such as special character translation or encoding, error processing retry count, transmit character delay, and timeout value are unchanged after the *CHAIN*. Logging will remain enabled if active.

If the *CHAIN* command is entered in the command edit execution modes, the following data entry format is displayed on the screen:

```
VOLUME  0       DRIVE 1         SLOT 6
FILENAME:
```

Enter the desired *VOLUME*, *DRIVE*, *SLOT*, and *FILENAME* parameters and press the **S1 RETURN** keyboard function to continue. In the command edit mode, the *CHAIN* command will be added to the current command file. In the command execution mode, the new file transfer macro will begin execution immediately after the **S1 RETURN** key is entered.

File transfer macro command files must be DOS files. Specifying another disk type in the *VOLUME* parameter will cause the error message **DISK TYPE MUST BE DOS** to be displayed. Wildcard characters are not allowed in the *FILENAME* entered. When a *CHAIN* command is executed, if the specified file transfer macro does not exist, the message **FILE NOT FOUND** is displayed and the command is aborted in command execution mode. The current macro is aborted if this command is being executed from a file transfer macro.

CONFIGURE

The *CONFIGURE* command is used to load a new Softerm configuration allowing any Softerm variables affecting file transfers to be changed from within a file transfer macro or from the command execution mode without returning to Terminal Setup. Any configuration file such as *SOFTERM.INIT* saved during terminal setup by the *5—SAVE CONFIGU-RATION* option can be loaded with the *CONFIGURE* command. This command is generally used when the hardware configuration used for file transfer varies, such as when there are two serial communications interfaces available. Since the size of the file transfer buffer varies depending on the terminal emulation selected for the configuration, it is useful to keep a separate configuration for file transfer using the *SOFTERM.TERMINAL* terminal emulation module which allows the largest file transfer buffer.

If the *CONFIGURE* command is entered in the command edit or execution mode, the following data entry format is displayed on the screen:

```
VOLUME  0     DRIVE 1      SLOT 6
FILENAME:
```

Enter the desired *VOLUME*, *DRIVE*, *SLOT*, and *FILENAME* parameters and press the **S1 RETURN** function to continue. In the command edit mode, the *CONFIGURE* command will be added to the current command file. In the command execution mode, the new configuration file will be loaded and initialized. The *CONFIGURE* command will not cause the current connection to be broken and serial parameters may be changed using this command while a connection is established. The *HANGUP* command should be used before the *CONFIGURE* command if a new connection is required.

Softerm configuration files must be DOS files. Specifying another disk type in the *VOLUME* parameter will cause the error message **DISK TYPE MUST BE DOS** to be displayed. Wildcard characters are not allowed in the *FILENAME* entered. If the specified configuration file does not exist, the message **FILE NOT FOUND** is displayed and the command is aborted in command execution mode. The current macro is aborted if this command is being executed from a file transfer macro. If the configuration contains an extended terminal emulation or other feature which requires a language card (16K RAM), then the filename specified with the extension *LC* must also exist and will be automatically loaded.

All file transfer variables such as special character translation or encoding, error processing retry count, transmit character delay, and timeout value are unchanged after the *CONFIGURE* is executed. Logging will remain enabled if active.

CONVERSE

The *CONVERSE* command is used to return to the online terminal operation mode terminating the current file transfer interactive command or macro execution. The *CONVERSE* command is useful when an immediate return to the online terminal mode is required from a file transfer macro or the interactive command execution mode.

If the *CONVERSE* command is entered in the command edit or execution modes, the following data entry screen is displayed:

INITIAL STRING:

The cursor is positioned to the *INITIAL STRING:* entry field. Up to 35 characters may be entered as initial keyboard input to the online terminal mode. The *INITIAL STRING* functions exactly like a keyboard macro and any type of keyboard character or function may be entered in the string. For example, if file transfer macro was used to download data for processing from a host computer, a *CONVERSE* command with an initial string of **S1 CTRL B** displayed as **%1↑B** could be used to terminate the file transfer macro and boot the system to allow the *HELLO* program to process the downloaded data.

Once the *INITIAL STRING* has been entered, pressing the **RETURN** in the command edit mode will add the command to the current macro file being edited. When entered in the command execution mode, file transfer command or macro execution is terminated, the display is cleared, and Softerm returns to the online terminal operation mode and the data specified in the *INITIAL STRING* becomes the initial keyboard input.

DIAL

The *DIAL* command is used when it is necessary to establish a dial-up connection to another system for file transfer. If automatic dialing capability is available and the appropriate *dialer driver* has been specified in the current Softerm configuration, the designated number is dialed automatically. If automatic dialing capability is not available, Softerm displays the message **DIAL: number** and waits for the connection to be manually established. Additional information concerning automatic dialing and the *Softerm Phone Book* can be found in the section on *dialer utilities* in Chapter 3 on Terminal Operation.

If the *DIAL* command is entered in the command edit or execution mode, the following data entry format is displayed on the screen:

```
NAME:
NUMBER:
```

The cursor is positioned to the string entry field just to the right of the label *NAME:*. If the user desires to access a number from the *Softerm Phone Book*, the appropriate name identifier should be entered in the *NAME:* field. Pressing the **RETURN** key will cause the following screen to be displayed:

```
SOFTERM PHONE BOOK IS IN:
     VOLUME O      DRIVE  1        SLOT  6
```

Enter the *VOLUME, DRIVE,* and *SLOT* parameters for the *SOFTERM PHONE BOOK* and press the **S1 RETURN** keyboard function. The Softerm Phone Book must be a DOS file. Specifying another disk type in the *VOLUME* parameter will cause the message **DISK TYPE MUST BE DOS** to be displayed. Once the Volume, Drive, and Slot parameters have been correctly specified and the **S1 RETURN** key is pressed, the *SOFTERM PHONE BOOK* is loaded and then accessed to retrieve the corresponding phone number and serial parameters. If there is no entry which matches the entered name, the message **NAME NOT FOUND** is displayed and the command is aborted.

If the user does not wish to access the Softerm Phone Book, but instead enter a number directly, the **S1** → keyboard function should be used to position the cursor to the *NUMBER:* string entry field. The desired phone number should be entered and the **RETURN** key pressed. Phone numbers are entered in free format and formatting characters such as parenthesis and dashes are ignored. Only the numeric characters 0-9 and the characters P, T, @, +, #, and * are significant. A description of phone number formats and special character functions can be found in the *dialer utilities* section of Chapter 3 on Terminal Operation.

Once the number has been accessed from the Softerm Phone Book or entered into the *NUMBER:* field, the following data entry format is displayed:

```
BITS/CHARACTER   8    # OF STOP BITS   1
PARITY           O    SPEED            5
```

This format allows the serial communications interface parameters to be adjusted if required for the dial-up connection being established. If the number was retrieved from the Softerm Phone Book, the values displayed are the values entered into the phone book. If the number was manually entered, the values displayed correspond to the current serial interface parameters in use. A description of these parameters can be found in Chapter 2 on Terminal Setup. When using a *DIAL* command, the serial interface parameter *MODEM CONTROL* is assumed. If a change must be made to the *SLOT* # or *PORT* # parameters, a *CONFIGURE* command should be used prior to the *DIAL* command to change the configuration.

In the command edit mode after editing of the serial interface parameters is complete, pressing the **S1 RETURN** key adds the *DIAL* command to the current macro command file. In the command execution mode, Softerm will initiate dialing of the specified number as soon as the **S1 RETURN** key is pressed to indicate editing of parameters is complete. The Softerm Phone Book is not accessed by a *DIAL* command in a file transfer macro when executed. The Softerm Phone Book is accessed only during the editing of the file transfer macro to retrieve the entry to be used. Refer to the section on *dialer utilities* in Chapter 3 on Terminal Operation for additional information on automatic dialing of numbers and the *Softerm Phone Book*.

Once dialing is complete and a connection established, the > prompt is displayed in the interactive command execution mode and the next command is executed in command file execution mode. If the connection as indicated by the presence of the *DCD* (data carrier detect) control signal is not established within the current timeout interval defined by the *TIMEOUT* command, the dial operation will be retried the number of times defined by the *RETRIES* command. Softerm automatically will provide a minimum of a 30 second timeout regardless of the value of the *TIMEOUT* command.

The *DIAL* command includes an implicit *HANGUP* command if a connection is currently established so that an explicit *HANGUP* command is not required.

END
The *END* command is used to terminate the execution of a file transfer macro command file or to terminate the interactive command execution mode and returns to the line mode file transfer menu. The current macro file and log file are closed when an *END* command is executed.

The *END* command requires no additional parameters when entered in the command edit mode or command execution mode.

HANGUP

The *HANGUP* command is used to *disconnect* when using dial-up communications facilities. The *DTR* (data terminal ready) control signal is lowered and Softerm waits 3 seconds for the *DCD* (data carrier detect) control signal to fall. Then Softerm returns to the > prompt in command execution mode, or continues execution of a file transfer macro command file with the next command. After a *HANGUP* command has been executed, a *DIAL* command must be executed to assert the *DTR* control signal so that additional communications can occur.

The *HANGUP* command requires no additional parameters when entered in the command edit or execution mode.

LOG

The *LOG* command is used to create a *log file* of all file transfer commands executed in line file transfer mode. An initial entry is written to the log file when the command begins executing and a *snapshot* of the current screen image is written to the log file at the completion of the command. This will include the final *CHARS, BLOCKS,* and *ERRORS* counts displayed during the execution of *SEND, RECEIVE, MONITOR* and *CATALOG* commands. The file list from a *CATALOG* command is also written to the log file. Any error message displayed as a result of executing a command will also be recorded in the log file.

The *LOG* command allows completely automatic execution of Softerm file transfer macros. Operator response to error messages displayed is not required when logging is active. Use of the *ONERR* command while logging is active provides an automatic method of handling error conditions.

Once initiated by the *LOG* command, logging remains active until a *NOLOG* or *END* command is executed, or the current file transfer macro or command execution mode is aborted. If the *LOG* command is entered in the command edit mode or command execution mode, the following data entry format is displayed on the screen:

```
VOLUME  0      DRIVE 1        SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters and press the **S1 RETURN** keyboard function to continue. In the command edit mode, the *LOG* command will be added to the current command file. In the command *execution* mode, the specified log file is deleted if it exists and a new file is opened.

Softerm log files must be DOS files. Specifying another disk type in the *VOLUME* parameter will cause the error message **DISK TYPE MUST BE DOS** to be displayed. Wildcard characters are not allowed in the *FILENAME* entered. The log file is created as a DOS file type T and is in standard text file format.

Once the log file is opened, any subsequent file transfer commands executed will be recorded. An I/O error while writing to the log file will cause it to be closed. The log file created may be printed or displayed using the Softerm local file transfer utilities.

If a *LOG* command is executed while there is already a log file open, the current log file will be closed and the new log file opened. If the *LOG* command specifies the same filename as the previous log file, the previous log file is deleted.

If the Softerm configuration includes a *clock driver*, each file transfer command recorded in the log file will include the current date and time in *MMDDYY HH:MM:SS* format.

MONITOR

The *MONITOR* command is used to place the Apple II system in the *monitor* mode. In the monitor mode, the system can automatically answer incoming calls and accept requests through remote terminal or system interaction to transmit or receive files in the character, XMODEM, or Softrans protocols, or to transmit the output of a CATALOG command. A system in the monitor mode functions in a passive manner, responding only to requests from the calling terminal or system. The monitor mode allows completely unattended operation and error messages will be briefly displayed but do not require operator intervention. If logging is active, all commands executed including error messages will be recorded in the log file.

The monitor mode is initiated by entering the *MONITOR* command in the command *execution* mode or by executing a macro command file containing a *MONITOR* command. The *MONITOR* command requires no additional parameters when entered in the command edit or execution mode.

Once the monitor mode is initiated, Softerm will wait for a connection to be established if not already present, transmit a **READY** message, and then wait for requests received through remote terminal interaction or through the Softrans protocol. Once initiated, the monitor mode remains active until terminated by a **S1 X** entered by the operator or by pressing the RESET key.

Refer to the section in this chapter titled *Using the Monitor Mode* for a complete description of the monitor mode commands and use.

NOLOG

The *NOLOG* command is used to terminate the currently active logging operation initiated by a previous *LOG* command. The currently active log file if any is closed and a new *LOG* command may be entered if required.

The *NOLOG* command requires no additional parameters when entered in the command edit or execution mode.

ONERR

The *ONERR* command is used to specify the action to be taken when an error condition occurs during the execution of file transfer commands. Error conditions recognized by this command include *line timeout* errors when using the character protocol, *line failure* errors which occur when the *RETRIES* count expires using Softrans or XMODEM protocol, *operator abort* errors caused by the **S1 X** function, *remote abort* errors when using the Softrans protocol, disk errors, and line disconnects due to loss of carrier. An operator abort used to terminate the line capture protocol *RECEIVE* command is also not considered to be an error.

If the *ONERR* command is entered in the command edit or execution mode, the following option format is displayed:

```
OPTION:   1
          1 — ABORT
          2 — IGNORE
          3 — CHAIN
```

The default selection for the *ONERR* option is *1—ABORT* which may be selected by entering a **1** or by pressing the **RETURN** key. This is also the default option for file transfer commands if no *ONERR* command has been executed.

If the *1—ABORT* option is selected, any error condition which occurs during execution of a file transfer command will cause the current file transfer macro file or command execution to be aborted after the appropriate error message has been displayed. If a *LOG* command has been executed to log file transfer command execution, or the *MONITOR* mode is in effect, no operator response is required for error messages and automatic operation occurs. If the option *2—IGNORE* is selected, any error condition which occurs during the execution of a file transfer command will be ignored after the appropriate error message is displayed. If a file transfer macro command file is being executed, the next command will then be executed. If interactive command execution mode is in effect, a new command may then be entered. If the *3—CHAIN* option is selected, the following data entry format is displayed:

VOLUME 0	DRIVE 1	SLOT 6
FILENAME:		

Enter the desired *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters and press the **S1 RETURN** keyboard function. The *FILENAME* should specify the name of the file transfer command macro file to be executed when an error condition occurs. File transfer macro command files must be DOS files and wildcard characters are not allowed. If this option has been selected and an error condition occurs during the execution of a file transfer command, after the appropriate error message is displayed the specified macro command file will be executed as if a *CHAIN* command had been entered.

Caution should be used when using the *ONERR* command since it is possible to create *looping* conditions. For example, executing a file transfer macro using Softrans protocol to *RECEIVE* a file which does not exist when the *ONERR* processing is set to chain to the same macro file will cause a looping condition.

If the file to be received is known to exist, the same *ONERR* processing could be used to retry indefinitely to receive a file regardless of error conditions.

The *ONERR* ignore option is useful to allow file transfer macro command execution to continue after the timeout interval has expired when receiving a file using the character protocol line capture *RECEIVE* command. This allows the timeout condition to be used as a termination indication for character protocol receive operations.

The *ONERR* chain option is useful in synchronizing *character protocol* file transfers. For example, a system which is to transmit a file using the *SEND* command could first execute a *XMIT:WAIT* command using a *WAIT* string only for a message such as "READY". This would be followed by the *SEND* command to transmit the desired file. The *ONERR* option would be set to chain to the same file if the *TIMEOUT* interval expires before receiving the *WAIT* string. The system which is to receive the file would execute a *RECEIVE* command using the *XMIT* string option to transmit the "READY" message to initiate sending of the file. The *ONERR* option could be used here to re-execute the sequence if the timeout interval expires on the *RECEIVE* command. The *ONERR* chain option is also useful to allow unlimited retries on a *DIAL* command regardless of the current value of the *RETRIES* option.

PAUSE

The *PAUSE* command is used to delay the execution of a file transfer macro for a specified interval of time. This command may be necessary when file transferring with some host computer systems to allow preparation time before the next command is executed.

If the *PAUSE* command is entered in the command edit or execution mode, the following data entry format is displayed on the screen:

---

1 SECONDS

The cursor is positioned to the *SECONDS* data entry field. Entering a **RETURN** accepts the current value displayed. Otherwise a value from 1 to 255 seconds may be entered. After the **RETURN** key is pressed in the command edit mode, the *PAUSE* command is added to the current command file. In the command execution mode, a delay of the specified number of seconds is executed before another command is processed.

PROMPT

The *PROMPT* command is used to display a message to the *local* terminal operator when operator intervention is required. For example, a message might be included in a file transfer macro to prompt the operator to load a particular diskette in a certain drive such as **LOAD A/R TRANSACTIONS IN DRIVE 2**.

If the *PROMPT* command is entered in the command edit or execution mode, the following data entry format is displayed on the screen:

MESSAGE:

The cursor is positioned to the string entry field just to the right of the label *MESSAGE:*. A text message of up to 35 characters in length can be entered. Pressing the **RETURN** key in the command edit mode adds the *PROMPT* command to the current macro command file. When a *PROMPT* command is executed, the specified message is displayed to the operator on Line 23 of the video display. Entering an **ESC** key clears the message from the screen and allows command execution to continue.

RECEIVE

The *RECEIVE* command is used to receive a file using the *character*, *XMODEM*, or *Softrans* protocol. Using the character protocol, the *RECEIVE* command operates in a *streaming* or *line capture* mode, and all data received until the *RECEIVE* command is aborted is considered part of the file transfer. An optional initialization string can be transmitted by the *RECEIVE* command to initiate the transmission of data at the host computer system if required. An optional termination wait string can be specified and if received will terminate the receive operation. Files may be received either directly to the printer or to disk using the character protocol. Files received to disk are created as text files. The file type for DOS and Pascal files can be specified with the default being File Type T for DOS and TEXT for Pascal. If DOS File Type B is specified, the starting address which will default to $0800 can also be specified. All data received is written to the file as standard ASCII text for CP/M and Pascal files, and with the high bit set for DOS File Type T text files. Character protocol receive operations are terminated by the reception of the specified wait termination string, a **S1 X** abort keyboard function entered by the operator, **RESET** or **S1 CTRL R**, or a timeout condition.

Using the XMODEM protocol, the *RECEIVE* command allows files to be received from another CP/M based system executing a compatible MODEM or XMODEM program. The serial parameters must be set for 8 data bits, 1 stop bit, and no parity for the XMODEM protocol to function properly. The *RECEIVE* command when executed allows an initialization string to be transmitted to the remote system which normally executes the XMODEM program on the CP/M system and specifies the file to be sent. Files may be received directly to printer or disk using the *XMODEM* protocol. Destination information for disk files allows the Volume indicating DOS, CP/M, or Pascal format, Slot, Drive, and Filename to be specified. File types for DOS and Pascal files can also be specified. All data received using the XMODEM protocol is written to disk exactly as received.

Using the Softrans protocol, the *RECEIVE* command allows files to be received from another Apple II which is in the monitor mode as a result of the *MONITOR* command or from a host computer executing the program *SOFTRANS.FORT*. The Softrans protocol permits the source and destination file information to be specified. Files may be received directly to the printer or to disk using the Softrans protocol. Source and destination information for disk files allows the Volume indicating DOS, CP/M, or Pascal disk format, Slot, Drive, and Filename to be specified. The source file specified for the file transfer is actually a file at the remote system. If the remote system is a host computer executing the *SOFTRANS.FORT* program, the disk type indicated by the *VOLUME* parameter should be specified as DOS. A Softrans message is sent to the remote system requesting transmission of the specified source file to initiate a *RECEIVE* operation using the Softrans protocol.

Receive operations using the character, XMODEM, or Softrans protocol also allow a selection of edit options to be specified allowing the file to be reformatted as it is transferred to its destination. Refer to the section in this chapter titled *File Transfer Edit Options* for a complete description of editing available.

Using Wildcard Characters in Filenames

The wildcard characters = and ? are not allowed in destination filename specifications for the *RECEIVE* command. The *RECEIVE* command does allow an additional special wildcard character to be used. If the first character of the destination filename specification is an asterisk *, the *RECEIVE* command will stop when executed and wait for the destination filename information including *VOLUME, DRIVE, SLOT* and *FILENAME* to be entered. Characters following the * in the filename are ignored and may be used as a prompt or comment. Once the destination file information has been correctly specified, pressing the **S1 RETURN** keyboard function will allow the *RECEIVE* command to continue.

Receive Status Display

During *RECEIVE* operations using the character, XMODEM, and Softrans protocols, the following status information is displayed on line 22:

CHARS   O BLOCKS   O ERRORS   O

The *CHARS* field displays the current *character count* of characters received. When using Softrans or XMODEM protocol, this count reflects the current count of characters received from the source file and not the actual count of characters received on the communications line. This allows visual monitoring of how much of the source file has been received. The *CHARS* count when using character protocol reflects the actual character count of characters received from the communications line.

The *BLOCKS* field displays the current *block count* received for the XMODEM or Softrans protocols. The block count is not applicable to the character protocol receive operation since characters are received in a *streaming* mode. The *ERRORS* count when using character protocol is incremented on any type of character error including parity, framing, or overrun errors. The *ERRORS* count when using Softrans or XMODEM protocol is incremented only once per block in error and on timeouts.

Receive Protocol Selection

If the *RECEIVE* command is entered in the command edit mode or execution mode, the following option format is displayed on the screen:

```
PROTOCOL:    1
             1 — CHARACTER
             2 — SOFTRANS
             3 — XMODEM
```

Receiving Files with Character Protocol

If the *1—CHARACTER* option is selected from the protocol selection menu for the *RECEIVE* command, the following data entry format is displayed:

```
PROTOCOL:    CHARACTER
XMIT:
WAIT:
```

The *PROTOCOL* is indicated as *CHARACTER* and the cursor is positioned to the string entry field just to the right of the label *XMIT:*. A string of up to 35 characters may be entered which is transmitted to the remote system before the line capture mode is entered. This string could be used as a command to the host computer system to begin transmitting the file. The file transfer command *XMIT:WAIT* normally should not be used for this purpose since file transfer macros are executed from disk and the host computer system could begin transmitting the file before the *RECEIVE* command is executed. The *XMIT* string is optional and may be skipped simply by pressing the **RETURN** key.

Caution: The *XMIT* string is transmitted exactly as entered and must include any terminator characters such as a carriage return required by the remote computer. For example, the command *TYPE MYFILE↑M* to type a file called *MYFILE* includes a ↑M indicating a carriage return ($0D) character.

After the *XMIT* string has been specified, pressing the **RETURN** key will position the cursor to the string entry field just to the right of the label *WAIT*. A string of up to 35 characters may be entered which will function as an automatic termination string if received. All data received prior to and including the wait termination string will be included in the destination file. After the specified wait termination command is received, the *RECEIVE* command is terminated.

Once the *XMIT* and *WAIT* strings have been specified, entering the **S1 RETURN** keyboard function will cause the following destination option menu to be displayed:

```
************ DESTINATION *************
OPTION:    2
           1—PRINT      2—DISK
```

Entering a **1** selects the system printer as the destination for the file transfer while entering a **2** selects disk as the destination. If *1—PRINT* is selected, the *EDIT OPTIONS* data entry screen is displayed. Select the desired edit options and press the **S1 RETURN** keyboard function. In the command edit mode, the *RECEIVE* command is added to the current macro command file.

In the command execution mode, the specified *XMIT* string is transmitted and the line capture mode is initiated. All subsequent data received is sent to the system printer until a **S1 X** is entered or the termination *WAIT* string is received to terminate the *RECEIVE* operation. If the printer is configured using a printer driver other than *FIRMWARE.PIO* or *APPLE SERIAL.PIO*, data is printed *simultaneously* with the receive operation. Otherwise data is buffered in memory until memory is full or the *RECEIVE* command is terminated and then printed. Receiving data and printing will *alternate* until the line capture mode is terminated. Pressing the **RESET** or **S1 CTRL R** keys to terminate a *RECEIVE* operation while printing will cause data to be lost.

If *2—DISK* is selected in the command edit or execution mode, the following data entry format is displayed:

```
************ DESTINATION *************
VOLUME  0     DRIVE 1       SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters and press the **S1 RETURN** keyboard function to continue. Wildcard characters other than * are not allowed in the *FILENAME* entered. If the disk type specified in the *VOLUME* DOS or Pascal, a *FILE TYPE* option is displayed. The default file type is T for DOS files and TEXT for Pascal files. Enter the desired file type or press the **RETURN** key to accept the default file type. If an invalid file type is entered, the Apple will "beep" and the entry is ignored.

If the destination file is a DOS file type B indicating a binary file, Softerm allows the starting address to be specified and will display an *ADDRESS* option field in hexadecimal format. The default address displayed is $0800 and may be accepted by entering an **S1 RETURN**. Otherwise any hexadecimal value may be entered.

After the destination filename information has been entered and the **S1 RETURN** key pressed, the *EDIT OPTIONS* data entry screen will be displayed. Select the desired edit options and press the **S1 RETURN** keyboard function. In the command edit mode the *RECEIVE* command will be added to the current command file.

In the command execution mode, the specified *XMIT* string is transmitted, and the line capture mode is initiated. All subsequent data received will be written to the destination file until the *RECEIVE* operation is terminated by a **S1 X** keyboard function or the termination *WAIT* string is received. The destination filename is deleted if it exists before the *RECEIVE* is initiated. The receiving of data and writing to the disk file will alternate depending on the size of the file transfer buffer in memory. Terminating the line capture operation with a **S1 X** will *flush* any remaining data in the file transfer buffer to disk. Pressing the RESET key to terminate the *RECEIVE* operation will cause data to be lost.

During a *RECEIVE* operation using the character protocol, data being received is displayed in a 3-line *scrolling region* in lines 18-20 on the display. This feature provides a visual confirmation of the data being received. Since scrolling decreases the effective throughput rate of character file transfers, it may not be desirable on systems operating at high baud rates using direct connections. The scrolling display may be toggled off and on by pressing the **ESC** key during the operation of the *RECEIVE* command.

Receiving Files with Softrans Protocol

If the *2—SOFTRANS* option is selected from the protocol selection menu for the *RECEIVE* command, the following data entry format is displayed:

```
PROTOCOL: SOFTRANS

*************** SOURCE ***************
VOLUME  O      DRIVE 1       SLOT 6
FILENAME:
```

The *PROTOCOL* is indicated as *SOFTRANS* and the cursor is positioned to the *FILENAME* entry field. Enter the desired *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters and press the **S1 RETURN** keyboard function to continue. Wild card characters are not allowed in the filename entered. If the remote system is a host computer executing the *SOFTRANS.FORT* program, the *VOLUME* parameter should specify a DOS disk type. After the source filename information has been specified and the **S1 RETURN** key is pressed, the following destination option format will be displayed:

```
************* DESTINATION **************
OPTION:    2
           1—PRINT     2—DISK
```

Entering a **1** selects the system printer as the destination for the file transfer while entering a **2** selects disk as the destination. If **1—PRINT** is selected, the *EDIT OPTIONS* data entry screen is displayed. Select the desired edit options and press the **S1 RETURN** keyboard function. In the command edit mode, the *RECEIVE* command is added to the current macro command file.

In the command execution mode, Softerm sends a Softrans message to the remote system requesting transmission of the designated source file. If the remote system accepts the request, it will begin transmitting the requested file and printing will begin on the local system printer if the current printer driver is not one of the *firmware* drivers. Otherwise, receiving of data and printing will alternate as in character protocol. The receive operation will automatically terminate when the complete file has been received and printed. The *RECEIVE* operation may be aborted by entering a **S1 X** or pressing the **RESET** or **S1 CTRL R** keys.

If *2—DISK* is selected in the command edit or execution mode, the following data entry format is displayed:

```
************* DESTINATION **************
VOLUME  O      DRIVE 1       SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters and press the **S1 RETURN** keyboard function to continue. Wildcard characters other than * are not allowed in the *FILENAME* entered. If the destination disk type specified in the *VOLUME* parameter is the same as the source disk type, the destination file type will be the same as the source file type. If an invalid file type for the destination disk type of DOS or Pascal is specified by a host computer *SOFTRANS.FORT* program, the destination file type will default to DOS File Type B with an address of $0800 or a Pascal DATA file.

If the destination disk type specified *differs* from the source disk type, and the destination disk type is DOS or Pascal, a *FILE TYPE* option is displayed. The default file type displayed is T for DOS files and TEXT for Pascal files. Enter the desired file type or press the **RETURN** key to accept the default file type. If an invalid file type is entered, the Apple will "beep" and the entry is ignored.

If the destination file type specified is a DOS file type B indicating a binary file, Softerm allows the starting address to be specified and will display an *ADDRESS* option field in hexadecimal format. The default address displayed is $0800 and may be accepted by entering an **S1 RETURN**. Otherwise any hexadecimal value may be entered.

After the destination filename information has been entered and the **S1 RETURN** key pressed, the *EDIT OPTIONS* data entry screen will be displayed. Select the desired edit options and press the **S1 RETURN** keyboard function. In the command edit mode, the *RECEIVE* command will be added to the current command file.

In the command execution mode, Softerm sends a Softrans message to the remote system in the monitor mode requesting transmission of the designated source file. If the remote system accepts the request, it will begin transmitting the requested file and all file data will be written to the destination file specified until the source file has been completely received. The destination file is created with the same file type as the source file when the same disk format type is specified. If the destination filename already exists, it is deleted before the *RECEIVE* operation is initiated. The receiving of data and writing to the disk will alternate depending on the size of the file transfer buffer in memory. The *RECEIVE* operation may be aborted by entering a **S1 X** or pressing the **RESET** or **S1 CTRL R** keys.

Receiving Files with XMODEM Protocol

If the *3—XMODEM* option is selected from the protocol selection menu for the *RECEIVE* command, the following data entry format is displayed:

```
PROTOCOL: XMODEM
XMIT:
```

The *PROTOCOL* is indicated as *XMODEM* and the cursor is positioned to the string entry field just to the right of the label *XMIT:*. A string of up to 35 characters may be entered which is transmitted to the remote system when the *RECEIVE* command is executed. This string could be used as a command to the remote computer system to begin transmitting the file. For remote CP/M systems, this string usually contains a command such as *XMODEM S FILENAME.EXT↑M* to execute the XMODEM program and send the specified file. The *XMIT* string is transmitted exactly as entered and must include any terminator characters such as carriage return required by the remote computer. The *XMIT* string is optional and may be skipped simply by pressing the **RETURN** key.

Caution: Many CP/M systems are unable to accept commands received at the speed of the connection and depend on the delay between characters introduced in typing commands. A *SPEED* command, typically with a value of 120, can be used to introduce an appropriate transmit character delay to simulate typing before the *RECEIVE* command is executed. An alternative method is to enter the command for the remote CP/M system in terminal mode and then switch to the line file transfer mode to execute the *RECEIVE* command. It may be desirable to use a keyboard macro for this sequence to produce as short a time delay as possible before executing the *RECEIVE* command.

After the *XMIT* string has been specified, pressing the **RETURN** key will cause the following destination option menu to be displayed:

```
************ DESTINATION **************
OPTION:     2
            1—PRINT     2—DISK
```

Entering a **1** selects the system printer as the destination for the file transfer while entering a **2** selects disk as the destination. If *1—PRINT* is selected, the *EDIT OPTIONS* data entry screen is displayed. Select the desired edit options and press the **S1 RETURN** keyboard function. In the command edit mode, the *RECEIVE* command is added to the current macro command file. In the command execution mode, the specified *XMIT* string is transmitted and the XMODEM receive operation is initiated. If the remote system accepts the request, it will begin transmitting the requested file after the initial NAK character is transmitted by the receiver. Printing will begin on the local system printer if the current printer driver is not one of the *firmware* drivers. Otherwise, receiving of data and printing will alternate as in character protocol. The receive operation will automatically terminate when the complete file is received and printed. The receive operation will also terminate if a CAN character is received or is aborted by the operator with a **S1 X** keyboard function or by pressing the **RESET** or **S1 CTRL R** keys.

If *2—DISK* is selected in the command edit or execution mode, the following data entry format is displayed:

```
************ DESTINATION *************
VOLUME  0      DRIVE 1        SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT*, and *FILENAME* parameters and press the **S1 RETURN** keyboard function to continue. Wildcard characters other than * are not allowed in the *FILENAME* entered. If the disk type specified in the *VOLUME* is DOS or Pascal, a *FILE TYPE* option is displayed. The default file type is T for DOS files and TEXT for Pascal files. Enter the desired file type or press the **RETURN** key to accept the default file type. If an invalid file type is entered, the Apple will "beep" and the entry is ignored.

If the destination file is a DOS file type B indicating a binary file, Softerm allows the starting address to be specified and will display an *ADDRESS* option field in hexadecimal format. The default address displayed is $0800 and may be accepted by entering an **S1 RETURN**. Otherwise any hexadecimal value may be entered.

After the destination filename information has been entered and the **S1 RETURN** key pressed, the *EDIT OPTIONS* data entry screen will be displayed. Select the desired edit options and press the **S1 RETURN** keyboard function. In the command edit mode the *RECEIVE* command will be added to the current command file.

In the command execution mode, the specified *XMIT* string is transmitted, and the XMODEM receive operation is initiated. If the remote system accepts the request, it will begin transmitting the requested file after the initial NAK character is transmitted by the receiver. All data received is written to the destination file specified until the source file has been completely received. If the destination filename already exists, it is deleted before the receive operation is initiated. The receiving of data and writing to the disk will alternate depending on the size of the file transfer buffer in memory. The receive operation will be aborted if a CAN character is received or is aborted by the operator using the **S1 X** keyboard function or by pressing the **RESET** or **S1 CTRL R** keys.

The *RETRIES* command can be used to specify the number of retries used by the *RECEIVE* command for XMODEM protocol. This value should normally be set to at least 10. The *TIMEOUT* command is not used with XMODEM protocol and a fixed timeout value of 10 seconds is used for receive operations.

REMARK

The *REMARK* command is used to allow *comments* to be included in a file transfer macro command file. It is a non-executable statement and functions as a *no operation* command in the command execution mode. Remarks may be entered in the command edit mode in free form following a *REMARK* command or abbreviation followed by a *space* and the desired text. Remarks may also be entered on any command line in a file transfer command file simply by entering a *space* after the command verb or abbreviation and the desired text.

RETRIES

The *RETRIES* command is used to specify the *maximum* retry count for error conditions using the Softrans protocol and receive operations with the XMODEM protocol before the command or executing macro file is aborted. Possible error conditions include timeouts, block check errors, or any other error condition such as an inappropriate reply to a message. The *RETRIES* command is not applicable to character protocol. If the *RETRIES* command is entered in the command *edit* or command *execution* mode, the following data entry format is displayed:

---

3   TIMES

The cursor is positioned to the *TIMES* data entry field. Entering a **RETURN** accepts the current value displayed. Otherwise a value from 1 to 255 times may be entered. After the **RETURN** key is pressed in the command edit mode, the *RETRIES* command is added to the current command file. In the command execution mode, the current retry count is reset to the specified value. The default value for the *RETRIES* option if not specified is 3.

If an error condition occurs during a file transfer operation, and the *RETRIES* count is exhausted during error recovery procedures, the message **LINE FAILURE** is displayed to the operator.

SCHEDULE

The *SCHEDULE* command provides a method by which file transfers can be automatically scheduled to occur at a specific date and time. For example, a *SCHEDULE* command used in a file transfer macro when executed suspends execution of the macro until the current date and time matches the specified date and time. This command requires a clock board in the Apple II system and the current configuration must include a clock driver other than *NULL.CLK*.

If the *SCHEDULE* command is entered in the command edit or execution mode, the following data entry format is displayed on the screen:

```
MM/DD/YY HH:MM:SS
```

The current date and time will be displayed and the cursor is positioned to the *month* field. Enter the desired date (month/day/year) and time (hours:minutes:seconds) in 24-hour format and press the **S1 RETURN** keyboard function. In command edit mode, the *SCHEDULE* command will be added to the current command file.

When the *SCHEDULE* command is executed in command execution mode, the following screen is displayed:

```
MM/DD/YY HH:MM:SS
MM/DD/YY HH:MM:SS
```

The first date and time line of the display will indicate the designated time that the *SCHEDULE* command will complete and allow other commands to be executed. The second date and time line will display the current time and will be updated each second until the current time matches the designated time. Once this occurs, the *SCHEDULE* command terminates and the next file transfer command can be executed.

The *SCHEDULE* command can be aborted at any time using the **S1 X** keyboard function. The current macro is aborted if this command is being executed from a file transfer macro.

SEND

The *SEND* command is used to transmit a file using either the *character*, *XMODEM*, or *Softrans* protocol. Using the character protocol, the *SEND* command can operate in a *streaming* or simple *block* mode with user-specified end of block terminator and acknowledge strings, fixed or variable block size, end of block delay, and character echo back wait. Source information for disk files transmitted using character protocol allows Volume indicating DOS, CP/M, or Pascal format, Drive, Slot, and Filename to be specified.

Using the XMODEM protocol, the *SEND* command allows files to be transmitted to another CP/M based system executing a compatible MODEM or XMODEM program. The serial parameters must be set to 8 data bits, 1 stop bit, and no parity for the XMODEM protocol to function properly. The *SEND* command when executed allows an initialization string to be transmitted to the remote system which normally executes the XMODEM program on the CP/M system and specifies the file to be received. Source information for disk files transmitted using the XMODEM protocol allows the Volume indicating DOS, CP/M, or Pascal format, Drive, Slot and Filename to be specified.

Using the Softrans protocol, the *SEND* command allows files to be sent to another Apple II which is in the monitor mode as a result of the *MONITOR* command or to a host computer executing the program *SOFTRANS.FORT*. The Softrans protocol permits the source and destination file information to be specified. Files may be sent directly to the remote system printer, or to disk using the Softrans protocol. Source and destination information for disk files allows the Volume indicating DOS, CP/M, or Pascal format, Slot, Drive, and Filename to be specified. The destination file specified for the file transfer is actually a file to be created at the remote system. If the remote system is a host computer executing the *SOFTRANS.FORT* program, the disk type of the destination file indicated in the *VOLUME* parameter should be specified as DOS. A Softrans message is sent to the remote system requesting permission to transmit the specified source file when a *SEND* command is executed.

Using Wildcard Characters in Filenames

The source filename specification for *SEND* commands permits the use of wildcard characters. If the source filename specification contains an = wildcard character, the send operation using Softrans protocol will automatically repeat until all filenames which match the filename specification have been transmitted. When using the character and XMODEM protocols, only the first file which matches the filename specification will be sent. The destination and edit options used are assumed to be the same for all files and are specified only once when the *SEND* command is entered. If a single = character is entered as the source filename specification, all files on the disk will be automatically transmitted using the *SEND* command.

If the source filename specification contains a ? wildcard character, Softerm will display a **CONFIRM? N** message for each file which matches the filename specification. Entering a **Y** will allow the *SEND* command to continue. The destination and edit options used are assumed to be the same for all files and are specified only once when the *SEND* command is entered. Entering an **N** or pressing the **RETURN** key will cause the next matching filename to be displayed without sending the current file. The send operation will automatically repeat for each file confirmed using the Softrans protocol. Only the first file confirmed will be sent when using the character and XMODEM protocols.

The *SEND* command also allows an additional special wildcard character to be used. If the first character of the source filename specification is an asterisk *, the *SEND* command will stop when executed and wait for the source filename information including *VOLUME*, *DRIVE*, *SLOT* and *FILENAME* to be entered. Characters following the * in the filename are ignored and may be used as a prompt or comment. Once the source file information has been correctly specified, pressing the **S1 RETURN** keyboard function will allow the *SEND* command to continue.

Send Status Display

During *Send* operations using the character, XMODEM, and Softrans protocols, the following status information is displayed on line 22:

| CHARS | 0 BLOCKS | 0 ERRORS | 0 |

The *CHARS* field displays the current *character count* of characters transmitted. When using Softrans or XMODEM protocol, this count reflects the current count of characters sent from the source file and not the actual count of characters transmitted on the communications line. This allows visual monitoring of how much of the source file has been sent. The *CHARS* count when using character protocol reflects the actual character count of characters transmitted on the communications line.

The *BLOCKS* field displays the current *block count* transmitted for the XMODEM or Softrans protocols. If a character protocol *SEND* command is executed which specifies an end of block terminator string, the block count will increment each time the terminator string is transmitted even if no acknowledge string has been specified. The *ERRORS* count when using character protocol is incremented on any type of character error including parity, framing, or overrun errors. The *ERRORS* count when using Softrans or XMODEM protocol is incremented only once per block in error and on timeouts.

Send Protocol Selection

If the *SEND* command is entered in the command edit or command execution mode, the following option format is displayed on the screen:

```
PROTOCOL:   1
            1 — CHARACTER
            2 — SOFTRANS
            3 — XMODEM
```

Sending Files with Character Protocol

If the *1--CHARACTER* option is selected from the protocol selection menu for the *SEND* command, the following data entry format is displayed:

```
PROTOCOL: CHARACTER
EOB=          ECHO MODE  N EOB DELAY  0
ACK=          AUTO-INS   N BLK SIZE   128
```

The *PROTOCOL:* is indicated as *CHARACTER* and the cursor is positioned to the string entry field just to the right of the label *EOB*. The character protocol parameter fields *EOB, ECHO MODE, EOB DELAY, ACK, AUTO-INS,* and *BLK SIZE* provide options which allow both *streaming* and simple *block* mode file transfers. The **RETURN** or **S1** → and **S1** ← keys may be used to position the cursor to each option field for editing. The effect of these options is described in the following paragraphs.

End of Block Terminator

The *EOB* option allows a *terminator string* of up to 4 characters to be specified. The string can consist of any of the 128 character codes in the ASCII character set. If the auto-insert mode specified by the *AUTO-INS* option field is set to **Y**, the terminator string will be inserted during the transmission after the number of characters specified by the block size value specified in the *BLK SIZE* parameter if no terminator is found in the data being transmitted before the maximum block size is reached. If an acknowledge string has been specified in the *ACK* field, Softerm will wait until the specified acknowledge is received after transmitting the terminator string when inserted or encountered in the file being transmitted. The block size parameter has no effect if *AUTO-INS* is set to **N**. If the *AUTO-INS* option is set to **N**, and an acknowledge string or end of block delay is not specified, the terminator string has no effect and data is transmitted in a *streaming* mode.

The *BLOCKS* count in the *SEND* command status display will be incremented each time the terminator is transmitted.

Echo Mode

The *ECHO MODE* option allows the echo back of each transmitted character when using character protocol to *acknowledge* the character transmitted. If this option is set to **Y**, Softerm waits after each character transmitted until the same character is received. All other characters are ignored. If the required character is not received within the current *TIMEOUT* period, the *SEND* operation is aborted.

If for some reason the echo back of a character does not occur or the character is received in error, entering the expected character on the keyboard will cause the file transfer to continue if the *TIMEOUT* period has not expired.

End of Block Delay

The *EOB DELAY* option allows a specified delay to occur after each block is transmitted before the the next block is transmitted. The delay is specified as a number from 0-99 to indicate the delay in one-tenth second increments. If a *EOB* terminator string has been specified, after each block is transmitted and the terminator string is sent, the specified delay will be executed before the next block is transmitted. If an *ACK* acknowledge string is also specified, the end of block delay will not be executed until after the acknowledge string has been received.

Acknowledge

The *ACK* option allows an *acknowledge string* of up to 4 characters to be specified. The string can consist of any of the 128 character codes in the ASCII character set. If the acknowledge string is specified, and either a *EOB* terminator string or the *AUTO-INS* option or both are specified,Softerm waits for the specified acknowledge string to be received before proceeding. If the acknowledge string is not received within the current *TIMEOUT* period, the *SEND* operation is aborted. If neither a terminator string, nor the auto-insert option is specified, the acknowledge string has no effect.

Auto-Insert Mode

The *AUTO-INS* option is used in conjunction with the *EOB* terminator string and the block size specified by the *BLK SIZE* field to provide simple block mode operation. If *AUTO-INS* is specified as **Y**, the termination string is automatically inserted in the transmit data stream after the number of characters specified by the block size if no terminator string is found in the data transmitted before the maximum block size is reached. If an acknowledge string has been specified in the *ACK* field, Softerm waits for the specified string to be received after the terminator string has been sent. If no terminator string has been specified, Softerm will wait for the specified acknowledge string to be received after the specified number characters according to the block size have been transmitted. If neither the terminator nor acknowledge strings is specified, the *AUTO-INS* option has no effect and data is transmitted in a *streaming* mode.

