

SOFTERM PC

Communications Software for the Tandy Model 1000/1200HD/2000 Personal Computers

IMPORTANT INFORMATION

This package contains the following:

- Softronics Program License Agreement
- Softerm PC Warranty Registration Card
- Softerm PC System Diskette
- Softerm PC Terminal Emulation Diskette

Softerm PC is a modular communications and terminal emulation program for MS-DOS based personal computers. It includes special system configuration files (*.SYS) for each type of personal computer supported including the Tandy Model 1000, 1200HD, and 2000 personal computers. For example, by selecting the system configuration file for the Model 2000 for use with Softerm PC, the software functions exactly as Softerm 2000.

The System Diskette contains the main Softerm program (SOFTERM.EXE) and overlay (SOFTERM.OVL) files, special system configuration files (*.SYS), auto-dial modem driver files (*.ADM), and other miscellaneous files. The System Diskette does not contain the MS-DOS operating system, but it can be installed by using the MS-DOS SYS command.

The Terminal Emulation Diskette contains terminal emulation files (*.TML) for each type of terminal which can be emulated by Softerm PC.

Before you perform any operations with the System or Terminal Emulation Diskettes, make backup copies by following the instructions on page 1.6 in your User's Guide.

DOCUMENTATION CHANGES

Many new features and capabilities have been added to Softerm PC since its original release. For your reference we have included this information on the Softerm PC System Diskette in a file called **UPDATES.DOC**. Important information is included, so please read this file before using the Softerm PC program. This file is in a text format which most text editors can accept, or you can use the MS-DOS TYPE command to examine it.



SYSTEM CONFIGURATION

Softerm PC is designed to execute on any MS-DOS based personal computer through special system configuration files. When Softerm is executed, it reads a file called SOFTERM.SYS which provides special routines for all machine dependent functions. Softerm includes special system configuration files with a .SYS extension for many MS-DOS compatible systems. You must select an appropriate system file before executing Softerm. In order to determine what system configuration files are available, enter the following command to list available files on the Softerm System Diskette:



DIR *.SYS

If a system configuration file exists for your system type, it can be used by entering the following command:


COPY *systype*.SYS SOFTERM.SYS

where *systype* matches the type of system you are using. The new SOFTERM.SYS file will be loaded whenever Softerm is executed. For example, to use Softerm PC on a Tandy Model 1000, 1200HD, or 2000, enter one of the following commands:


COPY TNDY1000.SYS SOFTERM.SYS (for the Model 1000)
COPY TNDY1200.SYS SOFTERM.SYS (for the Model 1200HD)
COPY TNDY2000.SYS SOFTERM.SYS (for the Model 2000)



USER SUPPORT


 Softronics wishes to support your use of Softerm PC so that you may use its full capabilities. While we have attempted to make Softerm as easy to use and error free as possible, the program and documentation are provided "As is", without warranty as to their appearance, 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 system definition and terminal emulation are specified. Also check to be sure the options for terminal emulation are correct.

 If the answer you need cannot be obtained by reading the manual, 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 Softronics Bulletin Board System at (303) 593-9530. Please include your name and phone number in case additional information is required.

You can also call (303) 593-9550 from 8:00 to 5:00 (Mountain Time) to reach our Technical Support personnel.

WARRANTY REGISTRATION

 Please fill out the Warranty Registration Card included in the Softerm package completely and mail it to Softronics. You must register in order to receive technical support from Softronics. Warranty registration also enables you to obtain a replacement diskette as described in the Limited Warranty section of the Program License Agreement. 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.

In the event your Softerm System or Terminal Emulation Diskette is found to be defective in materials or faulty workmanship under normal use and

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SOFTERM PC OPERATIONAL DIFFERENCES

Certain operational differences exist when using Softerm PC configured with a specific system file. Softerm 2000 does not require a SOFTERM.SYS file to execute, and all system dependent functions are integrated into the main program file. Softerm PC when executed reads the SOFTERM.SYS file to determine the characteristics of the system on which it is executed. The system specific .SYS files include support for the keyboard, video, serial and parallel ports. The keyboard support includes keynames displayed on Softerm help screens, so that the help screens automatically reflect the appropriate key legends for the system on which Softerm is executed.

The Softerm 2000 User's Guide includes system and terminal emulation keyboard charts which reflect the key legends used on the Model 2000 and 1000 keyboard. The Model 1200HD is provided with an IBM-PC compatible keyboard, and the appropriate keynames will appear on Help screens when the TNDY1200.SYS file is used. Key combinations which differ are as follows:

<u>1000/2000 Keyname</u>	<u>1200HD Keyname</u>
Enter	Return
Print	PrtSc
Insert	Ins
Delete	Del
Hold	Ctrl NumLock
F11	Alt F1
F12	Alt F2

Softerm PC also includes support for a selection of internal board modems compatible with the Model 1000 and 1200HD which provide automatic dialing capability. This type of modem requires a PC expansion slot and functions as a combination modem and COM adaptor. The automatic dialing capability can be accessed from the keyboard using special firmware built-in to the modem board, or by using the dialer drivers provided with Softerm PC.

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SOFTRONICS

SOFTERM 2000™

Communications Software for the Tandy Model 2000 Personal Computer

IMPORTANT INFORMATION

This package contains the following:

- READ ME FIRST sheet
- Software Registration Card
- Change of Address Card
- Softerm 2000 User's Guide
- Softerm 2000 System Diskette
- Softerm 2000 Terminal Emulation Diskette

Check your package carefully. If any of these items are missing, immediately contact the Tandy/Radio Shack store where you bought Softerm 2000 and let them know.

The System Diskette contains the main Softerm program (SOFTERM.COM) and overlay (SOFTERM.OVL) files, auto-dial modem driver files (*.ADM), and other miscellaneous system files.

The Terminal Emulation Diskette contains terminal emulation files (*.TML) for each type of terminal which can be emulated by Softerm 2000.

Before you perform any operations with the System or Terminal Emulation Diskettes, make back-up copies by following the instructions on page 1.6.

DOCUMENTATION CHANGES

Important final refinements were made to this documentation to bring you the best possible product. These changes were made too late to be included in the current printing of this user's guide. For your reference we have included this information on the Softerm 2000 System Diskette in a file called **UPDATES.DOC**. Important information is included, so please read this file before using the Softerm 2000 software. This file is in a text format which most word processors can accept, or you can use the MS-DOS TYPE command to examine it.



Cat. No. 26-5261

SOFTERM 2000™



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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 7 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, 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 contains a description of the Communications Agent System Definition procedure which defines the hardware configuration available to Softerm.

Chapter 3 is a detailed description of terminal setup including how to configure and use the Softerm program for terminal emulation with your personal computer system.

Chapter 4 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 keyboard translate table definition.

Chapter 5 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 6 describes the terminal emulations which are included with the Softerm program. Softerm contains a standard TTY compatible terminal emulation, a terminal emulation with user-definable functions, and exact terminal emulations of many popular CRT terminals which may be specified when configuring Softerm.

Chapter 7 describes how to use the advanced features of Softerm including using the Communications Agent from an external program such as a word processor or spreadsheet.

Overview: The “Soft Terminal”


Softerm is a powerful and flexible communications manager and terminal emulation program that operates on a variety of personal computers. It provides basic terminal communications to a variety of host computers, timesharing services, and information services such as **The Source**, **CompuServe** and **Dow Jones News/Retrieval**. Softerm also functions as an *exact* look-alike for many popular CRT terminals which enables applications written for a specific CRT terminal to operate with your personal computer system transparently and without programming changes. Special function keys, sophisticated editing features, and local printer capabilities of the terminals emulated by Softerm are fully supported. A wide range of CRT terminal emulations supporting both **conversational** and **block** modes are provided with Softerm transforming your personal computer into the most versatile and intelligent terminal system available.

Softerm is provided on two diskettes — a **System Diskette** which contains the main Softerm program and overlays, and a **Terminal Emulation Diskette** containing configuration files for each terminal emulation supported by Softerm.

Unlike many other intelligent terminal programs, Softerm operates at speeds up to 9600 bits per second. Softerm allows your personal computer 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 assembly language for fast response and efficient operation. It augments your personal computer by providing terminal communications, file transfer, and terminal emulation in a sophisticated intelligent terminal program.

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. Although a printer is not required to utilize Softerm, many features are available which can use a printer. 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's speed and flexibility offer a wide 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 personal computer becomes a highly adaptable terminal for full support of your communications needs.

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 an XOFF character. This technique is known as **pacing**.


Softerm enables you and your personal computer to transfer files to and from larger computers and other personal computers. You can **download** information from large host computers to your personal computer, storing the data on disk for subsequent processing or printing. You can send or receive text, program, or data files between your personal computer and other personal computers.



In the terminal emulation mode, Softerm includes the capability to capture received 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 remote file transfer modes flexible enough to match any host computer requirement. Line file transfers allow data to be transferred to the communications line from disk, and from the communications line to disk or print in a variety of protocols.

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 mode in which all data received is automatically captured as 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 line file transfer utilizes an easy to use command language which allows simple definition of even complex multiple-file transfers with handshaking. Many high-level commands are included which may be executed interactively or from a file transfer command file which has been previously entered and saved on disk.

Additionally, Softerm provides local file transfer capabilities which 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 you to verify the contents of the file before it is transferred to the host computer or after it has been received. 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.


Softerm supports automatic dialing in both terminal and file transfer modes. Dialer drivers are included for many popular modems with auto-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 DOS functions such as **RENAME** and **ERASE** to be executed from Softerm allowing convenient file maintenance. All Softerm options and configurations are specified using a menu-driven setup mode featuring formatted data entry and editing.


The “Communications Agent”



The Softerm program provides management of serial and parallel ports for communications and printing using an independent task manager known as the **Communications Agent**. The Communications Agent functions as a background program, similar to the **PRINT** program provided with DOS Revision 2.00. For Softerm, the Communications Agent provides direct support for terminal emulation, remote file transfer, and print functions. The Communications Agent can also be optionally installed on your system using the *terminate and stay resident* capability provided by DOS which allows a program to effectively become an extension of the operating system. Once installed in this manner, the functions provided by the Communications Agent can then be accessed by other programs such as word processors, spreadsheets, and database managers which are subsequently executed.



The functions provided by the Communications Agent allow the integration of *concurrent* communications capabilities including remote file transfer and local printing of files with almost any program. Access to the Communications Agent during the operation of another program is provided using the **Alt Break** keyboard function. If this key combination is pressed with the Softerm Communications Agent installed in the system, the current program is interrupted and a menu of available functions is displayed. You may then initiate, for example, printing of a local file, or a file transfer to or from a remote computer system, and return to the execution of the interrupted program while these tasks are being concurrently performed. The limitations on the number of concurrent activities which the Communications Agent can process is determined by the number of serial and parallel ports assigned to the Communications Agent and the performance constraints of the personal computer system hardware.



Softerm terminal emulation can also take advantage of the Communications Agent's concurrent processing capabilities. For example, you can be interacting conversationally with one host computer while a file transfer is operating with another. Since the Communications Agent can manage multiple communications ports, you can also switch your terminal emulation between ports allowing conversations with more than 1 host without breaking your connection. Softerm also allows you to exit to DOS without breaking your connection in order to perform a DOS function and subsequently return to Softerm terminal emulation with a connection already established.

Getting Started

Softerm is provided on two diskettes. The **System Diskette** contains the Softerm main program and overlay files, and auto-dial modem driver files. The **Terminal Emulation Diskette** contains terminal emulation files which allow you to generate tailored terminal configurations. The System Diskette also contains the Softrans protocol FORTRAN 77 source program which may be transferred to your host computer to provide Softrans protocol capability on the host.

Backing Up the System and Configuration Diskettes

Before attempting to use the Softerm program, backup copies of the Softerm System and Terminal Emulation Diskettes should be made. The Softerm System and Terminal Emulation Diskettes may be copied to backup or archive diskettes with normal operating system copy utilities such as the DOS **COPY** command.

The following steps can be used to make backup copies of the Softerm System and Terminal Emulation Diskettes:

- Format a new diskette using the DOS **FORMAT** command. For example, if you want to format a new diskette in drive **B:**, enter the following command:

FORMAT B:

- Insert the Softerm System or Terminal Emulation Diskette in drive **A:**, and enter the following command:

COPY A:*.* B:

Repeat this procedure for both Softerm diskettes.

Once the backup procedure is complete, the backup diskettes should be stored in a safe, dry place, free from magnetic interference.

Executing the Softerm Program

The Softerm main program is protected using a special software protection system. Softerm will execute properly only if the original Softerm System Diskette is available when the protected file is run and is not write protected. Whenever Softerm is executed, the default drive as indicated by the system prompt is searched to determine if the proper diskette is available. If the diskette is not found, the **A:** drive is then searched. If the original Softerm

System Diskette is there, the program will execute normally. If the original Softerm System Diskette cannot be located, you are simply returned to the DOS command prompt.

The backup copies of the System Diskette will not execute unless they are re-copied onto the original Softerm System Diskette they were copied from, or the original diskette is in the system as described above. **WARNING:** Do not run the DOS FORMAT utility on the original Softerm System Diskette. The System Diskette's special format will be destroyed and you will be unable to use Softerm, even from backup copies.

To use Softerm on a hard disk system, simply transfer the files from the System and Terminal Emulation Diskettes to the hard disk. At runtime, make sure the original Softerm System Diskette is available as described above. If found, Softerm will continue execution from the hard diskdrive.

If you experience "soft" errors, restore the system files from a backup copy. If this does not clear disk errors, you may continue to utilize Softerm from a backup copy as long as the original Softerm System Diskette is available as described above.

The Softerm program is executed by entering a command line in the following format at the DOS command prompt:

**SOFTERM[/A][/C][/N] [configname] [dirname/S] [dirname/T]
[kbmacroname/A]**

Parameters contained in square brackets [] are optional.

/A when specified on the program name **SOFTERM** will cause the Communications Agent only to be installed and Softerm will return to the DOS command prompt. If Softerm is subsequently executed in order to use terminal emulation, it will automatically determine that the Communications Agent has been previously installed.

/C when specified on the program name **SOFTERM** will force Softerm to the Communications Agent System Definition screen when the program is started. This option is used whenever you wish to edit the current Communications Agent configuration. For example, if a new asynchronous serial interface is added to your system hardware, you will need to make its presence known to the Communications Agent if you plan to access it from the Communications Agent or Softerm terminal emulation. Each time Softerm is executed, it will automatically display the Communications Agent System Definition Screen until your hardware configuration has been specified and saved. Once you have

saved the Communications Agent System Definition, the **/C** or **/N** must be used when a reconfiguration is required. Once the Communications Agent System Definition has been specified and saved, Softerm will automatically proceed to the Softerm main menu whenever Softerm is executed.

/N when specified on the program name **SOFTERM** will cause the current Communications Agent System Definition to be re-initialized when the program is started so that a new configuration can be specified. If the **/N** option is used, you must save the new configuration if you wish to replace the the Communications Agent System Definition.

configname specifies the filename of a Softerm terminal emulation configuration file which will be automatically loaded when Softerm is executed. If no filename is specified, Softerm will attempt to load the filename **SOFTERM.CNF** from the current directory by default. If this filename does not exist, Softerm will be initialized with no current terminal configuration and a terminal configuration must be generated or loaded before online terminal operation can be initiated.

dirname/S specifies the directory name where Softerm system files can be found. Complete paths should be used whenever directory names are specified. Softerm system files include **SOFTERM.OVL**, terminal emulation files with the extension **.TML**, and auto-dial modem driver files with the extension **.ADM**. If no system file directory name is specified, Softerm will search the current directory and then all directories specified by the DOS **PATH** command. If a system file directory is specified but cannot be found, Softerm will display an error message, then terminate and return to the DOS command prompt.

dirname/T specifies the directory name where any temporary files required during the execution of Softerm are to be created. This option overrides the directory specified in the Communications Agent System Definition. A **RAM** disk is a good selection for the temporary file directory. Both the temporary file path and system file path should always be available while Softerm is executing.

kbmacroname/A specifies the name of a keyboard macro definition file which is to be automatically loaded when Softerm is executed. If specified, Softerm will automatically proceed to online terminal operation and execute the *first* keyboard macro defined. Using this capability allows automatic operation of Softerm without operator intervention. 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.

Softerm Command Line Examples

SOFTERM

Executes Softerm normally. The directory name for system files will default to the current directory. The default terminal configuration file is **SOFTERM.CNF**. Communications Agent is *not* installed by this command and is removed when Softerm is terminated unless it had been previously installed by a **SOFTERM/A** command.

SOFTERM/A

Installs the Softerm Communications Agent and returns to the DOS command prompt. The Communications Agent will remain in memory until DOS is rebooted. You may execute Softerm for terminal emulation or other applications programs such as spreadsheets and word processors with full access to the Communications Agent using the **Alt Break** keyboard function.

SOFTERM/C C:\TEMP/T C:\SOFTERM/S

Executes Softerm normally but allows the Communications Agent to be reconfigured by displaying the Communications Agent System Definition screens. Once redefinition of the Communications Agent is complete, Softerm will continue to the terminal emulation main menu. Any temporary files will be created on drive **C:** in directory name **TEMP**. Softerm will assume any system files are located on drive **C:** in directory name **SOFTERM**. Default terminal configuration filename is **SOFTERM.CNF**.

SOFTERM MYVT100.CNF CALLHOST.KBM/A

Executes the Softerm program normally and assumes all system files are in the current directory. The terminal configuration file **MYVT100.CNF** and the keyboard macro definition file **CALLHOST.KBM** are automatically loaded. Softerm will automatically proceed to the online terminal operation and execute the *first* keyboard macro defined.

Softerm Command Line Errors

Errors which occur during the execution of the Softerm command line will cause an error message to be displayed, and Softerm will terminate and return to the DOS command prompt. A complete listing of all Softerm error messages can be found in the Appendix.

Executing Softerm from Diskette

To execute Softerm from diskette, insert the Softerm System diskette in the current default drive as indicated by the DOS command prompt, and enter the following command with any desired parameters:

SOFTERM

After a few seconds, the screen will clear, and the Softerm logo screen and copyright notice will appear. After a few seconds or when a key is pressed, the screen will clear and the Communications Agent System Definition screen or the Softerm Terminal Setup Menu will appear.

Executing Softerm from Hard Disk

To execute Softerm from hard disk, you must first insert the original Softerm System Diskette in drive **A:** of your system. Softerm can be executed from any directory on the hard disk assuming the directory where the **SOFTERM.EXE** program file is located is the current directory or appears in the current searchlist defined by the DOS **PATH** command. When executed from hard disk, if the current directory does not contain the required Softerm system files, Softerm will attempt to locate the system files using the directory searchlist.

When Softerm is executed, the special software protection system will verify that the original Softerm System Diskette is present in drive **A:**, and after a few seconds the Softerm logo screen and copyright notice will appear. After a few seconds or when a key is pressed, the screen will clear and the Communications Agent System Definition screen or the Softerm Terminal Setup Menu will appear.

Generating a Softerm Configuration

The Softerm program uses a menu-driven, formatted fill-in-the-blank method of specifying the Communications Agent system definition and terminal configuration. Softerm allows the terminal emulation to be selected from a range of popular conversational and block mode CRT terminals. Before Softerm can be used, your hardware configuration including asynchronous serial and parallel interfaces and their intended use must be specified to the Softerm Communications Agent. A detailed explanation of this process can be found in Chapter 2 on the system definition procedure. Once a system definition has been generated, it can be saved so that the hardware configuration is not repeated each time Softerm is used. The terminal configuration process allows you to specify a

terminal emulation and associated options to be used, and then save these specifications 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 3 on terminal setup.

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

- **Define the Hardware Configuration available to the Communications Agent**

The first time you execute Softerm, the **Communications Agent System Definition** screen will be displayed. This screen allows you to define all asynchronous serial and parallel interfaces available in your system hardware which are to be managed by the Communications Agent. Softerm will automatically detect serial interface **COM1** and parallel interface **LPT1** in your system and set default options for these ports. Softerm supports up to 4 serial communications ports and 3 parallel line printer ports and you may enter additional information to define non-standard ports. You must then specify what each port is connected to and how it is connected. Serial ports may be connected to computers or printers using hardwire or modems. Parallel ports may be connected to printers. Once the type of connection for each port has been specified, a second Communications Agent System Definition screen allows default options for each configured port to be specified. For example, options specified for a serial communications port include the speed, parity, number of data bits, and number of stop bits. Softerm automatically defaults all port options to the most commonly used values. A third System Definition screen allows foreground and background colors to be selected for Softerm screens, and printer command strings to be defined which can be used to initialize printers to various modes. Once the System Definition is complete, you may elect to save the system definition information so that the next time Softerm is executed, these screens are bypassed unless the **/C** parameter is specified on the command line.

- **Select the Terminal Emulation to be used**

Once the Communications Agent system definition is complete, Softerm automatically proceeds to the Terminal Emulation Setup Menu. Included with Softerm is a diskette labeled **Softerm Terminal Emula-**

tion Diskette. For each terminal emulation Softerm supports, there is a corresponding file on the terminal emulation diskette. In order to generate a useable Softerm terminal configuration, you must specify a terminal emulation to be used, and then select options associated with using the terminal emulation.

- **Edit Terminal Options**

Softerm provides many configuration options for terminal emulation 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. You should review the the default values selected by Softerm to insure that they match the parameters required by your host computer. This tutorial will identify only the options most likely to require editing. However, all Softerm terminal configuration options are explained in detail in Chapter 3.

- **Save the Configuration**

Once the completed configuration is ready, it should be *saved* on the Softerm System Diskette or in the default directory specified for system files so that the configuration process does not have to be repeated each time Softerm is used. If the terminal configuration is saved using the filename **SOFTERM.CNF**, it will be automatically loaded each time the Softerm is executed. Otherwise, the configuration may be saved using any legal filename and loaded as required using the **Load Configuration** option.

Using the Keyboard

While generating a Softerm terminal 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. Softerm includes keyboard help screens which are displayed any time the **Alt ?** key combination is entered.

Softerm uses a formatted fill-in-the-blank or multiple-choice method of entering data and selecting options. Each screen consists of a group of related fill-in-the-blank or multiple-choice fields called a *format*. The currently active field is displayed in inverse video. If the cursor is *blinking*, characters can be typed into the field at the position indicated by the cursor. Some fields may allow numeric

characters only, while other fields may allow any character including combinations using the **Shift**, **Alt**, and **Ctrl** keys. Numeric fields may require decimal (0-9) or hexadecimal (0-9, A-F) entry. Hexadecimal entry fields are displayed with a \$ preceding the first character position.

If the cursor is *not blinking*, a multiple-choice field is indicated. Pressing the space bar or the cursor positioning keys ↑↓←→ toggle between the available choices, while pressing the **Enter** key selects the currently displayed option. On Yes/No option fields, you can use the space bar to toggle between options or simply press the **Y** or **N** keys to select an option. The following table summarizes the keyboard functions which may be used while entering and editing a Communications Agent system definition or terminal configuration:

Keyboard Function Table

Keyboard Function	Description
Alt ?	Keyboard Help
Esc	Allow Edit Character Input or Clear Error Messages
Alt Esc	Cancel Format
Enter	Accept Field
Ctrl Enter	Truncate & Accept Field
Alt Enter	Accept Format
Tab	Move to Next Field
Shift Tab	Move to Previous Field
←	Cursor Left
→	Cursor Right
Home	Move to Start of Field
End	Move to End of Field
PgUp	Restore Field to Original Contents
Delete	Delete Character
Backspace	Delete Previous Character
Ctrl End	Erase to End of Field
Insert	Toggle Insert Mode
Space, ↑↓←→	Select Multiple Choice Options
Space, Y, N	Select Yes/No Option
Shift Print	Print Screen with Formfeed
Alt Print	Print Screen without Formfeed

Communications Agent System Definition

The first time Softerm is executed or if the /C or /N parameter is included on the DOS command line, the following screen is displayed:


Communications Agent System Definition					
Port	I/O Address	Connected To	Using	Dialer Type	Dial Mode
COM1	\$0010	Computer	Modem	Manual	
COM2	\$0000				
COM3	\$0000				
COM4	\$0000				
LPT1	\$0050	Printer			
LPT2	\$0000				
LPT3	\$0000				

Directory Paths	
System Files:	A:
Temp Files:	A:
All Other Files:	A:

If no Communications Agent system definition has been previously defined and saved, Softerm will automatically test your configuration for the presence of standard ports **COM1** and **LPT1** and set default values for all related fields. Available communications ports are assumed to be connected to computers using manual modems. Available line printer ports are assumed to be connected to printers.


The first field selected for entry will be the **I/O Address** of **COM1**. If an address of **\$0000** is entered in this field, Softerm will assume this port is not to be managed by the Communications Agent. Otherwise, typing the **Enter** key will accept the currently defined value and select the next field for entry. If a non-standard asynchronous serial interface is being used, its I/O Address may be entered in hexadecimal in this field. The I/O Addresses should not be entered or changed if you are uncertain of the correct value.

The next field selected for entry is the **Connected To** designation. This field allows you to indicate what type of device is connected to the port. For a serial communications port the choices are **Computer**, **Printer**, or **Nothing**. For a parallel line printer port, the choices are **Printer** or **Nothing**. You should select **Computer** if the port will be used for terminal communications to another



computer system. You should select **Printer** if the port will be connected to a serial or parallel line printer. You should select **Nothing** if the port is not currently connected to anything. The space bar or cursor positioning arrows may be used to toggle through available choices. Pressing the **Enter** key will accept the displayed choice and select the next field for entry.

The **Using**, **Dialer Type**, and **Dial Mode** fields are selected only if the connected to device type selected is **Computer**. The **Using** allows you to select between a direct connection using a **hardwire** or a dial-up connection using a **modem**. If the choice is **modem**, Softerm will then request a **Dialer Type** and default **Dial Mode**. Otherwise, entry will proceed to the next port definition.



Toggling between the entries of the **Dialer Type** field allows you to select the type of modem you are using. For example, if you are using a Hayes Smartmodem, you should select the choice **Smartmodem**. If you are not using an auto-dial modem, or have an auto-dial modem for which Softerm has no specific auto-dial module, you should select **Manual**. If you have selected any modem type other than manual, you will be asked to select the default **Dial Mode** for the modem selected. This mode can be either **Pulse** or **Tone**. This default option will be used when the phone number specified does not contain **T** or **P** characters to indicate the type of dialing required.

Once you have defined all ports on your system that will be available to the Communications Agent, pressing **Alt Enter** will accept the current screen format and continue to the next screen of the Communications Agent System Definition. This screen allows you to set default options for each port you have defined on your system.

Default Port Definitions

Port	COM1	LPT1
Bits/Character	8	
Parity	None	
Stop Bits	1	
Speed	1200	
RCV Pacing	Xon/Xoff	
XMIT Pacing	None	
Fill Character		
Fills After CR		
Fills After LF		
Fills After FF		
LF After CR		Yes
Page Length		66
Page Skip		6
Hardware FF		Yes
Page Width		80
Fold Long Lines		Yes
Graphic Char Set		No

For each port defined to the Communications Agent, a column of fields is displayed corresponding to options available for the port. Depending on the type of port or its use, some options are not applicable and will not be displayed. For example, only the first 6 options are applicable to a serial communications port used to connect to a computer. The default option values selected for the Communications Agent are used whenever a function is performed which does not specifically override these settings. This is usually the case when the Communications Agent is accessed from an external program such as a word processor or spreadsheet.

Communications options for ports which are used for serial printers can only be specified in the Communications Agent. Options for ports used for communications to a computer can be specified in each terminal configuration generated and will override the default values of the Communications Agent. Print formatting options for serial or parallel printer ports can also be specified in each Softerm terminal configuration. Refer to Chapter 2 for a complete description of the Port Definition options.

After you have completed editing of the Communications Agent Port Definitions, press the **Alt Enter** key and the following screen is displayed:

Video and Printer Definitions

Video Colors for Menus

Foreground: White

Background: Black

Printer Macro Strings

F1

F2

F3

F4

F5

F6

F7

F8

F9

F10

If you are using a color monitor, Softerm allows you to select the **Foreground** and **Background** colors used for Softerm menus and data entry screens. The **Printer Macro Strings** allow you to *pre-define* command strings which can be used to initialize the printer to the desired print format for Softerm print functions. When a Softerm print function or utility requests a printer command string, you can simply press function key **F1** to **F10** to include one of the predefined character sequences.

After you have completed editing of the Communications Agent Video and Printer Definitions, press the **Alt Enter** key and the following message is displayed:

Save Configuration? Yes

If you press the **Enter** key the default option **Yes** will be selected and the Communications Agent System Definition will be saved in the **SOFTERM.OVL** file. Once you have done this, the Communications Agent System Definition screens are not displayed when Softerm is executed unless the **/C** parameter is used.

For a complete description of all Communications Agent System Definition options, refer to Chapter 2. Remember to use the **Alt ?** key to display the keyboard help screen if you need help in editing any of the Softerm configuration screens. The introduction chapter will focus only on the basic steps necessary to use Softerm terminal emulation since using the Communications Agent independently is an advanced capability of Softerm and is fully discussed in Chapter 7. Only a brief description of the most important port options for

terminal communications will be presented in the next section. A complete discussion of the terminal setup and configuration procedure is presented in Chapter 3.

Terminal Configuration Setup Menu

Once the Communications Agent system definition is complete, the following screen is displayed:

```
----- Setup Options -----  
Disk Utilities  
Load Configuration  
Save Configuration  
Load Emulation  
Terminal Options  
Online Operation  
Exit to DOS  
  
----- Emulating -----  
  
Configuration Name:  
Current Path:           A:
```

Use the space bar or cursor positioning keys $\uparrow\downarrow\leftarrow\rightarrow$ to select options from the **Setup Options** menu. Pressing the **Enter** key to initiate **Online Operation** before a terminal emulation has been selected will cause the error message **Terminal Emulation Must Be Specified** to be displayed. Until the terminal emulation has been selected, Softerm cannot be used in terminal mode. Pressing the **Esc** key will clear error messages and allow the Softerm program to continue.

Selecting a Terminal Emulation

Select the **Load Emulation** option and press the **Enter** key. The cursor is then positioned to a multiple-choice selection field which will display **TTY Compatible** as the default selection. If you are configuring Softerm from diskette, you should remove the Softerm System Diskette and insert the Softerm Terminal Emulation Diskette in the same drive. Use the space bar or cursor positioning keys $\uparrow\downarrow\leftarrow\rightarrow$ to select the desired terminal emulation and press the **Enter** key. A file corresponding to the terminal emulation selected with extension **.TML** will

be loaded from the Softerm Terminal Emulation Diskette. Once the selected file is loaded, remove the Terminal Emulation Diskette and re-insert the System Diskette.

If you are planning to use Softerm to access an information service such as THE SOURCE or CompuServe, the **TTY Compatible** terminal emulation should be selected for this configuration. Otherwise, select the specific terminal emulation you need. Softerm also includes a **User Defined** terminal emulation which allows you to define the character sequences which trigger many standard terminal functions such as clear, home, and cursor positioning.

Once you have loaded a terminal emulation to be used for this configuration, the cursor will return to the **Setup Options** menu.

Editing Terminal Options

Softerm contains a series of data entry screens which allow options associated with the 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 terminal options and their effect on the configuration may be found in Chapter 3.

While editing terminal options, all of the previously described keyboard functions may be used. The **Enter** 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 **Tab** and **Shift Tab** keys may be used to position forwards and backwards through the fields on a screen. Once a screen has been completely edited, the **Alt Enter** key may be entered to accept the current screen and display the next.

Positioning the cursor to the **Terminal Options** selection and pressing the **Enter** key will cause the following screen to be displayed:

Communications Parameters

Port: COM1
Number of Data Bits: 8
Number of Stop Bits: 1
Parity: None
Speed: 1200
Duplex: Full
Receive Pacing: XON/XOFF
Transmit Pacing: None
Transmit Delay: 0
Answerback Message:

Softerm automatically initializes serial interface boards using the values specified in the **Communications Parameters**. The communications 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 data bits, 1 stop bit, no parity and speed of 300 or 1200 baud. Another common setting for many host computers is 7 data bits, 1 stop bit, and even parity.

The communications parameter **Port** selects which available serial communications port the current terminal configuration will use for terminal communications. The choice will be automatically limited only to **COM** ports defined in the Communications Agent.

The communications parameter **Number of Data Bits** 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 communications parameter **Number of Stop Bits** is the number of bits which should be appended to each character to detect correct character framing. 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 communications parameter **Parity** indicates whether or not and what type of parity is desired. Parity is used as a method of error detection. The choices for this option are **None**, **Odd**, **Even**, **Mark**, and **Space**.

The communications parameter **Speed** indicates the transmission speed in bits per second of the communications link between Softerm and the host computer. The available choices for speed are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 9600 bits per second. The transmission speed is also referred to as **baud rate**.

The communications parameter **Duplex** indicates whether or not the terminal should operate in the **Half** or **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. You 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*.

The communications parameter **Receive Pacing** is normally set to **XON/XOFF** for terminal communications with a host computer and allows Softerm to pace the incoming received characters to match its data handling capability.

The communications parameter **Transmit Pacing** is used only in special configurations used for file transfer and should be set to **None** for terminal communications.

After editing of the communications parameters is complete, entering **Alt Enter** will cause the following screen to be displayed:

```
----- Display Parameters -----
Cursor Definition: Underline
Foreground Color: White
Background Color: Black
Use BIOS: No
----- Printer Parameters -----
Port: LPT1
LF After CR: Yes
Page Length: 66
Page Skip Count: 6
Number of Columns: 80
Fold Long Lines: Yes
```

The **Display Parameters** allow you to define the video interface characteristics used by Softerm Terminal Emulation. If you have both a monochrome and color display attached to your system, Softerm will default to the currently active display adapter when executed. Softerm allows the **Cursor Definition**, as well as the **Foreground Color** and **Background Color** used to be specified. If colors are specified, Softerm will attempt to initialize to color mode when online terminal operation begins.

Softerm uses the BIOS video display routines whenever Softerm screen formats are being used. The display parameter **Use BIOS** allows you to specify whether or not the BIOS is to be used during online operation of terminal emulation or whether direct screen updating is to be used. This option should normally be set to **No** since direct updating of the video memory is significantly faster and more efficient.

Softerm provides the capability to utilize print functions during online operation of terminal emulation. 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 Parameters** allow you to define which **Port** will be used for print operations as well as print formatting specifications.

Softerm supports both serial and parallel interfaces for printers. The printer parameter **Port** selects which available serial or parallel port the current terminal configuration will use for print operations. The choice will be automatically limited only to **COM** and **LPT** ports defined in the Communications Agent. You can also select **None** indicating that no printer is available, or **Disk** and all print data will be written to a temporary file.

After editing of the display parameters and printer parameters is complete, entering **Alt Enter** will cause the following screen to be displayed:

```
-----Terminal Emulation Parameters-----
      CR After LF:  No
      LF After CR:  No
Auto Line Wrap:  Yes
      Page Mode:    No
Enter Key Sends: CR
Backspace Key Sends: BS ($08)
```

Softerm **Terminal Emulation Parameters** define standard options associated with the various terminal emulations provided by Softerm. These include automatic carriage return after line feed, automatic line feed after carriage return, automatic line wraparound, page or scroll mode, and characters transmitted by the **Enter** and **Backspace** keys.

Many of the specific terminal emulations provided with Softerm 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 **User Defined** terminal emulation available in Softerm includes a function definition screen which allows you to define emulation functions by assigning control character sequences to standard functions such as clearing the screen. A complete description of the user defined terminal emulation can be found in Chapter 6.

After editing of the terminal emulation parameters is complete, entering an **Alt Enter** will return to the terminal setup menu unless the terminal emulation being used includes additional parameters unique to the type of terminal. If there are special parameters required for the type of terminal selected, an additional parameter screen will be displayed. A complete description of the specific terminal emulations and features can be found in Chapter 6.

Saving the Configuration

Once the completed configuration is ready, it should be *saved* on the Softerm System Diskette or in the directory from which Softerm will be executed. If the terminal configuration is saved using the filename **SOFTERM.CNF**, it will be automatically loaded whenever Softerm is executed. The configuration may also be saved using any other filename of your choice and loaded as required after Softerm has been executed using the **Load Configuration** option.

Selecting the **Save Configuration** option will cause the cursor to be positioned to the **Configuration Name:** field near the bottom of the screen. You 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, pressing **Ctrl Enter** will truncate the remainder of the field and accept the data entered in the field. Otherwise, pressing the **Enter** key will cause the terminal 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. Selecting **Yes** will cause the existing file to be deleted and the new terminal configuration will be written to disk.

Online Terminal Operation

The online mode of terminal operation is initiated from the main Softerm menu by selecting the **Online Operation** option and pressing the **Enter** key. The screen is cleared, the terminal emulation specified is initialized and the cursor is positioned to the home position at row 1, column 1.

The serial communications interface is initialized and all characteristics such as line speed, parity, number of data bits, and stop bits are automatically set by Softerm. 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 communications interface.

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 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 generated using them are transmitted to the host computer.

All Softerm special functions and terminal emulation functions, are generated using key combinations which do not conflict with key combinations used to generate the standard ASCII character codes. Each terminal emulation defines

the specific key combinations used to emulate the keyboard functions of that terminal. All Softerm terminal emulations include a keyboard help screen which can be accessed by pressing the **Alt ?** key in the online terminal operation mode. Even though each terminal emulation included with Softerm includes key combinations unique to that terminal, standard key combinations are used for basic functions and access to extended Softerm capabilities.

The following table summarizes standard terminal emulation keyboard functions provided with Softerm terminal emulations:

Key	Function
Enter	CR, LF, or CR/LF
→	Cursor Right
←	Cursor Left
↑	Cursor Up
↓	Cursor Down
Backspace	BS or DEL
Shift Backspace	DEL or BS
Home	Home Cursor
PgUp	Clear Screen
PgDn	Erase to End of Screen
End	Erase to End of Line
Ctrl Break	Soft Reset
Hold	Stop Display
Alt A	Send Answerback Message
Alt B	Break
Alt V	View Softerm Status Line
Alt W c	Wait for Character c
Alt Z n	Delay n Seconds (0-9)
Alt ?	Display Keyboard Help Screen
Alt 1	Softerm Utility Functions
Alt 2	Softerm Goto Functions
Alt Shift id	Execute Keyboard Macro A-Z, 0-9

Softerm allows all 128 ASCII character codes to be generated from the keyboard. All 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.

Additional terminal emulation and special function keys are defined for each specific terminal emulation provided with Softerm. Refer to Chapter 6 on terminal emulation for information on specific terminals.

Softerm Utility Functions

Softerm includes a selection of utility functions which can be accessed from online terminal operation by pressing the **Alt 1** key. The following pop-up menu will be displayed and utility functions may then be invoked by pressing one of the special function keys corresponding to the desired function:

```
Utility Functions
F1 Print Screen with FF
F2 Print Screen without FF
F3 Toggle Capture Transparent to Print
F4 Toggle Capture Line Mode to Print
F5 Send Command to Printer
F6 Queue Print File/Cancel Print
F7 Copy Screen to Disk
F8 Toggle Capture Transparent to Disk
F9 Toggle Capture Line Mode to Disk
F10 Transmit File
Alt Esc Cancels
```

Softerm Goto Functions

Softerm includes a selection of Goto functions which can be used from online terminal operation to access extended Softerm capabilities by pressing the **Alt 2** key. The following pop-up menu will be displayed and Goto functions may then be invoked by pressing one of the special function keys corresponding to the desired function:

Goto Functions

- F1 Disk Utilities
- F2 Dial Utilities
- F3 Local File Transfer
- F4 Line File Transfer
- F5 Define Keyboard Macros
- F6 Terminal Setup
- F7 Define Translate Table
- F8 Exit, Break Connection
- F9 Exit, Keep Connection

Alt Esc Cancels

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 pressing **Alt V** during online terminal operation and the status is displayed on row 25. Online terminal operation is suspended and input is enabled on the status line whenever a blinking **▶** appears in the first column position. 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 **Alt V** or **Alt Esc**. If you exit using the **Alt V** key, the Softerm status line will remain on the screen during online operation. If you exit from the status line display using the **Alt Esc** key, the status line display will be cleared. The following information may be displayed on the status line depending on the state of the terminal emulation:

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.

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

Full Dplx 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 Dplx** mode.

Half Dplx 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 Dplx** mode.

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 or a capture line mode to print has been initiated 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 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 or a capture line mode to disk has been initiated 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.

Capture Xmit indicates that a transmit file utility function has been initiated and is currently active. In this mode, data is transmitted from the selected file as if it were entered from the keyboard.

Xlate On indicates that the *keyboard translate* feature is currently enabled and character codes are being translated as defined in the user keyboard translate table. This table is defined using the define keyboard translate table capability which is accessed from the Goto Functions Menu by entering **Alt 2** during online terminal operation. Refer to Chapter 4 on terminal operation for additional information on the keyboard translate table. Entering **T** while this status is displayed will toggle Softerm to the **Xlate Off** mode.

Xlate Off indicates that the *keyboard translate* feature is currently not enabled. Character codes defined in the user keyboard translate table will *not* be translated using the translate table and will be transmitted exactly as entered. Entering **T** while this status is displayed will toggle Softerm to the **Xlate On** mode.




Lowr indicates that the keyboard is currently in lower case mode and alphabetic characters entered will be processed as lower case. Pressing **Caps Lock** at any time will toggle the current mode to upper case from lower or to lower case from upper. Upper case mode is indicated by **Caps** on the status line.

↑↓→← indicates that the numeric keypad is currently in function mode with the cursor positioning keys and the **Home**, **PgUp**, **PgDn**, and **End** keys enabled. Pressing the **NumLock** at any time will toggle the current mode to numeric from function mode or to function mode from numeric. Numeric mode is indicated by **NMLK** on the status line.

MMM DD,YY HH:MM:SS indicates the current date and time. **C** toggles to **Connect: time**.

Connect: HH:MM:SS indicates elapsed time since the current connection was established. **C** toggles to the 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 or *hardwired* 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.

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 initiate 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 **Alt 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 communications **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 **Alt V** on the keyboard. If a connection has been properly established, the **Connected** indication should be present on the status line. Follow the procedures required by the computer system being accessed to initiate an interactive terminal session.

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 **Alt 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 **Carriage 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 Communications Agent system definition includes a **dialer driver** for the auto-dial modem in use. The Softerm dial utilities may be accessed from the online terminal mode using the **Goto Functions** accessed by entering **Alt 2**. Refer to Chapter 4 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 more easily.

The **Alt** and **Shift** keys in combination with a **single character id** are used to invoke a keyboard macro. The single character id may be any character in the range **A-Z** or **0-9**. If the character code entered in combination with the **Alt** and **Shift** 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 and a filename is included on the command line with the **/A** parameter, Softerm assumes this file is a standard keyboard macro file and will automatically load the specified file, begin online terminal operation, and execute the first keyboard macro entry defined in the specified keyboard macro file.

Softerm keyboard macros are defined using keyboard macro utilities by entering the **Alt 2** keyboard function to access Softerm Goto Functions in the online terminal mode. Refer to Chapter 4 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 **Alt 1** to access the utility functions followed by an **F1**. To print the current screen without a form feed, enter **Alt 1** followed by an **F2**.

Softerm screen formats such as menus, configuration parameter displays, and data displays such as a display of the current directory or local file transfer output may also be printed by entering **Shift Print** to print the screen with a form feed or **Alt Print** to print the screen without a form feed.

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 **Alt 1** to access the utility functions followed by an **F7**, and the last row of the screen will be temporarily replaced with the following screen format:

Filename:

Enter the **filename** of the file into which the screen is to be copied. Be sure to enter the complete path if the file is to be saved in any directory other than the current directory. Once you have entered the a filename, press the **Alt Enter** key 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 on the status line.

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 **Alt 1** to access the utility functions menu followed by an **F3**. In the transparent mode, all data received is simultaneously sent to both the display and printer. Using this mode allows 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 **Alt 1** followed by an **F3** or **F4** to toggle the operation off.

The second mode of concurrent printing is called **line** mode and is enabled by entering **Alt 1** to access the utility functions menu followed by an **F4**. 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 **Alt 1** followed by an **F4** or **F3** to toggle the operation off.

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 on the Softerm status line.

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 **Alt 1** to access the utility functions menu followed by an **F8**. 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 **Alt 1** followed by an **F8** or an **F9**, or the capture buffer becomes full.

The **line** capture mode is enabled by entering **Alt 1** to access the utility functions menu followed by an **F9**. 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 **Alt 1** followed by an **F9** or **F8**, or the capture buffer becomes full.

If the capture buffer becomes full during online terminal mode, the current contents of the capture buffer are written to disk. While the data is being written to disk, Softerm will continue to receive unless approximately 2000 characters are received before the write operation is complete. Communications with the host is then temporarily suspended using the specified pacing method such as **XON/XOFF**. Communications is automatically resumed after the capture buffer has been saved.

When either a **Alt 1** followed by an **F8** or **F9** is entered, the following screen format is displayed:

Filename:

Enter the **filename** of the file into which data received is to be captured. Once the filename is entered, press the **Alt Enter** key to initiate the disk capture mode. The Softerm terminal status line will now indicate that the capture mode is active by displaying **Capture Disk**.

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 **Alt 1** to access the utility functions menu followed by an **F10**. The following screen format will then be displayed:

Remove CR No Remove LF No EOL Char \$0D EOL Delay 0

This screen contains 4 fields and allows an **end of line character**, and **end of line delay** to be defined as well as options to **remove carriage returns** and **remove line feeds**. The end of line character can be specified as any ASCII character code in the range \$00 – \$7F. The end of line delay is specified as a number from 0 – 99 to indicate the delay in one-tenth second increments to use between lines as indicated by the end of line character. Thus a value of 10 would indicate a 1 second delay. The options to remove carriage returns or line feeds may be used to make the data being transmitted compatible with the receiving system.

Once all fields have been entered, press **Alt Enter** and the following screen format will be displayed:

Filename:

Enter the **filename** of the file to be transmitted and press the **Alt Enter** key. 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 execution of a DOS batch file. Softerm includes a special editor for creating, entering, and editing file transfer command files. 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 or any system supporting this protocol. 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.

A complete description of Softerm file transfer protocols and command language can be found in Chapter 5. 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 **Connected** status will disappear from the Softerm status line and a **Connection Broken** message is displayed.

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, several options are available. You can access the Softerm status line using an **Alt V** and toggle Softerm to the **Local** mode by entering an **L**. 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** if additional terminal communications is desired.

You can also access the Softerm Dial Utilities by entering **Alt 2** followed by an **F2** and select the **Hangup** option. Another alternative to break the connection is to exit to DOS by entering **Alt 2** followed by an **F8**.

Networks and Information Services

Softerm 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, and THE SOURCE, America's Information Utility are popular information services.

The information services are contacted by first accessing a nationwide communications network. Three such networks are Tymnet, GTE Telenet, and Uninet. Dow Jones and THE SOURCE are accessed through the Tymnet and GTE Telenet networks. THE SOURCE can also be accessed through the Uninet network. 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 then be connected to the specified host computer system through the Telenet network.