If the *AUTO-INS* option is specified as **N**, the *BLK SIZE* parameter has no effect on the transfer, and the block size is variable dependent on the specification of the terminator and acknowledge strings.

Block Size

The *BLK SIZE* option allows the maximum number of characters transmitted before waiting for a specified *ACK* acknowledge string to be specified. The *BLK SIZE* option has an effect only if the *AUTO-INS* option is specified as a **Y**. When the specified number of characters according to the block size has been transmitted without encountering an *EOB* terminator string, the *EOB* terminator string if specified is transmitted, and Softerm waits for the optional acknowledge string to be received. The block size may be specified at any number of characters in the range 16 to 255.

Source File Information

Once the character protocol option parameters for the *SEND* command have been specified, pressing the **S1 RETURN** key causes the following data entry format to be displayed:

```
*************** SOURCE ***************
VOLUME  0      DRIVE 1        SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT*, and *FILENAME* parameters and press the **S1 RETURN** keyboard function. The source *FILENAME* specified may contain a single filename or a filename specification including wildcard characters. Only the first filename matched when using a = wildcard character or the first filename confirmed when using the ? wildcard character will be sent. After the source filename information has been entered and the **S1 RETURN** key pressed, the *EDIT OPTIONS* data entry screen will be displayed. Select the desired options and press the *S1 RETURN* keyboard function. In the command edit mode, the *SEND* command will be added to the current command file.

In the command *execution* mode, Softerm will begin transmitting the file according to the specified option parameters for character protocol. The high bit if set on any data transmitted from the source file will be *stripped* from the data as it is transmitted. When the end of the source file is reached, the *SEND* operation is terminated and the next command can be executed. A *SEND* operation can be aborted by entering a **S1 X** keyboard function or by pressing the **RESET** or **S1 CTRL R** keys.

During a *SEND* operation using the character protocol, transmitted data is displayed in a 3-line *scrolling region* in lines 18-20 on the display. This feature provides a visual confirmation of the data being transmitted. Since scrolling decreases the effective throughput rate of character file transfers, it may not be desirable on systems operating at high baud rates using direct connections. The scrolling display may be toggled off and on by pressing the **ESC** key during the operation of the *SEND* command.

Character Protocol Send Example

As an example of how the *SEND* command may be used to transfer a file from an Apple II to a host computer, consider the following. Many host computers have input modes which display a *prompt* character or string and allow lines of information to be entered usually terminated by a *carriage return* or *new line* character. One such host computer uses a prompt string of ")". It then will accept lines of input terminated by new line characters and write them to an assigned file.

To use this capability with the *SEND* command, the *EOB* terminator string should be set to a new line (↑J) or *CTRL J* which generates the character code for an ASCII new line character, and the *ACK* acknowledge string should be set to match the 2-character prompt string of ")]". If the source file to be transmitted consists of text with lines terminated by carriage returns, the edit options should be used to convert carriage returns to line feeds.

Once the file transfer is initiated, lines from the source file will be transmitted and when a *new line* character is encountered, Softerm will wait until the next *prompt* character is received before transmitting the next line. This process would then continue until the complete file had been transmitted.

Many host computers have *COPY* or *ACCEPT* commands which allow lines of terminal input to be copied to a file. Lines entered terminated with carriage returns are written to the file and as characters entered are echoed as they are received. The host computer will normally echo back a carriage return and line feed for each carriage return received. In this case the *EOB* terminator string can be set to a carriage return (↑M) and the *ACK* acknowledge string can be set to line feed (↑J).

Sending Files with Softrans Protocol

If the *2—SOFTRANS* option is selected from the protocol selection menu for the *SEND* command, the following data entry format is displayed:

```
PROTOCOL: SOFTRANS

*************** SOURCE ***************
VOLUME  0     DRIVE 1      SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters and press the **S1 RETURN** keyboard function. The source *FILENAME* specified may contain a single filename or a filename specification including wildcard characters. Multiple files may be sent with a single *SEND* command when wildcard characters are used.

After the source filename information has been entered and the **S1 RETURN** key is pressed, the following option format will be displayed:

```
************ DESTINATION *************
OPTION:   2
          1—PRINT      2—DISK
```

Entering a **1** selects the remote system printer as the destination for the file transfer while entering a **2** selects the remote system disk as the destination. If *1—PRINT* is selected, the *EDIT OPTIONS* data entry screen is displayed. Select the desired edit options and press the **S1 RETURN** keyboard function. In the command edit mode the *SEND* command is added to the current macro command file.

In the command execution mode, Softerm sends a message to the remote system to initialize the file transfer operation to the printer and if no error conditions are encountered, begins transmitting the designated source file. The *SEND* operation will automatically terminate when the complete source file has been transmitted and acknowledged unless the source filename specification includes wildcard characters. The *SEND* operation may be aborted by entering a **S1 X** or by pressing the **RESET** or *S1 CTRL R* keys.

If *2—DISK* is selected in the command edit or execution mode, the following data entry format is displayed:

```
************* DESTINATION *************
VOLUME  0       DRIVE 1       SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT*, and *FILENAME* parameters and press the **S1 RETURN** keyboard function. If wildcard characters have been used in the source filename specification, the destination filename is not used, and the destination filename will be the same as the file or files matching the source filename specification.

If the destination disk type specified in the *VOLUME* parameter is the same as the source disk type, the destination file type will be the same as the source file type. If the remote system is a host computer executing the *SOFTRANS.FORT* program, the *VOLUME* parameter should specify a DOS disk type. If the destination disk type *differs* from the source disk type, and the destination disk type is DOS or Pascal, a *FILE TYPE* option is displayed. The default file type displayed is T for DOS files and TEXT for Pascal files. Enter the desired file type or press the **RETURN** key to accept the default file type. If an invalid file type is entered, the Apple will "beep" and the entry is ignored.

After the destination filename information has been entered and the **S1 RETURN** key pressed, the *EDIT OPTIONS* data entry screen will be displayed. Select the desired edit options and press the **S1 RETURN** keyboard function. In the command edit mode, the *SEND* command will be added to the current command file.

In the command execution mode, Softerm sends a message to the remote system to initialize the file transfer to disk and if no error conditions are encountered, begins transmitting the designated source file. If the destination filename exists at the remote system, the old file is deleted before the file transfer begins. The destination file at the remote system is created with the same file type as the source file if the same disk format type is specified. The *SEND* operation will automatically terminate when the source file has been completely transmitted and acknowledged unless the source filename specification includes wildcard characters. The *SEND* operation may be aborted by entering a **S1 X** keyboard function or by pressing the **RESET** or **S1 CTRL R** keys.

Sending Files with XMODEM Protocol

If the *3—XMODEM* option is selected from the protocol selection menu for the *SEND* command, the following data entry format is displayed:

```
PROTOCOL: XMODEM
XMIT:
```

The *PROTOCOL* is indicated as *XMODEM* and the cursor is positioned to the string entry field just to the right of the label *XMIT:*. A string of up to 35 characters may be entered which is transmitted to the remote system when the *SEND* command is executed. This string could be used as a command to the remote computer system to prepare to receive the file. For remote CP/M systems, this string usually contains a command such as *XMODEM R FILENAME.EXT↑M* to execute the XMODEM program to receive the specified file. The *XMIT* string is transmitted exactly as entered and must include any terminator characters such as carriage return required by the remote computer. The *XMIT* string is optional and may be skipped simply by pressing the **RETURN** key.

Caution: Many CP/M systems are unable to accept commands received at the speed of the connection and depend on the delay between characters introduced in typing commands. A *SPEED* command, typically with a value of 120, can be used to introduce an appropriate transmit character delay to simulate typing before the *SEND* command is executed. Since a *SPEED* command will also affect the rate at which the file is transmitted using the *SEND* command, it may be preferable to use an *XMIT:WAIT* command to send the XMODEM execution command to the remote computer. This could be preceded by a *SPEED* command of 120 and followed by a *SPEED* command of 0. The *XMIT* string in the *SEND* command could then be blank.

An alternative method is to enter the command for the remote CP/M system in terminal mode and then switch to the line file transfer mode to execute the *SEND* command. It may be desirable to use a keyboard macro for this sequence to produce as short a time delay as possible before the *SEND* command is executed.

After the *XMIT* string has been specified, pressing the **RETURN** key
will cause the following data entry format to be displayed:

```
*************** SOURCE ***************
VOLUME  0      DRIVE 1        SLOT 6
FILENAME:
```

Enter the desired *VOLUME, DRIVE, SLOT*, and *FILENAME* parameters
and press the **S1 RETURN** keyboard function to continue. The source
FILENAME specified may contain a single filename or a filename
specification including wildcard characters. Only the first filename
matched when using a = wildcard character or the first filename
confirmed using the ? wildcard character will be sent. After the source
filename information has been entered and the **S1 RETURN** key pressed,
the *EDIT OPTIONS* data entry screen will be displayed. Select the
desired edit options and press the **S1 RETURN** keyboard function. In
the command edit mode the *SEND* command will be added to the
current command file.

In the command execution mode, the specified *XMIT* string is transmitted,
and the XMODEM send operation is initiated. If the remote system
accepts the request, it will transmit a NAK character every 10 seconds
until it receives the first data block of the file. If a NAK character is
received by Softerm within a 70 second period after the *SEND* command
is initiated, the designated source file will begin transmitting. The
SEND operation will automatically terminate when the source file has
been completely transmitted and acknowledged. The *SEND* operation
may be aborted by entering a **S1 X** keyboard function or by pressing the
RESET or **S1 CTRL R** keys.

The *RETRIES* and *TIMEOUT* commands are not used with the *SEND*
command for XMODEM protocol. Softerm uses a fixed timeout period of
70 seconds with no retries for a XMODEM send operation.

SPECIAL

The *SPECIAL* command is used to define up to 8 *special characters*
which are automatically translated to a specified character when using
the *SEND* command with character protocol.

When using Softrans protocol, the *SPECIAL* command allows the user
to specify up to 8 additional characters to be encoded during a *SEND*
operation. The Softrans protocol automatically encodes ASCII control
characters in the range $00-$1F and characters in the range $7B-$7F.
Encoded characters are transmitted as upper or lower case alpha
characters, which can be transparently transmitted through communi-
cations networks. Encoded characters are automatically decoded to
their original form at the receiving system.

If the *SPECIAL* command is entered in the command *edit* or *execution* mode, the following data entry format is displayed on the screen:

```
ORIGINAL    TRANSLATION
X           X
```

Two columns of characters are displayed, *ORIGINAL* and *TRANSLATION*. For use with the character protocol *SEND* command, enter the ASCII character code to be translated in the *ORIGINAL* column. Any of the 128 ASCII character codes may be entered except *space* which is used to clear a table entry. Enter the ASCII character code to which the character is to be translated in the *TRANSLATION* column directly opposite the original character. Any of the 128 ASCII character codes may be used for the translation including space.

When designating additional characters to be encoded using the Softrans protocol with the *SEND* command, enter the ASCII character code to be encoded in the *ORIGINAL* column. ASCII character codes in the range $21-$40 and $71-7A may be specified for encoding. Characters in the range $00-$1F and $7B-$7F are automatically encoded by Softrans. All other characters are used for encoding purposes or as data. A space character may be entered to clear an entry. The *TRANSLATION* column is not used and anything entered in this column is ignored.

After the special characters to be translated or encoded have been entered, pressing the **S1 RETURN** will cause the *SPECIAL* command to be added to the current macro command file in the command edit mode. In the command execution mode, the translation table specified will be used with any subsequent *SEND* command until command execution is aborted. The special character translation table is *cleared* whenever a new macro command file is executed or command execution mode is entered.

SPEED

The *SPEED* command is used to define a *transmit character delay* which allows a delay between characters transmitted on the communications line. Its value may be 0 to 255 to indicate the delay in increments of approximately 520 microseconds which is equivalent to 1 character time at a baud rate of 19,200. This option could be used when the host computer or receiving end of file transmissions from Softerm are not able to accept characters as fast as the actual line speed allows.

During transmitting of files with the *SEND* command, the → and ←
keys may also be used to speed up or slow down file transfers. Pressing
the ← key will increase the delay thus slowing the transmission rate.
Pressing the → will decrease the delay thus increasing the transmis-
sion rate. This can be used to find an acceptable character delay for
future use with the *SPEED* command when file transferring with some
systems.

If the *SPEED* command is entered in the command edit or execution
mode, the following data entry format is displayed on the screen:

CHARACTER DELAY   0

The cursor is positioned to the *CHARACTER DELAY* data entry field.
Entering a **RETURN** accepts the current value displayed. Otherwise, a
value from 0 to 255 may be entered. After, the **RETURN** key is pressed
in the command edit mode, the *SPEED* command is added to the
current command file. In the command execution mode, the current
transmit character delay is reset to the specified value.

The default value for the *SPEED* option if not specified is 0.

TIMEOUT

The *TIMEOUT* command is used to specify the interval in seconds of the
time delay tolerated before aborting command execution when expecting
to receive data.

When using character protocol with a *RECEIVE* command, the timeout
applies to each character so that if a character is not received within
the specified timeout interval, the command is automatically aborted.
When using character protocol with the *SEND* command, the timeout
applies to the *ECHO WAIT* option as well as the *ACK* acknowledge
string wait option. If the character echo or specified acknowledge
string is not received within the timeout interval, command execution
is aborted. When a timeout occurs with character protocol, the message
LINE TIMEOUT is displayed to the operator.

The *TIMEOUT* interval operates in conjunction with the *RETRIES*
option when using the Softrans protocol. Timeouts can occur in the
Softrans protocol when a message block is expected but never received.
The Softrans protocol includes recovery procedures and will try the
current operation again until the *RETRIES* count is exhausted at which
time command execution will be aborted. When this occurs, the mes-
sage **LINE FAILURE** is displayed to the operator.

The *TIMEOUT* command is not used with the XMODEM protocol and
XMODEM protocol uses fixed timeout values of 10 seconds when
receiving files and 70 seconds when sending files.

File
Transfer

If the *TIMEOUT* command is entered in the command edit or command execution mode, the following data entry format is displayed:

```
15   SECONDS
```

The cursor is positioned to the *SECONDS* data entry field. Entering a **RETURN** accepts the current value displayed. Otherwise a value from 1 to 255 seconds may be entered. After the **RETURN** key is pressed in the command edit mode, the *TIMEOUT* command is added to the current command file. In the command execution mode, the current timeout interval is reset to the specified value. The default value for the *TIMEOUT* interval if not specified is 15 seconds.

If the **S1 X** operator abort function is entered while a file transfer command is timing out, the timeout interval must expire before the operator abort request is detected.

XMIT:WAIT

The *XMIT:WAIT* command is used to transmit a user-specified character string and/or wait to receive a user specified character string as a response. This command is useful where *handshaking* is required to synchronize the file transfer operation.

If the *XMIT:WAIT* command is entered in the command edit or execution mode, the following data entry format is displayed:

```
XMIT:
WAIT:
```

The cursor is positioned to the string entry field just to the right of the label *XMIT:*. A string of up to 35 characters may be entered to be transmitted. The *XMIT* string is optional, and if not defined, no data will be transmitted. The **RETURN** or **S1** $\rightarrow$ or **S1** $\leftarrow$ keys may be used to position the cursor to the *WAIT:* data entry field. The *WAIT:* entry field allows a string of up to 35 characters to be defined which must be received to allow command execution to continue. The WAIT string is optional and if not defined, no wait will occur. All other characters received while waiting for the specified string are ignored. If the specified *WAIT* string is not received within the current *TIMEOUT* interval, command execution is aborted.

Once both the *XMIT* and *WAIT* strings have been specified, pressing the **S1 RETURN** key adds the *XMIT:WAIT* command to the current command file in the command edit mode. In the command execution mode, the *XMIT* string if defined is transmitted, and Softerm then waits for the *WAIT* string to be received if defined. Once the *WAIT* string is received or if no *WAIT* string has been specified, command execution continues with the next command.

Command Files

Softerm line mode file transfer provides two methods of executing file transfer commands. The first is an *interactive* command execution mode in which Softerm file transfer commands are executed as they are entered. The second is a *deferred* command execution mode in which *macro command files* can be created which contain multiple file transfer commands. A macro command file can be executed as needed simply by specifying the name of the file. This allows complex file transfer sequences to be pre-defined and executed whenever they are required.

The size of a single command file is limited only by the amount of memory available to contain the macro file when editing. The *CHAIN* command discussed in the Command Language section allows command files to be *linked* together providing a virtually unlimited capability. A buffer area of 4096 bytes is provided for editing of macro command files. This allows a range of approximately 40 to 200 commands to be contained within a single file transfer macro file. When editing a macro command file, if the available memory space is exhausted, the message **BUFFER FULL** is displayed to the operator.

When a file transfer macro command file is executed, it is *not* loaded into the file transfer buffer. Instead, each command is read from the disk file and executed as required. The operation of file transfer macro command files is very similar to the DOS EXEC file operation. Since file transfer commands are interactively read from disk as they are executed, the disk containing the macro file must remain loaded during the execution of the macro.

Since file transfer command files actually execute from disk, care must be taken when attempting certain types of file transfer. For example, a command to a host computer to begin transmitting a file should not be done with a *XMIT:WAIT* command followed by a *RECEIVE* command to capture the data. Since the *RECEIVE* command must be read from disk after the *XMIT:WAIT* command has been executed, there is a possibility that data may be missed. Instead, the *XMIT* string available within the *RECEIVE* command should be used to transmit the host computer command.

The loading, saving, and editing of command files is described in the sections that follow.

Line File Transfer Options

The **S1 4** keyboard functions is utilized to access the Softerm line file transfer capability. If a **S1 4** keyboard function is entered from the online terminal operation mode, the following menu is displayed:

```
          SOFTERM LINE FILE TRANSFER
     VOLUME O      DRIVE  1       SLOT 6
FILE:
OPTION:    9
           1—DISK UTILITIES
           2—NEW
           3—LOAD
           4—EDIT
           5—SAVE
           6—EXECUTE
           7—COMMAND EXECUTION
           8—PRINT
           9—LOCAL
```

The default option for this menu is *9—LOCAL* which displays the Softerm local file transfer menu. This option may be selected by simply pressing the **RETURN** key. Each option on the *Softerm Line File Transfer* menu is explained in the following paragraphs.

1—Disk Utilities

The disk utilities option allows a selection of DOS, CP/M, and Pascal disk commands to be executed without exiting the Softerm program. These include *INIT, CATALOG, DELETE, RENAME, LOCK*, and *UNLOCK*. The utilization of this option is covered in detail in Chapter 3 on Terminal Operation.

2—New

If the option *2—NEW* is selected, the current *macro command file* contained in memory is erased. The *FILE:* display field at the top of the screen is also cleared. This option should be used after a *save* operation to clear the current macro command file being edited from memory to allow a new macro command file to be edited.

3—Load

If the option *3—LOAD* is selected, The cursor is positioned to the string entry field just to the right of the label *FILE:* near the top of the display just before the option selection. Enter the filename of a *previously* saved file transfer macro command file to be loaded into memory for editing.

If the current *VOLUME, DRIVE, SLOT*, and *DRIVE* are not the desired values, the **RETURN** or **S1** → and **S1** ← may be used to position the cursor to the desired parameter entry field. If a disk format other than DOS is specified for the *VOLUME* parameter, the message **DISK TYPE MUST BE DOS** is displayed.

Once the *VOLUME, DRIVE, SLOT*, and *FILENAME* fields have been correctly specified, pressing the **S1 RETURN** key will cause the designated file transfer macro command file to be read into memory. As an example, the macro command file *SOFTERM.HOOKUP* which is used to access the Softronics online update service described in Appendix E may be loaded.

If this option has been chosen accidentally, **S1 X** may be pressed which will return the cursor to the *OPTION:* selection in the menu without affecting the current file transfer macro in memory.

If the requested file transfer macro file does not exist, the error message **FILE NOT FOUND** is displayed. This is a standard DOS type error message and the user should refer to *The DOS Manual* for this and other DOS errors which may occur. If any DOS errors occur during the loading of a file transfer macro file, memory is erased just as if the *2—NEW* option had been selected. Any previous file transfer macro file contained in memory is always erased by the execution of the *3—LOAD* option.

Another type of error can occur when the filename entered is a valid DOS filename on disk, but is not actually a Softerm file transfer macro file. In this case the error message **FILE TYPE MISMATCH** is displayed. Pressing the **ESC** key will clear this message and return the cursor to the *OPTION:* selection.

Once the requested file transfer macro is successfully loaded, the cursor is repositioned to the *OPTION:* selection for further action. At this time, the *4—EDIT* option may be selected to perform any required editing or the *8—PRINT* option may be selected to print the contents of the file transfer macro.

4—Edit

The *4—EDIT* option from the line mode file transfer menu is used to *create* a new file transfer macro or to *edit* an existing file transfer macro file which has been loaded into memory.

```
        INSERT YOUR SYSTEM DISK
        PRESS RETURN WHEN READY

    VOLUME  0     DRIVE  1      SLOT 6
```

The Softerm System Diskette or other user diskette which contains the file *EDIT:SOFTERM FILE TRANSFER*. The *VOLUME*, *DRIVE*, and *SLOT* parameters may be modified before pressing the **RETURN** key. To change the *VOLUME*, press the → or ← keys repeatedly until the volume number changes to the desired volume. A volume number of 0 indicates that any volume number is acceptable. To change the *DRIVE*, press the **D** key which will toggle the drive number between 1 and 2. To change the *SLOT*, press the **S** key which will toggle the slot number between 1 and 7. When the **RETURN** key is pressed, the file *EDIT:SOFTERM FILE TRANSFER* will be loaded into memory.

If there is no current file transfer macro command file in memory, the video display is cleared and the following screen is displayed:

```
EDIT: FILENAME
>
```

The cursor is positioned directly over the *edit mode prompt* character ">" waiting for a *single character* edit mode command to be entered. If editing a previously saved file transfer macro command file which has been loaded into memory, the first *five* commands of the file transfer macro are displayed in a 5-line *scrolling region* on lines 1-5 of the video display. The edit mode prompt in this case is positioned to the *last* command line displayed. The following table defines the *single character* edit mode commands which may be entered when the cursor is positioned directly over the *edit mode prompt* character ">". Each edit mode command is described in detail in the paragraphs that follow.

Edit Mode Command	Function
→	Move down 1 line
←	Move up 1 line
S	Scroll down 4 lines
U	Scroll up 4 lines
D	Delete File Transfer Command
I	Insert File Transfer Command
B	Move to Beginning
N	Move to End
Q	Quit—Return to menu

→ Move Down

The edit mode command → moves the edit mode prompt character down 1 command line in the *scrolling region*. The parameters if any are displayed in the center portion of the video display for the command line directly opposite the edit mode prompt.

If the edit mode prompt is at the fifth line in the scrolling region and there are additional command lines in the current macro command file being edited, the command file is scrolled up 1 line and the edit mode prompt remains on the fifth line in the scrolling region. If the edit mode prompt is at the fifth line in the scrolling region and there are no additional command lines in the current macro command file being edited, the display is scrolled up so that the edit mode prompt is on a blank line. The insert command **I** may then be used to add additional command lines to the current macro command file while the 5 previous command lines are still displayed in the scrolling region. Any attempt to move the edit mode prompt farther down is ignored.

The → command in combination with the ← edit mode command may be used to scroll up and down through the command file *viewing* each command and its associated parameters one command line at a time. The **S2 1** or **S2 2** keyboard functions may be used to print the current contents of the screen if required. The entire command file can be printed by the *8—PRINT* option on the line mode file transfer menu.

←Move Up

The edit mode command ← moves the edit mode prompt character up 1 command line in the *scrolling region*. The parameters if any are displayed in the center portion of the video display for the command line directly opposite the edit mode prompt.

If the edit mode prompt is at the first line in the scrolling region and there are additional command lines in the current macro command file being edited before the current position of the prompt, the command file is scrolled down 1 line and the edit mode prompt remains on the first line in the scrolling region. If the edit mode prompt is at the first line in the scrolling region and there are no previous command lines, the ← key is ignored.

S—Scroll Down

The edit mode command **S** moves the edit mode prompt character *down* 4 lines in the *scrolling region*. The display in the scrolling region is adjusted so that the edit mode prompt is positioned to the fifth command line. If less than 4 command lines can be scrolled, the edit mode prompt will be positioned to the last command line displayed.

U—Scroll Up

The edit mode command **U** moves the edit mode prompt character *up* 4 command lines in the *scrolling region*. The display in the scrolling region is adjusted so that the edit mode prompt is positioned to the fifth command line. If less than 4 command lines can be scrolled, the first five lines of the command file will be displayed and the edit mode prompt is positioned to the fifth command line.

D—Delete

The edit mode command **D** deletes the current command line which is positioned directly opposite the edit mode prompt. If it is necessary to change a command line in the current file transfer macro command file, the command line must first be deleted, and a new command line inserted in its place. When **D** is entered to delete the current command line, the current command line is erased from the screen and any lines following the command line deleted will be scrolled upward. The edit mode prompt remains on the same line in the scrolling region so that successive lines may be deleted by entering **D** repetitively.

I—Insert

The edit mode command **I** allows additional file transfer command lines to be inserted anywhere in a macro command file including adding command lines to the end of the current macro. The edit mode prompt should be positioned using the $\rightarrow$ and $\leftarrow$ keys to the position it is desired to insert or add command lines. If inserting in the middle of the current macro command file, entering an **I** will clear the scrolling region and the cursor is positioned just to the right of the edit mode prompt. If inserting at the end of the current macro command file, the scrolling region is not cleared and the cursor is positioned just to the right of the edit mode prompt in its current position.

File transfer command verbs described previously in the section titled *Command Language and Execution* can now be entered. Each file transfer command line inserted must start with a legal file transfer command verb. The command verb may be abbreviated to the shortest unique string within the file transfer command language. Thus the command *XMIT:WAIT* may be abbreviated as an **X**. Following the command verb a space can be entered and any comment desired can be included on the command line up to the 35 character limit for a command line.

Pressing the **RETURN** key after entering a command line will cause the command line to be added to the current macro file if there are no parameters required or will cause additional parameter data entry formats to be displayed in the center portion of the screen. Once all parameter fields have been specified, the command will be added to the command file.

If the command verb entered on the command line is not understood, the message $\leftarrow$**INPUT ERROR** is displayed and the *arrow* will indicate the character position which did not match any legal command verb. The entry of command parameters may be aborted at any time using the **S1 X** keyboard function.

The following table lists the legal file transfer command verbs and their basic function. A full description of these commands and their associated parameters can be found in the *Command Language and Execution* section.

FILE TRANSFER
COMMAND VERBS FUNCTION

BREAK	Transmit Break Signal
CATALOG	Receive DOS, CP/M, or Pascal CATALOG
CHAIN	Execute New Macro File
CONFIGURE	Load New Configuration
CONVERSE	Conversational Terminal Mode
DIAL	Dial a Phone Number
END	End of File Transfer Macro
HANGUP	Disconnect, Lower DTR
LOG	Begin Logging
MONITOR	Initiate MONITOR Mode
NOLOG	End Logging
ONERR	On Error—Ignore, Abort, CHAIN
PAUSE	Delay n Seconds
PROMPT	Display Operator Message
RECEIVE	Receive a File
REMARK	Comment
RETRIES	Define Retry Count
SCHEDULE	Wait Until Date, Time
SEND	Transmit a File
SPECIAL	Define Special Character Translation or Encoding
SPEED	Define Transmit Character Delay
TIMEOUT	Define Timeout Interval
XMIT:WAIT	Transmit a String, Wait for Reply

B—Move to Beginning

The edit mode command **B** moves the edit mode prompt character to the *beginning* or first command line of the current macro command file. The insert command **I** may then be used to insert additional command lines before the first command line.

N—Move to End

The edit mode command **N** move the edit mode prompt character to the *end* of the current macro command file. The edit mode prompt will be placed on a blank line following the last command line in the file. The insert command **I** may then be used to add additional command lines at the end of the current command file.

Q—Quit

The edit mode command **Q** when entered exits the edit mode and returns to the line file transfer menu.

5—Save

If the option *5—SAVE* is selected, the cursor is positioned to the string entry field just to the right of the label *FILE:* near the top of the display just before the option selection. The current file transfer macro definition may be saved by entering a filename and pressing the **RETURN** key. If the *VOLUME, DRIVE,* and *SLOT* parameters displayed are not the desired values, the **RETURN** or **S1** → and **S1** ← may be used to position the cursor to the desired parameter entry field. Once the *VOLUME, DRIVE, SLOT,* and *FILENAME* parameters have been completely specified, entering **S1 RETURN** will cause the current file transfer macro definition to be saved.

When a new file transfer macro command file has been created or an existing macro file has been modified, it must first be saved before it can be executed using the *6—EXECUTE* line file transfer option. All macro command files are executed from disk like DOS EXEC files, and any command file in memory would be lost if a file is executed before the current command file in memory is saved. The *5—SAVE* operation does *not* clear the current file transfer macro from memory.

If this option has been chosen accidentally, **S1 X** may be pressed which will return the cursor to the *OPTION:* selection in the menu without causing a *save* operation.

If the entered file transfer macro filename already exists, the query **DELETE EXISTING FILE?** will appear at the bottom of the display. Entering an **N** or pressing **RETURN** indicates that you do *not* wish to delete the file. The cursor will return to the *OPTION:* selection for further action. If **Y** is entered for the *DELETE EXISTING FILE* query, the old file with the same filename will be deleted and the current file transfer macro definition will be written to disk.

If an **I/O ERROR** occurs during the saving of a file transfer macro file, the appropriate error message will be displayed. Pressing the **ESC** key will clear the error message and return the cursor to the *OPTION:* selection. The current file transfer macro definition is not affected by the error, and the save function may be repeated after correcting the disk problem.

Once the file transfer macro file is successfully saved, the cursor is repositioned to the *OPTION:* selection for further action.

6—Execute

If the *6—EXECUTE* option is selected, the cursor is positioned to the string entry field just to the right of the label *FILE:* near the top of the display just before the option selection. Enter the filename of the file transfer macro command file to be executed and press the **RETURN** key. If the *VOLUME*, *DRIVE*, and *SLOT* parameters displayed are not the desired values, the **RETURN** or **S1** → and **S1** ← may be used to position the cursor to the desired parameter entry field. Once the *VOLUME*, *DRIVE*, *SLOT*, and *FILENAME* parameters have been completely specified, entering **S1 RETURN** will cause the designated file transfer macro to begin execution.

If this option has been chosen accidentally, **S1 X** may be pressed which will return the cursor to the "OPTION:" selection in the menu without initiating the macro file command execution mode.

If the requested filename does not exist, the message **FILE NOT FOUND** will be displayed. Pressing the **ESC** key will return to the *OPTION:* selection for further action. If the requested filename exists, but is not a file transfer macro command file, the message **FILE TYPE MISMATCH** is displayed. Otherwise, Softerm will initiate execution of the specified file transfer macro command file. Once the file transfer macro begins execution, the screen is cleared, and the following screen is displayed:

```
EXECUTE: FILENAME
>
```

The current macro filename being executed is indicated just to the right of the *EXECUTE:* label at the top of the screen. The command execution mode *prompt* character ">" will point to the current command line being executed.

Command lines are displayed in a scrolling region in lines 1-5 as they are executed. Any parameters associated with each command line are displayed in the center portion of the screen as the command is executed. Refer to the section on *Command Language and Execution* for a description of the function and execution of each command verb.

The command execution mode may be aborted at any time by entering **S1 X** which will terminate the current macro execution and return to the line file transfer menu. Any **I/O ERRORS** while reading the macro command file will cause an appropriate error message to be displayed, and command execution to be aborted after pressing the **ESC** key to clear the error message. If the data associated with any command line is found to be invalid, macro execution is aborted.

Once the last command in the file transfer macro command file has been executed, or an *END* command is encountered, command execution will terminate and return to the line mode file transfer menu.

7—Command Execution

The *7—COMMAND EXECUTION* option allows file transfer commands to be executed *interactively*. If selected, the following screen is displayed:

    EXECUTE:
    >

The cursor is positioned just to the right of the command mode *prompt* ">". Any of the file transfer commands may be entered and executed interactively. Refer to the section titled *Command Language and Execution* for a complete description of the entry, parameters, and execution of each file transfer command.

If a **S1 X** is entered during the entry of file transfer command parameters before the command has begun execution, the command will be cancelled and the cursor will return to the execution mode prompt and a new command may be entered. If a **S1 X** is entered during the execution of a command, the execution is aborted and control is returned to the line mode file transfer menu.

If a *CHAIN* command is executed during interactive command execution, it will have the same result as the *6—EXECUTE* option for executing macro command files. The interactive command execution mode is terminated and Softerm will begin executing the specified macro command file.

When interactive command execution is complete, enter an *END* command to return to the line mode file transfer menu.

8—Print

If the *8—PRINT* option is selected, the current macro command file contained in memory as a result of the *3—LOAD* command or edit mode entry is printed. The resulting printout will include all commands and their associated parameters contained in memory just as they appear on the video display. The commands and parameters will be displayed on the video screen as they are printed.

If the file *EDIT:SOFTERM FILE TRANSFER* has not been loaded into memory by previously selecting the *4—EDIT* option, the following screen will be displayed:

```
        INSERT YOUR SYSTEM DISK
        PRESS RETURN WHEN READY

   VOLUME  O    DRIVE  1      SLOT 6
```

Insert the Softerm System Disk or other user disk which contains the file *EDIT:SOFTERM FILE TRANSFER* and press the **RETURN** key. Refer to the *4—EDIT* option for instructions on changing the current *VOLUME, DRIVE*, or *SLOT*.

If the current configuration does not include a printer, the message **NO PRINTER** is displayed. Otherwise, after the file transfer commands have been completely printed, the line file transfer menu is again displayed.

9—Local

If the **9—LOCAL** option is selected on the mode file transfer menu, the *Softerm Local File Transfer* menu will be displayed.

Using the Monitor Mode

The Softerm *monitor* mode provides a general-purpose interface for communicating with many different terminals and systems. The *MONITOR* command is used to place the Apple II system in the monitor mode. In this mode, the system can automatically answer incoming calls and accept requests through remote terminal or system interaction to transmit or receive files using the character, XMODEM, or Softrans protocols.

Character protocol allows files to be typed or accepted by the monitor, and the directory listed through a catalog function. The monitor can accept send and receive requests for files to be transmitted or received using the XMODEM protocol, popular with CP/M users. The serial parameters must be set for 8 data bits, 1 stop bit, and no parity for the proper operation of the XMODEM protocol. The Softrans protocol developed specifically for asynchronous file transfers can communicate with the monitor to execute *SEND*, *RECEIVE*, and *CATALOG* commands from another Apple II system using Softerm.

The monitor mode is initiated by entering the *MONITOR* command in the file transfer command execution mode or by executing a file transfer macro which contains a *MONITOR* command. Once the monitor mode is initiated, Softerm will wait for a connection to be established if not already present, display a *READY* message, and wait for requests received through remote terminal interaction or the Softrans protocol. A system in the monitor mode functions in a passive manner, responding only to requests from the calling terminal or system. The monitor mode allows completely unattended operation and error messages will be briefly displayed but do not require operator intervention. If logging is active, all commands executed including error messages will be recorded in the log file.

The *TIMEOUT* and *RETRIES* file transfer commands do not affect the *MONITOR* command which has fixed timeout and retry parameters for all protocols supported. The Softrans protocol and XMODEM receive operations use a 10 second timeout interval and allow for 10 retries. XMODEM send operations will timeout after approximately 70 seconds. The character protocol uses a 30 second timeout on transmit and a 60 second timeout on receive. A dial up connection will be automatically disconnected after 5 minutes of no activity in the *READY* state.

Once the monitor mode is initiated, it will remain active until terminated by a **S1 X** keyboard function, or by pressing the **RESET** or **S1 CTRL R** keys.

Monitor Mode Interactive Commands

The monitor mode responds to 12 high level interactive commands which are entered in the terminal communications mode at the remote system or terminal. The monitor mode will transmit a *READY* prompt when it is ready to receive a command. The monitor will respond to **CTRL S** requests to stop the display of data and **CTRL Q** requests to resume the display of data. No editing control characters are available while entering commands. If a mistake is made while entering a command, just press **RETURN**. The monitor will "beep", display a ? and a new *READY* prompt for any command not recognized. To abort the display of a file typed or a catalog, press **CTRL S** and wait 30 seconds. The monitor mode will timeout after 30 seconds and redisplay the *READY* prompt.

Many of the monitor mode interactive commands require arguments. The command and argument must be separated by at least one space. The following commands are available in the monitor mode:

VOLUME <volume number>
The *VOLUME* command specifies the disk format to be used with subsequent monitor mode commands. The *<volume number>* argument is a volume number from 0-254 to indicate DOS disk format and the DOS volume number, the characters *CPM* for CP/M disk format, and the characters *PAS* for Pascal disk format.

DRIVE <drive number>
The *DRIVE* command specifies the physical disk drive number to be used with subsequent monitor mode commands. The *<drive number>* argument can be a **1** or a **2**.

SLOT <slot number>
The *SLOT* command specifies the physical slot number of the disk controller to be used with subsequent monitor mode commands. The *<slot number>* argument must be in the range 1—7 and is validated to insure the presence of a disk controller.

CURRENT
The *CURRENT* command will display the current settings of the *VOLUME*, *DRIVE*, and *SLOT* commands for the monitor mode.

CATALOG <filename specification>
The *CATALOG* command displays a list of the filenames on the currently selected disk which match the *<filename specification>* argument. If no argument is specified, all files on the selected disk will be listed. The wildcard characters = and ? may be used in the filename specification to select a subset of the files on the selected disk to be listed. The = and ? function in an identical manner in the the monitor mode and no confirmation message is displayed.

DIR <filename specification>
The *DIR* command is equivalent to the *CATALOG* command.

TYPE <filename specification>

The *TYPE* command will cause a file to be typed or displayed to the remote system. The command is the equivalent of a character protocol *SEND* command. Wildcard characters = and ? may be used in the <*filename specification*> required as an argument, but only the first matching file will be typed and no confirmation message is displayed. The display of a file can be aborted by entering **CTRL S** to stop the display, and then waiting for the 30 second timeout to expire.

ACCEPT <filename>

The *ACCEPT* command is used to send a file to a system in monitor mode using character protocol. The <*filename*> argument specifies the name of the file to receive the data. The monitor will display a *GO*> prompt when the system is ready to accept data. Characters can be typed on the remote terminal or system or a file can be transferred using character protocol. The *ACCEPT* command is terminated by a **CTRL Z** character or a 60-second timeout.

XSEND <filename specification>

The *XSEND* command will cause a file to be transmitted using the XMODEM protocol. The command is the equivalent of an XMODEM protocol *SEND* command. Wildcard characters = and ? may be used in the <*filename specification*> required as an argument, but only the first matching file will be transmitted and no confirmation message is displayed.

XRCV <filename>

The *XRCV* command allows a file to be received by the monitor using the XMODEM protocol. The command is the equivalent of the XMODEM protocol *RECEIVE* command. The <*filename*> argument specifies the file to receive the data.

ECHO <ON or OFF>

This command turns echo mode for the *ACCEPT* command on or off. If the argument is specified as *ON*, characters transmitted to the monitor using an *ACCEPT* command will be echoed back for visual confirmation to the remote terminal or system. If the argument is specified as *OFF*, characters received are not echoed.

LF <ON or OFF>

This command turns the line feed mode for the *TYPE* and *ACCEPT* monitor mode commands on or off. If the argument is specified as *ON*, the monitor will add line feed characters after carriage returns in transmitted or echoed data. If the argument is specified as *OFF*, no line feed characters are added.

Monitor Mode Status Display

During *MONITOR* operations using the character, XMODEM, and Softrans protocols, the following status information is displayed on line 22:

```
CHARS      0 BLOCKS      0 ERRORS      0
```

The *CHARS* field displays the current *character count* of characters transmitted. When using Softrans or XMODEM protocol, this count reflects the current count of characters sent or received from the source file and not the actual count of characters transmitted on the communications line. This allows visual monitoring of how much of the source file has been sent. The *CHARS* count when using character protocol reflects the actual character count of characters transmitted on the communications line.

The *BLOCKS* field displays the current *block count* transmitted for the XMODEM or Softrans protocols. If a character protocol *SEND* command is executed which specifies an end of block terminator string, the block count will increment each time the terminator string is transmitted even if no acknowledge string has been specified. The block count is not applicable to the character protocol receive operation since characters are received in a streaming mode. The *ERRORS* count when using character protocol is incremented on any type of character error including parity, framing, or overrun errors. The *ERRORS* count when using Softrans or XMODEM protocol is incremented only once per block in error and on timeouts.

Apple to Apple File Transfers

Apple to Apple file transfers are accomplished by placing one of the two systems in the monitor mode using the file transfer *MONITOR* command. The other system can then establish a connection using the *DIAL* command from file transfer mode or the dial utilities from the online terminal mode with the agreed upon serial parameters. Once connected, the system in monitor mode will transmit the *READY* message to the other system.

The monitor mode will respond to commands entered by the remote system through terminal interaction, or to Softrans file transfer commands *SEND*, *RECEIVE*, and *CATALOG* entered through interactive file transfer command execution or file transfer macro command file execution. The Softronics Online Update Service described in Appendix E utilizes the monitor mode to update Softerm users with the latest enhancements and additions.

Using SOFTRANS.FORT

Included on the back side of the Softerm System Diskette is the FORTRAN 77 source program *SOFTRANS.FORT*. This program when compiled and adapted for use on a host computer system allows files to be transferred to and from an Apple system using the Softrans protocol. When the program is executed on the host computer, it functions in a similar manner to the Softerm *MONITOR* command, and accepts *SEND*, *RECEIVE*, and *CATALOG* command requests from Softerm.

The SOFTRANS.FORT program supplied with Softerm includes standard modules which are common to each host computer adaptation and comprise the main portion of the Softrans program. Also included as an example of a specific host computer adaptation are modules which interface to the main SOFTRANS.FORT program and provide Softrans capability for the Data General AOS operating system. To adapt the SOFTRANS.FORT program for a specific host computer, certain subroutines must be provided for the I/O interface to the target operating system. Once these have been written and combined with the main portion of the program, the Softrans protocol can be used. Instructions and additional information concerning the SOFTRANS.FORT program are contained in the file *SOFTRANS.INFO*.

Softronics maintains a library of host computer versions of the SOFTRANS.FORT program which have been contributed by Softerm users. These versions are available on diskette for a charge of $10.00 each which includes the diskette media and shipping and handling charges. These versions are provided by Softronics as a service to its users, but the responsibility for implementing the program on a particular host computer system lies entirely with the user. Contact Softronics for additional information on host computer and operating system versions of the SOFTRANS.FORT program available.

The source modules for the SOFTRANS.FORT program must be transferred to the host computer system using the character protocol. This is usually done using an editor or other utility on the host computer which allows lines of input to be copied from a terminal to a file. For example, if a host computer has a *COPY* <*destination*> <*source*> utility command, the terminal can be specified as the source and a file can be specified as the destination. Using the character protocol *SEND* command, the *EOB* terminator string could be specified as carriage return (↑M), and the the *ACK* acknowledge string could be specified as line feed (↑J). The *COPY* command could be executed on the host computer and a corresponding *SEND* command for each file transferred to the host computer system.

**File
Transfer**

Chapter 5
Terminal Emulation

Introduction

One of the most important capabilities Softerm provides is terminal
emulation of CRT terminals. Softerm 1 includes the general-purpose
TTY compatible terminal emulation *SOFTERM.TERMINAL*. This termi-
nal emulation is built-in to Softerm 1 and provides user-definable
terminal functions including answerback, clear screen, erase to end of
screen, erase to end of line, inverse video on, inverse video off, home
cursor, cursor left, cursor right, cursor up, cursor down, and direct
cursor addressing in a choice of formats. Many CRT terminals can be
adequately emulated using these functions.

Softerm 2 provides in addition to the *SOFTERM.TERMINAL* emulation,
exact emulations (within the limits of the hardware) of a selection of
popular CRT terminals. The emulations included with Softerm 2 pro-
vide most standard features and many extended features of the termi-
nals emulated including local printer support where applicable. Even
functions which Softerm cannot provide are processed as if these
features were present so that *all* function character codes are recog-
nized and handled properly.

The Apple II keyboard is the most restrictive hardware limitation when
providing terminal emulations for the Apple II computer. Since many
terminals have individual keys for special functions provided including
cursor control, editing, and user defined functions, any emulation
provided using the Apple keyboard will require a method of keyboard
emulation as well as display functions. Softerm 1 and 2 include a
keyboard expander expressly for this purpose. Softerm 1 includes a
2-key keypad and Softerm 2 includes a 3-key keypad which is used not
only for accessing Softerm extended functions, but to provide emula-
tion of terminal keyboard functions. The additional keys function as
SHIFT keys and allow all Softerm and terminal emulation keyboard
functions to be performed in a single keystroke when used in combina-
tion with the main keyboard. Since all Softerm functions are initiated
using the keyboard expander, the Apple keyboard can be used
transparently including all **CTRL** and **SHIFT** combinations. Softerm 2
terminal emulations define key sequences using the keyboard ex-
pander for *all* keyboard generated functions on the terminals emulated.

Another restrictive hardware limitation when providing terminal emulations on the Apple II is the 40-column video presentation when emulating 80-column terminals. Softerm handles this limitation by allowing the user to view either columns 1-40 or columns 41-80 using a **S1 O** function key to switch to the *other* half. Also Softerm *automatically* switches to the half which contains the cursor after no keyboard or line activity for approximately 1 second. Apple 40-column video provides normal, inverse, and flashing video modes but the flashing mode supports only a limited character set and many character codes display incorrectly when flashing. Softerm supports only the normal and inverse modes when Apple 40-column video is used.

Softerm 2 supports video attributes including reverse video, high and low intensity, blinking, and underlining if available as a hardware feature of the video interface supported by Softerm display drivers. Softerm includes display drivers for most popular 80-column boards available for the Apple II computer. Although a video interface may not support video attributes included in a terminal emulation, Softerm processes these functions in all terminal emulations as if the video interface supported these features. Softerm stores video attribute information on a *character by character* basis in its own internal display image so that other functions such as *print high intensity* are processed correctly. Terminals which provide line drawing, limited graphics, or point-addressable graphics when emulated by Softerm do not include these capabilities.

Terminal Characteristics

Half Duplex Operation

Some terminals offer a *half duplex* mode of operation which permits transmitting of data in only one direction at a time on the communications line. The line must be *turned around* between messages so that the other station has an opportunity to transmit. The turnaround usually occurs after a special character such as EOT (end of transmission) is transmitted or received. Half duplex also requires that the control signal RTS (request to send) is raised when the terminal transmits and lowered when the transmission completes. Softerm does *not* support this type of half duplex operation. Softerm operates only in a *full duplex* mode in which the control signal RTS is asserted any time the terminal is online.

Softerm does support a half duplex mode also known as *echoplex*. In this mode characters are *echoed* to the display and processed locally as well as transmitting the character codes to the host computer. However, the communications line functions in a full duplex manner and no line turnarounds occur.

Printer Pass Through

Some terminals include host-controlled *printer pass through* or *auxiliary port* capability which allows all data received on the serial communications line to be *simultaneously* displayed and printed. Some offer a mode in which the data is sent only to the printer and not the video display. Softerm 1 and 2 include a similar capability as a standard feature enabled by the **S2 3** and **S2 4** keyboard functions. The use of these functions is described in Chapter 3 on terminal operation.

Softerm 2 includes specific support for terminal or host-controlled printer pass through provided by the terminals emulated if a printer driver other than *NULL.PIO* is included in the configuration. The specific printer pass through capability can also be enabled manually if the terminal includes a keyboard function for this purpose.

If the *FIRMWARE.PIO* or *APPLE SERIAL.PIO* printer drivers are specified in the configuration, data is *not* simultaneously printed as it is received in printer pass through mode. Instead, the data is buffered in memory until memory is filled at which time the serial communications is temporarily suspended by the pacing control method specified in the configuration and the data is printed. After the data in memory is printed, receipt of data from the communications line is automatically resumed. The captured data in memory is also automatically printed if a function sequence is received from the host computer which terminates or disables printer pass through.

Terminal Emulation Parameters

Several options are provided with Softerm to enhance the use of the terminal emulations supported and to provide additional capability. These include pacing control using DTR or XON/XOFF, automatic carriage returns after line feeds, automatic line feeds after carriage returns, automatic line wraparound, page mode or scrolling, defining the **RETURN** key to generate either a carriage return, line feed, or carriage return and line feed, and specifying the host XON and XOFF character codes. These options are explained in detail in Chapter 2 on terminal setup.

The following *terminal emulation parameters* may be defined for each terminal emulation provided with Softerm. The user should edit these values if different parameter settings are desired in terminal setup before saving a configuration.

```
===== TERMINAL EMULATION PARAMETERS =====

PACE CTRL: DTR   N    XON/XOFF          Y
CR AFTER LF      Y    LF AFTER CR       N
RETURN = CR(0),  LF(1) OR CR/LF(2)      0
AUTO LINE WRAP   Y    PAGE MODE         N
HOST XON         $11 HOST XOFF          $13
```

Limitations

Each terminal emulated by Softerm 2 may have specific functions or capabilities which cannot be provided. Refer to the descriptions of individual terminal emulations for additional information on limitations.

Standard Keyboard Functions

Softerm utilizes a standard definition of keyboard functions which is consistent within the terminal emulations provided. The **S1** and **S2** keys are used for all standard terminal emulation keyboard functions used by Softerm 1 and 2. The **S3** key is used to provide extended terminal emulation keyboard functions for specific terminal emulations included with Softerm 2. Standard keyboard functions used with Softerm 1 and 2 are described in Chapter 3 on terminal operation. Each terminal emulation described in this chapter includes a *keyboard function table* specifically defining the standard and extended function key definitions for that emulation. The standard keyboard functions defined for each terminal emulation are as follows:

Keyboard	Function
RETURN	CR, LF, or CR/LF Emulation Option
S1 →	Cursor Right
S2 →	Cursor Down
S1 ←	Cursor Left
S2 ←	Cursor Up
S1 ↑	Cursor Up (Apple IIe)
S1 ↓	Cursor Down (Apple IIe)
S1 CTRL B	Boot
S2 CTRL B n	Boot from Slot n
S1 CTRL R	Soft RESET
S1 ESC	DEL (Rubout)
S1 A	Send Answerback Message
S1 B	Erase to End of Screen
S1 C	Clear Screen
S1 E	Erase to End of Line
S1 H	Home Cursor
S1 K	BREAK
S1 L	Shift Toggle
S2 L	Shift Lock
S1 N	New Line (Line Feed)
S1 O	Display Other Half (40-Column)
S1 Q	Resume Display
S1 S	Stop Display
S1 V	View Terminal Status
S1 W c	Wait for Character c
S1 Z n	Delay n Seconds (0-9)
S1 S2 id	Execute Keyboard Macro
S1 S2 c	Transmit Control Character c

SOFTERM.TERMINAL

Introduction

Softerm includes a general purpose, TTY compatible terminal emulation which is provided primarily for Softerm Users who are accessing timesharing or information services which do not require a specific terminal. This terminal emulation is built-in to the Softerm 1 program and may be selected for use with Softerm 2 by entering *SOFTERM.TERMINAL* for the terminal emulation filename when generating a configuration in terminal setup.

Features

The *SOFTERM.TERMINAL* emulation provides TTY standard carriage return and line feed processing and allows for user definition of the most common terminal functions including answerback, clear screen, erase to end of screen, erase to end of line, inverse video on, inverse video off, home cursor, cursor left, cursor right, cursor up, cursor down, and direct cursor addressing in a choice of formats. Softerm standard keyboard functions will also transmit the characters defined for the corresponding terminal function whenever the keyboard function is executed. Terminal emulation functions adequate for many applications can be defined using this capability.

If *SOFTERM.TERMINAL* is selected as the terminal emulation, the following screen is displayed after the last standard screen in the *EDIT OPTIONS* processing in terminal setup:

```
        **** TERMINAL FUNCTION DEFINITIONS *****
        ANSWERBACK               $FF  $FF  $FF
        SCREEN CLEAR             $FF  $FF  $FF
        ERASE TO END OF SCREEN   $FF  $FF  $FF
        ERASE TO END OF LINE     $FF  $FF  $FF
        INVERSE VIDEO ON         $FF  $FF  $FF
        INVERSE VIDEO OFF        $FF  $FF  $FF
        HOME CURSOR              $FF  $FF  $FF
        CURSOR LEFT              $FF  $FF  $FF
        CURSOR RIGHT             $FF  $FF  $FF
        CURSOR UP                $FF  $FF  $FF
        CURSOR DOWN              $FF  $FF  $FF
        CURSOR ADDRESS           $FF  $FF  $FF
        CURSOR ADDRESS TYPE       O
                                  O — COLUMN/ROW
                                  1 — ROW/COLUMN
        CURSOR ROW BIAS          $OO
        CURSOR COLUMN BIAS       $OO
```

This data entry screen allows character sequences to be defined which provide standard Softerm terminal functions. If the defined character sequences are received during terminal operation, the corresponding function will be performed. The character sequences defined are also transmitted if the corresponding keyboard function is executed. For example, if the cursor left function is defined to be the ASCII BS character $08, whenever the **S1** ← keyboard function is executed, a $08 character is transmitted.

A 1 to 3 character sequence may be defined for each terminal function displayed. The **RETURN** or **S1** → and **S1** ← can be used to position the cursor to define characters the terminal functions. Character codes must be entered left to right in hexadecimal in the sequence which when received will cause the corresponding terminal function to be performed. If a function does not require three characters, the remaining characters for each terminal function should be defined as $FF. All characters for the function should be set to $FF if the function is not available. The functions *SCREEN CLEAR, ERASE TO END OF PAGE, ERASE TO END OF LINE, HOME CURSOR, CURSOR LEFT, CURSOR RIGHT, CURSOR LEFT*, and *CURSOR DOWN* correspond to standard Softerm keyboard functions. When executed, these functions will transmit the defined character sequence.

If the *ANSWERBACK* character sequence is received, the answerback string defined in the System Parameters in Terminal Setup will be transmitted. This function can be used for a TTY compatible automatic answerback capability, or to provide an identification response to the host computer.

The character sequence for the *INVERSE VIDEO ON* function if received will cause all subsequent data characters received to be displayed in inverse video until the character sequence which defines the *INVERSE VIDEO OFF* function is received or until a **RESET** or **S1 CTRL R** keyboard function is performed.

The *CURSOR ADDRESS* function defines the character sequence which when received will cause the cursor to be positioned to a specific row and column. The character sequence defined by the *CURSOR ADDRESS* function is assumed to precede a 2-character cursor position in either *COLUMN/ROW* or *ROW/COLUMN* order as defined by the option *CURSOR ADDRESS TYPE*. The *CURSOR ROW BIAS* and *CURSOR COLUMN BIAS* represent a value which has been added to the actual row and column values to form the characters received. As an example assume the terminal requires the sequence *ESC = ROW COLUMN* to position the cursor and the row and column values are biased by $20. The *CURSOR ADDRESS* should be set to **$1B $3D $FF**, the *CURSOR ADDRESS TYPE* selected should be **1**, and the *CURSOR ROW BIAS* and *CURSOR COLUMN BIAS* should be set to **$20**.

When editing of the terminal function definition screen for the *SOFTERM.TERMINAL* emulation is complete, enter the **S1 RETURN** keyboard function to return to the terminal setup menu.

Function Definition Example

Many timesharing and information services which require standard TTY terminal emulation also support additional features which can be defined using the *SOFTERM.TERMINAL* function definitions. For example, if the timesharing or information service uses form feeds ($0C) to clear the screen, a backspace character ($08) to move the cursor left, and an ENQ ($05) to trigger an automatic answerback, the *SOFTERM.TERMINAL* functions would be defined as follows:

```
        **** TERMINAL FUNCTION DEFINITIONS *****

        ANSWERBACK              $05 $FF $FF
        SCREEN CLEAR            $0C $FF $FF
        ERASE TO END OF SCREEN  $FF $FF $FF
        ERASE TO END OF LINE    $FF $FF $FF
        INVERSE VIDEO ON        $FF $FF $FF
        INVERSE VIDEO OFF       $FF $FF $FF
        HOME CURSOR             $FF $FF $FF
        CURSOR LEFT             $08 $FF $FF
        CURSOR RIGHT            $FF $FF $FF
        CURSOR UP               $FF $FF $FF
        CURSOR DOWN             $FF $FF $FF
        CURSOR ADDRESS          $FF $FF $FF
        CURSOR ADDRESS TYPE      0
                                 0 — COLUMN/ROW
                                 1 — ROW/COLUMN
        CURSOR ROW BIAS         $00
        CURSOR COLUMN BIAS      $00
```

SOFTERM.TERMINAL Keyboard Functions

The following defines the standard keyboard functions for the *SOFTERM.TERMINAL* emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	User Defined
S2 →	Cursor Down	User Defined
S1 ←	Cursor Left	User Defined
S2 ←	Cursor Up	User Defined
S1 ↑	Cursor Up (Apple IIe)	User Defined
S1 ↓	Cursor Down (Apple IIe)	User Defined
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Screen	User Defined
S1 C	Clear Screen	User Defined
S1 E	Erase to End of Line	User Defined
S1 H	Home Cursor	User Defined
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Terminal
Emulation

ADDS Regent 20

Introduction

The ADDS Regent 20 display terminal can be emulated using Softerm 2 by entering *ADDS REGENT 20* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the Regent 20 including the full 128 character set and 80 X 24 display, conversational half or full duplex transmission, all addressable cursor modes, auxiliary port operation with a printer, and special terminal command sequences.

Features

The display format of the ADDS Regent 20 is 24 lines by 80 characters with the ability to display all 128 ASCII character codes including 32 control codes in the *Monitor Mode*. Softerm does *not* support this mode. Transmission rates and parity settings are determined by the type of serial I/O interface available in the Apple II computer. Softerm supports all available keyboard functions including ESC, ERASE, NEW LINE, LINE FEED, BREAK, DEL and BACK SPACE. Additional keyboard functions are provided by Softerm for Cursor Up, Cursor Down, Cursor Forward, Cursor Home, Erase to End of Line, and Erase to End of Page.

Remote terminal commands supported by Softerm include Absolute Address, Horizontal Address, Vertical Address, Audible Tone, AUX port OFF, AUX port ON, Backspace, Cursor Back, Cursor Down, Cursor Forward, Cursor Home, Cursor Up, Erase All, Erase to End of Line, Erase to End of Page, Keyboard Lock, Keyboard Unlock, Line Feed, New Line (CR), Transparent Print OFF, and Transparent Print ON.

The remote terminal command *Store Control Character* which allows a control code to be stored in memory without interpretation by the terminal is *not* supported by Softerm. However Softerm will process the command sequence but the control code is not stored in display memory and the control character is discarded.

Switch selectable settings supported by Softerm include Auto Line Feed, Auto Scroll, Cursor Display, Full/Half-Duplex and Upper/Lower Case. Switch selectable settings *not* supported by Softerm include Audible Key Feedback, Character Display and International Character Set. The switch setting for Keyboard Lock/Unlock is *not* supported but Softerm will respond to *both* Regent 20 and Consul 580 keyboard lock/unlock functions.

Softerm includes support for the *Auxiliary Port* if Softerm includes a printer driver other than *NULL.PIO*. If either a *AUX port ON* or *Transparent Print ON* remote command is received, all subsequent data is sent to the printer until a *AUX port OFF* command is received. If a *Transparent Print OFF* command is received, the Auxiliary Port will be returned to the state it was in before the *Transparent Print ON* command was received. In the *transparent mode* data is sent only to the printer and not displayed, otherwise the received data is both displayed and printed. Refer to the description of printer pass through in the introduction of this chapter for additional information.

ADDS Regent 20 Keyboard Functions

The following defines the standard keyboard functions for the ADDS Regent 20 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Forward	$06
S2 →	Cursor Down	$0A
S1 ←	Backspace	$08
S2 ←	Cursor Up	$1A
S1 ↑	Cursor Up (Apple IIe)	$1A
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Page	$1B $6B
S1 C	Erase All	$0C
S1 E	Erase to End of Line	$1B $4B
S1 H	Home Cursor	$01
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

ADDS Regent 25

Introduction

The ADDS Regent 25 display terminal can be emulated using Softerm 2 by entering *ADDS REGENT 25* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the Regent 25 including the full 128 character set and 80 X 24 display, conversational half or full duplex transmission, all addressable cursor modes, auxiliary port operation with a printer, function pad, and special terminal command sequences.

Features

The display format of the ADDS Regent 25 is 24 lines by 80 characters with the ability to display all 128 ASCII character codes including 32 control codes in the *Monitor Mode*. Softerm does *not* support this mode. Transmission rates and parity settings are determined by the type of serial I/O interface available in the Apple II computer. Softerm supports all available keyboard functions including ESC, ERASE, NEW LINE, LINE FEED, BREAK, DEL and BACK SPACE. Additional keyboard functions are provided by Softerm for Cursor Up, Cursor Down, Cursor Forward, Cursor Home, Erase to End of Line, and Erase to End of Screen.

Remote terminal commands supported by Softerm include Absolute Address, Horizontal Address, Vertical Address, Audible Tone, AUX port OFF, AUX port ON, Backspace, Cursor Back, Cursor Down, Cursor Forward, Cursor Home, Cursor Up, Erase All, Erase to End of Line, Erase to End of Page, Keyboard Lock, Keyboard Unlock, Line Feed, New Line (CR), Transparent Print OFF, and Transparent Print ON.

The remote terminal command *Store Control Character* which allows a control code to be stored in memory without interpretation by the terminal is *not* supported by Softerm. However, Softerm will process the command sequence but the control code is not stored in display memory and the control character is discarded.

Switch selectable settings supported by Softerm include Auto Line Feed, Auto Scroll, Cursor Display, Full/Half-Duplex and Upper/Lower Case. Switch selectable settings *not* supported by Softerm include Audible Key Feedback, Character Display and International Character Set. The switch setting for Keyboard Lock/Unlock is *not* supported but Softerm will respond to *both* Regent 25 and Consul 580 keyboard lock/unlock functions.

Softerm includes support for the *Auxiliary Port* if Softerm includes a printer driver other than *NULL.PIO*. If either a *AUX port ON* or *Transparent Print ON* remote command is received, all subsequent data is sent to the printer until an *AUX port OFF* command is received. If a *Transparent Print OFF* command is received, the Auxiliary Port will be returned to the state it was in before the *Transparent Print ON* command was received. In the *transparent mode* data is sent only to the printer and not displayed, otherwise the received data is both displayed and printed. Refer to the description of printer pass through in the introduction of this chapter for additional information.

Softerm also includes support for the Regent 25 *function pad*. Normally a switch setting selects from three options for the 12-key numeric keypad allowing standard codes, or a choice of 2 function code sequences. Softerm supports all three modes simultaneously by allowing any of the resulting code sequences to be generated from the keyboard. **S3** and **S3 S2** are used to generate the optional function code sequences.

ADDS Regent 25 Keyboard Functions

The following defines the standard keyboard functions for the ADDS Regent 25 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Forward	$06
S2 →	Cursor Down	$0A
S1 ←	Backspace	$08
S2 ←	Cursor Up	$1A
S1 ↑	Cursor Up (Apple IIe)	$1A
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Page	$1B $6B
S1 C	Erase All	$0C
S1 E	Erase to End of Line	$1B $4B
S1 H	Home Cursor	$01
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 0	Keypad Function	$02 $30 $0D
S3 1	Keypad Function	$02 $31 $0D
S3 2	Keypad Function	$02 $32 $0D
S3 3	Keypad Function	$02 $33 $0D
S3 4	Keypad Function	$02 $34 $0D
S3 5	Keypad Function	$02 $35 $0D
S3 6	Keypad Function	$02 $36 $0D
S3 7	Keypad Function	$02 $37 $0D
S3 8	Keypad Function	$02 $38 $0D
S3 9	Keypad Function	$02 $39 $0D
S3 .	Keypad Function	$02 $2E $0D
S3 ,	Keypad Function	$02 $2C $0D

Keyboard	Function	Characters
S3 S2 0	Keypad Function	$1B $30
S3 S2 1	Keypad Function	$1B $31
S3 S2 2	Keypad Function	$1B $32
S3 S2 3	Keypad Function	$1B $33
S3 S2 4	Keypad Function	$1B $34
S3 S2 5	Keypad Function	$1B $35
S3 S2 6	Keypad Function	$1B $36
S3 S2 7	Keypad Function	$1B $37
S3 S2 8	Keypad Function	$1B $38
S3 S2 9	Keypad Function	$1B $39
S3 S2 .	Keypad Function	$1B $2E
S3 S2 ,	Keypad Function	$1B $2C

ADDS Regent 40

Introduction

The ADDS Regent 40 display terminal can be emulated using Softerm 2 by entering *ADDS REGENT 40* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the Regent 40 including the full 128 character set and 80 X 24 display, conversational half or full duplex transmission, all addressable cursor modes, auxiliary port operation with a printer, visual attributes, function keys, editing, and special terminal command sequences.

Features

The display format of the ADDS Regent 40 is 24 lines by 80 characters with the ability to display all 128 ASCII character codes including 32 control codes in the *Monitor Mode*. Softerm does *not* support this mode. The ADDS Regent 40 also incorporates a 25th line used as a *Status Line* which Softerm does not support. Transmission rates and parity settings are determined by the type of serial I/O interface available in the Apple II computer. Softerm supports all available keyboard functions including ESC, ERASE, NEW LINE, LINE FEED, BREAK, DEL, LOCAL, HOME, AUX, F1-F8, CURSOR CONTROLS and BACK SPACE. Additional keyboard functions are provided by Softerm for Erase to End of Line, and Erase to End of Page.

Remote terminal commands supported by Softerm include Absolute Address, Horizontal Address, Vertical Address, Set Video Attribute, Audible Tone, Backspace, Cursor Back, Cursor Down, Cursor Forward, Cursor Home, Cursor Up, Delete Line, Erase All, Erase to End of Line, Erase to End of Page, Insert line, Keyboard Lock, Keyboard Unlock, Line Feed, New Line (CR), Local Mode, Printer Off, Printer On, Read Status, Transparent Mode Disable, and Transparent Mode Enable.

The remote terminal command *Store Control Character* which allows a control code to be stored in memory without interpretation by the terminal is *not* supported by Softerm. However Softerm will process the command sequence but the control code is not stored in display memory and the control character is discarded. Other remote terminal commands which are recognized but not processed are On-Line Mode, Local Mode, Status Line Enable and Disable, and Video ON and OFF. If a *Line Drawing Mode Enable* command is received, all characters are ignored until a *Line Drawing Mode Disable* command is subsequently received.

Switch selectable settings supported by Softerm include Auto Line Feed, Auto Scroll, Cursor Display, Full/Half-Duplex and Line Terminator Character. Switch selectable settings *not* supported by Softerm include Character Display, Upper/Lower Case, Line Turnaround and Reverse Channel.

Softerm includes support for the *Auxiliary Port* if Softerm includes a printer driver other than *NULL.PIO*. If either a *Printer ON* or *Transparent Mode Enable* remote command is received, all subsequent data is sent to the printer until a *Printer OFF* command is received. If a *Transparent Mode Disable* command is received, the Auxiliary Port will be returned to the state it was in before the *Transparent Mode Enable* command was received. In the *transparent mode* data is sent only to the printer and not displayed, otherwise the received data is both displayed and printed. The Auxiliary port may also be enabled by the **S3 P** keyboard function which emulates the AUX Key capability of the Regent 40. Refer to the description of printer pass through in the introduction of this chapter for additional information.

Softerm supports the *Set Video Attributes* command and all visual attributes which can be supported by the video display driver being utilized. If the visual attributes are changed by this command, Softerm *re-displays* all character positions after the current cursor position up to the next video attribute or the end of screen.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
=== ADDS REGENT 40 EMULATION OPTIONS ===

LINE TERMINATOR CODE                    $0D
```

The emulation option *LINE TERMINATOR CODE* allows the character code(s) which terminate locally initiated *function key* sequences as well as the *Read Status* remote function to be defined. Entering a $0D will cause a *carriage return* (CR) to become the terminator. Entering a $03 will cause a *carriage return* and *end of text* sequence (CR/ETX) to be the terminator and Softerm will send $0D $03 after each function key sequence or status message. Entering a $04 will cause a *carriage return* and *end of transmission* sequence (CR/EOT) to be the terminator and Softerm will send $0D $04 after each function key sequence or status message.

ADDS Regent 40 Keyboard Functions

The following defines the standard keyboard functions for the ADDS Regent 40 emulation. The function key terminator code ($??) is set by the Regent 40 emulation option *LINE TERMINATOR CODE* described previously.

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Forward	$06
S2 →	Cursor Down	$0A
S1 ←	Backspace	$08
S2 ←	Cursor Up	$1A
S1 ↑	Cursor Up (Apple IIe)	$1A
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Page	$1B $6B
S1 C	Erase All	$0C
S1 E	Erase to End of Line	$1B $4B
S1 H	Home Cursor	$01
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S3 P	AUX	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	F1	$02 $31 $??
S3 2	F2	$02 $32 $??
S3 3	F3	$02 $33 $??
S3 4	F4	$02 $34 $??
S3 5	F5	$02 $35 $??
S3 6	F6	$02 $36 $??
S3 7	F7	$02 $37 $??
S3 8	F8	$02 $38 $??

Keyboard	Function	Characters
S3 S2 1	SHIFT F1	$02 $21 $??
S3 S2 2	SHIFT F2	$02 $22 $??
S3 S2 3	SHIFT F3	$02 $23 $??
S3 S2 4	SHIFT F4	$02 $24 $??
S3 S2 5	SHIFT F5	$02 $25 $??
S3 S2 6	SHIFT F6	$02 $26 $??
S3 S2 7	SHIFT F7	$02 $27 $??
S3 S2 8	SHIFT F8	$02 $28 $??

ADDS Regent 60

Introduction

The ADDS Regent 60 display terminal can be emulated using Softerm 2 by entering *ADDS REGENT 60* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the Regent 60 including the full 128 character set and 80 X 24 display, conversational half or full duplex transmission, buffered transmission in Page, Message, Forms, and Modify operating modes, all addressable cursor modes, auxiliary port operation with a printer, visual attributes, function keys, editing, and special terminal command sequences.

Features

The display format of the ADDS Regent 60 is 24 lines by 80 characters with the ability to display all 128 ASCII character codes including 32 control codes in the *Monitor Mode*. Softerm does *not* support this mode. The ADDS Regent 60 also incorporates a 25th line used as a *Status Line*. Since Softerm displays only 24 lines, the status line is displayed on the 24th line in response to a keyboard function. The previous data on the 24th line is saved and restored after viewing the status line. Transmission rates and parity settings are determined by the type of serial I/O interface available in the Apple II computer.

Softerm supports all available keyboard functions including BACKSPACE, TAB, BACK-TAB, DEL, NEW LINE, E ALL, EOF, ESC, LINE FEED, PRINT, AUX, RESET, XMIT, HOME, CURSOR FORWARD, CURSOR BACK, CURSOR UP, CURSOR DOWN, INS C, SHIFT-INS C, DEL C, SHIFT-DEL C, INS L, DEL L, and function keys F1—F8. The operating mode keys CONV, FORM, MSG, PAGE, and MODIFY, are supported through the Status Line Display which permits toggling of the operating mode.

Remote terminal commands supported by Softerm include Cursor Home, Cursor Forward, Audible Tone, Cursor Back, Tab, Cursor Down, Vertical Address, Erase All, Carriage Return, Horizontal Address, Printer On, Printer Off, Cursor Up, Set Video Attribute, Transparent Mode Enable, Transparent Mode Disable, Keyboard Lock, Keyboard Unlock, Modify Mode, Delete Character (Line/Field), Delete Character (Page), Insert Character (Line/Field), Insert Character (Page), Erase Variable Data, Must Tab Enable, and Must Tab Disable, Erase to End of Field/Line, Erase to End of Page, Delete Line, Insert Line, Back Tab, Forms Generation Mode, Page MOde, Message Mode, Conversational Mode, Print Variable, Print All, Absolute Address, Store Control Codes, Read Status, and Transmit.

Other remote terminal commands which are recognized but not processed are Set Aux Baud Rate, Status Line Disable, Status Line Enable, On-Line Mode, Off-Line Mode, and Video ON and OFF. If a *Line Drawing Mode Enable* command is received, all characters are ignored until a *Line Drawing Mode Disable* command is subsequently received or the **RESET** or **S1 CTRL R** key is pressed.

Switch selectable settings supported by Softerm include Auto Line Feed, Auto Scroll, Cursor Display, Cursor Blink, Full/Half-Duplex and Line Terminator Character. Switch selectable settings *not* supported by Softerm include Character Display, Upper/Lower Case, Line Turnaround and Reverse Channel.

Softerm includes support for the *Auxiliary Port* if Softerm includes a printer driver other than *NULL.PIO*. If either a *Printer ON* or *Transparent Mode Enable* remote command is received, all subsequent data is sent to the printer until a *Printer OFF* command is received. If a *Transparent Mode Disable* command is received, the Auxiliary Port will be returned to the state it was in before the *Transparent Mode Enable* command was received. In the *transparent mode* data is sent only to the printer and not displayed, otherwise the received data is both displayed and printed. The Auxiliary port may also be enabled by the **S3 P** Softerm function which emulates the AUX Key capability of the Regent 60. Refer to the description of printer pass through in the introduction of this chapter for additional information.

Softerm supports the *Set Video Attributes* command and all visual attributes which can be supported by the video display driver being utilized. If the video attributes are changed by this command, Softerm *re-displays* all character positions after the current cursor position up to the next video attribute or the end of screen.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
═══ ADDS REGENT 60 EMULATION OPTIONS ═══

LINE TERMINATOR CODE                    $0D
```

The emulation option *LINE TERMINATOR CODE* allows the character code(s) which terminate locally initiated *function key* sequences as well as the *Read Status* and *Transmit* remote functions to be defined. Entering a $0D will cause a *carriage return* (CR) to become the terminator. Entering a $03 will cause a *carriage return* and *end of text* sequence (CR/ETX) to be the terminator and Softerm will send $0D $03 after each function key sequence, status message, or transmit function. Entering a $04 will cause a *carriage return* and *end of transmission* sequence (CR/EOT) to be the terminator and Softerm will send $0D $04 after each function key sequence, status message, or transmit function.

Operator Status Display

The ADDS Regent 60 terminal emulation includes a status display similar to the *Status Line* displayed on line 25 of the Regent 60 terminal. Since Softerm supports only a 24 line screen, the status information is displayed only when a **S3 V** keyboard function is entered. The data on the 24th line is temporarily replaced by the status information, and when the **S1 X** or **S3 V** key is pressed, the original data is restored to the line. The status information displayed includes the *Operating Mode, Field Type, Attribute,* and *Row-Column Position.*

The *Operating Mode* setting can be *toggled* while the status is displayed by pressing the **M** key. For example, to toggle from the conversational mode to one of the buffered modes (message, page, forms, modify), first display the status by entering **S3 V** and then press the **M** key until the desired operating mode *(CONV, MSG, PAGE, FORMS, MODIFY)* appears in the operating mode field.

Terminal
Emulation

ADDS Regent 60 Keyboard Functions

The following defines the standard keyboard functions for the ADDS Regent 60 emulation. The function key terminator code ($??) is set by the Regent 60 emulation option *LINE TERMINATOR CODE* described previously.

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 RETURN	Transmit	
S1 →	Cursor Forward	$06
S2 →	Cursor Down	$0A
S3 →	Tab	$09
S1 ←	Backspace	$08
S2 ←	Cursor Up	$1A
S3 ←	Back Tab	$1B $4F
S1 ↑	Cursor Up (Apple IIe)	$1A
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Page	$1B $6B
S1 C	Erase All	$0C
S2 C	Erase Variable Data	$1B $47
S1 D	Delete Character (Line/Field)	$1B $45
S2 D	Delete Character (Page)	$1B $65
S3 D	Delete Line	$1B $6C
S1 E	Erase to End of Line/Field	$1B $4B
S1 H	Home Cursor	$01
S1 I	Insert Character (Line/Field)	$1B $46
S2 I	Insert Character (Page)	$1B $66
S3 I	Insert Line	$1B $4D
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S1 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 P	Print All	$1B $78
S2 P	Print Variable	$1B $58
S3 P	AUX	

Keyboard	Function	Characters
S1 Q	Resume Display	
S1 R	Reset Modified Field	
S1 S	Stop Display	
S1 V	View Terminal Status	
S3 V	View Regent 60 Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	F1	$02 $31 $??
S3 2	F2	$02 $32 $??
S3 3	F3	$02 $33 $??
S3 4	F4	$02 $34 $??
S3 5	F5	$02 $35 $??
S3 6	F6	$02 $36 $??
S3 7	F7	$02 $37 $??
S3 8	F8	$02 $38 $??
S3 S2 1	SHIFT F1	$02 $21 $??
S3 S2 2	SHIFT F2	$02 $22 $??
S3 S2 3	SHIFT F3	$02 $23 $??
S3 S2 4	SHIFT F4	$02 $24 $??
S3 S2 5	SHIFT F5	$02 $25 $??
S3 S2 6	SHIFT F6	$02 $26 $??
S3 S2 7	SHIFT F7	$02 $27 $??
S3 S2 8	SHIFT F8	$02 $28 $??

ADDS Viewpoint

Introduction

The ADDS Viewpoint display terminal can be emulated using Softerm 2 by entering *ADDS VIEWPOINT* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the Viewpoint including the full 128 character set and 80 X 24 display, conversational half or full duplex transmission, absolute cursor addressing, cursor control and function keys, auxiliary port operation with a printer including print transparent, erase functions, and tagged data for visual attributes.

Features

The display format of the ADDS Viewpoint is 24 lines by 80 characters with the ability to display all 128 ASCII character codes including 32 control codes in the *Monitor Mode*. Softerm does *not* support this mode. Transmission rates and parity settings are determined by the type of serial I/O interface available in the Apple II computer. Softerm supports all available keyboard functions including ESC, RETURN, TAB, BREAK, DEL, HOME, F1-F3, CURSOR CONTROLS and BACK SPACE. Additional keys or CTRL key sequences are provided by Softerm for Erase, Erase to End of Line, and Erase to End of Page.

Remote terminal commands supported by Softerm include Absolute Address, Set Video Attribute, Audible Tone, Backspace, Cursor Back, Cursor Down, Cursor Forward, Cursor Home, Cursor Up, Delete Line, Erase Screen, Erase to End of Line, Erase to End of Page, Keyboard Lock, Keyboard Unlock, New Line (CR), Tag Bit Reset, Tag Bit Set, Transparent Print Off, and Transparent Print ON.

The remote terminal command *Store Control Character* which allows a control code to be stored in memory without interpretation by the terminal is *not* supported by Softerm. However Softerm will process the command sequence but the control code is not stored in display memory and the control character is discarded.

Switch selectable settings supported by Softerm include Auto Line Feed, Auto Scroll, Cursor Display and Format, and Full/Half-Duplex. Switch selectable settings *not* supported by Softerm include Video Character Display, Audible Key Tone, Display Parity Error, and International Character Sets.

Softerm includes support for the *Auxiliary Port* if Softerm includes a printer driver other than *NULL.PIO*. If *Transparent Print ON* remote command is received, all subsequent data is sent to the printer until a *Transparent Print OFF* command is received. In the *transparent mode* data is sent only to the printer and not displayed.

The Auxiliary port may also be enabled by the **S3 P** keyboard function which emulates the standard print capability of the Viewpoint. Refer to the description of printer pass through in the introduction of this chapter for additional information.

Softerm supports the *Set Attribute* in conjunction with the *Tag Bit Set*, and *Tag Bit Reset* commands and all visual attributes which can be supported by the video display driver being utilized. If the current visual attribute is changed by the *Set Attribute* command, Softerm *re-displays* all *tagged* character positions on the screen.

ADDS Viewpoint Keyboard Functions

The following defines the standard keyboard functions for the ADDS Viewpoint emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Forward	$06
S2 →	Cursor Down	$0A
S3 →	Tab	$09
←	Backspace	$08
S1 ←	Cursor Back	$15
S2 ←	Cursor Up	$1A
S1 ↑	Cursor Up (Apple IIe)	$1A
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Page	$1B $6B
S1 C	Erase All	$0C
S1 E	Erase to End of Line	$1B $4B
S1 H	Home Cursor	$01
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S3 P	AUX	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	F1	$02 $31
S3 2	F2	$02 $32
S3 3	F3	$02 $33
S3 S2 1	SHIFT F1	$02 $21
S3 S2 2	SHIFT F2	$02 $22
S3 S2 3	SHIFT F3	$02 $23

Terminal Emulation

Data General D200

Introduction

The Data General DASHER D200 display terminal can be emulated using Softerm 2 by entering *DGC D200* for the terminal emulation filename when generating a configuration in terminal setup. The D200 emulation is compatible and may be used with any application which uses a Data General 6052, 6053, DASHER D100, or DASHER D200. All the models listed are upward compatible with the functions and features provided by the D200 display terminal.

Features

D200 keyboards can transmit the 96 displayable characters of the ASCII character set but only 30 of the 32 control characters. The two control characters the keyboard cannot independently transmit are the *unit separator* ($1F) and the *record separator* ($1E). These character codes are used as *header* codes for function sequences. Softerm allows *all* 128 ASCII character codes to be generated from the keyboard.

Display commands for the D200 are divided into five groups. These are screen control, cursor position, character attribute, terminal identification, and diagnostic and print commands.

Softerm supports all screen control commands with the exception of *enable blink* and *disable blink*, all cursor position commands, and all character attribute commands. However, since the character attribute commands include start and end commands for *blink, dim, underscore,* and *reverse video*, these features are available only if the display driver and video board utilized supports these features. The diagnostic commands *enter remote test* and *exit remote test* are *not* supported.

The terminal identification command *model report request* is supported and Softerm will respond with the following 6 character sequence if there is no printer in the configuration:

$1E,$6F,$23,$21,$52,$20

If the configuration includes a printer, the following sequence will be transmitted:

$1E,$6F,$23,$21,$4A,$20

Softerm supports all printer commands if a printer is configured on the system. This includes the *print form* command which prints only the information displayed at full intensity. Softerm internally flags characters which are displayed at high intensity even if the video board or display driver does not support this feature.

Terminal
Emulation

As an extended feature of the Softerm D200 emulation, the host-controlled *Enable Printer Pass Through* and *Disable Printer Pass Through* commands compatible with Data General D400 and D450 terminals is provided. If Softerm includes a printer driver other than *NULL.PIO* in the current configuration, the following three character sequence when received will enable the printer pass through mode:

Printer Pass Through Enable: $1E $46 $60

If printer pass through is enabled, the following three character sequence will disable printer pass through and return Softerm to normal display operation:

Printer Pass Through Disable: $1E $46 $61

Softerm will respond to the host computer with a $06 character when the disable printer pass through command is received and printing is complete.

The printer pass through enabled by the host computer operates in a *transparent* mode so that all data received is sent to the printer and not the display until the disable printer pass through function is received. Refer to the description of printer pass through in the introduction of this chapter for additional information.

Data General D200 Keyboard Functions

The following table defines the standard keyboard functions for the Data General D200 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	$18
S3 S1 →	SHIFT Cursor Right	$1E $18
S2 →	Cursor Down	$1A
S3 S2 →	SHIFT Cursor Down	$1E $1A
S3 →	Tab	$09
S1 ←	Cursor Left	$19
S3 S1 ←	SHIFT Cursor Left	$1E $19
S2 ←	Cursor Up	$17
S3 S2 ←	SHIFT Cursor Up	$1E $17
S1 ↑	Cursor Up (Apple IIe)	$17
S3 S1 ↑	SHIFT Cursor Up (Apple IIe)	$1E $17
S1 ↓	Cursor Down (Apple IIe)	$1A
S3 S2 ↓	SHIFT Cursor Down (AppleIIe)	$1E $1A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 C	Erase Page	$0C
S1 E	Erase to End of Line	$0B
S1 H	Home	$08
S3 S1 H	SHIFT Home	$1E $08
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 P	Print	$1E $11
S2 P	Print Form	$1E $01
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Keyboard	Function	Characters
S3 1	FK1	$1E $71
S3 2	FK2	$1E $72
S3 3	FK3	$1E $73
S3 4	FK4	$1E $74
S3 5	FK5	$1E $75
S3 6	FK6	$1E $76
S3 7	FK7	$1E $77
S3 8	FK8	$1E $78
S3 9	FK9	$1E $79
S3 0	FK10	$1E $7A
S3 Q	FK11	$1E $7B
S3 W	FK12	$1E $7C
S3 E	FK13	$1E $7D
S3 R	FK14	$1E $7E
S3 T	FK15	$1E $7F
S3 S2 1	SHIFT FK1	$1E $61
S3 S2 2	SHIFT FK2	$1E $62
S3 S2 3	SHIFT FK2	$1E $63
S3 S2 4	SHIFT FK4	$1E $64
S3 S2 5	SHIFT FK5	$1E $65
S3 S2 6	SHIFT FK6	$1E $66
S3 S2 7	SHIFT FK7	$1E $67
S3 S2 8	SHIFT FK8	$1E $68
S3 S2 9	SHIFT FK9	$1E $69
S3 S2 0	SHIFT FK10	$1E $6A
S3 S2 Q	SHIFT FK11	$1E $6B
S3 S2 W	SHIFT FK12	$1E $6C
S3 S2 E	SHIFT FK13	$1E $6D
S3 S2 R	SHIFT FK14	$1E $6E
S3 S2 T	SHIFT FK15	$1E $6F
S3 S1 1	CTRL FK1	$1E $31
S3 S1 2	CTRL FK2	$1E $32
S3 S1 3	CTRL FK3	$1E $33
S3 S1 4	CTRL FK4	$1E $34
S3 S1 5	CTRL FK5	$1E $35
S3 S1 6	CTRL FK6	$1E $36
S3 S1 7	CTRL FK7	$1E $37
S3 S1 8	CTRL FK8	$1E $38
S3 S1 9	CTRL FK9	$1E $39
S3 S1 0	CTRL FK10	$1E $3A
S3 S1 Q	CTRL FK11	$1E $3B
S3 S1 W	CTRL FK12	$1E $3C
S3 S1 E	CTRL FK13	$1E $3D
S3 S1 R	CTRL FK14	$1E $3E
S3 S1 T	CTRL FK15	$1E $3F

Keyboard	Function	Characters
S3 S2 S1 1	SHIFT CTRL FK1	$1E $21
S3 S2 S1 2	SHIFT CTRL FK2	$1E $22
S3 S2 S1 3	SHIFT CTRL FK3	$1E $23
S3 S2 S1 4	SHIFT CTRL FK4	$1E $24
S3 S2 S1 5	SHIFT CTRL FK5	$1E $25
S3 S2 S1 6	SHIFT CTRL FK6	$1E $26
S3 S2 S1 7	SHIFT CTRL FK7	$1E $27
S3 S2 S1 8	SHIFT CTRL FK8	$1E $28
S3 S2 S1 9	SHIFT CTRL FK9	$1E $29
S3 S2 S1 0	SHIFT CTRL FK10	$1E $2A
S3 S2 S1 Q	SHIFT CTRL FK11	$1E $2B
S3 S2 S1 W	SHIFT CTRL FK12	$1E $2C
S3 S2 S1 E	SHIFT CTRL FK13	$1E $2D
S3 S2 S1 R	SHIFT CTRL FK14	$1E $2E
S3 S2 S1 T	SHIFT CTRL FK15	$1E $2F
S3 A	C1	$1E $5C
S3 S	C2	$1E $5D
S3 D	C3	$1E $5E
S3 F	C4	$1E $5F
S3 S2 A	SHIFT C1	$1E $58
S3 S2 S	SHIFT C2	$1E $59
S3 S2 D	SHIFT C3	$1E $5A
S3 S2 F	SHIFT C4	$1E $5B

Datapoint Datastation 3601

Introduction

The Datapoint Datastation 3601 can be emulated using Softerm 2 by entering *DATAPOINT 3601* for the terminal emulation filename when generating a configuration in terminal setup. The Datapoint 3601 general capabilities supported by Softerm include the full 128 character set with 80 X 24 display, absolute cursor addressing, printer on/off functions for local printer support, and roll up capability. The Softerm Datastation 3601 emulation is compatible with the Datapoint 5500 or 2200/1100 via the 9462 Multi-Port.

Features

The display format of the Datastation 3601 is 24 lines by 80 characters with standard absolute cursor positioning with the home position in the upper left of the display. Softerm includes support for all standard keys on the 3601 keyboard including Enter, DEL, Cancel, Back Space, INT, and New Line. Softerm also provides support for the edit keys Home, Clear, Erase to End of Line, and Erase to End of Frame. Conversation modes of full or half duplex are supported. Support for the Data rates, Parity, and Word Structure is determined by the serial I/O interface available in the Apple II computer.

Datapoint 3601 remote functions supported by Softerm include Bell, Backspace, Line Feed, Roll Up, Carriage Return, Printer On, Cursor On, Printer Off, Cursor Off, Home Up, Erase End-of-Line, Erase End-of-Frame, and Direct Cursor Positioning.

Softerm also includes support for the *Local Printer Option* if Softerm includes a printer driver other than *NULL.PIO*. When a *Printer On* function code $1A is received from the host computer, all subsequent data is sent to the printer until a *Printer Off* function code $14 is received from the host computer or the **RESET** or **S1 CTRL R** key is pressed. Data received is also displayed on the video display. Refer to the description of printer pass through in the introduction of this chapter for additional information.

Datapoint Datastation 3601 Keyboard Functions

The following defines the standard keyboard functions for the Datapoint Datastation 3601 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 RETURN	New Line	$0C
ESC	Cancel	$1B
←	Backspace	$08
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Frame	$17
S1 C	Clear Screen	$15 $17
S1 E	Erase to End of Line	$16
S1 H	Home Up	$15
S1 I	INT	$1C
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	Line Feed	$0A
S1 O	Display Other Half	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Terminal
Emulation

Digital Equipment VT52

Introduction

The Digital Equipment VT52 terminal can be emulated using Softerm 2 by entering *DEC VT52* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the VT52 including the full 128 character set and 80 X 24 display, user definable answerback message, Auto XON/XOFF, Line/Local, New Line, Tabs, Wraparound, Auxiliary Keypad Functions, and Program Function Keys.

Features

The VT52 emulation provided is a compatible subset of the Softerm VT100 terminal emulation and provides all functions of the VT100 emulation except for the ANSI mode control sequences.

Softerm supports all available keyboard functions including RETURN, LINEFEED, BACKSPACE, TAB, ESC, DELETE, START/STOP DISPLAY, BREAK, CURSOR CONTROL KEYS, PROGRAM FUNCTIONS, and AUXILIARY KEYPAD FUNCTIONS. Softerm also provides additional control keys for Erase Screen, Erase to End of Screen, and Erase to End of Line.

Softerm recognizes and processes all VT52 control sequences. However, hardware limitations prevent Softerm from implementing the *Special Graphics* character set. If the *Select Special Graphics Character Set* control sequence is received, any characters in the graphics range $5F–$7E will be displayed as blanks until the *Select ASCII Character Set* control sequence is received or the **RESET** or **S1 CTRL R** key is pressed.

VT52 control sequences which Softerm fully supports include Cursor Up, Cursor Down, Cursor Right, Cursor Left, Cursor to Home, Reverse Line Feed, Erase to End of Screen, Erase to End of Line, Direct Cursor Address, Identify, and Alternate Keypad mode.

DEC VT52 Keyboard Functions

The following defines the standard keyboard functions for the Digital Equipment VT52 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	$1B $43
S2 →	Cursor Down	$1B $42
S3 →	Tab	$09
←	Backspace	$08
S1 ←	Cursor Left	$1B $44
S2 ←	Cursor Up	$1B $41
S1 ↑	Cursor Up (Apple IIe)	$1B $41
S1 ↓	Cursor Down (Apple IIe)	$1B $42
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Screen	$1B $4A
S1 C	Erase Screen	$1B $48 $1B $4A
S1 E	Erase to End of Line	$1B $4B
S1 H	Cursor Home	$1B $48
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	PF1	$1B $50
S3 2	PF2	$1B $51
S3 3	PF3	$1B $52
S3 4	PF4	$1B $53

Keyboard	Function	Characters
S3 S2 0	Keypad Function 0	$1B $3F $70
S3 S2 1	Keypad Function 1	$1B $3F $71
S3 S2 2	Keypad Function 2	$1B $3F $72
S3 S2 3	Keypad Function 3	$1B $3F $73
S3 S2 4	Keypad Function 4	$1B $3F $74
S3 S2 5	Keypad Function 5	$1B $3F $75
S3 S2 6	Keypad Function 6	$1B $3F $76
S3 S2 7	Keypad Function 7	$1B $3F $77
S3 S2 8	Keypad Function 8	$1B $3F $78
S3 S2 9	Keypad Function 9	$1B $3F $79
S3 S2 -	Keypad Function -	$1B $3F $6D
S3 S2 ,	Keypad Function ,	$1B $3F $6C
S3 S2 .	Keypad Function .	$1B $3F $6E
S3 S2 RETURN	Keypad Function ENTER	$1B $3F $4D

Digital Equipment VT100

Introduction

The Digital Equipment Corporation VT100 terminal can be emulated using Softerm 2 by entering *DEC VT100* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the VT102 model including the full 128 character set and 80 X 24 display, user definable answerback message, ANSI or VT52 mode, Auto XON/XOFF, Line/Local, New Line, Tabs, Wraparound, Auxiliary Keypad and Cursor Mode Functions, Program function Keys, the additional character attributes of the Advanced Video Option, and the print and host editing features provided by the Printer Port Option.

Features

The display format of the VT102 allows for 24 lines by 80 or 132 characters. Softerm supports only the 80 column display format. The VT102 has an operator accessible *Setup* mode which allows terminal features to be selected and then saved in non-volatile memory. Softerm provides the equivalent of this mode in *Terminal Setup* and allows the equivalent of the following VT102 features to be specified: ANSI/VT52 Mode, ANSWERBACK Message, AUTO XON/XOFF, Bits per Character, CURSOR, LINE/LOCAL, NEW LINE, PARITY, PARITY SENSE, RECEIVE and TRANSMIT SPEED (Softerm allows only 1 speed to be selected and used for both receive and transmit), TABS and WRAPAROUND. Setup mode options available on the VT102 but *not* available with Softerm include AUTO REPEAT, CHARACTERS PER LINE, INTERLACE, KEYCLICK, MARGIN BELL, SCREEN BACKGROUND, SCREEN BRIGHTNESS (Usually adjustable depending on video monitor used), and SCROLL. Some options such as SCREEN BACKGROUND and AUTO REPEAT are available with hardware such as the Videx Videoterm and Keyboard Enhancer II.

Softerm supports all available keyboard functions including RETURN, LINEFEED, BACKSPACE, TAB, ESC, DELETE, START/STOP DISPLAY, BREAK, CURSOR CONTROL FUNCTIONS, PROGRAM FUNCTIONS, and AUXILIARY KEYPAD FUNCTIONS. Softerm also provides additional keyboard functions for Cursor Home, Erase all of the Display, Erase to End of Line, Erase to End of Screen, Print Screen, and Enable/Disable Auto Print.

Softerm recognizes and processes all escape and control sequences of the VT102 in both ANSI and VT52 compatible mode. However, hardware limitations prevent Softerm from providing a full implementation of some features. Some control sequences are completely ignored while others are processed in a limited manner.

Control sequences which Softerm supports fully in the ANSI mode include Cursor Position Report, Cursor Backward, Cursor Down, Cursor Forward, Cursor Position, Cursor Up, Device Attributes, ANSI/VT52 Mode, Autowrap Mode, Cursor Keys Mode, Identify Terminal, Keypad Application Mode, Keypad Numeric Mode, Origin Mode, Print Form Feed Mode, Print Extent Mode, Keyboard Action Mode, Send/Receive Mode, Insert/Replacement Mode, Restore Cursor, Save Cursor, Set Top and Bottom Margins, Single Width Line, Device Status Report, Erase in Display, Erase in Line, Horizontal Tabulation Set, Horizontal and Vertical Position, Index, Line Feed/New Line Mode, Next Line, Reverse Index, Reset to Initial State, Reset Mode, Select Graphic Rendition, Set Mode, Tabulation Clear, Enter and Exit Auto Print, Enter and Exit Printer Controller, Print Screen, Print Cursor Line, Delete Character, Insert Line, and Delete Line.

Control Sequences which Softerm recognizes but ignores in the ANSI mode include Request Terminal Parameters, Screen Alignment Display, Auto Repeat Mode, Column Mode, Scrolling Mode, Screen Mode, Load LEDS, and Invoke Confidence Test. Softerm recognizes and processes as a special case control sequences for *Double Height Line*, *Double Width Line*, and *Single Width Line*. For double height lines, only the *top half* line is displayed. For double width lines, each displayable character is followed by a space. Softerm also recognizes and processes as a special case the *Select Character Set* control sequence. If a *special graphics* character set is selected and invoked by either the SO or SI ASCII control characters, any characters in the graphics range of codes $5F–$7E, will be displayed as blanks.

The *Keypad Application Mode* and *Cursor Keys Mode* are simulated in Softerm using the **S3 S2** keys in combination with a 0-9, minus, period, comma, and RETURN for the auxiliary keypad functions. Softerm will automatically generate the appropriate codes when the cursor control keys are used for the cursor keys functions. However, these functions must be enabled by the *Set Mode* control sequence before the **S3 S2** keyboard function sequences and cursor key functions are enabled. Both modes must be set for the cursor control key functions to be active. Softerm also enables and disables the auxiliary keypad functions and generates the appropriate codes for the VT52 mode commands *Enter alternate keypad mode* and *Exit alternate keypad mode*.

In the VT52 compatibility mode Softerm supports all control sequences with the single exception of the *Select Special Graphics character set*. If the Special Graphics character set is selected, any characters in the graphics range of codes $5F–$7E will be displayed as blanks.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal
Setup, the following screen will be displayed:

```
====== DEC VT100 EMULATION OPTIONS ======

VT52 COMPATIBILITY MODE?              N
PRINT EXTENT FULL SCREEN?             Y
PRINT TERMINATOR FORM FEED?           Y
IDENTIFY AS VT102?                    Y


===================== TAB STOPS =====================
            1         2         3
   123456789012345678901234567890
            Y         Y         Y

            4         5         6
   123456789012345678901234567890
       Y         Y         Y         Y

                 7         8
       12345678901234567890
            Y         Y
```

If the *VT52 COMPATIBILITY MODE* option is specified as **Y** indicating
Yes, the VT102 emulation will be initialized in the VT52 mode. If the
Enter ANSI Mode command is received, the VT102 emulation will
switch to the ANSI mode. However, the RESET key or any ANSI mode
control sequence which would cause the terminal to return to its initial
state, will cause the terminal to return to the VT52 mode. If this option
is specified as **N** indicating *No*, the emulation will be initialized in the
ANSI mode.

The *PRINT EXTENT FULL SCREEN?* option determines what portion of
the screen is printed when the **S1 P** keyboard function is executed or a
print screen command is received. If this option is specified as **Y**, the
full screen will be printed. If this option is specified as **N**, only the area
defined in the current *scrolling region* will be printed.

The *PRINT TERMINATOR FORM FEED?* option specifies if a *form feed*
character is is generated after the screen is printed using the **S1 P**
keyboard function or when a *print screen* command is received. If this
option is specified as **Y**, a form feed character ($0C) is appended to the
data sent to the printer by the print screen function. If this option is
specified as a **N**, no form feed is included.

The *IDENTIFY AS VT102?* option allows the response to the *Device Attributes* (**ESC [c** or **ESC [0 c**) or *Identify* (**ESC Z**) command sequence to be either the standard response for a VT100 with the Advanced Video and Printer Port options, or as a VT102. If this options is specified as **Y**, Softerm will respond with **ESC [? 6 c** indicating a VT102. If this option is specified as **N**, Softerm will respond with **ESC [? 1 ; 1 1 c** indicating a VT100 with the VT1XX-AC option.

Softerm allows default tab stops to be defined which are set at initialization, when **RESET** or **S1 CTRL R** is pressed, or any control sequence is received which would return the terminal to its initial state. The *tab format* is displayed after the *IDENTIFY AS VT102?* question has been answered. It consists of 3 string entry fields, for columns 1-30, 31-60, and 61-80. The cursor will initially be placed at the start of the line for columns 1-30. Entering any non-blank character will result in a tab stop being set at the current location. A field accept keyboard function will move to the next field for entry. Entering an **S1 RETURN** or **S1 X** will return control to the main setup menu.

DEC VT100 Keyboard Functions

The following defines the standard keyboard functions for the Digital Equipment VT100 emulation. Refer to the VT52 Keyboard Function Table for keyboard functions in VT52 compatibility mode:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Forward	$1B ($5B or $4F) $43
S2 →	Cursor Down	$1B ($5B or $4F) $42
S3 →	Tab	$09
←	Backspace	$08
S1 ←	Cursor Backward	$1B ($5B or $4F) $44
S2 ←	Cursor Up	$1B ($5B or $4F) $41
S1 ↑	Cursor Up (Apple IIe)	$1B ($5B or $4F) $41
S1 ↓	Cursor Down (Apple IIe)	$1B ($5B or $4F) $42
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Display	$1B $5B $4A
S1 C	Erase Display	$1B $5B $32 $4A
S1 E	Erase to End of Line	$1B $5B $4B
S1 H	Cursor Home	$1B $5B $48
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 P	Print Screen	
S3 P	Enable/Disable Auto Print	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	PF1	$1B $4F $50
S3 2	PF2	$1B $4F $51
S3 3	PF3	$1B $4F $52
S3 4	PF4	$1B $4F $53

Keyboard	Function	Characters
S3 S2 0	Keypad Function 0	$1B $4F $70
S3 S2 1	Keypad Function 1	$1B $4F $71
S3 S2 2	Keypad Function 2	$1B $4F $72
S3 S2 3	Keypad Function 3	$1B $4F $73
S3 S2 4	Keypad Function 4	$1B $4F $74
S3 S2 5	Keypad Function 5	$1B $4F $75
S3 S2 6	Keypad Function 6	$1B $4F $76
S3 S2 7	Keypad Function 7	$1B $4F $77
S3 S2 8	Keypad Function 8	$1B $4F $78
S3 S2 9	Keypad Function 9	$1B $4F $79
S3 S2 -	Keypad Function -	$1B $4F $6D
S3 S2 ,	Keypad Function ,	$1B $4F $6C
S3 S2 .	Keypad Function .	$1B $4F $6E
S3 S2 RETURN	Keypad Function ENTER	$1B $4F $4D

Hazeltine 1400/1410

Introduction

The Hazeltine 1400 and 1410 video display terminals can be emulated using Softerm 2 by entering *HAZELTINE 1400/1410* for the terminal emulation filename when generating a configuration in terminal setup. The Hazeltine 1400/1410 general capabilities supported by Softerm include the full 128 character set with 80 X 24 display, full and half duplex modes, scrolling, absolute cursor positioning, and special control character sequences.

Features

The display format of the Hazeltine 1400/1410 is 24 lines by 80 characters but is limited to the 64 upper case alphabet from the ASCII character set. However, all 128 ASCII character codes may be keyed. Softerm allows all ASCII displayable characters including upper and lower case characters to be displayed. Softerm provides support for the 7 function keys ESC, RUB OUT, RETURN, LINE FEED, HOME, CLEAR and BREAK as well as *cursor right* and *cursor left* using the **S1** → and **S1** ← keys on the Apple II instead of the CTRL P and CTRL H on the Hazeltine 1400/1410. The only keyboard sequence not supported is the lead-in character followed by CTRL S which causes a *Test Pattern* to be displayed.

The remote command features of the Hazeltine 1400 and 1410 provide the user with the capability to control the terminal via the host computer software. For the terminal to execute a remote command, the command code must be preceded in some cases by a lead-in code which may be either a tilde or an ESC. Softerm includes support for the remote functions Home Cursor, Down Cursor, Left Cursor, Right Cursor, Address Cursor, Read Cursor Address, Clear Screen, Keyboard Lock, Keyboard Unlock and Send Character. Softerm does *not* support the remote function Display Self Test Pattern.

Hazeltine 1400/1410 Keyboard Functions

The following defines the standard keyboard functions for the Hazeltine 1400/1410 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	$10
S2 →	Cursor Down	$0A
S1 ←	Cursor Left	$08
S2 ←	None	
S1 ↑	None	
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	None	
S1 C	Clear Screen	$7E $1C
S1 E	None	
S1 H	Home Cursor	$7E $12
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Hazeltine 1500

Introduction

The Hazeltine 1500 Video Display Terminal can be emulated using Softerm 2 by entering *HAZELTINE 1500* for the terminal emulation filename when generating a configuration in terminal setup. The Hazeltine 1500 general capabilities supported by Softerm include the full 128 character set with 80 X 24 display, full and half duplex modes, scrolling, absolute cursor positioning, and special control character sequences including all remote commands.

Features

The display format of the Hazeltine 1500 is 24 lines by 80 characters with the capability to display 94 of the 128 ASCII character codes. An *Upper/Lower Case* enable switch is also provided allowing the user to select between upper case only or upper and lower case display. Softerm supports only upper and lower case display. Softerm provides support for the keyboard functions ESC, DEL, RETURN, LINE FEED, BACK SPACE, TAB, BREAK, RESET, HOME, CLEAR, Clear Foreground, Clear End of Line, and Clear End of Screen. The *Clear* functions are provided on separate keyboard functions and the **S1** → key is used to provide *cursor right* and the **S1** ← key is used to provide *cursor left* on the Apple II keyboard.

The remote command features of the Hazeltine 1500 provide the user with the capability to control the terminal via the host computer software. For the terminal to execute a remote command, the command code must be preceded in some cases by a lead-in code which is a tilde ($7E) character. Softerm includes support for the remote functions Home Cursor, Up Cursor, Down Cursor, Left Cursor, Right Cursor, Address Cursor, Read Cursor Address, Clear Screen, Clear Foreground, Clear to End of Line, Clear to End of Screen, Clear to End of Screen— Background Spaces, Background Follows, Foreground Follows, Delete Line, Insert Line, Keyboard Lock, Keyboard Unlock, Audible Alarm, and TAB.

Hazeltine 1500 Keyboard Functions

The following defines the standard keyboard functions for the Hazeltine 1500 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	$10
S2 →	Cursor Down	$0A
S3 →	Tab	$09
S1 ←	Cursor Left	$08
S2 ←	Cursor Up	$7E $0C
S1 ↑	Cursor Up (Apple IIe)	$7E $0C
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Clear to End of Screen	$7E $18
S1 C	Clear Screen	$7E $1C
S2 C	Clear Foreground	$7E $1D
S1 E	Clear to End of Line	$7E $0F
S1 H	Cursor Home	$7E $12
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Hazeltine 1520

Introduction

The Hazeltine 1520 Video Display Terminal can be emulated using Softerm 2 by entering *HAZELTINE 1520* for the terminal emulation filename when generating a configuration in terminal setup. The Hazeltine 1520 general capabilities supported by Softerm include the full 128 character set with 80 X 24 display, full duplex, half duplex, and format modes, selectable function lead-in character, selectable EOM character, automatic line feed, wraparound, scrolling, absolute cursor positioning, printer operations including print screen and online print with or without display, and special control character sequences including all remote commands.

Features

The display format of the Hazeltine 1520 is 24 lines by 80 characters with the capability to display 94 of the 128 ASCII character codes. The basic mode of operation for the Hazeltine 1520 terminal emulation is character-by-character when set for half or full duplex. In this case, data which is entered at the keyboard is sent directly to the computer. In the format mode of operation, the terminal becomes a buffered editing terminal, allowing the operator to enter data with characters transmitted to the computer only after the *SEND* key is pressed. Thus, before any data is actually transmitted, the operator may review it for errors, omissions and misplaced data, and take corrective action. After making the corrections, the operator may initiate a serial buffered transmission of the data by pressing the *SEND* key.

Setup switch options available on the Hazeltine 1520 and supported by Softerm include Baud Rate, Parity, Half or Full Duplex, Auto LF-CR, ESC—Tilde Lead-in Character Selection, Format Mode, EOM Character and Wraparound. The *Auto LF-CR* option corresponds to the Softerm *LF AFTER CR* option, and the *Wraparound* option corresponds to the Softerm *AUTO LINE WRAP* option.

Setup switch options available on the Hazeltine 1520 and *not* supported by Softerm include U/L CASE-UP and STD VIDEO-REV. Softerm supports only upper and lower case operation and standard video display of light characters on a dark background.

Softerm provides support for the keyboard functions ESC, DEL, RETURN, LINE FEED, BACK SPACE, TAB, BACK TAB, FUNCTION, BREAK, RESET, HOME, CLEAR, Clear Foreground, Clear End of Line, Clear End of Screen, Up Cursor, Down Cursor, Right Cursor, Left Cursor, Insert Line, Delete Line, and SEND. Send, Send Line, and Send Page keyboard functions are supported and the transmit symbol is displayed as a single inverse asterisk. The SHIFT SEND or PRINT function is also provided and the print symbol is displayed as a single inverse percent (%).

Pressing the FUNCTION key on the Hazeltine 1520 conditions the terminal for a three-character transmission which has no effect on the display. This capability is provided in Softerm using the **S1 F** key. On pressing the **S1 F** key, an audible alarm will sound alerting the operator to enter any ASCII code. Once an additional character is entered, the sequence ESC, ASCII code, and EOM character is transmitted.

The remote command features of the Hazeltine 1520 provide the user with the capability to control the terminal via the host computer software. For the terminal to execute a remote command, the command code must be preceded in some cases by a lead-in code which is either a tilde ($7E) character or an ESC ($1B) character. Softerm includes support for the remote functions Home Cursor, Up Cursor, Down Cursor, Left Cursor, Right Cursor, Address Cursor, Read Cursor Address, Clear Screen, Clear Foreground, Clear to End of Line, Clear to End of Screen, Clear to End of Screen—Background Spaces, Background Follows, Foreground Follows, Delete Line, Insert Line, Keyboard Lock, Keyboard Unlock, Audible Alarm, TAB, Set Format Mode, Return to Switches, Batch Transmit, Line Transmit, Page Transmit, Unprotected, Protected and Unprotected, Back Tab, Send Status, Remote Xmit, Non Stored Return, Remote Print, On-line Print-Display, On-line Print-No Display, and Printer Off Line.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
        === HAZELTINE 1520 EMULATION OPTIONS ===

    END OF MESSAGE CHARACTER               $0D
    FORMAT MODE?                           Y
    LEAD IN = ESC?                         Y
```

The emulation option *END OF MESSAGE CHARACTER* selects the character which will be inserted at the end of read cursor address, function, batch, line, and PAGE transmissions to signal the end of message (EOM). This character should be set to a $00 indicating no character, a CR ($0D), an EOT ($04), or an ETX ($03).

The emulation option *FORMAT MODE?* overrides the half or full duplex character mode and selects the format mode for keyboard entry and transmission. In format mode data entered on the display can be edited before the contents of the display is transmitted. Entering a **Y** selects the format mode of operation while entering an **N** selects conversational full or half duplex operation.

The emulation option *LEAD IN ESC?* allows the lead-in character for remote commands to be specified as either an ESC ($1B) or a tilde ($7E) character code. Entering a **Y** selects the ESC character as the lead-in code for remote commands. Entering an **N** selects the tilde as the lead-in code for remote commands.

The system parameter *USE INVERSE* may be used to highlight foreground or background data if low intensity is not available on the video interface being used. If the *USE INVERSE* option is set to **3**, low intensity background data will be displayed in inverse video. If the *USE INVERSE* option is set to **4**, high intensity foreground data will be displayed in inverse video. Refer to Chapter 3 for a complete description of the *USE INVERSE* system parameter.

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Hazeltine 1520 Keyboard Functions

The following defines the standard keyboard functions for the Hazeltine 1520 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 RETURN	SEND	
S2 RETURN	SEND LINE	
S3 RETURN	SEND PAGE	
S1 →	Cursor Right	$10
S2 →	Cursor Down	($7E or $1B) $0B
S3 →	Tab	$09
←	Backspace	$08
S1 ←	Cursor Left	$08
S2 ←	Cursor Up	($7E or $1B) $0C
S3 ←	Back Tab	($7E or $1B) $14
S1 ↑	Cursor Up (Apple IIe)	($7E or $1B) $0C
S1 ↓	Cursor Down (Apple IIe)	($7E or $1B) $0B
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Clear to End of Screen	($7E or $1B) $18
S1 C	Clear Screen	($7E or $1B) $1C
S2 C	Clear Foreground	($7E or $1B) $1D
S3 D	Delete Line	($7E or $1B) $13
S1 E	Clear to End of Line	($7E or $1B) $0F
S1 F	FUNCTION	$1B (ASCII code) EOM
S1 H	Home Cursor	($7E or $1B) $12
S3 I	Insert Line	($7E or $1B) $1A
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 P	PRINT	
S3 P	Online Print Enable/Disable	

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Keyboard	Function	Characters
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Honeywell VIP7205

Introduction

The Honeywell VIP7205 Video Display Terminal can be emulated using Softerm 2 by entering *HONEYWELL VIP7205* for the terminal emulation filename when generating a configuration in terminal setup. The Honeywell VIP7205 general capabilities supported by Softerm include the full 128 character set with 80 X 24 display, full duplex, full duplex with local display, and buffered transmission modes, function keys, full cursor control, automatic carriage return/line feed, page or roll mode, buffered line or page operation with local edit, and extension port.

Features

The display format of the Honeywell VIP7205 is 24 lines by 80 characters with the capability to display 95 of the 128 ASCII character codes. The VIP7205 provides selectable operating modes including full duplex with no local display, full duplex with local display, half duplex, half duplex buffered mode, and local display. Softerm supports all modes of operation using a full duplex communications link but does not support half duplex with two-way alternate capability and line turnaround. The mode of operation is character-by-character when set for full duplex or full duplex with local echo. In this case, data which is entered at the keyboard is sent directly to the computer. In the buffered mode of operation, the terminal becomes a buffered editing terminal, allowing the operator to enter data with characters transmitted to the computer only after the *XMIT* key is pressed. Thus, before any data is actually transmitted, the operator may review it for errors, omissions and misplaced data, and take corrective action. After making the corrections, the operator may initiate a serial buffered transmission of the data by pressing the *XMIT* key.

Setup switch options available on the Honeywell VIP7205 and supported by Softerm include CHARACTER/BUFFER, LINE/PAGE, ONLINE/LOCAL, ROLL/PAGE, BAUD RATE, LOCAL COPY/ECHO, 1/2 STOP BITS, EVEN/ODD PARITY, END OF MSG CHARACTER, and BLINK ENABLE. The Softerm *PAGE MODE* option corresponds to the VIP7205 *ROLL/PAGE* switch and the Softerm *HALF DUPLEX* option corresponds to the VIP7205 *LOCAL COPY* switch.

Setup switch options available on the Honeywell VIP7205 and not supported by Softerm include LOWERCASE and HALF DUPLEX. Softerm supports only upper and lower case operation and full duplex communications.

Softerm provides support for the keyboard functions ESC, DEL, RETURN, LF, BRK, HOME, CLR, ERASE EOL/EOP, TRANSMIT, Cursor Up, Cursor Down, Cursor Forward, Cursor Backward, and Function Keys F1—F7. Since Softerm does not support half duplex communications facilities, the END OF MESSAGE key is not supported.

Softerm supports all host processor commands and terminal response codes of the VIP7205 including Audible Alarm, Line Feed, Carriage Return, Set High Intensity, Set Low Intensity, Cursor Up, Cursor Down, Cursor Forward, Cursor Backward, Cursor Home, Erase End of Display, Erase End of Line, Reset Initial State, Read Cursor Address, Media Copy and Horizontal and Vertical Position. When the cursor is moved to a *phantom* position such as column 81, the function will be processed appropriately. However, the cursor will be displayed at Column 80 on the screen even when it is actually at Column 81.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
= HONEYWELL VIP7205 EMULATION OPTIONS =

END OF MESSAGE CHARACTER              $0D
BUFFER MODE?                          N
LINE TRANSMIT?                        N
ENABLE BLINK?                         N
```

The emulation option *END OF MESSAGE CHARACTER* selects the character which will be inserted at the end of a line or page buffered transmission to signal the end of message (EOM). This character should be set to a NUL ($00), a CR ($0D), a LF ($0A), an EOT ($04), or an ETX ($03).

The emulation option *BUFFER MODE?* overrides the half or full duplex character mode and selects the buffer mode for keyboard entry and transmission. In buffer mode data entered on the display can be edited before the contents of the display is transmitted. This option is equivalent to the VIP7205 *CHARACTERBUFFER* switch. Entering a **Y** selects buffer mode, while entering an **N** selects the character mode of operation.

The emulation option *LINE TRANSMIT?* is equivalent to the VIP7205 *LINE/PAGE* switch. If this option is set to **Y**, when a buffered transmit is executed the line containing the cursor up to but not including the cursor position is transmitted. If this option is set to **N**, page mode is assumed and transmission starts at the home position and proceeds up to the cursor position.

The emulation option *ENABLE BLINK?* if specified as **Y** will cause characters or fields proceeded by set low intensity command to blink. This option is equivalent to the VIP7205 *INHIBIT/ENABLE BLINK* internal switch option.

The system parameter *USE INVERSE* allows fields specified to be low or high intensity to be displayed in inverse video. Otherwise, background data is displayed at low intensity and foreground (normal) data at high intensity. If the Softerm display driver and video board in use does not provide low intensity, the data will appear as normal unless inverse is selected. If the *USE INVERSE* parameter is set to **3**, background or low intensity data is displayed in inverse video. If the *USE INVERSE* parameter is set to **4**, foreground or high intensity data is displayed in inverse video. Refer to Chapter 3 for a complete description of the *USE IN-VERSE* system parameter.

Honeywell VIP7205 Keyboard Functions

The following defines the standard keyboard functions for the Honeywell VIP7205 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 RETURN	XMIT	$1B $69
S1 →	Cursor Right	$1B $43
S2 →	Cursor Down	$1B $42
S1 ←	Cursor Left	$1B $44
S2 ←	Cursor Up	$1B $41
S1 ↑	Cursor Up (Apple IIe)	$1B $41
S1 ↓	Cursor Down (Apple IIe)	$1B $42
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Clear to End of Screen	$1B $4A
S1 C	Clear Screen	$1B $60
S1 E	Clear to End of Line	$1B $4B
S1 H	Home Cursor	$1B $48
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	F1	$1B $30
S3 2	F2	$1B $32
S3 3	F3	$1B $36
S3 4	F4	$1B $38
S3 5	F5	$1B $3A
S3 6	F6	$1B $3C
S3 7	F7	$1B $3E

Keyboard	Function	Characters
S3 S2 1	SHIFT F1	$1B $31
S3 S2 2	SHIFT F2	$1B $35
S3 S2 3	SHIFT F3	$1B $37
S3 S2 4	SHIFT F4	$1B $39
S3 S2 5	SHIFT F5	$1B $3B
S3 S2 6	SHIFT F6	$1B $3D
S3 S2 7	SHIFT F7	$1B $3F
S1 S2 S3 B	Buffered Mode	
S1 S2 S3 C	Character Mode	
S1 S2 S3 L	Line Transmit Mode	
S1 S2 S3 P	Page Transmit Mode	

IBM 3101 Model 1X

Introduction

The IBM 3101 Display Terminal Models 10, 12, and 13 EIA RS-232C only can be emulated using Softerm 2 by entering *IBM 3101-1X* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the IBM 3101 Model 1X including Character Transmission, Full Duplex Operation, Half Duplex Operation with full duplex communications, Auxiliary Printer Interface, full 128 character set and 80 X 24 display, Mono/Dual case, Program Function Keys, Keyboard lock/unlock, Cursor control, Erase functions, Tab forward, Auto New Line, Scroll On/Off, CR/CR-LF, Auto Line Feed, and Audible Alarm.

Features

The display format of the IBM 3101 Model 1X display terminal is 24 lines by 80 characters with the ability to display all 128 ASCII character including 32 control codes in the *Transparent Mode*. Softerm does *not* support this mode. The 3101 also includes an *operator information area* at the bottom of the display screen as an operation interface. It displays various modes and status of the 3101 communications and operations. Softerm does *not* support the operator information area.

The IBM 3101 Model 1X functions only in the *character* mode. *Block* mode is available only on Models 20, 22, and 23. Softerm supports only the character mode features in the emulation of the 3101 Model 1X display terminal. Softerm supports the *full duplex* operation mode and *half duplex* operation mode when using a full duplex communications facility. Half duplex operation using a half duplex communications facility with or without reverse channel is *not* supported. Thus operation of the 3101 emulation with a 202-type modem with switched RTS (request to send) is *not* supported.

Setup switch options available on the IBM 3101 Model 1X and supported by Softerm include Dual Character Set Selection, Automatic New Line, Automatic Line Feed, Carriage Return or Carriage Return-Line Feed Selection, Scroll On/Off, Line Turnaround Character Selection, and Blink Cursor On/Off. The Softerm terminal emulation options *AUTO WRAP, PAGE MODE*, and *READ FUNCTION TERMINATOR* correspond to IBM 3101 setup switch options *Automatic New Line, Scroll On/Off,* and *Line Turnaround Character Selection* respectively.

Line speed selection, character framing, parity bit selection, for the communications and auxiliary interfaces are determined by the type of serial communications interface and printer interface available on the Apple II computer.

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Setup switch options available on the IBM 3101 Model 1X and *not* supported by Softerm include Mono Character Set Selection, Interface Selection, Modem Control, Reverse Channel Control, and Reverse Video On/Off.

Softerm supports all the 3101 Model 1X keyboard functions including Cursor Up, Cursor Down, Cursor Right, Cursor Left, Backspace, Tab, New Line, Home, CLEAR, ERASE INPUT, ERASE EOS, ERASE EOL, Program Function Keys, ESC, DEL, BREAK, LOCAL and RESET. The *AUX* key capability is provided by the Softerm **S3 P** Printer Enable/Disable Function.

Host initiated functions which Softerm recognizes and processes include Line Feed, Carriage Return/New Line, Back Space, Horizontal Tab, Sound Alarm, Form Feed, Vertical Tab, Cursor Move Up, Cursor Move Down, Cursor Move Right, Cursor Move Left, Cursor Move Home, Set Cursor Address, Tab Set, Tab Clear, Erase EOL, Erase EOS, Erase Input, Clear, Keyboard Lock, Keyboard Unlock, Read Cursor Position, Read Status, Read Setup Switch, Set Buffer Address, Mandatory Disconnect, and Insert Cursor at Buffer Address.

Host initiated functions which Softerm recognizes but ignores include Logical Keyboard Lock, Enter Transparent Mode, Exit Transparent Mode, and Set Control.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
 ===== IBM 3101-1X EMULATION OPTIONS =====

 READ FUNCTION TERMINATOR                      $0D
```

The emulation option *READ FUNCTION TERMINATOR* allows the character which terminates the locally initiated *Program Function Key* sequences and the response to host initiated functions *Read Status, Read Switches* and *Read Cursor Position* to be specified. This corresponds to the *Line Turnaround Character Selection* switches in the 3101 terminal. The user should enter a $04 (EOT), $03 (ETX), $0D (CR), or a $13 (XOFF) depending the requirements of the host computer. If the XOFF character is selected, the user should insure that the Terminal Emulation Parameter *PACE CTRL: XON/XOFF* is set to **N**.

IBM 3101-1X Keyboard Functions

The following defines the standard keyboard functions for the IBM 3101 Model 1X emulation. The *Program Function Key* terminator character ($??) is set by the 3101 emulation option *READ FUNCTION TERMINATOR* described previously.

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	$1B $43
S2 →	Cursor Down	$1B $42
S3 →	Tab	$09
←	Backspace	$08
S1 ←	Cursor Left	$1B $44
S2 ←	Cursor Up	$1B $41
S1 ↑	Cursor Up (Apple IIe)	$1B $41
S1 ↓	Cursor Down (Apple IIe)	$1B $42
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase EOS	$1B $4A
S1 C	Erase Input	$1B $4B
S2 C	Clear ALL	$1B $4C
S1 E	Erase EOL	$1B $49
S1 H	Home	$1B $48
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S3 P	AUX	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Keyboard	Function	Characters
S3 1	PF1	$1B $61 $??
S3 2	PF2	$1B $62 $??
S3 3	PF3	$1B $63 $??
S3 4	PF4	$1B $64 $??
S3 5	PF5	$1B $65 $??
S3 6	PF6	$1B $66 $??
S3 7	PF7	$1B $67 $??
S3 8	PF8	$1B $68 $??

Terminal
Emulation

IBM 3101 Model 2X

Introduction

The IBM 3101 Display Terminal Models 20, 22, and 23 EIA RS-232C only can be emulated using Softerm 2 by entering *IBM 3101-2X* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the IBM 3101 Model 2X including Character or Block Mode Transmission, Full Duplex Operation, Half Duplex Operation with full duplex communications, Auxiliary Printer Interface, Buffer Print Operations, full 128 character set and 80 X 24 display, Program Function Keys, Model 2X unique function keys, Keyboard lock/unlock, Cursor control, Erase functions, Tab operations, Edit Functions, Auto New Line, Scroll On/Off, CR/CR-LF, Auto Line Feed, and Audible Alarm.

Features

The display format of the IBM 3101 Model 2X display terminal is 24 lines by 80 characters with the ability to display all 128 ASCII character including 32 control codes in the *Transparent Mode*. Softerm does *not* support this mode. The 3101 also includes an *operator information area* at the bottom of the display screen as an operation interface. It displays various modes and status of the 3101 communications and operations. Although this information is not continuously displayed, Softerm provides a special function key to display the terminal status.

The IBM 3101 Model 2X functions in either the *character* or *block* mode selectable by a Softerm Terminal Setup configuration option. In the character mode, a character is immediately transmitted when a keyboard key is pressed. In the block mode, a data stream is transmitted, which has been edited and stored when the *SEND* key is pressed.

In character mode, Softerm supports the *full duplex* and *half duplex* operation mode when using a full duplex communications facility. In block mode, Softerm supports the half duplex operation mode with a full duplex communication facility. Half duplex operation using a half duplex communication facility with or without reverse channel is not supported. Thus operation of the 3101 emulation with a 202-type modem with switched RTS (request to send) is *not* supported.

Setup switch options available on the IBM 3101 Model 2X and supported by Softerm include Block/Character Transmission Mode Selection, Half Duplex/Full Duplex Mode, Line Turnaround Character Selection, Send Line Option, Null Suppress Selection, Automatic New Line, Automatic Line Feed, Carriage Return or Carriage Return/Line Feed Selection, Scroll On/Off and Blink Cursor On/Off. The Softerm terminal emulation options *AUTO WRAP* and *PAGE MODE* correspond to IBM 3101 setup switch options *Automatic New Line* and *Scroll On/Off* respectively.

Line speed selection, character framing, parity bit selection, for the communications and auxiliary interfaces are determined by the type of serial communications interface and printer interface available on the Apple II computer.

Setup switch options available on the IBM 3101 Model 2X and *not* supported by Softerm include Mono character set selection, Interface Selection, Modem Control, Reverse Channel Control, and Reverse Video On/Off.

Softerm supports all the 3101 Model 2X keyboard functions including Cursor Up, Cursor Down, Cursor Right, Cursor Left, Backspace, Tab, Back Tab, New Line, Home, CLEAR, ERASE INPUT, ERASE EOS, ERASE EOL/EOF, INS CHAR, DEL CHAR, INS LINE, DEL LINE, PRGM MODE, ATTR, SEND, SEND MSG, SEND LINE, PRINT, PRINT MSG, PRINT LINE, Program Function Keys, ESC, DEL, BREAK, LOCAL and RESET. The *AUX* key capability is provided by the Softerm **S3 P** Printer Enable/Disable Function.

Host initiated functions which Softerm recognizes and processes include Line Feed, Carriage Return/New Line, Back Space, Horizontal Tab, Sound Alarm, Form Feed, Vertical Tab, Time Fill Character, Cursor Move Up, Cursor Move Down, Cursor Move Right, Cursor Move Left, Cursor Move Home, Set Cursor Address, Tab Set, Tab Clear, Back Tab, Erase EOL/EOF, Erase EOS, Erase Input, Clear, Print Line, Print Message, Print Page, Insert Line, Delete Line, Insert Character, Delete Character, Keyboard Lock, Keyboard Unlock, Read Cursor Position, Read Status, Read Setup Switch, Read Buffer, Set Buffer Address, Set Control, Mandatory Disconnect, and Insert Cursor at Buffer Address.