Logging in to Uninet

Dial the Uninet access number, and once you are connected Uninet will display **>L?**. Press the **Enter** key to generate a carriage return, type a period (.) and press the **Enter** key again. Next the network asks for your assigned computer system number by displaying **UNINET PAD XXXX PORT XX SERVICE:**. Type the system number of the system you are trying to access followed by **Enter**. You will then be connected to the specified host computer system through the Uninet 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.LGN** 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 **COMPUSRV.LGN** 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

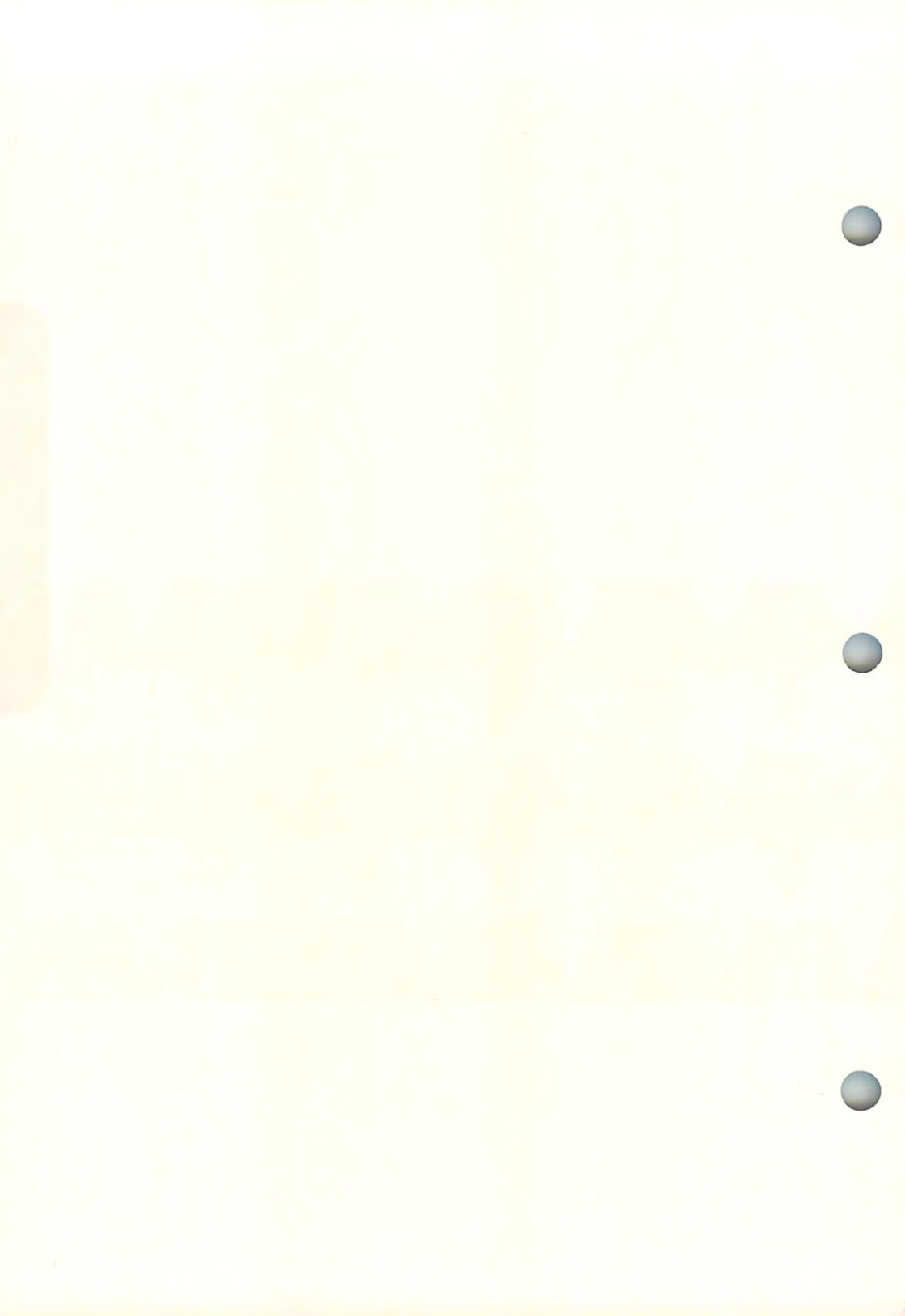
Dow Jones News/Retrieval brings you up-to-the-minute news and information, providing a convenient and productive tool in daily business decisions. It is for anyone with an interest in the news and the economy, whether it be managing information for business or following the stock market for personal 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 Street Week transcripts, and Movie Reviews.

The Dow Jones News/Retrieval service may be accessed through one of two communication networks—Telenet or Tymnet. The Softerm System Diskette contains an example automatic logon macro command file **DOWJONES.LGN** 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.



System Definition

Introduction

The Softerm program provides management of serial and parallel ports for communications and printing using an independent task manager known as the Communications Agent. For Softerm, the Communications Agent provides direct support for terminal emulation, remote file transfer, and print functions. The System Definition procedure defines the hardware configuration available to the Communications Agent.

The first time you execute Softerm the **Communications Agent System Definition** screen will be displayed. This screen allows you to define all asynchronous serial and parallel interfaces in your system which are to be managed by the Communications Agent. You must specify what each port is connected to and how it is connected. Softerm supports up to 4 serial communications ports and 3 parallel line printer ports. Once the connection for each port has been specified, a second Communications Agent System Definition Screen allows default options for each configured port to be chosen. Once the System Definition is complete, you may elect to save the system definition information so that the next time Softerm is executed, these screens are bypassed unless the /C or /N parameter is specified on the command line.

Using the Keyboard

The Softerm program uses a formatted, fill-in-the-blank and multiple-choice method of specifying both the Communications Agent System Definition and terminal emulation configurations. While generating the system definition, certain keyboard functions are utilized during data entry and editing of system definition options. Note that these functions are similar to operations provided by most text editor or word processing programs. These same 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 Help** is always available by pressing the **Alt ?** key combination.

The following table lists keyboard functions which are available whenever Softerm data entry screen formats and menus are displayed:

Keyboard Function	Description
Alt ?	Keyboard Help
Esc	Allow Edit Character Input or Clear Error Messages
Alt Esc	Cancel Format
Enter	Accept Field
Ctrl Enter	Truncate & Accept Field
Alt Enter	Accept Format
Tab	Move to Next Field
Shift Tab	Move to Previous Field
←	Cursor Left
→	Cursor Right
Home	Move to Start of Field
End	Move to End of Field
PgUp	Restore Field to Original Contents
Delete	Delete Character
Backspace	Delete Previous Character
Ctrl End	Erase to End of Field
Insert	Toggle Insert Mode
Space, ↑↓←→	Select Multiple Choice Options
Space, Y, N	Select Yes/No Option
Shift Print	Print Screen with Formfeed
Alt Print	Print Screen without Formfeed

Keyboard Help

The **Alt ?** key can be used at any time to display a keyboard help screen. Pressing any key while the keyboard help screen is displayed will restore the previous screen.

Clear Error Messages, Allow Edit Character Input

The **Esc** key is utilized both as an error message clear key and a *lead-in* key to enable entering edit characters in strings. Error messages which occur during the operation of Softerm 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 **Enter** in a string entry field, you must enter an **Esc** followed by the **Enter**. The **Enter** key instead of causing an accept field function to be performed will be included in the data and displayed as an «ENT». **Esc** may be used with any Softerm function key which is used to perform a special function and cannot normally be entered as data.



Cancel Format

The **Alt Esc** key cancels data entry on the current screen format and returns to the previous menu. If used during data entry on either of the Communications Agent System Definition screens, it will terminate the program and return to DOS. If used during terminal setup, it will cause an immediate return to the terminal setup menu.

Accept Field

The **Enter** key will accept the data currently displayed 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, pressing the **Enter** key 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 **Enter** is pressed regardless of the position of the cursor. Thus if the field already contains data such as a default value, **Enter** accepts the current data and positions the cursor to the next field.



Truncate and Accept Field

The **Ctrl Enter** key is utilized as a truncate field and accept function key. If entered, the **Ctrl Enter** 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 **Enter** had been pressed. The cursor will be positioned to the first character position of the next data entry field.

Accept Format

The **Alt Enter** 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.



Move to Next Field

The **Tab** 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 **Tab** will cause to the cursor to *wraparound* to the first data entry field in the current screen format.

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

Move to Previous Field

The **Shift Tab** 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 **Shift Tab** will cause the cursor to *wraparound* to the last data entry field in the current screen format.

The **Shift Tab** 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 back-spaced over existing data to the position in a data entry field where editing is required.

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.

Move to Beginning of Field

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

Move to End of Field

The **End** key is utilized as a move cursor to end of field function key. If entered, the **End** 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. Some fields may require the **Enter** key to be pressed before the cursor is positioned to the next data entry field.

Restore Field to Original Contents

The **PgUp** key is used as a restore field to original contents function key. If **PgUp** 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.

Delete Character

The **Delete** key is utilized as a delete character function key. If the **Delete** 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.

Delete Previous Character

The **Backspace** key may be used to delete the character previous to the cursor position in the current field. If the **Backspace** key is entered at any character position in the field, the previous character is deleted, the cursor is backspaced, and all characters remaining in the field are shifted left one position. This key has no effect if entered in the first character position of a field.

Erase to End of Field

The **Ctrl End** key is utilized as an erase to end of field function key. If the **Ctrl End** 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.

Toggle Insert Mode

The **Insert** key is utilized as an insert mode function key. Entering an **Insert** 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 an **Insert** 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 **Enter** which accepts the current field is entered.

Select Multiple Choice Option

The **space** and $\uparrow\downarrow\leftarrow\rightarrow$ keys may be used to select a multiple-choice option on a choice data entry field. The **space**, \downarrow , and \rightarrow keys will display or position the cursor to the next choice. The \uparrow and \leftarrow keys will display or position the cursor to the previous choice. The currently displayed choice, or the choice indicated by the cursor is then selected by pressing the **Enter** key.

Select Yes/No Option

The **space** and **Y** or **N** keys may be used to select either **Yes** or **No** on a Yes/No option field. The **space** will toggle between **Yes** and **No**, while pressing **Y** will select **Yes** and pressing **N** will select **No**. The currently displayed choice is then selected by pressing the **Enter** key.

Print Screen

The **Shift Print** and **Alt Print** keys are utilized as a print screen function keys. These keys may be used during the system definition or terminal setup process or on any Softerm extended function screen to print the current contents of the screen to the printer. This allows a permanent record of the configuration definition and parameter values to be printed.

Entering **Shift Print** will print the current screen with a form feed. Entering **Alt Print** will print the current screen without a form feed.

Setup Data Entry and Editing

Data Entry Formats

The Communications Agent System Definition procedure, through a series of fill-in-the-blank **data entry formats**, allows a specific hardware configuration to be defined. A data entry format consists of a series of fill-in-the-blank or multiple-choice data entry fields into which data may be entered and edited or selected. There are several types of data entry fields used in the system definition 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, you will hear a 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 **Input is 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 allows you to toggle the choice from yes to no or no to yes by pressing the **space bar**. You can also enter a **Y** to indicate a **Yes** response or an **N** to indicate a **No** response. If an attempt is made to enter a character other than space, Y or N, you will hear a 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 and special key combinations. Non-displayable control codes and special key combinations will be indicated in the entry field by displaying a character

sequence contained in left and right *chevron* characters (« »). Some keys and key combinations such as **Enter** will require that an **Esc** character precede their entry as a *lead-in* to allow these characters to be entered into a string field.

The **Shift**, **Ctrl**, and **Alt** shift keys are represented as a single, highlighted lowercase character using **s** for **Shift**, **c** for **Ctrl**, and **a** for **Alt**. Special keys and function keys are represented with a 3-character abbreviation as follows:

Abbreviation	Key Description
NUL	Ctrl @
ENT	Enter
TAB	Tab
BSP	Backspace
ESC	Esc
PRT	Print
HOM	Home
END	End
PUP	PgUp
PDN	PgDn
UP	↑
DWN	↓
RHT	→
LFT	←
INS	Insert
DEL	Delete
NMn	Character n on numeric keypad in numeric lock mode
KPn	Character n on numeric keypad in keypad mode
Fnn	Function Key nn

Since non-displayable character codes and special function keys require additional character positions for display in ASCII string fields, Softerm automatically uses *horizontal scrolling* within the field. The **Home** and **End** keys can be used to position to the beginning or end of the actual data.

Multiple Choice Fields

Softerm uses two types of **multiple choice** option fields. Softerm menus display all available choices in a list with the currently selected choice displayed in inverse video. Data entry formats use a field select in which only the current

choice is displayed. The **space** and $\uparrow\downarrow\leftarrow\rightarrow$ keys may be used to select a multiple choice option. The currently displayed choice, or the choice indicated by inverse video highlighting is then selected by pressing the **Enter** key.

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 pressing the **Enter** key. Otherwise, if a field is only partially entered, a field accept function such as a **Enter** must be used 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 **Tab** and **Shift Tab** keys may be used to skip forwards and backwards field to field within a data entry format on a single screen. Some data entry procedures may consist of multiple screens. If this is the case, an **Alt Enter** 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.

Some data entry fields in the system definition and terminal setup configuration formats will be **not applicable** to the specific configuration being edited. If this is the case, a **N/A** or nothing will be displayed in these entry fields and the cursor will not stop on these fields. You should not be concerned with any field on which the cursor does not stop.

System Definition Screen Formats

The first time Softerm is executed or if the /C parameter is included on the DOS command line, the following screen is displayed:

----- Communications Agent System Definition -----

Port	I/O Address	Connected To	Using	Dialer Type	Dial Mode
COM1	\$0010	Computer	Modem	Manual	
COM2	\$0000				
COM3	\$0000				
COM4	\$0000				
LPT1	\$0050	Printer			
LPT2	\$0000				
LPT3	\$0000				

----- Directory Paths -----

System Files:	A:
Temp Files:	A:
All Other Files:	A:

If no Communications Agent system definition has been previously defined and saved, or you have used the /N parameter on the DOS command line to execute Softerm, your configuration will automatically be tested for the presence of standard ports **COM1** and **LPT1** and set default values for all related fields. Available communications ports are assumed to be connected to computers using manual modems. Available line printer ports are assumed to be connected to printers. If you have previously saved a Communications Agent system definition and have used the /C parameter on the DOS command line to execute Softerm, the saved system definition will be displayed.

This screen is divided into two parts. The first section allows you to define which input/output ports are to be managed by the Softerm Communications Agent and the second part allows the default directory paths used by Softerm to be defined. I/O ports are divided into two groups. Serial communications ports are referenced as **COM1**, **COM2**, **COM3**, and **COM4**. Parallel ports are referenced as **LPT1**, **LPT2**, and **LPT3**.

The first field selected for entry will be the **I/O Address** of **COM1**. If an address of **\$0000** is entered in this field, Softerm will assume this port is not to be managed by the Communications Agent. Otherwise, typing the **Enter** key

will accept the currently defined value and select the next field for entry. If a non-standard asynchronous serial interface is being used, its I/O Address may be entered in hexadecimal in this field.

The next field selected for entry is the **Connected To** designation. This field allows you to indicate what type of device is connected to the port. For a serial communications port the choices are **Computer**, **Printer**, or **Nothing**. For a parallel line printer port, the choices are **Printer** or **Nothing**. You should select **Computer** if the port will be used for terminal communications to another computer system. You should select **Printer** if the port will be connected to a serial or parallel line printer. You should select **Nothing** if the port is not currently connected to anything. The space bar or cursor positioning arrows may be used to toggle through available choices. Pressing the **Enter** key will accept the displayed choice and select the next field for entry.

The **Using**, **Dialer Type**, and **Dial Mode** fields are selected only if the connected to device type selected is **Computer**. The **Using** allows you to select between a direct connection using a **hardwire** or a dial-up connection using a **modem**. If the choice is **modem**, Softerm will then request a **Dialer Type** and default **Dial Mode**. Otherwise, entry will proceed to the next port definition.

Toggling between the entries of the **Dialer Type** field allows you to select the type of modem you are using. For example, if you are using a Hayes Smartmodem, you should select the choice **Smartmodem**. If you are not using an auto-dial modem, or have an auto-dial modem for which Softerm has no specific auto-dial module, you should select **Manual**. If you have selected any modem type other than manual, you will be asked to select the default **Dial Mode** for the modem selected. This mode can be either **Pulse** or **Tone**. This default option will be used when the phone number specified does not contain **T** or **P** characters to indicate the type of dialing required.

Once all the applicable fields have been specified for each port, entry will continue to the next port. Once you have defined the use of all **COM** and **LPT** ports to be managed by the Communications Agent, the cursor will move to the **Directory Path** area of the screen. The current directory path for **System Files**: is displayed but cannot be changed. The system file directory defaults to the current directory when Softerm is executed, or can be specified on the Softerm command line using the **/S** parameter.

The directory path for **Temp Files**: allows you to specify where Softerm temporary files such as print files will be created. For example, if you use a function to print the current screen to a printer controlled by the Communica-

tions Agent, Softerm creates a temporary print file to contain the screen data and then queues the file on a temporary print queue. When prior print requests have been completed by the Communications Agent, the screen data will be printed and the temporary files deleted.

The directory path for **All Other Files**: indicates the current default directory where all other files used or created as a result of Softerm functions are located when a complete path is not specified in filename entry fields. It will be automatically set to the directory in which Softerm is executed, and becomes the default directory for terminal emulation. When the Communications Agent is installed to perform background operations for other programs such as word processors and spreadsheets, the directory in which Softerm is executed also becomes the default directory for the Communications Agent.

Once you have defined all ports on your system that will be available to the Communications Agent and default directory paths to be used, pressing **Alt Enter** will accept the current screen format and continue to the next screen of the Communications Agent System Definition. This screen allows you to set default options for each port you have defined on your system.

Default Port Definitions

Default Port Definitions		
Port	COM1	LPT1
Bits/Character	8	
Parity	None	
Stop Bits	1	
Speed	1200	
RCV Pacing	Xon/Xoff	
XMIT Pacing	None	
Fill Character		
Fills After CR		
Fills After LF		
Fills After FF		
LF After CR		Yes
Page Length		66
Page Skip		6
Hardware FF		Yes
Page Width		80
Fold Long Lines		Yes
Graphic Char Set		No

For each port defined to the Communications Agent, a column of fields is displayed corresponding to options available for the port. Depending on the type of port or its use, some options are *not applicable* and will not be displayed. For example, only the first 6 options are applicable to a serial communications port used to connect to a computer. The default option values selected for the Communications Agent are used whenever a function is performed which does not specifically override these settings. This is usually the case when the Communications Agent is accessed from an external program such as a word processor or spreadsheet.

Communications options for ports which are used for serial printers can only be specified in the Communications Agent. Options for ports used for communications to a computer can be specified in each terminal configuration generated and will override the default values of the Communications Agent. Print formatting options for serial or parallel printer ports can also be specified in each Softerm terminal configuration.

The following table summarizes the relationship of port options to the type of device connected and where the options can be specified for each type of port. The first three columns specify which port options are applicable to the type of connection on a **COM** or **LPT** port. The next two columns specify for the three types of connections whether the option can be specified in the Communications Agent System Definition or individual terminal configurations.

Option	COM to computer	COM to printer	LPT to printer	Specify in Comm Agent			Specify in Term Config		
Bits/Character	Yes	Yes	N/A	Yes	Yes	N/A	Yes	No	N/A
Parity	Yes	Yes	N/A	Yes	Yes	N/A	Yes	No	N/A
Stop Bits	Yes	Yes	N/A	Yes	Yes	N/A	Yes	No	N/A
Speed	Yes	Yes	N/A	Yes	Yes	N/A	Yes	No	N/A
RCV Pacing	Yes	N/A	N/A	Yes	N/A	N/A	Yes	N/A	N/A
XMIT Pacing	Yes	Yes	N/A	Yes	Yes	N/A	Yes	No	N/A
Fill Character	N/A	Yes	N/A	N/A	Yes	N/A	N/A	No	N/A
Fills After CR	N/A	Yes	N/A	N/A	Yes	N/A	N/A	No	N/A
Fills After LF	N/A	Yes	N/A	N/A	Yes	N/A	N/A	No	N/A
Fills After FF	N/A	Yes	N/A	N/A	Yes	N/A	N/A	No	N/A
LF After CR	N/A	Yes	Yes	N/A	Yes	Yes	N/A	Yes	Yes
Page Length	N/A	Yes	Yes	N/A	Yes	Yes	N/A	Yes	Yes
Page Skip	N/A	Yes	Yes	N/A	Yes	Yes	N/A	Yes	Yes
Hardware FF	N/A	Yes	Yes	N/A	Yes	Yes	N/A	No	No
Page Width	N/A	Yes	Yes	N/A	Yes	Yes	N/A	Yes	Yes
Fold Long Lines	N/A	Yes	Yes	N/A	Yes	Yes	N/A	Yes	Yes
Graphic Char Set	N/A	Yes	Yes	N/A	Yes	Yes	N/A	No	No

Port Definition Options

The following paragraphs define the options for the **COM** and **LPT** ports defined in the system definition.

Bits/Character

The serial port 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.



Parity

The serial port 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 choices for this field are **None**, **Odd**, **Even**, **Mark**, and **Space**. If you have selected **8 bits/character**, the parity selection should be **None**. If you have selected **7 bits/character**, then parity may be selected from **Odd**, **Even**, **Mark**, and **Space**.

Stop Bits

The serial port option **Stop Bits** is the number of bits which should be appended to each character to detect correct character framing. The choices for this field are **1** or **2**. This setting is usually dependent on the requirements of the host computer system.




Speed

The serial port option **Speed** indicates the transmission speed in bits per second of the communications link between Softerm and the host computer. The available choices for speed are **50**, **75**, **110**, **134.5**, **150**, **300**, **600**, **1200**, **1800**, **2000**, **2400**, **3600**, **4800**, **7200**, and **9600** bits per second. The transmission speed is also referred to as **baud rate**.

RCV Pacing

The serial port option **RCV Pacing** defines the type of pacing control Softerm will use when receiving characters from a remote computer system on this port. This option is applicable only to **COM** ports connected to a computer and is not used when the connection is to a printer. The choices for this option are **XON/XOFF**, **DTR**, and **None**. The specific option chosen depends on the type of connection and the host system software.



The selection of **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. This option is appropriate when the serial port is connected to the host computer system either locally or using a modem and communications line.

The selection of **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 allowing Softerm to *pace* the incoming received characters to match its data handling capability. This option may be appropriate when the serial port is *directly* connected to the host computer system locally, rather than using a communications modem.

XMIT Pacing

The serial port option **XMIT Pacing** indicates whether or not Softerm should respond to any type of pacing while transmitting data on a serial communications port. The choices for this option are **XON/XOFF** and **None**. If the port is used to connect to a computer system, this option is usually set to **None**. If the port is used to connect to a printer, choosing **XON/XOFF** allows the printer to pace the flow of data by transmitting XON and XOFF characters to Softerm.

XON/XOFF should be selected if Softerm is to perform *resume/suspend* operations in response to XON and XOFF characters received from the printer or computer. Since most terminals do not have the capability to respond to XON and XOFF characters, this option should be set to **None** for most terminal communications and terminal emulation applications to host computers. 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.

Fill Character

The serial port option **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 option **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 0–255.

Fill After LF

The serial port option **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 0–255.

Fill After FF

The serial port option **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 0–255.

LF After CR

The printer port 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 your application requires overprinting capability, this option should be set to **No**. If a line feed after carriage return is desired, select **Yes** for this option. If line feeds are not required, select **No** for this option.

Page Length

The printer port option **Page Length** allows you 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

The printer port option **Page Skip** 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.

Hardware FF

The printer port option **Hardware FF** indicates whether or not the printer has the capability to form feed when sent the ASCII FF character **\$OC**. If the printer used on this port has hardware form feed capability, select **Yes** for this option. If no form feed capability is available, select **No**.



Page Width

The printer port option **Page Width** 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 port option **Fold Long Lines** indicates whether print lines longer than the number of columns defined should be *truncated* or *folded*. Folding means that the long print line is printed first on one line up to the number of columns available, and then the remainder is printed on the next line. Truncation means that the remainder is not printed. Select **Yes** for this option if folding is desired or **No** if long print lines are to be truncated.



Graphic Char Set

The printer port option **Graphic Char Set** indicates whether the printer has the capability to print graphics characters in the range \$80–\$FF. If you select **No** for this option, graphics characters are automatically translated to spaces for all print operations. If you select **Yes** for this option, graphic characters are sent to the printer for all print operations.

Video and Printer Definitions

After you have completed editing of the Communications Agent Port Definitions, press the **Alt Enter** key and the following screen is displayed:

```
-----Video and Printer Definitions-----
Video Colors for Menus                Printer Macro Strings
Foreground:  White                    F1
Background: Black                    F2
                                         F3
                                         F4
                                         F5
                                         F6
                                         F7
                                         F8
                                         F9
                                         F10
```

Video Colors for Menus

If you are using a color monitor, Softerm allows you to select the **Foreground** and **Background** colors used for Softerm menus and data entry screens. If you are using a monochrome monitor, these options have no effect. The available color choices for foreground or background color are **White, Black, Blue, Green, Cyan, Red, Magenta, and Brown**. The selected colors will take effect only if the display is currently in color mode.

Printer Macro Strings

The **Printer Macro Strings** allow you to *pre-define* command strings which can be used to initialize the printer to the desired print format for Softerm print functions. For example, it may be necessary to send the printer a command when you wish to print in compressed or 132 column format. When a Softerm print function or utility requests a printer command string, you can simply press function key **F1** to **F10** to include one of the predefined character sequences in the command. Each print macro string may contain up to 10 characters.

Saving the System Definition

After you have completed editing of the Communications Agent Video and Printer Definitions, press the **Alt Enter** key and the following message is displayed:

Save Configuration? Yes

If you press the **Enter** key the default option **Yes** will be selected and the Communications Agent System Definition will be saved in the **SOFTERM.OVL** file. Once you have done this, the Communications Agent System Definition screens are not displayed when Softerm is executed unless the **/C** or **/N** parameter is used.

Notes:

Terminal Setup



Terminal Setup

Introduction

The Terminal Setup procedure allows the terminal configuration and options for accessing a remote system to be completely specified and the results saved in a configuration file. This file can become the default configuration for Softerm, or an optional configuration file which can be loaded and executed whenever needed. Softerm may be configured with different terminal emulations in order to access various host computer systems with different terminal requirements. Separate Softerm configurations may be generated for access to host computers at different transmission speeds and line characteristics. Different I/O port configurations may also 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, the specific terminal emulation to be used must be selected, and terminal options including communications parameters, display parameters, printer parameters, and terminal emulation parameters must be chosen. Each of these parameter areas in the terminal configuration definition have initial default values and may be edited through formatted data entry screens in the setup mode.

Using the Keyboard

Softerm uses a formatted, fill-in-the-blank and multiple-choice method of specifying the terminal configuration. While generating the terminal configuration, certain keyboard functions are utilized during data entry and editing of configuration parameters. These keyboard functions are identical to those used for specifying the Communications Agent System Definition and are fully explained in Chapter 2. You can also enter **Alt ?** at any time during the terminal configuration process to display the keyboard help screen.

Terminal Setup Menu

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

```
— Setup Options —  
Disk Utilities  
Load Configuration  
Save Configuration  
Load Emulation  
Terminal Options  
Online Operation  
Exit to DOS  
  
— Emulating —  
  
Configuration Name:  
Current Path:      A:
```

The default selection for this menu is **Online Operation** which terminates the setup mode and initiates online terminal operation. The current **Configuration Name** is displayed at the bottom of the display screen and the specific terminal emulation in this configuration is indicated in the field under the header **Emulating**.

The first time you try to use Softerm, the terminal emulation has not been specified and no terminal configuration has been saved. If an attempt to select **Online Operation** is made without having specified the terminal emulation, the error message **Terminal Emulation must be specified** is displayed. The **Esc** key must then be pressed to clear the error message and allow the setup mode to continue.

Generating a Softerm Terminal Configuration

The Softerm program uses a menu-driven, formatted fill-in-the-blank and multiple-choice method of specifying the terminal emulation and configuration options. Softerm allows the terminal emulation to be selected from a range of popular conversational and block mode CRT terminals. Once a terminal 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:

- **Select the Terminal Emulation to be used**

Included with Softerm is a diskette labeled **Softerm Terminal Emulation Diskette**. For each terminal emulation Softerm supports, there is a corresponding file on the terminal emulation diskette. In order to generate a useable Softerm terminal configuration, you must specify a terminal emulation to be used, and then select options associated with using the terminal emulation.

- **Edit Terminal Options**

Softerm provides many configuration options for terminal emulation which may be edited according to your specific requirements. Each of the options has a default value corresponding to the most frequently used selection. You should review the the default values selected by Softerm to insure that they match the parameters required by your host computer, and if not, change the parameters to the correct values. Select **Terminal Options** on the Terminal Setup Menu to edit terminal configuration options.

- **Save the Configuration**

Once the completed configuration is ready, it should be *saved* on the Softerm System Diskette or in the default directory specified for system files so that the configuration process does not have to be repeated each time Softerm is used. If the terminal configuration is saved using the filename **SOFTERM.CNF**, it will be automatically loaded each time the Softerm is executed. 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 terminal setup menu in detail.

Disk Utilities

The disk utilities option allows a selection of DOS disk commands to be executed without exiting the Softerm program. Since these commands are also available in the online terminal operation mode, the utilization of this option is covered in detail in Chapter 4 on Terminal Operation.

Load Configuration

If the **Load Configuration** option is selected, the cursor is positioned to the **Configuration Name:** field near the bottom of the screen. A previously saved configuration may be loaded by entering a filename and pressing the **Enter** key. If the configuration file is not in the directory specified by the **Current Path:** field, be sure to enter a complete directory path to the configuration filename or use the disk utilities to change the default path.

If this option has been chosen accidentally, **Alt Esc** may be pressed which will restore the contents of the **Configuration Name:** field and return the cursor to the terminal setup menu without affecting the current configuration.

If the requested configuration file does not exist, the error message **File not found** is displayed. Press the **Esc** key to clear the error message, restore the **Configuration Name:** field to its previous contents, and return to the terminal setup menu.

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 **Unable to read configuration file** may be displayed. Pressing the **Esc** key will clear this message and return the cursor to the terminal setup menu.

Once the requested configuration is successfully loaded, the cursor is repositioned to the terminal setup menu for further action. At this time you can select **Terminal Options** if any changes to this configuration are required, or select **Online Operation** if it is your desire to execute the loaded configuration and initiate online terminal operation.

Save Configuration

If the **Save Configuration** option is selected, the cursor is positioned to the **Configuration Name** field near the bottom of the screen. The current terminal configuration may be saved by entering a legal DOS filename and pressing the **Enter** key. If you do not wish the configuration file to be saved in the directory specified by the **Current Path:** field, be sure to enter a complete directory path to the configuration filename or use the disk utilities to change the default path.

If the terminal configuration is saved using the filename **SOFTERM.CNF** on the Softerm System Diskette or in the Softerm system directory, it will be automatically loaded whenever Softerm is executed unless a configuration filename is specified on the DOS command line. The configuration may also be saved using any other filename of your choice and loaded as required the **Load Configuration** option.

If this option is selected before a terminal emulation has been specified, the error message **Terminal Emulation must be specified** is displayed.

If this option has been chosen accidentally, **Alt Esc** may be pressed which will restore the previous contents of the field and return the cursor to the terminal setup 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. Pressing an **N** followed by **Enter** indicates that you do *not* wish to delete the file. The cursor will return to the terminal setup menu for further action. Pressing a **Y** followed by **Enter** for the delete existing file query, will cause the old file with the same filename to be deleted and the current terminal configuration to 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 terminal setup menu. 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 terminal configuration, the resulting file on disk contains only a *partial* configuration which will not execute properly. This file will be automatically 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 terminal configuration is successfully saved, the cursor is repositioned to the terminal setup menu for further action. At this time, you can select **Online Operation** if it is your desire to execute the current configuration and initiate online terminal operation.

Load Emulation

If the **Load Emulation** option is selected, the cursor is positioned to a multiple-choice selection field which will display **TTY Compatible** as the default selection. If you are configuring Softerm from diskette, you should remove the Softerm System Diskette and insert the Softerm Terminal Emulation Diskette in the same drive. Use the space bar or cursor positioning keys ↑↓ ←→ to select the desired terminal emulation and press the **Enter** key. A file corresponding to the terminal emulation selected with extension **.TML** will be loaded from the Softerm Terminal Emulation Diskette. Once the selected file is loaded, remove the Terminal Emulation Diskette and re-insert the System Diskette.

If you are planning to use Softerm to access an information service such as THE SOURCE or CompuServe, the **TTY Compatible** terminal emulation should be selected for this configuration. Otherwise, select the specific terminal emulation you need. Softerm also includes a **User Defined** terminal emulation which allows you to define the character sequences which trigger many standard terminal functions such as clear, home, and cursor positioning.

Once you have loaded a terminal emulation to be used for this configuration, the cursor will return to the terminal setup menu.

Terminal Options

Softerm contains a series of data entry screens which allow options associated with the terminal emulation and hardware configuration to be specified. These options default to the most commonly used values and generally require very little editing. While editing terminal options, all of the previously described keyboard functions may be used. The **Enter** 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 **Tab** and **Shift Tab** keys may be used to position forwards and backwards through the fields on a screen. Once a screen has been completely edited, the **Alt Enter** key may be entered to accept the current screen and display the next.

Positioning the cursor to the **Terminal Options** selection and pressing the **Enter** key will cause the following screen to be displayed:

```
-----Communications Parameters-----
                                     Port: COM1
Number of Data Bits: 8
Number of Stop Bits: 1
                                     Parity: None
                                     Speed: 1200
                                     Duplex: Full
Receive Pacing: XON/XOFF
Transmit Pacing: None
Transmit Delay: 0
Answerback Message:
```

This is the first in a series of 3 data entry screens which allow options associated with the terminal configuration including communications parameters, display parameters, printer parameters, and terminal emulation parameters to be specified. 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 6 for additional information of specific terminal emulations.

When editing in the data entry formats, remember that the **Tab** and **Shift Tab** permit forward and backward movement between fields in a data entry format. The **Enter** key is used to accept the current field and move forward to the next field. The **Alt Enter** is used to accept the current screen and display the next screen in a series of data entry screen formats. The **Alt Esc** key may be used to cancel the terminal options function and return to the terminal setup menu.

Communications Parameters

Communications parameters are Softerm options which identify the communications port and associated options to be used for terminal communications to a host computer system. For the port selected, these parameters will override corresponding values defined in the Communications Agent system definition when this terminal configuration is used. The following options or communications parameters are currently defined in the Softerm program.

Port

The communications parameter **Port** selects which available serial communications port the current terminal configuration will use for terminal communications. The choice will automatically be limited to **COM** ports defined in the Communications Agent system definition.

Number of Data Bits

The communications parameter **Number of Data Bits** 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.

Number of Stop Bits

The communications parameter **Number of Stop Bits** is the number of bits which should be appended to each character to detect correct character framing. The choices for this field are **1** or **2**. This setting is usually dependent on the requirements of the host computer system.

Parity

The communications parameter **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 choices for this field are **None**, **Odd**, **Even**, **Mark**, and **Space**. If you have selected **8 bits/character**, the parity selection should be **None**. If you have selected **7 bits/character**, then parity may be selected from **Odd**, **Even**, **Mark**, and **Space**.

Speed

The communications parameter **Speed** indicates the transmission speed in bits per second of the communications link between Softerm and the host computer. The available choices for speed are **50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 9600** bits per second. The transmission speed is also referred to as **baud rate**.

Duplex

The communications parameter **Duplex** indicates whether or not the terminal emulation should operate in **Half** or **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. You should check the requirements of the host computer before selecting this option. If half duplex is selected, and the host computer is full duplex, characters entered on the keyboard will be displayed and processed *twice*.

Receive Pacing

The communications parameter **Receive Pacing** defines the type of pacing control Softerm will use when receiving characters from the host computer system. The choices for this option are **XON/XOFF, DTR, and None**. The specific option chosen depends on the type of connection and the host system software.

The selection of **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. This option is appropriate when the serial port is connected to the host computer system either locally or using a modem and communications line.

The selection of **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 allowing Softerm to *pace* the incoming received characters to match its data handling capability. This option may be appropriate when the serial port is *directly* connected to the host computer system locally, rather than using a communications modem.

Transmit Pacing

The communications parameter **Transmit Pacing** indicates whether or not Softerm should respond to any type of pacing while transmitting data to the host computer. The choices for this option are **XON/XOFF** and **None**.

XON/XOFF should be selected if Softerm is to perform *resume/suspend* operations in response to XON and XOFF characters received from the host computer. Since most terminals do not have the capability to respond to XON and XOFF characters, this option should be set to **None** for most terminal communications and terminal emulation applications to host computers. 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.

Transmit Delay

Some host computers are not able to receive small *bursts* of data which may result when using some of Softerm's extended capabilities. For example, Softerm keyboard macros allow a string of data to be transmitted as a result of a single keystroke. As a result, the host computer's receive capability may be overrun and some of the data may be missed. The communications parameter **Transmit 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 of 255 milliseconds. This option is in effect only for data transmitted as a result of keyboard macros, or the transmit file utility function during online terminal operation.

Answerback Message

The communications parameter **Answerback Message** is a string of ASCII character codes transmitted when an answerback function request is received. Since automatic answerback is dependent on the specific terminal emulation, Softerm will transmit the answerback message automatically only if the answerback function is defined for the terminal emulation selected. You can also transmit the answerback message any time the key combination **Alt A** is used during online operation.

Both displayable and non-displayable ASCII character codes may be included in an answerback string. Remember that non-displayable codes entered will be displayed enclosed in left and right chevron « » characters. The answerback string can contain up to 30 actual characters. Softerm will automatically use *horizontal scrolling* in the field if the entire string cannot be displayed as a result of non-displayable character codes. The **Home** and **End** keys can be used to position to the beginning or end of the actual data.

Display and Printer Parameters

After editing of the communications parameters is complete, entering **Alt Enter** will cause the following screen to be displayed:

```
-----Display Parameters-----
Cursor Definition: Underline
Foreground Color: White
Background Color: Black
Use BIOS: No
-----Printer Parameters-----
Port: LPT1
LF After CR: Yes
Page Length: 66
Page Skip Count: 6
Number of Columns: 80
Fold Long Lines: Yes
```

Display Parameters

The **Display Parameters** allow you to define the video interface characteristics used by Softerm Terminal Emulation. If you have both a monochrome and color display attached to your system, Softerm will default to the currently active display adapter when executed.

Cursor Definition

The display parameter **Cursor Definition** allows the definition or type of cursor to be specified. The available choices are **Underline**, **Partial Block**, **Half Block**, and **Full Block**.

Foreground Color

The display parameter **Foreground Color** allows the color used for the foreground to be selected when using a color monitor. If you are using a monochrome monitor, this option has no effect. This parameter determines the color of the characters displayed on the screen by terminal emulation during online operation. The foreground color for Softerm data entry screens is

defined in the Communications Agent System Definition. Available choices for foreground color are **White, Black, Blue, Green, Cyan, Red, Magenta,** and **Brown.**

Background Color

The display parameter **Background Color** allows the color used for the background to be selected when using a color monitor. If you are using a monochrome monitor, this option has no effect. This parameter determines the color of the field on which characters are displayed by terminal emulation during online operation. The background color for Softerm data entry screens is defined in the Communications Agent System Definition. Available choices for background color are **White, Black, Blue, Green, Cyan, Red, Magenta,** and **Brown.**

Use BIOS

Softerm uses the BIOS video display routines whenever Softerm screen formats are being used. The display parameter **Use BIOS** allows you to specify whether or not the BIOS is to be used during online operation of terminal emulation or whether direct screen updating is to be used. This option should normally be set to **No** since direct updating of the video memory is significantly faster and more efficient.

Printer Parameters

Softerm provides the capability to utilize print functions during online operation of terminal emulation. 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 Parameters** allow you to define which **Port** will be used for print operations as well as print formatting specifications.

Port

Softerm supports both serial and parallel interfaces for printers. The printer parameter **Port** selects which available serial or parallel port the current terminal configuration will use for print operations. The choice will be automatically limited only to **COM** and **LPT** ports defined in the Communications Agent. You can also select **None** indicating that no printer is available, or **Disk** and all print data will be written to a temporary file. If a serial interface is being

used, insure that the serial port parameters and particularly the number of data bits, number of stop bits, parity, and speed defined for the port in the Communications Agent system definition match the printer being used.

If the printer port is specified as an **LPT** or **COM** port, all Softerm online and offline print functions will print directly to the selected port.

If the printer port is specified as **None**, online print functions such as **Capture Transparent to Print** are not available. However, if a printer is configured in the Communications Agent System Definition, offline printing functions such as local file transfer **Copy File to Print** are still available and allow you to select the printer port when executed.

If the printer is specified as **Disk**, a temporary print file will be created in the temporary file directory. The file will be named **SOFTEMP.nnn** where **nnn** is a number from **000** to **999**. The temporary print file can be printed using the **Queue Print File** option of the Softerm Utility Functions which will close the file and queue it to a selected printer. Any online print function performed during terminal operation will append data to the temporary file. Offline print functions performed will allow you to select the printer port when executed.


LF After CR

The printer parameter **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 your application requires overprinting capability, this option should be set to **No**. If a line feed after carriage return is desired, select **Yes** for this option. If line feeds are not required, select **No** for this option.

Page Length

The printer parameter **Page Length** allows you 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 parameter **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.


Number of Columns

The printer parameter **Number of 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 parameter **Fold Long Lines** indicates whether print lines longer than the number of columns defined should be *truncated* or *folded*. Folding means that the long print line is printed first on one line up to the number of columns available, and then the remainder is printed on the next line. Truncation means that the remainder is not printed. Select **Yes** for this option if folding is desired or **No** if long print lines are to be truncated.



Terminal Emulation Parameters

After editing of the display parameters and printer parameters is complete, entering **Alt Enter** will cause the following screen to be displayed:

```
-----Terminal Emulation Parameters-----  
  
CR After LF: No  
LF After CR: No  
Auto Line Wrap: Yes  
Page Mode: No  
Enter Key Sends: CR  
Backspace Key Sends: BS ($08)
```

Softerm **Terminal Emulation Parameters** define standard options associated with the various terminal emulations provided by Softerm. Many of the specific terminal emulations provided with Softerm 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 **User Defined** terminal emulation available in Softerm includes a function definition screen which allows you to define emulation functions by assigning control character sequences to standard functions such as clearing the screen. A complete description of the user defined terminal emulation can be found in Chapter 6.

The following terminal emulation parameters are standard options available in all Softerm terminal emulations:

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 enabled by selecting **Yes**, 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 enabled by selecting **Yes**, 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 you 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 enabled by selecting **Yes**, 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 enabled, 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 you to select the scrolling mode of the terminal. If this option is enabled by selection **Yes**, 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 **No** is selected for this option, scrolling is *enabled* and scrolling is performed when required as defined by the terminal emulation selected.

Enter Key Sends

The terminal emulation parameter **Enter Key Sends** allows you to select the character code generated when the **Enter** key is pressed. If **CR** is selected for this option, a carriage return (CR) character is sent to the host computer whenever the **Enter** key is pressed. If **LF** is selected for this option, a line feed (LF) character is sent to the host computer whenever the **Enter** key is pressed. If **CR/LF** is selected for this option, both a carriage return (CR) and a line feed (LF) character are sent to the host computer.

Backspace Key Sends

The terminal emulation parameter **Backspace Key Sends** allows you to select the character code generated when the **Backspace** and **Shift Backspace** keys are pressed. If **BS (\$08)** is selected for this option, an ASCII backspace (BS) character is sent to the host computer whenever the **Backspace** is pressed and an ASCII delete (DEL) is sent when the **Shift Backspace** key is used. If **DEL**

(\$7F) is selected for this option, an ASCII delete (DEL) character is sent to the host computer for the **Backspace** key, and an ASCII BS character is sent for the **Shift Backspace** key.

After editing of the terminal emulation parameters is complete, entering an **Alt Enter** will return to the terminal setup menu unless the terminal emulation being used includes additional parameters unique to the type of terminal. If there are special parameters required for the type of terminal selected, an additional parameter screen will be displayed. A complete description of the specific terminal emulations and features can be found in Chapter 6.

Online Operation

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

If a terminal emulation has not been specified, the error message **Terminal Emulation must be specified** is displayed. After pressing the **Esc** key to clear the error message, you must specify a terminal emulation by selecting the **Load Emulation** option before attempting to initiate online operation.

Refer to Chapter 4 for additional information on online terminal operation.

Exit to DOS

If the **Exit to DOS** option is selected, the Softerm program will terminate and you are returned to the DOS command prompt.

Terminal Operation



Terminal Operation

Introduction

The online mode of terminal operation is initiated from the main Softerm menu by selecting the **Online Operation** option and pressing **Enter** key. Online terminal operation is then **initialized** by performing the following steps:

- The screen is cleared, the terminal emulation selected is initialized, and the cursor is positioned to the home position at row 1, column 1.
- The serial communications interface is initialized and all characteristics such as line speed, parity, number of data bits, and stop bits are automatically set by Softerm.
- 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) RS-232 control signals on the serial communications interface.

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.

You should refer to documentation on your modem for dialing procedures and instructions on establishing remote connections. If you are using an auto-dial modem which Softerm supports with a dialer driver, you should refer to the section on the Softerm **dialer utilities**.

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 you while using Softerm which are not available while using a standard CRT terminal. These additional capabilities are accessed through Softerm **Utility Functions** using the **Alt 1** key and **Goto Functions** using the **Alt 2** key.

Chapter 4 includes information and instructions on all Softerm extended capabilities except for **File Transfer** which is covered in detail in Chapter 5.

Using the Keyboard

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.

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 *not* disabled, and data may still be received from the host computer when offline functions are being performed.

While an offline function is being executed, the serial interface will continue to receive data into the internal ring buffer. When you return to the online mode, any data received will then be processed normally. If the buffer becomes full during the offline operation, 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**.

When the offline function is complete, Softerm will automatically assert the **RTS** and **DTR** signals, or transmit 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. The following table summarizes the keyboard functions which may be used while entering and editing data in the offline mode:

Keyboard Function	Description
Alt ?	Keyboard Help
Esc	Allow Edit Character Input or Clear Error Messages
Alt Esc	Cancel Format
Enter	Accept Field
Ctrl Enter	Truncate & Accept Field
Alt Enter	Accept Format
Tab	Move to Next Field
Shift Tab	Move to Previous Field
←	Cursor Left
→	Cursor Right
Home	Move to Start of Field
End	Move to End of Field
PgUp	Restore Field to Original Contents
Delete	Delete Character
Backspace	Delete Previous Character
Ctrl End	Erase to End of Field
Insert	Toggle Insert Mode
Space, ↑↓←→	Select Multiple Choice Options
Space, Y, N	Select Yes/No Option
Shift Print	Print Screen with Formfeed
Alt Print	Print Screen without Formfeed

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


Online Keyboard Operation

The 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 generated using them are transmitted to the host computer.

All Softerm special functions and terminal emulation functions, are generated using key combinations which do not conflict with key combinations used to generate the standard ASCII character codes. Each terminal emulation defines the specific key combinations used to emulate the keyboard functions of that terminal. All Softerm terminal emulations include a keyboard help screen which can be accessed by pressing the **Alt ?** key in the online terminal operation mode. Even though each terminal emulation included with Softerm includes key combinations unique to that terminal, standard key combinations are used for basic functions and access to extended Softerm capabilities.

The following table summarizes standard terminal emulation keyboard functions provided with Softerm terminal emulations:

Key	Function
Enter	CR, LF, or CR/LF
→	Cursor Right
←	Cursor Left
↑	Cursor Up
↓	Cursor Down
Backspace	BS or DEL
Shift Backspace	DEL or BS
Home	Home Cursor
PgUp	Clear Screen
PgDn	Erase to End of Screen
End	Erase to End of Line
Ctrl Break	Soft Reset
Hold	Stop Display
Alt A	Send Answerback Message
Alt B	Break
Alt V	View Softerm Status Line
Alt W c	Wait for Character c
Alt Z n	Delay n Seconds (0-9)
Alt ?	Display Keyboard Help Screen
Alt 1	Softerm Utility Functions
Alt 2	Softerm Goto Functions
Alt Shift id	Execute Keyboard Macro A-Z, 0-9




Softerm allows all 128 ASCII character codes to be generated from the keyboard. All 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.

Additional terminal emulation and special function keys are defined for each specific terminal emulation provided with Softerm. Refer to Chapter 6 on terminal emulation for information on specific terminals.

Online Keyboard Functions

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

Carriage Return / New Line




The **Enter** 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 **Enter Key Sends** 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 → 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 ← 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 ↑ 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.

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 ↓ 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.

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.

Backspace/Delete

The **Backspace** key is used in the online terminal communications mode to provide the **backspace** or **delete** function. The terminal emulation option **Backspace Key Sends** allows you to define whether the **Backspace** key sends the **BS** Character \$0D or the **DEL** character \$7F. If **BS** is selected for this

option, the **Backspace** key will transmit a \$08 character and the **Shift Backspace** key will transmit a \$7F character code. If **DEL** is selected, the characters transmitted are reversed.

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.

Home Cursor

The **Home** 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 1 column 1 of the display screen.

Clear Screen

The **PgUp** 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 1 column 1) position.

Erase to End of Screen

The **PgDn** 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 last character position on the screen. The cursor remains at the initial row and column position at which this function was executed.

Erase to End of Line

The **End** 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.

Soft Reset

The **Ctrl Break** key is used in the online terminal operation mode as a **re-initialize** or **restart** function. Terminal operation is re-started as if you had just exited from the terminal setup menu to online terminal operation. Softerm is re-initialized as described in the introduction section of this chapter. Auto-dial modems are not re-initialized by soft reset processing. You should note that when this function is performed, any dial-up connection will *not be broken* and the current connection remains established.

Stop Display

The **Hold** key is used in the online terminal communications mode to provide the **stop display** function. You can use this key to stop the current display output. Pressing the **Hold** key will cause the display output to be halted after the next carriage return or cursor movement command is processed. Any key subsequently pressed will resume display output.

Although the Start/Stop display capability provided by Softerm is 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**. 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 **Receive Pacing** option of the communications parameters. When the ring buffer is able to again accept characters, an **XON** character is sent to the host computer or **DTR** is asserted.

Send Answerback Message

Entering a **Alt A** will cause the **answerback** string defined in the terminal setup communications 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.

Break

Entering a **Alt B** 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.