Host initiated functions which Softerm recognizes but ignores include Logical Keyboard Lock, Enter Transparent Mode, Exit Transparent Mode, and Cancel.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
===== IBM 3101-2X EMULATION OPTIONS =====

LINE TURNAROUND CHARACTER          $0D
BLOCK MODE                         Y
NULL SUPPRESS                      Y
SEND KEY = SEND LINE               N
```

The emulation option *LINE TURNAROUND CHARACTER* selects the line turnaround and block terminator character. The user should enter a $04 (EOT), $03 (ETX), $0D (CR), or a $13 (XOFF) depending on the requirements of the host computer. If the XOFF character is selected, the user should insure that the Terminal Emulation Parameter *PACE CTRL: XON/XOFF* is set to **N**.

The emulation option *BLOCK MODE?* selects the Block Transmission Mode if **Y** is entered and the Character Transmission Mode if **N** is entered. If block mode is selected, the characters entered from the keyboard are stored in a buffer corrected and edited by the operator, and then transmitted to the host when the *SEND* key is pressed. The *AUTO WRAP* option is forced if block mode is selected.

The emulation option *NULL SUPPRESS?* allows trailing nulls to be suppressed when a block mode transmission is performed. This option is valid only for block mode operation and is selected by entering a **Y**. If null suppression is not required, an **N** should be entered.

The emulation option *SEND KEY = SEND LINE?* is used to activate the *SEND LINE* key function when the *SEND* key is pressed. If **Y** is entered the *SEND* key will function as the *SEND LINE* key. If **N** is entered, the *SEND* key will function as the *SEND PAGE* key.

The system parameter *USE INVERSE* allows fields specified to be highlighted to be displayed in inverse video. Otherwise, the low intensity attribute is selected for highlighting. If the Softerm display driver and video board in use does not provide low intensity, the data will appear as normal unless inverse is selected. Entering a **3** for the *USE INVERSE* system parameter will cause low intensity or highlighted data to be displayed in inverse video. Refer to Chapter 3 for a complete description of the *USE INVERSE* system parameter.

Operational Characteristics

During block mode operation, when the display screen is currently unformatted (no field attributes are present), and a start field command is received, data will be displayed as it is received. However, all screen positions for certain types of fields are not immediately updated unless characters are received for each position. After no additional data has been received for a timeout period of approximately 1 second, the entire screen will be checked and any additional updating required will be performed.

If the keyboard becomes inadvertently locked through a received keyboard lock command from the host without a subsequent keyboard unlock command, the **S3 R** keyboard function may be used to unlock the keyboard without causing a disconnect. However, this function will also rewrite the screen and can be used whenever the current screen display appears to be incorrect due to an error condition.

Operator Status Display

The IBM 3101-2X terminal emulation includes a status display similar to the *Operator Information Area* displayed on line 25 of the 3101. Since Softerm supports only a 24 line screen, the status information is displayed only when a **S3 V** keyboard function is entered. The data on line 24 is temporarily replaced by the status information, and when the **S1 X** or **S3 V** key is pressed, the original data is restored to the line. The status information displayed includes *BLOCK* or *CHAR MODE*, and *PROGRAM* or *INSERT* sub-modes.

The *BLOCK* or *CHAR MODE* setting can be toggled while the status is displayed by pressing the **B** key. For example, to toggle from the half duplex character mode to block mode, first display the status by entering **S3 V** and then press the **B** key to change the *CHAR MODE* to *BLOCK MODE*. Changing the mode from character to block, or block to character, will cause the screen to be cleared and the terminal emulation to be re-initialized.

Terminal
Emulation

IBM 3101-2X Keyboard Functions

The following defines the standard keyboard functions for the IBM 3101 Model 2X emulation. The *Program Function Key* terminator character ($??) is set by the 3101 emulation option *LINE TURNAROUND CHARAC-TER* described previously.

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 RETURN	SEND	
S2 RETURN	SEND LINE	
S3 RETURN	SEND PAGE	
S3 S2 RETURN	SEND MESSAGE	
S1 →	Cursor Right	$1B $43
S2 →	Cursor Down	$1B $42
S3 →	Tab	$09
←	Backspace	$08
S1 ←	Cursor Left	$1B $44
S2 ←	Cursor Up	$1B $41
S3 ←	Back Tab	
S1 ↑	Cursor Up (Apple IIe)	$1B $41
S1 ↓	Cursor Down (Apple IIe)	$1B $42
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S3 A	ATTR	
S1 B	Erase EOS	$1B $4A
S1 C	Erase Input	$1B $4B
S2 C	Clear ALL	$1B $4C
S1 D	DEL CHAR	
S3 D	DEL LINE	
S1 E	Erase EOL	$1B $49
S1 I	INS CHAR	
S3 I	INS LINE	
S1 H	Home	$1B $48
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	

Keyboard	Function	Characters
S1 P	PRINT PAGE	
S2 P	PRINT LINE	
S3 P	AUX	
S3 S2 P	PRINT MESSAGE	
S1 S2 S3 P	PRGM MODE	
S1 Q	Resume Display	
S3 R	Reset Keyboard Lock and Rewrite Screen	
S1 S	Stop Display	
S1 V	View Terminal Status	
S3 V	View IBM 3101 Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	PF1	$1B $61 $??
S3 2	PF2	$1B $62 $??
S3 3	PF3	$1B $63 $??
S3 4	PF4	$1B $64 $??
S3 5	PF5	$1B $65 $??
S3 6	PF6	$1B $66 $??
S3 7	PF7	$1B $67 $??
S3 8	PF8	$1B $68 $??

Lear Siegler ADM-3A

Introduction

The Lear Siegler ADM-3A Video Display Unit can be emulated using Softerm 2 by entering *LSI ADM-3A* for the terminal emulation filename when generating a configuration in terminal setup. The ADM-3A general capabilities supported by Softerm include the full 128 character set with 80 X 24 display, full and half duplex modes, scrolling, absolute cursor positioning, selectable auto new line, and special control character sequences.

Features

The display format of the ADM-3A can be 24 or 12 lines by 80 characters. Softerm supports only the 80 X 24 display format. *Cursor control* in the ADM-3A can be on or off allowing absolute cursor positioning with the home position in the upper left of the screen with cursor control *on*, and no absolute cursor positioning with home as the first position of the bottom line with cursor control *off*. Softerm supports only the *cursor control on* mode of operation.

Softerm includes support for the ADM-3A functional control keys Escape, Rubout, Break, Return, Clear, Home, Line Feed, and Here Is and the transmission modes Full Duplex and Half Duplex. Support for Data rates, Parity, and Word Structure is determined by the serial I/O interface available in the Apple II computer.

Switch selectable settings and features in the ADM-3A not supported by Softerm include Upper Case/Lower Case, Disable Keyboard Lock, Disable Clear Screen, Secondary Channel, Code Turnaround, 202 Modem, Cursor Control Off, and Destructive Cursor. Optional features *not* supported by Softerm include Split Baud Rate and Beep Defeat.

Softerm does include support for *Gated Extension Port Operation* if Softerm includes a printer driver other than *NULL.PIO*. If the gated extension port operation option is specified, when an *enable extension port* function code $0E is received from the host computer, all subsequent data is sent to the printer until a *disable extension port* function code $0F is received from the host computer or the **RESET** or **S1 CTRL R** key is pressed. Data received is also displayed on the video display. Refer to the description of printer pass through in the introduction of this chapter for additional information.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

======== ADM-3A EMULATION OPTIONS ========

GATED EXTENSION PORT OPERATION?   N

If this option is specified as **Y**, the *gated extension port operation* described previously is used. If this option is specified as **N**, the *keyboard lock/unlock* feature is enabled. When a $0E function code is received, the keyboard is *unlocked*, and when a $0F function code is received, the keyboard is *locked*.

Lear Siegler ADM-3A Keyboard Functions

The following defines the standard keyboard functions for the Lear Siegler ADM-3A emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	$0C
S2 →	Cursor Down	$0A
S1 ←	Cursor Left	$08
S2 ←	Cursor Up	$0B
S1 ↑	Cursor Up (Apple IIe)	$0B
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Here Is	Answerback String
S1 B	None	
S1 C	Clear Screen	$1A
S1 E	None	
S1 H	Home Cursor	$1E
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S3 P	Enable/Disable Extension Port	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Lear Siegler ADM-5

Introduction

The Lear Siegler ADM-5 Video Display Unit can be emulated using Softerm 2 by entering *LSI ADM-5* for the terminal emulation filename when generating a configuration in terminal setup. The ADM-5 general capabilities supported by Softerm include the full 128 character set with 80 X 24 display, full and half duplex modes, scrolling, absolute cursor positioning, selectable auto new line, editing functions, gated extension port operation, and special control character sequences.

Features

The display format of the ADM-5 is 24 lines by 80 characters with standard absolute cursor positioning with the home position in the upper left of the display. Softerm includes support for the cursor control keys Backspace, Forespace, Up, Down, Home, Return, and Line Feed, the functional command keys Escape, Rubout (delete), Break, Tab, Clear, and Here Is. Softerm also provides support for the edit keys Erase to End of Line, and Erase to End of Page. Conversation modes of full or half duplex are supported. Support for the Data rates, Parity, and Word Structure is determined by the serial I/O interface available in the Apple II computer.

Switch selectable settings and features in the ADM-5 not supported by Softerm include Secondary Channel, Code Turnaround and 202 Modem. Softerm includes support for the optional feature Automatic Answerback.

Softerm also includes support for the *Gated Extension Port Operation* if Softerm includes a printer driver other than *NULL.PIO*. If the gated extension port option is specified, when an *enable extension port* function code $0E is received from the host computer, all subsequent data is sent to the printer until a *disable extension port* function code $0F is received from the host computer or the **RESET** or **S1 CTRL R** key is pressed. Data received is also displayed on the video display. Refer to the description of printer pass through in the introduction of this chapter for additional information.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal
Setup, the following screen will be displayed:

```
========== ADM-5 EMULATION OPTIONS ==========

GATED EXTENSION PORT OPERATION?     N
```

If this option is specified as **Y**, the *gated extension port operation*
described previously is used. If this option is specified as **N**, the
keyboard lock/unlock feature is enabled. When a $0E function code is
received, the keyboard is *unlocked*, and when a $0F function code is
received, the keyboard is *locked*.

Lear Siegler ADM-5 Keyboard Functions

The following defines the standard keyboard functions for the Lear Siegler ADM-5 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	$0C
S2 →	Cursor Down	$0A
S3 →	Tab	$09
S1 ←	Cursor Left	$08
S2 ←	Cursor Up	$0B
S1 ↑	Cursor Up (Apple IIe)	$0B
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Here Is	Answerback String
S1 B	Erase to End of Screen	$1B $59
S1 C	Clear Screen	$1A
S1 E	Erase to End of Line	$1B $54
S1 H	Home Cursor	$1E
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S3 P	Enable/Disable Extension Port	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

TeleVideo 910

Introduction

The TeleVideo Model 910 terminal can be emulated using Softerm 2 by entering *TELEVIDEO 910* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the TeleVideo 910 including the full 128 character set and 80 X 24 display, video attributes, Tab and Back Tab, editing features, cursor controls, conversational full or half duplex transmission, and the simultaneous or transparent print modes.

Features

The display format of the TeleVideo 910 is 24 lines by 80 characters with the ability to display all 128 ASCII character codes including 32 control codes in the *Monitor Mode*. Softerm does *not* support this mode. Transmission rates and parity settings are determined by the type of serial I/O interface available in the Apple II computer.

Softerm supports all available keyboard functions including HOME, RETURN, LINEFEED, BACKSPACE, CURSOR UP, CURSOR DOWN, CURSOR RIGHT, CURSOR LEFT, TAB, BACK TAB, CLEAR, PRINT and HOME. The SHIFT CLEAR key which clears the screen to *nulls* is provided as a separate key in Softerm but it is processed identically to a CLEAR.

Functional commands recognized and processed by Softerm include Home, New Line, Carriage Return, Cursor Down, Cursor Up, Cursor Right, Cursor Left, Set Column Tab, Clear Tab, Clear all tabs, Back Tab, Move to Tab, Erase Line, Erase Page, Clear Screen, Load Cursor Row, Load Cursor Column, Load Cursor Row and Column, Enable Keyboard, Disable Keyboard, Enable Printer Port, Disable Printer Port, Enable Transparent Print, Disable Transparent Print, Auto Scroll On/Off and all Visual Attributes including Invisible Cursor.

Functional commands recognized but ignored by Softerm include Display Control Character, Self Test On, Monitor On, and Monitor Off.

Softerm includes support for the *Printer Port* if Softerm includes a printer driver other than *NULL.PIO*. If either an *Enable Printer Port* or *Enable Transparent Print* remote command is received, all subsequent data is sent to the printer until a *Disable Printer Port* command is received. If a *Disable Transparent Print* command is received while the printer port is enabled, the printer will remain enabled and received data will be displayed as well as printed. In the *transparent mode* data is sent only to the printer and not displayed, otherwise the received data is both displayed and printed. The printer port may also be enabled by the **S3 P** keyboard function which provides the *PRINT* key capability of the TeleVideo 910. Refer to the description of printer pass through in the introduction of this chapter for additional information.

TeleVideo 910 Keyboard Functions

The following defines the standard keyboard functions for the TeleVideo 910 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 →	Cursor Right	$0C
S2 →	Cursor Down	$0A
S3 →	TAB	$09
S1 ←	Cursor Left	$08
S2 ←	Cursor Up	$0B
S1 ↑	Cursor Up (Apple IIe)	$0B
S1 ↓	Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	Erase to End of Page	$1B $59
S1 C	CLEAR	$1B $1A
S2 C	SHIFT CLEAR	$1B $2A
S1 E	Erase to End of Line	$1B $54
S1 H	Home Cursor	$1E
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S3 P	Enable/Disable Printer Port	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Keyboard	Function	Characters
S3 0	FUNCT/0	$01 $40 $0D
S3 1	FUNCT/1	$01 $41 $0D
S3 2	FUNCT/2	$01 $42 $0D
S3 3	FUNCT/3	$01 $43 $0D
S3 4	FUNCT/4	$01 $44 $0D
S3 5	FUNCT/5	$01 $45 $0D
S3 6	FUNCT/6	$01 $46 $0D
S3 7	FUNCT/7	$01 $47 $0D
S3 8	FUNCT/8	$01 $48 $0D
S3 9	FUNCT/9	$01 $49 $0D

TeleVideo 925

Introduction

The TeleVideo Model 925 terminal can be emulated using Softerm 2 by entering *TELEVIDEO 925* for the terminal emulation filename when generating a configuration in terminal setup. Softerm supports all the general capabilities of the TeleVideo 925 including the full 128 character set and 80 X 24 display, video attributes, Tab and Back Tab, editing features, cursor controls, conversational full or half duplex transmission, block mode transmission, and auxiliary port control including page print, buffered transparent, and buffered with screen copy.

Features

The display format of the TeleVideo 925 is 24 lines by 80 characters with the ability to display all 128 ASCII character codes including 32 control codes in the *Monitor Mode*. Softerm does *not* support this mode. The TeleVideo 925 also displays a 25th status line which is not supported by Softerm. The 925 has the option of one additional page of display memory. Softerm supports only a single page of display memory. Transmission rates and parity settings are determined by the type of serial I/O interface available in the Apple II computer.

Softerm supports all available keyboard functions including HOME, RETURN/ENTER, LINEFEED, BACKSPACE, CURSOR UP, CURSOR DOWN, CURSOR RIGHT, CURSOR LEFT, TAB, BACK TAB, ESC, LOC ESC, PRINT, FUNCT, CHAR INSERT, CHAR DELETE, LINE INSERT, LINE DELETE, LINE ERASE, PAGE ERASE, SEND, BREAK, DEL, and F1—F11.

Functional commands recognized and processed by Softerm include Bell, Cursor Left, Cursor Right, Cursor Down, Cursor Up, Cursor Home, Address Cursor Page Row Column, Address Cursor Row Column, Read Cursor Page Row Column, Read Cursor Row Column, Carriage Return, Linefeed, Newline, Tab, Back Tab, Set Column Tab, Clear Column Tab, Clear All Tabs, Field Tabs, Clear All to Nulls, Clear Unprotected to Spaces, Clear All to Half-Intensity, Clear Unprotected to Null, Set Video Attribute, Erase EOL with Spaces, Erase EOL with Nulls, Erase EOP with Spaces, Erase EOP with Nulls, Lock Keyboard, Unlock Keyboard, Protect Mode On, Protect Mode Off, Write Protect (Half Intensity) Off, Write Protect (Half Intensity) On, Block Mode On, Conversation Mode On, Blank Screen, Normal Screen, Send Line Unprotect Only, Send Page Unprotect Only, Send Line All, Send Page All, Send Message Unprotect Only, Send Message All, Enable Bidirectional Printer Mode, Disable Bidirectional Printer Mode, Enable X On/Off, Disable X On/Off, Extension Mode On, Extension Mode Off, Page Print, Transparent Print On, Transparent Print Off, Load User Line, Display User Line, Turn Off 25th Line, Reverse Linefeed, Set Local Edit Mode, Select Termination Character, Set Cursor Attribute, and Set Print Termination Character.

Functional commands recognized and processed but ignored by Softerm include Back Page, Advance Page, Keyclick On, Keyclick Off, Black on White, White on Black, Auto Page On, Auto Page Off, Monitor Mode On, Monitor Mode Off, Load Time, and Read Time.

Softerm includes support for the *Printer Port* if Softerm includes a printer driver other than *NULL.PIO*. If either an *Enable Bidirectional Port, Extension Mode On,* or *Transparent Print On* remote command is received, all subsequent data is sent to the printer until a *Disable Bidirectional Port, Extension Mode Off,* or *Transparent Print Off* command is received. In the *transparent mode* data is sent only to the printer and not displayed, otherwise the received data is both displayed and printed. The printer port may also be enabled by the **S3 P** keyboard function. Refer to the description of printer pass through in the introduction of this chapter for additional information.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
    === TELEVIDEO 925 EMULATION OPTIONS ===
    BLOCK MODE?                        Y
    LOCAL EDIT?                        N
    PAGE ATTRIBUTES?                   N
    SEND KEY = SEND LINE               N
```

The emulation option *BLOCK MODE?* selects the Block Transmission Mode if **Y** is entered and the Character Transmission Mode if **N** is entered. If block mode is selected, the characters entered from the keyboard are stored in a buffer corrected and edited by the operator, and then transmitted to the host when the *SEND* key is pressed.

The emulation option *LOCAL EDIT?* sets the edit keys for local operation only if **Y** is entered and the Duplex Edit Mode if **N** is entered. In Duplex Edit Mode the edit keys will be transmitted as alphanumeric keys and operated on according to the current Full or Half Duplex mode. The editing keys are TAB, BACK TAB, CHAR INSERT, CHAR DELETE, LINE INSERT, LINE DELETE, LINE ERASE, PAGE ERASE, BACKSPACE, HOME, CURSOR UP-DOWN-RIGHT-LEFT, CLEAR SPACE, SEND, and PRINT.

The emulation option *PAGE ATTRIBUTES?* if set to **Y** allow the Set Video Attribute command to set the video attributes from the current cursor position to the end of the screen. If this option is set to **N**, the Set Video Attribute command affects only the current line.

The emulation option *SEND KEY = SEND LINE?* is used to activate the *SEND LINE* key function when the *SEND* key is pressed. If **Y** is entered the *SEND* key will function as the *SEND LINE* key. If **N** is entered, the *SEND* key will function as the *SEND PAGE* key.

TeleVideo 925 Keyboard Functions

The following defines the standard keyboard functions for the TeleVideo 925 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 RETURN	SEND	$1B ($36 or $37)
S2 RETURN	SEND LINE ALL	$1B $36
S3 RETURN	SEND PAGE ALL	$1B $37
S1 →	Cursor Right	$0C
S2 →	Cursor Down	$16
S3 →	TAB	$09
←	BACKSPACE	$08
S1 ←	Cursor Left	$08
S2 ←	Cursor Up	$0B
S3 ←	BACK TAB	$1B $49
S1 ↑	Cursor Up (Apple IIe)	$0B
S1 ↓	Cursor Down (Apple IIe)	$16
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S3 ESC	LOC ESC	
S1 A	Send Answerback Message	Answerback String
S1 B	PAGE ERASE (Spaces)	$1B $59
S2 B	PAGE ERASE (Nulls)	$1B $79
S1 C	CLEAR SPACE	$1A
S2 C	CLEAR ALL (Nulls)	$1B $2A
S1 D	CHAR DELETE	$1B $57
S3 D	LINE DELETE	$1B $52
S1 E	LINE ERASE (Spaces)	$1B $54
S2 E	LINE ERASE (Nulls)	$1B $74
S3 F	FUNCT	$01 (ASCII code) $0D
S1 H	HOME	$1E
S1 I	CHAR INSERT	$1B $51
S3 I	LINE INSERT	$1B $45
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	LINE FEED	$0A
S1 O	Display Other Half	

Keyboard	Function	Characters
S1 P	PRINT	$1B $50
S3 P	Enable/Disable Printer Port	
S1 Q	Resume Display	
S1 S	Stop Display	
S1 V	View Terminal Status	
S3 V	Display User Line	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	F1	$01 $40 $0D
S3 2	F2	$01 $41 $0D
S3 3	F3	$01 $42 $0D
S3 4	F4	$01 $43 $0D
S3 5	F5	$01 $44 $0D
S3 6	F6	$01 $45 $0D
S3 7	F7	$01 $46 $0D
S3 8	F8	$01 $47 $0D
S3 9	F9	$01 $48 $0D
S3 0	F10	$01 $49 $0D
S3 Q	F11	$01 $4A $0D
S3 S2 1	SHIFT F1	$01 $60 $0D
S3 S2 2	SHIFT F2	$01 $61 $0D
S3 S2 3	SHIFT F3	$01 $62 $0D
S3 S2 4	SHIFT F4	$01 $63 $0D
S3 S2 5	SHIFT F5	$01 $64 $0D
S3 S2 6	SHIFT F6	$01 $65 $0D
S3 S2 7	SHIFT F7	$01 $66 $0D
S3 S2 8	SHIFT F8	$01 $67 $0D
S3 S2 9	SHIFT F9	$01 $68 $0D
S3 S2 0	SHIFT F10	$01 $69 $0D
S3 S2 Q	SHIFT F11	$01 $6A $0D

TeleVideo 950

Introduction

The TeleVideo Model 950 terminal can be emulated using Softerm 2 by entering *TELEVIDEO 950* for the terminal emulation filename when generating a configuration in terminal setup. This emulation requires an Apple II, II Plus, or IIe system configured with at least 64K of RAM memory and cannot be used with 48K systems. Softerm supports all the general capabilities of the TeleVideo 950 including the full 128 character set and 80 X 24 display, screen attributes, cursor attributes, cursor control, editing, programmable function keys, status line, conversational full or half duplex transmission, block mode transmission, and auxiliary port control including formatted or unformatted page print, buffered transparent, and buffered with screen copy.

Features

The display format of the TeleVideo 950 is 24 lines by 80 characters with the ability to display all 128 ASCII character codes including 32 control codes in the *Monitor Mode*. Softerm does *not* support this mode. The TeleVideo 950 also includes 15 special graphic characters which are displayed as blanks by Softerm. The TeleVideo 950 also displays a 25th status line which is also supported by Softerm. Although this information is not continuously displayed, Softerm provides a special function key to display the terminal status. The 950 has the option of 1-3 additional pages (24 lines) of display memory. Softerm supports only a single page (24 lines) of display memory. Transmission rates and parity settings are determined by the type of serial I/O interface available in the Apple II computer.

Softerm supports all available keyboard functions including HOME, RETURN/ENTER, LINEFEED, BACKSPACE, CURSOR UP, CURSOR DOWN, CURSOR RIGHT, CURSOR LEFT, TAB, BACK TAB, ESC, LOC ESC, PRINT, FUNCT, CHAR INSERT, CHAR DELETE, LINE INSERT, LINE DELETE, LINE ERASE, PAGE ERASE, CLEAR SPACE, SEND, BREAK, DEL, and F1—F11.

Functional commands recognized and processed by Softerm include Bell, Backspace, Tab, Linefeed, Reverse Linefeed, Cursor Up, Cursor Right, Carriage Return, Disable XON/XOFF, Enable XON/XOFF, XON, XOFF, Bi-directional On, Bi-directional Off, Cursor Down, Home, New Line, Enable Keyboard, Disable Keyboard, Graphics Mode On, Graphics Mode Off, Protect Mode On, Protect Mode Off, Write Protect (Half Intensity) Off, Write Protect (Half Intensity) On, Cursor Address (PRC), Cursor Address (RC), Cursor Attributes, Read Cursor Address (PRC), Program Send Key, Set Tab, Clear Tab, Clear All Tabs, Send Line Unprotected, Send Page Unprotected, Send Message Unprotected, Send Line All, Send Page All, Send Message All, Clear All to Nulls, Clear Unprotected to Nulls, Clear Unprotected to Spaces, Read Cursor Ad-

dress (RC), Read Cursor Address (PRC), Copy (Extension) Print On, Copy (Extension) Print Off, Block Mode, Conversation Mode, Video Attributes, Back Tab, Send Terminal ID, Page Edit, Line Edit, Page Print, Unformatted Print, Character Insert, Character Delete, Line Insert, Line Delete, Line Erase to Spaces, Line Erase to Nulls, Page Erase to Spaces, Page Erase to Nulls, Send User Line, Transparent Print Mode On, Transparent Print Mode Off, Load User Line, Display User Line, Field Tab, Local Edit, Duplex Edit, Set Send Delimeters, Set Half Duplex, Set Full Duplex, Linelock Off All Lines, and Load Function Keys.

The Linelock Line command will cause the current and all preceeding lines to become locked by setting the top margin to the current line plus 1. The Send Status Line Command will cause only a carriage return to be transmitted.

Functional commands recognized and processed but ignored by Softerm include Smooth Scroll, Normal Scroll, Back Page, Advance Page, Keyclick On, Keyclick Off, Black on White, White on Black, Auto Page On, Auto Page Off, Monitor Mode On, Monitor Mode Off, Page Size, Screen On, Screen Off, Go To User ROM, Program Printer Port, and Program CPU Port.

Softerm includes support for the *Printer Port* if Softerm includes a printer driver other than *NULL.PIO*. If either an *Enable Bidirectional Port, Copy (Extension) Mode On,* or *Transparent Print On* remote command is received, all subsequent data is sent to the printer until a *Disable Bidirectional Port, Copy (Extension) Mode Off,* or *Transparent Print Off* command is received. In the *transparent mode* data is sent only to the printer and not displayed, otherwise the received data is both displayed and printed. The printer port may also be enabled by the **S3 P** keyboard function. Refer to the description of printer pass through in the introduction of this chapter for additional information.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
        == TELEVIDEO 950 EMULATION OPTIONS ==
     BLOCK MODE?                          N
     LOCAL EDIT?                          N
     PAGE ATTRIBUTES?                     N
```

The emulation option *BLOCK MODE?* selects the Block Transmission Mode if **Y** is entered and the Character Transmission Mode if **N** is entered. If block mode is selected, the characters entered from the keyboard are stored in a buffer corrected and edited by the operator, and then transmitted to the host when the *SEND* key is pressed.

The emulation option *LOCAL EDIT?* sets the edit keys for local operation only if **Y** is entered and the Duplex Edit Mode if **N** is entered. In Duplex Edit Mode the edit keys will be transmitted as alphanumeric keys and operated on according to the current Full or Half Duplex mode. The editing keys are TAB, BACK TAB, CHAR INSERT, CHAR DELETE, LINE INSERT, LINE DELETE, LINE ERASE, PAGE ERASE, BACKSPACE, HOME, CURSOR UP-DOWN-RIGHT-LEFT, CLEAR SPACE, SEND, and PRINT.

The emulation option *PAGE ATTRIBUTES?* if set to **Y** allow the Set Video Attribute command to set the video attributes from the current cursor position to the end of the screen. If this option is set to **N**, the Set Video Attribute command affects only the current line.

Operator Status Line Display

The TeleVideo 950 terminal includes a status line (25th line on the display screen) which is operationally separate from the 24 lines of screen data. Since Softerm supports only a 24 line screen, the status information is displayed only when a **S3 V** keyboard function is entered. The data on line 24 is temporarily replaced by the status information, and when the **S1 X** or **S3 V** key is pressed, the original data is restored to the line. The status information displayed includes *ROW* and *COLUMN*, *INSERT* or *EDIT* mode, *PAGE* or *LINE* editing, *GRAPH* mode, *CHAR* or *BLOCK* mode, *H.I.* (Half Intensity) mode, *PROTECT* mode, and *KEYBOARD LOCK* mode.

The *INSERT* or *EDIT* mode setting can be toggled while the status is displayed by pressing the **I** key. For example, to toggle from the *EDIT* mode to the *INSERT* mode, first display the status by entering **S3 V** and then press the **I** key. Pressing the **L** key will cause the *LINE* or *PAGE* editing mode to be toggled. Pressing the **B** key will cause the *CHAR* or *BLOCK* mode setting to be toggled. Pressing the **H** key will cause the *H.I.* mode to be toggled between *ON* and *OFF*. Pressing the **P** key will cause the *PROTECT* mode setting to be toggled between *ON* and *OFF*. Pressing the **K** key will cause the *KEYBOARD LOCK* setting to be toggled between *ON* and *OFF*.

TeleVideo 950 Keyboard Functions

The following defines the standard keyboard functions for the TeleVideo 950 emulation:

Keyboard	Function	Characters
RETURN	CR, LF, or CR/LF	$0D, $0A, or $0D $0A
S1 RETURN	SEND	User Defined
S2 RETURN	SHIFT SEND	User Defined
S1 →	Cursor Right	$0C
S2 →	Cursor Down	$16
S3 →	TAB	$09
S3 S2 →	SHIFT Cursor Down	$0A
←	BACKSPACE	$08
S1 ←	Cursor Left	$08
S2 ←	Cursor Up	$0B
S3 ←	BACK TAB	$1B $49
S3 S2 ←	SHIFT Cursor Up	$1B $6A
S1 ↑	Cursor Up (Apple IIe)	$0B
S2 ↑	SHIFT Cursor Up (Apple IIe)	$1B $6A
S1 ↓	Cursor Down (Apple IIe)	$16
S2 ↓	SHIFT Cursor Down (Apple IIe)	$0A
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S3 ESC	LOC ESC	
S1 A	Send Answerback Message	Answerback String
S1 B	PAGE ERASE (Spaces)	$1B $59
S2 B	PAGE ERASE (Nulls)	$1B $79
S1 C	CLEAR SPACE	$1A
S2 C	CLEAR ALL (Nulls)	$1B $2A
S1 D	CHAR DELETE	$1B $57
S2 D	SHIFT CHAR DELETE	$1B $72
S3 D	LINE DELETE	$1B $52
S3 S2 D	SHIFT LINE DELETE	$1B $4F
S1 E	LINE ERASE (Spaces)	$1B $54
S2 E	LINE ERASE (Nulls)	$1B $74
S3 F	FUNCT	$01 (ASCII code) $0D
S1 I	CHAR INSERT	$1B $51
S2 I	SHIFT CHAR INSERT	$1B $71
S3 I	LINE INSERT	$1B $45
S3 S2 I	SHIFT LINE INSERT	$1B $4E

S1 J	HOME	$1E
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 N	LINE FEED	$0A
S1 O	Display Other Half	
S1 P	PRINT	$1B $50
S2 P	SHIFT PRINT	$1B $4C
S3 P	Enable/Disable Printer Port	
S1 Q	Resume Display	
S1 S	Stop Display	
S3 U	Dsiplay User Line	
S1 V	View Terminal Status	
S3 V	View TeleVideo 950 Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

Programmable Function Keys		**Default**
S3 1	F1	$01 $40 $0D
S3 2	F2	$01 $41 $0D
S3 3	F3	$01 $42 $0D
S3 4	F4	$01 $43 $0D
S3 5	F5	$01 $44 $0D
S3 6	F6	$01 $45 $0D
S3 7	F7	$01 $46 $0D
S3 8	F8	$01 $47 $0D
S3 9	F9	$01 $48 $0D
S3 0	F10	$01 $49 $0D
S3 Q	F11	$01 $4A $0D
S3 S2 1	SHIFT F1	$01 $60 $0D
S3 S2 2	SHIFT F2	$01 $61 $0D
S3 S2 3	SHIFT F3	$01 $62 $0D
S3 S2 4	SHIFT F4	$01 $63 $0D
S3 S2 5	SHIFT F5	$01 $64 $0D
S3 S2 6	SHIFT F6	$01 $65 $0D
S3 S2 7	SHIFT F7	$01 $66 $0D
S3 S2 8	SHIFT F8	$01 $67 $0D
S3 S2 9	SHIFT F9	$01 $68 $0D
S3 S2 0	SHIFT F10	$01 $69 $0D
S3 S2 Q	SHIFT F11	$01 $6A $0D

Hewlett Packard 2622A

Introduction

The Hewlett Packard 2622A Display Terminal can be emulated using Softerm 2 by entering *HP 2622A* for the terminal emulation filename when generating a configuration in terminal setup. This emulation requires an Apple II, II Plus, or IIe system configured with at least 64K of RAM memory and cannot be used with 48K systems. Softerm supports all the general capabilities of the HP 2622A including Display Enhancements (inverse video, blinking, underlining, and half-bright if available in the hardware used), Character, Line, or Block Mode Operation, Forms and Non-Forms Mode, Eight user-definable function keys, Two-character user-definable RETURN key, Full editing capabilities (insert/delete/clear line and insert/delete character), Adjustable margins and tab stops, Programmatic cursor sensing and addressing, primary, secondary, and device status functions, and internal/external print operations.

Features

The display format of the HP 2622A display terminal is 24 lines by 80 characters and two additional lines for system soft key labels. Softerm does not display the soft key labels concurrently with the standard 24 X 80 display. Using a keyboard function, the soft key labels for the user-definable function keys f1-f8 may be displayed and temporarily replace the last two lines of the display. Any key subsequently entered including a function key will be processed normally and the last two lines of the display are automatically restored to their previous contents

Softerm does not support the line drawing character set. If line drawing character sequences are received, the screen display positions for these characters are blanked. Softerm supports only 1 page (1920 characters or 24 lines) of display memory; however, cursor positioning functions are processed as if 2 pages (48 lines) exist. Display control functions related to multiple page operation are processed accordingly. Next Page/Previous Page functions will cause the screen to be cleared or rolled up or down the appropriate number of lines and the cursor placed at the home position. Roll Up/Roll Down will cause a blank line to be added to the bottom or the top of the display and an upward or downward scroll of the remaining lines on the screen.

Cursor positioning to rows greater than 23 or programs that require internal terminal display memory of 25 lines or more will cause the screen to roll up the appropriate number of lines and the information that is scrolled off the screen is lost. To view a page of information that is greater than 24 lines, the Capture Line Mode to Disk function should be utilized with **S1 8** before the screen begins to fill up with information. After the information has been displayed on the screen, it can be redisplayed by going to the local file transfer using **S1 3** and choosing LOCAL and then transfering the file to video.

The HP 2622A includes a Memory Lock Mode which provides two separate functions called overflow protect and display lock. Softerm supports only the display lock feature which allows a top margin to be specified so that lines above the top margin become locked and cannot be scrolled off the screen. The HP 2622A also includes a display functions mode which causes ASCII control codes and escape sequences to be displayed and not executed. Softerm does not support this feature. The Caps Mode and Caps Lock mode is also not supported.

The HP 2622A includes a Terminal Configuration and Datacomm Configuration Menu which allow terminal options and parameters to be selected and saved in non-volatile memory. Softerm emulates this capability through its standard Terminal Setup capability and includes a special HP 2622A parameter screen for options not provided as standard Softerm features. Terminal Configuration options provided by the HP 2622A and supported by Softerm include Return Def, Local Echo, Start Col, ASCII 8 Bit, Xmit Fnctn(A), SPOW(B), InhEolWrp(C), Line/Page(D), InhHndShk(G), Inh DC2(H), Fld Separator, and Blk Terminator. The *Local Echo* option corresponds to the Softerm System Parameter *Half Duplex*, and the *InhEolWrp(C)* corresponds to the Softerm Terminal Emulation Parameter *Auto Line Wrap*. Terminal Configuration options not supported by Softerm include Language, Frame Rate, and Caps Lock.

Datacomm Configuration Options provided by the HP 2622A and supported by Softerm include Baud Rate, Parity, EnqAck, Chk Parity, RecvPace, and XmitPace. The *Baud Rate, Parity,* and *Chk Parity* correspond to the Softerm Serial I/O Driver Parameters *Speed, Parity,* and *Bits/Character*. RecvPace corresponds to the Softerm Terminal Emulation Parameter *PACE CTRL: XON/XOFF* and *XmitPace* corresponds to the Softerm System Parameter *RCV XON/XOFF*.

Softerm supports all the HP 2622A keyboard functions including RETURN, ENTER, TAB, TAB RIGHT, TAB LEFT, ESC, DEL, BACK SPACE, NEXT PAGE, PREV PAGE, Cursor Home Up, Cursor Home Down, Cursor Up, Cursor Left, Cursor Right, Cursor Down, ROLL DOWN, ROLL UP, INS LINE, DEL LINE, INS CHAR, DEL CHAR, CLEAR LINE, CLEAR DSPLY, BREAK, RESET, and function keys f1 through f8.

Functions provided by the AIDS, MODES, and USER KEYS, are provided as separate keys or by the HP 2622A Status Display which allows various modes of operation to be toggled. Softerm provides special keys for functions including Copy Page, Copy Line, Record Mode, Set Left Margin, Set Right Margin, Clear Margins, Set Tab, Clear Tab, Clear All Tabs, Display Function Key Labels, Function Key Default Values, and Display HP 2622A Status. Block/Character Mode, Modify Mode, and Auto LF Mode may be toggled using the HP 2622A Status Display function.

Host initiated terminal control functions which Softerm recognizes and processes include Copy memory to destination(s), Set Tab, Clear Tab, Clear All Tabs, Set Left Margin, Set Right Margin, Clear All Margins, Delay One Second, Cursor Up, Cursor Down, Cursor Right, Cursor Left, Hard Reset, Cursor Home Down, Move Cursor to Left Margin, Cursor Home Up, Horizontal Tab, Clear Display from cursor to end of memory, Clear Line from cursor to end of line, Insert Line, Delete Line, Delete Character, Start Insert Character Mode, End Insert Character Mode, Roll Up, Roll Down, Next Page, Previous Page, Format Mode On, Format Mode Off, Start Unprotected Field, End Unprotected Field, Primary Terminal Status Request, Sense Cursor Position (relative), Sense Cursor Position (absolute), Unlock Keyboard, Lock Keyboard, Transmit a block of text to computer, Modem Disconnect, Soft Reset, Backtab, Begin Memory Lock Mode, End Memory Lock Mode, and Secondary Terminal status request.

Terminal Control Functions which Softerm recognizes but ignores include Display Functions Mode On, Display Functions Mode Off, Begin User Keys Definition Mode, End User Keys Definition Mode, and initiate terminal self test. If a Begin User Keys Definition Mode function is received and subsequently followed by a transmit block request, the current definition of the user keys will be transmitted.

All host initiated cursor control operations and configuration operations are recognized and supported by Softerm. Data Operations addressed to an internal or external printer supported by Softerm include Copy Line, Copy Page, and Copy All, Write Record, Device Status, Record Mode, and printer control functions including form feed, multiple line feed, and turning logging on and off. The standard Capture Line Mode to Print capability is used for Top or Bottom Logging. Printer control functions for normal, expanded, and compressed characters, and Report and Metric mode are not supported. Record mode allows data to be transferred from the host computer to the printer transparently without interpretation or display.

Softerm supports all host initiated function key and error message operations with the exception of enabling and disabling the function or function control keys and automatic display of function key labels. If an error message is received, the last two rows of the screen are temporarily cleared and the received error message is displayed. The error message will remain displayed until a key is entered at which time the error message is erased and the last two rows of the screen are restored to their previous contents.

Softerm supports all display enhancement operations if the video display hardware being used supports the visual attributes utilized. If a formatted screen is transmitted to the host system, the correct video enhancement sequences will be transmitted. Alternate Character Set Selection is not supported by Softerm, and if received these sequences are ignored.

The Terminal ID Status function is supported by Softerm and will cause a *2622A* character string to be transmitted.

Terminal Setup Parameters

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
======= HP 2622A EMULATION OPTIONS =======
RETURN DEF                          $0D $00
START COL                                 1
XMIT FNCTN                                N
SPOW                                      N
INH HND SHK                               N
INH DC2                                   N
FLD SEPARATOR                           $1F
BLK TERMINATOR                          $1E
ENQ-ACK                                   Y
ASCII 8BIT                                N
BLOCK MODE                                N
   0-LINE  1-PAGE                         O
MODIFY ALL MODE                           N
AUTO LF MODE                              N
```

The emulation option *RETURN DEF* specifies the definition of the **RETURN** key. The default definition is an ASCII CR ($0D). The definition may consist of up to two characters. If the second character is a null ($00), it is ignored.

The emulation option *START COL* specifies the column at which transmission is to begin in MODIFY LINE or MODIFY ALL modes if the line has no logical start-of-text pointer. Its value may be from 1—80.

The emulation option *XMIT FNCTN* specifies whether escape code functions are both executed at the terminal and transmitted to the host computer. If this field is specified as **Y**, the escape code sequences generated by control keys such as **S1 C** (CLEAR DSPLY) and **S1 E** (CLEAR LINE) are transmitted to the host computer. If local echo (Half Duplex) is selected, the function is also performed locally. If this field is specified as **N**, the escape code sequences for the major function keys are executed locally but not transmitted to the host computer.

The emulation option *SPOW* specifies whether or not spaces entered through the keyboard will overwrite existing characters. If this option is specified as **N**, spaces entered through the keyboard will overwrite existing characters. If this option is specified as **Y**, the Space Overwrite Latch is enabled. Once enabled, it is turned on by a carriage return and turned off by a line feed home up, or tab.

The emulation options *INH HND SHK* and *INH DC2* determine what type of handshaking is to be used when transferring blocks of data from the terminal to the host computer.

The emulation option *FLD SEPARATOR* defines the character which is transmitted at the end of each unprotected field when the terminal is in block page mode and a formatted display is active. The character may be specified as any valid ASCII character in the range $00—$7F.

The emulation option *BLK TERMINATOR* defines the character which is transmitted at the end of certain types of block data transfers between the terminal and the host computer. The character may be specified as any valid ASCII character in the range $00—$7F.

The emulation option *ENQ-ACK* enables the use of the Hewlett Packard ENQ-ACK handshake as a pacing mechanism. Entering a **Y** for this option enables the ENQ-ACK handshake while entering an **N** disables the handshake.

The emulation option *ASCII 8BIT* specifies whether the ASCII SO code for shifting to the alternate character set is effective to the end of the line or to the next ASCII SI code even if it occurs several lines later. If this option is specified as a **Y**, SO codes will be effective until the next SI code even if it occurs several lines later. If this option is specified as an **N**, SO codes are effective only to the end of the current line. This option does not affect the Serial I/O parameter *BITS/CHARACTER*.

The emulation option *BLOCK MODE* specifies whether or not the terminal will operate in character or block mode by default. If this option is specified as a **Y**, Softerm will operate in the block mode. Characters entered from the keyboard in block mode are not transmitted as they are entered. A complete line or screen may be entered and then transmitted using the ENTER key. If this option is specified as an **N**, Softerm will operate in the character mode. In the character mode, a character is immediately transmitted when a keyboard key is pressed. Softerm can be toggled between the block and character modes using the HP 2622A Status Display initiated with the **S3 V** keyboard function.

The emulation option *0-LINE 1-PAGE* specifies whether or not the terminal, when operating in block mode, will transmit data a line at a time or a page at a time. Entering a **0** selects the line at a time data transmission for block mode. Entering a **1** selects the page at a time data transmission for block mode.

The emulation option *MODIFY ALL MODE* allows the Modify All Mode of operation to be selected by default. Entering a **Y** selects the Modify All mode of operation while entering an **N** selects the Modify Off mode of operation. The Modify Mode can be toggled between Modify Off, Modify Line, and Modify All using the HP 2622A Status Display initiated by the **S3 V** keyboard function.

The emulation option *AUTO LF MODE* allows the Auto Line Feed Mode to be selected by default. When Auto Line Feed Mode is enabled, an ASCII line feed control code is automatically appended to each ASCII carriage return control code generated through the keyboard. Entering a **Y** for this option enables the Auto Line Feed Mode. Entering an **N** for this option disables the Auto Line Feed Mode. The Auto Line Feed Mode can be toggled on and off using the HP 2622A Status Display initiated by the **S3 V** keyboard function.

When editing of the HP 2622A emulation options is complete, enter an **S1 RETURN** keyboard function to continue to function key definition.

Function Key Definition

When editing of the HP 2622A emulation options is complete, entering an **S1 RETURN** keyboard function will cause the following screen to be displayed:

```
========== FUNCTION KEY DEFINITIONS ==========

KEY # 1  ID:      f1               MODE  T
TEXT: ↑[p

KEY # 2  ID:      f2               MODE  T
TEXT: ↑[q

KEY # 3  ID:      f3               MODE  T
TEXT: ↑[r

KEY # 4  ID:      f4               MODE  T
TEXT: ↑[s
```

The cursor is initially positioned to the *ID:* field for Function Key #1. The fields displayed for each function key definition include the *ID:*, *MODE*, and *TEXT:*. The **RETURN** or **S1** → and **S1** ← keys may be used to position the cursor to any field within a function key definition. When editing of one function key definition is complete, entering an **S1 RETURN** will position the cursor to the *ID:* field of the next function key definition.

The *ID:* field defines the function key label of up to 16 characters. The labels are displayed on the bottom two rows of the screen when an **S1 U** keyboard function is entered in the online terminal operation mode. The label definition is displayed as two fields of eight characters each on two rows. The first 8 characters of the *ID:* correspond to the upper portion of the label and the last 8 characters correspond to the lower portion.

The *MODE* field defines the function key attribute as executed locally only (L), transmitted to the host computer only (T), or treated in the same manner as the alphanumeric keys (N). If the *MODE* field is set to N, and Softerm is in the local mode, the content of the key is executed locally. If Softerm is in the online full-duplex mode, the content of the key is transmitted to the host computer. If Softerm is in the online half-duplex mode, the content of the key is both transmitted to the host computer and executed locally.

The *TEXT:* field consists of 3 ASCII string entry fields of 20, 30, and 30 characters for a total of 80 characters. As each field is entered, Softerm checks to determine if all positions in the previous field were entered and automatically adjusts the screen display so that the combination of characters in the 3 fields is processed as a contiguous function key definition. ASCII control characters may be entered directly are displayed

using a two-character combination of an ↑ followed by an alphanumeric character. Some character codes such as RETURN and ESC must be proceeded by an ESC character when entered in order to be accepted as data. Refer to the description of ASCII string fields in Chapter 2 on Terminal Setup for additional information.

After each function key entry is complete, the **S1 RETURN** key is used to position the cursor to the next function key definition. When the **S1 RETURN** key is entered for Function Key #4, the current definition for function keys 5 through 8 will be displayed. When the **S1 RETURN** key is entered for Function Key #8, the current definition for function keys 1 through 4 will be displayed. Once editing of the function key definitions is complete, enter an **S1 X** to return to the terminal setup menu.

HP 2622A Status Display

The HP 2622A terminal emulation includes a status display which includes information normally displayed on the additional screen rows on the HP 2622A where the function key labels are displayed. Since Softerm supports only a 24 line screen, the status information is displayed only when a **S3 V** keyboard function is entered. The data on line 24 is temporarily replaced by the status information, and when the **S1 X** or **S3 V** key is pressed, the original data is restored to the line. The status information displayed includes the current *ROW* (1-24) and *COLUMN* (1-80), *INSERT* mode indicator, *BLOCK* or *CHARACTER* mode, *MODIFY* mode, *AUTO LF* mode, and *MEMORY LOCK* mode.