View Softerm Status Line

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 pressing **Alt V** during online terminal operation and the status is displayed on row 25. Online terminal operation is suspended and input is enabled on the status line whenever a blinking ► appears in the first column position. 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 **Alt V** or **Alt Esc**. If you exit using the **Alt V** key, the Softerm status line will remain on the screen during online operation. If you exit from the status line display using the **Alt Esc** key, the status line display will be cleared. The following information may be displayed on the status line depending on the state of the terminal emulation:

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.

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

Full Dplx 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 Dplx** mode.

Half Dplx 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 Dplx** mode.

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 or a capture line mode to print has been initiated 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 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 or a capture line mode to disk has been initiated 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.

Capture Xmit indicates that a transmit file utility function has been initiated and is currently active. In this mode, data is transmitted from the selected file as if it were entered from the keyboard.

Xlate On indicates that the *keyboard translate* feature is currently enabled and character codes are being translated as defined in the user keyboard translate table. This table is defined using the Define Translate Table capability accessed from the Goto Functions Menu by entering **Alt 2** during online terminal operation. Entering **T** while this status is displayed will toggle Softerm to the **Xlate Off** mode.

Xlate Off indicates that the *keyboard translate* feature is currently not enabled. Character codes defined in the user keyboard translate table will *not* be translated using the translate table and will be transmitted exactly as entered. Entering **T** while this status is displayed will toggle Softerm to the **Xlate On** mode.

Lowr indicates that the keyboard is currently in lower case mode and alphabetic characters entered will be processed as lower case. Pressing **Caps Lock** at any time will toggle the current mode to upper case from lower or to lower case from upper. Upper case mode is indicated by **Caps** on the status line.

↑↓→← indicates that the numeric keypad is currently in function mode with the cursor positioning keys and the **Home**, **PgUp**, **PgDn**, and **End** keys enabled. Pressing the **NumLock** at any time will toggle the current mode to numeric from function mode or to function mode from numeric. Numeric mode is indicated by **NMLK** on the status line.

MMM DD,YY HH:MM:SS indicates the current date and time. **C** toggles to **Connect: time**.

Connect: HH:MM:SS indicates elapsed time since the current connection was established. **C** toggles to the current date and time.

Wait for Character

Entering a **Alt 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 **Ctrl Break** key.

Pause

Entering a **Alt 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.

Display Keyboard Help Screen

All Softerm terminal emulations include a keyboard help screen which can be accessed by pressing the **Alt ?** key at any time during online terminal operation. When the **Alt ?** key is pressed, one or more screens are displayed which define the keyboard functions available in the current terminal emulation. The help

screens indicated which keys and key combinations are used to perform the same functions provided by the terminal being emulated. If multiple help screens are available, pressing any key will display the next help screen. After the last help screen has been displayed, pressing any key will restore the original contents of the screen before the **Alt ?** key was pressed.

Softerm Utility Functions

Softerm includes a selection of utility functions which can be accessed from online terminal operation by pressing the **Alt 1** key. The following pop-up menu will be displayed and utility functions may then be invoked by pressing one of the special function keys corresponding to the desired function:

```
Utility Functions
F1 Print Screen with FF
F2 Print Screen without FF
F3 Toggle Capture Transparent to Print
F4 Toggle Capture Line Mode to Print
F5 Send Command to Printer
F6 Queue Print File/Cancel Print
F7 Copy Screen to Disk
F8 Toggle Capture Transparent to Disk
F9 Toggle Capture Line Mode to Disk
F10 Transmit File

Alt Esc Cancels
```

The Softerm status line is also automatically displayed whenever the Utility Functions menu is displayed. The previous contents of the status line are restored when you return to the online mode of operation. A complete description of the Utility Functions is included later in this chapter.

Softerm Goto Functions

Softerm includes a selection of Goto functions which can be used from online terminal operation to access extended Softerm capabilities by pressing the **Alt 2** key. The following pop-up menu will be displayed and Goto functions may then be invoked by pressing one of the special function keys corresponding to the desired function:

Goto Functions

- F1 Disk Utilities
- F2 Dial Utilities
- F3 Local File Transfer
- F4 Line File Transfer
- F5 Define Keyboard Macros
- F6 Terminal Setup
- F7 Define Translate Table
- F8 Exit, Break Connection
- F9 Exit, Keep Connection

Alt Esc Cancels

A complete description of the Goto Functions is included later in this chapter.

Execute Keyboard Macro

The **Alt Shift** 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 **Alt 2, F1, Enter, Enter** character sequence entered in a keyboard macro will cause the **Disk Utilities** menu to be displayed and a **Display Directory** function to be selected displaying the current directory. A file transfer macro could be invoked through a keyboard macro to dial a host computer and automatically send **logon** sequences. A **Alt Shift id** sequence in a keyboard macro will cause the contents of the specified macro to be inserted in place of the **Alt Shift 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 **Alt** and **Shift** keys in combination with a single character id to select the desired keyboard macro. The single character id can be any character in the range **A-Z** or **0-9**. If the character code entered in combination with the **Alt Shift** keys does not match a currently defined keyboard macro, Softerm 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**.

Softerm Extended Functions and Capabilities

Softerm includes many extended features which enhance online terminal operation and provide capabilities not available with conventional terminals.

Softerm Goto Functions 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 the capability to define special keyboard translation.

Softerm Utility Functions provide terminal mode operations for printing screens, capturing received data to print or disk, copying screens to disk, and transmitting files from disk.

Softerm Utility Functions

Softerm includes a selection of utility functions which can be accessed from online terminal operation by pressing the **Alt 1** key. The following pop-up menu will be displayed and utility functions may then be invoked by pressing one of the special function keys corresponding to the desired function:

Utility Functions

```
F1 Print Screen with FF
F2 Print Screen without FF
F3 Toggle Capture Transparent to Print
F4 Toggle Capture Line Mode to Print
F5 Send Command to Printer
F6 Queue Print File/Cancel Print
F7 Copy Screen to Disk
F8 Toggle Capture Transparent to Disk
F9 Toggle Capture Line Mode to Disk
F10 Transmit File
```

Alt Esc Cancels

The Softerm status line is automatically displayed whenever the Utility Functions menu is displayed. This allows you to check the current status of the capture mode. The previous contents of the status line are restored when you return to the online mode of operation.

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 **Alt 1** to access the utility functions followed by an **F1**. To print the current screen without a form feed, enter **Alt 1** followed by an **F2**.

Softerm screen formats such as menus, configuration parameter displays, and data displays such as a display of the current directory or local file transfer output may also be printed by entering **Shift Print** to print the screen with a form feed or **Alt Print** to print the screen without a form feed.

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 on the status line.

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 **Alt 1** to access the utility functions menu followed by an **F3**. In the transparent mode, all data received is simultaneously sent to both the display and printer. Using this mode allows 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 **Alt 1** followed by an **F3** or **F4** to toggle the operation off.

The second mode of concurrent printing is called **line** mode and is enabled by entering **Alt 1** to access the utility functions menu followed by an **F4**. 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 **Alt 1** followed by an **F4** or **F3** to toggle the operation off.

Send Command to Printer

Softerm includes a utility function which allows **command strings** to be sent to the printer. This capability can be used to condition the printer for a subsequent print operation by including control characters in the string to select the character font, lines per inch, or other selectable printer attribute. To send a command string to the printer, enter **Alt 1** followed by an **F5**, and the last row of the screen will be temporarily replaced with the following screen:

Command:

Up to 30 characters can be entered in the command string. If you have defined **Printer Macro Strings** in the Communications Agent System Definition corresponding to function keys **F1** through **F10**, you can enter the macro strings in the printer command string simply pressing the corresponding function key. Initially, the function keys will display as «Fnn» in the printer command string. If you then press the **Enter** key, the macro strings represented by the function keys will be expanded on the screen *without* sending the command to the printer. This allows further editing of the printer command string before it is sent to the printer.

Once entry of the printer command string is complete, pressing the **Alt Enter** key will send the command string to the printer and restore the last row of the screen.

Queue Print File/Cancel Print

The operation of the **Queue Print File/Cancel Print** utility function is dependent on how the printer parameter **Port** has been selected.

If the printer parameter **Port** has been selected as **Disk**, this function allows the current temporary print file to be closed and queued to a selected printer. A new temporary print file will be automatically opened when the next print function is used during terminal operation. If **Alt 1** followed by **F6** is entered, the following query is displayed:

Print to Port:

You may select from available **COM** and **LPT** ports connected to printers by pressing the space bar or the $\uparrow\downarrow\rightarrow\leftarrow$ keys until the desired port is displayed and then pressing **Enter**. The current temporary print file **SOFTEMP.nnn** will be closed and added to the queue for the selected printer port. If **Disk** is selected for the **Print to Port:** option, the temporary print file is closed but is not queued to a port.

If the printer parameter **Port** has been selected as a **COM** or **LPT** port, this function allows you to cancel currently active printing on the selected port. If **Alt 1** followed by **F6** is entered, all remaining data buffered in memory will be discarded and printing will terminate.

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 **Alt 1** to access the utility functions followed by an **F7**, and the last row of the screen will be temporarily replaced with the following screen format:

Filename:

Enter the **filename** of the file into which the screen is to be copied. Be sure to enter the complete path if the file is to be saved in any directory other than the current directory. Once you have entered the a filename, press the **Alt Enter** key 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 on the Softerm status line.

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 **Alt 1** to access the utility functions menu followed by an **F8**. 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 **Alt 1** followed by an **F8** or an **F9**, or the capture buffer becomes full.

The **line** capture mode is enabled by entering **Alt 1** to access the utility functions menu followed by an **F9**. 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 **Alt 1** followed by an **F9** or **F8**, or the capture buffer becomes full.

If the capture buffer becomes full during online terminal mode, the current contents of the capture buffer are written to disk. While the data is being written to disk, Softerm will continue to receive unless approximately 2000 characters are received before the write operation is complete. Communications with the host is then temporarily suspended using the specified pacing method such as **XON/XOFF**. Communications is automatically resumed after the capture buffer has been saved.

When either a **Alt 1** followed by an **F8** or **F9** is entered, the following screen format is displayed:

Filename:

Enter the **filename** of the file into which data received is to be captured. Once the filename is entered, press the **Alt Enter** key to initiate the disk capture mode. The Softerm terminal status line will now indicate that the capture mode is active by displaying **Capture Disk**.

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 **Alt 1** to access the utility functions menu followed by an **F10**. The following screen format will then be displayed:

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Remove CR No Remove LF No EOL Char \$0D EOL Delay 0

This screen contains 4 fields and allows an **end of line character**, and **end of line delay** to be defined as well as options to **remove carriage returns** and **remove line feeds**. The end of line character can be specified as any ASCII character code in the range \$00—\$7F. The end of line delay is specified as a number from 0—99 to indicate the delay in one-tenth second increments to use between lines as indicated by the end of line character. Thus a value of 10 would indicate a 1 second delay. The options to remove carriage returns or line feeds may be used to make the data being transmitted compatible with the receiving system.

Once all fields have been entered, press **Alt Enter** and the following screen format will be displayed:

Filename:

Enter the **filename** of the file to be transmitted and press the **Alt Enter** key. 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 Goto Functions

Softerm includes a selection of Goto functions which can be used from online terminal operation to access extended Softerm capabilities by pressing the **Alt 2** key. The following pop-up menu will be displayed and Goto functions may then be invoked by pressing one of the special function keys corresponding to the desired function:

Goto Functions

F1 Disk Utilities
F2 Dial Utilities
F3 Local File Transfer
F4 Line File Transfer
F5 Define Keyboard Macros
F6 Terminal Setup
F7 Define Translate Table
F8 Exit, Break Connection
F9 Exit, Keep Connection

Alt Esc Cancels

Disk Utilities

The **Alt 2** key followed by **F1** is used to access the **Disk Utilities** from the online terminal operation mode. When this function is executed, a disk utilities menu is displayed which provides functions to display the current directory, delete files, rename files, and to set the current default directory path.

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

Dial Utilities

The **Alt 2** key followed by **F2** is used to access the **Dial Utilities** from the online terminal operation mode. If Softerm is being used 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 adding, deleting, listing, and printing entries in the Softerm Phone Book, and dialing 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 **Alt 2** key followed by **F3** is used to access **Local File Transfer** capabilities which allow local disk files to be printed, displayed, or copied. When this function is executed, the local file transfer menu is displayed which includes options for disk utilities, local file transfer, line file transfer, and queue management.

A complete description of file transfer capabilities and operation may be found in Chapter 5.

Line File Transfer

The **Alt 2** key followed by an **F4** is used to access **Line File Transfer** capabilities which allow setup and execution of file transfers to and from remote computer systems including **uploading** and **downloading** of files. When this function is executed, the line file transfer menu is displayed which includes options for interactive execution of file transfers, and creating and editing file transfer macro command files.

Define Keyboard Macros

The **Alt 2** key followed by an **F5** is utilized to access the **Keyboard Macro Setup** data entry screens. Keyboard macros are executed using the **Alt** and **Shift** 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 **Alt 2** key followed by an **F6** is used to return to the terminal setup mode. Refer to Chapter 3 on terminal setup for additional information.

Define Translate Table

The **Alt 2** key followed by **F7** is used to access the data entry screen which allows the keyboard translate table to be edited. This capability allows the default mapping of keyboard input character processing during online terminal operation to be modified. The keyboard translate feature can be toggled on or off from the Softerm status line display.

A complete description of the keyboard translate table may be found in this chapter in the section title **Keyboard Translate Table**.

Exit, Break Connection

The **Alt 2** key followed by **F8** is used to terminate the Softerm program and return to DOS, breaking any connection currently active. Softerm will perform the equivalent of a **hangup** operation by lowering the **DTR** modem signal, and then return to the DOS command prompt.

Exit, Keep Connection

The **Alt 2** key followed by **F9** is used to terminate the Softerm program and return to DOS, *without* breaking any connection currently active. This function can be used to temporarily return to DOS in order to execute another program. Although the connection is maintained, all data received while Softerm is not active is lost.

When Softerm is subsequently re-executed, it will automatically determine that a connection is already established, and will not reinitialize the communications interface. Online operation can proceed as if no interruption had occurred.

Softerm Disk Utilities

Introduction

Softerm includes a **Disk Utilities** option which allows a selection of DOS disk functions to be used without exiting the Softerm program. The Softerm disk utilities may be accessed from the online terminal operation mode using the **Alt 2** key to display the **Goto Functions** followed by **F1** to select the disk utilities. A selection for disk utilities is also included in the menus for most other Softerm extended features. 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 Goto Functions, the following menu is displayed:

```
Disk Utilities
Display Directory
Rename File
Delete File
Set Default Path
Alt Esc Cancels
```

When the disk utilities menu is displayed, the **Display Directory** option is selected by default as indicated by inverse video highlighting of the field. You should use the $\uparrow\downarrow\leftarrow\rightarrow$ keys or the space bar to select a function from the menu and then press the **Enter** key to select the highlighted function. Press the **Alt Esc** key if you want to cancel the disk utilities and return to the previous menu or online terminal operation.

Specifying Filenames

Filenames entered for Softerm disk utility functions may include a drive specifier and a complete directory path from the root directory of the drive including the special symbols backslash (\), period (.), or double period (..). If no directory path is specified, the current default directory path will be used. If the directory path specified does not begin with the root directory, Softerm assumes the directory path specified begins with the current default directory. The current directory path is displayed at the bottom of the screen whenever the disk utilities menu is displayed.

Softerm allows global or wildcard characters to be used in filenames specified for most disk operations performed in Softerm. The wildcard characters, asterisk (*) and question mark (?), are used to specify a subset of the filenames in a directory; by indicating the portion of a filename which may be ignored or which may match any series of characters. The asterisk is used to match any string of characters and the question mark is used to match single characters. An "*" used alone or "*.*" will match all filenames. An "*" will match only filenames with no extension.

The use of filename wildcard characters is identical to the operation of these characters when specified for standard DOS operations. The disk operation requested will be performed on all files whose filenames meet the subset specification.

For example, if the you wished to delete all the files in a directory which started with the characters **TEMP**, a wildcard filename specification of **TEMP*.*** could be entered for the filename when using the **Delete File** function. Another example of using wildcard characters is with the **Display Directory** function. Entering a filename specification of ***.EXE**, would cause only executable program files with the **.EXE** extension to be displayed in the resulting list.

If the first character of the filename is specified as a +, Softerm will display the query **Confirm?** for each file matching the filename template. If **No** is selected, the next matching filename will be displayed and the query repeated. If **Yes** is selected, the requested operation will be performed.

Disk Utilities Options

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

Display Directory

The **Display Directory** function is used to display a list of all the files in a directory, and optionally allow files selected from the list to be renamed or deleted. The entire directory is read into memory, and if all filenames contained in the directory cannot be contained on a single screen display, forward or backward scrolling may be used to view the entire directory list. An additional feature allows sub-directories shown in the list to be selected, and a display of the files in the selected sub-directory can be performed without returning to the disk utilities menu.

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If the **Display Directory** option is selected, Softerm will display the following screen:

Dir of:

The **Dir of:** field allows you to specify the directory to be listed and optionally a filename template to select only matching files for display. If no directory specification is entered and the **Enter** key is pressed, all files in the current default directory are listed. Otherwise, the directory specification is entered in same format used by DOS as follows:

[d:][path][filename[.ext]]

You can use the wildcard characters ? and * in the filename and extension parameters. After you have entered the directory specification to be listed, press the **Enter** key and a directory list in the following format will be displayed:

Volume: _____	Space Remaining: 318464
Path: B:\BASIC*	
.	<Directory>
ART.BAS	1920 03/08/83 12:00
CIRCLE.BAS	1664 03/08/83 12:00
COMM.BAS	4352 03/08/83 12:00
GAMES	<Directory>
MUSIC.BAS	8704 03/08/83 12:00
SAMPLES.BAS	2304 03/08/83 12:00
..	<Directory>
BALL.BAS	2048 03/08/83 12:00
COLORBAR.BAS	1536 03/08/83 12:00
DONKEY.BAS	3584 03/08/83 12:00
MORTGAGE.BAS	6272 03/08/83 12:00
PIECHART.BAS	2304 03/08/83 12:00
SPACE.BAS	1920 03/08/83 12:00

↑↓→← Move Cursor, Alt-Esc Cancels F1 = Delete, F9 = Rename, Enter = Dir

The directory list is displayed in alphabetical order left to right. While the directory list is displayed, selected files can be deleted or renamed. The ↑↓→← keys are used to select a specific filename entry which is indicated by inverse video highlighting of the field. If the **F1** key is entered for a selected filename entry, the following is displayed:

```
Delete: d:\path\filename.ext
Confirm? No
```

To delete the indicated filename, you must toggle the **Confirm?** query to **Yes** and then press the **Enter** key. The filename entry will be deleted and disappear from the directory list, and another filename entry can then be selected.

If the **F9** key is entered for a selected filename entry, the following is displayed:

```
Rename: d:\path\filename.ext
To:
```

To rename the indicated filename, enter a new filename in the **To:** field and press the **Enter** key. The file will be renamed and the new name will be displayed in the directory list. The new name cannot include a drive or directory path since the file will remain in the same directory after its name has changed.

If the selected filename is a directory entry as indicated by **<Directory>** in the entry, pressing the **Enter** key will cause a new directory list to be displayed of the selected directory. If the current directory displayed is a sub-directory, you can display its parent directory by selecting the entry containing a double period (**..**) and pressing the **Enter** key.

To **cancel** the current directory display and return to the disk utilities menu, press the **Alt Esc** key.

Rename File

The **Rename File** function is used to change the name of a file in the current or a specified directory. If this option is selected, the following screen is displayed:

Rename :

To:

Enter the filename of the file to be renamed in the **Rename:** field and the new filename in the **To:** field and press the **Enter** key. You can use the wildcard characters ? and * in the filename specification of both the file to be renamed and the new filename. Softerm will attempt to rename all files matching the filename template according to the new filename template. A drive and directory path can be specified only with the first filename; the file will remain in the same directory after its name has been changed. If no directory path is specified, the current default directory is assumed.

Delete File

The **Delete File** function is used to eliminate unwanted files from the current or a specified directory. If this option is selected, the following screen is displayed:

Delete:

Enter the filename of the file to be deleted in the **Delete:** field and press the **Enter** key. If no drive or directory path is entered, the file is deleted from the current directory. You can use the wildcard characters ? and * in the filename and in the extension. These characters should be used with caution, however, because multiple files can be erased in a single delete operation.

Set Default Path

The **Set Default Path** function is used to change the current default directory used for disk operations in Softerm. If this option is selected, the cursor is positioned to the **Current Path:** field at the bottom of the screen. The new current path including drive and directory path may then be entered. After the new default path has been specified, press the **Enter** key. Softerm will verify that the new drive and directory path is valid and return to the disk utilities menu.

Softerm Keyboard Macros

Introduction

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 **Alt Shift** keys are used in the online terminal communications mode to invoke a keyboard macro. The **Alt Shift** keys are pressed in combination with a **single character id** to select the desired keyboard macro. The keyboard macro id character can be any character in the range A–Z and 0–9. Alpha characters A–Z are restricted to uppercase only since Softerm will automatically convert lower case alpha keyboard macro ids to upper case. If the character code entered in combination with the **Alt Shift** keys does not match a currently defined keyboard macro, the keyboard macro sequence is ignored.

If the character code entered in combination with the **Alt Shift** 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 **Alt Shift 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 **Alt Shift** 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 20 individual keyboard macros of a maximum 28 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.

Define Keyboard Macros

The **Alt 2** key followed by **F5** during online terminal operation is used to access the keyboard macro setup data entry screens. If the **Define Keyboard Macros** option is selected from the Softerm Goto Functions menu, the following screen is displayed:

Keyboard Macro Options	Current Macro Definitions
	ID Text
Disk Utilities	
Edit Macros	
Save Macro File	
Load Macro File	
Alt Esc Cancels	

When the keyboard macro options menu is displayed, the **Disk Utilities** option is selected by default as indicated by inverse video highlighting of the field. The name of the current keyboard macro file if any is displayed at the bottom of the screen and the current macro definitions are displayed to the right of the options menu. You should use the $\uparrow\downarrow\leftarrow\rightarrow$ keys or the space bar to select a function from the menu and then press the **Enter** key to select the highlighted function. Press the **Alt Esc** key if you want to cancel the definition of keyboard macros and return to online terminal operation.

Before returning to online terminal operation, the current keyboard macro definitions may be printed with the **Shift Print** or **Alt Print** keys allowing you to keep a hard-copy record of the keyboard macro definition. You may also wish to save the keyboard macro definition using the **Save Macro File** option.

The following paragraphs will cover each option of the Keyboard Macro Options menu in detail:

Disk Utilities

The disk utilities option allows a selection of DOS disk functions to be used without exiting the Softerm program. These include functions to display the current directory, delete files, rename files, and to set the current default directory path.

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

Edit Macros

If the option **Edit Macros** is selected, the cursor is positioned to the **Id** field of the first macro definition in the following section of the keyboard macro options screen:

————— Current Macro Definitions —————

ID Text

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

Entering a new Keyboard Macro

Once the **Edit Macros** option is selected, the cursor is positioned to the first **keyboard macro entry**. Each keyboard macro definition may consist of up to 20 keyboard macro entries and each keyboard macro entry consists of two data entry fields.

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 **Alt Shift** keys when a keyboard macro is invoked. The keyboard macro id can be any character in the range A–Z or 0–9. 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 or the Extended ASCII character codes defined by Softerm to represent keys on the keyboard not included in the standard ASCII character set.

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 the representation for the **Enter** key in a keyboard macro, you must enter an **Esc** followed by a **Enter**. This code will be displayed in the keyboard macro text as a «ENT». **Esc** may be used with any data entry function key and **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 keyboard sequence **Alt 2, F3, ↑, Enter, LISTING, Enter, Alt Enter** invokes a local file transfer to video and displays the text file LISTING. Note that when this sequence is entered into a keyboard macro, the **Enter** and **Alt Enter** keys must be preceded by an **Esc** key.

Once the desired character codes have been entered in the text field of a keyboard macro entry, the entry is terminated by pressing the **Enter** 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 **Alt Enter** or **Alt Esc** will return to the Keyboard Macros Option menu.

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. The **Enter** and **Tab** or **Shift Tab** keys may be used to position the cursor to the macro id or the text of the keyboard macro entries which require editing. The field may then be edited using the cursor positioning and editing functions such as insert and delete character. Press the **Alt ?** key to display a keyboard help screen listing the available data entry format editing keys.

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 **Alt Enter** or **Alt Esc** keys will return to the Keyboard Macro Options menu.

Save Macro File

If the option **Save Macro File** is selected and the **Enter** key is pressed, the cursor is positioned to the **Current Macro File:** field at the bottom of the display. The current keyboard macro definition may be saved by entering a new filename or by editing the current filename and pressing the **Enter** key.

If this option has been chosen accidentally, **Alt Esc** may be pressed which will return the cursor to the Keyboard Macro Options menu without causing a **save** operation.

If the entered keyboard macro filename already exists, the query **Delete existing file?** will appear at the bottom of the display. Selecting **No** and pressing **Enter** indicates that you do *not* wish to delete the file. The cursor will return to the Keyboard Macro Options menu for further action. If **Yes** is selected, and the **Enter** key is pressed, the old file with the same filename will be deleted and the current keyboard macro definition will be written to disk.

If a disk 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 Keyboard Macro Options menu. 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 Keyboard Macro Options menu for further action. At this time, you can press the **Alt Esc** to return to online terminal operation.

Load Macro File

If the option **Load Macro File** is selected and the **Enter** key is pressed, the cursor is positioned to the **Current Macro File:** field at the bottom of the display. The filename of a **previously saved** keyboard macro file may be entered. Pressing the **Enter** key will cause the requested keyboard macro file to be loaded into memory.

If this option has been chosen accidentally, **Alt Esc** may be pressed which will return the cursor to the Keyboard Macro Options 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 you should refer to your DOS manual for a complete description of this and other errors which may occur. Appendix B 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 **Not a keyboard macro file** is displayed. Pressing the **Esc** key will clear this message and return the cursor to the Keyboard Macro Options menu.

Once the requested keyboard macro file is successfully loaded, the macro definitions are displayed, and the cursor is repositioned to the Keyboard Macro Options menu 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 **Alt Esc** key will return to online operation.

Keyboard Macro Example

Included on the Softerm System Diskette is a sample keyboard macro file named **EXAMPLE.KBM**. 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, you should first enter **Alt V** to display the status, **L** to toggle to the **Local** mode, and **Alt V** or **Alt Esc** to return to the terminal mode. Then enter **Alt 2** followed by **F5** to access the **Keyboard Macro Options** menu selection. The option **Load Macro File** should be selected and **EXAMPLE.KBM** entered as the filename. Once the keyboard macro file is successfully loaded, the following screen is displayed:

```
-----Current Macro Definitions-----
ID Text
1 Simple text string
2 String with terminator«cM»«cJ»
3 Dir «a2»«F01»«ENT»«ENT»
4 Dial ATTD4521710«cM»
5 Logon Name«cM»
6 Logon Password«cM»
7 «sa5»«aW»:«sa6»
8 ABCDEFGHIJKLMNOPQRSTUVWXYZ
9 «sa8»«sa8»«sa8»«sa8»«sa8»«sa8»«sa8»«sa8»
N «sa9»«sa9»«sa9»«sa9»«sa9»«sa9»«sa9»«sa9»
F FILESTATUS/AS/S +.SR«cJ»
L Loop «saL»
P Pause «aZ»5 Pause «aZ»5 «cM»«cJ»
X «a2»«F04»«UP »«ENT»CONNECT«ENT»«aENT»
C «a1»«F08»CAPTURE«aENT»
```

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 the **Alt Shift 1** key:

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 «**CM**» and a line feed «**CJ**». In the online terminal mode these functions would cause a **\$OD** and **\$OA** character to be transmitted to the host computer. The carriage return is entered into the macro using the **Ctrl M** key and the line feed is entered using a **CTRL J**. This keyboard macro is invoked in the online terminal mode using the **Alt Shift 2** key.

Keyboard Macro Id 3 contains a local directory list function executed using the **Softerm Disk Utilities**. A **Alt 2** key followed by **F1** was entered and is represented in the keyboard macro as «**a2**»«**F01**». An explanation of the representation of special keys such as the function keys in data entry strings may be found in Chapter 2 in the section *Using the Keyboard*. The first «**ENT**» provides an **Enter** for the **Display Directory** menu selection. The second «**ENT**» provides an **Enter** for the **Dir of:** directory name field. This keyboard macro is invoked using the **Alt Shift 3** key.

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 «**CM**» is transmitted to the modem which will dial the number specified when this keyboard macro is executed. This keyboard macro is invoked using the **Alt Shift 4** key.

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 **Alt Shift 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 the **Alt Shift 6** key.

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 «**sa5**» in this macro which represents the **Alt Shift 5** key is replaced with the contents of Keyboard Macro Id 5 and the «**sa6**» which represents the **Alt Shift 6** key is replaced with the contents of Keyboard

Macro Id 6. This macro also contains an example of a **wait for character** function. The «aW»: which represents the **Alt W** key 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 the **Alt Shift 7** key.

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 8 references to Keyboard Macro Id 8. Keyboard Macro Id N contains 8 references to Keyboard Macro Id 9. If Keyboard Macro Id N is invoked using the **Alt Shift N** key, the text in Keyboard Macro Id 8 will be transmitted 8 X 8 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 **DIR**. It may be invoked using the **Alt Shift F** key.

Keyboard Macro Id L is an example of how **looping** keyboard macros can be created. The text string **Loop** is continually transmitted until the **Ctrl Break** key is pressed since the «saL» representing the **Alt Shift L** key in the macro will cause this macro to repeat indefinitely. This macro is invoked using the **Alt Shift L** key.

Keyboard Macro Id P demonstrates how the **Alt Z** pause key can be used in a keyboard macro. The «aZ» represents the **Alt 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 «cM»«cJ». This macro is invoked using the **Alt Shift P** key.

Keyboard Macro Id X is an example of how Softerm file transfer macros can be executed using keyboard macros. The «a2»«F04» sequence representing a **Alt 2** key followed by **F4** will display the **Softerm Line File Transfer** menu. The multiple ↓ represented by «UP» selects **Execute** for a file transfer command file whose filename is **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 the **Alt Shift X** key.

Keyboard Macro Id C demonstrates how a general-purpose capture to disk function can be implemented using a keyboard macro. The «a1»«F08» representing the **Alt 1** key followed by **F8** initiates transparent capture to disk.

The **Filename:** is specified as **CAPTURE** and the «aENT» representing the **Alt Enter** key is used to accept the filename and initiate the capture operation. This keyboard macro can be invoked using the **Alt Shift C** key.

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. Automatic startup occurs whenever Softerm is executed and the command line includes a keyboard macro filename with the **/A** parameter. The filename specified with the **/A** parameter is a standard keyboard macro file which may be created using the keyboard macro setup utilities. If the specified keyboard macro file exists on the disk when Softerm is executed, the program will automatically initialize as if you had immediately entered the online operation mode from the main Softerm menu, and execute the *first* keyboard macro entry defined in the specified 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 create and execute a **.BAT** batch command file with commands to execute the Softerm program and to re-execute the BASIC program. The Softerm command line should include a filename using the **/A** parameter to specify an auto-execute keyboard macro file. The automatically executed 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 terminate Softerm and exit to DOS. The BASIC program when re-executed could then process the data which was downloaded and resume operation.

In this manner, entirely automatic communications with other systems can be accomplished easily using Softerm command lines which perform a function automatically when executed, or by incorporating the use of Softerm in an automatic mode with other applications. An alternative method of accessing Softerm capabilities from other applications is to install the Softerm Communications Agent as an extension to DOS and use the **Alt Break** key to access its functions directly from an applications program. This capability is explained in Chapter 7 on using Softerm advanced features.

Keyboard Translate Table

Introduction

The **Keyboard Translate Table** provides the capability to redefine the default mapping of keyboard input character processing during online terminal operation. The keyboard translate feature can be toggled on or off from the Softerm status line display.

For example, the **Ctrl D** key normally transmits a \$04 character when entered on the keyboard. Using the keyboard translate table, the **Ctrl D** key could be modified to access a keyboard macro which normally requires the **Alt Shift** key in combinations with a single character id in the range A–Z or 0–9. The keyboard macro, in turn, could be set up to access the dial utilities to establish a connection with a host computer. Thus a remote connection could be established simply by entering **Ctrl D** on the keyboard. The **Ctrl D** could also be modified to transmit up to a 2-character sequence such as **ESC D**.

The keyboard translate capability allows the function of the entire 128 character ASCII character set 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, a new copy of the configuration can be saved with the modified translate table.

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 **Alt V** key is used to display the current terminal status on the last row of the display. If the keyboard translate feature is off, **Xlate Off** is displayed on the status line. If the keyboard translate feature is on, **Xlate On** is displayed. Entering a **T** while the status is displayed and input is enabled as indicated by a blinking **▶**, allows the keyboard translate feature to be toggled on or off. If the current configuration is saved with the keyboard translate feature enabled, it will be enabled whenever the configuration is loaded without the necessity of using the Softerm status line.

Define Translate Table

To define the keyboard translate table, access the Softerm Goto Utilities using the **Alt 2** key. Select the **Define Translate Table** option with the **F7** key and the following data entry screen will be displayed:

Keyboard Translate Table

Key	Xlate	Key	Xlate	Key	Xlate	Key	Xlate	Key	Xlate	Key	Xlate
NUL	00 00 00	SYN	16 16 00	,	2C 2C 00	B	42 42 00	X	58 58 00	l	6C 6C 00
SOH	01 01 00	ETB	17 17 00	-	2D 2D 00	C	43 43 00	Y	59 59 00	m	6D 6D 00
STX	02 02 00	CAN	18 18 00	.	2E 2E 00	D	44 44 00	Z	5A 5A 00	n	6E 6E 00
ETX	03 03 00	EM	19 19 00	/	2F 2F 00	E	45 45 00		5B 5B 00	o	6F 6F 00

etc.

The keyboard translate screen includes 6 columns representing the keyboard characters from \$00–\$7F and their respective translation. Each entry includes the graphic keyboard character, its character code value in hexadecimal, and the two character sequence to which it can be translated.

The first character of the translation can be in the range \$00–\$AF, or \$F0–\$F7. Characters in the range \$00–\$7F are ASCII character codes. Characters in the range \$80–\$AF are Extended ASCII character codes representing the additional keys available on personal computer keyboards. Refer to Appendix C for a complete list of all ASCII and Extended ASCII character codes. Characters in the range \$F0–\$F7 represent combinations of the **Shift**, **Ctrl**, and **Alt** keys used with the second character in the translation according to the following table:

Code	Shift, Ctrl, Alt Key Combination
F0	None
F1	Shift
F2	Ctrl
F3	Ctrl Shift
F4	Alt
F5	Alt Shift
F6	Alt Ctrl
F7	Alt Ctrl Shift

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For example to translate a **Ctrl D** character to either a **Alt Shift D** to access a keyboard macro or an **ESC D** 2-character sequence, the following translation could be used:

Key	Xlate	Function
EOT 04	F5 44	Execute Keyboard Macro id D
EOI 04	1B 44	Transmit ESC D sequence

If the second character of the 2-character translation is specified as a \$00, only the first character will be transmitted.

When editing of the keyboard translate table is complete, press the **Alt Enter** or **Alt Esc** key to return to online terminal operation. The new keyboard translation can be used in the online terminal operation mode whenever it has been activated by using the **Alt V** terminal status command to turn the keyboard translate feature on.

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 system definition includes communications ports connected to auto-dial modems. The Softerm Dial Utilities may be accessed from the online terminal operation mode using the **Alt 2** key to display the Goto Functions followed by **F2**. 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 from the Goto Functions menu, the following screen is displayed:

```
—Dial Utilities Options —
  Add Phone Book Entry
  List Phone Book
  Print Phone Book
  Dial Number
  Hangup

      Alt Esc Cancels

Phone Book Path: A:\SOFTERM.FON
```

Softerm will automatically open the file **SOFTERM.FON** which contains the Softerm Phone Book if this file is found in the current default directory or the system file directory. The directory in which the phone book is found is displayed in the **Phone Book Path** field at the bottom of the screen. If Softerm is unable to find the file **SOFTERM.FON** in either the current default directory or the system directory, the following screen is displayed:

```
Unable to find SOFTERM.FON
Enter directory path:

Current system files path: A:
Current default files path: A:
```

You can then enter a directory path for the directory which contains or should contain the Softerm Phone Book and press the **Enter** key. If the file **SOFTERM.FON** exists in the directory specified, it will be opened. If the phone book does not exist in the specified directory, the message **Creating a new phone book** will be displayed and the file **SOFTERM.FON** will be created in the specified directory.

The default option for the Dial Utilities Options menu is **Dial Number** which allows you to initiate dialing of an entered number or a number from the Softerm Phone Book. This option may be selected simply by pressing the **Enter** key. Each option in the Softerm Dial Utilities menu is explained in the following paragraphs.

Add Phone Book Entry

If the option **Add Phone Book Entry** is selected, the following screen is displayed:

```
          Name:
          Number:
Number of Data Bits: 8
Number of Stop Bits: 1
          Parity: None
          Speed: 1200
```

The Softerm Phone Book file allows an unlimited number of entries consisting of an identifying **name**, the actual **phone number** to be dialed, and the **communications 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 **Enter** key or **Tab** and **Shift Tab** 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 attempts to enter a blank name will be ignored.

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
V	Go voice after dialing

The characters **P** and **T** may be used anywhere and intermixed freely in the number field to indicate the type of dialing for remaining digits. If the modem does not have the capability to switch between tone and pulse dialing within a number, the **P** and **T** characters are ignored except in the first character position. If neither a **P** nor **T** is specified, dialing will default to either pulse or touchtone depending on how the system definition **Dial Mode** is specified. Once a **P** or **T** is used in dialing a phone number, it becomes the new mode for subsequent numbers dialed in the current phone number.

The character **V** is used as the last character of a number to indicate that you intend to go into voice mode instead of data mode. The modem will return to the command state after the number is dialed.

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:

```
T19015551212
P@1-901-555-1212
T @ 8 + 0160 + (901) 555-1212
T9P5551212
```

Communications 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 **Enter** key or **Tab** and **Shift Tab** keys may be used to position forward or backward to the desired parameter entry field. Refer to the section titled **Communications Parameters** in Chapter 3 on Terminal Setup for a description of these parameters.

Once editing of the name, number, and communications parameters is complete, pressing the **Alt Enter** key will cause the new entry to be added to the current Softerm Phone Book file. 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. If the new entry is successfully added, the current entry is cleared and the cursor returns to the **Name:** field so that another entry can be added. Press **Alt Esc** to return to the dial utilities menu.

List Phone Book

The option **List Phone Book** allows the current contents of the Softerm Phone Book to be viewed one entry at a time. Once displayed, each phone book entry can be edited, displayed, or a dial operation initiated. If this option is selected, the following screen is displayed:

Name:
Number:
Number of Data Bits:
Number of Stop Bits:
Parity:
Speed:

←→↑↓ = Select Entry F1 = Dial F5 = Edit F9 = Delete

The cursor is positioned to the **Name** entry field. You can then enter a complete or partial name and press the **Enter** key. The first entry which matches or is greater than the name entered will then be displayed. If you press the **Enter** key without specifying a name, the first entry in the phone book will be displayed.

Once a phone book entry is displayed using the **List** option, you can use the **Enter, space, →, and ↓** keys to display the next entry, and the **← or ↑** keys to display the previous entry. Entries are maintained in alphabetical order beginning with the first entry.

Entering an **F1** while a Softerm Phone Book entry is displayed will cause Softerm to **dial** the number currently displayed. Refer to the **Dial Number** option for a description of the dialing operation.

Entering an **F5** while a Softerm Phone Book entry is displayed will allow the current entry to be edited. The cursor is positioned to the **Number** field and the number and communications parameters may be changed to the desired values. Once editing of the phone book entry is complete, the **Alt Enter** key is used to accept the changes and return to the **List** mode.

Entering an **F9** while a Softerm Phone Book entry is displayed allows the current entry to be deleted. If **F9** is entered, the message **Confirm deletion of entry** is displayed. To delete the entry, select **Yes** and press the **Enter** key. If you do not wish to delete the entry, select **No** and press the **Enter** key. Softerm will return to the **List** mode and the next phone book entry is displayed. If the last phone book entry is deleted, the previous phone book entry is displayed. If all entries have been deleted from the phone book, Softerm will return to the Dial Utilities Options menu.

Print Phone Book

If the option **Print Phone Book** is selected, the contents of the current Softerm Phone Book can be printed. If this option is selected, the following query is displayed:

Print to Port:

You may select **Disk** or from available **COM** and **LPT** ports connected to printers by pressing the space bar or the $\uparrow\downarrow\rightarrow\leftarrow$ keys until the desired selection is displayed and then pressing **Enter**. If the port selected is currently assigned to terminal emulation, the print data will be appended to the print capture buffer and sent directly to the printer. If the port selected is currently assigned to the Communications Agent, the print data will be written to a temporary file and the file will be added to the queue for the selected port. If **Disk** is selected, the print data will be written to a temporary file and its name will be displayed.

The cursor will return to the Dial Utilities Options selection automatically after the complete phone book has been printed.

Dial Number

If the **Dial Number** option is selected, the following screen is displayed:

Name:
Number:
Number of Data Bits: 8
Number of Stop Bits: 1
Parity: None
Speed: 1200

The cursor is positioned to the **Name** field. If you wish to dial a number from the Softerm Phone Book, the appropriate name identifier should be entered in the **Name** field. Pressing the **Enter** key will retrieve the corresponding entry from the phone book and allow you to modify the number or communications parameters if required. To initiate dialing of the number, press the **Alt Enter** key.

If no entry in the phone book is found which matches the name entered, the message **Name not found in phone book** is displayed. Pressing an **Esc** will allow the **Name** field to be re-entered.

If you do not wish to use the Softerm Phone Book, but instead enter a number directly, press the **Enter** key without entering a name to position the cursor to the **Number** field. The desired phone number should be entered and the **Enter** key pressed. You can also specify the serial communications interface parameters for the dial-up connection being established. If changes are required to any of the displayed parameters, the **Enter** or **Tab** and **Shift Tab** 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 3 on Terminal Setup. Once editing of the communications parameters is complete, pressing the **Alt Enter** key will initiate the dial operation.

If the dial utilities are accessed from online terminal operation, the dial operation is initiated on the port assigned to the current terminal configuration when the **Alt Enter** key is pressed. If the dial utilities are accessed from an external program using the Communications Agent, and more than one **COM** port is available for the dial operation, the following query is displayed:

Dial on Port:

You may select from available **COM** ports connected to computers using modems by pressing the space bar or the $\uparrow\downarrow\rightarrow\leftarrow$ keys until the desired selection is displayed and then pressing **Enter**. If only one **COM** port is available, Softerm will automatically use it. If there are no available modem controlled ports, the message **No available modem controlled ports** is displayed and the dial operation will be aborted.

Once the dial operation is initiated, Softerm checks for a **Dialer Type** other than **Manual** in the current system definition for the selected port. 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 if the dial utilities were accessed from online terminal operation. If the dial utilities were accessed from an external program using the Communications Agent, Softerm will return to the dial utilities menu after the connection is established.

Softerm will wait for the connection to be established as indicated by the presence of the **DCD** data carrier detect RS232-C control signal for approximately 45 seconds. If no connection can be made within this time interval, the message **No connection, redialing.....press control-break to abort** is displayed. Softerm will continue to retry the dial operation until the **Ctrl Break** key is entered.

Entering a **Ctrl Break** at any time during a dial operation will abort the dial operation and return to the dial utilities menu. The phone book file **SOFTERM.FON** is automatically closed whenever dialing is initiated.

If the **Dialer Type** in the Communications Agent System Definition is specified as **Manual** indicating that automatic dialing capability is *not* available, the following message is displayed when dialing is attempted:

From COMn: Dial nnnnnnn.. Press Esc at carrier

Pressing the **Esc** key will initiate a search for carrier and once a connection has been made, Softerm return to the online terminal mode or the dial utilities menu.

An alternative to dialing using the **Dial Number** option, is the **List Phone Book** option. Whenever a phone book entry is displayed using this option, dialing can be initiated by pressing the **F1** key. Dialing will proceed just as if the entry had been selected using the **Dial Number** option.

Hangup

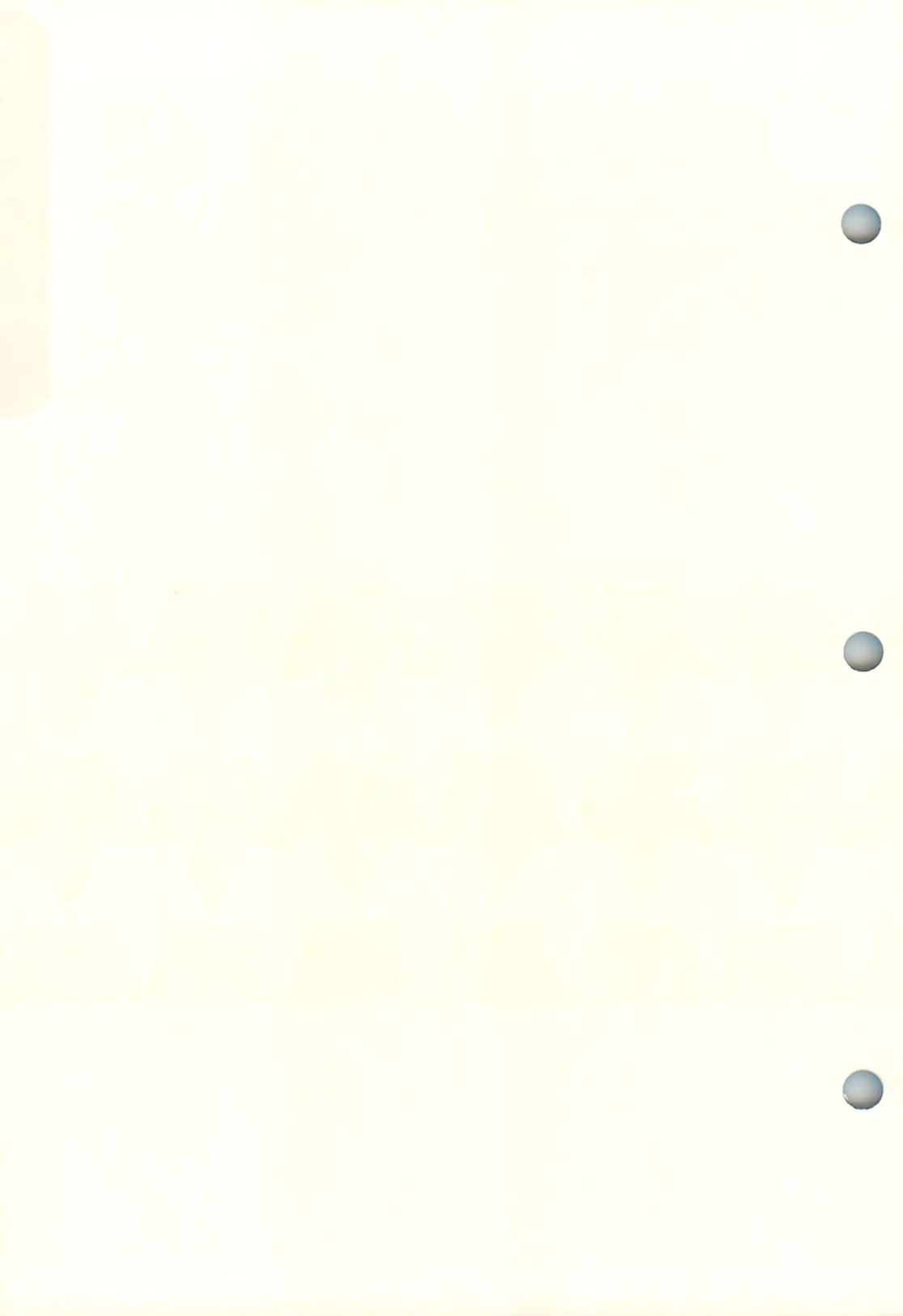
If the **Hangup** option is selected from the dial utilities menu, and the dial utilities were accessed from online terminal operation, Softerm will break the connection on the **COM** port assigned in the current terminal configuration by lowering the **DTR** modem signal. The **DTR** signal will be automatically raised after the hangup has occurred.

If the **Hangup** option is selected from the dial utilities menu, and the dial utilities were accessed from an external program using the Communications Agent, the following query will be displayed if more than one **COM** port is available for the hangup operation:

Hangup on Port:

You may select from available **COM** ports connected to computers using modems by pressing the space bar or the $\uparrow\downarrow\rightarrow\leftarrow$ keys until the desired selection is displayed and then pressing **Enter**. If only one **COM** port is available, Softerm will automatically select it for the hangup. If there are no available modem controlled ports, the message **No available modem controlled ports** is displayed and the hangup operation will be aborted.

After the hangup operation is complete, Softerm will return to the dial utilities options menu.



File Transfer

Introduction

Softerm offers a variety of file transfer modes flexible enough to match any user 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.

The local file transfer capabilities allow Softerm to function as a **file utility program** while maintaining communications with a host computer system. For example, text files can be displayed or printed, allowing you to verify the contents of the file before it is transferred to the host computer or after it has been received.

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 translating characters or ranges of characters to others, changing line terminators to match the requirements of the system, expanding tabs, compressing multiple spaces to a single space, padding blank lines, setting or clearing the high bit, removing unwanted characters or ranges of 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 captured as 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. 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 **buffer size** used for line file transfers is dependent on the type of protocol used. Softerm uses a 512 byte file buffer for disk accessing, a 128 byte communications buffer for the Softrans and XMODEM protocols, and a 1K byte communications buffer for the Character protocol. When transmitting a file from disk, data from the file is read into the file transfer buffer area and then transferred into the communications buffer area as required. This continues automatically until the entire file has been transmitted.

When receiving a file transmitted to Softerm, data is received into the communications buffer and then transferred to the file buffer where it is *concurrently* written to disk as other data is received. If the communications buffer becomes full before the file buffer has been written to disk, Softerm will automatically send an XOFF or lower DTR depending on the **spacing control** option selected during terminal setup. If this occurs, when the contents of the file buffer is completely written to the specified disk file, Softerm will automatically send an XON character or raise 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 a printer has been specified for use by terminal emulation, printing will occur concurrently with the reception of data. Otherwise, the file is received into a temporary file on disk and queued for subsequent printing by the Communications Agent.

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

directory list to another computer system. Files can be typed or accepted and the directory displayed using the character protocol, XMODEM send and receive file requests can be processed, and Softrans commands are automatically executed.



Softerm Local File Transfer

Local File Transfer Options

The **Alt 2** key followed by **F3** during online terminal operation is used to access the Softerm local file transfer capability. If the **Local File Transfer** option is selected from the Softerm Goto Functions menu, the following screen is displayed:

```
—Local Transfer Options —  
Disk Utilities  
Copy File to Video  
Copy File to Print  
Copy File to Disk  
Line File Transfer  
Queue Management  
Alt Esc Cancels
```

When the local transfer options menu is displayed, the **Copy File to Print** option is selected by default as indicated by inverse video highlighting of the field. The current directory path is also displayed at the bottom of the screen. You should use the $\uparrow\downarrow\leftarrow\rightarrow$ keys or the space bar to select an option from the menu and then press the **Enter** key to select the highlighted function. Press the **Alt Esc** key if you want to cancel Local File Transfer option selection and return to online terminal operation.

Local Transfer Options

Each option on the Softerm Local File Transfer menu is explained in the following paragraphs.

Disk Utilities

The disk utilities option allows a selection of DOS disk functions to be used without exiting the Softerm program. These include functions to display the current directory, delete files, rename files, and to set the current default directory path.

A complete description of the disk utilities may be found in Chapter 4 on terminal operation.

Copy File to Video

If **Copy File to Video** is selected from the local transfer options, the following screen is displayed:

Source File Path

This option is used to display the contents of a file on the the video monitor. Enter the filename of the file to be transferred to the video display in the **Source File Path** field and press the **Enter** key. If no drive or directory path is entered, the file is assumed to be in the current directory. If a filename is entered without using the wildcard characters ? or *, only the designated file will be transferred. If the source file path contains wildcard characters, the local file transfer operation will automatically repeat until all filenames which match the source filename template have been displayed, or the **Ctrl Break** key is used to abort the local transfer operation.

If the first character of the source file path is specified as a +, Softerm will display the query **Confirm?** for each file matching the filename template. If **No** is selected, the next matching filename will be displayed or the or the cursor will return to the local transfer options menu. If **Yes** is selected, processing of the selected file will continue.

Once the **Source File Path** has been entered, the **Edit Options**, data entry screen is displayed. These options allow the data from the file to be *reformatted* as the file is transferred. The edit options used are assumed to be the same for all files transferred when the source file path includes the wildcard characters * or ?. If the + character is used so that files must be confirmed, Softerm allows the edit options to be specified for each file.

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, pressing **Alt Enter** will initiate the display to video of the source files requested.

Once the display of the requested file is initiated, Softerm reads data from the file into memory, clears the screen and displays up to 24 lines of the data. If there is more data in the file, the message **More.....** is displayed on row 25. If there is no remaining data in the file, the message **No More..** is displayed.

If Softerm indicates there is **More.....** data in the file to be displayed, pressing any non-function key will cause the next page of data to be displayed. If there is **No More..** data in the file, enter **Alt Esc** to terminate display of the current file and begin display of the next file if more than one file matches the source filename template. Otherwise, the local transfer options menu is displayed.

Pressing **Alt R** will cause the local file transfer to *restart* from the beginning of the file. You can print the current screen by pressing either **Shift Print** to print the screen with a formfeed or **Alt Print** to print the screen without a formfeed.

Pressing **Alt Esc** will cancel display of the current file and begin the next if more than one file matches the source filename template. Otherwise, the local transfer options menu is displayed. The **Ctrl Break** key will abort the local file transfer operation and return to the local transfer options menu.

Copy File to Print

If **Copy File to Print** is selected from the local transfer options, the following screen is displayed:

————— Source File Path —————

This option is used to print the contents of a file on the printer. Enter the filename of the file to be transferred to the printer in the **Source File Path** field and press the **Enter** key. If no drive or directory path is entered, the file is assumed to be in the current directory. If a filename is entered without using the wildcard characters ? or *, only the designated file will be transferred. If the source file path contains wildcard characters, the local file transfer operation will automatically repeat until all filenames which match the source filename template have been printed, or the **Ctrl Break** key is used to abort the local transfer operation.

If the first character of the source file path is specified as a +, Softerm will display the query **Confirm?** for each file matching the filename template. If **No** is selected, the next matching filename will be displayed or the cursor will return to the local transfer options menu. If **Yes** is selected, processing of the selected file will continue.

Once the **Source File Path** has been specified, the following screen is displayed:

Printer Definitions

Print to Port: LPT1
Initialization String:
Deactivation String:
Copies: 1 Delete After Print: No
Page Length: 66 Page Skip Count: 6
Column Width: 80 Fold Long Lines: Yes

The **Printer Definitions** allow formatting options to be specified for each file printed. The following paragraphs describe each of the printer definition options available.

The **Print to Port** option allows you to specify on which port the file will be printed. If you are accessing local file transfer from Softerm terminal emulation, the use of this option depends on how the terminal setup printer **Port** has been specified.

If the port selected for the local file transfer is the same as the terminal setup printer **Port** in the current terminal configuration, Softerm uses the online capture buffer area for the print operation and sends the data from the capture buffer directly to the selected printer. When printing is initiated, Softerm will read as much of the file as possible into the capture buffer area, and will begin printing. Editing according to the options specified is performed as the file is printed. If the current capture buffer does not contain the entire file, additional data is read from the file as the capture buffer empties. This process continues until the file has been completely read into the capture buffer, or the file transfer is aborted.

If the terminal setup printer **Port** has been specified as **Disk** or **None**, or is not the same as the port selected for the local file transfer, or you are accessing local file transfer from an external program using the Communications Agent **Alt Break** feature, background printing of the file will be managed by the Communications Agent. Softerm allows you to select from available **LPT** and **COM** ports connected to printers configured in the Communications Agent System Definition. After the edit options have been specified, Softerm will add an entry for the selected file to the print queue of the designated port. The file will be printed after any previous entries in the print queue are completed.

The **Initialization String** and **Deactivation String** allow you to specify strings of up to 10 characters which will be sent to the printer when printing of the selected file is initiated or terminated. You can also enter function keys

F1—F10 to include printer macros defined in the Communications Agent System Definition. When entered, these function keys will be displayed as «Fnn». When the **Enter** key is pressed to terminate the initialization or deactivation string, the printer macro definition characters will be substituted and displayed.

The **Copies** option allows you to specify the number of times the selected file is to be printed. Its value may range from 1 – 255.

The **Delete After Print** option allows you to specify whether the selected file is to be deleted after it is printed. If **Yes** is selected for this option, the print file will be automatically deleted after printing completes. If **No** is selected for this option, the print file will not be deleted.

The **Page Length** option allows you 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.

The **Page Skip Count** option 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.

The **Column Width** option 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.

The **Fold Long Lines** option indicates whether print lines longer than the number of columns defined should be *truncated* or *folded*. Folding means that the long print line is printed first on one line up to the number of columns available, and then the remainder is printed on the next line. Truncation means that the remainder is not printed. Select **Yes** for this option if folding is desired or **No** if long print lines are to be truncated.

Once the **Printer Definitions** have been entered, the **Edit Options**, data entry screen is displayed. These options allow the data from the file to be *reformatted* as the file is transferred. The edit options used are assumed to be the same for all files transferred when the source file path includes the wildcard

characters * or ?. If the + character is used so that files must be confirmed, Softerm allows the edit options to be specified for each file. 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, pressing **Alt Enter** will initiate printing of the source files requested.

Pressing **Alt Esc** will cancel printing of the current file and begin the next if more than one file matches the source filename template. Otherwise, the local transfer options menu is displayed. The **Ctrl Break** key will abort the local file transfer operation and return to the local transfer options menu.

Copy File to Disk

If **Copy File to Disk** is selected from the local transfer options, the following screen is displayed:

————— Source File Path —————

This option is used to copy the contents of one file to another. Enter the filename of the file to be copied in the **Source File Path** field and press the **Enter** key. If no drive or directory path is entered, the file is assumed to be in the current directory. If a filename is entered without using the wildcard characters ? or *, only the designated file will be copied. If the source file path contains wildcard characters, the local file transfer operation will automatically repeat until all filenames which match the source filename template have been copied, or the **Ctrl Break** key is used to abort the local transfer operation.

If the first character of the source file path is specified as a +, Softerm will display the query **Confirm?** for each file matching the filename template. If **No** is selected, the next matching filename will be displayed or the cursor will return to the local transfer options menu. If **Yes** is selected, processing of the selected file will continue.

Once the **Source File Path** has been entered, the following screen is displayed:

————— Destination File Path —————

Enter the destination filename for the copy file to disk operation and press the **Enter** key. If no drive or directory path is entered, Softerm assumes the file is to

be created in the current default directory. If you use the wildcard characters ? or * in the source filename, Softerm will attempt to copy all files matching the source filename template according to the destination filename template. If you also use wildcard characters in the destination filename template, destination filenames will correspond to the source filename according to the position of the wildcard characters.

Once the **Destination File Path** has been entered, the **Edit Options**, data entry screen is displayed. These options allow the data from the file to be *reformatted* as the file is transferred. The edit options used are assumed to be the same for all files transferred when the source file path includes the wildcard characters * or ?. If the + character is used so that files must be confirmed, Softerm allows the edit options to be specified for each file. 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, pressing **Alt Enter** will initiate copying of the source files requested.

If the destination filename already exists, the following option screen is displayed:

File Already Exists, Select Option: Delete Append Cancel

The default option is **Cancel** to abort the file transfer. If **Enter** is pressed selecting the default option, or if **Cancel** is selected, copying of the selected file is aborted and the next file matching the source filename template will be copied, or Softerm will return to the local transfer options menu if there are no more files to be copied. If **Delete** is selected, the old file is deleted in preparation for the new file to be transferred. If **Append** is selected, the source file data will be appended to the end of the destination file. The **Append** option can be used to append multiple source files to a single destination file.

Once the local file transfer to disk is complete, the local transfer options menu is redisplayed for further action or the next source file which matches a wildcard filename specification will be copied.

Pressing **Alt Esc** will cancel copying of the current file and begin the next if more than one file matches the source filename template. Otherwise, the local transfer options menu is displayed. The **Ctrl Break** key will abort the local file transfer operation and return to the local transfer options menu.

Line File Transfer

If the option **Line File Transfer** is selected from the local transfer options menu, the **Line Transfer Options** menu is displayed. Refer to the section titled **Softerm Line File Transfer** for a complete description of these options.

Queue Management

The Softerm Communications Agent provides a job queue for each **COM** and **LPT** port configured as well as a **Time** queue for file transfer requests scheduled for a specific date and time. Queue management allows you to display the status of all queues, display job entries on a selected queue, delete individual jobs from a selected queue, or flush all jobs from a selected queue. Refer to Chapter 7 on Advanced Features for a complete description of background processing and queue management.

File Transfer Edit Options

Softterm 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 information has been specified for a local or line file transfer, the following screen is displayed:

```
----- Edit Options -----  
  
      Hi Order Bit: No Change          Hex Dump: No  
Desired End of Line: No Change      Tab Column Multiple: 0  
      Pad Blank Lines: No            Space Compress: No  
  
Remove:  
Translate:
```

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. The **Enter** or **Tab** and **Shift Tab** may be used to position the cursor to any of the edit options. Pressing the **Alt Enter** terminates the editing of options and initiates the selected file transfer.

Hi Order Bit

The edit option **Hi Order Bit** the high order bit of each character in the source file to be set, cleared, or remain unchanged. If **Set** is selected, it 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. If **Clear** is selected, it will cause the high order bit of each character in the source file to be set to a binary 0 bit as the file is transferred to the destination. If **No Change** is selected, the high order bit is unaffected.

Hex Dump

The edit option **Hex Dump** if selected by **Yes** will cause the source file to be converted to a displayable hexadecimal dump format which appears as follows:

```
00000000: 48 45 58 20 44 55 4D 50 0D 0A 00 00 00 00 00 00  HEX DUMP.....
```

Each line will display a 8 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 during online terminal operation using the **Alt 1** key followed by **F8**, 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 except for the **Hi Order Bit** option are ignored.

Desired End of Line

The edit option **Desired End of Line** allows you to choose what line terminator is to be used for the destination when transferring text files. The line terminators may be selected from **CR** for **carriage return**, **LF** for **line feed**, or **CR/LF** for **carriage return/line feed**. Softerm will automatically convert the line terminators used in the source file to the selected line terminator in the destination file.

Tab Column Multiple

The edit option **Tab Column Multiple** 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.

Pad Blank Lines

The edit option **Pad Blank Lines** if selected by a **Yes** will cause any line in the source file which consists of a single **line terminator** character to be changed to a **space** character followed by a **line terminator** 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 only a line terminator.

Space Compress

The edit option **Space Compress** if selected by a **Yes** 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.

Remove and Translate

The edit option **Remove** is used to remove selected characters and ranges of characters from the source file as the file is written to the destination. The **Translate** edit option is used to convert characters or ranges of characters to other characters or strings of characters. These options are useful if a file contains unwanted formatting characters which must be removed or converted before the data can be processed.

The **Remove** or **Translate** string entry fields may contain *multiple* arguments which may be optionally separated by **spaces** or **commas (,)**, or ranges separated by a **hyphen (-)**. Arguments in the **Translate** field must be specified in **pairs** so that both a **from** and **to** argument are included for each translate entry in the field. Character arguments and ranges may be specified in either ASCII or hexadecimal characters in the range \$00—\$FF. A hexadecimal character is indicated by a \$ followed by 2 digits in the range 0—9 or A—F.

The backslash character \ is used to indicate that the next character has no special interpretation. It may be used with space, comma, hyphen, dollar sign, and backslash to allow these characters to be used in arguments.

The following are examples of valid arguments in the **Remove** or **Translate** edit option fields:

ArgumentFunction

A	Single ASCII Character
\$41	Single Hexadecimal Character
a-z	ASCII Character Range
\$61-\$7A	Hexadecimal Character Range
\,	Comma as Argument

The following are examples of valid specifications for **Remove** and **Translate**:

a-z,A-Z \$7F,\$20 ([,])

This string, if used in the **Translate** edit option field, will convert lowercase a-z to uppercase A-Z, convert all DEL (\$7F) characters to a space (\$20), and will convert parenthesis () to square brackets []. Arguments in the **Translate** field must be specified in pairs.

\$00-\$08 \$0B \$0E-\$1F

This string, if used in the **Remove** edit option field, will remove control characters except for HT (\$09), LF (\$0A), FF (\$0C), and CR (\$0D).

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 **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 3 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.

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.F77** 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 captured 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. Character protocol receive operations are terminated by a **Ctrl Break** key 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. Softerm allows character codes to be **translated** to a different character code or **removed** as they are sent using the file transfer **edit options**. 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 Softerm 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 personal computer systems, the Softerm protocol should be used if possible 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 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

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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«cM»** to execute the XMODEM program to receive the specified file.

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«cM»** to execute the XMODEM program and send the specified file. 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.F77** 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 personal computer 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 a personal computer executing the Softerm program and a host computer executing the **SOFTRANS.F77** program, the personal computer is always the controlling system since the **SOFTRANS.F77** program is written to operate in monitor mode only.

The Sofrans 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 Sofrans protocol:

Hex	ASCII	Function
\$7B	{	Start of Message
\$7C		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 Sofrans message are in the range (\$20–\$7A), with a carriage return used to terminate blocks.

The Sofrans 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 Sofrans 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 Sofrans and biased to appear as non-control characters. The ASCII vertical bar (|) 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 Sofrans as special functions which does not allow these characters to be transparently transferred through the network. Sofrans allows the user to specify up to 8 additional characters which are automatically encoded and decoded during file transfers.

The Sofrans 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 block 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 an encoded 16-bit cyclic redundancy check (CRC-16) which functions as a checksum for the block.

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.

Three different error detection methods are used by Softrans to provide reliable error-free file transfers. These include 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 personal computer 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 a personal computer system and a host computer system executing the **SOFTRANS.F77** program, the personal computer is the controlling system and the host computer is automatically in the monitor mode when **SOFTRANS.F77** 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. The disposition of files sent to or received from a host computer system executing the **SOFTRANS.F77** 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 Uninet. 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 file transfers between personal computers 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.

File Transfer Command Language

Softerm line file transfers are controlled by a **command language** which can be used in an interactive immediate execution mode or in a deferred execution mode using file transfer **command files** which contain multiple commands. The use of file transfer command files, described later in this section, allow file transfer sequences to be pre-defined and executed automatically when required.

The file transfer command language consists of 35 commands which may require additional parameters. The following table lists the file transfer commands and their basic function:

Command	Function
ABORT	Abort Command Execution
BREAK	Transmit Break Signal
CHAIN	Execute New Command File
CHDIR	Change Default Directory
CONVERSE	Exit to Terminal Mode
DELAY	Delay hh:mm hours and minutes
DIAL	Dial a Phone Number
ELSE	Alternate Conditional Processing
END	End of File Transfer Command File
ENDIF	End Conditional Processing
HANGUP	Disconnect, Lower DTR
HELP	Display File Transfer Help Screen
IF	Begin Conditional Processing
JUMP	Jump to LABEL
LABEL	Name a Command Sequence
LOG	Begin Logging
MONITOR	Initiate MONITOR Mode
NOLOG	End Logging
ON	On string received, Jump to LABEL
ONERR	On Error Jump to LABEL
PAUSE	Delay n Seconds
PROMPT	Display Operator Message
QCOMM	Queue File Transfer Command File
QPRINT	Queue Print File
RECEIVE	Receive a File
REMARK	Comment

RESUME	Resume Execution After Error
RETRIES	Define Retry Count
RETRY	Retry Last Command
SCHEDULE	Wait Until Date, Time
SEND	Transmit a File
SPEED	Define Transmit Character Delay
TERMINAL	Interactive Terminal Mode
TIMEOUT	Define Timeout Interval
XMIT:WAIT	Transmit a String, Wait for Reply

The following paragraphs describe the various command 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.

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 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 to create a command file and the **command execution mode** where the commands are actually executed.

Softerm includes a built-in editor for creating command files. However, command files are standard text files and can be created using almost any editor or word processor. A description of the command syntax used is included in this section. Additional information on general command syntax is found in the section on command files.

Specifying Filenames

Filenames entered for Softerm file transfer commands may include a drive specifier and a complete directory path from the root directory of the drive including the special symbols backslash (\), period (.), or double period (..). If no directory path is specified, the current default directory path will be used. If the directory path specified does not begin with the root directory, Softerm assumes the directory path specified begins with the current default directory.

Softerm allows global or wildcard characters to be used in filenames specified for most file transfer commands performed by Softerm. The wildcard characters, asterisk (*) and question mark (?), are used to specify a subset of the

filenames in a directory, by indicating the portion of a filename which may be ignored or which may match any series of characters. The asterisk is used to match any string of characters and the question mark is used to match single characters. An "*" used alone or "*.*" will match all filenames. An "?" will match only filenames with no extension.

The use of filename wildcard characters is identical to the operation of these characters when specified for standard DOS operations. The file transfer command requested will be performed on all files whose filenames meet the subset specification.

If the first character of the filename is specified as a +, Softerm will display the query **Confirm** for each file matching the filename template. If **No** is selected, the next matching filename will be displayed and the query repeated. If **Yes** is selected, the requested operation will be performed.

When using the Softrans protocol to transfer files to or from Softerm executing on an Apple II personal computer, you can also specify **Volume**, **Drive**, and **Slot** parameters on the source or destination filenames. The standard Apple DOS command format may be used as follows:

filename,Vnnn,Dn,Sn

The **V** parameter if specified indicates the Volume number from **0—254** for DOS format disks, **PAS** for Pascal format disks, or **CPM** for CP/M format disks. The **D** parameter if specified indicates the Drive number to be used as **0** or **1**. The **S** parameter if specified indicates the Slot number from **1—6**.

ABORT

The **ABORT** command is used to abort the execution of a file transfer command file. It is usually used in combination with the **ONERR** command and **IF ERROR** conditional processing when it is desired to terminate execution of the command file due to the type of error encountered.

The **ABORT** command is entered in the command edit or immediate execution modes in the following format:

> **ABORT**

The **ABORT** command requires no additional parameters when entered. The current command file and log file are closed when an **ABORT** command is executed.

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 **Alt B** 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 is entered in the command edit or immediate execution modes in the following format:

```
> BREAK
```

The **BREAK** command requires no additional parameters when entered.

CHAIN

The **CHAIN** command is used to terminate the execution of the current file transfer command file and to execute another. It can also be used in the command execution mode to execute a file transfer command file when executing file transfer commands interactively. It can be used within a command file when a single file transfer command file cannot contain all the commands required or it is desired to segment the operation of multiple file transfers. All file transfer variables such as error processing retry count, transmit character delay, and timeout value are unchanged after the **CHAIN**. Logging will remain enabled if active.

The **CHAIN** command is entered in the command edit or execution modes in the following format:

```
> CHAIN d:\path\filename.ext
```

The new file transfer command file path is entered as an argument on the command line. In the command edit mode, the **CHAIN** command will be added to the current command file. In the immediate command execution mode, the new file transfer command file will begin execution immediately after the **Enter** key is pressed.

Wildcard characters are not allowed in the filename entered. When a **CHAIN** command is executed, if the specified file transfer command file does not exist, an error message is displayed and the command is aborted in command execution mode. Execution of the current command file is aborted if this command is being executed from a command file.

CHDIR

The **CHDIR** command is used to change the current default directory used for filenames specified in file transfer commands. The **CHDIR** command is entered in the command edit or immediate execution modes in the following format:

```
> CHDIR d:\pathname
```

The new default directory including a drive specifier and directory path is entered as an argument on the command line. Filenames entered for file transfer commands may include a drive specifier and a complete directory path from the root directory of the drive. If no directory path is specified in a filename, the current default directory path will be used. If the directory path specified in a filename does not begin with the root directory, Softerm assumes the directory path specified begins with the current default directory.

When entered in the command edit mode, the **CHDIR** command will be added to the current command file being edited. If the command file is executed, the **CHDIR** command will cause subsequent commands to reference the new default directory. When entered in the immediate execution mode, all subsequent commands entered will reference the new default directory.

CONVERSE

The **CONVERSE** command is used to return to the online terminal operation mode *terminating* the current file transfer interactive command or command file execution. The **CONVERSE** command is useful when an immediate return to the online terminal mode is required from a file transfer command file or the interactive command execution mode.

The **CONVERSE** command is entered in the command edit or immediate execution modes in the following format:

```
> CONVERSE initial string
```

Up to 35 characters may be entered as initial keyboard input to the online terminal mode as an argument on the command line. Extended ASCII characters are not allowed in the initial string, but a special sequence is allowed to invoke keyboard macros from the initial string. A tilde (~) character followed by an M is used to reference a keyboard macro. The **keyboard macro id** character which identifies the keyboard macro to be used immediately follows this sequence. For example, a sequence such as ~M1 is used to invoke keyboard macro id 1.

The **CONVERSE** command is not valid when used in a command file executed in the background by the Communications Agent or when terminal mode is not available. If the **Initial String** is used when returning to the limited Communications Agent terminal mode, it can only be used for transmitted data since keyboard macros are not available in this mode.

Once the **Initial String** has been entered, pressing the **Enter** key in the command edit mode will add the command to the current command file being edited. When entered in the command execution mode, file transfer command 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.

DELAY

The **DELAY** command is used to suspend the execution of file transfer commands for a specified interval in hours and minutes. The **DELAY** command is entered in the command edit or immediate execution modes in the following format:

```
> DELAY hh:mm
```

The delay time in hours (hh) and minutes (mm) is specified as an argument on the command line. For example, a delay of 1 hour and 10 minutes would be specified as 01:10 and a delay of 5 minutes would be specified as 00:05.

If a **DELAY** command is executed in immediate command execution mode, no further commands can be entered until the delay expires or the command is aborted. If used in a command file executed during terminal emulation, command processing will be suspended for the specified time interval. The **DELAY** command can be aborted at any time by pressing the **Alt Esc** or **Ctrl Break** keys.

If a **DELAY** command is encountered in a command file being executed by the Communications Agent in the background, execution of the command file is suspended and the command file is queued on the **Time** queue. When the specified time interval expires, the command file will be requeued on the **COM** queue from which it was removed.

When using the delay command to suspend execution of a command file in the background, it is usually advisable to execute a **HANGUP** command before the **DELAY** command to break the current connection. Other command files may be executed during the delay period which change the current connection. A **DIAL** command can then be used to re-establish the connection after the delay expires. If logging is active when a command file is suspended, the log file is temporarily closed and then reopened automatically when the command file is resumed. The current default directory when the command file is suspended, **RETRIES** count, and **TIMEOUT** value will be restored.

DIAL

The **DIAL** command is used when it is necessary to establish a dial-up connection to another system for file transfer or to change the current serial communications parameters such as baud rate. If automatic dialing capability is available and the appropriate **Dialer Type** has been specified in the Communications Agent system definition for the selected port, the designated number can be dialed automatically. If automatic dialing capability is not available, Softerm will display a message to indicate that the number must be dialed manually.

The **DIAL** command is entered in the command edit or immediate execution modes in the following format:

```
> DIAL name/switches
```

The **name/switches** argument is optional. If specified the **name** argument references a name in the Softerm phone book file **SOFTERM.FON**. The **switches** argument allows any of the following additional parameters to be optionally specified:

Switch	Function
/number	Phone number
/SPEED=	Baud rate (50–9600)
/STOP=	Number of stop bits (1 or 2)
/BITS=	Number of data bits (7 or 8)
/PARITY=	None, even, odd, mark, space

For example, the following are valid **DIAL** commands:

```
> DIAL BOB/SPEED=1200/PARITY=NONE
> DIAL /9+++5551212/BITS=8
> DIAL OFFICE
> DIAL
```

When the **DIAL** command is entered, the following screen is displayed:

```
          Name:
          Number:
Number of Data Bits: 8
Number of Stop Bits: 1
          Parity: None
          Speed: 1200
```

If a name argument or any switches have been specified on the command, line these values will be automatically displayed in the appropriate fields.

The cursor is positioned to the **Name** field. If you wish to dial a number from the Softerm Phone Book, the appropriate name identifier should be entered in the **Name** field. If the **Name** field is entered in the command edit or immediate execution mode, Softerm will automatically open the file **SOFTERM.FON** which contains the Softerm Phone Book if this file is found in the current default directory or the system file directory. The directory in which the phone book is found is displayed in the **Phone Book Path** field at the bottom of the screen. If Softerm is unable to find the file **SOFTERM.FON** in either the current default directory or the system directory, the following screen is displayed:

```
Unable to find SOFTERM.FON
Enter directory path:

Current system files path: A:
Current default files path: A:
```

You can then enter a directory path for the directory which contains or should contain the Softerm Phone Book and press the **Enter** key. If the file **SOFTERM.FON** exists in the directory specified, it will be opened. If the phone book does not exist in the specified directory, Softerm will continue to request a directory path for the phone book.

After the phone book file has been opened, Softerm will retrieve the corresponding entry for the **Name** entered from the phone book and allow you to modify the number or communications parameters if required. To add the **DIAL** command to the current command file in the command edit mode, or to initiate dialing of the number in the command execution mode, press the **Alt Enter** key.

If no entry in the phone book is found which matches the name entered, the message **Name not found in phone book** is displayed. Pressing an **Esc** will allow the **Name** field to be re-entered.

If you do not wish to use the Softerm Phone Book, but instead enter a number directly, press the **Enter** key without entering a name to position the cursor to the **Number** field. The desired phone number should be entered and the **Enter** key pressed. You can also specify the serial communications interface parameters for the dial-up connection being established. If changes are required to any of the displayed parameters, the **Enter** or **Tab** and **Shift Tab** 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 3 on Terminal Setup. Once editing of the communications parameters is complete, press the **Alt Enter** key.

If you wish only to change the current serial communications interface parameters, neither a name nor a number is entered. Softerm will reset the communications interface according to the specified parameters without attempting to dial a number.

When the **DIAL** command is encountered in the command execution mode, Softerm checks for a **Dialer Type** other than **Manual** in the current system definition for the current port. If automatic dialing capability is available, Softerm will dial the requested number and when a connection has been established, return to the command execution mode.

If the **Dialer Type** in the Communications Agent System Definition is specified as **Manual** indicating that automatic dialing capability is *not* available, the following message is displayed when dialing is attempted:

From COMn: Dial nnnnnnn.. Press Esc at carrier

Pressing the **Esc** key will initiate a search for carrier and once a connection has been made, Softerm returns to the online terminal mode or the dial utilities menu.

Warning: The preceding message will also be displayed when manual dialing is required for a file transfer command file executing in the background. The current program will be interrupted and the message is displayed. When the **Esc** key is pressed to indicate the connection is established, the program will continue.

In the command edit mode after editing of the communications parameters is complete, pressing the **Alt Enter** key adds the **DIAL** command to the current command file. In the command execution mode, Softerm will initiate dialing of the specified number as soon as the **Alt Enter** 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 command file when executed if a number has been specified. If only a name and no number is specified for a **DIAL** command in a file transfer command file, or if the phone book file or corresponding entry for the name requested cannot be found, execution of the command file is aborted. Refer to the section on **dialer utilities** in Chapter 4 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 if the **TIMEOUT** currently specified is less than 30 seconds.

The **DIAL** command includes an implicit **HANGUP** command if a connection is currently established so that a previous **HANGUP** command is not required.

The default switch values for a **DIAL** command in a command file are as defined in the phone book if only a name is specified. If only a number is specified and no name, the switch values will be determined from the current communications parameters for the port.

ELSE

The **ELSE** command is used to specify alternate conditional processing when used in conjunction with a previous **IF** command.

If the conditional result of an **IF** command is true, all commands following the **IF** command are executed until an **ELSE** or the corresponding **ENDIF** command is encountered. Commands following an **ELSE** command up to the corresponding **ENDIF** command are ignored.

If the conditional result of an **IF** command is false, all commands following the **IF** are ignored until an **ELSE** command or **ENDIF** command is encountered. Commands following the **ELSE** command are executed until the **ENDIF** command corresponding to the **IF** command is reached.

The **ELSE** command is entered in the command edit mode in the following format:

```
> ELSE
```

The **ELSE** command requires no additional parameters when entered. This command is ignored if there is no previous corresponding **IF** command. The following example demonstrates how the **ELSE** command is used:

```
> IF conditional expression
>
>   commands executed if condition is true
>
> ELSE
>
>   commands executed if condition is false
>
> ENDF
```

The **ELSE** command is ignored when entered in the immediate execution mode.

END

The **END** command is used to terminate the execution of a file transfer command file or to terminate the immediate command execution mode and returns to the line file transfer options menu.

The **END** command is entered in the command edit or immediate execution modes in the following format:

```
> END
```

The **END** command requires no additional parameters when entered. The current command file and log file are closed when an **END** command is executed.

ENDIF

The **ENDIF** command is used to terminate the conditional processing of a previous corresponding **IF** statement and resume normal command processing. The **ENDIF** command is entered in the command edit or immediate execution modes in the following format:

```
> ENDIF
```

The **ENDIF** command requires no additional arguments when entered. This command is ignored if there is no previous corresponding **IF** command or if entered in the immediate 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 connection to be broken. Then Softerm returns to the prompt in command execution mode, or continues execution of a file transfer command file with the next command. After a **HANGUP** command has been executed, a **DIAL** command must be executed on the port to assert the **DTR** control signal so that additional communications can occur.

The **HANGUP** command is entered in the command edit or execution modes in the following format:

```
> HANGUP
```

The **HANGUP** command requires no additional parameters when entered.

HELP

The **HELP** command is used to display the file transfer Help screen. The **HELP** command is entered in the command edit or immediate execution modes in the following format:

```
> HELP
```

The **HELP** command requires no additional parameters when entered and is ignored if used in command files.

IF

The **IF** command is used to provide conditional processing on error conditions or to determine if a specific file exists on disk. The **IF** command is entered in the command edit mode in the following format:

```
> IF ERROR=n  
> IF EXIST=d:\path\filename.ext
```

The **IF ERROR=*n*** command format allows the type of the last error condition to be tested. The error code *n* parameter specified is defined as follows:

Error Code	Type of Error
0	None
1	Timeout
2	Line Failure (Retry count expired or loss of carrier)
3	Operator Abort
4	Remote Abort
5	DOS Error

The **IF ERROR=n** command is used in conjunction with the **ONERR** command to provide an error processing routine when an error occurs during the execution of any command. If the **ONERR** command is not used in a command file, command file execution will be aborted by default when an error occurs. The **IF ERROR** command will always indicate no error has occurred when the **ONERR** command is not used.

If the error code specified matches the type of error which last occurred, commands following the **IF** command up to the corresponding **ENDIF** or **ELSE** command are executed. Otherwise, these commands are skipped and command execution resumes after the corresponding **ELSE** command or **ENDIF** command.

The **IF EXIST** command format allows the existence of a file on disk to be determined. If the specified file on disk exists, commands following the **IF** command up to the corresponding **ENDIF** or **ELSE** command are executed. Otherwise, these commands are skipped and command execution resumes after the corresponding **ELSE** command or **ENDIF** command.

Softerm permits the *nesting* of **IF** commands if required. Each **IF** command must be matched to a corresponding **ENDIF** command for proper execution. If **ELSE** commands are used with nested **IF** commands, they will be matched with the first previous **IF** command which has not been terminated by an **ENDIF** command. The following screen is an example of nested **IF** commands:

```
> IF condition (1)
>   commands executed if condition (1) is true
>
>   IF condition (2)
>     commands executed if condition (2) is true
>
>   ELSE
>     commands executed if condition (2) is false
>
>   ENDIF terminates condition (2)
>
> ELSE
>   commands executed if condition (1) is false
>
> ENDIF terminates condition (1)
```

The **IF** command is ignored if entered in the immediate command execution mode.

JUMP

The **JUMP** command is used in command files to transfer command execution to the command immediately following a specified **LABEL** command. The **JUMP** command is entered in the command edit mode in the following format:

```
> JUMP label
```

The **label** corresponds to the **name** specified in a **LABEL** command. Jumps may occur in either a forward or backward direction, and execution will continue with the first command following a **LABEL** command whose name matches the **JUMP** command label. If no **LABEL** command is found with a matching name, command execution is aborted.

The **JUMP** command will cancel all conditional processing when used in conjunction with **IF**, **ELSE**, and **ENDIF** commands. The **JUMP** command is ignored when entered in immediate command execution mode.

LABEL

The **LABEL** command is used to identify by name a sequence of commands within a file transfer command file. The **LABEL** command is entered in the command edit mode in the following format:

```
> LABEL name
```

The name specified may be up to 10 characters in length. The **LABEL** command is used in conjunction with the **JUMP**, **ON**, and **ONERR** commands to allow the execution sequence of commands to be altered. The **LABEL** command is ignored when entered in immediate command 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 copy of the current command line with including arguments and switches is written to the log file. The final **Characters**, **Blocks**, and **Errors** counts displayed during the execution of **SEND**, **RECEIVE**, **MONITOR** commands are also written to the log file.

Once initiated by the **LOG** command, logging remains active until a **NOLOG**, **END**, **CONVERSE**, or **ABORT** command is executed, or the current file transfer command file or command execution mode is aborted. The **LOG** command is entered in the command edit or execution modes in the following format:

```
> LOG d:\path\filename.ext
```

The desired log filename is specified as an argument on the command line. 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.

Wildcard characters are not allowed in the log filename entered. The log file is created and written in standard text file format.

Once the log file is opened, any subsequent file transfer commands executed will be recorded. Each file transfer command recorded in the log file will include the current date and time in **MM/DD/YY HH:MM:SS** format. A DOS 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.

MONITOR

The **MONITOR** command is used to place the current port 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 DIR command. A port 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 when initiated through immediate command execution or a command file from terminal mode and error messages will be briefly displayed but do not require operator intervention. The monitor mode can also be initiated in the background using a command file under the control of the Communications Agent. 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 immediate command execution mode or by executing a command file containing a **MONITOR** command in the following format:

```
> MONITOR
```

The **MONITOR** command requires no additional parameters when entered in the command edit or immediate execution mode.

Once the monitor mode is initiated, Softerm will wait for a connection to be established on the port if not already present, transmit a **READY** message, and then wait for requests received through remote terminal interaction or through

the Softrans protocol. If initiated through immediate command execution or a command file executed from terminal mode, the **MONITOR** command remains active until terminated by a **Alt Esc** entered by the operator or by pressing the **Ctrl Break** key.

If the monitor mode has been initiated in the background through execution of a command file queued to a port controlled by the Communications Agent, the command file must be deleted from the appropriate **COM** queue using the queue management functions to terminate the **MONITOR** command.

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 **NOLOG** command is entered in the command edit or immediate execution modes in the following format:

```
> NOLOG
```

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.

ON

The **ON** command is used to transmit a user-specified character string and/or wait to receive a variable response. Up to 5 user-specified response character strings can be defined which if received will cause a jump to a corresponding label. This command is useful when different command file processing must be performed depending on a response received from the remote computer.

The **ON** command is entered in the command edit mode in the following format:

```
> ON /switches/string=label/string=label...
```

The switches argument and response strings allow the following additional parameters to be specified:

Switch	Function
/XMIT=string	Transmit string
/string=label	Conditional response string and corresponding label

For example, the following are valid **ON** commands:

```
> ON /XMIT=LOOKUP«cm»/YES=FOUND/NO=NOTTHERE
> ON /READY=DONEXT/ERROR=STARTOVER
> ON
```

If the **ON** command is entered, the following screen is displayed:

```
Xmit:
String      Label
ssssssssss 1111111111
```

Any switches or strings and labels entered on the command line will be automatically displayed in the corresponding fields. The cursor is positioned to the **Xmit** string entry field. 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 **String** and corresponding **Label** fields allow up to 5 conditional response strings and the label name of associated processing to be entered. Each **String** specified may be up to 10 characters in length. The **Label** corresponds to the **name** specified in a **LABEL** command. If a **String** is specified, a **Label** must also be specified. At least one response string and label must be defined. Uppercase and lowercase characters are equivalent in response strings and will match either case when received.

Once the **Xmit** string and response string/labels have been specified, pressing the **Alt Enter** key adds the **ON** command to the current command file in the command edit mode. In the command execution mode, the **Xmit** string if specified is transmitted, and Softerm then waits for any of the defined response strings to be received or until a timeout occurs. The **TIMEOUT** command can be used to define the length of time Softerm will wait for a valid response, and the **ONERR** command can be used to process a timeout condition. If one of

the defined response strings is received, command execution will continue with the first command following a **LABEL** command whose name matches the label corresponding to the response string received. If no **LABEL** command is found with a matching name, command execution is aborted.

ONERR

The **ONERR** command is used in command files to transfer command execution when an error occurs to the command immediately following a specified **LABEL** command. 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 **Alt Esc** 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 *not* considered to be an error.

The **ONERR** command is entered in the command edit mode in the following format:

```
> ONERR label
```

The **label** corresponds to the **name** specified in a **LABEL** command.

If an **ONERR** command is used in a command file, when an error condition occurs execution will continue with the first command following a **LABEL** command whose name matches the **ONERR** command label. If no **LABEL** command is found with a matching name, command execution is aborted.

If the **ONERR** command is not used in a command file, execution of the command file is aborted when an error condition occurs. The **ONERR** command is ignored when entered in immediate command execution mode.

Caution should be used when using the **ONERR** command since it is possible to create **looping** conditions. For example, executing a file transfer command file using Softrans protocol to **RECEIVE** a file which does not exist when the **ONERR** processing is set to **RETRY** the **RECEIVE** command will cause a looping condition.

PAUSE

The **PAUSE** command is used to delay the execution of a file transfer command file 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.

The **PAUSE** command is entered in the command edit or immediate execution mode in the following format:

```
> PAUSE seconds
```

The desired pause time in **seconds** is entered as an argument on the command line. A value from 1 to 255 seconds may be specified for the pause. After the **Enter** 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.

If used in a file transfer command file, the **PAUSE** command does *not* cause the command file to be placed on the **Time** queue to suspend its execution. The delay indicated is processed immediately and no further commands are processed on the port until the pause interval is complete.

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 command file to prompt the operator to load a particular diskette in a certain drive.

The **PROMPT** command is entered in the command edit or immediate execution modes in the following format:

```
> PROMPT message
```

The text of the message to be displayed is specified on the command line. Pressing the **Enter** key in the command edit mode adds the **PROMPT** command to the current command file. When a **PROMPT** command is executed,

the specified message is displayed to the operator on Row 25 of the video display. Entering an **Esc** key clears the message from the screen and allows command execution to continue.

Warning: If the **PROMPT** command is used in a command file executing in the background, the current program is interrupted and the prompt message will be displayed to the operator. When the **Esc** key is pressed in response to the message, the program will continue.

QCOMM

The **QCOMM** command is used to queue a file transfer command file on the current or a specified port. The **QCOMM** command is entered in the command edit or immediate execution modes in the following format:

```
> QCOMM d:\path\filename.ext/switches
```

The file transfer command filename to be queued may be optionally entered as the first argument on the command line followed by optional argument switches. The switches argument allows any of the following additional parameters to be optionally specified:

Switch	Function
/COMn	Queue to specified COM port
/1=string	Replaces %1 in command file
2=string	Replaces %2 in command file
3=string	Replaces %3 in command file
4=string	Replaces %4 in command file
5=string	Replaces %5 in command file

For example, the following are valid **QCOMM** commands entered in the command edit mode:

```
> QCOMM DIALIT.MAC/COM2/1=THE SOURCE
> QCOMM TRANSFER.MAC/2=NEWDATA
> QCOMM
```

If a **QCOMM** command is entered the following screen is displayed:

Command file:

Port:

Parameters

1:

2:

3:

4:

5:

Any arguments and switches entered on the command line will be automatically displayed in the corresponding fields. The cursor is positioned to the **Command file** field. The name of the file transfer command file to be queued is entered in this field. The **Port** field allows the communications port to which the command file is queued to be selected. Softerm does not attempt to verify that the port selected is a valid communications port specified as connected to a computer in the system definition when the **QCOMM** command is entered. This allows command files to be created on one system that are to be executed on another.

The **Parameter** fields allow up to 5 strings to be specified which are substituted for dummy arguments in the command file when the command file is executed. Each string may be up to 14 characters in length. A dummy argument is defined in the command file as a percent (%) sign followed by a number from 1 – 5. Thus wherever a %1 occurs in the command file, it will be replaced by the string defined as parameter 1 in the **QCOMM** command.

After all fields have been specified, pressing the **Alt Enter** key will add the **QCOMM** command to the command file in edit mode, or execute the command in the command execution mode. When the **QCOMM** command is executed, if the specified command file does not exist, or the communications port specified is invalid for any reason, command execution will be aborted.

If a command file is queued to a communications port which is currently assigned to terminal emulation, the command file will not be executed until the port is released by terminal emulation.

QPRINT

The **QPRINT** command is used to queue a file to be printed to a **LPT** or **COM** port connected to a printer. The **QPRINT** command is entered in the command edit or immediate execution modes in the following format:

```
> QPRINT d:\path\filename.ext/switches
```

The print filename to be queued may be optionally entered as the first argument on the command line followed by optional argument switches. The switches argument allows any of the following additional parameters to be optionally specified:

Switch	Function
COMn	Queue to specified COM port
LPTn	Queue to specified LPT port
COPIES=nnn	Number of copies to print (1–255)
DELETE	Delete file after print
LINES=nnn	Page length (3–255)
SKIP=nnn	Page skip count (0–255)
COLUMNS=nnn	Column width (0–255)
NOFOLD	Truncate long lines

These switches correspond to the **Printer Definitions** described in the local file transfer section on the **Copy File to Print** function. The following option switches may also be specified on the command line and correspond to the standard **Edit Options** available for local and line file transfers:

Switch	Function
HISSET	Hi bit set
HIICLR	Hi bit clear
HEX	Hex Dump
CR	Line terminator is carriage return
LF	Line terminator is line feed
NL	Line terminator is new line (CR-LF)
TAB=n	Tab column multiple (1–9)
PAD	Pad blank lines
COMPRESS	Space Compress
REMOVE=string	Remove specification
TRANSLATE=string	Translate specification

For example, the following are valid **QPRINT** commands entered in the command edit mode:

```
> QPRINT B:DATAFILE/LPT1/HICLR/HEX/DELETE
> QPRINT OUTPUT.DOC/COM2/COPIES=2/NOFOLD
> QPRINT
```

If a **QPRINT** command is entered the following screen is displayed:

```
Filename:
Port:

        Copies: 1      Delete After Print: No
    Page Length: 66    Page Skip Count: 6
    Column Width: 80   Fold Long Lines: Yes

-----Edit Options-----
    Hi Order Bit: No Change      Hex Dump: No
    Desired End of Line: No Change  Tab Column Multiple: 0
    Pad Blank Lines: No          Space Compress: No

Remove:
Translate:
```

Any arguments and switches entered on the command line will be automatically displayed in the corresponding fields. The cursor is positioned to the **Filename** field. The name of the print file to be queued is entered in this field. The **Port** field allows the printer port to which the command file is queued to be selected. Softerm does not attempt to verify that the port selected is a valid printer port specified as connected to a printer in the system definition when the **QPRINT** command is entered. This allows command files to be created on one system that are to be executed on another.

Refer to the section on local file transfer **Copy File to Print** for complete description of the printer definition options displayed and the section on **Edit Options** for the edit option fields.

Once all fields have been specified, pressing the **Alt Enter** key will add the **QPRINT** command to the command file in edit mode, or execute the command in command execution mode. When the **QPRINT** command is executed, if the specified print file does not exist, or the printer port specified is invalid for any reason, command execution will be aborted.

If a print file is queued to a communications port which is currently assigned to terminal emulation, the file will not be printed until terminal emulation releases the port.

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 **line capture** mode, and all data received until the **RECEIVE** command is aborted is captured as 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 to a specified disk file or to a temporary file and queued to a printer using the character protocol. Character protocol receive operations are terminated by the reception of the specified wait termination string, a **Alt Esc** abort keyboard function entered by the operator, **Alt Break**, or a timeout condition.

Using the **XMODEM** protocol, the **RECEIVE** command allows files to be received from another system executing a compatible **MODEM** or **XMODEM** program. The communications 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 remote system and specifies the file to be sent.

Files may be received either to a specified disk file or to a temporary file and queued to a printer using the **XMODEM** protocol. 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 personal computer which is in the monitor mode as a result of the **MONITOR** command or from a host computer executing the program **SOFTRANS.F77**. The **Softrans** protocol permits the source and destination file information to be specified.

Files may be received either to a specified disk file or to a temporary file and queued to a printer using the **Softrans** protocol. The source file specified for the file transfer is actually a file at the remote system. 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 file paths for the **RECEIVE** command. The **RECEIVE** command does allow an additional special wildcard character to be used. If the first character of the destination file path is a %, the **RECEIVE** command will stop when executed and wait for the destination filename information to be entered. Characters following the % in the filename are ignored and may be used as a prompt or comment. A % character followed by a number from 1 – 5 indicates a dummy argument which will be replaced by actual arguments when the command file in which they are used is executed. Once the destination file information has been correctly specified, pressing the **Alt Enter** key will allow the **RECEIVE** command to continue.