The *BLOCK* or *CHARACTER* mode setting can be toggled while the status is displayed by pressing the **B** key. For example, to toggle from character mode to block mode, first display the status by entering **S3 V** and then press the **B** key to change the *CHARACTER* mode to *BLOCK* mode.

The *MODIFY* mode setting can be toggled while the status is displayed by pressing the **M** key. Pressing the M key repeatedly will toggle the modify mode between *MODIFY OFF*, *MODIFY ALL*, and *MODIFY LINE*. If *MODIFY LINE* is selected, this mode remains in effect only until a **RETURN** or **S1 RETURN** (Enter) key is pressed which will return to the *MODIFY OFF* mode.

The *AUTO LF* mode setting can be toggled while the status is displayed by pressing the **A** key. Pressing the **A** key repeatedly will the toggle the auto line feed mode between *AUTO LF OFF* and *AUTO LF ON*.

The *MEMORY LOCK* mode setting can be toggled while the status is displayed by pressing the **L** key. Pressing the **L** key repeatedly will toggle the memory lock mode between *MEMORY LOCK OFF* and *MEMORY LOCK ON*. The current cursor position must be in a row greater than 1 to activate the *MEMORY LOCK ON* mode.

HP 2622A Keyboard Functions

The following defines the standard keyboard functions for the HP 2622A emulation:

Keyboard	Function	Characters
RETURN	RETURN	User Defined
S1 RETURN	ENTER	
S1 →	Cursor Right	$1B $43
S2 →	Cursor Down	$1B $42
S3 →	Tab	$09
←	Backspace	$08
S1 ←	Cursor Left	$1B $44
S2 ←	Cursor Up	$1B $41
S3 ←	Back Tab	$1B $69
S1 ↑	Cursor Up (Apple IIe)	$1B $41
S1 ↓	Cursor Down (Apple IIe)	$1B $42
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S1 B	CLEAR DSPLY	$1B $4A
S1 C	CLEAR DSPLY	$1B $4A
S1 D	DEL CHAR	$1B $50
S3 D	DEL LINE	$1B $4D
S1 E	CLEAR LINE	$1B $4B
S1 G	NEXT PAGE	
S2 G	PREV PAGE	
S1 H	HOME UP	$1B $48
S2 H	HOME DOWN	$1B $46
S1 I	INS CHAR	$1B $51 or $1B $52
S3 I	INS LINE	$1B $4C
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 M	LEFT MARGIN	
S2 M	RIGHT MARGIN	
S3 M	CLR ALL MARGINS	
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	

S1 P	COPY PAGE	
S2 P	COPY LINE	
S3 P	RECORD MODE	
S1 Q	Resume Display	
S1 R	ROLL UP	$1B $53
S2 R	ROLL DOWN	$1B $54
S1 S	Stop Display	
S3 S	SET START COL	
S1 T	SET TAB	
S2 T	CLEAR TAB	
S3 T	CLR ALL TABS	
S1 U	USER KEYS	
S1 S2 S3 U	DEFAULT VALUES	
S1 V	View Terminal Status	
S3 V	View HP 2622A Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	f1	User Defined
S3 2	f2	User Defined
S3 3	f3	User Defined
S3 4	f4	User Defined
S3 5	f5	User Defined
S3 6	f6	User Defined
S3 7	f7	User Defined
S3 8	f8	User defined

Honeywell VIP7801

Introduction

The Honeywell VIP7801 Video Display Terminal can be emulated using Softerm 2 by entering *HONEYWELL VIP7801* for the terminal emulation filename when generating a configuration in terminal setup. This emulation requires an Apple II, II Plus, or IIe system configured with at least 64K of RAM memory and cannot be used with 48K systems. The Honeywell VIP7801 general capabilities supported by Softerm include the full 128 character ASCII set with 80 X 24 display and simulated 80-character status line; asynchronous character, text, and form transmission modes; visual and form attributes; full keyboard emulation including cursor control, editing, device control, and function keys; auxiliary port printer support; and support for the VAF7821 Buffered Printer Adapter Option. The VDF7811 72-Line Scroll Option is *not* supported.

Features

The display format of the Honeywell VIP7801 is 24 lines by 80 characters with the capability to display 139 characters including the 95 ASCII character set, 11 business graphic symbols, and 33 symbols used only in communications display mode. Softerm supports display of only the standard ASCII character set not including line graphic or special communications symbols. The VIP7801 also displays a 25th line called the Status Line, which is used to indicate the current operational status of the terminal, and as a message line separate from the data space, providing a one-line window for dialog between the operator and the host. Although the operational status is not constantly displayed, Softerm provides a special function key to display the terminal status. Softerm utilizes the 24th line as the message line, and any information displayed on the 24th line is saved before and restored after any host to operator interaction on the status line.

Softerm supports all operational modes of the VIP7801 including Character, Text, and Form mode of operation. The Character mode of operation provides the capability to transmit a code or codes immediately as they are generated by a keystroke. In the Character Nonecho mode, the terminal reacts to codes from the keyboard as they are transmitted to the host. In the Character Echo mode, the terminal does not react to code sequences generated by the keyboard unless these codes are *echoed* by the host computer and received as normal data.

The Text mode of operation allows the operator to enter data into the terminal where it is stored and displayed, but not sent to the host until a transmit is initiated by the operator using the TRANSMIT or RETURN key if the Transmit on Return option is set. In Text mode, messages may

be composed, visually checked for correctness, edited if necessary, and then transmitted. A message can be variable in length encompassing a single character, a part of a line, several lines, or an entire screen.

The Form mode of operation derives its name from the pre-printed paper form on which headings, labels, and instructions on filling in the blank spaces are not changeable by users of the form. In the VIP7801, these fields are considered *protected*. Unlike the paper form, the terminal provides for validation of the data as it is entered into the blank spaces or *unprotected* fields. This validation is controlled by the Form attributes which can be assigned in combinations as required for different fields. These attributes include protected, unprotected, digits only, numeric only, alpha only, entry required, fill required, justify right, transmit always, and modify transmit. Softerm supports all form attributes with the exception of *Omit Print*. Softerm supports all visual attributes including inverse, low intensity, underline, hide, and blink if the video interface and display driver used support these capabilities. Only the unprotected data is normally transmitted to the host in Form mode when the TRANSMIT key is entered.

Setup switch options available on the Honeywell VIP7801 and supported by Softerm include With/Without CR/LF, Default to Character/Text, Space Suppress On/Off, Underline/Block Cursor, Blink/Nonblinking Cursor, Block Transmit Mode, EOT/ETX termination character, Echo/Nonecho Character Mode Operation, Transmit on Return in Text Mode, Roll or Non-roll operation.

Setup switch options available on the Honeywell VIP7801 and not supported by Softerm include Test Mode, Display All Mode, and Hold/Drop DTR in Local. However, Softerm provides a special *local* mode of operation which does not drop the DTR signal causing a disconnect. Softerm can be toggled between the special local and online mode using the VIP7801 Status Display initiated with the **S3 V** keyboard function.

Softerm provides support for the keyboard functions CLEAR, RESET, INIT, Function Keys F1–F12, TRANSMIT, PRINT, AUTO LF, LOCAL, DEL, BACK SPACE, ERASE EOP, ERASE EOF, TAB CLR, TAB SET, BREAK, TAB, DEL CHAR, INS CHAR, DEL LINE, INS LINE, RETURN, HOME, ESC, LF, SEG UP, SEG DOWN, SCROLL UP, SCROL DOWN, TEXT, FORM, CHAR, and ATTRB.

Host initiated VIP7801 operational commands which Softerm recognizes and processes include Auxiliary Port Connect, Auxiliary Port Disconnect, Auxiliary Port Parallel, Attribute, Bel, Back Space, Cursor Back Tab, Clear, Character Mode, Cursor Position Binary, Cursor Position Decimal, Carriage Return, Cursor Request Binary, Cursor Request Decimal, Cursor Backward, Cursor Down, Cursor Forward, Cursor Home, Cursor Up, Delete Attribute, Delete Character, Delayed Enquiry, Disconnect, De-lete Line, Data Space Home, Enquiry, Erase to End of Field, Erase to

End of Page, Echoplex, Form Mode, Horizontal Tab, Insert Line, Insert Mode, Insert Mode Reset, Keyboard Lock, Keyboard Unlock, Line Feed, Line Graphics Reset, Line Graphics Set, Non-Echoplex, No Operation, Reset Block Mode, Reset, Reset to Initial State, Right Justify Fill, Reset Modified Indicators, Roll Mode Reset, Roll Mode Set, Restricted Operation Reset, Restricted Operation Set, Set Block Transmit, Status Line Lock, Status Line Reset, Status Line Set, Space Suppress Reset, Space Suppress Set, Set Transmission Pointer, Tab Clear, Tab Initialize, Tab Set, Text Mode, Transmit Next Block, Test Results Display, Transmit on Return Reset, Transmit on Return Set, Transmit All, and Transmit Data.

Host initiated VIP7801 operational commands which Softerm recognizes but ignores include Firmware Version Display (will cause Clear), Next Segment, Previous Segment, Scroll Down, Scroll Up, and Test Results Display.

Host initiated VAF7821 buffered printer adapter commands which Softerm recognizes and processes include Print Control Character, Printer Delayed Status Request, Print Data Space, Print Data Terminator, Printer Status Request (indicates a device type of PRU7005), Print Host Data, Print Mode Set, Print Repeated Characters, Printer Adapter Reset, and Print Transparent Data.

Host initiated VAF7821 buffered printer adapter commands which Softerm recognizes but ignores include Print Multiple Copies and Print Transmit All. Any form following a Print Transmit All command will be processed normally.

After the last standard screen in the *EDIT OPTIONS* mode in Terminal Setup, the following screen will be displayed:

```
═══ HONEYWELL VIP7801 EMULATION OPTIONS ═══
END OF MESSAGE CHARACTER              $03
CR/LF DELIMETERS                       N
TEXT MODE?                             N
SPACE SUPPRESS?                        Y
BLOCK TRANSMIT MODE?                   N
TRANSMIT ON RETURN?                    N
ECHO MODE?                             Y
ROLL MODE?                             Y
PRINT ALL?                             Y
PRINT CONTROL CHARACTERS
        START                         $FF
        END                           $FF
```

The emulation option *END OF MESSAGE CHARACTER* selects the character which terminates all transmitted messages. This character should be set to an ETX ($03), or an EOT ($04).

The emulation option *CR/LF DELIMETERS?* determines if a CR/LF (carriage return/line feed) delimiter is sent at the end of each line in Text mode. Entering a **Y** selects CR/LF delimiters for lines transmitted in Text mode. Entering an **N** will cause no delimiter to be sent. This option is ignored if the *SPACE SUPPRESS* option is set to **Y**.

The emulation option *TEXT MODE?* determines which mode Softerm will enter when initially entering the online mode from terminal setup or when a Reset to Initial State command is received. Entering a **Y** selects the Text mode of operation, while entering an **N** selects the Character mode of operation.

The emulation option *SPACE SUPPRESS?* determines if trailing spaces on a line are to be suppressed on a data transmission to the host. Entering a **Y** for this option will cause trailing spaces to be suppressed, while entering an **N** will cause trailing spaces to be transmitted.

The emulation option *BLOCK TRANSMIT MODE?* determines if data is transmitted to the host as a series of blocks or as a single transmission. If this option is specified as **Y**, the terminal transmits messages in blocks of 256 characters. If this option is specified as an **N**, the terminal transmits the entire message in one transmission.

The emulation option *TRANSMIT ON RETURN?* determines if the **RETURN** key functions as a TRANSMIT key or normally when operating in the Text mode. If this option is specified as **Y**, the **RETURN** key will initiate a transmit operation in the Text mode. If this option is specified as **N**, the **RETURN** key will operate normally.

The emulation option *ECHO MODE?* determines if keyboard data is displayed or acted upon when operating in the Character mode. If this options is specified as **Y**, keyboard data is sent to the host and not displayed or acted upon until processed and returned from the host. If this option is specified as **N**, keyboard data is displayed or acted upon as it is keyed.

The emulation option *ROLL MODE?* allows or prevents rolling of data when a LF (line feed) is received on the last line of the display. Entering a **Y** allows rolling of screen data while entering an **N** prevents rolling of the screen.

The emulation option *PRINT ALL?* determines the extent of the data printed when a Print Data Space buffered printer adapter command is received. If this option is specified as **Y**, both protected and unprotected data is printed. If this option is specified as **N**, only unprotected data is printed.

The emulation option *PRINT CONTROL CHARACTERS* designates the character combination to be sent to the printer at the *START* and *END* of printing when a Print Data Space buffered printer adapter command

is received. If the character code is specified as $FF, no characters are sent to the printer. If the character codes are specified in the range $00-$7F, a carriage return ($0D) is sent to the printer followed by the character specified. Normally the *START* and *END* control characters are specified as a CR ($0D), LF ($0A), FF ($0C), or VT ($0B).

Operator Status Line Display

The Honeywell VIP7801 terminal includes a Status Line (25th line on the display screen) which is operationally separate from the 24 lines of screen data. It can be used as a host message line, a host conversation line, or it can be used to inform the operator of status conditions produced automatically by the terminal. Included on the status line are the READY indicator, the modes of operation, the error messages, and the current row and column position of the cursor.

Since Softerm supports only a 24 line screen, the status information is displayed only when a **S3 V** keyboard function is entered. The data on line 24 is temporarily replaced by the status information, and when the **S1 X** or **S3 V** key is pressed, the original data is restored to the line. The status line is automatically displayed when an error condition occurs. Status messages displayed by Softerm include *DATA OVERFLOW, INVALID COMMAND, FILL REQUIRED, ENTRY REQUIRED, ALPHA, DIGITS, NUMERIC, ALPHA/DIGITS, ALPHA/NUMERIC,* and *READY.* The status information displayed includes *INSERT* mode, *GRAPH* mode, *TEXT, FORM,* or *CHAR* mode, *ECHO* mode, *TX-RET* mode, *ROLL* mode, *AUTO-LF* mode, *LOCAL* mode, and the current *ROW* and *COL.*

The *AUTO-LF* mode setting can be toggled while the status is displayed by pressing the **A** key. The *LOCAL* mode setting can be toggled while the status is displayed by pressing the **L** key. Setting the terminal for *LOCAL* operation will not cause a disconnect and allows local editing to be performed in the *CHAR* mode of operation.

If a Status Line Set command is received from the host, Softerm automatically saves the data and attributes of line 24, positions the cursor to the first position of line 24 and clears the line for message display or interaction with the host computer. When a Status Line Reset or Status Line Lock command is received from the host, the previous contents of line 24 will be restored. If a Status Line Lock command is used to reset the status line, Softerm sounds the audible alarm and delays approximately 2 seconds before line 24 is restored so that any message displayed by the host can be read by the operator.

Terminal
Emulation

Honeywell VIP7801 Keyboard Functions

The following defines the standard keyboard functions for the Honeywell
VIP7801 emulation:

Keyboard	Function	Characters
RETURN	CR, CR/LF, or TRANSMIT	$0D, $0D $0A
S1 RETURN	TRANSMIT	$1B $69
S2 RETURN	CTRL TRANSMIT	
S1 →	Cursor Right	$1B $43
S2 →	Cursor Down	$1B $42
S3 →	Tab	$09
←	Backspace	$08
S1 ←	Cursor Left	$1B $44
S2 ←	Cursor Up	$1B $41
S3 ←	Back Tab	$1B $5B $5A
S1 ↑	Cursor Up (Apple IIe)	$1B $41
S1 ↓	Cursor Down (Apple IIe)	$1B $42
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S2 A	ATTRB	$1B $73
S3 A	DELETE ATTRB	$1B $5B $51
S1 B	ERASE EOP	$1B $4A
S1 C	RESET	$1B $65
S2 C	CLEAR	$1B $60
S3 C	INIT	$1B $63
S1 D	DEL CHAR	$1B $5B $50
S3 D	DEL LINE	$1B $5B $4D
S1 E	ERASE EOF	$1B $4B
S1 G	NEXT SEGMENT	$1B $5B $32 $73
S2 G	PREV SEGMENT	$1B $5B $31 $73
S1 H	HOME	$1B $48
S2 H	CTRL HOME	$1B $5B $48
S1 I	INS MODE	$1B $5B $49
S2 I	INS MODE RESET	$1B $5B $4A
S3 I	INS LINE	$1B $5B $4C
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	

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S1 M	FORM	$1B $5B $68
S2 M	TEXT	$1B $5B $6C
S3 M	CHAR	$1B $6B
S1 N	New Line (Line Feed)	$0A
S1 O	Display Other Half	
S1 P	PRINT	$1B $5B $30 $70
S1 S2 S3 P	PRINT RESET	$1B $5B $32 $70
S1 Q	Resume Display	
S1 R	SCROLL UP	$1B $5B $30 $73
S2 R	SCROLL DOWN	$1B $5B $31 $73
S1 S	Stop Display	
S1 T	TAB SET	$1B $70
S2 T	CLEAR TAB	$1B $5B $67
S3 T	TAB INITIALIZE	$1B $5B $4E
S1 V	View Terminal Status	
S3 V	View Honeywell VIP7801 Status	
S1 W c	Wait for Character c	
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F
S3 1	F1	$1B $30
S3 2	F2	$1B $32
S3 3	F3	$1B $36
S3 4	F4	$1B $38
S3 5	F5	$1B $3A
S3 6	F6	$1B $3C
S3 7	F7	$1B $3E
S3 8	F8	$1B $50
S3 9	F9	$1B $52
S3 0	F10	$1B $54
S3 Q	F11	$1B $5C
S3 W	F12	$1B $5E
S3 S2 1	SHIFT F1	$1B $31
S3 S2 2	SHIFT F2	$1B $35
S3 S2 3	SHIFT F3	$1B $37
S3 S2 4	SHIFT F4	$1B $39
S3 S2 5	SHIFT F5	$1B $3B
S3 S2 6	SHIFT F6	$1B $3D
S3 S2 7	SHIFT F7	$1B $3F
S3 S2 8	SHIFT F8	$1B $51
S3 S2 9	SHIFT F9	$1B $53
S3 S2 0	SHIFT F10	$1B $56
S3 S2 Q	SHIFT F11	$1B $5D
S3 S2 W	SHIFT F12	$1B $5F

Honeywell VIP7803

Introduction

The Honeywell VIP7803 Word Processing Workstation can be emulated using Softerm 2 by entering *HONEYWELL VIP7803* for the terminal emulation filename when generating a configuration in terminal setup. This emulation requires an Apple II, II Plus, or IIe system configured with at least 64K of RAM memory and cannot be used with 48K systems. The Honeywell VIP7803 is an expanded version of the Honeywell VIP7801 terminal optimized for use is a word processing application. They serve as comprehensive workstations in multifunctional office environments and add new word processing features to the basic VIP7801 terminal.

The Softerm emulation of the Honeywell VIP7803 word processing workstation includes all features of the Softerm emulation of the Honeywell VIP7801 video display terminal. Refer to the description of the Honeywell VIP7801 terminal emulation in Chapter 5 for additional information. Only the additional capabilities provided by the VIP7803 are covered in this section.

Features

The Honeywell VIP7803 workstation provides additional features not provided in the VIP7801 terminal including a simplified keyboard with a typewriter layout, key legends designed for office use, expanded character set with word processing symbols, and expanded command set adding terminal operations designed to enhance word processing applications.

The displayable character set of the VIP7803 was expanded to include special word processing symbols. Since Softerm is not able to display the exact symbols used by the VIP7803, a different method is used to identify characters used as word processing symbols. If any of the special word processing symbols are received, Softerm displays the character which normally represents the DEL ($7F) character for the video interfaces supported by Softerm. This character is normally an inverse block character. To help identify which word processing symbol is represented, the hexadecimal value for the character at the cursor location is displayed on the status line as $XX whenever the VIP7803 status is displayed using the **S3 V** keyboard function. The word processing symbol can then be identified using the following table:

Hexadecimal Code	WP Function
$0B	INDENT
$0C	PAGE
$0E	STOP
$11	CENTER
$12	DEC TAB
$13	MERGE
$14	DON'T MERGE
$18	NOTE
$19	TAB
$1C	RETURN
$1D	CODE
$1E	SUPERSCRIPT
$1F	SUBSCRIPT

Additional host initiated VIP7803 operational commands which Softerm recognizes and processes include Define Fixed Lines, End Row/Column Maintenance, Save Row/Column Count Screen Position, Scroll Left, Start Row/Column Maintenance, Scroll Right, Set Window Position, and Word Processing Mode.

Terminal
Emulation

Honeywell VIP7803 Keyboard Functions

The following defines the standard keyboard functions for the Honeywell VIP7803 emulation:

Keyboard	Function	Characters
RETURN	CR, CR/LF	$0D, $0D $0A
S1 RETURN	EXECUTE	$1B $69
S1 →	Cursor Right	$1B $43
S2 →	Cursor Down	$1B $42
S3 →	Tab	$09
S1 S3 →	Shift Cursor Right	$1B $75
S2 S3 →	Shift Cursor Down	$1B $22
←	Backspace	$08
S1 ←	Cursor Left	$1B $44
S2 ←	Cursor Up	$1B $41
S3 ←	Back Tab	$1B $5B $5A
S1 S3 ←	Shift Cursor Left	$1B $6F
S2 S3 ←	Shift Cursor Up	$1B $21
S1 ↑	Cursor Up (Apple IIe)	$1B $41
S1 ↓	Cursor Down (Apple IIe)	$1B $42
S1 S3 ↑	Shift Cursor Up (IIe)	$1B $21
S1 S3 ↓	Shift Cursor Down (IIe)	$1B $22
S1 CTRL B	Boot	
S2 CTRL B n	Boot from Slot n	
S1 CTRL R	Soft RESET	
S1 ESC	DEL (Rubout)	$7F
S1 A	Send Answerback Message	Answerback String
S3 A	ABBREV	$1B $2F
S3 S2 A	SHIFT ABBREV	$1B $33
S1 B	COPY	$1B $57
S2 B	SHIFT COPY	$1B $67
S1 C	CLEAR (RESET)	$1B $65
S2 C	SHIFT CLEAR (CLEAR)	$1B $60
S3 C	CTRL CLEAR (INIT)	$1B $63
S1 D	DELETE (CHAR)	$1B $5B $50
S3 D	SHIFT DELETE (LINE)	$1B $5B $4D
S1 E	ERASE (EOF)	$1B $4B
S2 E	SHIFT ERASE (EOL)	$1B $4A
S1 F	FORMAT	$1B $5E
S2 F	SHIFT FORMAT	$1B $5F
S1 G	GO TO PAGE	$1B $78
S2 G	SHIFT GO TO PAGE	$1B $79

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S1 H	HOME	$1B $48
S2 H	SHIFT HOME	$1B $5B $48
S1 I	INSERT (CHAR)	$1B $5B $49
S3 I	SHIFT INSERT (LINE)	$1B $5B $4C
S1 J	MOVE	$1B $68
S2 J	SHIFT MOVE	$1B $6A
S1 K	BREAK	BREAK
S1 L	Shift Toggle	
S2 L	Shift Lock	
S1 M	MENU	$1B $35
S2 M	SHIFT MENU	$1B $31
S3 M	MERGE	$1B $5C
S3 S2 M	SHIFT MERGE	$1B $5D
S1 N	New Line (Line Feed)	$0A
S3 N	NOTE	$1B $25
S3 S2 N	SHIFT NOTE	$1B $26
S1 O	Display Other Half	
S1 P	PRINT	$1B $3A
S2 P	SHIFT PRINT	$1B $3B
S3 P	PAGE	$1B $23
S3 S2 P	SHIFT PAGE	$1B $24
S1 Q	Resume Display	
S1 R	REPLACE	$1B $45
S2 R	SHIFT REPLACE$1B $4C	
S1 S	Stop Display	
S3 S	STOP	$1B $27
S3 S2 S	SHIFT STOP	$1B $28
S1 T	DEC TAB	$1B $52
S2 T	SHIFT DEC TAB	$1B $53
S1 U	AUTO _	$1B $4E
S2 U	SHIFT AUTO _	$1B $55
S1 V	View Terminal Status	
S3 V	View Honeywell VIP7803 Status	
S1 W c	Wait for Character c	
S1 X	SIGN OFF	$1B $32
S2 X	SHIFT SIGN OFF	$1B $30
S1 Y	HELP	$1B $36
S2 Y	SHIFT HELP	$1B $37
S1 Z n	Delay n Seconds (0-9)	
S1 S2 id	Execute Keyboard Macro	User Defined
S1 S2 c	Transmit Control Character c	$00-$1F

S3 1	SEARCH	$1B $34
S3 S2 1	SHIFT SEARCH	$1B $40
S3 2	CENTER	$1B $50
S3 S2 2	SHIFT CENTER	$1B $51
S3 3	COMMAND	$1B $3C
S3 S2 3	SHIFT COMMAND	$1B $3D
S3 4	CODE	$1B $29
S3 S2 4	SHIFT CODE	$1B $2A
S3 5	CALCULATE	$1B $38
S3 S2 5	SHIFT CALCULATE	$1B $39
S3 6	INDENT	$1B $3E
S3 S2 6	SHIFT INDENT	$1B $3F
S3 7	SUPER SUB	$1B $54
S3 S2 7	SHIFT SUPER SUB	$1B $56
S3 8	EXTRA 1	$1B $7B
S3 S2 8	SHIFT EXTRA 1	$1B $7C
S3 9	EXTRA 2	$1B $7D
S3 S2 9	SHIFT EXTRA 2	$1B $7E

Appendix A
Interface Cards and Modems

General Information

Serial and Parallel Interfaces

Softerm includes support for a variety of serial and parallel interface cards for use as the serial communications or printer interface. The filenames on the Softerm Configuration Diskette are identified as *INTERFACE NAME.SIO* if the filename is a *serial communications* driver for the named interface and *INTERFACE NAME.PIO* if the filename is a *printer* driver for the named interface. Serial communications drivers require serial I/O interface cards but printer drivers are provided for both serial and parallel I/O interface cards.

Most of the serial and parallel interface cards have *on board firmware* which allow these boards to be easily used with the standard Apple languages and programs or to make them *software compatible* with standard Apple interfaces. Softerm, in order to operate at the higher transmission speeds up to 9600 baud, does not use *any* of the firmware available on these boards. Although a printer driver *FIRMWARE.PIO* is provided which uses the standard firmware techniques, this driver does not allow *simultaneous* reception of data from the communications interface and printing. Any printing using this driver is accomplished in an alternating receive/print mode but does allow the use of many printer interfaces for which a special print driver is not yet available for Softerm.

Many of the serial and parallel interfaces have the capability to operate using *interrupts*. Softerm is designed and written so that interrupt capability is not used for operation of the interface cards. Softerm is written entirely in 6502 Assembly Language and instruction loops are *timed* so that characters cannot be missed even at high transmission speeds. Usually processing with interrupts is a software *programmable* feature of the interface. However, some boards require a *hardware jumper* to enable or disable interrupts. Refer to specific information on the interface cards for additional information.

Most of the serial interfaces have *programmable* characteristics. This means that interface parameters such as character size, number of stop bits, parity, and speed may be specified by the software. However, the speed parameter on some boards is selected by *jumpers, thumbwheels,* or *dip switches* and cannot be selected by software. On other boards the jumpers and switches provide only a *default* setting which is effective only if the software does not select some other speed. Softerm always sets the speed and other characteristics by software when possible. The user should refer to specific information in this Appendix on the interface used for further details. It is *very important* that the serial I/O driver *SPEED* parameter be set correctly, even if the actual speed is determined by hardware jumpers. Softerm uses the serial speed parameter to provide timing for various internal routines.

Some of the interface cards have more than one interface on the card. The combinations include 2 serial interfaces, 1 serial and 1 parallel, and 1 serial and 2 parallel. In the serial I/O and printer driver parameters, *PORT #* is used to designate which interface on the card is to be used. Port number assignments for interface cards with multiple interface capability may be found in the individual descriptions of interface cards.

Printer driver parameters include both serial I/O characteristics and parallel I/O characteristics. If a parallel interface is being used, the serial I/O characteristics are not applicable. If a serial interface is used, the parallel I/O characteristics are not applicable. The parallel I/O characteristics involving the *STROBE* and *ACKNOWLEDGE* signals are usually determined by the hardware. Some interface cards provide only one method of operation, while others provide jumpers on the interface card to select the polarity of these signals. A few allow the software to determine how these signals are used. Refer to the information on specific parallel interfaces in this Appendix for details on the operation of these signals.

Default values for serial I/O driver options and printer driver options vary slightly from one interface board to another. A detailed description of the function of these options is provided in Chapter 2 on *Terminal Setup*. The default options for each interface may be viewed by loading the appropriate driver file and selecting the *EDIT OPTIONS* choice on the Terminal Setup main menu. The descriptions of individual interface cards in this Appendix will provide any additional information that may be required.

Auto-Dial Modems

Softerm includes support for a selection of modems which provide automatic dialing capability. The automatic dialing capability can be accessed from the keyboard using special firmware built-in to the modem, or by using the *dialer drivers* included with Softerm. The filenames on the Softerm Configuration Diskette are identified as *MODEM NAME.DIAL* if the filename is a *dialer driver* for the named modem.

Many of the modems includes option switches which allow the modem to be configured for use with terminals or computers. If the modem is configured for use with a terminal, the control signals *DCD* (data carrier detect), and *CTS* (clear to send) are presented constantly so that the terminal keyboard can be used to interact with the modem firmware to dial phone numbers. When a modem is configured in this manner, a *connection*, which is determined by the presence of the carrier detect signal, is indicated constantly to any attached terminal or computer system. Many Apple serial interfaces will not transmit unless the carrier detect signal is asserted. In this case, the modem must be configured for operation with a terminal.

Since Softerm dialer drivers assume that the presence of the carrier signal indicates a connection has been established, when the dialer driver transmits the dial sequence to the modem, the connection appears to be established before the number has actually been dialed if the modem is configured for operation with a terminal. When using the the Softerm Dial Utilities, an immediate return to the online terminal operation mode will occur after the phone number is transmitted to the modem. When using the *DIAL* file transfer command in a file transfer macro file, the next command will be executed immediately after the phone number is transmitted to the modem. *PAUSE* commands can be used after *DIAL* commands to insure that a connection has been established before continuing execution of the file transfer macro. However, if a busy or no answer results from the dial operation, Softerm will be unaware that no connection is established.

An alternate method is to use the *XMIT:WAIT* command after the *DIAL* command to wait for the *connect* message generated by the modem. For example, the Hayes Smartmodem generates the message "CONNECT" when a connection is established. The *TIMEOUT* command is used to define the length of time Softerm will wait for the message. An *ONERR* command may be used to repeat the sequence using the *CHAIN* option. Refer to Chapter 4 on *Command Language and Execution* for additional information.

If the modem includes option switches which allow the modem to be configured for use with a computer, the control signals *DCD* and *CTS* are asserted only after a connection is established. The Softerm dialer drivers can then detect if a connection has been established after the

dial sequence has been transmitted to the modem. If no connection is indicated when using the Softerm Dial Utilities after the 45 second timeout period, the message **NO CONNECTION, PRESS R TO REDIAL** is displayed and the operator can take the appropriate action. If no connection is indicated when using the *DIAL* file transfer command after the timeout period specified by the *TIMEOUT* command, the dial operation will be repeated according to the current value of the *RETRIES* command. After the retry count is exhausted, the message **NO CON-NECTION** is displayed and command or macro execution is aborted.

With most auto-dial modems supported by Softerm, an initialization string is transmitted to the modem the *first* time an exit occurs from the terminal setup menu to the online terminal operation mode. This initialization string is used to reset the modem, or to initialize internal parameters in the modem for operation with Softerm.

Refer to the descriptions of individual modems in this Appendix for additional information.

Appendices

Communications Interfacing

Softerm utilizes the communications interface standard EIA RS232-C which specifies the interface between a terminal (DTE or Data Terminal Equipment) and a modem (DCE or Data Communications Equipment). This standard allows for a remote connection of a terminal to a host computer using a modem and a leased or dial-up telephone line.

However, Softerm may also be used using a local direct connection to the host computer using either *modem eliminators* or *specially modified cables* so that standard modems are not required. Usually, there is a limit of 50 feet for a direct connection using standard EIA communications interfaces, but this is highly dependent on the quality and type of cable utilized as well as the driving capability of the interfaces used. The speed at which the terminal is used also affects the distance which a terminal can be located from a host computer when using a direct connection. In many instances, it is possible to have cable lengths of 1000 feet or more and still have reliable operation.

The following sections will provide information on both remote connections using modems and local direct connections using modem eliminators or specially modified cables. The cable configurations presented are *typical* of how the interfaces are accomplished and *not necessarily* the only method which can be used.

Interfacing to a Modem

A modem is a device for converting digital signals into analog frequencies for transmission across telephone lines, and also for converting received telephone frequencies into digital signals. The device which converts digital signals into analog frequencies is called a *modulator*. The device which converts analog frequencies back into digital signals is called a *demodulator*. The two devices when combined for data transmission to and from a computer is called a *modem* for MOdulator/DEModulator.

The most common modems in use for full duplex asynchronous data transmission are The Bell System model 103 which may be used at speeds up to 300 baud and The Bell System Model 212 which may be used at 300 or 1200 baud. Many Bell System compatible modems are also available from other companies which also may be used.

There are two broad categories of modems. Some connect directly to the phone line without using the telephone handset. Most 212 compatible modems are of this type. Some do make use of the telephone handset, and are called *acoustic couplers*. These modems are the ones you must put the handset into after you dial the number and hear the special tone signifying a computer connection. Many 103 compatible modems are of this type.

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The RS232-C specification provides for as many as 25 signals between a DTE and a DCE. For most asynchronous terminal to modem connections, only 8 or 9 of these signals are wired. The following table lists the signals which are connected when available from a terminal to a modem:

Signal	Function	Connector
GND	Frame Ground	Pin 1
TXD	Transmit Data	Pin 2
RXD	Receive Data	Pin 3
RTS	Request to Send	Pin 4
CTS	Clear to Send	Pin 5
DSR	Data Set Ready	Pin 6
GND	Signal Ground	Pin 7
DCD	Data Carrier Detect	Pin 8
DTR	Data Terminal Ready	Pin 20

The user should refer to the technical reference manuals provided by the manufacturer for the specific signals and modem cable configurations provided with the serial I/O interfaces supported by Softerm.

Interfacing Directly to a Host Computer

Even though the RS232 signals are designed for the interactions of terminals and host computers using data communications equipment such as modems, it is also possible to *directly connect* a terminal to a host computer without using a modem. This is usually accomplished using either a device known as a *modem eliminator* or a *specially modified cable*.

A modem eliminator is a special device which allows standard modem cables to be used from the host computer and terminal which plug in to the modem eliminator. Inside the modem eliminator the RS232-C signals are crossed in a special manner to simulate the operation of a modem. When a modem eliminator is used with Softerm, the serial I/O parameter *MODEM CONTROL* should indicate **Y** the same as if a modem were being used. This method of direct connection allows only the XON/XOFF form of *pacing* to be used. The following table indicates how a modem eliminator connects the RS232 signals:

Terminal			Computer	
Signal	**Cable**		**Signal**	**Cable**
GND	Pin 1	to	GND	Pin 1
TXD	Pin 2	to	RXD	Pin 3
RXD	Pin 3	to	TXD	Pin 2
RTS	Pin 4		RTS	Pin 4
	to			to
CTS	Pin 5		CTS	Pin 5
DSR	Pin 6	to	DCD	Pin 8
	to			
DTR	Pin 20			
GND	Pin 7	to	GND	Pin 7
DCD	Pin 8	to	DSR	Pin 6
				to
			DTR	Pin 20

The GND connection using Pin 1 is optional and not required.

Another method of establishing a direct connection between a terminal and a computer requires a *specially modified cable*. Inside the cable connectors, certain signals are looped back to provide the required modem interface signals. In this method only 3 signals must be wired in the cable between the terminal and host computer. Optionally, the DTR signal may be wired from the terminal to the host computer CTS signal to provide the *pacing* control. Otherwise, XON/XOFF may be used. Many printers when connected using a serial interface have the capability to provide a *busy* indicator by lowering the DTR signal. In this case the DTR signal from the printer should also be wired to the CTS signal on the serial interface connector. In the cable diagrams that follow *TERMINAL* refers to a printer when connecting to the Apple *COMPUTER* and refers to the Softerm serial I/O interface when connecting to a host *COMPUTER*.

The following table indicates how the connecting cables can be wired to provide a local direct connect from Softerm to a host computer or from a serial printer to the Apple computer using XON/XOFF for pacing control:

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Terminal			Computer	
Signal	**Cable**		**Signal**	**Cable**
GND	Pin 1	to	GND	Pin 1
GND	Pin 7	to	GND	Pin 7
TXD	Pin 2	to	RXD	Pin 3
RXD	Pin 3	to	TXD	Pin 2
RTS	Pin 4		RTS	Pin 4
	to			to
CTS	Pin 5		CTS	Pin 5
DSR	Pin 6		DSR	Pin 6
	to			to
DCD	Pin 8		DCD	Pin 8
	to			to
DTR	Pin 20		DTR	Pin 20

The GND connection on Pin 1 is optional and not required.

The following table indicates how the connecting cables can be wired to connect a serial printer which uses the DTR signal as a ready indicator to the Apple computer or to connect Softerm to a host computer which uses DTR as the pacing control:

Terminal			Computer	
Signal	**Cable**		**Signal**	**Cable**
GND	Pin 1	to	GND	Pin 1
GND	Pin 7	to	GND	Pin 7
TXD	Pin 2	to	RXD	Pin 3
RXD	Pin 3	to	TXD	Pin 2
RTS	Pin 4		DSR	Pin 6
	to			to
CTS	Pin 5		DCD	Pin 8
				to
DSR	Pin 6		DTR	Pin 20
	to			
DCD	Pin 8			
	to			
DTR	Pin 20	to	CTS	Pin 5

The connection of Pin 4 (RTS) to Pin 5 (CTS) is not required for a printer. The GND connection on Pin 1 is optional and not required.

Serial Interfaces

Advanced Logic Systems "Dispatcher"

The Advanced Logic Systems "Dispatcher" interface can be specified in Softerm as the serial communications interface by entering *ALS DISPATCHER.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *ALS DISPATCHER.PIO* for the printer driver.

The transmission speed used with the Dispatcher is selected using dip switches and provides speeds which can be used with Softerm of 110, 150, 300, 1200, 2400, and 9600. The parity, number of data bits, and number of stop bits is programmable and selected by Softerm according to the values specified in terminal setup.

The DTR and DCD signals are hardwired. Softerm cannot hangup or detect a disconnect, and a connection always appears to be present when using this board connected to a modem.

Apple II Communications Interface Card (A2B0003X)

The Apple II Communications Interface Card (A2B0003X) can be specified in Softerm as the serial communications interface by entering *APPLE COMM.SIO* for the serial I/O driver when generating a configuration in terminal setup. It may be specified as the printer interface by entering *APPLE COMM.PIO* for the printer driver when generating a configuration in terminal setup.

The Apple II Communications Interface Card permits only two speeds to be selected. These may be hardwired to 110/300, 300/1200, or 1200/4800 baud. The speed, number of data bits (7 or 8), number of stop bits (1 or 2), and the parity are software selectable.

The DTR signal is not software controllable and the DCD signal is hardwired. Therefore when using a dial up modem, a connection always appears to be present whether a connection has been established or not.

Apple II Serial Interface Card (A2L008)

The Apple II Serial Interface Card (A2L0008) can be specified in Softerm as the printer interface by entering *APPLE SERIAL.PIO* for the printer driver when generating a configuration in terminal setup. Since this board uses a technique of bit by bit character assembly, it cannot be used as a serial communications interface with Softerm.

Softerm uses the standard firmware supplied with this board. The baud rate, parity, number of stop bits, and number of data bits are software selectable and the *dip switches* on the board are ignored. Since the standard firmware is used with this board, simultaneous printing and receiving data from the communications line is not possible.

Apple II Super Serial Card

The Apple II Super Serial Card can be specified in Softerm as the serial communications interface by entering *APPLE SUPER.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *APPLE SUPER.PIO* for the printer driver.

This board uses a *jumper block* to allow connection either to a modem or a slave terminal or printer. When the jumper block is set to *modem*, the connector appears as a standard modem connector. When the jumper block is set to *terminal*, connector functions as a modem eliminator allowing a printer, slave terminal, or even a host computer to be directly connected.

Although the baud rate, parity, number of data bits, and number of stop bits may be specified on the board using *dip switches*, Softerm sets these parameters using software according to the values specified in terminal setup. The baud rate of 2000 is not available with this board.

When operating with a modem or directly with a host system, communications mode must be selected by setting switches SW1-5, SW1-6, and SW1-7 to the ON position. Switches SW2-6 and SW2-7 should be in the OFF position. The jumper block must point towards MODEM.

When operating with a printer, printer mode must be selected by setting switches SW1-5 to OFF and SW1-6 and SW1-7 to ON. Switches SW2-6 and SW2-7 should be in the OFF position. The jumper block must point towards TERMINAL.

Basis 108 Serial Interface

The Basis 108 internal serial interface can be specified in Softerm as the serial communications interface by entering *BASIS 108.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface be entering *BASIS 108.PIO* for the printer driver.

The Basis 108 internal serial interface uses a programmable 6551 Asynchronous Communications Interface Adaptor (ACIA). The baud rate, parity, number of data bits, and number of stop bits are programmable and are set by Softerm according to the values specified in terminal setup. The baud rate of 2000 is not available. All modem control signals required for Softerm operation are provided by the ACIA.

The *BASIS 108.PIO* printer driver supports both the internal serial and parallel interfaces of the Basis 108. To select the serial interface, the *PORT #* parameter is set to 1. To select the parallel interface, the *PORT #* parameter is set to 2.

Bit 3 Dual-Comm Plus

The Bit 3 Dual-Comm Plus can be specified in Softerm as the serial communications interface by entering *DUAL-COMM PLUS.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *DUAL-COMM PLUS.PIO* for the printer driver.

The Bit 3 Dual-Comm Plus contains two serial communications interfaces. Port A is configured as a DTE allowing a standard connection to a modem. Port B is configured as a DCE allowing easy connection to printers or a direct connect to a host computer. However, with the appropriate cable, either port can be used for serial communications with a host computer or for attaching a local printer. The *PORT #* specified in serial I/O or printer parameters in terminal setup is Port #1 for Port A and Port #2 for Port B. Both ports on this board may be used simultaneously by Softerm, one to provide serial communications with the host computer, and the other to connect to a printer.

Thumb wheel switches on the board are used to specify the baud rates for each port. The parity, number of data bits and stop bits are set by software according to the values specified in terminal setup. All other option switches are ignored by Softerm.

CCS 7710 Asynchronous Serial Interface

The California Computer Systems 7710 Asynchronous Serial Interface can be specified in Softerm as the serial communications interface by entering *CCS 7710.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *CCS 7710.PIO* for the printer driver.

The DTR pacing control option should *not* be used with this board since the current receive data character is lost when this signal changes state.

The Softerm driver for the CCS 7710 encompasses all models including the 7710-A and 7710-D now known as the 7710-01 and 7710-02. The 7710-A or 7710-01 is configured to interface a printer or slave terminal whereas the 7710-D or 7710-02 is configured to interface to a modem.

The 7710-A may also be used to interface to a modem but since the connector provided is a DCE configuration, a DTE adaptor must be provided. A cable with two RS232 male connectors may be wired as follows:

CCS 7710	to	Modem
Pin 1	to	Pin 1
Pin 2	to	Pin 3
Pin 3	to	Pin 2
Pin 4	to	Pin 6
Pin 5	to	Pin 20
		to
		Pin 4
Pin 7	to	Pin 7
Pin 20	to	Pin 8

The transmission speed used with the 7710 is selected using *baud rate dip switches* and provides speeds which can be used with Softerm of 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2400, 4800, and 9600. The parity, number of data bits, and number of stop bits is programmable and selected by Softerm according to the values specified in terminal setup.

Intra Computer PSIO

The Intra Computer PSIO programmable serial input/output card can be specified in Softerm as the serial communications interface by entering *INTRA PSIO.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *INTRA PSIO.PIO* for the printer driver.