RECEIVE Status Display

During **RECEIVE** operations using the character, XMODEM, and Softrons protocols, the following status information is displayed:

% Complete 0	Characters 0	Blocks 0	Errors 0
--------------	--------------	----------	----------

The **% Complete** field indicates the percentage of the file which has currently been received when using Softrons protocol. The **% Complete** field is not applicable to the Character or XMODEM protocols for a **RECEIVE** command.

The **Characters** field displays the current **character count** of characters received. When using Softrons 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 **Characters** 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 Softrons 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 Softrons or XMODEM protocol is incremented only once per block in error and on timeouts.

RECEIVE Command Entry

The **RECEIVE** command is entered in the command edit or immediate execution modes in the following format:

```
> RECEIVE d:\path\filename.ext/switches
```

The destination filename to be received may be optionally entered as the first argument on the command line followed by optional argument switches. The switches argument allows any of the following additional parameters to be optionally specified:

Switch	Function
/CHARACTER	Character protocol
/XMODEM	XMODEM protocol
/SOFTRANS	Softrans protocol
/XMIT=string	Character and XMODEM protocol initiate string
/TERMINATE=string	Character protocol terminate string
/WHEN=string	Character protocol when received string
/REPLY=string	Character protocol reply string
/SOURCE=filename	Softrans protocol source file path

These switches allow the protocol to be selected and various protocol-dependent options to be specified. The following option switches may also be specified on the command line and correspond to the standard **Edit Options** available for local and line file transfers:

Switch	Function
/HISET	Hi bit set
/HICLR	Hi bit clear
/HEX	Hex Dump
/CR	Line terminator is carriage return
/LF	Line terminator is line feed
/NL	Line terminator is new line (CR-LF)
/TAB=n	Tab column multiple (1–9)
/PAD	Pad blank lines
/COMPRESS	Space Compress
/REMOVE=string	Remove specification
/TRANSLATE=string	Translate specification

For example, the following are valid **RECEIVE** commands entered in the command edit mode:

```
> RECEIVE BBSLIST.TXT/CHARACTER/XMIT=TYPE BBSLIST«cM»/NL
> RECEIVE TEST.EXE/SOFTTRANS/SOURCE=C:BETA.EXE
> RECEIVE
```

RECEIVE Protocol Selection

If the **RECEIVE** command is entered in the command edit mode or execution mode, and the protocol has not been specified on the command line, the following option screen is displayed:

```
Protocol: Character
```

The space bar and ↑↓←→ can be used to select between the **Character**, **Softtrans**, and **XMODEM** protocols. Once the desired protocol has been selected, press the **Enter** key to continue.

Receiving Files with Character Protocol

If the **Character** option is selected from the protocol selection menu for the **RECEIVE** command or is specified on the command line, the following screen is displayed:

The character protocol also allows a string of up to 10 characters which when received will cause a specified reply of up to 10 characters to be transmitted. These strings are optionally specified in the **When received** and **Reply with** fields. This feature allows character mode file transfer with systems which use a special pacing protocol such as **ENQ/ACK** where when an **ENQ** character is received, the terminal must reply with an **ACK**. Be sure to include any control characters or terminators required in the **Reply with** field such as «**CM**» to send a carriage return.

The **Destination file** field specifies the filename to which the file received is written. If no drive or directory path is entered, Softerm assumes the file is to be created in the current default directory. Wildcard characters other than % are not allowed in the filename entered.

You can also specify that the data received is to be queued for printing by entering a **COM** or **LPT** port for the destination filename. The data received will be written to a temporary file and when the **RECEIVE** command terminates, the temporary file will be automatically queued to the designated port. A form feed will be sent to the printer and the temporary file deleted after the file is printed.

If the **RECEIVE** command is being used from Softerm terminal emulation, and the printer port selected as the destination is the same as the terminal setup printer **Port** in the current terminal configuration, the print file received is queued but will not begin printing until direct control of the printer port is released by terminal emulation.

The **Edit Options** allow the data received to be reformatted as the file is transferred. Refer to the section on *File Transfer Edit Options* for a complete description of these fields.

Once all fields for the character protocol **RECEIVE** command have been entered, press the **Alt Enter** key to continue. In the command edit mode, the **RECEIVE** command is added to the current command file.

In the command execution mode, the specified **Xmit** string is transmitted and the line capture mode is initiated. The data received is written to a temporary file until a **Alt Esc** is entered or the **Terminate on** string is received to terminate the **RECEIVE** operation. During the file transfer, if the string specified in the **When received** field is received, the response as indicated by the **Reply with** field will be transmitted.

The receiving of data and writing to the disk file will operate concurrently. Terminating the line capture operation with a **Alt Esc** will flush any remaining data in the file transfer buffer to disk. Pressing the **Ctrl Break** key to abort the **RECEIVE** operation will cause data to be lost.

During a **RECEIVE** operation using the character protocol, data being received is displayed in a **scrolling region** 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 **Softrans** option is selected from the protocol selection menu for the **RECEIVE** command or is specified on the command line, the following screen is displayed:

Protocol: Softrans

Source file:

Destination file:

Edit Options

Hi Order Bit: No Change

Hex Dump: No

Desired End of Line: No Change

Tab Column Multiple: 0

Pad Blank Lines: No

Space Compress: No

Remove:

Translate:

Any arguments and switches entered on the command line will be automatically displayed in the corresponding fields. The **Protocol** is indicated as **Softrans** and the cursor is positioned to the **Source file** field. Enter the filename of the file to be transferred in this field. If no drive or directory path is entered, the file is assumed to be in the current directory on the remote system. Wild card characters are not allowed in the filename entered.

Enter the destination filename for the file transfer in the **Destination file** field. If no drive or directory path is entered, Softerm assumes the file is to be created in the current default directory. Wildcard characters other than % are not allowed in the filename entered.

You can also specify that the data received is to be queued for printing by entering a **COM** or **LPT** port for the destination filename. The data received will be written to a temporary file and when the **RECEIVE** command terminates, the temporary file will be automatically queued to the designated port. A form feed will be sent to the printer and the temporary file deleted after the file is printed.

If the **RECEIVE** command is being used from Softerm terminal emulation, and the printer port selected as the destination is the same as the terminal setup printer **Port** in the current terminal configuration, the print file received is queued but will not begin printing until direct control of the printer port is released by terminal emulation.

The **Edit Options** allow the data received to be reformatted as the file is transferred. Refer to the section on *File Transfer Edit Options* for a complete description of these fields.

Once all fields for the Softrans protocol **RECEIVE** command have been entered, press the **Alt Enter** key to continue. In the command edit mode, the **RECEIVE** command is 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. 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 operate concurrently. The **RECEIVE** operation may be aborted by pressing the **Alt Esc** or **Ctrl Break** keys.

Receiving Files with XMODEM Protocol

If the **XMODEM** option is selected from the protocol selection menu for the **RECEIVE** command or is specified on the command line, the following screen is displayed:

Protocol: XMODEM

Xmit:

Destination file:

Edit Options

Hi Order Bit: No Change	Hex Dump: No
Desired End of Line: No Change	Tab Column Multiple: 0
Pad Blank Lines: No	Space Compress: No

Remove: .
Translate:

The **Protocol** is indicated as **XMODEM** and the cursor is positioned to the **Xmit** string entry field. 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«cM»** 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 transmitted at 5 characters per second to allow for systems which expect commands to be entered at normal keyboard entry speeds. The **Xmit** string is optional and may be skipped simply by pressing the **Enter** 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 100, can be used to introduce an appropriate transmit character delay to simulate typing when using the **XMIT:WAIT** to transmit commands before the **RECEIVE** command is executed.

Enter the destination filename for the file transfer in the **Destination file** field. If no drive or directory path is entered, Softerm assumes the file is to be created in the current default directory. Wildcard characters other than % are not allowed in the filename entered.

You can also specify that the data received is to be queued for printing by entering a **COM** or **LPT** port for the destination filename. The data received will be written to a temporary file and when the **RECEIVE** command termi-

nates, the temporary file will be automatically queued to the designated port. A form feed will be sent to the printer and the temporary file deleted after the file is printed.

If the **RECEIVE** command is being used from Softerm terminal emulation, and the printer port selected as the destination is the same as the terminal setup printer **Port** in the current terminal configuration, the print file received is queued but will not begin printing until direct control of the printer port is released by terminal emulation.

The **Edit Options** allow the data received to be reformatted as the file is transferred. Refer to the section on *File Transfer Edit Options* for a complete description of these fields.

Once all fields for the XMODEM protocol **RECEIVE** command have been entered, press the **Alt Enter** key to continue. In the command edit mode, the **RECEIVE** command is 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 operate concurrently. The receive operation will be aborted if a **CAN** character is received or is aborted by the operator using the **Alt Esc** or **Ctrl Break** 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 command file. It is a non-executable statement and functions as a **no operation** command in the command execution mode. The **REMARK** command is entered in the command edit mode in the following format:

> **REMARK** text

Remarks may be entered in the command edit mode in free form following a **REMARK** command followed by a **space** and the desired text.

RESUME

The **RESUME** command is used in **ONERR** command processing to *resume* execution with the next command after the command on which an error occurred. The **RESUME** command is entered in the command edit mode in the following format:

> **RESUME**

The **RESUME** command requires no additional parameters when entered. If this command is executed as a result of **ONERR** processing after an error has occurred, the *next* command after the command on which the error occurred will be executed. This command is ignored when executed in the immediate execution mode or when an error has not occurred.

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 command 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.

The **RETRIES** command is entered in the command edit or execution modes in the following format:

> **RETRIES** count

The maximum retry count is specified as an argument on the command line. A value from 0 to 255 may be entered. A value of 0 is equivalent to specifying a value of 1. After the **Enter** 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.

RETRY

The **RETRY** command is used in **ONERR** command processing to *retry* the command on which an error occurred. The **RETRY** command is entered in the command edit mode in the following format:

```
> RETRY
```

The **RETRY** command requires no additional parameters when entered. If this command is executed as a result of **ONERR** processing after an error has occurred, the command on which the error occurred will be re-executed. This command is ignored when executed in the immediate execution mode or when an error has not occurred.

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 command file when executed suspends execution of the command file until the current date and time matches the specified date and time. If the command file is operating under the control of the Communications Agent in the background, the command file is removed from the **COM** port queue and placed on the **Time** queue until the scheduled time is reached.

The **SCHEDULE** command is entered in the command edit or immediate execution modes in the following format:

> SCHEDULE mm:dd:yy hh:mm

The desired date (month/day/year) and time (hours:minutes) in 24-hour format is entered as an argument on the command line. If any date or time parameter is entered as ??, Softerm assumes that the current value for the parameter will always match the **SCHEDULE** specification. 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:

Schedule at: MM/DD/YY HH:MM

Current Time: 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 **Alt Esc** key when executing in immediate mode. The current command file is aborted if this command is being executed from a file transfer command file.

If a file transfer command file executing in the background under the control of the Communications Agent has been suspended and placed on the **Time** queue, when the current time matches the **SCHEDULE** time, the command file will be queued on the **COM** port queue from which it was removed.

When using the schedule command to suspend execution of a command file in the background, it is usually advisable to execute a **HANGUP** command before the **SCHEDULE** command to break the current connection. Other command files may be executed on the port before the suspended command file is resumed which change the current connection. A **DIAL** command can then be used to re-establish the connection when the command file is resumed. If logging is active when a command file is suspended, the log file is

temporarily closed and then reopened automatically when the command file is resumed. The current default directory when the command file is suspended, **RETRIES** count, and **TIMEOUT** value will be restored.

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.

Using the XMODEM protocol, the **SEND** command allows files to be transmitted to another 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 remote system and specifies the file to be received.

Using the Softrans protocol, the **SEND** command allows files to be sent to another personal computer executing the Softerm program which is in the monitor mode as a result of the **MONITOR** command or to a host computer executing the program **SOFTRANS.F77**. 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. The destination file specified for the file transfer is actually a file to be created at the remote system. 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 file path for **SEND** commands permits the use of wildcard characters. If the source filename specification contains * or ? wildcard characters, 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 or *.* is entered as the source filename specification, all files in the current directory will be automatically transmitted using the **SEND** command.

If the first character of the source file path contains a + wildcard character, Softerm will display a **Confirm?** message for each file which matches the filename template. Selecting **Yes** 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. Selecting **No** 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 a %, the **SEND** command will stop when executed and wait for the source file path to be entered. Characters following the % in the filename are ignored and may be used as a prompt or comment. A % character followed by a number from 1 – 5 indicates a dummy argument which will be replaced by actual arguments when the command file in which they are used is executed. Once the source file path has been correctly specified, pressing the **Enter** key 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:

% Complete 0	Characters 0	Blocks 0	Errors 0
--------------	--------------	----------	----------

The **% Complete** field indicates the percentage of the file which has currently been transmitted.

The **Characters** 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 **Characters** 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 Command Entry

The **SEND** command is entered in the command edit or immediate execution modes in the following format:

```
> SEND d:\path\filename.ext/switches
```

The source filename to be sent may be optionally entered as the first argument on the command line followed by optional argument switches. The switches argument allows any of the following additional parameters to be optionally specified:

Switch	Function
/CHARACTER	Character protocol
/XMODEM	XMODEM protocol
/SOFRANS	Softrans protocol
/EOB=string	Character protocol end of block string
/ACKNOWLEDGE=string	Character protocol acknowledge string
/EOBWAIT=nnn	Character protocol end of block delay
/BLOCK=nnn	Character protocol block size
/ECHO	Character protocol echo wait option
/DESTINATION=filename	Softrans protocol destination file path
/XMIT=string	XMODEM protocol initiate string

These switches allow the protocol to be selected and various protocol-dependent options to be specified. The following option switches may also be specified on the command line and correspond to the standard **Edit Options** available for local and line file transfers:

Switch	Function
/HISET	Hi bit set
/HICLR	Hi bit clear
/HEX	Hex Dump
/CR	Line terminator is carriage return
/LF	Line terminator is line feed
/NL	Line terminator is new line (CR-LF)
/TAB=n	Tab column multiple (1–9)
/PAD	Pad blank lines
/COMPRESS	Space Compress
/REMOVE=string	Remove specification
/TRANSLATE=string	Translate specification

For example, the following are valid **SEND** commands entered in the command edit mode:

```
> SEND BBSLIST.TXT/CHARACTER/EOB=«cM»/ACKNOWLEDGE=«cJ»
> SEND TEST.EXE/SOFTTRANS/DESTINATION=C:BETA.EXE
> SEND
```

SEND Protocol Selection

If the **SEND** command is entered in the command edit mode or execution mode, and the protocol has not been specified on the command line, the following option screen is displayed:

```
Protocol: Character
```

The space bar and $\uparrow\downarrow\leftarrow\rightarrow$ can be used to select between the **Character**, **Softrans**, and **XMODEM** protocols. Once the desired protocol has been selected, press the **Enter** key to continue.

Sending Files with Character Protocol

If the **Character** option is selected from the protocol selection menu for the **SEND** command or is specified on the command line, the following screen is displayed:

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 **End of Block** 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 **Acknowledge** string is also specified, the end of block delay will not be executed until after the acknowledge string has been received.

Acknowledge

The **Acknowledge** 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 **End of Block** terminator string or the **Block Size** option is non-zero 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 a non-zero block-size is specified, the acknowledge string has no effect.

Echo Wait

The **Echo Wait** option allows the echo back of each transmitted character when using character protocol to **acknowledge** the character transmitted. If this option is set to **Yes**, 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.

Block Size

The **Block Size** option allows the maximum number of characters transmitted before waiting for a specified **Acknowledge** string to be specified. The **Block Size** option has an effect only if a non-zero value is specified. When the specified number of characters according to the block size has been transmitted without encountering an **End of Block** terminator string, the **End of Block** 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 0 to 255.

Source File Information

The **Source file** field specifies the filename from which the file sent is read. If no drive or directory path is entered, Softerm assumes the file exists in the current default directory. The source file path specified may contain a single filename or a filename template including wildcard characters. Only the first filename matched when using the * or ? wildcard characters or the first filename confirmed when using the + wildcard character will be sent.

The **Edit Options** allow the data received to be reformatted as the file is transferred. Refer to the section on *File Transfer Edit Options* for a complete description of these fields.

Once all fields for the character protocol **SEND** command have been entered, press the **Alt Enter** key to continue. In the command edit mode, the **SEND** command is 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 **Alt Esc** or by pressing the **Ctrl Break** key.

During a **SEND** operation using the character protocol, transmitted data is displayed **scrolling region** on the display. Any data received is also displayed in a separate scrolling region. This feature provides a visual confirmation of the data being transmitted and any responses 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 **SEND** command.

Character Protocol SEND Example

As an example of how the **SEND** command may be used to transfer a file from your system 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 **line feed** character. One such host computer uses a prompt string of `)`). It then will accept lines of input terminated by line feed characters and write them to an assigned file.

To use this capability with the **SEND** command, the **End of Block** terminator string should be set to a line feed «**cJ**» or **Ctrl J** which generates the character code for an ASCII line feed character, and the **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 and line feeds, the edit options should be used to change the terminators to line feeds.

Once the file transfer is initiated, lines from the source file will be transmitted and when a **line feed** 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 **End of Block** terminator string can be set to a carriage return «**cM**» and the **Acknowledge** string can be set to line feed «**cJ**».

Sending Files with Softrans Protocol

If the **Softrans** option is selected from the protocol selection menu for the **SEND** command or is specified on the command line, the following screen is displayed:

Protocol: Softrans

Source File:

Destination File:

— Edit Options —

Hi Order Bit: No Change

Hex Dump: No

Desired End of Line: No Change

Tab Column Multiple: 0

Pad Blank Lines: No

Space Compress: No

Remove:

Translate:

Any arguments and switches entered on the command line will be automatically displayed in the corresponding fields. The **Protocol** is indicated as **Softrans** and the cursor is positioned to the **Source File** entry field. Enter the

desired source file pathname and press the **Enter** key. The source file path 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.

Enter the desired destination file pathname in the **Destination File** field and press the **Enter** key. 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.

You can also specify that the data sent is to be queued for printing at the remote system by entering a **COM** or **LPT** port for the destination filename. The data sent will be written to a temporary file and when the **SEND** command terminates, the temporary file will be automatically queued to the designated port. A form feed will be sent to the printer and the temporary file deleted after the file is printed.

If the printer port selected as the destination at the remote system is the same as the terminal setup printer **Port** in the current terminal configuration of the remote system, the print file received is queued but will not begin printing until direct control of the printer port is released by terminal emulation.

The **Edit Options** allow the data received to be reformatted as the file is transferred. Refer to the section on *File Transfer Edit Options* for a complete description of these fields.

Once all fields for the Softrons protocol **SEND** command have been entered, press the **Alt Enter** key to continue. In the command edit mode, the **SEND** command is added to the current command file.

In the command execution mode, Softerm sends a message to the remote system to initialize the file transfer 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 **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 **Alt Esc** or by pressing the **Ctrl Break** key.

Sending Files with XMODEM Protocol

If the **XMODEM** option is selected from the protocol selection menu for the **SEND** command or is specified on the command line, the following screen is displayed:

```

Protocol: XMODEM
      Xmit:
Source File:

```

```

-----Edit Options-----
      Hi Order Bit: No Change      Hex Dump: No
Desired End of Line: No Change    Tab Column Multiple: 0
      Pad Blank Lines: No          Space Compress: No
Remove:
Translate:

```

Any arguments and switches entered on the command line will be automatically displayed in the corresponding fields. The **Protocol** is indicated as **XMODEM** and the cursor is positioned to the **Xmit** string entry field. 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«cM»** 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 transmitted at 5 characters per second to allow for systems which expect commands to be entered at normal keyboard entry speeds. The **Xmit** string is optional and may be skipped simply by pressing the **Enter** 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 100, can be used to introduce an appropriate transmit character delay to simulate typing when using the **XMIT:WAIT** to send commands to the CP/M system 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 the **Xmit** string included in the **SEND** command. When using the **XMIT:WAIT** command to send commands to the remote computer, it should be preceded by a **SPEED** command of 100 and followed by a **SPEED** command of 0.

Enter the desired source file pathname in the **Source File** field and press the **Enter** key to continue. The source file path specified may contain a single filename or a filename specification including wildcard characters. Only the first filename matched when using * or ? wildcard characters or the first filename confirmed using the + wildcard character will be sent.

The **Edit Options** allow the data received to be reformatted as the file is transferred. Refer to the section on *File Transfer Edit Options* for a complete description of these fields.

Once all fields for the XMODEM protocol **SEND** command have been entered, press the **Alt Enter** key to continue. In the command edit mode, the **SEND** command is 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 **Alt Esc** or by pressing the **Ctrl Break** key.

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.

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 1 millisecond. 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.

The **SPEED** command is entered in the command edit or immediate execution modes in the following format:

```
> SPEED milliseconds
```

A value from 0 to 255 may be entered on the command line to indicate the delay value in milliseconds. After, the **Enter** 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.

TERMINAL

The **TERMINAL** command provides a limited terminal emulation mode for conversational interaction with a host computer system. A basic TTY compatible emulation is provided which allows interactive dialog with the remote system. The terminal emulation mode provided in line file transfer is *not* the same mode provided by standard Softerm terminal emulation. If full terminal emulation capabilities are required, the **CONVERSE** command can be used to terminate file transfer command execution and return to terminal emulation.

The **TERMINAL** command is entered in the command edit or immediate execution modes in the following format:

```
> TERMINAL
```

The **TERMINAL** command requires no additional parameters when entered. In the command edit mode, the **TERMINAL** command will be added to the current command file when the **Enter** key is pressed. When terminal mode is initiated in the command execution mode, the screen will clear and communications can begin immediately if a dial-up connection is already established or a hardwired connection is being used. Otherwise, a connection can be established from terminal mode using the dial utilities.

Other functions available during terminal mode are disk utilities and local file transfer. These functions are accessed by pressing function keys. Function key options are displayed on row 25 during terminal mode. To exit from terminal

mode, the **F8** or **F9** function keys are used and Softerm will return to the mode of command execution from which the terminal mode was initiated. A complete description of the terminal mode can be found in Chapter 7 on the *Advanced Features* of the Communications Agent.

If the **TERMINAL** command is encountered in a command file executed in the background by the Communications Agent, the command file is aborted.

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 **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.

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 message **Line Failure** is displayed.

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.

The **TIMEOUT** command is entered in the command edit or immediate execution modes in the following format:

> **TIMEOUT** seconds

A timeout value from 0 to 65535 seconds is entered on the command line as an argument. Entering a value of 0 is equivalent to 65536. After the **Enter** 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.

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.

The **XMIT:WAIT** command is entered in the command edit or immediate execution modes in the following format:

> **XMIT:WAIT** /switches

The switches argument allows the following additional parameters to be optionally specified:

Switch	Function
/XMIT=string	Transmit string
/WAIT=string	Wait for reply

The switches allow the **Xmit** and **Wait** strings to be optionally specified on the command line. If the **XMIT:WAIT** command is entered, the following screen is displayed:

Xmit:

Wait:

Any switches entered on the command line will be automatically displayed in the corresponding fields. The cursor is positioned to the **Xmit** string entry field. 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 **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 **Alt Enter** 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 **immediate** 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 **command files** can be created which contain multiple file transfer commands. A 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 command 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 large buffer area is provided for editing of command files. This allows a range of approximately 40 to 200 commands to be contained within a single file transfer command file. When editing a command file, if the available memory space is exhausted, the message **Buffer Full** is displayed to the operator.

When a file transfer command file is executed, it is *not* completely loaded into memory. Instead, each command is read from the disk file and executed as required. The operation of file transfer command files is very similar to the DOS batch file operation. Since file transfer commands are interactively read from disk as they are executed, the disk containing the command file must remain available during the execution of the command file.

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.

Command File Format

File transfer command files exist on disk as text files. Within the text file, a command is defined by a **keyword**, a possible **argument**, and possible **switch** modifiers. The general format of a command in a command file is as follows:

```
> keyword argument/switch/switch=value.....
```

The > character is required and identifies the line as containing a command keyword. The > character must be the first non-blank, non-tab character on the line. Any other character occurring as the first non-blank, non-tab character on the line indicates that the line is a continuation of a previous command. Carriage returns (\$0D) and line feeds (\$0A) and any blank or tab characters following the carriage return or line feed are considered to be white space and may be used to separate keywords, arguments, and switches.


A switch modifier is preceded by a / character. If multiple switches are used on a command, each must be preceded by a / character.

The tilde (~) character is used to insert characters which normally are interpreted as special functions into an argument or switch value string. Command lines can contain any of the 128 ASCII characters including control characters. For example, the following character sequences can be used to allow function characters to be inserted in strings:

Sequence	Function
~c or ~C	Insert a carriage return into strings
~l or ~L	Insert a line feed into strings
~ ~	Insert a tilde into strings
~ <i>any character</i>	Insert control characters, /, %, etc. into strings

Command File Parameters

Command files when executed allow parameters to be specified which replace dummy arguments in the command file. Up to 5 dummy arguments may be used in the command file. Dummy arguments are represented in the command file by a % character followed by an argument number from 1 to 5. Up to 14




characters may be used to replace a dummy argument. The actual parameters are specified when the command file is queued or executed using the **QCOMM** command, or the line file transfer **Queue a Command File** or **Execute a Command File** options.

Dummy arguments can be used for any portion of a command line in a command file and can also be catenated to allow for a larger parameter. When a command file is executed, the actual parameters specified will be substituted for the dummy arguments before the command line is evaluated.

Although dummy arguments may replace any portion of a command line when it is executed, when using the line file transfer **Edit a Command File** option to edit a command file containing dummy arguments, syntax errors may result depending on how the dummy arguments are used. In some cases it may be necessary to edit the command file using a separate text editor program.

Command Errors



During the execution of a file transfer command file, any command syntax error will cause the termination of the command file, and if a dial-up connection is being used, the connection will be broken. If logging is active, the error condition will also be recorded in the log. If logging is not active, a message will be written to the file **SOFTERM.MSG** indicating the command filename and the offending command.

Command execution errors which occur during interactive immediate command execution are displayed to the operator. When an error occurs, the **Esc** key must be pressed to clear the error message and allow the next command to be entered.

If the execution of a command file is being watched, errors which occur are briefly displayed, but no operator intervention is required. Command execution errors which occur during background execution of a command file are not displayed. If logging is active, command execution errors are recorded in the log file.

Line File Transfer Options

The **Alt 2** key followed by **F4** during online terminal emulation is used to access the Softerm line file transfer capability. If the **Line File Transfer** option is selected from the Softerm Goto Functions menu, the following screen is displayed:

```
— Line File Transfer Options —  
  
Disk Utilities  
Edit a Command File  
Execute a Command File  
Queue a Command File  
Immediate Execution  
Watch Execution  
Local File Transfer  
Queue Management  
  
Alt Esc Cancels
```

The default option for this menu is **Immediate Execution** which allows file transfer commands to be entered and executed interactively. This option may be selected by simply pressing the **Enter** key. The current directory path is also displayed at the bottom of the screen. You should use the $\uparrow\downarrow\rightarrow\leftarrow$ keys or the space bar to select an option from the menu and then press the **Enter** key to select the highlighted function. Press the **Alt Esc** key if you want to cancel Line File Transfer option selection and return to online terminal operation.

Each option on the **Softerm Line File Transfer** menu is explained in the following paragraphs.

Disk Utilities

The disk utilities option allows a selection of DOS disk functions to be used without exiting the Softerm program. These include functions to display the current directory, delete files, rename files, and to set the current default directory path.

A complete description of the disk utilities may be found in Chapter 4 on terminal operation.

Edit a Command File

The **Edit a Command File** option is used to **create** a new file transfer command file or to **edit** an existing file transfer command file. If this option is selected, the following screen is displayed:

```
Command File:
```

The **Command File** field specifies the filename of the command file to be edited. If you wish to create a new command file, press the **Enter** key without entering a filename. Otherwise, enter the filename of the command file to be edited. If no drive or directory path is entered, Softerm assumes the file is in the current default directory. Wildcard characters are not allowed in the filename entered.

After the command file to be edited has been specified, the following screen is displayed:

```
Edit: command filename
>
```

The cursor is positioned directly over the **edit mode prompt** character > waiting for a **single character** edit mode command to be entered. The filename of the command file being edited or blanks if a new file is being created is displayed in the **Edit: command filename** field at the top of the screen.

If you are editing a previously saved file transfer command file which has been loaded into memory, the first group of commands in the command file are displayed in the command entry **scrolling region**. The edit mode prompt in this case is positioned to the *first* 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
---------	----------

?	Display edit mode commands
↓	Move down 1 line
↑	Move up 1 line
S	Scroll display down
U	Scroll display up
D	Delete Command Line
I	Insert Command Lines
B	Move to Beginning
N	Move to End
E	Edit current command line
Q	Quit—Return to menu

Help

The edit mode command **?** will cause a list of the edit mode commands to be displayed on the screen.

↓ - 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 last line in the scrolling region and there are additional command lines in the current command file being edited, the command file is scrolled up 1 line and the edit mode prompt remains on the last line in the scrolling region. If the edit mode prompt is at the last line in the scrolling region and there are no additional command lines in the current 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 command file while the 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 **Shift Print** or **Alt**

Print keys may be used to print the current contents of the screen if required. The entire command file can be printed using the local file transfer **Copy File to Print** option.

↑ - 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 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** in the **scrolling region** and adjusts the display so that the line previously displayed as the last line is now displayed as the first line. The scrolling region and display move down in reference to the command file. The edit mode prompt is positioned to the last command line displayed.

U - Scroll Up

The edit mode command **U** moves the edit mode prompt character **up** in the **scrolling region** and adjusts the display so that the line previously displayed as the first line is now displayed as the last line. The scrolling region and display move up in reference to the command file. The edit mode prompt is positioned to the last command line. If less than the number of lines in the scrolling region can be scrolled, the first lines of the command file will be displayed and the edit mode prompt is positioned to the last command line.

D - Delete

The edit mode command **D** deletes the current command line which is positioned directly opposite the edit mode prompt. 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 command file including adding command lines to the end of the current command file. The edit mode prompt should be positioned using the **↑** and **↓** keys to the position it is desired to insert or add command lines. If inserting in the middle of the current 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 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 *File Transfer Command Language* can now be entered. Each file transfer command line inserted must start with a legal file transfer command keyword. The command keyword 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**.

Pressing the **Enter** key after entering a command line will cause the command line either to be added to the current command file or cause additional parameter data entry fields to be displayed in the center portion of the screen. Once all parameter fields have been specified and the **Alt Enter** key is pressed, the command will be added to the command file.

If the command keyword entered on the command line is not understood, the appropriate message is displayed with an **arrow** which points to the first character in error. The entry of command parameters may be aborted at any time using the **Alt Esc** key.

The following table lists the legal file transfer command keywords, shortest unique abbreviation, and their basic function. A full description of these commands and their associated parameters can be found in the *File Transfer Command Language* section.

Command	Abbrev	Function
ABORT	A	Abort Command Execution
BREAK	B	Transmit Break Signal
CHAIN	CHA	Execute New Command File
CHDIR	CHD	Change Default Directory
CONVERSE	CO	Exit to Terminal Mode
DELAY	DE	Delay hh:mm hours and minutes
DIAL	DI	Dial a Phone Number
ELSE	EL	Alternate Conditional Processing
END	END	End of File Transfer Command File
ENDIF	ENDI	End Conditional Processing
HANGUP	HA	Disconnect, Lower DTR
HELP	HE	Display File Transfer Help Screen
IF	I	Begin Conditional Processing
JUMP	J	Jump to LABEL
LABEL	LA	Name a Command Sequence
LOG	LO	Begin Logging
MONITOR	M	Initiate MONITOR Mode
NOLOG	N	End Logging
ON	ON	On string received, Jump to LABEL
ONERR	ONE	On Error Jump to LABEL
PAUSE	PA	Delay n Seconds
PROMPT	PR	Display Operator Message
QCOMM	QC	Queue File Transfer Command File
QPRINT	QP	Queue Print File
RECEIVE	REC	Receive a File
REMARK	REM	Comment
RESUME	RES	Resume Execution After Error
RETRIES	RETRI	Define Retry Count
RETRY	RETRY	Retry Last Command
SCHEDULE	SC	Wait Until Date, Time
SEND	SE	Transmit a File
SPEED	SP	Define Transmit Character Delay
TERMINAL	TE	Interactive Terminal Mode
TIMEOUT	TI	Define Timeout Interval
XMIT:WAIT	X	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 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** is used to move the edit mode prompt character to the **end** of the current 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.

E - Edit

The edit mode command **E** is used to edit an existing command which includes parameters displayed in fields on the screen such as the **DIAL**, **SEND** and **RECEIVE** commands. The edit command cannot be used to edit commands whose arguments appear only on the command line. This type of command line should be deleted with the **D** command and re-entered with the **I** command.

If the **E** command is entered, the cursor will be positioned to the first parameter entry field displayed for the command. When editing of all parameter fields is complete, press the **Alt Enter** key to continue.

Q - Quit

The edit mode command **Q** is used when editing of the command file is complete to return to the line file transfer options menu. If **Q** is entered, the following option is displayed:

Save command file? Yes

If **No** is selected for this option, Softerm will return to the line file transfer options menu without saving the current command file.

If **Yes** is selected for this option, the cursor is positioned to the **Edit: filename** field at the top of the screen. Press the **Enter** key to save the current command file in the command filename displayed. If you are creating a new command file or you wish to save the current command file in a different filename, enter the new filename and press the **Enter** key. The command file will be saved in the filename specified and Softerm will return to the line file transfer options menu.

Execute a Command File

The **Execute a Command File** option is used to interactively execute a file transfer command file from terminal emulation mode. If this option is selected, the following screen is displayed:

Command File:

Parameters

1:
2:
3:
4:
5:

Enter the filename of the file transfer command file to be executed in the **Command File** field and press the **Enter** key. If no drive or directory path is entered, Softerm assumes the file is in the current default directory. Wildcard characters are not allowed in the filename entered.

The **Parameters** entry fields allow up to 5 arguments to be entered which replace dummy arguments in the command file. Dummy arguments are represented in the command file by a % character followed by a argument number from 1 to 5. Up to 14 characters may be entered in each parameter field.

After the command filename and parameters have been entered, press the **Alt Enter** key to begin execution of the command file. The display is cleared, and the following screen is displayed:

Execute: command filename

>

The current command filename being executed is displayed in the **Execute:** field 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 as they are executed. Any parameters associated with each command line are displayed on the command line or in the center portion of the screen as the command is executed. Refer to the section on **File Transfer Command Language** for a description of the function and execution of each command.

The command execution mode may be aborted at any time by entering **Alt Esc** which will terminate the current command file execution and return to the line file transfer menu. Any DOS errors while reading the command file will cause an appropriate error message to be briefly displayed, and command execution to be aborted. If the data associated with any command line is found to be invalid, command file execution is also aborted.

Once the last command in the file transfer command file has been executed, or an **END** command is encountered, command execution will terminate and return to the line file transfer options menu.

If the **Execute a Command File** option is selected while using line file transfer after using the **Alt Break** key to access the Communications Agent, the **Queue a Command File** function will be performed. Interactive execution of command files is available only from terminal emulation mode.

Queue a Command File

The **Queue a Command File** option is used to queue a file transfer command file to a communications port for background execution by the Communications Agent. If this option is selected, the following screen is displayed:

```
Command File:
      Port: COMn

Parameters

1:
2:
3:
4:
5:
```

Enter the filename of the file transfer command file to be queued in the **Command File** field and press the **Enter** key. If no drive or directory path is entered, Softerm assumes the file is in the current default directory. Wildcard characters are not allowed in the filename entered.

The **Port** option allows you to select the **COM** port to which the command file is queued. The space bar or $\uparrow\downarrow\rightarrow\leftarrow$ keys can be used to toggle through the choices and pressing the **Enter** key will select the port displayed. The choices will be automatically limited to **COM** ports which are configured as connected to computers in the Communications Agent System Definition.

The **Parameters** entry fields allow up to 5 arguments to be entered which replace dummy arguments in the command file. Dummy arguments are represented in the command file by a % character followed by a argument number from 1 to 5. Up to 14 characters may be entered in each parameter field.

After the command filename and parameters have been entered, press the **Alt Enter** key to queue the command file to the specified port. After an entry has been made to the specified queue, the cursor will return to the line file transfer options menu.

Immediate Execution

The **Immediate Execution** option allows file transfer commands to be executed **interactively**. If selected, the following screen is displayed:

```
Port: COMn
```

The **Port** option allows you to select the **COM** port on which immediate execution of commands is to be used. The space bar or ↑↓→← keys can be used to toggle through the choices and pressing the **Enter** key will select the port displayed. The choices will be automatically limited to **COM** ports which are available and configured as connected to computers in the Communications Agent System Definition.

After a communications port for immediate execution has been selected, the following screen is displayed:

```
Immediate Execution Mode
```

```
>
```

The cursor is positioned just to the right of the > command mode **prompt** character. Any of the file transfer commands may be entered and executed interactively. Refer to the section titled **File Transfer Command Language** for a complete description of the entry, parameters, and execution of each file transfer command.

If a **Alt Esc** is entered during the entry of file transfer command parameters before the command has begun execution, the command will be canceled and the cursor will return to the execution mode prompt and a new command may

be entered. If a **Alt Esc** is entered during the execution of a command, the execution is aborted and control is returned to the line file transfer options menu.

If a **CHAIN** command is executed during interactive command execution, it will have the same result as the **Execute Command File** option for executing command files if line file transfer has been accessed from terminal emulation mode. The interactive command execution mode is terminated and Softerm will begin executing the specified command file. The **CHAIN** command is not allowed in immediate execution mode when accessed from the Communications Agent options menu.

When interactive command execution is complete, enter an **END** command to return to the line mode file transfer menu.

Watch Execution

The **Watch Execution** option is used to observe the execution of file transfer command files executing on a communications port in the background. If this option is selected, the following screen is displayed:


Port: COMn

The **Port** option allows you to select the **COM** port on which the execution of commands is to be watched. The space bar or $\uparrow\downarrow\rightarrow\leftarrow$ keys can be used to toggle through the choices and pressing the **Enter** key will select the port displayed. The choices will be automatically limited to **COM** ports which are actively executing command files in the background.

After a communications port has been selected, the following screen is displayed:

Execute: command filename
>

The current command filename being executed on the selected port is displayed in the **Execute:** field 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 as they are executed. Any parameters associated with each command line are displayed on the command line or in the center portion of the screen as the command is executed.

The watch execution mode may be terminated at any time by entering **Alt Esc** which will return to the line file transfer menu. If you wish to abort the execution of the command file being watched, press the **Ctrl Break** key. The current command file will be aborted and the next command file on the queue if any will be initiated.


Local File Transfer

If the **Local File Transfer** option is selected on the mode file transfer menu, the Softerm local transfer options menu will be displayed. Refer to the section in this chapter on *Softerm Local File Transfer* for a complete description of the functions available.

Queue Management



The Softerm Communications Agent provides a job queue for each **COM** and **LPT** port configured as well as a **Time** queue for file transfer requests scheduled for a specific date and time. Queue management allows you to display the status of all queues, display job entries on a selected queue, delete individual jobs from a selected queue, or flush all jobs from a selected queue. Refer to Chapter 7 on Advanced Features for a complete description of background processing and queue management.



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 a communications port in the monitor mode. In this mode, the port 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 DIR 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** and **RECEIVE** commands from another personal computer 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 command file 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 **Alt Esc** or **Ctrl Break** key when executed interactively. To terminate the monitor mode on a port executing a **MONITOR** command from a command file in the



background, the Queue Management functions must be used to delete the active command file on the port. A **Ctrl Break** key entered in the **Watch Execution** mode will also terminate the monitor mode executing in a background command file.

Monitor Mode Interactive Commands

The monitor mode responds to 10 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. While entering commands, the previous character can be deleted by typing an ASCII BS or DEL character. If you wish to cancel the entire command line, just press **Esc**. 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:


HELP

The **HELP** command will display information about using the monitor mode including a list of commands.

CURRENT

The **CURRENT** command will display the default directory for file transfer operations used in the monitor mode. It is set initially to the current default directory when the **MONITOR** command is executed.

CHDIR d:\ path



The **CHDIR** is used to change the current default directory used for filenames specified in file transfer operations used in the monitor mode. The new default directory including a drive specifier and directory path is entered as an argument on the command line.

DIR d:\ path\ filename.ext

The **DIR** command displays a list of the filenames in a specified directory. If no drive or directory path is specified, all files in the current default directory will be listed. The wildcard characters * and ? may be used in the filename and extension parameters to select a subset of the files in the specified directory to be listed.

TYPE d:\ path\ filename.ext

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. If no drive or directory path is specified, the file is assumed to be in the current directory. Wildcard characters * and ? may be used in the filename or extension specified, but only the first matching file will be typed. 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 d:\ path\ filename.ext

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. If no drive or directory path are specified, the file will be created in the current default directory. 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 d:\ path\ filename.ext

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. If no drive or directory path is specified, the file is assumed to be in the current default directory. Wildcard characters * and ? may be used in the filename or extension, but only the first matching file will be transmitted.

XRCV d:\ path\ filename.ext

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 specifies the file to receive the data. If no drive or directory path is specified, the file will be created in the current default directory.

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. The echo mode is initially set to **ON**.

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. The line feed mode is initially set to **ON**.

Monitor Mode Status Display

During **MONITOR** operations using the character, XMODEM, and Softrans protocols, the following status information is displayed:

% Complete 0	Characters 0	Blocks 0	Errors 0
--------------	--------------	----------	----------

The **% Complete** field indicates the percentage of the file which has currently been received or transmitted. The **% Complete** field is not applicable to the Character or XMODEM protocols for a **RECEIVE** command.

The **Characters** 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 **Characters** 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.

System to System File Transfers

System to System file transfers are accomplished by placing a port on 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 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** and **RECEIVE** entered through interactive file transfer command execution or file transfer command file execution.

Using SOFTRANS.F77

Included on the Softerm System Diskette is the FORTRAN 77 source program **SOFTRANS.F77**. This program when compiled and adapted for use on a host computer system allows files to be transferred to and from a personal computer system using the Sofrans protocol. When the program is executed on the host computer, it functions in a similar manner to the Softerm **MONITOR** command, and accepts **SEND** and **RECEIVE** command requests from Softerm.

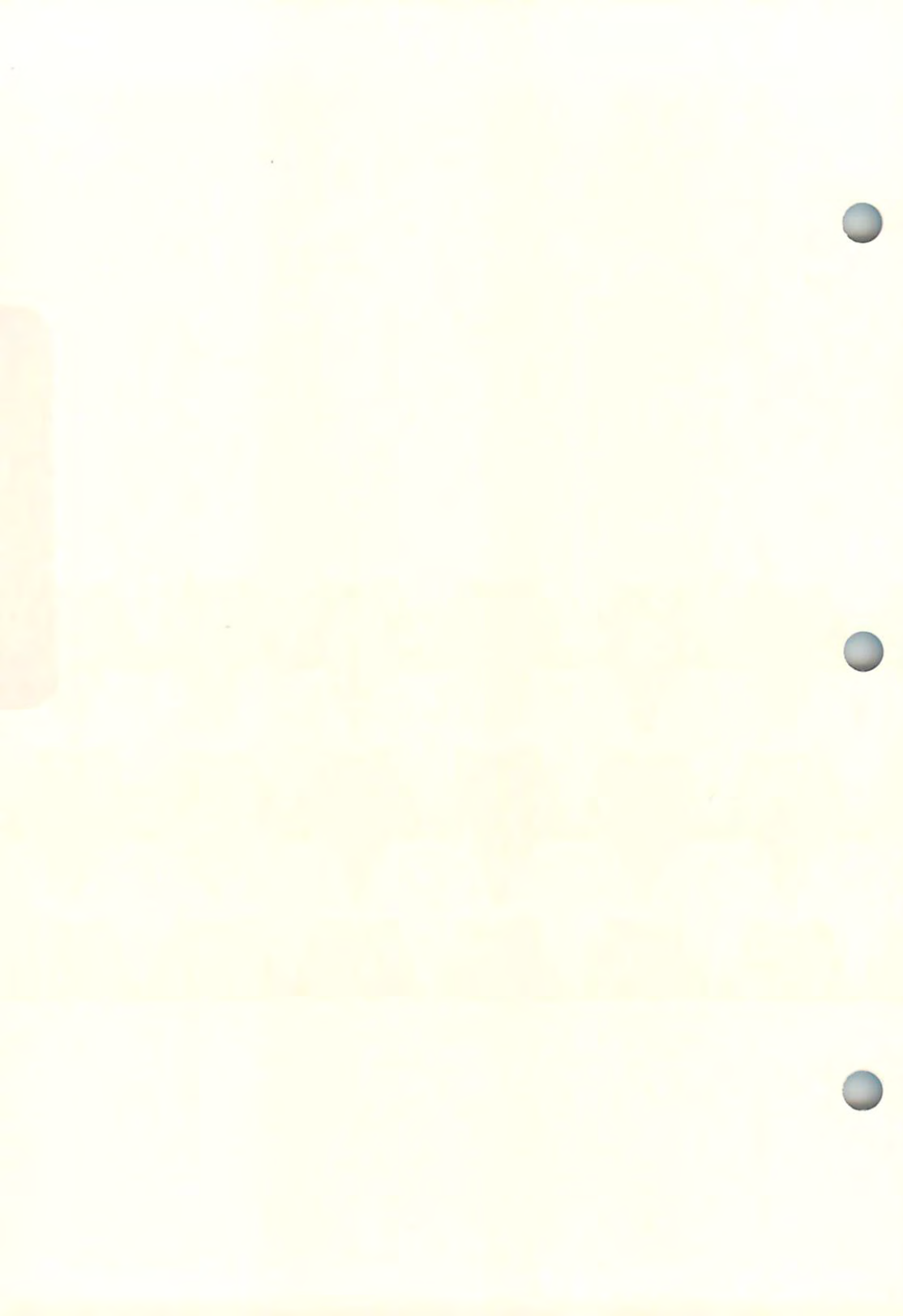
The **SOFTRANS.F77** program supplied with Softerm includes standard modules which are common to each host computer adaptation and comprise the main portion of the Sofrans program. Also included as an example of a specific host computer adaptation are modules which interface to the main **SOFTRANS.F77** program and provide Sofrans capability for the Data General AOS operating system. To adapt the **SOFTRANS.F77** 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 Sofrans protocol can be used. Instructions and additional information concerning the **SOFTRANS.F77** program are contained in the file **SOFTRANS.DOC**.

Softronics maintains a library of host computer versions of the **SOFTRANS.F77** 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. These versions are also available for downloading from the Softronics Bulletin Board and Online Update Service. Contact Softronics for additional information on host computer and operating system versions of the **SOFTRANS.F77** program available.

The source modules for the **SOFTRANS.F77** 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 **End of Block** terminator string could be specified as carriage return «**CM**», and the the **Acknowledge** string could be

specified as line feed «CJ». The COPY command could be executed on the host computer and a corresponding SEND command for each file transferred to the host computer system.





Terminal Emulation

Introduction

One of the most important capabilities Softerm provides is terminal emulation of CRT terminals. Softerm provides *exact* emulations (within the limits of the hardware) of a selection of popular CRT terminals. The emulations included with Softerm provide most standard features and many extended features of the terminals emulated including local printer support where applicable. Functions which Softerm cannot provide are processed as if these features were present so that *all* function character codes are recognized and handled properly.

Softerm also includes a general-purpose **TTY Compatible** terminal emulation for use with timesharing and information services. A special **User Defined** terminal emulation provides user-definable terminal functions including answerback, clear screen, erase to end of screen, erase to end of line, insert line, delete line, inverse video on and off, low intensity on and off, underline on and off, home cursor, backspace, 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.

The keyboard is the most restrictive hardware limitation when providing terminal emulations for a personal computer. Since many terminals have individual keys for special functions provided including cursor control, editing, and user defined functions, any emulation provided require a method of keyboard emulation as well as display functions. Softerm uses available editing and function keys and key combinations using the **Shift**, **Ctrl**, and **Alt** to provide full keyboard emulation for supported terminals.

Softerm supports **video attributes** including reverse video, high and low intensity, blinking, and underlining as well as **logical attributes** such as alpha only and numeric only if available as a hardware feature of the terminals emulated. Softerm stores video and logical attribute information on a character by character basis in its own internal display image and supports all attribute dependent functions so that functions such as *print high intensity* and *send unprotected* are processed correctly. Line drawing or limited graphics character sets provided by some terminals are emulated to the extent that the graphic characters have a close equivalent available on the personal computer.

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.

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 includes a similar capability as a standard utility function described in Chapter 4 on terminal operation. Softerm also includes specific support for terminal or host-controlled printer pass through provided by the terminals emulated if a printer 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.

The Tandy Model 2000 includes a **smooth scroll** capability. This feature can be toggled on or off from the keyboard using the **Alt Hold** key. Terminal emulations which include smooth scrolling host functions will automatically enable or disable this feature when required.

Limitations

Each terminal emulated by Softerm 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. Standard keyboard functions used with Softerm are described in Chapter 4 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 following table summarizes standard terminal emulation keyboard functions provided with Softerm terminal emulations:

Key	Function
Enter	CR, LF, or CR/LF
→	Cursor Right
←	Cursor Left
↑	Cursor Up
↓	Cursor Down
Backspace	BS or DEL
Shift Backspace	DEL or BS
Home	Home Cursor
PgUp	Clear Screen
PgDn	Erase to End of Screen
End	Erase to End of Line
Ctrl Break	Soft Reset
Hold	Stop Display
Alt Hold	Smooth Scroll Toggle
Alt A	Send Answerback Message
Alt B	Break
Alt V	View Softerm Status Line
Alt W c	Wait for Character c
Alt Z n	Delay n Seconds (0-9)
Alt ?	Display Keyboard Help Screen
Alt 1	Softerm Utility Functions
Alt 2	Softerm Goto Functions
Alt Shift id	Execute Keyboard Macro A-Z, 0-9

Softerm allows all 128 ASCII character codes to be generated from the keyboard. All 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.

Note: The **Break** key on the Tandy 2000 can be used as well as the **Alt B** key to perform a **Break** function.

TTY Compatible Terminal Emulation

Introduction

Softerm includes a general purpose, TTY compatible terminal emulation which is provided primarily for Softerm users who are planning to access timesharing systems and information services such as THE SOURCE and CompuServe which do not require a specific terminal emulation. This terminal emulation may be used by selecting **TTY Compatible** for the terminal emulation when generating a configuration in terminal setup.

Features

The TTY emulation provides all standard Softerm keyboard functions including Cursor positioning, Home, Clear, Erase to End of Screen, and Erase to End of Line. However, these functions are performed locally and no character codes are transmitted.

The following table defines character codes which perform special functions when received by the TTY Compatible emulation:

Character	Function
\$05	Automatic Answerback
\$08	Backspace (destructive)
\$0A	Line Feed
\$0C	Form Feed (Clear)
\$0D	Carriage Return

TTY Compatible Terminal Emulation Keyboard Functions

The following table defines the standard keyboard functions for the TTY Compatible terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	Local
←	Cursor Left	Local
↑	Cursor Up	Local
↓	Cursor Down	Local
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	Local
PgUp	Clear Screen	Local
PgDn	Erase to End of Screen	Local
End	Erase to End of Line	Local
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

User Defined Terminal Emulation

Introduction

Softerm includes a general purpose, user defined terminal emulation which is provided primarily for Softerm users who require emulation of a terminal not specifically included with Softerm. This terminal emulation may be used by selecting **User Defined** for the terminal emulation when generating a configuration in terminal setup.

Features

The user defined terminal emulation provides TTY standard carriage return, line feed, and backspace 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, insert line, delete line, inverse video on and off, low intensity on and off, underline on and off, blinking on and 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 **User Defined** is selected as the terminal emulation, the following screen is displayed after the last standard screen in the **Terminal Options** processing in terminal setup:

```

-----Terminal Function Definitions-----
      Answerback:
      Home Cursor:
      Clear Screen:
      Erase to End of Screen:
      Erase to End of Line:
      Insert Line:
      Delete Line:
      Printer On:                Off:
      Inverse Video On:         Off:
      Low Intensity On:        Off:
      Underline On:           Off:
      Blink On:                Off:
-----Cursor Positioning Functions-----
      Cursor Left:              Cursor Right:
      Cursor Up:                Cursor Down:
      Cursor Position:          Type: Row/Column +$20

```

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 «**CH**» (**\$08**), whenever the ← is pressed, a **\$08** character is transmitted.

Up to a 5 character sequence may be defined for each terminal function displayed. The **Enter** or **Tab** and **Shift Tab** can be used to position the cursor to define characters for the terminal functions. Character codes must be entered left to right in the sequence which when received will cause the corresponding terminal function to be performed. The character sequence is terminated by the first blank position in the field. Entry of some characters may require an **Esc** lead-in character to be entered first. For example, to enter an **Esc** character code (**\$1B**) in the field you must press the **Esc** key as the lead-in character followed by another **Esc** as the character to be entered in the field. It will be displayed as «**ESC**». Refer to the section on ASCII string fields in Chapter 2 for additional information.

If the **Answerback** character sequence is received, the answerback string defined in the Communications 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 sequences for video attributes provide a function to turn the attribute on or off. Once a video attribute is turned on, all subsequent data characters received will be displayed with the selected attribute until the character sequence which turns the attribute off is received, or a **Clear Screen** function is received.

The **Cursor Position** 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 Position** function is assumed to precede a 2-character cursor position in either **Row/Column** or **Column/Row** order as defined by the option **Type**. The row and column values may be specified as **+\$00** indicating the two characters received are the actual row and column values or as **+\$20** to indicate that hexadecimal 20 must be subtracted from the row and column character values to obtain the actual row and column. The available **Type** options are **Row/Column +\$00**, **Row/Column+\$20**, **Column/Row +\$00**, **Column/Row +\$20**. 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 hexadecimal 20. The **Cursor Position** should be set to **«ESC»=**, the **Type** selected should be **Row/Column +\$20**.

When editing of the terminal function definition screen for the **User Defined** emulation is complete, press **Alt Enter** to return to the terminal setup menu.

User Defined Terminal Emulation Keyboard Functions

The following table defines the standard keyboard functions for the **User Defined** terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	User Defined
←	Cursor Left	User Defined
↑	Cursor Up	User Defined
↓	Cursor Down	User Defined
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	User Defined
PgUp	Clear Screen	User Defined
PgDn	Erase to End of Screen	User Defined
End	Erase to End of Line	User Defined
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt Insert	Insert Line	User Defined
Alt Delete	Delete Line	User Defined
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

ADDS Regent 20

Introduction

The ADDS Regent 20 display terminal can be emulated using Softerm by selecting **ADDS Regent 20** for the terminal emulation 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. 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), Store Control Character, Transparent Print OFF, and Transparent Print ON.

Switch selectable settings supported by equivalent Softerm options 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 the terminal configuration includes a printer. 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.

ADDS Regent 20 Keyboard Functions

The following table defines the standard keyboard functions for the ADDS Regent 20 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Forward	\$06
←	Cursor Back	\$15
↑	Cursor Up	\$1A
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	\$01
PgUp	Erase All	\$0C
PgDn	Erase to End of Page	\$1B \$6B
End	Erase to End of Line	\$1B \$4B
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

ADDS Regent 25

Introduction

The ADDS Regent 25 display terminal can be emulated using Softerm by selecting **ADDS Regent 25** for the terminal emulation 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. 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), Store Control Character, Transparent Print OFF, and Transparent Print ON.

Switch selectable settings supported by equivalent Softerm options 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 the terminal configuration includes a printer. 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.

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. **Alt** and **Alt Shift** are used to generate the optional function code sequences.

ADDS Regent 25 Keyboard Functions

The following table defines the standard keyboard functions for the ADDS Regent 25 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Forward	\$06
←	Cursor Back	\$15
↑	Cursor Up	\$1A
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	\$01
PgUp	Erase All	\$0C
PgDn	Erase to End of Page	\$1B \$6B
End	Erase to End of Line	\$1B \$4B
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

The following functions are generated using the numeric keypad except for the comma (,) which is entered on the main keyboard:

Alt 0	Keypad Function 0	\$02 \$30 \$0D
Alt 1	Keypad Function 1	\$02 \$31 \$0D
Alt 2	Keypad Function 2	\$02 \$32 \$0D
Alt 3	Keypad Function 3	\$02 \$33 \$0D
Alt 4	Keypad Function 4	\$02 \$34 \$0D

Alt 5	Keypad Function 5	\$02 \$35 \$0D
Alt 6	Keypad Function 6	\$02 \$36 \$0D
Alt 7	Keypad Function 7	\$02 \$37 \$0D
Alt 8	Keypad Function 8	\$02 \$38 \$0D
Alt 9	Keypad Function 9	\$02 \$39 \$0D
Alt .	Keypad Function .	\$02 \$2E \$0D
Alt ,	Keypad Function ,	\$02 \$2C \$0D
Alt Shift 0	Keypad Function 0	\$1B \$30
Alt Shift 1	Keypad Function 1	\$1B \$31
Alt Shift 2	Keypad Function 2	\$1B \$32
Alt Shift 3	Keypad Function 3	\$1B \$33
Alt Shift 4	Keypad Function 4	\$1B \$34
Alt Shift 5	Keypad Function 5	\$1B \$35
Alt Shift 6	Keypad Function 6	\$1B \$36
Alt Shift 7	Keypad Function 7	\$1B \$37
Alt Shift 8	Keypad Function 8	\$1B \$38
Alt Shift 9	Keypad Function 9	\$1B \$39
Alt Shift .	Keypad Function .	\$1B \$2E
Alt Shift ,	Keypad Function ,	\$1B \$2C

ADDS Regent 40

Introduction

The ADDS Regent 40 display terminal can be emulated using Softerm by selecting **ADDS Regent 40** for the terminal emulation 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, line drawing, 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 specifically support since the standard Softerm status line contains similar information. 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), Store Control Character, Local Mode, Printer Off, Printer On, Read Status, Transparent Mode Disable, Transparent Mode Enable, Line Drawing Mode Enable, and Line Drawing Mode Disable.

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.

Switch selectable settings supported by equivalent Softerm options 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 the terminal configuration includes a printer. 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 **Ctrl Print** keyboard function which emulates the AUX Key capability of the Regent 40.

After the last standard screen in the **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

————— ADDS Regent 40 Emulation Options —————
Line Terminator Code: CR

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. Selecting **CR** will cause a **carriage return** (\$0D) to become the terminator. Selecting **CR/ETX** will cause a **carriage return** and **end of text** sequence to be the terminator and Softerm will send \$0D \$03 after each function key sequence or status message. Selecting **CR/EOT** will cause a **carriage return** and **end of transmission** sequence 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 table defines the standard keyboard functions for the ADDS Regent 40 terminal emulation. The function key terminator code (\$??) is set by the Regent 40 emulation option **Line Terminator Code** described previously.

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Forward	\$06
←	Cursor Back	\$15
↑	Cursor Up	\$1A
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	\$01
PgUp	Erase All	\$0C
PgDn	Erase to End of Page	\$1B \$6B
End	Erase to End of Line	\$1B \$4B
Ctrl Break	Soft Reset	
Hold	Stop Display	
Ctrl Print	AUX	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	F1	\$02 \$31 \$??
F2	F2	\$02 \$32 \$??
F3	F3	\$02 \$33 \$??
F4	F4	\$02 \$34 \$??
F5	F5	\$02 \$35 \$??

F6	F6	\$02 \$36 \$??
F7	F7	\$02 \$37 \$??
F8	F8	\$02 \$38 \$??
Shift F1	Shift F1	\$02 \$21 \$??
Shift F2	Shift F2	\$02 \$22 \$??
Shift F3	Shift F3	\$02 \$23 \$??
Shift F4	Shift F4	\$02 \$24 \$??
Shift F5	Shift F5	\$02 \$25 \$??
Shift F6	Shift F6	\$02 \$26 \$??
Shift F7	Shift F7	\$02 \$27 \$??
Shift F8	Shift F8	\$02 \$28 \$??

ADDS Regent 60

Introduction

The ADDS Regent 60 display terminal can be emulated using Softerm by selecting **ADDS Regent 60** for the terminal emulation 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, line drawing, 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** which is supported by Softerm.

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, DELL, 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, Status Line Enable, Status Line Disable and Transmit.

Other remote terminal commands which are recognized but not processed are Set Aux Baud Rate, On-Line Mode, Off-Line Mode, and Video ON and OFF.

Switch selectable settings supported by equivalent Softerm options 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 the terminal configuration includes a printer. 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 **Ctrl Print** Softerm function which emulates the AUX Key capability of the Regent 60.

After the last standard screen in the **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

```
-----ADDS Regent 60 Emulation Options-----  
Line Terminator Code: CR
```

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. Selecting **CR** will cause a **carriage return** (\$0D) to become the terminator. Selecting a **CR/ETX** will cause a **carriage return** and **end of text** sequence to be the terminator and Softerm will send \$0D \$03 after each function key sequence, status message, or transmit function. Selecting a **CR/EOT** will cause a **carriage return** and **end of transmission** sequence 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. The status information displayed includes the **Operating Mode**, **Field Type**, **Attribute**, and **Row-Column Position**. The status line can be displayed by pressing **Alt T** during online terminal operation.

While the status is displayed, Softerm allows the **Operating Mode** of the Regent 60 to be **toggled** by pressing the **M** key. Online terminal operation is suspended and input is enabled on the status line whenever a blinking ► appears in the first column of the status line. For example, to toggle from the conversational mode to one of the buffered modes (message, page, forms, modify), first display the status by entering **Alt T** and then press the **M** key until the desired operating mode (**Conv, Msg, Page, Forms, Modify**) appears in the operating mode field.

To return to the online mode after displaying the status, enter **Alt T** or **Alt Esc**. If you exit using the **Alt T** key, the status line will remain on the screen during online operation and will be automatically updated if required. If you exit from the status line display using the **Alt Esc** key, the status line will be cleared.

ADDS Regent 60 Keyboard Functions

The following table defines the standard keyboard functions for the ADDS Regent 60 terminal emulation. The function key terminator code (\$??) is set by the Regent 60 emulation option **Line Terminator Code** described previously.

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
Alt Enter	Transmit	
→	Cursor Forward	\$06
←	Cursor Backward	\$15
↑	Cursor Up	\$1A
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	Tab	\$09
Shift Tab	Back Tab	\$1B \$4F
Home	Home Cursor	\$01
PgUp	Erase All	\$0C
Ctrl PgUp	Erase Variable Data	\$1B \$47
PgDn	Erase to End of Page	\$1B \$6B
End	Erase to End of Line/Field	\$1B \$4B
Delete	Delete Character (Line/Field)	\$1B \$45
Ctrl Delete	Delete Character (Page)	\$1B \$65
Alt Delete	Delete Line	\$1B \$6C
Insert	Insert Character (Line/Field)	\$1B \$46
Ctrl Insert	Insert Character (Page)	\$1B \$66
Alt Insert	Insert Line	\$1B \$4D
Ctrl Break	Soft Reset	
Hold	Stop Display	
Shift Print	Print ALL	\$1B \$78
Alt Print	Print Variable	\$1B \$58
Ctrl Print	AUX	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK

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Alt R	Reset Modified Field	
Alt T	Display Regent 60 Status	
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	F1	\$02 \$31 ???
F2	F2	\$02 \$32 ???
F3	F3	\$02 \$33 ???
F4	F4	\$02 \$34 ???
F5	F5	\$02 \$35 ???
F6	F6	\$02 \$36 ???
F7	F7	\$02 \$37 ???
F8	F8	\$02 \$38 ???
Shift F1	Shift F1	\$02 \$21 ???
Shift F2	Shift F2	\$02 \$22 ???
Shift F3	Shift F3	\$02 \$23 ???
Shift F4	Shift F4	\$02 \$24 ???
Shift F5	Shift F5	\$02 \$25 ???
Shift F6	Shift F6	\$02 \$26 ???
Shift F7	Shift F7	\$02 \$27 ???
Shift F8	Shift F8	\$02 \$28 ???

ADDS Viewpoint

Introduction

The ADDS Viewpoint display terminal can be emulated using Softerm by selecting **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. Softerm supports all available keyboard functions including ESC, RETURN, TAB, BREAK, DEL, HOME, F1-F3, CURSOR CONTROLS and BACK SPACE. Additional 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), Store Control Character, Tag Bit Reset, Tag Bit Set, Transparent Print Off, and Transparent Print ON.

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 the terminal configuration includes a printer. 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 **Ctrl Print** 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. 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 table defines the standard keyboard functions for the ADDS Viewpoint terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Forward	\$06
←	Cursor Back	\$15
↑	Cursor Up	\$1A
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	\$01
PgUp	Erase All	\$0C
PgDn	Erase to End of Page	\$1B \$6B
End	Erase to End of Line	\$1B \$4B
Ctrl Break	Soft Reset	
Hold	Stop Display	
Ctrl Print	AUX	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	F1	\$02 \$31 \$0D
F2	F2	\$02 \$32 \$0D
F3	F3	\$02 \$33 \$0D
Shift F1	Shift F1	\$02 \$21 \$0D
Shift F2	Shift F2	\$02 \$22 \$0D
Shift F3	Shift F3	\$02 \$23 \$0D

Data General D200

Introduction

The Data General DASHER D200 display terminal can be emulated using Softerm by selecting **Data General D200** for the terminal emulation 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. 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.

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 the terminal configuration includes a printer, 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.

Data General D200 Keyboard Functions

The following table defines the standard keyboard functions for the Data General D200 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$18
Ctrl →	Shift Cursor Right	\$1E \$18
←	Cursor Left	\$19
Ctrl ←	Shift Cursor Left	\$1E \$19
↑	Cursor Up	\$17
Ctrl ↑	Shift Cursor Up	\$1E \$17
↓	Cursor Down	\$1A
Ctrl ↓	Shift Cursor Down	\$1E \$1A
Backspace	DEL	\$7F
Home	Home	\$08
Ctrl Home	Shift Home	\$1E \$08
PgUp	Erase Page	\$0C
PgDn	Erase Page	\$0C
End	Erase to End of Line	\$0B
Tab	Tab	\$09
Ctrl Break	Soft Reset	
Hold	Stop Display	
Shift Print	Print	\$1E \$11
Alt Shift Print	Print Form	\$1E \$01
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	

Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	FK1	\$1E \$71
F2	FK2	\$1E \$72
F3	FK3	\$1E \$73
F4	FK4	\$1E \$74
F5	FK5	\$1E \$75
F6	FK6	\$1E \$76
F7	FK7	\$1E \$77
F8	FK8	\$1E \$78
F9	FK9	\$1E \$79
F10	FK10	\$1E \$7A
F11	FK11	\$1E \$7B
F12	FK12	\$1E \$7C
Alt F3	FK13	\$1E \$7D
Alt F4	FK14	\$1E \$7E
Alt F5	FK15	\$1E \$70
Shift F1	Shift FK1	\$1E \$61
Shift F2	Shift FK2	\$1E \$62
Shift F3	Shift FK3	\$1E \$63
Shift F4	Shift FK4	\$1E \$64
Shift F5	Shift FK5	\$1E \$65
Shift F6	Shift FK6	\$1E \$66
Shift F7	Shift FK7	\$1E \$67
Shift F8	Shift FK8	\$1E \$68
Shift F9	Shift FK9	\$1E \$69
Shift F10	Shift FK10	\$1E \$6A
Shift F11	Shift FK11	\$1E \$6B
Shift F12	Shift FK12	\$1E \$6C
Alt Shift F3	Shift FK13	\$1E \$6D
Alt Shift F4	Shift FK14	\$1E \$6E
Alt Shift F5	Shift FK15	\$1E \$60
Ctrl F1	Ctrl FK1	\$1E \$31
Ctrl F2	Ctrl FK2	\$1E \$32
Ctrl F3	Ctrl FK3	\$1E \$33
Ctrl F4	Ctrl FK4	\$1E \$34
Ctrl F5	Ctrl FK5	\$1E \$35
Ctrl F6	Ctrl FK6	\$1E \$36
Ctrl F7	Ctrl FK7	\$1E \$37

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Ctrl F8	Ctrl FK8	\$1E \$38
Ctrl F9	Ctrl FK9	\$1E \$39
Ctrl F10	Ctrl FK10	\$1E \$3A
Ctrl F11	Ctrl FK11	\$1E \$3B
Ctrl F12	Ctrl FK12	\$1E \$3C
Alt Ctrl F3	Ctrl FK13	\$1E \$3D
Alt Ctrl F4	Ctrl FK14	\$1E \$3E
Alt Ctrl F5	Ctrl FK15	\$1E \$30
Shift Ctrl F1	Shift Ctrl FK1	\$1E \$21
Shift Ctrl F2	Shift Ctrl FK2	\$1E \$22
Shift Ctrl F3	Shift Ctrl FK3	\$1E \$23
Shift Ctrl F4	Shift Ctrl FK4	\$1E \$24
Shift Ctrl F5	Shift Ctrl FK5	\$1E \$25
Shift Ctrl F6	Shift Ctrl FK6	\$1E \$26
Shift Ctrl F7	Shift Ctrl FK7	\$1E \$27
Shift Ctrl F8	Shift Ctrl FK8	\$1E \$28
Shift Ctrl F9	Shift Ctrl FK9	\$1E \$29
Shift Ctrl F10	Shift Ctrl FK10	\$1E \$2A
Shift Ctrl F11	Shift Ctrl FK11	\$1E \$2B
Shift Ctrl F12	Shift Ctrl FK12	\$1E \$2C
Alt Shift Ctrl F3	Shift Ctrl FK13	\$1E \$2D
Alt Shift Ctrl F4	Shift Ctrl FK14	\$1E \$2E
Alt Shift Ctrl F5	Shift Ctrl FK15	\$1E \$20

The follow functions are generated on the numeric keypad:

Alt 1	C1	\$1E \$5C
Alt 2	C2	\$1E \$5D
Alt 3	C3	\$1E \$5E
Alt 4	C4	\$1E \$5F
Alt Shift 1	Shift C1	\$1E \$58
Alt Shift 2	Shift C2	\$1E \$59
Alt Shift 3	Shift C3	\$1E \$5A
Alt Shift 4	Shift C4	\$1E \$5B

Datapoint Datastation 3601

Introduction

The Datapoint Datastation 3601 can be emulated using Softerm by selecting **Datapoint 3601** for the terminal emulation 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.

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 the terminal configuration includes a printer. 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. Data received is also displayed on the video display.

Datapoint Datastation 3601 Keyboard Functions

The following table defines the standard keyboard functions for the Datapoint Datastation 3601 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
Shift Enter	New Line	\$0C
Esc	Cancel	\$1B
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Up	\$15
PgUp	Clear Screen	\$15 \$17
PgDn	Erase to End of Frame	\$17
End	Erase to End of Line	\$16
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt I	INT	\$1C
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

Digital Equipment VT52

Introduction

The Digital Equipment VT52 terminal can be emulated using Softerm by selecting **DEC VT52** for the terminal emulation 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, Special Graphics Character Set, 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 keys for Erase Screen, Erase to End of Screen, and Erase to End of Line.

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, Select Special Graphics Character Set, Select ASCII Character Set, and Alternate Keypad mode.

DEC VT52 Keyboard Functions

The following table defines the standard keyboard functions for the Digital Equipment VT52 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$1B \$43
←	Cursor Left	\$1B \$44
↑	Cursor Up	\$1B \$41
↓	Cursor Down	\$1B \$42
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	Tab	\$09
Home	Cursor Home	\$1B \$48
PgUp	Erase Screen	\$1B \$48 \$1B \$4A
PgDn	Erase to End of Screen	\$1B \$4A
End	Erase to End of Line	\$1B \$4B
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	PF1	\$1B \$50
F2	PF2	\$1B \$51
F3	PF3	\$1B \$52
F4	PF4	\$1B \$53

The following functions are entered on the numeric keypad except for the comma (,) and minus (-) which are entered on the main keyboard:

Alt 0	Keypad Function 0	\$1B \$3F \$70
Alt 1	Keypad Function 1	\$1B \$3F \$71
Alt 2	Keypad Function 2	\$1B \$3F \$72
Alt 3	Keypad Function 3	\$1B \$3F \$73
Alt 4	Keypad Function 4	\$1B \$3F \$74
Alt 5	Keypad Function 5	\$1B \$3F \$75
Alt 6	Keypad Function 6	\$1B \$3F \$76
Alt 7	Keypad Function 7	\$1B \$3F \$77
Alt 8	Keypad Function 8	\$1B \$3F \$78
Alt 9	Keypad Function 9	\$1B \$3F \$79
Alt ,	Keypad Function ,	\$1B \$3F \$6C
Alt -	Keypad Function -	\$1B \$3F \$6D
Alt .	Keypad Function .	\$1B \$3F \$6E
Alt Enter	Keypad Function ENTER	\$1B \$3F \$4D

Digital Equipment VT100

Introduction

The Digital Equipment Corporation VT100 terminal can be emulated using Softerm by selecting **DEC VT100** for the terminal emulation 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, Special Graphics Character Set, 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, and SCROLL.

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, Scrolling 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, Select Character Set, 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, 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.

The **Keypad Application Mode** and **Cursor Keys Mode** are simulated in Softerm using the **Alt** key in combination with a 0-9, minus, period, comma, and **Enter** 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 auxiliary keypad 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.

After the last standard screen in the **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

————— DEC VT100 Emulation Options —————

VT52 Compatibility Mode: No
Print Extent Full Screen: Yes
Print Terminator Form Feed: Yes
Identify as VT102: Yes
Shift-3 Displays: #

=====
=====
Tab Stops
=====
=====

		T		T		T		T	
Columns 1-40	12345678901234567890123456789012345678901234567890								
		T		T		T		T	
Columns 41-80	12345678901234567890123456789012345678901234567890								

If the **VT52 Compatibility Mode** option is specified as **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, 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 **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 **Shift Print** keyboard function is executed or a **print screen** command is received. If this option is specified as **Yes**, the full screen will be printed. If this option is specified as **No**, 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 generated after the screen is printed using the **Shift Print** keyboard function or when a **print screen** command is received. If this option is specified as **Yes**, 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 **No**, 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 **Yes**, Softerm will

respond with **ESC [? 6 c** indicating a VT102. If this option is specified as **No**, Softerm will respond with **ESC [? 1 ; 1 1 c** indicating a VT100 with the VT1XX-AC option.

The **Shift-3 Displays** option allows the character displayed when the **Shift 3** key is pressed or a ASCII # (\$23) character is received to be selected. The character selected by be either a **#** or a **£**.

Softerm allows default tab stops to be defined which are set at initialization, when **Ctrl Break** is pressed, or any control sequence is received which would return the terminal to its initial state. The **tab format** consists of 2 string entry fields, for columns 1-40 and 41-80. Entering any non-blank character such as a **T** will result in a tab stop being set at the current location.

DEC VT100 Keyboard Functions

The following table defines the standard keyboard functions for the Digital Equipment VT100 terminal emulation. Refer to the VT52 Keyboard Function Table for keyboard functions in VT52 compatibility mode.

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$1B (\$5B or \$4F) \$43
←	Cursor Left	\$1B (\$5B or \$4F) \$44
↑	Cursor Up	\$1B (\$5B or \$4F) \$41
↓	Cursor Down	\$1B (\$5B or \$4F) \$42
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	Tab	\$09
Home	Cursor Home	\$1B \$5B \$48
PgUp	Erase Display	\$1B \$5B \$32 \$4A
PgDn	Erase to End of Display	\$1B \$5B \$4A
End	Erase to End of Line	\$1B \$5B \$4B
Ctrl Break	Soft Reset	
Hold	Stop Display	
Shift Print	Print Screen	
Ctrl Print	Enable/Disable Auto/Print	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	PF1	\$1B \$4F \$50
F2	PF2	\$1B \$4F \$51
F3	PF3	\$1B \$4F \$52

F4 PF4 \$1B \$4F \$53

The following functions are entered on the numeric keypad except for the comma (,) and minus (-) which are entered on the main keyboard:

Alt 0	Keypad Function 0	\$1B \$4F \$70
Alt 1	Keypad Function 1	\$1B \$4F \$71
Alt 2	Keypad Function 2	\$1B \$4F \$72
Alt 3	Keypad Function 3	\$1B \$4F \$73
Alt 4	Keypad Function 4	\$1B \$4F \$74
Alt 5	Keypad Function 5	\$1B \$4F \$75
Alt 6	Keypad Function 6	\$1B \$4F \$76
Alt 7	Keypad Function 7	\$1B \$4F \$77
Alt 8	Keypad Function 8	\$1B \$4F \$78
Alt 9	Keypad Function 9	\$1B \$4F \$79
Alt ,	Keypad Function ,	\$1B \$4F \$6C
Alt -	Keypad Function -	\$1B \$4F \$6D
Alt .	Keypad Function .	\$1B \$4F \$6E
Alt Enter	Keypad Function ENTER	\$1B \$4F \$4D

Hazeltine 1400/1410

Introduction

The Hazeltine 1400 and 1410 video display terminals can be emulated using Softerm by selecting **Hazeltine 1400/1410** for the terminal emulation 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 → and ← keys 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 table defines the standard keyboard functions for the Hazeltine 1400/1410 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$10
←	Cursor Left	\$08
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	\$7E \$12
PgUp	Clear Screen	\$7E \$1C
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

Hazeltine 1500

Introduction

The Hazeltine 1500 Video Display Terminal can be emulated using Softerm by selecting **Hazeltine 1500** for the terminal emulation 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 → key is used to provide **cursor right** and the ← key is used to provide **cursor left** on 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 table defines the standard keyboard functions for the Hazeltine 1500 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$10
←	Cursor Left	\$08
↑	Cursor Up	\$7E \$0C
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Cursor Home	\$7E \$12
PgUp	Clear Screen	\$7E \$1C
Ctrl PgUp	Clear Foreground	\$7E \$1D
PgDn	Clear to End of Screen	\$7E \$18
End	Clear to End of Line	\$7E \$0F
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

Hazeltine 1520

Introduction

The Hazeltine 1520 Video Display Terminal can be emulated using Softerm by selecting **Hazeltine 1520** for the terminal emulation 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 equivalent Softerm options 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 rectangular block. The SHIFT SEND or PRINT function is also provided and the print symbol is displayed as a diamond.

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 **Alt F** key. On pressing the **Alt 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 **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

Hazeltine 1520 Emulation Options

End of Message Character: CR
Format Mode: Yes
Lead-In Character: ESC

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). The character may be selected as **None** indicating no character, **CR** (\$0D), **EOT** (\$04), or **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. **Yes** selects the format mode of operation while **No** selects conversational full or half duplex operation.

The emulation option **Lead-In Character** allows the lead-in character for remote commands to be specified as either an **ESC** (\$1B) or a **Tilde** (\$7E) character code.

Hazeltine 1520 Keyboard Functions

The following table defines the standard keyboard functions for the Hazeltine 1520 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
Alt Enter	SEND	
Shift Enter	SEND LINE	
Ctrl Enter	SEND PAGE	
→	Cursor Right	\$10
←	Cursor Left	\$08
↑	Cursor Up	(\$7E or \$1B) \$0C
↓	Cursor Down	(\$7E or \$1B) \$0B
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	Tab	\$09
Shift Tab	Back Tab	(\$7E or \$1B) \$14
Home	Home Cursor	(\$7E or \$1B) \$12
PgUp	Clear Screen	(\$7E or \$1B) \$1C
Ctrl PgUp	Clear Foreground	(\$7E or \$1B) \$1D
PgDn	Clear to End of Screen	(\$7E or \$1B) \$18
End	Clear to End of Line	(\$7E or \$1B) \$0F
Alt Delete	Delete Line	(\$7E or \$1B) \$13
Alt Insert	Insert Line	(\$7E or \$1B) \$1A
Ctrl Break	Soft Reset	
Hold	Stop Display	
Shift Print	PRINT	
Ctrl Print	Online Print Enable/Disable	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt F	FUNCTION	\$1B (ASCII Code) EOM
Alt V	View Softterm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	

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Alt ?	Display Keyboard Help
Alt 1	Softerm Utility Functions
Alt 2	Softerm Goto Functions
Alt Shift id	Execute Keyboard Macro A-Z, 0-9 User Defined



Hewlett Packard 2622A

Introduction

The Hewlett-Packard 2622A Display Terminal can be emulated using Softerm by selecting **Hewlett-Packard 2622** for the terminal emulation when generating a configuration in terminal setup. Softerm supports all the general capabilities of the HP 2622A including Display Enhancements (inverse video, blinking, underlining, and half-bright), 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. The **F10** key is used to *toggle* the soft key label display on or off. The soft key labels for the user-definable function keys f1-f8 temporarily replace the lines 23 and 24 of the display. While the soft key labels are displayed, any key subsequently entered will be processed normally and lines 23 and 24 are automatically restored to their previous contents.

Softerm supports the **Line Drawing** and **Extended Roman** character sets. However, some characters for which there is no equivalent may be blanked. Softerm supports 2 pages (3840 characters or 48 lines) of display memory and display control functions related to multiple page operation are processed accordingly:

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 equivalent Softerm options 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 communications parameter **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 equivalent Softerm options include Baud Rate, Parity, EnqAck, Chk Parity, RecvPace, and XmitPace. The **Baud Rate**, **Parity**, and **Chk Parity** correspond to the Softerm communications parameters **Speed**, **Parity**, and **Number of Data Bits**. **RecvPace** corresponds to the Softerm communications parameter **Receive Pacing** and **XmitPace** corresponds to **Transmit Pacing**.

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, rows 23 and 24 are temporarily cleared and the received error message is displayed. The error message will remain displayed until the **Esc** 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.

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 **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

Hewlett-Packard 2622A Emulation Options

```
RETURN Def: $OD $00
Start Col: 1
XmitFunctn(A): No
SPOW(B): No
Line/Page(D): Line
InhHndShk(G): No
Inh DC2(H): No
Fld Separator: $LF
Blk Terminator: $LE
ASCII 8 Bits: No
EnqAck: Yes
Block Mode: No
Modify All Mode: No
Auto LF Mode: No
```

The emulation option **RETURN Def** specifies the definition of the **Enter** key. The default definition is an ASCII CR (\$OD). 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 **XmitFunctn(A)** specifies whether escape code functions are both executed at the terminal and transmitted to the host computer. If this field is specified as **Yes**, the escape code sequences generated by control keys such as **PgUp** (CLEAR DSPLY) and **End** (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 **No**, the escape code sequences for the major function keys are executed locally but not transmitted to the host computer.

The emulation option **SPOW(B)** specifies whether or not spaces entered through the keyboard will overwrite existing characters. If this option is specified as **No**, spaces entered through the keyboard will overwrite existing characters. If this option is specified as **Yes**, 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 option **Line/Page(D)** 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. **Line** selects the line at a time data transmission for block mode. **Page** selects the page at a time data transmission for block mode.

The emulation options **InhHndShk(G)** and **Inh DC2(H)** 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 **ASCII 8 Bits** 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 **Yes**, SO codes will be effective until the next SI code even if it occurs several lines later. If this option is specified as **No**, SO codes are effective only to the end of the current line. This option does not affect the communications parameter **Number of Data Bits**. The emulation option **ASCII 8-Bits** also allows the character set used whenever the alternate character set is selected to be specified. If **Yes** is specified, the **Extended Roman** becomes the default alternate character set. If **No** is specified, **Line Drawing** becomes the default alternate character set. If the **ASCII 8-Bits** option is set to **Yes**, you should insure that the communications parameter **Number of Data Bits** is set to **8**, and **Parity** is set to **None**.

When editing of the HP 2622A emulation options is complete, press **Alt Enter** to continue to function key definition.

The emulation option **EnqAck** enables the use of the Hewlett-Packard ENQ-ACK handshake as a pacing mechanism. Selecting **Yes** for this option enables the EnqAck handshake while selecting **No** disables the handshake.

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 **Yes**, 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 **No**, Softerm will operate in the character mode. In the character

mode, a character is immediately transmitted when a keyboard key is pressed. Softterm can be toggled between the block and character modes using the HP 2622A Status Display initiated with the **Alt T** keyboard function.

The emulation option **Modify All Mode** allows the Modify All Mode of operation to be selected by default. **Yes** selects the Modify All mode of operation while **No** 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 **Alt T** 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. Selecting **Yes** for this option enables the Auto Line Feed Mode. Selecting **No** 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 **Alt T** keyboard function.

Function Key Definition

When editing of the HP 2622A emulation options is complete, pressing the **Alt Enter** key will cause the following screen to be displayed:

Function Key Definitions

```
f1 Attribute: T Label: f1
«ESC»p
f2 Attribute: T Label: f2
«ESC»q
f3 Attribute: T Label: f3
«ESC»r
f4 Attribute: T Label: f4
«ESC»s
f5 Attribute: T Label: f5
«ESC»t
f6 Attribute: T Label: f6
«ESC»u
f7 Attribute: T Label: f7
«ESC»v
f8 Attribute: T Label: f8
«ESC»w
```

The fields displayed for each function key definition include the **Attribute**, **Label** on the first line of each key definition, and an 80-character key definition field occupying the entire second line of each key definition.

The **Attribute** 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 **Attribute** 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 **Label** field defines the function key label of up to 16 characters. The labels are displayed on rows 23 and 24 of the screen when an **F10** key 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 **Label** correspond to the upper portion of the label and the last 8 characters correspond to the lower portion.

The entire line (80 characters) immediately below the attribute and label fields is available for specifying the character string that is to be displayed, executed, and/or transmitted whenever the function key is pressed.

Once editing of the function key definitions is complete, press the **Alt Enter** key 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. Softterm displays the status information on row 25 whenever the **Alt T** key is pressed. The status information displayed includes the current **Row** (1-48) 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. Online terminal operation is suspended and input is enabled on the status line whenever a blinking ► appears in the first column of the status line. For example, to toggle from character mode to block mode, first display the status by entering **Alt T** 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 the **Enter** or **Alt Enter** (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 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.

To return to the online mode after displaying the status, enter **Alt T** or **Alt Esc**. If you exit using the **Alt T** key, the status line will remain on the screen during online operation and will be automatically updated if required. If you exit from the status line display using the **Alt Esc** key, the status line will be cleared.

Hewlett-Packard 2622A Keyboard Functions

The following table defines the standard keyboard functions for the Hewlett-Packard 2622A terminal emulation:

Keyboard	Function	Characters
Enter	RETURN	User Defined
Alt Enter	ENTER	
→	Cursor Right	\$1B \$43
←	Cursor Left	\$1B \$44
↑	Cursor Up	\$1B \$41
↓	Cursor Down	\$1B \$42
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	TAB	\$09
Shift Tab	BACK TAB	\$1B \$69
Alt →	SET TAB	
Alt ←	CLEAR TAB	
Alt Ctrl Tab	CLR ALL TABS	
Home	HOME UP	\$1B \$48
Ctrl Home	HOME DOWN	\$1B \$46
PgUp	CLEAR DSPLY	\$1B \$4A
PgDn	CLEAR DSPLY	\$1B \$4A
End	CLEAR LINE	\$1B \$4B
Delete	DEL CHAR	\$1B \$50
Alt Delete	DEL LINE	\$1B \$4D
Insert	INS CHAR	\$1B \$51 or \$1B \$52
Alt Insert	INS LINE	\$1B \$4C
Ctrl Break	Soft Reset	
Hold	Stop Display	
Shift Print	COPY PAGE	
Alt Print	COPY LINE	
Ctrl Print	RECORD MODE	

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Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt D	DEFAULT VALUES	
Alt [LEFT MARGIN	
Alt]	RIGHT MARGIN	
Alt Ctrl M	CLR ALL MARGINS	
Alt PgDn	NEXT PAGE	
Alt PgUp	PREV PAGE	
Alt ↑	ROLL UP	
Alt ↓	ROLL DOWN	
Alt S	SET START COL	
Alt T	Display HP 2622A Status	
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F10	USER KEYS	
F1	f1	User Defined
F2	f2	User Defined
F3	f3	User Defined
F4	f4	User Defined
F5	f5	User Defined
F6	f6	User Defined
F7	f7	User Defined
F8	f8	User Defined

Honeywell VIP7205

Introduction

The Honeywell VIP7205 Video Display Terminal can be emulated using Softerm by selecting **Honeywell VIP7205** for the terminal emulation 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 equivalent Softerm options 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 **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 **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

```
—————Honeywell VIP7205 Emulation Options—————  
End of Message Character: CR ($0D)  
Operating Mode: Character  
Transmit Mode: Page  
Enable Blink: No
```

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)**, **CR (\$0D)**, **LF (\$0A)**, **EOT (\$04)**, or **ETX (\$03)**.

The emulation option **Operating Mode** allows the selection of either **Character** or **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 **CHARACTER/BUFFER** switch.

The emulation option **Transmit Mode** is equivalent to the VIP7205 **LINE/PAGE** switch. If this option is selected as **Line**, 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 selected as **Page**, 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 **Yes** will cause characters or fields preceded by set low intensity command to blink. This option is equivalent to the VIP7205 **INHIBIT/ENABLE BLINK** internal switch option.

Operator Status Line Display

The Softerm VIP7205 terminal emulation includes a status line which may be displayed on the 25th line by pressing **Alt T** during online terminal operation. The status line display indicates the current **Row** and **Column**, **Character Mode** or **Buffer Mode**, **Page Xmit** or **Line Xmit** when operating in buffer mode, and the current **End of Message** character.

While the status line is displayed, Softerm allows the **Operating Mode** to be toggled by pressing the **B** key. Online terminal operation is suspended and input is enabled on the status line whenever a blinking ► appears in the first column of the status line. For example, to toggle from the character mode to the buffer mode, first display the status by entering **Alt T** and then press the **B** key until **Buffer Mode** appears on the status line. You can also toggle the buffer transmit mode from **Line** to **Page** by pressing the **L** key.

To return to the online mode after displaying the status, enter **Alt T** or **Alt Esc**. If you exit using the **Alt T** key, the status line will remain on the screen during online operation and will be automatically updated if required. If you exit from the status line display using the **Alt Esc** key, the status line will be cleared.

Honeywell VIP7205 Keyboard Functions

The following table defines the standard keyboard functions for the Honeywell VIP7205 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
Alt Enter	XMIT	\$1B \$69
→	Cursor Right	\$1B \$43
←	Cursor Left	\$1B \$44
↑	Cursor Up	\$1B \$41
↓	Cursor Down	\$1B \$42
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	\$1B \$48
PgUp	Clear Screen	\$1B \$60
PgDn	Clear to End of Screen	\$1B \$4A
End	Clear to End of Line	\$1B \$4B
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt T	Display VIP7205 Status Line	
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	F1	\$1B \$30
F2	F2	\$1B \$32
F3	F3	\$1B \$36
F4	F4	\$1B \$38
F5	F5	\$1B \$3A

F6	F6	\$1B \$3C
F7	F7	\$1B \$3E
Shift F1	Shift F1	\$1B \$31
Shift F2	Shift F2	\$1B \$35
Shift F3	Shift F3	\$1B \$37
Shift F4	Shift F4	\$1B \$39
Shift F5	Shift F5	\$1B \$3B
Shift F6	Shift F6	\$1B \$3D
Shift F7	Shift F7	\$1B \$3F

Honeywell VIP7801

Introduction

The Honeywell VIP7801 Video Display Terminal can be emulated using Softerm by selecting **Honeywell VIP7801** for the terminal emulation when generating a configuration in terminal setup. 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 the standard ASCII character set and line graphic characters but not the 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. Softerm provides full support for the status line capabilities.

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 Non-echo 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 equivalent Softerm options 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 **Alt T** 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, SCROLL 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, Bell, 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, Delete 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 **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

—————Honeywell VIP7801 Emulation Options —————

End-of-Message Character: ETX (\$03)
CR/LF Delimiters: No
Operating Mode: Character
Space Suppress: Yes
Block Transmit Mode: No
Transmit on Return: No
Echo Mode: Yes
Roll Mode: Yes
Print All: Yes
Print Control Characters:
Start: None
End: None

The emulation option **End-of-Message Character** selects the character which terminates all transmitted messages. This character should be selected as either an **ETX (\$03)**, or an **EOT (\$04)**.

The emulation option **CR/LF Delimiters** determines if a CR/LF (carriage return/line feed) delimiter is sent at the end of each line in Text mode. **Yes** selects CR/LF delimiters for lines transmitted in Text mode. Selecting **No** will cause no delimiter to be sent. This option is ignored if the **Space Suppress** option is set to **Yes**.

The emulation option **Operating Mode** determines which mode Softerm will enter when initiating the online mode from terminal setup or when a Reset to Initial State command is received. **Text** selects the Text mode of operation, while **Character** 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. Selecting **Yes** for this option will cause trailing spaces to be suppressed, while selecting **No** 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 **Yes**, the terminal transmits messages in blocks of 256 characters. If this option is specified as **No**, the terminal transmits the entire message in one transmission.

The emulation option **Transmit on Return** determines if the **Enter** key functions as a TRANSMIT key or normally when operating in the Text mode. If this option is specified as **Yes**, the **Enter** key will initiate a transmit operation in the Text mode. If this option is specified as **No**, the **Enter** 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 option is specified as **Yes**, 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 **No**, 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. Selecting **Yes** allows rolling of screen data while selecting **No** 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 **Yes**, both protected and unprotected data is printed. If this option is specified as **No**, 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. The choices for **Start** and **End** control characters are **None**, **CR**, **CR/LF**, **CR/VT**, and **CR/FF**. If the character code is specified as **None**, no characters are sent to the printer.

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.

Softerm displays the status information on row 25 whenever the **Alt T** key is pressed. 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 status line also allows certain modes of operation to be *toggled* by pressing specific keys while the

status line is displayed. Online terminal operation is suspended and input is enabled on the status line whenever a blinking ► appears in the first column. To return to the online mode after displaying the status, enter **Alt T** or **Alt Esc**. If you exit using the **Alt T** key, the status line will remain on the screen during online operation and will be automatically updated if required. If you exit from the status line display using the **Alt Esc** key, the status line will be cleared.

The status line is also 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**. If a field entry error condition such as attempting to enter alphabetic data in a numeric field occurs, the alarm is sounded and the appropriate error message will be displayed on the status line. No additional entry is permitted until the error condition is cleared by pressing the **PgUp** (RESET) key.

After entering **Alt T** to display the status line, the **Auto-LF** mode setting can be toggled 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.

Honeywell VIP7801 Keyboard Functions

The following defines the standard keyboard functions for the Honeywell VIP7801 emulation:

Keyboard	Function	Characters
Enter	CR, CR/LF, or TRANSMIT	\$0D, \$0D \$0A
Alt Enter	TRANSMIT	\$1B \$69
Ctrl Enter	CTRL TRANSMIT	
→	Cursor Right	\$1B \$43
←	Cursor Left	\$1B \$44
↑	Cursor Up	\$1B \$41
↓	Cursor Down	\$1B \$42
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	Tab	\$09
Shift Tab	Back Tab	\$1B \$5B \$5A
Alt →	TAB SET	\$1B \$70
Alt ←	CLEAR TAB	\$1B \$5B \$67
Alt Ctrl Tab	TAB INITIALIZE	\$1B \$5B \$4E
Home	HOME	\$1B \$48
Ctrl Home	CTRL HOME	\$1B \$5B \$48
PgUp	RESET	\$1B \$65
Ctrl PgUp	CLEAR	\$1B \$60
Alt Ctrl PgUp	INIT	\$1B \$63
PgDn	ERASE EOP	\$1B \$4A
End	ERASE EOF	\$1B \$4B
Delete	DEL CHAR	\$1B \$5B \$50
Alt Delete	DEL LINE	\$1B \$5B \$4D
Insert	INS MODE	\$1B \$5B \$49
Ctrl Insert	INS MODE RESET	\$1B \$5B \$4A
Alt Insert	INS LINE	\$1B \$5B \$4C
Ctrl Break	Soft Reset	
Hold	Stop Display	

Shift Print	PRINT	\$1B \$5B \$30 \$70
Alt Ctrl Print	PRINT RESET	\$1B \$5B \$32 \$70
Alt A	ATTRB	\$1B \$73
Alt D	DELETE ATTRB	\$1B \$5B \$51
Alt B	Break	BREAK
Alt C	CHAR	\$1B \$6B
Alt X	TEXT	\$1B \$5B \$6C
Alt F	FORM	\$1B \$5B \$68
Alt ↑	SCROLL UP	\$1B \$5B \$30 \$73
Alt ↓	SCROLL DOWN	\$1B \$5B \$31 \$73
Alt PgDn	NEXT SEGMENT	
Alt PgUp	PREV SEGMENT	
Alt T	Display VIP7801 Status Line	
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	F1	\$1B \$30
F2	F2	\$1B \$32
F3	F3	\$1B \$36
F4	F4	\$1B \$38
F5	F5	\$1B \$3A
F6	F6	\$1B \$3C
F7	F7	\$1B \$3E
F8	F8	\$1B \$50
F9	F9	\$1B \$52
F10	F10	\$1B \$54
F11	F11	\$1B \$5C
F12	F12	\$1B \$5E
Shift F1	Shift F1	\$1B \$31
Shift F2	Shift F2	\$1B \$35
Shift F3	Shift F3	\$1B \$37

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Shift F4	Shift F4	\$1B \$39
Shift F5	Shift F5	\$1B \$3B
Shift F6	Shift F6	\$1B \$3D
Shift F7	Shift F7	\$1B \$3F
Shift F8	Shift F8	\$1B \$51
Shift F9	Shift F9	\$1B \$53
Shift F10	Shift F10	\$1B \$56
Shift F11	Shift F11	\$1B \$5D
Shift F12	Shift F12	\$1B \$5F

Honeywell VIP7803

Introduction

The Honeywell VIP7803 Word Processing Workstation can be emulated using Softerm by selecting **Honeywell VIP7803** for the terminal emulation when generating a configuration in terminal setup. The Honeywell VIP7803 is an expanded version of the Honeywell VIP7801 terminal optimized for use in 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 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. Softerm displays equivalent symbols from the available graphics character set. A special help screen which defines the utilization of the word processing symbols may be displayed by entering **Alt ?** during online operation and then paging through the help screens.