The Intra Computer PSIO utilizes a programmable UART and no jumpers are required for selection of options. The baud rate, parity, number of data bits, and number of stop bits are set according to the values specified in terminal setup.

The interface provides all required modem signals and in addition provides the RI (Ring Indicator) signal and an extra programmable output signal OUT1. The RI signal is ignored by Softerm and the OUT1 signal is not used. The standard connector provided with the board is a female RS232-C connector. For connection to a modem an adaptor cable with two male connectors and Pins 1-8 and 20 wired is required.

Microtek SV-622C Serial Interface

The Microtek SV-622C Serial Interface Card can be specified in Softerm as the serial communications interface by entering *APPLE SUPER.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *APPLE SUPER.PIO* for the printer driver.

This board uses two cable connectors labeled *P2* and *P3* to allow connection either to a modem, a slave terminal or printer. When the cable is attached to the P2 connector the card is set as a standard modem connector (DCE device). And when the cable is attached to the P3 connector the card functions as a modem eliminator (DTE device) allow-

ing a printer, slave terminal, or even a host computer to be directly connected. But if the device requires CTS to transmit character codes, the cable connecting to P3 will require an additional adaptor since CTS is not provided.

Although the baud rate, parity, number of data bits, number of stop bits, and other parameters may be specified on the board using dip switches, Softerm sets these parameters using software according to the values specified in terminal setup. The baud rate of 2000 is not available with this board.

SSM ASIO Apple Serial I/O Interface

The SSM Microcomputer Products ASIO Apple Serial I/O interface can be specified in Softerm as the serial communications interface by entering *SSM ASIO.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *SSM ASIO.PIO* for the printer driver.

The SSM ASIO interface provides for 8 baud rates selected by *jumper clips* which are 110, 134, 300, 600, 1200, 2400, 4800, and 9600. Interrupts are enabled on this board when a jumper is inserted from E8 to E9. This jumper should *not* be present when using Softerm. The parity, number of data bits, and number of stop bits are programmable and will be set according to the values specified in terminal setup.

The interface provides all required modem signals except for DTR which is pulled to +12 volts. Two connectors are provided, J1 configured for printers and J2 configured for modem operation. When a printer is connected to J1, inserting the jumper from E1 to E2 allows the DTR signal from the printer to be used as a *busy* indicator.

Since the SSM ASIO interface does not allow software control of the DTR signal, Softerm cannot hangup or disconnect and any connection must be broken manually if a standard modem cable is used. However, a special adapter cable can be wired so that Softerm can control the DTR signal. This adapter cable is described in the information on the Prometheus VERSAcard.

Appendices

Serial/Parallel Interfaces

Mountain Computer CPS Multifunction Card

The Mountain Computer CPS Multifunction Card can be specified in Softerm as the serial communications interface by entering *MCI CPS.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *MCI CPS.PIO* as the printer driver.

The Mountain Computer CPS Card provides a serial interface and a parallel interface, as well as a clock/calendar capability. The serial interface uses connector J4 and is specified in the serial I/O or printer driver parameters as *PORT 1*. The parallel interface uses connector J5 and is specified in the printer driver parameters as *PORT 2*. Even though the CPS card has a *phantom slot* capability, the *physical* location of the board is always specified in the *SLOT #* parameter of the serial I/O and printer drivers. Softerm allows the serial interface to be used concurrently with a printer on the parallel interface. The RESET key will cause a disconnect when using the CPS Card with dial-up connections.

The serial interface provides all required modem signals and a software selectable baud rate. The baud rates available with Softerm include 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 9600. The parity, number of data bits, and number of stop bits are also software selected by Softerm according to the values specified in terminal setup.

The parallel interface provides a strobe, acknowledge/busy, and 8 data lines. The polarity of the strobe signal is determined by the *+S JUMPER* and the polarity of the acknowledge/busy signal is determined by the *FE JUMPER*.

Prometheus VERSAcard

The Prometheus VERSAcard can be specified in Softerm as the serial communications interface by entering *VERSACARD.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *VERSACARD.PIO* as the printer driver.

The serial I/O driver *SLOT #* parameter should be specified as the physical location of the board. The printer driver *SLOT #* should be specified as the phantom slot assigned by *Switch S1* on the VERSAcard. The printer driver *PORT #* parameter should be specified as 1 to indicate the serial interface and as 2 to indicate the parallel interface.

The parity, number of data bits, and number of stop bits are software selectable on the VERSAcard, however the baud rate is selected using *Switch S2* on the VERSAcard.

Since the VERSAcard does not allow software control of the DTR signal, Softerm cannot hangup or disconnect and any connection must be broken manually if the standard modem cable supplied with VERSAcard is used. However, a special adapter cable can be wired as follows so that Softerm can control the DTR signal:

VERSAcard		to	Modem	
Pin 1	GND		Pin 1	GND
Pin 2	TXD		Pin 2	TXD
Pin 3	RXD		Pin 3	RXD
Pin 4	RTS		Pin 20	DTR
Pin 5	CTS		Pin 6	DSR
Pin 6	DSR		Pin 8	DCD
Pin 7	GND		Pin 7	GND
Pin 20	DTR		Pin 4	RTS

SSM AIO Serial & Parallel Apple Interface

The SSM Microcomputer Products AIO Serial and Parallel Apple Interface can be specified in Softerm as the serial communications interface by entering *SSM AIO.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *SSM AIO.PIO* for the printer driver.

The SSM AIO provides a serial interface and 2 parallel interfaces. The serial interface uses connector J2 and is specified in Softerm serial I/O or printer parameters as *PORT 1*. The parallel interfaces use connector J1 and the AIO Port A is specified in the Softerm printer parameters as *PORT 2* and AIO Port B is specified as *PORT 3*. Softerm allows the serial interface to be used for the serial communications concurrently with a printer on one of the two parallel interfaces.

All required modem signals are provided by the serial interface except for DTR which is pulled to +12 Volts. The transmission speed is set by a *Baud Rate Rotary Switch* with which 110, 300, 600, 1200, 2400, and 4800 baud may be selected. A jumper allows the 110 setting to become 134.5, and a modification allows the baud rates from 300 to 4800 to double. The parity, number of data bits, and number of stop bits are programmable and will be set according to the values specified in terminal setup.

Since the SSM AIO serial interface does not allow control of the the DTR signal, Softerm cannot hangup or disconnect and any connection must be broken manually if a standard modem cable is used. However, a special adapter cable can be wired so that Softerm can control the DTR signal. This cable is described in the information on the Prometheus VERSAcard.

Appendices

The two parallel interfaces provide 8 data, 1 strobe, and one acknowledge line. The polarity of the strobe and acknowledge signals is controlled by software and will be set according to the printer driver parameters specified in terminal setup.

SSM AIO II Serial & Parallel Apple Interface

The SSM AIO II Serial and Parallel Apple Interface can be specified in Softerm as the serial communications interface by entering *SSM AIO II.SIO* for the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *SSM AIO II.PIO* as the printer driver.

The SSM AIO II provides a serial interface and two parallel interfaces. The serial interface uses connector J3 for printers and connector J4 for modems and is specified in the serial I/O or printer driver parameters as *PORT 1*. A general purpose parallel connector is provided on J2 corresponding to the AIO II Parallel Port A referenced in Softerm as *PORT 2*. A Centronics parallel printer connector is provided on J1 corresponding to the AIO II Parallel Port B referenced in Softerm as *PORT 3*. Softerm allows the serial interface to be used for serial communications concurrently with a printer on one of the two parallel interfaces.

The serial interface provides all required modem signals and allows DTR to be used as the printer busy indicator if jumper option P20 is installed for connector J3. Although jumpers are provided to select the baud rate, the selection is also a programmable feature of the AIO II and Softerm selects the baud rate by software according to the value specified in terminal setup. The speeds which may be selected are 110, 134.5, 300, 1200, 2400, 4800, and 9600.

The two parallel interfaces provide 8 data, 1 strobe, and 1 acknowledge line. The polarity of the strobe and acknowledge signals is controlled by software and will be set according to the printer driver parameters specified in terminal setup.

Videx PSIO Parallel/Serial I/O Interface

The Videx PSIO parallel/serial I/O interface can be specified in Softerm as the serial communications interface by entering *VIDEX PSIO.SIO* as the serial I/O driver when generating a configuration in terminal setup. It can also be specified as the printer interface by entering *VIDEX PSIO.PIO* as the printer driver.

The Videx PSIO provides both a serial and parallel interface on a single board. Switches on the board define a *phantom slot number* for one of the interfaces. When using this board with Softerm, the *physical* location of the board is always specified in the *SLOT #* parameter of the serial I/O and printer drivers. Softerm allows the serial interface to be used concurrently with a printer on the parallel interface. The serial interface is selected for the printer driver by specifying the *PORT #* parameter as 1. The parallel interface is selected by specifying the *PORT #* parameter as 2.

The serial interface provides all required modem signals and a software selectable baud rate. The baud rate of 2000 is not available with this board. The parity, number of data bits, and number of stop bits are also software selected by Softerm according to the values specified in terminal setup.

The parallel interface provides a strobe, acknowledge, and 8 data lines. The polarity of the strobe and acknowledge signals are determined by jumpers on the board.

Serial/Modem Interfaces

Hayes Microcomputer Products Micromodem II, IIe

The Hayes Microcomputer Products Micromodem II can be specified in Softerm as the serial communications interface by entering *MICRO-MODEM.SIO* for the serial I/O driver when generating a configuration in terminal setup.

The Hayes Microcomputer Products Micromodem IIe can be specified in Softerm as the serial communications interface by entering *MICRO-MODEM IIE.SIO* for the serial I/O driver when generating a configuration. The Micromodem IIe supports *tone* dialing whereas the original Micromodem II supports *pulse* dialing only.

The Micromodem II provides a serial interface combined with a Bell System 103 compatible modem with an integral auto-dialer which operates in the pulse mode only. The dialer driver in Softerm for the Micromodem II is integrated with the serial I/O driver and is automatically loaded when the serial I/O driver is loaded in terminal setup.

The serial interface provides 2 software selectable baud rates which may be specified in terminal setup as 110 or 300 baud. The parity, number of data bits, and number of stop bits are also software selectable and will be set according to the values specified in the serial I/O parameters in terminal setup. Interrupts are not used by Softerm with this board, and the interrupt jumper between the two large eyes immediately below the II on the board should not be connected.

Multi-Tech Modem II

The Multi-Tech Modem II can be specified in Softerm as the serial communications interface by entering *MULTI-TECH MODEM II.SIO* for the serial I/O driver when generating a configuration in terminal setup.

The Modem II provides a serial interface combined with a Bell System 103 compatible modem with an integral auto-dialer which operates in the pulse mode only. The dialer driver in Softerm for the Modem II is integrated with the serial I/O driver and is automatically loaded when the serial I/O driver is loaded in terminal setup.

The serial interface provides 2 software selectable baud rates which may be specified in terminal setup as 110 or 300 baud. The parity, number of data bits, and number of stop bits are also software selectable and will be set according to the values specified in the serial I/O parameters in terminal setup.

Novation Apple-Cat II

The Novation Apple-Cat II can be specified in Softerm as the serial communications interface by entering *APPLE-CAT II.SIO* for the serial I/O driver when generating a configuration in terminal setup.

Appendices

The Apple-Cat II provides a serial interface combined with a Bell System 103, 202, or optionally a 212 compatible modem. The interface also includes an integral auto-dialer which is capable of both pulse and touch tone dialing. Softerm provides support for only the 103 or 212 modes of operation since the 202 is a half duplex mode of operation which Softerm does not support. The dialer driver for the Apple-Cat II in Softerm is integrated with the serial I/O driver and is automatically loaded when the serial I/O driver is loaded in terminal setup.

The serial interface provides a range of baud rates which may be used by Softerm when operating in the 103 compatible mode including 50, 75, 110, 150, and 300 baud. The *SPEED* parameter for the serial I/O driver in terminal setup should be set for 1200 baud when operating in the 212 compatible mode. The parity, number of data bits, and number of stop bits are software selectable and determined by the values entered for the corresponding parameters in the serial I/O driver in terminal setup.

The *PORT #* option in the serial I/O parameters determines which slot the additional 1200 baud 212 option board is located. The *PORT #* may be specified as 1-7 indicating which physical slot contains the 212 option board. The *PORT #* may be specified as 8 which indicates the *slot saver* feature is being used for the 212 option board. The *PORT #* is specified as 9 to indicate that no 212 option board is present.

The Novation Apple-Cat II also provides a *printer port* feature which allows a serial printer to be connected when the interface is not being used for terminal communications. Softerm does *not* support this capability.

SSM ModemCard

The SSM ModemCard can be specified in Softerm as the serial communications interface by entering *SSM MODEMCARD.SIO* for the serial I/O driver when generating a configuration in terminal setup.

The ModemCard provides a serial interface combined with a Bell System 103 compatible modem with an integral auto-dialer which operates in the pulse or tone modes. The dialer driver in Softerm for the ModemCard is integrated with the serial I/O driver and is automatically loaded when the serial I/O driver is loaded in terminal setup.

The serial interface provides 2 software selectable baud rates which may be specified in terminal setup as 110 or 300 baud. The parity, number of data bits, and number of stop bits are also software selectable and will be set according to the values specified in the serial I/O parameters in terminal setup.

Parallel Interfaces

Apple Parallel Printer Interface

The Apple Parallel Printer Interface can be specified in Softerm as the printer interface by entering *APPLE PRINT.PIO* as the printer driver when generating a configuration in terminal setup.

The Apple Parallel Printer Interface provides 1 strobe, 1 acknowledge, and 8 data lines. The polarity of the strobe and acknowledge signals is determined by a *jumper block* on the interface card.

Basis 108 Parallel Interface

The Basis 108 internal parallel interface can be specified in Softerm as the printer interface by entering *BASIS 108.PIO* as the printer driver when generating a configuration in terminal setup.

The parallel interface is a Centronics compatible interface which generates all signals necessary for controlling the printer. The polarity of the strobe and acknowledge signals is determined by the hardware and not alterable.

The printer driver included with Softerm supports both the internal serial and parallel interfaces of the Basis 108. To select the serial interface, the *PORT #* parameter in the printer driver is set to 1. To select the parallel interface, the *PORT #* parameter is set to 2.

CCS 7720 Parallel Interface

The California Computer Systems 7720 Parallel Interface can be specified in Softerm as the printer interface by entering *CCS 7720.PIO* as the printer driver when generating a configuration in terminal setup.

The CCS 7720 provides 2 parallel ports referenced as Port A and Port B. These ports are specified in the printer driver parameters in terminal setup as *PORT 1* when using CCS 7720 Port A and *PORT 2* when using CCS 7720 Port B. Each port provides 1 strobe, 1 acknowledge, and 8 data lines. The polarity of the strobe and acknowledge signals is selected by software and determined when using Softerm by the corresponding parameters in the printer driver options in terminal setup.

CCS 7728 Centronics Parallel Interface

The California Computer Systems 7728 Centronics Parallel Interface can be specified in Softerm as the printer interface by entering *CCS 7728.PIO* as the printer driver when generating a configuration in terminal setup.

The CCS 7728 provides a Centronics printer compatible parallel interface including 8 parallel data outputs, busy and acknowledge, paper empty, fault, select, strobe, and reset signals. The polarity of the strobe is low to high, and the acknowledge/busy is determined by the cable.

The CCS 7728 provides a jumper which enables interrupts when using this board. The interrupt jumper should *not* be connected for proper operation of Softerm.

Epson APL Printer Interface

The Epson APL Printer Interface is compatible with the Apple Parallel Printer Interface and can be used with Softerm by specifying *APPLE PRINT.PIO* as the printer driver when generating a configuration in terminal setup.

Interactive Structures PKASO Interface

The Interactive Structures PKASO interface can be specified in Softerm as the printer interface by entering *PKASO.PIO* as the printer driver when generating a configuration in terminal setup.

The PKASO interface provides 8 data, strobe, acknowledge, busy, select, and paper out signals. The polarity of the strobe and acknowledge signals is controlled by software and will be set according to the corresponding printer driver parameters specified in terminal setup.

Microtek Apple Dumpling-GX

The Microtek Apple Dumpling graphics printer interface can be specified in Softerm as the printer interface by entering *APPLE DUMPLING-GX.PIO* as the printer driver when generating a configuration in terminal setup.

The Apple Dumpling-GX interface provides 8 data, strobe, busy, select, and paper out signals. The polarity of the strobe and busy signals is determined by the hardware.

Orange Micro Grappler Interface

The Orange Micro Grappler Interface can be specified in Softerm as the printer interface by entering *GRAPPLER.PIO* as the printer driver when generating a configuration in terminal setup.

The Grappler Interface provides 8 data, strobe, acknowledge, busy, select, and paper empty signals. The polarity of the strobe signal is controlled by software and will be set according to the corresponding printer driver parameters specified in terminal setup. The polarity of the acknowledge and busy signals is fixed and determined by which signal is used in the cable provided.

Orange Micro Grappler+ Interface

The Orange Micro Grappler+ Interface can be specified in Softerm as the printer interface by entering *GRAPPLER+.PIO* as the printer driver when generating a configuration in terminal setup.

The Grappler Interface provides 8 data, strobe, acknowledge, busy, select, and paper empty signals. The polarity of the strobe, acknowledge, and busy signals is determined by the hardware.

Practical Peripherals Micro Buffer II

The Practical Peripherals Micro Buffer II interface can be specified in Softerm as the printer interface by entering *MICRO BUFFER II.PIO* as the printer driver when generating a configuration in terminal setup.

The Micro Buffer II is available in both serial and parallel versions which are compatible with the Softerm driver. A 16K or optionally 32K RAM buffer is provided to buffer data between the Apple system and the serial or parallel interface. When the buffer is full, an internal not ready status is generated to the Softerm driver.

The parallel interface version provides 8 data, 1 strobe, and 1 acknowledge signals. The polarity of the strobe and acknowledge signals is determined by the hardware. The serial interface version uses jumpers to select a speed of 300 or 1200 baud. The serial parameters are fixed at 7 data bits, 1 stop bit, and space parity.

SSM APIO Parallel Interface

The SSM Microcomputer Products APIO Parallel interface can be specified in Softerm as the printer interface by entering *SSM APIO.PIO* as the printer driver when generating a configuration in terminal setup.

The SSM APIO Parallel Interface provides two parallel interfaces referenced as Port A and Port B. Port A may be used with Softerm by specifying *PORT 1* in the printer driver parameters in terminal setup and Port B may be used by specifying *PORT 2*. A general purpose parallel connector is provided on J1 for ports A and B and a Centronics type connector is provided on J2 which is directly connected to Port B. When using connector J2 the port number parameter in the printer driver setup should be specified as *PORT 2*.

The two parallel interfaces provide 8 data, 1 strobe, and 1 acknowledge line. The polarity of the strobe and acknowledge signals is controlled by software and will be set according to the corresponding printer driver parameters specified in terminal setup.

Tymac PPC-100 Printer Interface

The Tymac PPC-100 Printer Interface is compatible with the Apple Parallel Printer Interface and can be used with Softerm by specifying *APPLE PRINT.PIO* as the printer driver when generating a configuration in terminal setup.

Wesper Micro Wizard-BPO Printer Interface

The Wesper Micro Wizard-BPO printer interface can be specified in Softerm as the printer interface by entering *WIZARD BPO.PIO* as the printer driver when generating a configuration in terminal setup.

A 16K or optionally 32K RAM buffer is provided to buffer data between the Apple system and the parallel interface. When the buffer is full, an internal not ready status is generated to the Softerm driver. Signals such as printer busy and select are not directly accessible by the Softerm driver. The polarity of the strobe and acknowledge signals are determined by the hardware.

Appendices

Auto-Dial Modems

Datec 212 Auto-Dial Modem

The Datec 212 Auto-Dial modem can be used with Softerm automatic dialing capabilities by entering *DATEC 212.DIAL* as the dialer driver when generating a configuration in terminal setup.

Other Datec modems with auto-call units (ACU) may be compatible with the Softerm driver. For proper operation ACU firmware Revision 3.5 or later is required and the configuration switches of the ACU must be set as follows:

Switch	Setting
1	ON
2-8	OFF

For serial interfaces which will not transmit unless the carrier detect signal is asserted, Switch 2 must be set to the ON position.

Hayes Smartmodem 300 and 1200

The Hayes Microcomputer Products Smartmodem 300 and Smartmodem 1200 can be used with Softerm automatic dialing capabilities by entering *SMARTMODEM.DIAL* as the dialer driver when generating a configuration in terminal setup.

The originate baud rate when using the Smartmodem 1200 is determined from the current Softerm serial I/O *SPEED* parameter which can select either 300 or 1200 baud. The configuration switches to establish the operating parameters for the Smartmodem 300 and 1200 should be set as follows when operating with Softerm:

Switch	Setting
1	UP
2-5	DOES NOT MATTER
6	UP
7-8	DOES NOT MATTER

For serial interfaces which will not transmit without the carrier detect signal asserted, set Switch 6 DOWN. Whenever Softerm initially exits from the terminal setup menu to the online terminal operation mode, a delay will occur while an initialization string is transmitted to the Smartmodem to set various internal parameters.

Multi-Tech MT212C Auto-Dial Modem

The Multi-Tech MT212C auto-dial modem can be used with Softerm automatic dialing capabilities by entering *MULTI-TECH MT212C.DIAL* as the dialer driver when generating a configuration in terminal setup.

The MT212C provides 1200 baud operation and pulse dialing only. The only delay available during dialing is wait for dial tone. The ACU in this modem allows a maximum phone number length of 16 characters.

NEC N212BR Auto-Dial Auto-Logon Modem

The NEC N212BR Auto-Dial Auto-Logon modem can be used with Softerm automatic dialing capabilities by entering *NEC N212BR.DIAL* as the dialer driver when generating a configuration in terminal setup.

Racal-Vadic VA212 Auto-Dial Modem

The Racal-Vadic VA212 auto-dial modem can be used with Softerm automatic dialing capabilities by entering *RACAL-VADIC VA212.DIAL* as the dialer driver when generating a configuration in terminal setup.

The Softerm driver expects the standard factory option settings. The modem will automatically select pulse or tone dialing. If a *T* or *P* is the first character of a Softerm phone number, the appropriate command option will be issued to override the automatic selection and use the type of dialing indicated. The VA212 has no separate delay command and the only delay available is wait for dial tone. This can be changed to a 5-second delay by changing option 23 in the modem to enable blind dialing.

Rixon R212A Intelligent Modem

The Rixon R212A Intelligent Modem can be used with Softerm automatic dialing capabilities by entering *RIXON R212A. DIAL* as the dialer driver when generating a configuration in terminal setup. The modem also includes a Hayes Smartmodem compatible mode which can be used with the *SMARTMODEM.DIAL* dialer driver.

The Softerm driver is designed to work with the default Rixon options in the Rixon mode. Since carrier is constantly present in the Rixon mode, *PAUSE* or *XMIT:WAIT* commands must be included when using a *DIAL* command in a macro. However the option "CTS ON" can be set to "N", and a modified cable can be used to allow Softerm to wait for carrier and detect disconnects properly. To modify the cable, disconnect CTS (Pin 5) from the modem and jumper RTS (Pin 4) to CTS so that characters can still be transmitted to the modem.

Universal Data Systems 212A/D Auto-Dial Modem

The Universal Data Systems 212A/D modem can be used with Softerm automatic dialing capabilities by entering *UDS 212AD.DIAL* as the dialer driver when generating a configuration in terminal setup.

The UDS 212A/D will normally default to pulse dialing. If a *T* or *P* is the first character of the dial string, the appropriate command is issued to override this selection. The *T* and *P* characters are ignored in other

positions in the phone number. The ACU in this modem echos every character sent by Softerm including control characters before a connection is established which may cause problems when using some terminal emulations.

U.S. Robotics Auto-Dial 212A

The U.S. Robotics Auto-Dial 212A modem can be used with Softerm automatic dialing capabilities by entering *USR AD 212A.DIAL* as the dialer driver when generating a configuration in terminal setup. For proper operation the configuration switches must be set as follows:

RNG	— Use as specified in manual
8HI	— ON
BAL	— Use as specified in manual
DTR	— OFF

Pin 4 may have to be looped back to Pin 5 on the serial I/O interface depending on the revision of the modem.

Ven-Tel MD212 Plus Auto-Dial Modem

The Ven-Tel MD212 Plus auto-dial modem can be used with Softerm automatic dialing capabilities by entering *VEN-TEL MD212 PLUS.DIAL* as the dialer driver when generating a configuration in terminal setup.

The MD212 Plus does not allow software control of the type of dialing used. Switch H1 on the standalone MD212 Plus if UP will cause pulse dialing and if DOWN will cause tone dialing. On the rackmount version, Switch S7-1 will cause pulse dialing if ON and tone dialing if OFF.

Appendices

Clock Interfaces

General Information

Softerm includes support for a selection of clock interfaces which provide the current date and time for use with Softerm file transfer capabilities. The filenames on the Softerm Configuration Diskette are identified as *INTERFACE NAME.CLK* if the filename is a clock driver for the named interface. If no clock interface is available, the filename *NULL.CLK* is specified as the clock driver.

Softerm allows the current date and time to be *set* in the Terminal Setup mode unless otherwise specified for supported clock interfaces. The date and time if available is used by the file transfer *LOG* and *SCHEDULE* commands. The *LOG* command records information about each file transfer command executed in a specified log file. Each entry in the log file will include the current date and time if a clock driver other than *NULL.CLK* is included in the current configuration. The *SCHEDULE* command allows file transfers to be executed at a specific date and time. When a *SCHEDULE* command is executed, the current date and time are compared to the date and time specified in the *SCHEDULE* command each second until the current and specified values match. File transfer command execution is then resumed.

CCS 7424 Clock Card

The California Computer Systems 7424 can be specified in Softerm as the clock interface by entering *CCS 7424.CLK* for the clock driver when generating a configuration in terminal setup.

The CCS 7424 must have the write enable jumper installed in order for Softerm to set the date and time. This jumper should connect to the EN or rightmost position to enable setting of the date and time.

MBI Appletime Clock Card

The MBI Appletime Clock Card can be specified in Softerm as the clock interface by entering *MBI APPLETIME.CLK* for the clock driver when generating a configuration in terminal setup.

The MBI Appletime clock card includes a write protect switch which must be OFF in order for Softerm to set the date and time.

Mountain Computer CPS Multifunction Card

The Mountain Computer CPS Multifunction Card can be specified in Softerm as the clock interface by entering *MCI CPS.CLK* for the clock driver when generating a configuration in terminal setup.

Appendices

The CPS card provides two possible clock input formats. Softerm accesses the clock directly and either format may be specified in the CPS card setup procedure. The *SLOT #* parameter specified in the clock driver parameters in terminal setup is the *physical* location of the CPS card and not the phantom slot number which may have been assigned to the clock.

Mountain Computer The Clock

The Mountain Computer "The Clock" can be specified in Softerm as the clock interface by entering *THE CLOCK.CLK* for the clock driver when generating a configuration in terminal setup.

The Softerm driver for The Clock provides a read-only capability and does not allow setting of the date and time from the Softerm program.

Prometheus VERSAcard

The Prometheus VERSAcard can be specified in Softerm as the clock interface by entering *VERSACARD.CLK* for the clock driver when generating a configuration in terminal setup.

The VERSAcard provides a write enable switch S2-6 which must be set to ON in order for Softerm to set the date and time. The clock driver *SLOT #* parameter should be set to the physical location of the board.

Thunderware Thunderclock Plus

The Thunderware Thunderclock Plus can be specified in Softerm as the clock interface by entering *THUNDERCLOCK PLUS.CLK* for the clock driver when generating a configuration in terminal setup.

The Thunderclock Plus includes a write protect switch which must be OFF in order for Softerm to set the date and time.

Appendix B
80-Column Video Boards

General Information

Introduction

Softerm includes support for a selection of 80-column video boards. An 80 column by 24 row display format is provided for all terminal emulations included with Softerm. Since the standard Apple video was designed for operation with ordinary limited resolution television sets, only 40 columns may be viewed at a time. Softerm allows the standard Apple 40-column video to be utilized by displaying the low 40 columns (1-40) or the high 40 columns (41-80) of the terminal being emulated selectable by a keystroke. However, a more professional looking presentation is made possible by the addition of an 80-column video board and monitor to the Apple II system.

All of the 80-column video boards supported by Softerm generate upper and lower case characters and require a good-quality monochrome monitor for best results. Characters are formed on the video display as a matrix of dots within a field of fixed size. Common character sizes are 5 by 7 or 7 by 9 dots. A 5 x 7 character size will generally require a monitor with a bandwidth of at least 3 MHz while a 7 x 9 character size will require a monitor with a bandwidth of at least 12 MHz. All of the boards store the character dot tables in a read-only memory (ROM) except Sup'R'Terminal which uses RAM. Some of the boards allow an alternate character set to be selected from another ROM or from programmable memory. Softerm functions with whichever character set is currently selected.

All of the 80-column video boards have on-board firmware in ROM except for the Computer Stop Omnivision whose firmware is loaded from disk. This firmware provides compatibility with standard Apple languages such as BASIC and Pascal. Softerm does *not* utilize the firmware of any of the video boards but accesses the CRTC (CRT Controller) on the boards directly. An exception to this is the Sup'R'Terminal where the standard firmware is used to initialize the RAM character generation tables. Direct use of the CRTC is necessary in order to achieve the maximum performance possible from the video boards when Softerm is operating at transmission speeds up to 9600 baud. Operational characteristics of the 80-column video boards affecting performance are discussed later in the Appendix.

Some of the boards support software switching of video from 40-column to 80-column video and vice-versa. Softerm supports this feature and automatically selects 80-column video when the user exits from terminal setup to online terminal operation if an 80-column display driver has been specified. The 80-column video remains in effect once initialized until the display driver is changed in terminal setup or until the user exits from Softerm using the **S1 CTRL B** Boot function.

Performance Considerations

The performance of Apple 40-column video and the 80-column video boards is the primary limiting factor in obtaining sustained communications speeds of up to 9600 baud. Since Softerm supports XON/XOFF (start/stop) or DTR pacing control and a large serial communications ring buffer, this is not a serious limitation at any transmission speed. More start/stop operation may occur at higher transmission speeds when using certain boards, but usually does not detract from the operational appearance of Softerm. All 80-column video boards and the Apple 40-column video are capable of sustaining 1200 baud transmission speeds without start/stop sequences occurring.

There are two primary operational characteristics of the video boards which limit the performance of Softerm. These are the availability of *hardware scrolling* and the technique of the *video RAM access method.*

Hardware scrolling is accomplished using a register provided by the CRTC display controller on the video board which defines the *home* position for screen refresh. Therefore to accomplish the normal scrolling action at the bottom of the video display, a single line must be cleared to blanks, and the start address register for screen refresh is adjusted by one line. Software scrolling is accomplished by *moving* 23 lines of characters one line up and clearing the remaining line to blanks. Refer to the individual descriptions of the 80-column boards supported by Softerm for additional information on hardware and software scrolling.

There are three video RAM access methods used by the 80-column video boards supported by Softerm. The first method uses a *memory mapped* technique where a physical portion of the video RAM memory is mapped into the addressable memory space of the Apple II computer. Characters can be directly stored into the video RAM by simply storing the character into the equivalent Apple II memory address. This is the fastest method but is the most susceptible to visual *rippling* or *tearing* on the video display as data is being changed.

The second technique of accessing the video RAM is required by video boards which utilize an *intelligent CRT controller* such as the Synertek 6545. In this method the CRTC has complete control of the video RAM memory. A register is provided for the memory address of the location to be accessed and for the data character to be stored, as well as a status register which indicates when the video RAM may be accessed. This technique is several times slower than the the direct mapped memory access method described previously.

The third video RAM access method requires *polling* of the video board to receive permission to store a character. The board must be polled a second time to see if the character has been accepted. The video RAM memory is mapped directly to Apple memory addresses, but is only available during horizontal and vertical retrace. This technique is many times slower than the direct mapped memory access method described previously.

The maximum throughput attainable when using Softerm with any display driver is approximately 6500 baud when accessing video memory in a non scrolling mode.

Specifying CRTC Parameters

The display driver option in terminal setup allows the horizontal and vertical timing registers and the cursor start and end registers of the 80-column video boards to be adjusted if required. This may be necessary depending on the operational characteristics of the board and monitor used. Factors which affect these settings include *character size* (5 X 7, 7 X 9, etc.), the *revision level* of the video board, and the bandwidth of the monitor utilized. The default values for these parameters contained in the display drivers supplied with Softerm should not be changed unless the video presentation is unacceptable.

If adjustments to these parameters are required, entering a **Y** for the *SPECIFY CRTC PARAMETERS* option in the display driver parameters in terminal setup will cause the following screen to be displayed:

```
======= CRTC REGISTER PARAMETERS =======
  0    1    2    3    4    5    6    7    8    9
$7B  $50  $62  $19  $1B  $08  $18  $19  $00  $08
====== CURSOR DEFINITION PARAMETERS ======
                   START    END
          1        $60      $07
          2        $63      $07
          3        $68      $68
          4        $00      $07
          5        $03      $07
          6        $08      $08
```

All of the 80-column video boards use either the Motorola 6845 CRTC, the Synertek 6545 CRTC, or the Hitachi HD46505 CRTC which is compatible with the Motorola 6845. It is recommended that if the CRTC register parameters are to be edited, that the user obtain the manufacturer's technical specification on the CRTC involved as a reference. A brief description of the function of the various registers follows.

Registers 0, 1, 2, and 3 provide the *Horizontal Timing Registers* for the CRTC.

Register 0 is the *Horizontal Total Register*. This register determines the horizontal frequency of horizontal sync. It is the total of displayed plus non-displayed character time units minus one.

Register 1 is the *Horizontal Displayed Register*. This register determines the number of displayed characters per horizontal line.

Register 2 is the *Horizontal Sync Position Register*. This register determines the horizontal sync position on the horizontal line.

Register 3 is the *Horizontal Sync Width Register*. This register determines the width of the horizontal sync pulse.

Registers 4 through 9 provide the *Vertical Timing Registers* for the CRTC.

Register 4 and Register 5 determine the vertical frequency of vertical sync. Register 4 is the *Vertical Total Register* and Register 5 is the *Vertical Total Adjust Register*. The calculated number of character line times is usually an integer plus a fraction to get exactly a 50 or 60 Hz vertical refresh rate. The integer number of character times minus one is programmed in the Vertical Total Register; the fraction is programmed into the Vertical Scan Adjust Register as a number of scan line times.

Register 6 is the *Vertical Displayed Register*. This register determines the number of displayed character rows on the CRT screen, and is programmed in character row times.

Register 7 is the *Vertical Sync Position*. This register determines the vertical sync position with respect to the reference. It is programmed in character row times.

Register 8 is the *Interlace Mode Register*. This register controls the raster scan mode. On the Synertek 6545, this register controls the addressing mode as well.

Register 9 is the *Maximum Scan Line Address Register*. This register determines the number of scan lines per character row including spacing. The programmed value is a max address and is one less than the number of scan lines.

The cursor definition parameters allow 6 sets of cursor start and end definitions to be defined corresponding to the 6 *CURSOR DEFINITION* choices available in the display driver parameters in terminal setup. The start and end definitions correspond to Register 10 the *Cursor Start Register* and Register 11 the *Cursor End Register* in the CRTC.

The *Cursor Start Register* controls the cursor format. Bit 5 is the blink timing control. When bit 5 is 0, the blink frequency is 1/16 of the vertical field rate, and when bit 5 is a 1, the blink frequency is 1/32 of the vertical field rate. Bit 6 is used to enable a blink. The cursor start scan line is set by the lower 5 bits.

The *Cursor End Register* sets the cursor end scan line.

Appendices

80-Column Video Boards

Advanced Logic Systems Smarterm

The Advanced Logic Systems Smarterm 80-column video board can be specified in Softerm as the video interface by entering *SMARTERM* as the display driver when generating a configuration in terminal setup.

The Smarterm provides a 5 x 7 dot matrix character size with no lowercase descenders. Software switching from 40- to 80-column video and inverse video is provided and supported by Softerm. An enhanced 7 x 11 dot matrix character set with true descenders is available which requires modifications to the default CRTC parameters provided with Softerm. If the 7 x 11 dot matrix character set is used, the CRTC parameters should be set as follows:

```
========= CRTC REGISTER PARAMETERS =========
  0    1    2    3    4    5    6    7    8    9
$7F  $50  $64  $58  $18  $0D  $18  $18  $48  $0B
======== CURSOR DEFINITION PARAMETERS ========
                     START      END
             1       $80       $0A
             2       $85       $0A
             3       $8B       $0B
             4       $80       $0A
             5       $85       $0A
             6       $8B       $0B
```

The Smarterm does not provide a non-blinking cursor. All cursor definition choices in Softerm Terminal Setup Display Parameters will result in a blinking cursor.

The Smarterm uses a 6545 compatible CRTC and includes hardware scrolling capability. The video display RAM is accessed through the intelligent CRT controller registers.

Advanced Logic Systems Smarterm II

The Advanced Logic Systems Smarterm II 80-column video board can be specified in Softerm as the video interface by entering *SMARTERM II* as the display driver when generating a configuration in terminal setup.

The Smarterm II provides 7 x 9 character size dot matrix with lowercase descenders. Software switching from 40- to 80-column video is provided and supported by Softerm. Either inverse video or low intensity can be selected by a jumper on the board for use in highlighting but is processed as inverse video by Softerm.

The Smarterm II uses a 6845 compatible CRTC but does not provide hardware scrolling capability. The video display RAM is accessed through a direct memory mapping technique.

Apple IIe 80-Column Textcards

The Apple IIe regular and extended 80-column Textcards can be specified in Softerm as the video interface by entering *APPLE IIE.80* as the display driver when generating a configuration in terminal setup.

The Apple IIe uses a 7 x 9 character size dot matrix with lowercase descenders. Inverse video and software switching from 40- to 80-column mode is standard and supported by Softerm. Scrolling is provided through software and video display RAM is accessed through a direct memory mapping technique.

Applied Engineering Viewmaster

The Applied Engineering Viewmaster is compatible with the Softerm driver for the Viewmax 80 described later in this section.

Basis 108 80-Column Video

The Basis 108 internal 80-column video capability can be specified in Softerm as the video interface by entering *BASIS 108.80* as the display driver when generating a configuration in terminal setup.

Character generation in the Basis 108 is based on a 2532 EPROM. The Basis 108 has been delivered with two different character generators identified as 46-3 or 46-4 depending on the position of its character set. Softerm allows the various character sets to be utilized by specifying Register #0 in the *CRTC PARAMETERS* according to the following table:

CRTC #0 Register Value	Character Set 46-3 EPROM	Character Set 46-4 EPROM
0	Standard Apple II	Standard Apple II
1	German ASCII	ASCII
2	ASCII	German ASCII
3	APL	APL
4	Full German ASCII	Full ASCII

Inverse video and software switching from 40- to 80-column mode is standard and supported by Softerm. Scrolling is provided through software and video display RAM is accessed through a direct memory mapping technique.

Bit 3 Full-View 80

The Bit 3 Computer Full-View 80 80-column video board can be specified in Softerm as the video interface by entering *FULL-VIEW 80* as the display driver when generating a configuration in terminal setup.

The Full-View 80 provides a standard 7 x 9 character size and optionally a 5 x 7 character size in a 8 x 10 dot matrix with lowercase descenders. Inverse video and software switching from 40- to 80-column video is provided and supported by Softerm. The default CRTC parameters provided with Softerm are for the 7 x 9 character set. If the 5 x 7 character set is utilized, editing of the CRTC parameters will be necessary. If the 5 x 7 character set is used, the CRTC parameters should be set as follows:

```
========= CRTC REGISTER PARAMETERS =========
   0    1    2    3    4    5    6    7    8    9
  $81  $50  $64  $3A  $1F  $06  $18  $1B  $78  $07
======== CURSOR DEFINITION PARAMETERS ========
                    START    END
          1         $60      $07
          2         $64      $07
          3         $67      $07
          4         $00      $07
          5         $04      $07
          6         $07      $07
```

The Full-View 80 uses a 6545 compatible CRTC and includes hardware scrolling capability. The video display RAM is accessed through the intelligent CRT controller registers.

Computer Stop Omnivision

The Computer Stop Omnivision 80-column video board can be specified in Softerm as the video interface by entering *OMNIVISION* as the display driver when generating a configuration in terminal setup.

The Omnivision provides a 5 x 7 dot matrix character size with no lowercase descenders. Inverse video is provided and supported by Softerm. Software switching from 40- to 80-column video is not provided by the Omnivision but a manual switch is provided. No firmware is required by Softerm to use the Omnivision board.

The Omnivision includes a special **SHIFT** key hookup. This **SHIFT** key is supported by Softerm if the *SHIFT KEY TYPE* display driver parameter is set to *2* in terminal setup. The Omnivision uses a 6845 compatible CRTC and includes hardware scrolling capability. The video display RAM is accessed through a direct memory mapping technique.

Franklin ACE 80-Column

The Franklin ACE 80-column video board can be specified in Softerm as the video interface by entering *FRANKLIN ACE.80* as the display driver when generating a configuration in terminal setup.

The Franklin ACE 80-column provides a 7 x 9 character size dot matrix with lowercase descenders. Inverse video and software switching from 40- to 80-column video is provided and supported by Softerm.

The Franklin ACE 80-column uses a 6845 compatible CRTC and includes hardware scrolling capability. The video RAM is accessed through a direct memory mapping technique. Early revisions of the Franklin 80-column board require the CRTC parameters to be set as follows:

```
======== CRTC REGISTER PARAMETERS ========
   0    1    2    3    4    5    6    7    8    9
 $69  $50  $56  $1A  $19  $02  $18  $18  $30  $09
```

M & R Enterprises Sup'R'Terminal

The M & R Enterprises Sup'R'Terminal 80-column video board can be specified in Softerm as the video interface by entering *SUP'R'TERM* as the display driver when generating a configuration in terminal setup.

The Sup'R'Terminal provides a 5 x 8 character size dot matrix with lowercase descenders. Inverse video is provided and supported by Softerm. Sup'R'Terminal does not support software switching of the video display between Apple 40-column and its 80-column video source. The Sup'R'Terminal must be used in Slot 3 of the Apple II computer.

The Sup'R'Terminal uses a 6845 compatible CRTC but does not provide hardware scrolling. The video ram is accessed through a direct memory mapping technique.

Micromax Viewmax 80

The Micromax Viewmax-80 80-column video board can be specified in Softerm as the video interface by entering *VIEWMAX 80* as the display driver when generating a configuration in terminal setup.

The Viewmax 80 provides a 7 x 9 character size dot matrix with lowercase descenders. Inverse video and software switching from 40- to 80-column video is provided and supported by Softerm.

The Viewmax 80 uses a 6845 compatible CRTC and includes hardware scrolling capability. The video RAM is accessed through a direct memory mapping technique.

Microtek Magnum 80

The Microtek Magnum 80 80-column video board can be specified in Softerm as the video interface by entering *MAGNUM 80* as the display driver when generating a configuration in terminal setup.

The Magnum 80 provides a 7 x 9 character size dot matrix with lowercase descenders. Inverse video and software switching from 40- to 80-column video is provided and supported by Softerm.

The Magnum 80 uses a 6845 compatible CRTC and includes hardware scrolling capability. The video RAM is accessed through a direct memory mapping technique.

STB Systems STB-80

The STB Systems STB-80 80-column video board can be specified in Softerm as the video interface by entering *STB-80* as the display driver when generating a configuration in terminal setup.

The STB-80 provides a 8 x 9 character size dot matrix with lowercase descenders. Inverse Video by character and software switching from 40- to 80-column video is standard and supported by Softerm. The STB-80 also provides a full-screen video inversion feature which is *not* supported by Softerm.

The STB-80 uses a 6545 compatible CRTC and includes hardware scrolling capability. The video display RAM is accessed through the intelligent CRT controller registers.

Techcom Enterprises SuperVision

The Techcom Enterprises SuperVision 80-column video board can be specified in Softerm as the video interface by entering *SUPERVISION* as the display driver when generating a configuration in terminal setup.