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.

Honeywell VIP7803 Keyboard Functions

The following table defines the standard keyboard functions for the Honeywell VIP7803 terminal emulation:

Keyboard	Function	Characters
Enter	CR or CR/LF	\$0D or \$0D \$0A
Alt Enter	EXECUTE	\$1B \$69
→	Cursor Right	\$1B \$43
Ctrl →	Shift Cursor Right	\$1B \$75
←	Cursor Left	\$1B \$44
Ctrl ←	Shift Cursor Left	\$1B \$6F
↑	Cursor Up	\$1B \$41
Ctrl ↑	Shift Cursor Up	\$1B \$21
↓	Cursor Down	\$1B \$42
Ctrl ↓	Shift Cursor Down	\$1B \$22
Backspace	Backspace	\$08
Tab	Tab	\$09
Shift Tab	Back Tab	\$1B \$5B \$5A
Home	HOME	\$1B \$48
Ctrl Home	CTRL HOME	\$1B \$5B \$48
PgUp	CLEAR (RESET)	\$1B \$65
Ctrl PgUp	SHIFT CLEAR (CLEAR)	\$1B \$60
Alt Ctrl PgUp	CTRL CLEAR (INIT)	\$1B \$63
PgDn	ERASE (EOF)	\$1B \$4B
Ctrl PgDn	SHIFT ERASE (EOP)	\$1B \$4A
End	STOP	\$1B \$27
Ctrl End	SHIFT STOP	\$1B \$28
Delete	DELETE (CHAR)	\$1B \$5B \$50
Alt Delete	SHIFT DELETE (LINE)	\$1B \$5B \$4D
Insert	INSERT (CHAR)	\$1B \$5B \$49
Alt Insert	SHIFT INSERT (LINE)	\$1B \$5B \$4C
Ctrl Break	Soft Reset	

Hold	Stop Display	
Shift Print	PRINT	\$1B \$3A
Alt Shift Print	SHIFT PRINT	\$1B \$3B
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt T	Display VIP7803 Status Line	
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
Alt =	CALCULATE	\$1B \$38
Alt Shift =	SHIFT CALCULATE	\$1B \$39
F1	COMMAND	\$1B \$3C
Shift F1	SHIFT COMMAND	\$1B \$3D
F2	FORMAT	\$1B \$5E
Shift F2	SHIFT FORMAT	\$1B \$5F
F3	GO TO PAGE	\$1B \$78
Shift F3	SHIFT GO TO PAGE	\$1B \$79
F4	INDENT	\$1B \$3E
Shift F4	SHIFT INDENT	\$1B \$3F
F5	SEARCH	\$1B \$34
Shift F5	SHIFT SEARCH	\$1B \$40
F6	ABBREV	\$1B \$2F
Shift F6	SHIFT ABBREV	\$1B \$33
F7	COPY	\$1B \$57
Shift F7	SHIFT COPY	\$1B \$67
F8	MOVE	\$1B \$68
Shift F8	SHIFT MOVE	\$1B \$6A
F9	CENTER	\$1B \$50
Shift F9	SHIFT CENTER	\$1B \$51

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F10	PAGE	\$1B \$23
Shift F10	SHIFT PAGE	\$1B \$24
Alt F1	SIGN OFF	\$1B \$32
Alt Shift F1	SHIFT SIGN OFF	\$1B \$30
Alt F2	DEC TAB	\$1B \$52
Alt Shift F2	SHIFT DEC TAB	\$1B \$53
Alt F3	SUPER SUB	\$1B \$54
Alt Shift F3	SHIFT SUPER SUB	\$1B \$56
Alt F4	MERGE	\$1B \$5C
Alt Shift F4	SHIFT MERGE	\$1B \$5D
Alt F5	AUTO _	\$1B \$4E
Alt Shift F5	SHIFT AUTO _	\$1B \$55
Alt F6	NOTE	\$1B \$25
Alt Shift F6	SHIFT NOTE	\$1B \$26
Alt F7	CODE	\$1B \$29
Alt Shift F7	SHIFT CODE	\$1B \$2A
Alt F8	MENU	\$1B \$35
Alt Shift F8	SHIFT MENU	\$1B \$31
Alt F9	REPLACE	\$1B \$45
Alt Shift F9	SHIFT REPLACE	\$1B \$4C
Alt F10	HELP	\$1B \$36
Alt Shift F10	SHIFT HELP	\$1B \$37

IBM 3101 Model 1X

Introduction

The IBM 3101 Display Terminal Models 10, 12, or 13 can be emulated using Softerm by selecting **IBM 3101-1X** for the terminal emulation 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. The **full duplex** operation mode and **half duplex** operation mode when using a full duplex communications facility are supported. 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 equivalent Softerm options 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.

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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 **Ctrl Print** 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 **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

————— IBM 3101-1X Emulation Options —————

Read Function Terminator: CR (\$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 character selected can be **CR (\$0D)**, **EOT (\$04)**, **ETX (\$03)**, or **XOFF (\$13)** depending the requirements of the host computer. If the **XOFF** character is selected, the user should insure that the Terminal Emulation Parameter **Receive Pacing** is set to **None**.

IBM 3101-1X Keyboard Functions

The following table defines the standard keyboard functions for the IBM 3101 Model 1X terminal emulation. The **Program Function Key** terminator character (\$??) is set by the 3101 emulation option **Read Function Terminator** described previously.

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$1B \$43
←	Cursor Left	\$1B \$44
↑	Cursor Up	\$1B \$41
↓	Cursor Down	\$1B \$42
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	Tab	\$09
Home	Home	\$1B \$48
PgUp	Erase Input	\$1B \$4B
Ctrl PgUp	Clear All	\$1B \$4C
PgDn	Erase EOS	\$1B \$4A
End	Erase EOL	\$1B \$49
Ctrl Break	Soft Reset	
Hold	Stop Display	
Ctrl Print	AUX	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	PF1	\$1B \$61 \$??
F2	PF2	\$1B \$62 \$??

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F3	PF3	\$1B \$63 \$??
F4	PF4	\$1B \$64 \$??
F5	PF5	\$1B \$65 \$??
F6	PF6	\$1B \$66 \$??
F7	PF7	\$1B \$67 \$??
F8	PF8	\$1B \$68 \$??



IBM 3101 Model 2X

Introduction

The IBM 3101 Display Terminal Models 20, 22, or 23 can be emulated using Softerm by selecting **IBM 3101-2X** for the terminal emulation 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. Softerm includes a special status line which provides similar information concerning the operating modes of the 3101 emulation.

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 equivalent Softerm options 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.

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 **Ctrl Print** 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 **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

————— IBM 3101-2X Emulation Options —————

Line Turnaround Character: CR (\$0D)
Operating Mode: Block
Null Suppress: Yes
Send Key = Send Line: No

The emulation option **Line Turnaround Character** selects the line turnaround and block terminator character. The character selected can be **CR (\$0D)**, **EOT (\$04)**, **ETX (\$03)**, or **XOFF (\$13)** depending on the requirements of the host computer. If the **XOFF** character is selected, the user should insure that the Terminal Emulation Parameter **Receive Pacing** is set to **None**.

The emulation option **Operating Mode** selects the initial operating mode for the terminal when online operation is initiated. **Block** or **Character** mode may be selected. 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. Softerm can also be toggled between the block and character modes during online operation using the 3101 Status Display initiated with the **Alt T** keyboard function.

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 **Yes**. If null suppression is not required, **No** should be selected.

The emulation option **Send Key = Send Line** is used to activate the **SEND LINE** key function when the **SEND** key is pressed. If **Yes** is selected, the **SEND** key will function as the **SEND LINE** key. If **No** is selected, the **SEND** key will function as the **SEND PAGE** key.

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 **Alt 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. The status information displayed includes the current **Row** and **Column**, **Block** or **Char Mode**, and **Program** or **Insert** sub-modes. The status line can be displayed by pressing **Alt T** during online terminal operation.

While the status is displayed, the **Operating Mode** of the 3101 emulation to be **toggled** by pressing the **B** key. Online terminal operation is suspended and input is enabled on the status line whenever a blinking ► appears in the first column of the status line. For example, to toggle from the half duplex character mode to block mode, first display the status by entering **Alt T** and then press the **B** key to change the **Char Mode** to **Block Mode**.

To return to the online mode after displaying the status, enter **Alt T** or **Alt Esc**. If you exit using the **Alt T** key, the status line will remain on the screen during online operation and will be automatically updated if required. If you exit from the status line display using the **Alt Esc** key, the status line will be cleared.

IBM 3101-2X Keyboard Functions

The following table defines the standard keyboard functions for the IBM 3101 Model 2X terminal emulation. The **Program Function Key** terminator character (\$??) is set by the 3101 emulation option **Line Turnaround Character** described previously.

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$1B \$43
←	Cursor Left	\$1B \$44
↑	Cursor Up	\$1B \$41
↓	Cursor Down	\$1B \$42
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	Tab	\$09
Shift Tab	Back Tab	
Home	Home	\$1B \$48
PgUp	Erase Input	\$1B \$4B
Ctrl PgUp	Clear All	\$1B \$4C
PgDn	Erase EOS	\$1B \$4A
End	Erase EOL	\$1B \$49
Delete	DEL CHAR	
Alt Delete	DEL LINE	
Insert	INS CHAR	
Alt Insert	INS LINE	
Ctrl Break	Soft Reset	
Hold	Stop Display	
Shift Print	PRINT PAGE	\$1B \$57
Alt Print	PRINT LINE	\$1B \$55
Alt Shift Print	PRINT MESSAGE	\$1B \$56
Ctrl Print	AUX	
Alt A	ATTR	
Alt B	Break	BREAK
Alt P	PRGM MODE	

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Alt R	Reset Keyboard Lock, Rewrite Screen	
Alt T	Display 3101 Status Line	
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	PF1	\$1B \$61 \$??
F2	PF2	\$1B \$62 \$??
F3	PF3	\$1B \$63 \$??
F4	PF4	\$1B \$64 \$??
F5	PF5	\$1B \$65 \$??
F6	PF6	\$1B \$66 \$??
F7	PF7	\$1B \$67 \$??
F8	PF8	\$1B \$68 \$??

Lear Siegler ADM-3A

Introduction

The Lear Siegler ADM-3A Video Display Unit can be emulated using Softerm by selecting **Lear Siegler ADM-3A** for the terminal emulation 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.

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 the terminal configuration includes a printer. 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 **Ctrl Break** key is pressed. Data received is also displayed on the video display.

After the last standard screen in the **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

————— Lear Siegler ADM-3A Emulation Options —————

Gated Extension Port Operation: No

If this option is specified as **Yes**, the **gated extension port operation** described previously is used. If this option is specified as **No**, 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 table defines the standard keyboard functions for the Lear Siegler ADM-3A terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$0C
←	Cursor Left	\$08
↑	Cursor Up	\$0B
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	\$1E
PgUp	Clear Screen	\$1A
Ctrl Break	Soft Reset	
Hold	Stop Display	
Ctrl Print	Enable/Disable Extension Port	
Alt A	Here Is	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

Lear Siegler ADM-5

Introduction

The Lear Siegler ADM-5 Video Display Unit can be emulated using Softerm by selecting **Lear Siegler 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.

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 the terminal configuration includes a printer. 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 **Ctrl Break** key is pressed. Data received is also displayed on the video display.

After the last standard screen in the **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

————— Lear Siegler ADM-5 Emulation Options —————

Gated Extension Port Operation: No

If this option is specified as **Yes**, the **gated extension port operation** described previously is used. If this option is specified as **No**, the **keyboard lock/unlock** feature is enabled. When a \$OE function code is received, the keyboard is **unlocked**, and when a \$OF function code is received, the keyboard is **locked**.

Lear Siegler ADM-5 Keyboard Functions

The following table defines the standard keyboard functions for the Lear Siegler ADM-5 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$0C
←	Cursor Left	\$08
↑	Cursor Up	\$0B
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Home	Home Cursor	\$1E
PgUp	Clear Screen	\$1A
PgDn	Erase to End of Screen	\$1B \$59
End	Erase to End of Line	\$1B \$54
Ctrl Break	Soft Reset	
Hold	Stop Display	
Ctrl Print	Enable/Disable Extension Port	
Alt A	Here Is	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

TeleVideo 910

Introduction

The TeleVideo Model 910 terminal can be emulated using Softerm by selecting **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.

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, SelfTest On, Monitor On, and Monitor Off.

Softerm includes support for the **Printer Port** if the terminal configuration includes a printer. 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 **Ctrl Print** keyboard function which provides the **PRINT** key capability of the TeleVideo 910.



TeleVideo 910 Keyboard Functions

The following table defines the standard keyboard functions for the TeleVideo 910 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$0C
←	Cursor Left	\$08
↑	Cursor Up	\$0B
↓	Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	TAB	\$09
Home	Home Cursor	\$1E
PgUp	CLEAR	\$1A
Ctrl PgUp	SHIFT CLEAR	\$1B \$2A
PgDn	Erase to End of Page	\$1B \$59
End	Erase to End of Line	\$1B \$54
Ctrl Print	Enable/Disable Printer Port	
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined

The following functions are entered on the numeric keypad:

Alt 0	FUNCT/0	\$01 \$40 \$0D
Alt 1	FUNCT/1	\$01 \$41 \$0D

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Alt 2	FUNCT/2	\$01 \$42 \$0D
Alt 3	FUNCT/3	\$01 \$43 \$0D
Alt 4	FUNCT/4	\$01 \$44 \$0D
Alt 5	FUNCT/5	\$01 \$45 \$0D
Alt 6	FUNCT/6	\$01 \$46 \$0D
Alt 7	FUNCT/7	\$01 \$47 \$0D
Alt 8	FUNCT/8	\$01 \$48 \$0D
Alt 9	FUNCT/9	\$01 \$49 \$0D

TeleVideo 925

Introduction

The TeleVideo Model 925 terminal can be emulated using Softerm by selecting **TeleVideo 925** for the terminal emulation 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 simulated by Softerm. The 925 has the option of one additional page of display memory. Softerm supports only a single page of display memory.

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, Read Time, 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, and Load Time.

Softerm includes support for the **Printer Port** if the terminal configuration includes a printer. 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 **Ctrl Print** keyboard function.

After the last standard screen in the **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

```
-----TeleVideo 925 Emulation Options-----
      Operating Mode: Character
              Edit Mode: Duplex
      Page Attributes: No
      Send Key = Send Line: No
```

The emulation option **Operating Mode** selects the transmission mode of the terminal and may be selected as either **Character** or **Block**. In **Block** mode, characters entered from the keyboard are stored in a buffer which may be corrected and edited by the operator, and then transmitted to the host when the **SEND** key is pressed.

The emulation option **Edit Mode** sets the edit keys for local operation only if **Local** is selected and the Duplex Edit Mode if **Duplex** 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 **Yes** will 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 **No**, 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 **Yes** is selected, the **SEND** key will function as the **SEND LINE** key. If **No** is entered, the **SEND** key will function as the **SEND PAGE** key.

Operator Status Line Display

The TeleVideo 925 terminal emulation includes a status line which may be displayed on the 25th line by pressing the **Alt T** key. The status information displayed includes **Row** and **Column**, **Local** or **Duplex** edit mode, **Character** or **Block** mode, **H.I.** (Half Intensity) mode, **Protect** mode, and **Keyboard Lock** mode.

The **Block** or **Character** mode setting can be toggled while the status is displayed by pressing the **B** key. Online terminal operation is suspended and input is enabled on the status line whenever a blinking ► appears in the first column position. For example, to toggle from the **Block** mode to the **Character** mode, first display the status by entering **Alt T** and then press the **B** key. Pressing the **E** key will cause the **Local** or **Duplex** editing mode 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**.

To return to the online mode after displaying the status, enter **Alt T** or **Alt Esc**. If you exit using the **Alt T** key, the status line will remain on the screen during online operation and will be automatically updated if required. If you exit from the status line display using the **Alt Esc** key, the status line will be cleared.

TeleVideo 925 Keyboard Functions

The following table defines the standard keyboard functions for the TeleVideo 925 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
Alt Enter	SEND	\$1B (\$36 or \$37)
Shift Enter	SEND LINE ALL	\$1B \$36
Ctrl Enter	SEND PAGE ALL	\$1B \$37
→	Cursor Right	\$0C
←	Cursor Left	\$08
↑	Cursor Up	\$0B
↓	Cursor Down	\$16
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	TAB	\$09
Shift Tab	BACK TAB	\$1B \$49
Home	HOME	\$1E
PgUp	CLEAR SPACE	\$1A
Ctrl PgUp	CLEAR ALL (Nulls)	\$1B \$2A
PgDn	PAGE ERASE (Spaces)	\$1B \$59
Ctrl PgDn	PAGE ERASE (Nulls)	\$1B \$79
End	LINE ERASE (Spaces)	\$1B \$54
Ctrl End	LINE ERASE (Nulls)	\$1B \$74
Delete	CHAR DELETE	\$1B \$57
Alt Delete	LINE DELETE	\$1B \$52
Insert	CHAR INSERT	\$1B \$51
Alt Insert	LINE INSERT	\$1B \$45
Ctrl Esc	LOC ESC	
Shift Print	PRINT	\$1B \$50
Ctrl Print	Enable/Disable Printer Port	
Ctrl Break	Soft Reset	
Hold	Stop Display	

Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt F	FUNCT	\$01 (ASCII Code) \$0D
Alt T	Display 925 Status Line	
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	F1	\$01 \$40 \$0D
F2	F2	\$01 \$41 \$0D
F3	F3	\$01 \$42 \$0D
F4	F4	\$01 \$43 \$0D
F5	F5	\$01 \$44 \$0D
F6	F6	\$01 \$45 \$0D
F7	F7	\$01 \$46 \$0D
F8	F8	\$01 \$47 \$0D
F9	F9	\$01 \$48 \$0D
F10	F10	\$01 \$49 \$0D
F11	F11	\$01 \$4A \$0D
Shift F1	Shift F1	\$01 \$60 \$0D
Shift F2	Shift F2	\$01 \$61 \$0D
Shift F3	Shift F3	\$01 \$62 \$0D
Shift F4	Shift F4	\$01 \$63 \$0D
Shift F5	Shift F5	\$01 \$64 \$0D
Shift F6	Shift F6	\$01 \$65 \$0D
Shift F7	Shift F7	\$01 \$66 \$0D
Shift F8	Shift F8	\$01 \$67 \$0D
Shift F9	Shift F9	\$01 \$68 \$0D
Shift F10	Shift F10	\$01 \$69 \$0D
Shift F11	Shift F11	\$01 \$6A \$0D

TeleVideo 950

Introduction

The TeleVideo Model 950 terminal can be emulated using Softerm by selecting **TeleVideo 950** for the terminal emulation filename when generating a configuration in terminal setup. 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 includes 15 special graphic characters and a 25th status line which are supported by Softerm. 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.

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 Address (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 Delimiters, Set Half Duplex, Set Full Duplex, Linelock Off All Lines, and Load Function Keys.

The Linelock Line command will cause the current and all preceding 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 the terminal configuration includes a printer. 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 **Ctrl Print** key.

After the last standard screen in the **Terminal Options** mode in Terminal Setup, the following screen will be displayed:

```
----- TeleVideo 950 Emulation Options -----  
Operating Mode: Character  
Edit Mode: Duplex  
Page Attributes: No
```

The emulation option **Operating Mode** selects the transmission mode of the terminal and may be selected as either **Character** or **Block**. In **Block** mode, characters entered from the keyboard are stored in a buffer which may be corrected and edited by the operator, and then transmitted to the host when the **SEND** key is pressed.

The emulation option **Edit Mode** sets the edit keys for local operation only if **Local** is selected and the Duplex Edit Mode if **Duplex** 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 **Yes** will 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 **No**, the Set Video Attribute command affects only the current line.

Operator Status Line Display

The TeleVideo 950 terminal emulation includes a status line which may be displayed on the 25th line by pressing the **Alt T** key. The status information displayed includes **Row** and **Column**, **Insert** or **Edit** edit mode, **Page** or **Line** editing, **Graph** mode, **Char** or **Block** mode, **H.I.** (Half Intensity) mode, **Protect** mode, and **Keyboard Lock** mode.

The **Block** or **Char** mode setting can be toggled while the status is displayed by pressing the **B** key. Online terminal operation is suspended and input is enabled on the status line whenever a blinking **►** appears in the first column position. For example, to toggle from the **Block** mode to the **Char** mode, first display the status by entering **Alt T** and then press the **B** key. Pressing the **I** key will cause the **Insert** or **Edit** mode to be toggled. Pressing the **L** key will cause the **Line** or **Page** editing mode 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**.

To return to the online mode after displaying the status, enter **Alt T** or **Alt Esc**. If you exit using the **Alt T** key, the status line will remain on the screen during online operation and will be automatically updated if required. If you exit from the status line display using the **Alt Esc** key, the status line will be cleared.

TeleVideo 950 Keyboard Functions

The following table defines the standard keyboard functions for the TeleVideo 950 terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
Alt Enter	SEND	User Defined
Alt Shift Enter	SHIFT SEND	User Defined
→	Cursor Right	\$0C
←	Cursor Left	\$08
↑	Cursor Up	\$0B
Ctrl ↑	Shift Cursor Up	\$1B \$6A
↓	Cursor Down	\$16
Ctrl ↓	Shift Cursor Down	\$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	TAB	\$09
Shift Tab	BACK TAB	\$1B \$49
Home	HOME	\$1E
PgUp	CLEAR SPACE	\$1A
Ctrl PgUp	CLEAR ALL (Nulls)	\$1B \$2A
PgDn	PAGE ERASE (Spaces)	\$1B \$59
Ctrl PgDn	PAGE ERASE (Nulls)	\$1B \$79
End	LINE ERASE (Spaces)	\$1B \$54
Ctrl End	LINE ERASE (Nulls)	\$1B \$74
Delete	CHAR DELETE	\$1B \$57
Ctrl Delete	SHIFT CHAR DELETE	\$1B \$72
Alt Delete	LINE DELETE	\$1B \$52
Alt Shift Delete	SHIFT LINE DELETE	\$1B \$4F
Insert	CHAR INSERT	\$1B \$51
Ctrl Insert	SHIFT CHAR INSERT	\$1B \$71
Alt Insert	LINE INSERT	\$1B \$45

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Alt Shift Insert	SHIFT LINE INSERT	\$1B \$4E
Ctrl Esc	LOC ESC	
Shift Print	PRINT	\$1B \$50
Alt Shift Print	SHIFT PRINT	\$1B \$4C
Ctrl Print	Enable/Disable Printer Port	
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt F	FUNCT	\$01 (ASCII Code) \$0D
Alt T	Display 950 Status Line	
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	F1	\$01 \$40 \$0D
F2	F2	\$01 \$41 \$0D
F3	F3	\$01 \$42 \$0D
F4	F4	\$01 \$43 \$0D
F5	F5	\$01 \$44 \$0D
F6	F6	\$01 \$45 \$0D
F7	F7	\$01 \$46 \$0D
F8	F8	\$01 \$47 \$0D
F9	F9	\$01 \$48 \$0D
F10	F10	\$01 \$49 \$0D
F11	F11	\$01 \$4A \$0D
Shift F1	Shift F1	\$01 \$60 \$0D
Shift F2	Shift F2	\$01 \$61 \$0D
Shift F3	Shift F3	\$01 \$62 \$0D
Shift F4	Shift F4	\$01 \$63 \$0D
Shift F5	Shift F5	\$01 \$64 \$0D
Shift F6	Shift F6	\$01 \$65 \$0D
Shift F7	Shift F7	\$01 \$66 \$0D

Shift F8
Shift F9
Shift F10
Shift F11

Shift F8
Shift F9
Shift F10
Shift F11

\$01 \$67 \$0D
\$01 \$68 \$0D
\$01 \$69 \$0D
\$01 \$6A \$0D



TRS-80 Model 16 Console

Introduction

The TRS-80 Model 16 Console can be emulated using Softerm by selecting **TRS-80 Mod16 Console** for the terminal emulation when generating a configuration in terminal setup. This emulation can be used when operating a Tandy Model 2000 system as a terminal to a multi-terminal TRS-80 Model 16 system using the TRS Xenix operating system. The emulation is fully compatible with the **trs16** entry in the **TERMCAPS** terminal capabilities file and programs such as Scripsit which can use this feature.

Features

The TRS-80 Model 16 Console emulation includes support for the Model II Graphics Characters in the range \$00—\$1F. When online operation of the emulation is initialized, Softerm modifies the standard Model 2000 graphics character set in the range \$80—\$9F to emulate the Model II graphics characters. When you exit Softerm to DOS, or when you return to the terminal setup options menu, the standard Model 2000 graphics characters are restored.

The emulation includes keyboard functions for RETURN, BACKSPACE, TAB, ESC, DELETE, HOLD, BREAK, CURSOR CONTROL KEYS, HOME, CLEAR, ERASE TO END OF PAGE, ERASE TO END OF LINE, INSERT CHARACTER, INSERT LINE, DELETE CHARACTER, DELETE LINE, and FUNCTION KEYS F1 — F8.

Control sequences which the emulation supports include Cursor Up, Cursor Down, Cursor Right, Cursor Left, Cursor Home, Clear Screen, Erase to End of Page, Erase to End of Line, Direct Cursor Address, Insert Line, Delete Line, Insert Character, Delete Character, Start Normal Video, Start Inverse Video, Cursor On, Cursor Off, Start Graphics Mode, End Graphics Mode, Cursor Blink On, Cursor Blink Off, Change Cursor to Underline, and Change Cursor to Block.

TRS-80 Model 16 Console Keyboard Functions

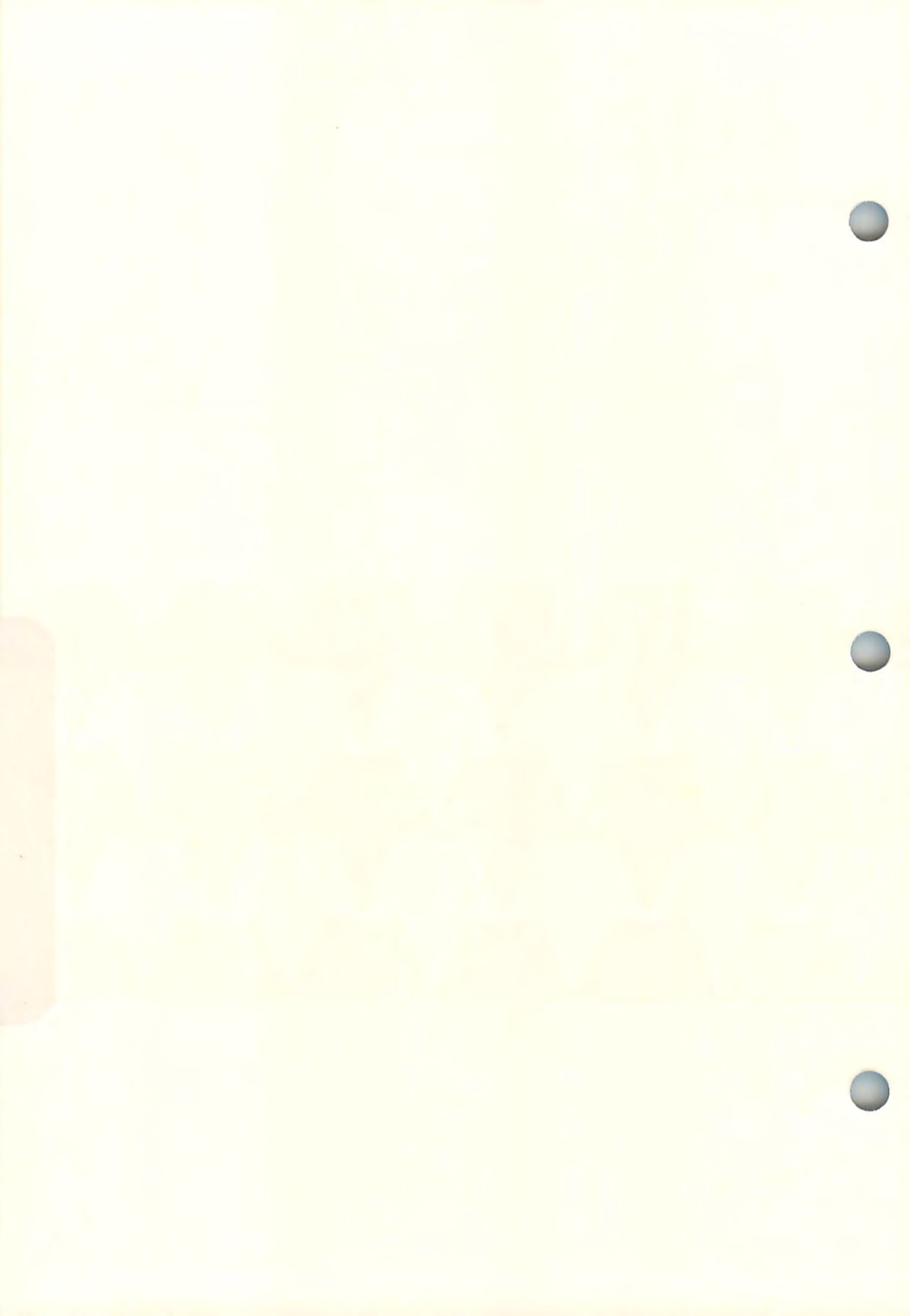
The following table defines the standard keyboard functions for the TRS-80 Model 16 Console terminal emulation:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
→	Cursor Right	\$1B \$43
←	Cursor Left	\$1B \$44
↑	Cursor Up	\$1B \$41
↓	Cursor Down	\$1B \$42
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Tab	Tab	\$09
Home	Cursor Home	\$1B \$48
PgUp	Clear Screen	\$1B \$45
PgDn	Erase to End of Page	\$1B \$4A
End	Erase to End of Line	\$1B \$4B
Insert	Insert Character	\$1B \$50
Alt Insert	Insert Line	\$1B \$4C
Delete	Delete Character	\$1B \$51
Alt Delete	Delete Line	\$1B \$4D
Ctrl Break	Soft Reset	
Hold	Stop Display	
Alt A	Send Answerback Message	User Defined
Alt B	Break	BREAK
Alt V	View Softerm Status Line	
Alt W c	Wait for Character c	
Alt Z n	Delay n Seconds (0-9)	
Alt ?	Display Keyboard Help	
Alt 1	Softerm Utility Functions	
Alt 2	Softerm Goto Functions	
Alt Shift id	Execute Keyboard Macro A-Z, 0-9	User Defined
F1	f1	\$01

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F2	f2	\$02
F3	f3	\$04
F4	f4	\$0C
F5	f5	\$15
F6	f6	\$10
F7	f7	\$0E
F8	f8	\$13





Advanced Features

Introduction

Softerm is a powerful and flexible communications manager which provides many advanced features not found in most communications programs.

- Softerm can be used as a stand-alone program to provide terminal communications and exact terminal emulation of many specific CRT terminals used with host computer systems.
- Softerm can function as a background print program which provides multi-port print spooling capability to allow printing to be accomplished concurrently with the execution of other programs.
- Softerm can be operated as a background utility program which provides access to disk and file utility functions without terminating the program currently executing.
- Finally, Softerm can be used as a background communications program allowing file transfers with remote systems to be processed concurrently with the execution of other programs and allowing unattended remote access to local files while the system is being used for another purpose.

The Softerm program provides management of multiple serial and parallel ports for communications and printing using a multi-task manager known as the **Communications Agent**. The Communications Agent provides direct support for terminal emulation, remote file transfer, and print functions. The Communications Agent can be optionally installed on your system using the *terminate and stay resident* capability provided by DOS which allows a program to effectively become an extension of the operating system. Once installed in this manner, the functions provided by the Communications Agent can then be accessed by other programs such as word processors, spreadsheets, and database managers which are subsequently executed.

The functions provided by the Communications Agent are a subset of the full Softerm program and allow the integration of *concurrent* communications capabilities including remote file transfer and local printing of files with almost any program. When the Communications Agent is installed, it assumes direct control of keyboard processing but is transparent to other programs. It also provides buffering of 128 keystrokes for Softerm terminal emulation.

Access to the Communications Agent during the operation of another program is provided using the **Alt Break** keyboard function. If this key combination is pressed with the Softerm Communications Agent installed in the system, the current program is interrupted and a menu of available functions is displayed. However, if the current display mode is graphics, the **Alt Break** key is ignored. You may then initiate, for example, printing of a local file, or a file transfer to or from a remote computer system, and return to the execution of the interrupted program while these tasks are being concurrently performed. The limitations on the number of concurrent activities which the Communications Agent can process is determined by the number of serial and parallel ports assigned to the Communications Agent and the performance constraints of the personal computer system hardware.

Softerm terminal emulation can also take advantage of the Communications Agent's concurrent processing capabilities. For example, you can be interacting conversationally with one host computer while a file transfer is operating with another. Since the Communications Agent can manage multiple communications ports, you can also switch your terminal emulation between ports allowing conversations with more than one host without breaking your connection. If the terminal emulation printer port is assigned to **Disk**, the Communications Agent will manage the **COM** and **LPT** ports assigned to printers. Print files created by terminal emulation functions can then be queued to any available printer port for concurrent processing by the Communications Agent.

Softerm uses *real-time* scheduling techniques to provide the maximum performance for concurrent operations. The Communications Agent provides interrupt device drivers for the system clock, **COM** and **LPT** ports, and the keyboard to create an interrupt-driven environment for the system scheduler. The use of real-time scheduling techniques eliminates unnecessary pauses in the operation of I/O devices and provides the maximum throughput while exhibiting smooth performance.

The Communications Agent manages the system activity through individual queues or lists of jobs for each **COM** and **LPT** port, as well as a **Time** queue for jobs whose execution has been deferred. Comprehensive queue management is provided, which allow you to view the status and contents of each job queue, with the capability to cancel individual jobs or flush an entire queue. In addition, each time Softerm is executed, the job queues are checked to determine if any jobs have not been completed since the last time Softerm was executed. If any jobs remain, a special screen allows you to select which queues are to be restarted or canceled. This capability allows you to recover active jobs after a system failure.

Using the Communications Agent

In order to use the Communications Agent from an external program, it must first be installed in your system using the DOS *terminate and stay resident* feature. The Softerm command line provides the parameter switch **/A** for this purpose. To install the Communications Agent on your system, enter a command line in the following format at the DOS command prompt:

SOFTERM/A[/C][/N] [dirname/S] [dirname/T]

The **/A** parameter is required and indicates that the Communications Agent only is to be installed. The **/C** and **/N** parameter switches are optional and allow you to edit or redefine the Communications Agent System Definition if used. The **dirname/S** and **dirname/T** arguments allow you to specify the system directory which contains required system files such as **SOFTERM.OVL**, and the directory where temporary files will be created. The default directory for all other files will be the current directory when Softerm is executed. A complete description of these optional command line arguments can be found in Chapter 1.

When Softerm is executed with the **/A** parameter switch, the screen will clear and the Softerm logo screen and copyright notice will appear. After a few seconds the screen will clear, and the Communications Agent System Definition screen will appear if the **/C** or **/N** switch is used, or the System Definition has never been saved. Otherwise, Softerm will return immediately to the DOS command prompt. To verify that the Communications Agent has been properly installed, press the **Alt Break** key and the Communications Agent menu should appear.

If the System Definitions screens are displayed, you should follow the system definition procedure described in Chapter 2. After you respond to the question **Save Configuration?** at the end of the definition procedure, Softerm will return to the DOS command prompt with the Communications Agent installed.

Note: Once the Communications Agent is installed in your system, it can only be removed by rebooting DOS.

Many Softerm functions including those provided by the Communications Agent, require the use of the system overlay file **SOFTERM.OVL**. This file must be available when the Communications Agent is accessed using the **Alt Break** key. If you are using Softerm on a diskette based system, the Softerm System Diskette or other diskette containing the file **SOFTERM.OVL** must be inserted in the drive indicated for system files in the system definition when

using functions provided by the Communications Agent. If possible, this file should remain available at all times. If you are using Softerm on a hard disk based system, the **SOFTERM.OVL** file will automatically be accessed from the system directory.

Once you have installed the Communications Agent and are returned to the DOS command prompt, you can continue to use your system in a normal manner. The Communications Agent will function as an extension to your DOS operating system, and will be transparent to *most* programs which can be executed from the DOS command prompt. However, programs which attempt to access the hardware directly, modify interrupt vector locations, or bypass the BIOS calls may not execute properly with the Communications Agent installed.

Error messages which occur during the operation of the Communications Agent which cannot be displayed are written to a file called **SOFTERM.MSG**. This file is automatically created in the system directory when Softerm is executed with the **/A** option to install the Communications Agent.

Since the Communications Agent is a subset of the full Softerm program, if you need to use full terminal emulation you simply execute Softerm normally without the **/A** switch. Softerm will automatically determine that the communications agent has been installed and proceed directly to the Terminal Setup Options menu. When this execution of Softerm is subsequently terminated to return to the DOS command prompt, the Communications Agent will *not* be removed.

Communications Agent Options

After the Communications Agent is installed in your system, you can access its functions by entering **Alt Break** during the execution of any program. The **Alt Break** key is ignored if the current display mode is graphics. The current screen image will be saved in the **SOFTERM.OVL** system overlay file and the following options menu will be displayed:

```
SOFTERM 2000      Version 1.00.00
Communications Agent Options

Disk Utilities
Local File Transfer
Line File Transfer
Queue Management
Dial Utilities
Terminal Mode

Alt Esc Cancels
```

When the Communications Agent options menu is displayed, the **Disk Utilities** option is selected by default as indicated by inverse video highlighting of the field. The current version number of Softerm is also displayed. You should use the $\uparrow\downarrow\leftarrow\rightarrow$ keys or the space bar to select an option from the menu and then press the **Enter** key to select the highlighted function. Press the **Alt Esc** key if you want to cancel the Communications Agent option selection and return to the interrupted program.

Disk Utilites

The disk utilities option allows a selection of DOS disk functions to be used. These include functions to display a list of files in a directory, delete files, rename files, and to set the current default directory path.

A complete description of the disk utilities may be found in Chapter 4 on terminal operation.

Local File Transfer

The local file transfer option allows disk files to be printed, displayed, or copied. A selection of edit options provide reformatting of the data if required as the file is transferred. The local file transfer **Copy File to Print** option is used to queue

files to **LPT** and **COM** ports assigned to printers. Once an entry has been made to a queue for a printer port, you can return to the program interrupted to access the Communications Agent while the printing is concurrently performed in the background.

A complete description of local file transfer capabilities and operation can be found in Chapter 5.

Line File Transfer

The line file transfer option allows the setup and execution of file transfers to and from remote computer systems including **uploading** and **downloading** of data. Execution of file transfers can be interactive, or automatic using pre-defined command files. File transfer command files can also be queued for background execution to **COM** ports which are defined to be connected to computers in the system definition. This feature allows file transfers to be initiated and then performed concurrently in the background while you return to the program interrupted to access the Communications Agent.

A complete description of line file transfer capabilities and operation can be found in Chapter 5.

Queue Management

The Communications Agent provides a job queue for each **COM** and **LPT** port configured as well as a **Time** queue for file transfer command files which have deferred execution until a specific time through the **SCHEDULE** command. Queue management allows you to display the status of all queues, display job entries on a selected queue, delete individual jobs from a selected queue, or flush all jobs from a selected queue.

A Communications Agent queue is simply a list of jobs to be performed. A printer queue services a **LPT** or **COM** port connected to a printer. Jobs on a printer queue are files which are to be printed on the assigned port. Job entries to a printer queue can be made by the local file transfer **Copy File to Print** function, **print screen** functions, and the **Queue Print File** Softerm utility function.

A communications queue services a **COM** port used for communications to a remote computer system. Jobs on a communications queue are file transfer command files which are added to the queue using the line file transfer **Queue a Command File** option.

The time queue holds job entries until a specific time or date and time. Jobs on the time queue are file transfer command files which executed a **SCHEDULE** or **DELAY** command causing execution of the file to be suspended. The command file is removed from the communications queue on which it was executing and is placed on the time queue until its scheduling parameters are satisfied.

If the **Queue Management** option is selected on the Communications Agent Options menu, the following screen is displayed:

Queue	Time Q	COM1	LPT1
Status		Idle	Idle

←→↑↓ = Select Queue	Alt Esc Cancels
Enter = Display	F9 = Flush

The queue name and status are displayed across the top of the screen for the **Time Q** and each **COM** and **LPT** port defined in the system definition. The status field displayed beneath the queue name indicates the current processing state of the queue. The following table lists the possible status indicators and their definition:

Status	Description
Idle	There are no active jobs
Active	A job is active
TmlEmu	Port is assigned to terminal emulation
Abort	An active job has been deleted and is in abort processing
Error	A device error has occurred

To display the contents of a selected queue, you can use the ↑↓→← keys to highlight the queue name desired and then press the **Enter** key. To flush the contents of a selected queue (delete all jobs), press the **F9** key. Once the jobs on a selected queue are displayed, you can use the **F1** key to delete an individual job or the **F9** key to flush all jobs on the queue. Inverse video is used to highlight the selected job, and the ↑↓→← keys can be used to select a

specific job on a queue for deletion. If the job to be deleted is active and in an **Error** status, the **F1** key may have to be used *twice* to remove the job from the queue.

The **Alt Esc** key is used to cancel the current queue display and return to the queue selection portion of the screen.

If the **Time Q** is selected and the **Enter** key is pressed, the following screen is displayed:

Execute Time	Port	Pathname
MM/DD/YY HH:MM	COMn	d:\path\filename.ext

The **Execute Time** field indicates the date and time at which the suspended job will be reactivated. Question marks (??) are displayed for month (MM), day (DD), year (YY), or hour (HH) if these fields have not been defined. The only required execution time parameter is minutes (MM), and Softerm will accept the current date and time values for any undefined field. The **Port** indicates which **COM** port the job will subsequently be assigned to when the execution time parameters are satisfied. The **Pathname** defines the path to the command file which has been suspended.

If a **COM** port which is defined to be connected to a computer in the system definition is selected for display and the **Enter** key is pressed, the following screen is displayed:

Flags	Pathname
ffff	d:\path\filename.ext

The **Flags** field indicates any special conditions applicable to the job entry. The available flags are listed at the bottom of the screen and include the following:

Flags	Condition
*	Executing
A	Aborting
D	Delete command file when done

The **Pathname** field defines the path to the command file for the job.

If a **COM** or **LPT** port which is defined to be connected to a printer in the system definition is selected for display and the **Enter** key is pressed, the following screen is displayed:

Flags	Copies	Pathname
ffff	nn	d:\path\filename.ext

The **Flags** field indicates any special conditions applicable to the job entry. The available flags are listed at the bottom of the screen and include the following:

Flags	Condition
*	Printing
A	Aborting
T	Timeout (device not responding)
D	Delete print file when done
F	Add form feed after printing

The **Copies** field indicates the number of times the print file is to be printed to the selected port. The **Pathname** field defines the path to the print file for the job.

Terminal Mode

The Communications Agent provides a limited terminal emulation mode for conversational interaction with a host computer system. A basic TTY compatible emulation is provided which allows interactive dialog with the remote system. The following table defines character codes which perform special functions when received in terminal mode:

Character	Function
\$05	Automatic Answerback
\$08	Backspace (destructive)
\$0A	Line Feed
\$0C	Form Feed (Clear)
\$0D	Carriage Return

Many Softerm terminal emulation extended capabilities are not available in Communications Agent terminal mode. If extended capabilities or full terminal emulation of a specific terminal is required for successful host interaction, you should use standard Softerm terminal emulation instead of the limited terminal mode in the Communications Agent.

The following table defines the standard keyboard functions for the Communications Agent terminal mode:

Keyboard	Function	Characters
Enter	CR, LF, or CR/LF	\$0D, \$0A, or \$0D \$0A
Backspace	BS or DEL	\$08 or \$7F
Shift Backspace	DEL or BS	\$7F or \$08
Alt B	Break	BREAK
F1	Disk Utilities	
F2	Dial Utilities	
F3	Local File Transfer	
F4	Line File Transfer	
F6	Terminal Setup	
F8	Exit, Break Connection	
F9	Exit, Keep Connection	
F10	Toggle Function Key Display	

If **Terminal Mode** is selected from the Communications Agent options menu, the following screen is displayed:

```
-----Communications Parameters-----
      Port: COM1
Number of Data Bits: 8
Number of Stop Bits: 1
      Parity: None
      Speed: 1200
      Duplex: Full
      Receive Pacing: XON/XOFF
Answerback Message:

-----Terminal Emulation Parameters-----
      CR After LF: No
      LF After CR: No
      Enter Key Sends: CR
Backspace Key Sends: BS ($08)
```

This screen allows you to select the **Communications Parameters** and **Terminal Emulation Parameters** to be used for the Communications Agent terminal mode. The communications parameter **Port** determines on which **COM** port the terminal mode will operate. The choices for this field will be limited to **COM** ports which are available and defined as connected to computers in the Communications Agent system definition. The communications parameters and terminal emulation parameters used for the Communications Agent terminal mode are identical to the parameters used for terminal setup for standard Softerm terminal emulation. A complete description of these parameters can be found in Chapter 3 on terminal setup.

Once the communications and terminal emulation parameters have been specified, press **Alt Enter** to initiate terminal mode on the selected port. To return to the Communications Agent options menu before entering terminal mode, press the **Alt Esc** key.

When terminal mode is initiated, the screen will clear and communications can begin immediately if a dial-up connection is already established or a hardwired connection is being used. Otherwise, a connection can be established using the **Dial Utilities**. The dial utilities can be accessed during terminal mode by pressing the **F2** key. Function key options are displayed on row 25 and the **F10** key can be used to toggle the display through the available choices.

Other functions available during terminal mode are disk utilities, local file transfer, and line file transfer. These extended capabilities operate in the same manner as when using standard Softerm terminal emulation. You can also return to the terminal mode setup screen if any changes are required to the communications or terminal emulation parameters.

To exit from the terminal mode and return to the Communications Agent options menu, press the **F8** or **F9** keys. The **F8** key will also break the current connection by performing a hangup operation. Use the **F9** key if you want to exit from terminal mode but keep the current connection.

Background Printing

The Softerm Communications Agent provides the capability of *background* printing which allows printing to be accomplished concurrently while you are using another program. Any **COM** or **LPT** port configured in the system definition as connected to a printer can be used for background printing. Background printing can also be initiated from standard Softerm terminal emulation on any port except for the printer port assigned in the terminal emulation **Printer Parameters**, unless it is assigned as **Disk** or **None**.

The Communications Agent provides a queue for each **COM** and **LPT** port assigned to printers in the system definition. Each entry or job on the queue references a file to be printed. Entries are made to the queue through the Softerm terminal emulation **Queue Print File** utility function, print screen functions, and local file transfer **Copy File to Print**. Entries are made to the print queues from an external program when the the local file transfer **Copy File to Print** function is used to print a file generated by the external program.

The disk containing the files being printed must remain available in the specified drive until all printing is complete. Any file in the print queue should not be altered or erased until after it is printed.

Background Printing from Terminal Emulation

When using Softerm as a standalone terminal emulation program, background printing can be utilized depending on the port selected and how it is assigned in the terminal configuration. Softerm provides the capability to assign direct control of a printer port to terminal emulation, making the port unavailable for background printing by the Communications Agent. Direct control of the printer during terminal emulation eliminates the need for temporary files to contain print data generated by Softerm print functions, and all print data is appended to the print capture buffer during online terminal operation and sent directly to the printer. However, the Softerm program cannot be terminated until printing is complete, or is aborted using the **Cancel Print** utility function.

The terminal emulation printer port is assigned in the terminal options **Printer Parameters** and may be selected as any **COM** or **LPT** port connected to printers, **Disk**, or **None**. If the printer port is assigned to an available **COM** or **LPT** port, print functions to the assigned port will append data to the print capture buffer and sent directly to the printer. Print functions directed to other ports will create temporary files if required and are queued for background printing by the Communications Agent.

If the terminal emulation printer port is assigned as **Disk**, a temporary print file is created to serve as the print capture buffer for online print utility functions such as **Capture Transparent to Print** and **Print Screen with FF**. The **Queue Print File** utility function can then be used to close the temporary file and queue it to a selected printer port for background printing. Any subsequent online print function executed will create a new temporary print file to serve as the print capture buffer. Offline print functions such as local file transfer **Copy File to Print** or **Shift Print** are queued directly to a selected printer port for background printing and do not append data to the temporary print file serving as the print capture buffer.



If the terminal emulation printer port is assigned as **None**, online print utility functions are not available. Offline print functions are still available and are queued directly to selected printer ports, if any, for background printing.

If **Softerm** is executed as a standalone program for terminal emulation, and the Communications Agent has not been previously installed using the **/A** option switch, **Softerm** cannot be terminated while background printing is active since the Communications Agent would be removed before the background printing is complete. If you plan to use background printing during terminal emulation, you should first install the Communications Agent in your system separately by executing **Softerm** with the **/A** switch. This will allow you to terminate **Softerm** terminal emulation to execute another program without waiting for printing to complete.



Background Printing from Other Programs

You can also use the background printing capabilities provided by the Communications Agent from other programs which include the capability to create print files for print output functions. These print files can then be queued to a selected port managed by the Communications Agent using the local file transfer **Copy File to Print** option.

If the program requires direct control of the printer port for print functions, they will operate normally when the printer port is not busy printing under the control of the Communications Agent. If a print function which requires direct control of the printer port is attempted while the Communications Agent is actively printing on the required port, a **timeout** indication is received by the program attempting to print until all files on the print queue for the port have been printed and the port is in an *idle* state.



For example, the print screen feature provided by the BIOS using the **Shift Print** key and the printer echo feature provided by the DOS operator interface program **COMMAND.COM** which is toggled on or off by the **Ctrl N** key, require direct control of the printer. These functions cannot be used while the Communications Agent is busy printing on the required port.

To queue a file for background printing while using another program other than **Softerm**, press the **Alt Break** key to interrupt the current program and access the Communications Agent options menu. Use the space bar or **↑↓→←** keys to select the **Local File Transfer** option and press the **Enter** key. Select the **Copy File to Print** option and press the **Enter** key. Follow the procedure described in Chapter 5 on File Transfer for the **Copy File to Print** option. The printer port is selected by the **Print to Port** option in the printer definitions.

Once the source file path, printer definitions, and edit options have been specified, an entry is made to the queue for the selected printer port, and if no other jobs are currently active on the queue, background printing is initiated. You can then return to the interrupted program while the file is concurrently printed.

Background Communications

A unique feature provided by Softerm is the capability to process communications functions concurrently in the background while other programs are being used. Softerm provides a queue for each **COM** port defined as connected to a computer in the system definition on which *command files* generated using the line file transfer command language can be queued. The Communications Agent will process command files queued to a port concurrently with other programs executing on the system including Softerm terminal emulation.

Softerm file transfer command files provide the capability to perform almost any type of communications interaction automatically and concurrently with other system activity. For example, a command file could be set up to dial a host computer, logon with a username and password, initiate a program on the host to receive transmitted data, send the data using a choice of protocols, initiate a program on the host to process the data, and then hangup. The command file could also include a **SCHEDULE** or **DELAY** command to delay further execution of commands until a certain time when it is expected the processing of the data on the host computer is complete. The results of the processed data could then be transferred back to the system by the same command file.

A special queue called the **Time Q** is provided for command files whose execution has been deferred through the use of a **SCHEDULE** or **DELAY** command. The **SCHEDULE** command allows the execution of a command file to be delayed until a specific date and/or time. The date and time specification includes month, day, year, hour, and minute but the only required field is minute. Softerm will return the command file to the appropriate **COM** queue when the date and time specification is matched. The **DELAY** command allows the delay of a specific amount of time in hours and minutes before execution of the command file is resumed.

The file transfer command language includes a **MONITOR** command which is used to place a communications port in the *monitor* mode. In the monitor mode, the system can automatically answer incoming calls on the port and accept requests through remote terminal or system interaction for file transfers in any protocol and utility functions such as displaying the files in a directory. The monitor mode allows completely unattended operation, and if initiated using a command file queued for background execution on a **COM** port, the monitor mode can be used concurrently with the execution of other programs. This feature can be used effectively in **electronic mail** applications since your system can be accessed by a remote user to transmit a file to your system while you are using it for another purpose.

Background Execution of Command Files

File transfer command files are queued to a COM port for background execution using the line file transfer **Queue a Command File** option. Line file transfer may be used from standard Softerm terminal emulation, the Communications Agent Options menu accessed from another program, and the Communications Agent terminal mode.

The line file transfer option to queue command files allows you to specify the COM port on which the command file is to be queued, and the pathname of the command file to be used. If the selected COM port is the port currently assigned to terminal emulation when using Softerm or the terminal mode when using the Communications Agent, the command file will be queued but is not executed until the port is released by terminal emulation. If the selected COM port is *not* the port currently assigned to terminal emulation or terminal mode, the command file is queued to the selected port for concurrent execution in a background mode. The **Execute a Command File** option should be used to execute a command file on the port currently assigned to terminal emulation.

The disk containing the command file being executed must remain available in the specified drive until the execution is complete. Any command file in the communications queue should not be altered or erased until after it is executed.

Softerm also provides the capability to *observe* the execution of a command file queued for background processing. If the line file transfer **Watch Execution** option is selected for interactive command execution, and the COM port selected is active with the background execution of a command file, Softerm will display the file transfer commands as they are executed. You can then return to the line file transfer options menu without aborting the executing command file by pressing the **Alt Esc** key. The **Ctrl Break** key can be used to *abort* the current command file in this mode.

If Softerm is executed as a standalone program for terminal emulation, and the Communications Agent has not been previously installed using the **/A** option switch, the Communications Agent will be *automatically* installed when Softerm is terminated if background communications is active. Otherwise, the Communications Agent would be removed before the background communications activity is complete.

For additional information on the background execution of file transfer command files, refer to Chapter 5 on File Transfer.

Restarting Background Queues

Each time Softerm is executed, the job queues are checked to determine if any jobs remain to be processed since the last time Softerm was executed. If the Communications Agent is already installed, the queues are assumed to be active and the checking is not performed.

The **Restart Jobs** screen is displayed after the Communications Agent is initialized. If the Communications Agent System Definition has never been saved, the system definition screens are displayed first. Once the **Save Configuration?** option is entered at the completion of the system definition procedure, the restart screen will be displayed.

If any queues have jobs remaining which have never completed, the following screen is displayed when the Communications Agent is initialized:

Restart Jobs on	
Time Queue	Yes
COM1 Queue	Yes
LPT1 Queue	Yes

The **Restart Jobs** screen includes an option field for any queue which has jobs remaining to be processed. The default restart option for any queue will be **Yes** which will restart processing of the queue when Softerm has been fully initialized. If you change the restart option for any queue to **No**, all jobs on the designated queue will be flushed. The **Enter** or **Tab** and **Shift Tab** keys can be used to position to the restart option field for each queue. Press the **Alt Enter** key when you have selected all restart options to continue Softerm initialization.

Background processing of the job queues will restart when the Communications Agent has been installed if you are using the **/A** parameter switch to execute Softerm or after Softerm loads the terminal configuration if you are executing Softerm to use terminal emulation. If the terminal configuration assigns one of the **COM** or **LPT** ports which has jobs remaining for direct use, the queue will not be restarted for background processing unless the terminal configuration is changed to a different port. The jobs will remain inactive on the queue until the queue can be restarted.

The capability to restart Softerm job queues allows you to recover from a system failure without the need to manually requeue jobs which have not completed. Any job which was active at the time of a system failure will be restarted from the beginning of the job.

Utility Programs

Softerm includes two standalone utility programs which can be used to queue print files or file transfer command files to the Communications Agent if it is installed in your system. The utility programs can be executed at the DOS command prompt, or referenced in DOS batch files with the **.BAT** extension. The utility programs provide a method of queuing print files or command files to the Communications Agent without using the **Alt Break** feature from the keyboard.

QCOMM

The **QCOMM** utility program is used to queue a file transfer command file on a specified port. The arguments and switches for the utility program are identical to the **QCOMM** file transfer command described in Chapter 5. The **QCOMM** utility program can be executed using a command line in the following format at the DOS command prompt:

```
A> QCOMM d:\path\filename.ext/switches
```

The file transfer command filename to be queued is entered as the first argument on the command line followed by optional argument switches. The switches argument allows any of the following additional parameters to be optionally specified:

Switch	Function
/COMn	Queue to specified COM port
/1=string	Replaces %1 in command file
/2=string	Replaces %2 in command file
/3=string	Replaces %3 in command file
/4=string	Replaces %4 in command file
/5=string	Replaces %5 in command file

For example, the following are valid **QCOMM** command lines:

```
A> QCOMM DIALIT.MAC/COM2/1=THE SOURCE
A> QCOMM TRANSFER.MAC/2=NEWDATA
A> QCOMM LOGON.MAC
```

The name of the file transfer command file to be queued is specified as the first argument on the command line. The **/COMn** switch allows the communications port to which the command file is queued to be selected. If no port is specified, the Communications Agent will *scan* the **COM** ports and select the first port available.

Up to 5 strings can be specified which are substituted for dummy arguments in the command file when the command file is executed. Each string may be up to 14 characters in length. A dummy argument is defined in the command file as a percent (%) sign followed by a number from 1 – 5. Thus wherever a %1 occurs in the command file, it will be replaced by the string defined for the **/1=** switch in the **QCOMM** command line.

QPRINT

The **QPRINT** utility program is used to queue a file to be printed to a **LPT** or **COM** port connected to a printer. The **QPRINT** utility program can be executed using a command line in the following format at the DOS command prompt:

```
A> QPRINT d:\path\filename.ext/switches
```

The print filename to be queued is entered as the first argument on the command line followed by optional argument switches. The switches argument allows any of the following additional parameters to be optionally specified:

Switch	Function
/COMn	Queue to specified COM port
/LPTn	Queue to specified LPT port
/COPIES=nnn	Number of copies to print (1–255)
/DELETE	Delete file after print
/LINES=nnn	Page length (3–255)
/SKIP=nnn	Page skip count (0–255)
/COLUMNS=nnn	Column width (0–255)
/NOFOLD	Truncate long lines

These switches correspond to the **Printer Definitions** described in the local file transfer section in Chapter 5 on the **Copy File to Print** function. The following option switches may also be specified on the command line and correspond to the standard **Edit Options** available for local and line file transfers described in Chapter 5:

Switch	Function
/HISET	Hi bit set
/HICLR	Hi bit clear
/HEX	Hex Dump
/CR	Line terminator is carriage return
/LF	Line terminator is line feed
/NL	Line terminator is new line (CR-LF)
/TAB=n	Tab column multiple (1–9)
/PAD	Pad blank lines
/COMPRESS	Space Compress
/REMOVE=string	Remove specification
/TRANSLATE=string	Translate specification

For example, the following are valid **QPRINT** command lines:

```
A> QPRINT B:DATAFILE/LPT1/HICLR/HEX/DELETE
A> QPRINT OUTPUT.DOC/COM2/COPIES=2/NOFOLD
A> QPRINT SOFTRANS.DOC
```

The name of the print file to be queued is entered as the first argument on the command line. The **/LPTn** or **/COMn** switches allow the printer port to which the command file is queued to be selected. If no port is specified, the Communications Agent will *scan* the **LPT** and **COM** ports and select the first port available.

Notes:





Communications Interfacing

Introduction

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.

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

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 Communications Agent System Definition should indicate that the port is connected to a modem, 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

Appendix A/ Communications Interfacing

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 a serial printer to the personal computer and refers to the Softerm serial communications 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 Softerm using XON/XOFF for 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		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 Softerm 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.

Auto-Dial Modems

Introduction

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.

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.

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. **ONERR** processing may be used to repeat the sequence using the **RETRY** command.

If the modem includes option switches which allow the modem to be configured for use with a computer, the control signal **DCD** is 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, redialing.....press control break to abort** 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 Connection** 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.

The built-in serial interface in the Tandy Model 2000 requires the presence of the **CTS** signal in order to transmit characters to the modem. If this signal is not available from the modem in command mode, it may be necessary to use a modified cable with some auto-dial modems. The **CTS** signal can be provided using a local loopback of the **RTS** signal to **CTS** after first disconnecting the **CTS** signal from the modem.

Refer to the descriptions of individual modems in this Appendix for additional information.

Anchor Automation SIGNALMAN MARK XII

The Anchor Automation SIGNALMAN MARK XII auto-dial modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **SIGNALMAN MARK XII** as the modem dialer type for the port when generating the Communications Agent System Definition.

The MARK XII does not allow local control of the DTR signal so that a call cannot be disconnected by dropping DTR by selecting local mode on the Softerm status line. To hangup a connection, use the dial utilities **Hangup** option or enter the escape to command mode sequence **+++** followed by a hangup command **AT H** in the terminal mode.

The use of the **+** character in a Softerm phone number will cause a blind 2 second wait. The use of the **@** character in a phone number will cause a blind 4 second wait.

Cermetek INFO-MATE 212A

The Cermetek INFO-MATE 212A auto-dial modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **INFO-MATE 212A** as the modem dialer type for the port when generating the Communications Agent System Definition.

The internal option switches should be set as follows for operation with Softerm:

Switch	Setting	Function
1	On	Asynchronous Operation
2	Off	7 or 8 Bit Data with 2 Stop Bits
3	Off	Normal CTS/DSR/DCD Operation
4	On	Host Controlled DTR
5	User Option	Battery Backup
6	User Option	Exclusion Key Telephone Control

When using this modem on systems with serial interfaces which will not transmit without the CTS signal such as the Tandy 2000, the CTS signal from the modem must be disconnected and CTS provided to the serial interface through a local loopback of the RTS signal.

The use of the + character in a Softerm phone number will cause a blind 2 second wait. The @ character in a phone number is not supported.

Datec 212 Auto-Dial Modem

The Datec 212 Auto-Dial modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **Datec 212** as the modem dialer type for the port when generating the Communications Agent System Definition.

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

Hayes Smartmodem 300 and 1200

The Hayes Microcomputer Products Smartmodem 300 and 1200 can be used with Softerm automatic dialing capabilities on a specific port by selecting **Hayes Smartmodem** as the modem dialer type for the port when generating the Communications Agent System Definition.

The originate baud rate when using the Smartmodem 1200 is determined from the current Softerm communications **Speed** parameter which can select either 300 or 1200 baud. The configuration switches to establish the operating parameters for the standalone Smartmodem 300 and 1200 should be set as follows when operating with Softerm:

Switch	Setting	Function
1	Up	Normal DTR operation
2	User Option	Word/Digit result codes
3	User Option	Quiet/Result codes sent
4	User Option	Echo/No Echo in command state
5	User Option	Auto-Answer Enabled/Disabled
6	Up	Normal DCD operation
7	User Option	RJ11/(RJ12 or RJ13) jack
8	User Option	Disable Enable command recognition

When 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 MT212AH Auto-Dial Modem

The Multi-Tech MT212AH auto-dial modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **Multi-Tech MT212AH** as the modem dialer type for the port when generating the Communications Agent System Definition.

The internal option switches should be set as follows for operation with Softerm:

Switch-3	Setting	Function
1	User Option	Enable/Disable auto-answer
2	Open	Normal DTR Operation
3	Open	Normal DCD Operation

Switch-4	Setting	Function
1	User Option	Word/Digit result codes
2	User Option	Enable/Suppress command responses
3	User Option	Enable/Disable command echo
4	User Option	Enable/Disable command mode

Multi-Tech MT212C Auto-Dial Modem

The Multi-Tech MT212C auto-dial modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **Multi-Tech MT212C** as the modem dialer type for the port when generating the Communications Agent System Definition.

The MT212C provides 1200 baud operation and pulse dialing only. 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 on a specific port by selecting **NEC N212BR** as the modem dialer type for the port when generating the Communications Agent System Definition.

Novation SMART-CAT Modem

The Novation 103 and 103/212 SMART-CAT modems can be used with Softerm automatic dialing capabilities on a specific port by selecting **Novation SMART-CAT** as the modem dialer type for the port when generating the Communications Agent System Definition.

The internal option switches should be set as follows for operation with Softerm:

Switch	Setting	Function
1	On	Set command character to %
2	User Option	Verbose/terse response codes
3	User Option	High/low data rate
4	User Option	Enable/Disable auto answer
5	Off	Normal CTS/DSR/DCD operation

The use of the + character in a Softerm phone number will cause a blind 5 second wait.

PROMETHEUS ProModem 1200

The PROMETHEUS ProModem 1200 modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **PROMETHEUS ProModem** as the modem dialer type for the port when generating the Communications Agent System Definition.

The internal option switches should be set as follows for operation with Softerm:

Switch	Setting	Function
1	On	Enable Command Recognition
2	User Option	RJ11/(RJ12 or RJ13) jack
3	User Option	Initialized by Softerm
4	User Option	Enable/Disable auto answer
5	User Option	Echo/No Echo in command state
6	User Option	Initialized by Softerm
7	User Option	Verbal/Numeric result codes
8	Off	Normal DTR operation
9	Off	Prevent modem automatically redialing
10	Off	Normal DCD operation

The ProModem includes true wait for dial tone capability.

Racal-Vadic VA212 Auto-Dial Modem

The Racal-Vadic VA212 auto-dial modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **Racal-Vadic VA212** as the modem dialer type for the port when generating the Communications Agent System Definition.

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.

Radio Shack TRS-80 Modem II

The Radio Shack TRS-80 Modem II can be used with Softerm automatic dialing capabilities on a specific port by selecting **TRS-80 MODEM II** as the modem dialer type for the port when generating the Communications Agent System Definition.

The **FORCE DTR** switch on the rear of the modem should be set to **OFF**. The front panel **AUTO/MAN** should be set to **AUTO** for automatic dialing. The **ORIG/ANS** switch can be set to either position.

The use of the @ character in a Softerm phone number will cause a blind 4 second wait.

Radio Shack TRS-80 DC-1200 Modem

The Radio Shack TRS-80 DC-1200 Modem with auto-dial module can be used with Softerm automatic dialing capabilities on a specific port by selecting **TRS-80 DC-1200** as the modem dialer type for the port when generating the Communications Agent System Definition.

The internal option switches should be set as follows for operation with Softerm:

Switch	Setting	Function
1	Closed	Enable serial data out
2	User Option	Not used
3	User Option	Enable/Disable character echo
4	User Option	Status responses/Modem II compatible
5	User Option	Not used
6	User Option	7 bits, even parity 8 bits, no parity
7	User Option	Disable/Enable A-A1 control
8	Open	Disable forced local carrier

When using this modem on systems with serial interfaces which will not transmit without the CTS signal such as the Tandy 2000, the CTS signal from the modem must be disconnected and CTS provided to the serial interface through a local loopback of the RTS signal.

The use of the @ character in a Softerm phone number will cause a blind 4 second wait.

Rixon R212A Intelligent Modem

The Rixon R212A Intelligent Modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **Rixon R212A** as the modem dialer type for the port when generating the Communications Agent System Definition. The modem also includes a Hayes Smartmodem compatible mode which can be used with the **Hayes Smartmodem** dialer type.

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 used when using a **DIAL** command in a macro. However, the Rixon modem 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 on a specific port by selecting **UDS 212A/D** as the modem dialer type for the port when generating the Communications Agent System Definition.

U.S. Robotics Auto-Dial 212A

The U.S. Robotics Auto-Dial 212A modem can be used with Softerm automatic dialing capabilities on a specific port by selecting **USR AD 212A** as the modem dialer type for the port when generating the Communications Agent System Definition. For proper operation the configuration switches must be set as follows:

- RNG - Use as specified in manual
- 811 - 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 on a specific port by selecting **Ven-Tel MD212 Plus** as the modem dialer type for the port when generating the Communications Agent System Definition.

The MD212 Plus does not allow software control of the type of dialing used. Switch III 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.

Error Messages

Softerm Error Messages

The following error messages may occur during system definition, terminal setup, online terminal operation, and file transfer while using Softerm or the Communications Agent. Softerm error messages are displayed at the bottom of the screen and may be cleared by pressing the **Esc** key.

Argument Expected

A file transfer command line being entered or executed is missing an argument for a command switch in the format **/switch=argument**. The **=** on a command switch should not be specified without an argument.

Argument not Allowed for Switch

A file transfer command line being entered or executed specified an argument on a switch when the switch does not allow an argument.

Argument Required

A file transfer command line being entered or executed is missing a required argument.

At least one port must be defined for communications

An attempt has been made to exit the Communications Agent System Definition without configuring at least one **COM** port configured for communications with a computer.

Buffer Full

An attempt has been made to add a command line to the current file transfer 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 command file into more than 1 file.

Capture Active, Do you wish to cancel it

Capture to print or disk is active, and a Softerm Goto Function has been selected. If you select **Yes**, the current capture operation is terminated and Softerm will continue to the selected Goto function. Only the capture mode is

canceled, any printing which is active will continue. If you select **No**, Softerm will return to the Goto Functions menu selection. You can then enter **Alt Esc** to cancel the menu.

Command file terminated normally

This message is written to the **SOFTERM.MSG** file by the Communications Agent when a file transfer command file completes execution in the background.

Command file too large for edit buffer

An attempt has been made to edit a file transfer command file which is too large for the edit buffer available. The file can be edited with a standard text editor as an alternative.

Confirm?

This message is displayed whenever a file is about to be deleted by a Softerm utility function or to confirm filenames during file transfer operations when the **+** character is used as the first character of the filename specification. To confirm an operation select **Yes**. If you do not wish the operation to be performed, select **No**.

Confirm deletion of entry

This message is displayed whenever an entry in the Softerm Phone Book is about to be deleted. To confirm the deletion of a phone book entry select **Yes**. Otherwise, select **No**.

Confirm deletion of job **Confirm deletion of all jobs**

These messages are displayed whenever a job is about to be deleted from a queue or the queue is about to be flushed (all jobs) when queue management is being performed. To confirm deletion of a job or jobs select **Yes**. Otherwise, select **No**.

Connection Broken

This error occurs when Softerm is being used with a modem and the modem **carrier** signal is lost usually indicating that a disconnect has occurred. You should re-establish the connection before continuing to operate Softerm in the online mode.

Creating a new phone book

When using the Dial Utilities and the file **SOFTERM.FON** containing the Softerm Phone Book cannot be found in the directory specified, Softerm will create a new phone book file.

Dial on Port:

This message is displayed when using the Dial Utilities from an external program through the Communications Agent to dial a phone number and there are multiple **COM** ports available which are connected to a computer using a modem. The space bar or ↑↓→← keys can be used to toggle through the choices and pressing the **Enter** key will continue the dial operation.

Delete Existing File?

This message is displayed during operations such as saving a terminal configuration or keyboard macro file when the selected filename already exists. If you select **Yes** for this option and press **Enter**, the old file will be deleted before the save operation is performed. If you select **No**, a new filename must be entered.

Directory Full

Indicates that no additional files can be created in the current directory. A root directory on diskette or hard disk can hold a fixed maximum number of files. Sub-directories are not restricted in size. Refer to your DOS manual for additional information.

Disk Full

This error indicates that there is no available space remaining on the disk. When this error occurs during terminal emulation, Softerm provides an option to continue the operation which encountered the error on a new disk, or to abort the operation. Refer to the section on DOS errors for additional information.

End of File

This message is displayed when the end of a file is encountered before the logical completion of the function using the file. This could be the result of a damaged file or directory.

Error code nnn hex, contact Softronics....

This message is displayed when an unknown or invalid DOS error code is encountered. You should record the circumstances of this error condition and forward the information to Softronics.

Execution Aborted

The execution of a file transfer command file was aborted by an **ABORT** command or a fatal error condition.

File Already Exists

This error indicates that the new name requested for a file in a **rename** operation already exists.

File Already Exists, Select Option

If the destination filename specified for a **Capture to Disk** Softerm utility function or a local file transfer **Copy File to Disk** operation already exists, the following option format is displayed:

File Already Exists, Select Option: Delete Append Cancel

Use the space bar or the $\uparrow\downarrow\rightarrow\leftarrow$ keys to select an option and press the **Enter** key. If you select **Delete**, the current file will be deleted before the requested operation is initiated. If you select **Append**, data from the current operation will be appended to the existing file. If you select **Cancel**, you can select a different destination filename for the operation.


File Close Error

An error was encountered while attempting to close a file. Indicates Softerm was unsuccessful in updating the FCB information in the directory.

File is in Use

The file requested for use by an operation is already in use by another concurrent operation and cannot be accessed at this time.

Illegal Filename



The **filename** specified for an operation is invalid. In DOS, filenames are from 1 to 8 characters long and can contain the letters of the alphabet, the numbers 0–9, and the special characters \$ = & @ ! % () - { } ' _ . A filename can be followed by an optional **extension**. The extension starts with a period, has 1–3 characters, and follows immediately after the filename.

Incompatible Patch File

The **SOFTERM.PF** patch file does not match the major revision level of the main Softerm program, or is not in the correct format. If the correct patch file cannot be found, you can initialize Softerm without it by deleting the existing patch file or renaming it to some other filename.

← Input Error

A command line entered in the line mode file transfer command edit or immediate execution modes is invalid. The ← will point to the first character in error.



Input is 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.

Insufficient memory for initial terminal configuration

There is not enough memory available to load the terminal configuration file specified on the Softerm command line when Softerm is executed.

Insufficient memory for terminal emulation, Softerm terminating

There is not enough memory available when Softerm is executed to use Softerm terminal emulation capability.



Insufficient memory to build control blocks, Softerm terminating

There is not enough memory available when Softerm is executed to allocate the required line and job control blocks.

Insufficient memory for configuration Insufficient memory for emulation

There is not enough memory available to load the terminal configuration or terminal emulation when using the **Load Configuration** or **Load Emulation** options in terminal setup.

Invalid communications port specified, will be defaulted

An attempt has been made to load a terminal configuration which specifies a **COM** port which is not defined in the current Communications Agent System Definition. Softerm will default the port to an available **COM** port.

Invalid Hex Digit

An invalid character was included in a hexadecimal argument in the **Remove** or **Translate** fields when entering **Edit Options** for a local or line file transfer. Hexadecimal arguments must begin with a \$, followed by 2 digits in the range 0–9, or A–F.

Invalid printer port specified, will be defaulted

An attempt has been made to load a terminal configuration which specifies a **COM** or **LPT** port for a printer which is not defined in the current Communications Agent System Definition. Softerm will default the port to the first available printer port.

Invalid temporary filename path, configuration will be performed

The directory path specified for temporary files in the Communications Agent System Definition when Softerm is executed is invalid. Softerm will automatically display the System Definition screens so that a new temporary file directory can be entered.

Invalid Translate Range

An invalid range has been specified in the translate field for **Edit Options** specified for a local or line file transfer. For example, the end of the range is a smaller value than the beginning.

Job Queue is Full

There are no more job control blocks available for queueing operations. Softerm allows a maximum of 80 active jobs.

Keyboard macro file specified is invalid

The keyboard macro file specified on the Softerm command line with the `/A` option is not in the correct format. Softerm will continue to the terminal setup options menu.

Line Failure

The retry count has been exhausted during error recovery procedures or carrier is lost using the Softrans or XMODEM protocols in line file transfer. The current command or command 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 command file is aborted and must be re-executed after determining the cause of the timeout condition.

Line Too Long

A command line read from a file transfer command file during command execution or editing exceeds 512 characters.

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 in Phone Book

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 available modem controlled ports

An attempt has been made to use the Dial Utilities to dial a number and there are no `COM` ports available connected to computer using a modem.

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, redialing.....press control-break to abort

A connection was not established within the 45 second timeout interval for a dial operation using the Softerm Dial Utilities. Softerm will automatically retry the dial operation or you can press the **Ctrl Break** key to abort the operation and return to the dial utilities menu.

No entries found in phone book after the name just entered

There are no entries in the Softerm Phone Book which match or are greater than the name identifier entered for the Dial Utilities **List** option.

No Operator Available

An attempt was made to execute a file transfer command such as **TERMINAL** in a command file executed in the background.

No inactive communications ports available

An attempt was made to load a terminal configuration and there are no inactive communications ports available. This is a fatal error and will cause an exit to DOS.

No printer ports defined

The local file transfer **Copy File to Print** option has been selected and no printers have been defined in the Communications Agent System Definition.

No Temporary Files Available

Softerm provides for a maximum of 1000 temporary files. These files are named **SOFTEMP.nnn** where **nnn** is a number from 000 – 999.

No terminal emulation in specified configuration

The terminal configuration filename specified on the Softerm command line has no terminal emulation. This usually indicates that the file is damaged or is not a Softerm terminal configuration file.



No unassigned COM ports available

The immediate execution mode was selected for line file transfer and there were no available COM ports.

Not a keyboard macro file

An attempt was made using the **Load Macro File** option on the Keyboard Macro Options menu to load a file which is not a keyboard macro file. The load request is ignored and the field is restored to its previous contents.

Operator Abort

A command or operation has been aborted by the operator.

Output in file SOFTEMP.nnn

This message is displayed when you select **Disk** for the **Print to Port** option for a print operation. The output from the print operation is written to the indicated temporary file.



Pathname Not Allowed


An attempt was made to specify a new pathname in the new name for a file rename function. The new name cannot include a drive or directory path since the file will remain in the same directory after its name has changed.

Port Already Assigned

The port indicated in a file transfer command file is already assigned to another function such as terminal emulation.

Printing is active, cannot change ports

The printer currently assigned to terminal emulation is active and an attempt has been made to change the assigned port. The printing must complete or be canceled before the printer port assigned can be changed.



Printing is active, cannot change terminal emulation

An attempt has been made to load a new terminal configuration while printing is active to the printer assigned to the current terminal configuration. The printing must complete or be canceled before the the terminal configuration can be changed.

Print to Port:

This message is displayed for print operations to select an available **COM** or **LPT** port, or **Disk**. The space bar or ↑↓→← keys can be used to toggle through the choices and pressing the **Enter** key will continue the operation.



Queue is Empty

There are no jobs on the selected queue when the queue is displayed in queue management.

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 Softerm error message.

Selected Port is Idle

The watch execution mode in line file transfer was selected for a port which is not active.

Softerm Communications Agent already installed

The **/A** parameter was used on the Softerm command line when the Communications Agent was already installed.



Softerm Communications Agent already installed, cannot configure. Softerm terminating

The **/N** or **/C** parameter was used on the Softerm command line to configure a new Communications Agent System Definition with the Communications Agent currently installed. You must remove the Communications Agent from your system by rebooting before changes can be made to the System Definition.

Softerm Error nn

This message is displayed if Softerm is unable to read the **SOFTERM.OVL** overlay file in order to retrieve the text of an error message. The error code **nn** is displayed in hexadecimal according to the following table:



Softerm	
Error Code	Description
00	Unknown Error
01 – 12	DOS Function Call Errors
13 – 1F	DOS Critical Errors
20	Unknown Error
21	Unknown Error
22	End of File
23	File Close Error
24	Disk Full
25	Pathname Not Allowed
26	File Already Exists
27	Directory Full
28	File is in Use
29	Illegal Filename
2A	Operator Abort
2B	Undefined Port
2C	Port Already Assigned
2D	Specified Port is Defined as a Printer
2E	Translate List is Incomplete
2F	Invalid Translate Range
30	Invalid Hex Digit
31	Job Queue is Full
32	No Temporary Files Available
33	Unable to Read System Overlay
34	Line Timeout
35	Unable to Transmit to Modem
36	Argument Required
37	Input Error
38	Unknown Switch
39	Switch Requires Argument
3A	Argument not Allowed for Switch
3B	Argument Expected
3C	Input is Out of Range
3D	No Connection
3E	Name not Found in Phone Book
3F	Line Too Long

Specified communications port already active, will be defaulted

An attempt has been made to load a terminal configuration which specifies a COM port which is already active and not available for terminal emulation. Softerm will default the port to an available COM port.

Specified Port is Defined as a Printer

The port specified for a line file transfer operation is defined as a printer port in the current Communications Agent System Definition.

Specified printer port is already active, will be defaulted

An attempt has been made to load a terminal configuration which specifies a COM or LPT port form a printer which is already active and not available for use by terminal emulation. Softerm will default the port to disk.

Switch Requires Argument

A file transfer command line being entered or executed is missing a required argument on a switch. The switch has been specified as `/switch` instead of `/switch=argument`.

Terminal Emulation must be specified

An attempt was made to select **Terminal Options** or **Online Operation** on the terminal setup options menu. These options cannot be used until the terminal emulation has been selected using the **Load Emulation** option.

Translate List is Incomplete

The translate field in the **Edit Options** for a local or line file transfer contains an odd number of entries. Arguments in a translate list must be entered in corresponding pairs.

Transmit is Complete

This message is displayed when the Softerm Utility Function **Transmit File** reaches the end of the requested file.

Unable to access help format

An error occurred reading the Softerm keyboard help screen from the `SOFTERM.OVL` overlay file.

Unable to find SOFTERM.OVL, Softerm terminating

When Softerm is executed, it searches the current directory and all directories specified by the DOS `PATH` command for the `SOFTERM.OVL` overlay file. If the `/S` parameter switch is used, only the specified directory is searched.

Unable to find specified configuration file

The terminal configuration filename specified on the Softerm command line when executing Softerm cannot be found. Softerm will continue to the terminal setup options menu.

Unable to load dialer drivers, Softerm will terminate

Softerm was unable to load a dialer driver file corresponding to the **Dialer Type** specified in the Communications Agent System Definition. The dialer driver files have an extension of `.ADM` and are provided on the Softerm System Diskette.

Unable to read configuration file Unable to read terminal file

This error may occur during the load of a **configuration** or **terminal emulation** from the Softerm setup main menu. If a DOS error occurs while attempting to load either of these types of files, the above message will be displayed along with the appropriate DOS error message.

Unable to read job queue, Softerm terminating

When Softerm is executed, it is unable to read the job queue information from the `SOFTERM.OVL` overlay file. This could indicate that the file is damaged and should be restored from a backup disk.

Unable to read SOFTERM.OVL, Softerm terminating.

An error has occurred in reading the initial Communications Agent System Definition when Softerm is executed. This may indicate that the `SOFTERM.OVL` overlay file is damaged and should be restored from a backup disk.

Unable to read SOFTERM.OVL, insert system disk and press escape

A Softerm function which requires access to the overlay file **SOFTERM.OVL** has been executed and the file is no longer present. This usually occurs because the Softerm System Diskette has been removed. You should insert your system disk in the drive specified for system files and press the **Esc** key.

Unable to read specified configuration file

The terminal configuration filename specified on the Softerm command line cannot be read due to an irrecoverable error. Softerm will continue to the terminal setup options menu.

Unable to read specified keyboard macro file

The keyboard macro filename specified on the Softerm command line with the **/A** option cannot be read due to an irrecoverable error. Softerm will continue to the terminal setup options menu.

Unable to Read System Overlay

When executing a file transfer command file, Softerm was unable to read the required system overlay from the **SOFTERM.OVL** file.

Unable to read terminal cross reference from SOFTERM.OVL

Softerm is unable to read the terminal cross reference information from the **SOFTERM.OVL** file when a **Load Emulation** operation is executed in terminal setup. Press the **Esc** key to try again, press the **Alt Esc** key to exit. This may indicate that the **SOFTERM.OVL** file is damaged and should be restored from a backup disk.

Unable to Transmit to Modem

Softerm is unable to transmit commands to the modem when using the dial utilities, or executing a file transfer **DIAL** command. The modem connection should be checked.

Undefined Port

The port indicated in a file transfer command file is undefined in the current Communications Agent System Definition.

Unknown Switch

A file transfer command line being entered or executed includes a switch for the command which is not defined.

Unknown switch, Softerm terminating

An invalid parameter switch was used on the Softerm command line.

Waiting for printer to finish, press Alt Esc to return to Online Mode

An attempt has been made to return to DOS from Softerm while the printer assigned to terminal emulation is still active. Press the **Alt Esc** to return to online mode. The remaining print data can be canceled using the Softerm Utility Function **Cancel Print**.

DOS Error Messages

DOS error messages may occur during Softerm operation when functions which use DOS system calls are performed. Refer to the specific chapter in the Softerm user's guide which covers the function being performed for additional information on the effect of these errors.

If a DOS error or **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:

Select Option: Continue on New Disk Abort

If **Abort** is selected, the message **Operator Abort** is displayed and the operation is aborted. If you wish to continue the operation using 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 **Continue on new disk** option can then be selected. If the DOS error is the result of a disk capture operation, you are given the opportunity to choose a new **Filename** to be used with the new disk. If the DOS error is the result of a **RECEIVE** line file transfer command, the current filename is used on the new disk.

Two types of DOS errors can occur during the operation of Softerm. These are known as **critical errors** and **function call** errors. For both types of errors, Softerm will display a error message and then usually abort the current operation. The operation can then be retried after correcting the problem which causes the error to occur. If an error of either type occurs when Softerm is executed and before its initialization phase is complete, you will normally be returned to the DOS command prompt.

Refer to the DOS Reference Manual for additional information on critical and function call errors.

DOS Critical Errors

The following critical DOS error messages may occur during Softerm operation:

DOS Error Code	Softerm Error Code	Description
0	13	Unit is Write Protected
1	14	Unknown Unit
2	15	Drive Not Ready
3	16	Unknown Command
4	17	Data Check Error
5	18	Bad Request Structure Length
6	19	Seek Error
7	1A	Unknown Media Type
8	1B	Sector Not Found
9	1C	Printer is Out of Paper
A	1D	Write Fault
B	1E	Read Fault
C	1F	Disk Failure

DOS Function Call Errors

The following DOS function call error messages may occur during Softerm Operation:

DOS Error Code	Softerm Error Code	Description
1	01	Unknown Error
2	02	File Not Found
3	03	Invalid Path
4	04	No More File Control Blocks
5	05	Access Denied
6	06	File Not Open
7	07	Memory Overwrite – Control Blocks Destroyed
8	08	Insufficient Memory Available
9	09	Invalid Memory Address
10	0A	Invalid Environment
11	0B	Invalid Format
12	0C	Invalid Access Code
13	0D	Invalid Data
15	0F	Invalid Drive
16	10	Attempt to Remove Current Directory
17	11	Not the Same Device
18	12	No More Files

ASCII Character Set

General Information

ASCII is the acronym 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. Softterm allows all 128 character codes to be generated from the keyboard. All codes can be generated with a single keystroke, sometimes in combination with the **Shift** and **Ctrl** keys.

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 G** 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**.

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	EOF	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 \
\$1D	29	GS	group separator	Ctrl]
\$1E	30	RS	record separator	Ctrl ^
\$1F	31	US	unit separator	Ctrl _
\$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
\$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	@
\$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

Appendix C / ASCII Character Set

\$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	[
\$5C	92	\	backslash	\
\$5D	93]	close bracket]
\$5E	94	^	circumflex	^
\$5F	95	_	underscore	_
\$60	96	`	grave accent	`
\$61	97	a	a	a
\$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

Appendix C/ ASCII Character Set

\$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	{
\$7C	124		line	
\$7D	125	}	close brace	}
\$7E	126	~	tilde	~
\$7F	127	DEL	delete (rubout)	Shift BackSpace

Extended ASCII Character Set

Softterm defines additional character codes to represent keys available on the keyboard which are not defined in the normal ASCII character set. Extended ASCII character codes in the range \$80 – \$AF are used to represent these keys.

Hex	Dec	Name	Keyboard
\$80	128	Function Key 1	F1
\$81	129	Function Key 2	F2
\$82	130	Function Key 3	F3
\$83	131	Function Key 4	F4
\$84	132	Function Key 5	F5
\$85	133	Function Key 6	F6
\$86	134	Function Key 7	F7
\$87	135	Function Key 8	F8
\$88	136	Function Key 9	F9
\$89	137	Function Key 10	F10
\$8A	138	Function Key 11	F11
\$8B	139	Function Key 12	F12
\$8C	140	Function Key 13	F13
\$8D	141	Function Key 14	F14
\$8E	142	Function Key 15	F15
\$8F	143	Function Key 16	F16
\$90	144	Tab	Tab
\$91	145	Backspace	Backspace
\$92	146	Enter	Enter
\$93	147	Print Screen	Print
\$94	148	Numeric Keypad 0	0
\$95	149	Numeric Keypad 1	1
\$96	150	Numeric Keypad 2	2
\$97	151	Numeric Keypad 3	3
\$98	152	Numeric Keypad 4	4
\$99	153	Numeric Keypad 5	5
\$9A	154	Numeric Keypad 6	6
\$9B	155	Numeric Keypad 7	7
\$9C	156	Numeric Keypad 8	8
\$9D	157	Numeric Keypad 9	9
\$9E	158	Numeric Keypad .	.
\$9F	159	Numeric Keypad +	+

\$A0	160	Numeric Keypad -	-
\$A1	161	Insert	Insert
\$A2	162	End	End
\$A3	163	Cursor Down	↓
\$A4	164	Page Down	PgDn
\$A5	165	Cursor Left	←
\$A6	166	Keypad 5	5
\$A7	167	Cursor Right	→
\$A8	168	Cursor Home	Home
\$A9	169	Cursor Up	↑
\$AA	170	Page Up	PgUp
\$AB	171	Delete	Delete
\$AC	172	Keypad +	+
\$AD	173	Keypad -	-
\$AE	174	Numeric Lock	NumLock
\$AF	175	Scroll Lock	Scroll Lock

Notes:



User Support

User Support Policy

Sofronics 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, 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 system definition and terminal emulation are specified. Also check to be sure the options for terminal emulation are correct.

Second, consult your local Tandy/Radio Shack Computer Center. Trained customer service representatives are available 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 local customer service representative, you should contact Tandy Customer Service in Fort Worth, Texas according to the procedure described in your software registration information.

Softerm Patch Files

Whenever Softerm is executed, after the initial logo screen is displayed, Softerm checks for a patch file named **SOFTERM.PF** in the system directory. If this file does not exist, the program will continue since this file is not mandatory for the operation of Softerm. However, if a patch file is available for the current revision of Softerm, you should insure that it is present in the directory used for Softerm system files whenever Softerm is executed. Otherwise, Softerm will be executing with possible problems that the patch file was intended to correct.

The patch file includes a revision number which modifies the main Softerm version number displayed on the logo screen and the terminal setup options screen. The patch file is keyed to a specific revision of the main program. If the patch file does not match the current revision of the Softerm program or is in the incorrect format, the message **Incompatible Patch File** is displayed and Softerm will terminate.

For information on the availability of patch files for Softerm 2000, contact Tandy Customer Service. Softerm patch files are provided through the Sofronics Online Update Service.

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 as well as a convenient distribution mechanism for additional terminal emulations and other program enhancements. Also **user-contributed** tips on using Softerm, keyboard macro files, file transfer macro files, and specific host computer versions of **SOFTRANS.F77** will be made available.

The Online Update Service is a special bulletin board system based on the public domain RBBS-PC and 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 Phone Book under the name **Softronics BBS**.

Using the Online Update Service

Using the Softronics Online Update Service is similar to accessing most bulletin board systems. You should configure Softerm in the following manner when using the Online Update Service:

```
Terminal Emulation: TTY Compatible
Number of Data Bits: 8
Number of Stop Bits: 1
                    Parity: None
                    Speed: 300 or 1200
                    Duplex: Full
Receive Pacing: XON/XOFF
Transmit Pacing: None
Transmit Delay: 0
```

Use the default values for the **Terminal Emulation Parameters** with the **TTY Compatible** emulation.

Note: The first time you access the Softronics Bulletin Board System and Online Update Service, use the capture to disk or capture to print capability to create a permanent record of the session. The first time you log on to the system, instructions will be displayed on how to use the Online Update Service.

To use the online update service, dial the Softronics Bulletin Board System using the phone number for **Softronics BBS** in the Softerm Phone Book. When the system answers, press the **Enter** key 2 or more times which transmits carriage returns to allow the system to detect your baud rate. The system will then display the following message:

CAN YOUR TERMINAL DISPLAY LOWER CASE?

Type in a **Y** and press the **Enter** key. The following message is then displayed:

Do you want graphics?

Type in a **Y** and press **Enter**. The system will then display a **Welcome** message followed by the following questions:

What is your **FIRST** name?
And your **LAST** name?
Checking User File...

Once you have entered your first and last name, the system will check to see if you have previously logged on to the system. If you have previously logged on, the system will request the password you entered the first time on the system. Once your password has been verified, the system will notify you if there are any messages for you and continue to the main menu of the message subsystem.

If this is the first time you have logged on the system, the following questions are displayed:

What type of system are you calling from?
What **CITY** and **STATE** are you calling from?
Type in a message security **PASSWORD**?
Type in **PASSWORD** again for security double check?

Enter your system type as **Tandy 2000**.

Appendix D / User Support

You should remember the password chosen for the next time you call. If you are a first time user, the system will display instructions on using the Online Update Service. Additional help information on using the BBS may be obtained by choosing the **H)elp** selection from the various menus.

If you encounter any difficulty in using the Softronics BBS and Online Update Service, contact Softronics Technical Support.

Glossary

ACIA

Abbreviation for **Asynchronous communications interface adapter**. A semiconductor chip that is designed to provide flexible asynchronous communications support.

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. It is usually built into the modem and consists of two rubbery muffs into which the receiver fits.

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-dial

A modem feature, the function of which is to initiate phone calls using tone or pulse dialing of numbers under software control and, upon receiving an answer tone, respond with an originate tone. Softerm supports this capability through the Softerm Phone Book and Dial Utilities.

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

A 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.

Bulletin Board

A dial-up service whereby personal computer users who have a modem post messages, or electronic bulletins for other users. A typical bulletin board system (BBS) has an electronic mail feature, a mode to "chat" with the systems operator (SYSOP), and other "help" and entertainment features.

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 terminal configuration options.

Control character

A code generated by holding down the control key (marked as CTRL on the 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.

DAA

Abbreviation for **Data Access Arrangement**, a device or circuit used between the telephone network and any device connecting to it, such as a modem. It insures that problems occurring in the device will not cause problems on the telephone network. An FCC approved DAA allows a device to be connected directly to the telephone network.

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 for character framing or parity checking.

Data Compression

The *squeezing* of data for the purpose of increasing throughput. This squeezing can be done on a character basis by reducing the character size of transmitted characters, as well as on a message basis by eliminating redundant characters.

DCD

Abbreviation for **Data Carrier Detect**, an RS-232C control signal from a DCE to a DTE indicating that a communication connection is established. This signal is sometimes referred to as **Received Line Signal Detect** or **RLSD**.

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.

Direct-Connect Modem

A type of modem that can be directly connected to a phone line by a jack (as opposed to an acoustic coupled modem, where the telephone receiver is placed in the 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.

Download/Upload

The transfer of an entire data file (or program) between computers. Transferring a file from a host to a remote computer is **downloading**. Transferring from a remote computer to a host is **uploading**.

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.

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.

Echo check

Employed as an error detecting scheme. Characters sent are compared to those echoed by the remote system. If they are dissimilar, an error may have occurred.

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. This is one of many services provided by most information utilities.

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 character protocol 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.

FSK

Abbreviation for **Frequency-Shift Keying**, a modulation method used in lower-speed modems. It uses one frequency to represent 0's and another frequency to represent 1's.

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.

Hardwired

A physically wired connection committed to one specific use, such as a dedicated port on a computer to a specified terminal.



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.

Host Computer

The primary or controlling computer in a communications network which connected terminals use to perform work.

Information Utility

A service available to the general public that provides access to various databases. With personal computers connected to the telephone system, users can access these databases and communicate with other users through electronic mail services provided by many of the information utilities.



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 computer from the program it is executing to a specific routine which handles the condition that caused the interrupt.

Keyboard macro

A definition of a series of keystrokes which replace a simple keyboard control sequence.

Local Mode

Operating mode of the terminal in which the serial communications interface is *disabled*. This prohibits online communications and provides 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.

Logon

The procedure of establishing contact with another system and identifying yourself.

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 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 4 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 4 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.

Parameter

One of a number of variables necessary to control the operation of a program to perform the task desired. For example, the transmission speed is one of the parameters necessary for a data communications program.

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.



Password

A secret number, word, or group of words that allow authorized individuals to connect their terminal or computer to a system or database.

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.

RLSD

Abbreviation for **Received Line Signal Detect**, an RS-232C control signal from a DCE to a DTE indicating that a connection is established. This signal is also referred to as **Data Carrier Detect**.

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 ROM of most personal computers 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

A process whereby the bits of a character are transmitted one at a time on the communications link. A character is therefore not formed until all the bits comprising it are received.

Serial Port



A data channel on a computer that allows serial data into and out of the computer. It converts parallel data to serial data, and serial data to parallel data. The output of a serial port can go to a modem or other serial device such as a printer.


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, and is 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.

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 site for data transfer with a computer system.

Timesharing system

A computer system accessible from remote terminals, each terminal 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. This integrated circuit (chip) handles parallel-to-serial and serial-to-parallel conversions. It is the major component of a serial port, and usually adds or tests parity, and adds or strips start and stop bits.

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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RADIO SHACK, A DIVISION OF TANDY CORPORATION

**U.S.A.: FORT WORTH, TEXAS 76102
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TANDY CORPORATION

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