The Supervision provides a 7 x 11 character size dot matrix with 2 dot lowercase descenders. Visual attributes provided and supported by Softerm include flashing, inverse, half intensity, and underline when using terminal emulations which support these attributes. Software switching from 40- to 80-column video is provided and supported by Softerm. The SuperVision includes a **SHIFT** key modification using an EZ hook-up to the keyboard encoder. This **SHIFT** key is supported by Softerm if the *SHIFT KEY TYPE* display driver parameter is set to *2* in terminal setup.

The SuperVision uses a 6545 compatible CRTC and includes hardware scrolling capability. The video display RAM is accessed through the CRTC registers.

Videx Ultraterm

The Videx Ultraterm video board can be specified in Softerm as the video interface by entering *ULTRATERM* for the display driver when generating a configuration in terminal setup.

The Ultraterm provides a standard 9 x 12 character size dot matrix or optionally a 9 x 16 character size dot matrix. If the 9 x 16 dot matrix character set is used, the CRTC parameters should be set as follows:

```
============ CRTC REGISTER PARAMETERS ============
  0    1    2    3    4    5    6    7    8    9
 $7A  $50  $5D  $38  $1F  $05  $18  $1C  $03  $0E

========= CURSOR DEFINITION PARAMETERS =========
                    START      END
            1        $60       $0C
            2        $66       $0C
            3        $6D       $6E
            4        $00       $0C
            5        $06       $0C
            6        $0D       $0E
```

The Ultraterm provides a selection of screen formats including 80 x 24, 96 x 24, 160 x 24, 80 x 32, 80 x 48, 132 x 24, and 128 x 32. Softerm supports only the 80 x 24 format. Software switching from 40- to 80-column video is provided and supported by Softerm. The Ultraterm provides both inverse video and high or low intensity for highlighting. Softerm supports this capability through the *USE INVERSE* system parameter. If the *USE INVERSE* option is set to 1 or 2, inverse video is used for the inverse attribute. If the *USE INVERSE* option is set to 3, low intensity is used for the inverse attribute. If the *USE INVERSE* attribute is set to 4, high intensity is used for the inverse attribute.

The Ultraterm uses a 6845 compatible CRTC and includes hardware scrolling capability. The video display RAM is accessed through a direct memory mapping technique.

Videx Videoterm

The Videx Videoterm 80-column video board can be specified in Softerm as the video interface by entering *VIDEOTERM* for the display driver when generating a configuration in terminal setup.

The Videoterm provides a 7 x 9 character size in a 9 x 9 dot matrix with true lowercase descenders. Inverse video is supported if the *Inverse Character Set* is available as the *alternate* character set. If the alternate character set is not the inverse character set, the *USE INVERSE* option in the System Parameters in terminal setup should be set to 0. Software switching from 40- to 80-column video display is available as an option and is supported by Softerm.

The Softerm keyboard expander circuit board uses the expansion ROM area which may cause *blanking* of the display when the disk is accessed with early versions of the Videoterm board. A modification to the Videoterm board is required to correct this problem. Contact Videx for instructions on modifying the Videoterm board to correct this problem.

Appendices

When using an Apple Monitor III with a Videx Videoterm board, the default CRTC parameters used must be changed for the monitor to work properly with Softerm. The following values should be set in the CRTC register parameters:

```
======== CRTC REGISTER PARAMETERS ========
    0    1    2    3    4    5    6    7    8    9
  $7B  $50  $5C  $29  $1B  $08  $18  $1B  $00  $08
```

The Videoterm uses a 6845 compatible CRTC and includes hardware scrolling capability. The video display RAM is accessed through a direct memory mapping technique.

Vista Computer Vision 80

The Vista Computer Vision 80 80-column video board can be specified in Softerm as the video interface by entering *VISION 80* as the display driver when generating a configuration in terminal setup.

The Vision 80 provides a 9 x 10 character size dot matrix with lowercase descenders. Inverse video and software switching from 40- to 80-column video is provided and supported by Softerm.

The Vision 80 uses a 6845 compatible CRTC but does not provide hardware scrolling. The video RAM is accessed through a polling technique and is only available during horizontal and vertical retrace.

Wesper Micro Systems Wizard 80

The Wesper Micro Systems Wizard 80 80-column video board can be specified in Softerm as the video interface by entering *WIZARD 80* as the display driver when generating a configuration in terminal setup.

The Wizard 80 provides a 7 x 9 character size dot matrix with lowercase descenders. Inverse video and software switching from 40- to 80-column video is provided and supported by Softerm.

The Wizard 80 uses a 6845 compatible CRTC and includes hardware scrolling capability. The video RAM is accessed through a direct memory mapping technique.

Appendix C
ASCII Character Set

General Information

ASCII is the acronyn for American National Standard Code for Information Interchange. The ASCII code assigns a unique binary number to each letter, digit, punctuation mark, or other symbol used. The code consists of seven bits plus a parity bit per character. The ASCII codes have 96 printable characters and 32 non-printable (control) characters.

Softerm allows all 128 character codes to be generated from the Apple keyboard. All codes can be generated with a single keystroke, usually in combination with the SHIFT and CTRL keys. Exceptions to this are the ASCII control characters FS ($1C), US ($1F), and DEL ($7F) and eight displayable codes ([, \ , __, `, {, l, }, ~). These characters are generated using the **S1** key in combination with other keys on the Apple keyboard.

In the table that follows, keyboard sequences which indicate a capital letter such as "A" require that a **SHIFT** operation be performed if the keyboard is in lower case. If a *control* character such as **CTRL C** or **CTRL Y** is entered, either an upper or lower case character may be entered. If the keyboard function is a keyboard macro, uppercase or lowercase may be entered for keyboard macro ids in the range A-Z. If the table indicates a **SHIFT** keyboard sequence is required, the keyboard must be in upper case *lock*.

The following table assumes a standard, unmodified Apple keyboard. Apple II and Apple II Plus systems which have keyboard enhancers installed or Apple IIe systems have the capability to generate many of the codes for which Softerm requires a **S1** keyboard function using the **SHIFT** key.

Appendices

ASCII Character Reference Table

Hex	Dec	ASCII	Name	Keyboard
$00	0	NUL	null	CTRL @
$01	1	SOH	start heading	CTRL A
$02	2	STX	start text	CTRL B
$03	3	ETX	end text	CTRL C
$04	4	EOT	end transmission	CTRL D
$05	5	ENQ	enquire	CTRL E
$06	6	ACK	acknowledge	CTRL F
$07	7	BEL	bell	CTRL G
$08	8	BS	backspace	CTRL H
$09	9	HT	horizontal tab	CTRL I
$0A	10	LF	line feed	CTRL J
$0B	11	VT	vertical tab	CTRL K
$0C	12	FF	form feed	CTRL L
$0D	13	CR	carriage return	CTRL M
$0E	14	SO	shift out	CTRL N
$0F	15	SI	shift in	CTRL O
$10	16	DLE	data link escape	CTRL P
$11	17	DC1	device control 1	CTRL Q
$12	18	DC2	device control 2	CTRL R
$13	19	DC3	device control 3	CTRL S
$14	20	DC4	device control 4	CTRL T
$15	21	NAK	negative ack	CTRL U
$16	22	SYN	synchronous idle	CTRL V
$17	23	ETB	end trans block	CTRL W
$18	24	CAN	cancel	CTRL X
$19	25	EM	end medium	CTRL Y
$1A	26	SUB	substitute	CTRL Z
$1B	27	ESC	escape	ESC
$1C	28	FS	file separator	CTRL or S1 +
$1D	29	GS	group separator	CTRL] or CTRL SHIFT M
$1E	30	RS	record separator	CTRL ∧ or CTRL SHIFT N
$1F	31	US	unit separator	CTRL __ or S1 0
$20	32	SP	space	SPACE BAR
$21	33	!	exclamation	!
$22	34	"	quotation	"
$23	35	#	number sign	#
$24	36	$	dollar sign	$
$25	37	%	percent sign	%
$26	38	&	ampersand	&
$27	39	'	apostrophe	'
$28	40	(	open parenthesis	(
$29	41	)	close parenthesis	)
$2A	42	*	asterisk	*
$2B	43	+	plus sign	+
$2C	44	,	comma	,
$2D	45	−	minus	−
$2E	46	.	period	.
$2F	47	/	slash	/
$30	48	0	zero	0

ASCII Character Reference Table

Hex	Dec	ASCII	Name	Keyboard
$31	49	1	one	1
$32	50	2	two	2
$33	51	3	three	3
$34	52	4	four	4
$35	53	5	five	5
$36	54	6	six	6
$37	55	7	seven	7
$38	56	8	eight	8
$39	57	9	nine	9
$3A	58	:	colon	:
$3B	59	;	semicolon	;
$3C	60	<	less than	<
$3D	61	=	equal to	=
$3E	62	>	greater than	>
$3F	63	?	question mark	?
$40	64	@	at sign	@ or S1 *
$41	65	A	A	A
$42	66	B	B	B
$43	67	C	C	C
$44	68	D	D	D
$45	69	E	E	E
$46	70	F	F	F
$47	71	G	G	G
$48	72	H	H	H
$49	73	I	I	I
$4A	74	J	J	J
$4B	75	K	K	K
$4C	76	L	L	L
$4D	77	M	M	M
$4E	78	N	N	N
$4F	79	O	O	O
$50	80	P	P	P
$51	81	Q	Q	Q
$52	82	R	R	R
$53	83	S	S	S
$54	84	T	T	T
$55	85	U	U	U
$56	86	V	V	V
$57	87	W	W	W
$58	88	X	X	X
$59	89	Y	Y	Y
$5A	90	Z	Z	Z
$5B	91	[	open bracket	[or S1 ,
$5C	92	\	backslash	\ or S1 /
$5D	93	]	close bracket	] or SHIFT M or S1 .
$5E	94	∧	circumflex	∧ or SHIFT N or S1 ?
$5F	95	—	underscore	or S1 —
$60	96	`	grave accent	` or S1;
$61	97	a	a	a

ASCII Character Reference Table

Hex	Dec	ASCII	Name	Keyboard
$62	98	b	b	b
$63	99	c	c	c
$64	100	d	d	d
$65	101	e	e	e
$66	102	f	f	f
$67	103	g	g	g
$68	104	h	h	h
$69	105	i	i	i
$6A	106	j	j	j
$6B	107	k	k	k
$6C	108	l	l	l
$6D	109	m	m	m
$6E	110	n	n	n
$6F	111	o	o	o
$70	112	p	p	p
$71	113	q	q	q
$72	114	r	r	r
$73	115	s	s	s
$74	116	t	t	t
$75	117	u	u	u
$76	118	v	v	v
$77	119	w	w	w
$78	120	x	x	x
$79	121	y	y	y
$7A	122	z	z	z
$7B	123	[	open brace	[or S1 <
$7C	124	|	line	| or S1 :
$7D	125	]	close brace	] or S1 >
$7E	126	~	tilde	~ or S1 =
$7F	127	DEL	delete (rubout)	DEL or S1 ESC

Appendix D
Error Messages

Softerm Error Messages

The following error messages may occur during terminal setup, online terminal operation, and file transfer while using Softerm. Softerm error messages are displayed at the bottom of the screen and may be cleared by pressing the **ESC**, **RETURN**, or **S1 X** keys.

BUFFER FULL

An attempt has been made to add a command line to the current file transfer macro command file being edited in memory and there is insufficient memory to add the command. The *CHAIN* command should be used to segment the file transfer macro into more than 1 file.

CONFIGURATION IS INCOMPLETE

An attempt was made to select the *4—EDIT OPTIONS* or *6—EXIT SETUP* option on the terminal setup main menu or to print a screen without having first specified all required configuration definition modules. These options cannot be used until the terminal emulation, serial I/O driver, display driver, printer driver, dialer driver, and clock driver have been specified.

CONNECTION BROKEN

This error occurs when Softerm is being utilized with a modem and the *carrier* modem signal is lost usually indicating that a disconnect has occurred. The user should re-establish the connection before continuing to operate Softerm in the online mode.

DIALER DRIVER IS PART OF SERIAL DRIVER

An attempt was made to load a *dialer driver* and the serial interface has a *built-in* dialer driver. For example, the Hayes Microcomputer Products *Micromodem II* or the Novation *Apple-CAT* include built-in dialer drivers. The request to load a different dialer driver will be ignored.

DISK TYPE MUST BE DOS

The *VOLUME* parameter for a disk operation specified the CP/M or Pascal disk type for a Softerm file which requires DOS format.

Appendices

EMULATION REQUIRES LANGUAGE CARD

An attempt was made to load a terminal emulation in terminal setup which requires a language card.

ERROR IN SAVING: FILENAME

An error occurred while saving language card portion of either a new *SOFTERM* or configuration file in the Softerm Program Utilities. The *FILENAME* will have the *-LC* extension and a file I/O error message will also be displayed indicating the reason for the problem.

FILE TYPE MISMATCH

An attempt was made to load the wrong type driver file for the current configuration. For example, a *terminal emulation* filename was entered in the field for *serial IO driver*. The load request is ignored and the field is restored to its previous contents.

INCOMPATIBLE PATCH FILE

The patch file being applied by the Softerm Program Utilities does not match the major revision level of the main Softerm program, or is not in the correct format.

← INPUT ERROR

A command entered in the line mode file transfer command edit or execution modes is unrecognizable. The *arrow* ← will point to the first character which does not match a legal command.

LINE FAILURE

The retry count has been exhausted during error recovery procedures using the Softrans or XMODEM protocols in line file transfer. The current command or macro file is aborted and must be re-executed after determining the cause of the failure.

LINE TIMEOUT

The *TIMEOUT* interval has been exceeded during a transmit or receive operation in line file transfer. The current command or macro file is aborted and must be re-executed after determining the cause of the timeout condition.

MUST HAVE LANGUAGE CARD TO RUN THIS SOFTERM

The *SOFTERM* program being loaded by the *SOFTERM BOOT* program included a *SOFTERM-LC* file and no language card is present in the system.

NAME ALREADY IN PHONE BOOK

An attempt has been made to add an entry to the *Softerm Phone Book* and an entry with the same name identifier is already in the phone book.

NAME NOT FOUND

An attempt has been made to access a phone number in the *Softerm Phone Book* using a name identifier which does not have a corresponding entry in the phone book.

NO CONNECTION

This error message will be displayed if the retry count is exhausted when executing a file transfer *DIAL* and no connection has been established. This could be the result of a busy or no answer on the phone number being dialed.

NO CONNECTION, PRESS R TO REDIAL

A connection was not established within the 45 second timeout interval for a dial operation using the Softerm Dial Utilities. Press **R** to retry the dial operation. Press **ESC** to return to the dial utilities menu.

NO LANGUAGE CARD FOUND

A utility routine in the Softerm Program Utilities requires a language card in order to provide an additional feature for the Softerm program.

NO PRINTER

An attempt has been made to use a Softerm print function and a null printer driver has been specified (NULL.PIO). If a printer is available, the current configuration should be modified and the appropriate printer driver added to the configuration.

OPERATOR ABORT

A command or operation has been aborted by the operator.

OUT OF RANGE

An attempt was made to enter a value which was less than the minimum or greater than the maximum for a numeric data entry field. Refer to the description of the field in error to determine the minimum and maximum values and re-enter the field in error.

PHONE BOOK IS FULL

An attempt has been made to add more than 50 entries to the *Softerm Phone Book*.

REMOTE ABORT: REASON

The current line file transfer operation using the Softrans protocol has been aborted by the remote system. The reason included in the message will be a standard file I/O error message or operator abort message.

SUP'R'TERM MUST BE IN SLOT 3
PRESS ESCAPE TO RESTART

The configuration has been specified with the M & R Enterprises SUP'R'TERMINAL 80-column video board which must be in slot 3. The video board should be re-inserted in the correct slot or the configuration should be corrected if in error. Pressing the **ESC** key will cause the system to be restarted.

UNABLE TO LOAD: FILENAME

This error may occur during the load of a *configuration* or *terminal emulation* from the Softerm setup main menu, or during the execution of the file transfer *CONFIGURE* command. Some terminal emulations have a second file which is loaded into the language card (16K RAM). The name of this file will be of the form *FILENAME.FUNC* where *FILENAME* is the name of a specific terminal emulation. If the configuration includes an extended terminal emulation or other feature which requires a language card, a second file is also used. The filename will be the configuration filename with a *-LC* appended to the end. If a file I/O error occurs while attempting to load either of these files, the above message will be displayed along with the appropriate file I/O error message.

UNABLE TO LOAD SOFTERM

The *SOFTERM BOOT* program was unable to load the *SOFTERM* program file. A additional file I/O error message will be displayed indicating the reason for the error.

UNABLE TO LOAD SOFTERM-LC

The *SOFTERM BOOT* program was unable to load the *SOFTERM-LC* program file in the language card. An additional file I/O error message will be displayed indicating the reason for the error.

UNEXPECTED INTERRUPT
PRESS ESCAPE TO REBOOT

An unexpected interrupt occurred during the operation of Softerm. This is usually the result of a hardware problem or an I/O device or controller which is unknown to Softerm. If the problem persists, remove all controller boards which are not required by Softerm. Pressing the **ESC** key will cause the disk to be rebooted.

File I/O Error Messages

File I/O error messages may occur during Softerm operation when functions which use the diskette are performed. Refer to the specific chapter in the Softerm user's guide which covers the function being performed for a complete description of the effect of these errors.

If a file I/O error such as **DISK FULL** occurs during disk capture operations in the online terminal operation mode or when executing *RECEIVE* commands in line file transfer, the following option screen will be displayed:

```
OPTION:   1       1-ABORT   2-NEW DISK
```

If *1-ABORT* is selected, the message **OPERATOR ABORT** is displayed and the operation is aborted. If the user desires to continue the operation usng a new disk, the current disk should be removed from the selected drive and a new disk should be inserted which has been previously initialized. The *2-NEW DISK* option can then be selected. If the file I/O error is the result of a disk capture operation, the user is given the opportunity to specify the *VOLUME, DRIVE, SLOT,* and *FILENAME* to be used with the new disk. If the file I/O error is the result of a *RECEIVE* line file transfer command, the currently selected *VOLUME, DRIVE, SLOT,* and *FILENAME* are used for the new disk.

The following file I/O error messages may occur during Softerm operation:

BAD DISK TYPE

The *VOLUME* parameter for a disk operation specified a value other than *0-254* to indicate DOS disk format, *CPM* to indicate CP/M disk format, or *PAS* to indicate Pascal disk format.

BAD FILE DATA

This error occurs when loading a DOS File Type B file into memory and the file length specification in the header does not match the actual length of the file.

DIRECTORY FULL

This error occurs when no additional filenames can be added to the directory on the diskette for the disk type specified.

DISK FULL

This error occurs when Softerm attempts to store information on a diskette, and finds that no more storage is available on that diskette.

DISK TYPE MISMATCH

This error occurs when the type of disk specified in the *VOLUME* parameter for Softerm disk operations does not match the type of disk in the selected *DRIVE* and *SLOT*.

FILE ALREADY EXISTS

This error occurs when trying to RENAME a file and a file with the new name already exists on the disk.

FILE IN USE

This error occurs when an attempt is made to access a file which is already in use. For example, a local file transfer which specifies the same source and destination filename on the same disk drive will display this error.

FILE LOCKED

This error occurs when an attempt to write, rename, or delete on a DOS format disk using a filename that has been LOCKed on the diskette that is in the selected drive.

FILE NOT FOUND

This error occurs when a file I/O command specifies a filename that is not in the catalog for the diskette in the selected disk drive.

I/O ERROR

This error occurs after an unsuccessful attempt to store or retrieve data on a diskette.

INVALID COMMAND

This error occurs if CP/M or Pascal disk format is specified for a file LOCK or UNLOCK operation.

VOLUME MISMATCH

This error occurs when the Volume parameter specified for a DOS format diskette is not the same as the volume number assigned to the diskette in the selected disk drive, when that diskette was INITed.

WRITE PROTECT

This error occurs when Softerm attempts to store information on a diskette, but the drive does not detect a *write protect* notch or cutout in the left side of the diskette's outer case.

YOU CAN'T DO THAT

The *1—TERMINAL EMULATION* option has been chosen on the load definition modules menu in terminal setup when using Softerm 1. Softerm 1 includes the built-in terminal emulation *SOFTERM.TERMINAL* and specific terminal emulations are not available. Specific terminal emulations are available with Softerm 2.

Appendix E
User Support

User Support Policy

Softronics wishes to support your use of Softerm so that you may utilize its full capabilities. While we have attempted to make Softerm as easy to use and error free as possible, the program and manual are provided "As is", without warranty as to their performance, merchantability or fitness for any particular purpose.

Occasionally a problem may arise and you will wish to seek technical assistance. If you encounter any difficulty in using Softerm, and it does not operate as described, you should take the following steps:

First, consult the manual to make sure you are properly operating the program. Check to see if the program is properly configured and the correct hardware interfaces and terminal emulation are specified. Also check to be sure the parameters for hardware and terminal emulation are correct.

Second, consult your dealer. Many dealers have trained technicians who can answer most hardware and software questions you may have.

Finally, if the answer you need cannot be obtained by reading the manual or from your dealer, write a full and complete description of your problem and mail it to Softronics, Attention: Technical Support. The problem description may also be transferred as a text file to the system printer on the Softronics Online Update Service. Please include your name and phone number in case there is additional information required.

You may also call (901) 683-6850 from 9:00 to 5:00 (Central Time) and ask for Technical Support.

Appendices

Service Information

Warranty Registration

Please fill out the Warranty Registration Card included in the Softerm package completely and mail it to Softronics. Warranty Registration enables you to obtain a replacement diskette as described in the Limited Warranty in the front of this manual. Your name will also be included in Softronics' mailing list, so that you may be notified of special information, upgrades and new product announcements by mail.

Diskette Replacement Policy

In the event your Softerm System or Configuration Diskette is found to be defective in materials and faulty workmanship under normal use and service during the 90 day warranty period, the diskette may be returned to Softronics or any authorized dealer and Softronics will replace the diskette, without charge to you, providing that you have previously returned the enclosed Warranty Registration Card or can supply proof of purchase. Be sure to enclose the faulty diskette with your replacement request. If the failure of the diskette has resulted from accident, abuse, or misapplication of the diskette, then Softronics has no obligation to replace the diskette under the terms of the Limited Warranty.

After 90 days, and up to one year after the date of delivery, a replacement diskette is available from Softronics for $15.00.

Backup Diskettes

The Softerm System and Configuration Diskettes are not copy-protected and backup copies may be created using standard DOS copy utilities.

Keyboard Expander Service Policy

The Softerm keyboard expander printed circuit card and keypad are warranted against manufacturing defects for a period of ninety days. Manufacturing defects are defects that prevent proper installation or operation of the keyboard expander circuit board and keypad. The warranty also covers damage during shipping.

During the warranty period, Softronics will replace the damaged circuit board and keypad free of charge. The warranty does not cover damage caused by misuse, neglect, or attempted repair. If the keyboard expander circuit board or keypad is damaged due to a computer malfunction (such as a short from the power supply), contact your computer dealer or Softronics and explain the circumstances.

Warning: Any attempted repair or modification of the keyboard expander circuit board or keypad (other than that performed by Softronics) during the warranty period will void the warranty.

If your keyboard expander circuit board and keypad requires repair, send it prepaid directly to Softronics. Contact Softronics for return information and authorization. Products without proper authorization will not be accepted.

If the repair is required during the warranty period, please enclose proof of purchase. During the warranty period, Softronics will replace or repair your keyboard expander circuit board and keypad without charge. If service is required after the warranty period expires, it will be repaired for a flat fee. This service charge does not cover damage due to negligence, misuse, or inadequate packaging upon returning the circuit board and keypad to Softronics.

Appendices

Online Update Service

Description

The Softronics *Online Update Service* is provided as an additional support service to users of Softerm. Its purpose is to allow fast turnaround of Softerm program fixes for user-reported problems using the patch file facility provided in the Softerm program utilities as well as a convenient distribution mechanism for additional terminal emulations, display drivers, serial I/O drivers, printer drivers, dialer drivers, clock drivers, and utility routines which become available. Also *user-contributed* keyboard macro files, file transfer macro files, and specific host computer versions of *SOFTRANS.FORT* will be made available.

The Online Update Service is available 24 hours a day, 7 days a week. The service may be used at 300 baud for users with Bell System 103 compatible modems or at 1200 baud for users with Bell System 212A compatible modems. The phone number for the service is included in the *SOFTERM.HOOKUP* file transfer macro on the Softerm System Diskette or may be obtained by calling information and requesting the number of the Softronics Online Update Service.

The Softronics equipment configuration for the Online Update Service will consist of an Apple II with 2 disk drives. Drive 1 will normally contain any updates to the Softerm System and Configuration Diskettes. Drive 2 will usually contain special items such as a new host computer version of the *SOFTRANS.FORT* program, or user contributed items and suggestions. Both drives will be write protected. If it is necessary to transfer a file to Softronics, call and arrange a special time for the transfer.

You can also transfer text files containing problem descriptions or any written correspondence for Softronics directly to the system printer. The Online Update Service uses the *Softrans* protocol and the Softronics equipment configuration will be in the *MONITOR* mode. Any incoming call will be automatically answered and file transfers may begin immediately.

Since the Online Update Service operates in the *MONITOR* mode, a connection can be established in terminal mode and any monitor mode terminal command such as *CATALOG* and *TYPE* can be used. However, Softronics provides macro command files to allow the the update procedure to be automatic and reduce the amount of connect time required to receive an update.

Using the Online Update Service

Included on the Softerm System Diskette is a file transfer macro named *SOFTERM.HOOKUP*. This macro includes a *DIAL* command with the Softronics Online Update Service phone number and serial interface parameters of 300 baud, 8 bits/character, no parity, and 1 stop bit. The *DIAL* command must be replaced and the speed parameter changed if the Online Update Service is accessed at 1200 baud. Following the *DIAL* command are *RECEIVE* commands for filenames *SOFTERM.NEWS and SOFTERM.UPDATE*.

The file *SOFTERM.NEWS* is a text file which may be printed or displayed and contains the latest information concerning user-reported problems and fixes as well as descriptions of new terminal emulations or drivers available for Softerm. In addition, any *user-contributed* news, descriptions of contributed macros, useful information, or suggestions will be included. Softerm News is usually updated on a monthly basis. Several months previous news files will be available depending on diskette space. These files are named *SOFTERM.NEWS.MMMYY* where MMM is an abbreviation for the month (JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC) and YY is the year. The filename *LAST UPDATE.MMDDYY* will indicate the last date on which the Softerm News file was changed. A *CATALOG* command can be used to determine if any new updates have been made available since the last user update procedure.

The file *SOFTERM.UPDATE* is a file transfer macro which if executed will establish a connection with Softronics and transfer all *new* or *updated* files available for Softerm including patch files. This macro may be edited by the user before execution to remove the transfers of any unneeded files. The *SOFTERM.UPDATE* macro file is restarted each quarter. Previous quarter update macro files will be available depending on diskette space. These files are named *SOFTERM.UPDATE.QQYY* where QQ indicates the quarter of the year (1Q, 2Q, 3Q, 4Q) and YY indicates the year.

The *SOFTERM.HOOKUP* file transfer macro is terminated by a *HANGUP* and *END* commands which return to the line file transfer menu. The *HANGUP* command is included to allow the user time to review the information contained in the *SOFTERM.NEWS* file and to edit the *SOFTERM.UPDATE* file transfer macro and to delete unneeded *RECEIVE* file transfer requests from the macro before it is executed. The *SOFTERM.UPDATE* file transfer macro also begins with a *DIAL* command which may require editing, includes *RECEIVE* commands for all update files, and ends with *HANGUP* and *END* commands which return control to the line file transfer menu.

Appendices

Online Update Procedure

The steps necessary to access the Softronics Online Update Service are as follows:

1. Insert your Softerm System Diskette containing the file *SOFTERM.HOOKUP* in Drive 1. From the online terminal communications mode enter a **S1 4** keyboard function to access the line file transfer menu.

2. If you are planning to access the Online Update Service at 1200 baud, you will need to replace the *DIAL* command in the macro to change the speed. If your modem asserts the carrier signal constantly, you will need to insert a *PAUSE* command after the *DIAL* command to allow sufficient time for a connection to be established. Otherwise, proceed to step 3. To edit the *SOFTERM.HOOKUP* macro, select *3—LOAD* and enter *SOFTERM.HOOKUP* as the file transfer macro filename. Select *4—EDIT* and make any required changes to the macro including inserting a *PAUSE* command or replacing the *DIAL* command changing the *SPEED* parameter from 5 to 7 to indicate 1200 baud. Be careful to enter the correct phone number, and insure that the serial parameters are set to 8 bits/character, 1 stop bit, and 0 for no parity. Then select *5—SAVE* and enter *SOFTERM.HOOKUP* as the file transfer macro filename to save the modified macro file on disk.

3. Select *6—EXECUTE* and enter *SOFTERM.HOOKUP* as the file transfer macro filename. The first command to be executed is *DIAL* to establish a connection to the Softronics Online Update Service computer system. If the user system does not have automatic dial capability, Softerm will display the message **DIAL: number**, and wait for the number displayed to be manually dialed. After dialing the number and establishing a connection, press the **ESC** key to continue. If the system includes automatic dialing capability, the *DIAL* command will automatically dial the number. After the connection is established, the files *SOFTERM.NEWS* and *SOFTERM.UPDATE* will be transferred to the user's system. When the file transfers are complete, the *HANGUP* and *END* commands will disconnect and the line file transfer menu is displayed.

4. Enter *9—LOCAL* to display the local file transfer menu and select *2—LOCAL* to execute a local file transfer. Enter *SOFTERM.NEWS* for the source filename. Select *1—PRINT* or *3—VIDEO* to print or display the file. After reading the Softerm News to determine if any updates are available which affect your configuration, perform steps 5-8 to receive the update files. Otherwise, the update procedure is complete.

5. After displaying or printing the *SOFTERM.NEWS* file, the local file transfer menu is displayed. Before proceeding, you should prepare a disk to receive the update files from the Online Update Service. Using the *1—DISK UTILITIES* option, initialize a blank disk. After the disk is initialized, press the **RETURN** key to return to the local file transfer menu. Copy the *SOFTERM.UPDATE* macro file received using the procedure described previously from the Softerm System Diskette to the newly initialized disk. This can be done using *2—LOCAL* option to execute a local file transfer. Insert the new disk which contains the *SOFTERM.UPDATE* file in Drive 1. Select *3—LINE* on the local file transfer menu to display the line file transfer menu.

6. Select *3—LOAD* and enter *SOFTERM.UPDATE* as the file transfer macro filename. Select *4—EDIT* and make any required changes to the macro including inserting a *PAUSE* command if necessary and replacing the *DIAL* command to change the speed to 1200 baud. Any *RECEIVE* commands for unneeded files should be deleted from the macro. Select *5—SAVE* and enter *SOFTERM.UPDATE* as the file transfer macro filename to save the modified macro file on disk.

7. Select *6—EXECUTE* and enter *SOFTERM.UPDATE* as the file transfer macro filename. The first command to be executed is the *DIAL* to establish a connection to the Softronics Online Update Service Computer System. If the user system does not have automatic dial capability, Softerm will display the **DIAL: number** message. After a connection has been manually established, press the **ESC** key to continue. Once a connection has been established, the remaining commands in the file transfer macro are executed. Any files referenced by *RECEIVE* commands in the file transfer macro will be automatically transferred to the user's system. When the file transfers are complete, the *HANGUP* and *END* commands will disconnect and the line file transfer menu is displayed and the online update is complete.

8. After the update files have been received, the Softerm Configuration Diskette should be updated with any new drivers and terminal emulations. Use the Softerm local file transfer utilities or a DOS file utility program such as FID to replace files on the Softerm Configuration Diskette. If a new *SOFTERM.PATCH-X.XX* file is received, it should be copied to the Softerm System Diskette. The Softerm program utilities described in Chapter 3 should then be used to apply the patch file and create a new copy of the Softerm program on the System Diskette.

Appendices

Appendix F
Utility Routines

Appendix F is reserved for future documentation on utility routines which provide extended features and capabilities to the Softerm program. The utility routines are used in conjunction with the Softerm Program Utilities described in Chapter 3 on Terminal Operation.

Appendices

Glossary

ACK
A control character which is sent in response to a block of data received to *acknowledge* that the data has been received correctly. Acknowledge characters are used with the character, XMODEM, and Softrans protocols for file transfer in Softerm.

Acoustic Coupler
A data communications device that converts outgoing digital signals into acoustic frequencies for transmission lines using a conventional telephone handset. It also converts incoming acoustic frequencies into the original digital signals.

Address
A number which indicates the location of stored data in memory.

Alphanumeric
Refers to a character set containing alphabetic and numeric symbols as well as other symbols such as punctuation marks.

ASCII
American Standard Code for Information Interchange, one of the standards used to translate alphanumeric and control characters into binary numbers. The ASCII code assigns a unique binary number to each letter, digit, punctuation mark, or other symbol used. The code consists of seven bits plus a parity bit per character. The ASCII codes have 96 printable characters and 32 non-printable (control) characters.

Asynchronous Communication
Refers to a method of serial communication where characters are transmitted one at a time, where unequal intervals can occur between transmitted characters.

Auto-answer
A feature of a dial-up modem which allows an incoming call to be automatically answered and communications established. Usually requires a control signal known as "data terminal ready" (DTR) from the receiving computer system to answer the call after a "ring interrupt" (RI) is received.

Auto carriage return

A terminal feature which provides a carriage return after every line feed, so that the cursor not only drops down to the next line but also returns to the first character position.

Auto line feed

A terminal feature which provides a line feed after every carriage return, so that the cursor not only returns to the first character of the line but it also drops down to the next line to avoid printing over existing characters.

Baud

The number of information bits which can be transmitted serially each second over a communication line.

Binary

Referring to the system of numerical notation which has a radix 2.

Bit

One of the two symbols (0 or 1) in the binary numbering system. Since computers process all information by means electronic signals (on/off, high/low), binary digits lend themselves ideally to representing this information. A catenation of *binary digit*.

Boot

The process of loading and starting up a computer system or program.

BREAK

An approximately 250 millisecond space (0) signal of more than 10 bit times sent over a communication line to interrupt the sender. This signal is often used to abort output or end a session with a timesharing service.

Buffer

A temporary storage area for a block of data, often for input/output.

Byte

A group of bits, normally 8, that are operated on as a unit, the smallest addressable unit in many computers.

Cable

A set of separate wires bound together in a unified package, carrying separate but related signals as in connecting a computer to a printer.

Carrier

The background signal on a communications channel that is modified to *carry* the information.

Cathode ray tube (CRT)

A television-type picture tube used in display terminals for displaying characters and other graphics.

Character

A digit, letter, or other symbol.

Character code

A combination of bits which represents a particular character in a character set.

Character set

A collection of alphanumeric and control symbols.

CPS

Characters per second.

Communications interface card

A printed-circuit-board installed in the computer containing hardware and firmware to control data format, transmit/receive interrupt conditions, communication speed, parity, and other communication factors.

Configuration file

File containing a complete set of Softerm configuration options, or a file containing individual configuration options such as for a serial interface or 80-column video interface card.

Control character

A code generated by holding down the control key (marked as CTRL on the Apple keyboard) while pressing another key, resulting in a different signal than the second key normally generates. Usually associated with the 32 non-printing or displayed data communication and control characters as opposed to the 96 that can normally be displayed.

CTS

Abbreviation for *Clear to Send*, an RS-232C control signal from a DCE to a DTE indicating that the DCE is ready to receive data.

Cursor

The indicator marking the current active position on a video (CRT) display, sometimes a blinking white rectangle.

Data

A general expression for the bit streams that are used by a computer system and its peripheral devices.

Data bits

Bits representing the actual data to be transferred or used, as opposed to bits added in the front or back to facilitate synchronization such as start and stop bits or error checking using parity bits.

DCD

Abbreviation for *Data Carrier Detect*, an RS-232C control signal from a DCE to a DTE indicating that a communication connection has been established.

DCE

Abbreviation for *Data Communication Equipment*, as defined by the RS-232C standard, any device that transmits or receives information. Usually, this is a modem.

Dot matrix

Refers to a method of forming characters using a rectangular block of dots. When individual dots within the block are printed or displayed in certain patterns, a character is formed.

DSR

Abbreviation for *Data Set Ready*, an RS-232C control signal from a DCE to a DTE indicating that the DCE is ready to establish a connection.

DTE

An abbreviation for *Data Terminal Equipment*, as defined by the RS-232C standard, any device which generates or absorbs information. The Apple II computer and serial communications interface with the Softerm program comprise a DTE configuration.

DTR

Abbreviation for *Data Terminal Ready*, an RS-232C control signal from a DTE to a DCE which indicates the terminal is in a ready state when present. This signal is sometimes used for "pacing" control when a terminal is *directly connected* to a computer system without a modem.

EIA interface

Electronics Industries Association standards for the characteristics of signals used in connecting terminals to modems and a variety of other device interconnections.

Electronic Mail

Correspondence and documents generated, stored, transmitted, or displayed by computers or other electronic means.

ENQ

Abbreviation for *Enquiry*, a control character used in some protocols in a request for information sequence. Softerm responds with the user-specified *answerback string* for terminals emulated which support the answerback function.

EOB

Abbreviation for *End of Block*, a character code used to indicate the end of a block of data. Softerm block mode file transfers allow this character to be specified.

EOT

Abbreviation for *End of Transmission*, a control character which indicates the end of a transmission sequence which may consist of multiple blocks of data.

ETX

Abbreviation for *End of Text*, a control character used to indicate the end of a block of text or data characters.

File transfer

Transmitting a file from one computer to another, as in using one of the Softerm program's file transfer protocols such as Softrans.

Firmware

Software which resides in ROM and so is relatively unchangeable compared to software in RAM.

Full-duplex

Refers to a mode of serial data transmission which enables information to be received and transmitted at the same time. Data entered via the keyboard is routed directly to the host computer without display. The display is comprised only of alphanumeric data received by the terminal.

Half-duplex

Refers to a mode of serial data transmission which enables information to be received and transmitted but not at the same time. Data keyed from the keyboard is transmitted and displayed simultaneously. The data displayed is processed as if it were data transmitted by the computer.

Handshaking

The rules and procedures for interfacing devices operating remotely from each other, so that each is ready for the signals that can come from each other. These include hardware level rules such as the interpretation of interface signals. Software procedures are usually defined in a higher level line control procedure known as a "protocol".

Hardware

The physical devices or electronic parts which make up a computer system.

Hexadecimal

A numbering system which uses 16 digits. Usually these are represented by the ten decimal digits 0-9 and the letters A-F representing decimal 10-15 respectively. Each hexadecimal digit represents a string of four binary digits.

Interface card

A printed circuit board intended for insertion into a computer to control signals between that computer and other devices.

Interrupt

A special control signal from an external source that diverts the Apple II from the program it is executing to a specific routine which handles the condition that caused the interrupt.

Keyboard macro

A definition of sequence of transmitted characters which are invoked by a simple keyboard control sequence.

Local Mode

Operating mode of the terminal in which the serial communications interface is *disabled* prohibiting online communications and providing an *internal loopback* of transmit to receive so that characters entered from the keyboard are processed as if they had been received on the communications line.

Lowercase

Non-capital letters or those characters created when the **SHIFT** key is not held down.

LRC

Abbreviation for *Longitudinal Redundancy Check*, consisting of a character appended to a block of data after an ETB or ETX character which forms a *checksum* for the data characters contained in the block.

Mark

One of the two conditions for a data communications line, the other called space. Mark traditionally corresponds to a one bit and is used as a stop bit.

Memory

The storage area of a computer.

Modem

A device for converting digital signals into analog frequencies for transmission across telephone lines, and also for converting received telephone frequencies into digital signals. Modem is a contraction of MOdulator/DEModulator.

NAK

Abbreviation for *Negative Acknowledge*, a control character which is sent in response to a block of data received as an indication the data has been received incorrectly.

Offline

The state of a device or terminal when it is not controlled by a computer system. Softerm is in the offline mode whenever it is in an extended Softerm function such as Terminal Setup or Disk Utilities. For additional information on the online, offline, and local modes in Softerm, refer to Chapter 3 on Terminal Operation.

Online

The state of a device or terminal when it is controlled by a computer system. Softerm is in the online mode whenever it is in active communications with a host computer. In this mode, the serial communications interface is enabled and data will be received, transmitted, and processed in accordance with the specifications of the terminal emulation being used. Refer to Chapter 3 on Terminal Operation for additional information.

Pacing

A method of controlling the flow of received data so that the capabilities or buffering of a terminal device are not exceeded. A commonly used method for asynchronous terminals uses XON (start) and XOFF (stop) characters to control the flow of data. Terminals directly connected to a computer without a modem sometimes use the control signal DTR (data terminal ready) to control pacing.

Parallel Interface

A connection between two devices where there is a separate wire for each bit of a character, so that an entire character can be transferred in a single instant.

Parity

A method of error detection. An extra bit (the parity bit) is added to the code for each unit of data. When using even parity, the sum of all the ones in the code is even; when using odd parity, the sum is odd. A computer can detect errors by checking for the correct parity in each unit of data received.

Program

The sequence of instructions or routines required to perform a specific action or solve a specific problem.

Protocol

The convention for transmitting data over a communications line. It includes whether there will be stop and start bits, and how many, as well as which characters will have special meaning for controlling the transmissions. Error detection and retransmission procedures and data compression also come under this heading, which is variously termed line protocol, link protocol, line control procedures, or line discipline. Softrans and XMODEM are examples of specific protocols.

Radix

The radix of a numbering system is the maximum number of different digits which can be used in the numbering system.

RAM

An acronym for Random Access Memory. Usually characterized by a type of memory that stores information until the power is turned off, or until new information is written over the old information.

Receive

To await and accept characters coming across a communication line, for display or storage.

RI

Abbreviation for *Ring Indicator*, an optional RS-232C signal from a DCE to a DTE that indicates the arrival of a call.

ROM

An acronym for Read Only Memory. A type of memory that stores information which is permanent. Often used for storing a program that must remain intact when the power is turned off. The monitor program contained in the Autostart ROM of the Apple computer is an example.

RS-232C

A standard for the interface between a terminal and a modem. It specifies the wires that carry data and control signals, and the electronic signals and levels that are sent along those wires.

RTS

Abbreviation for *Request To Send*, an RS-232C signal from a DTE to a DCE to prepare the DCE for data transmission.

Scrolling

If a displayable ASCII code is received at the last character position of the last displayable character row, the data moves up one row, the top row of data is removed, and the cursor moves to the first character position of the last row. Data from the last character row is replaced with spaces. This type of manipulation and cursor movement is referred to as scrolling. Scrolling sometimes occurs when the cursor is on the bottom line and a line feed or carriage return is received.

Send

To put characters onto a communication line.

Serial communication

Process of communication whereby bits are transmitted one at a time. A character is therefore not formed until all the bits comprising it are received.

Serial Interface

A connection in which all the bits of a character are sent along a single wire, one bit at a time.

SOH

Abbreviation for *Start Of Header*, a control character used to identify the beginning of a header or command data as opposed to text.

Space

One of two conditions of a data communications line, the other called mark. Space usually means a zero bit, used as a start bit showing a change in the line as the beginning of transmission.

Start bit

A bit placed in front of every character, to aid in synchronizing the computers sending and receiving. Start bits are usually zeros, also called spaces.

Stop bits

These are bits appended to every character, to aid in synchronizing the computers sending and receiving data. Stop bits are usually ones, also called marks.

STX

Abbreviation for *Start Of Text*, a control character used to indicate the beginning of a block of text or data characters.

Glossary

Terminal

An input/output device, usually made up of a keyboard and video display, and sometimes including its own printer and magnetic storage devices, that can act as a separate and even remote site for data transfer with a computer system.

Timesharing system

A computer system accessible from remote terminals, each receiving a portion of the total resources of the host system.

Transmission

Sending of signals, usually characters, along a communications line.

Type-ahead

A feature or condition in which characters entered at the keyboard are saved when their use or transmission is inhibited, and then used or sent at the next opportunity.

UART

Universal Asynchronous Receiver/Transmitter. Used to transfer serial data from one device to another.

Uppercase

Capital letters or the set of characters created while the **SHIFT** key is held down.

XOFF

A control character commonly used for *pacing* or the rate of flow of data to a terminal. The XOFF character is used to *stop* the flow of data.

XON

A control character commonly used for *pacing* or the rate of flow of data to a terminal. The XON character is used to *start* flow of data.

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