# DESTERM 128 V2.00 -- USER GUIDE

By Matthew E. Desmond

TABLE OF CONTENTS:

# 1 What is the DesTerm 128 Terminal Program?

DesTerm 128 is a program that allows you to use your Commodore 128 to enter the world of telecommunications. This program represents over three years of research and development -- from a small BASIC program that was written in an afternoon, it has matured into a full-featured terminal program packed with many useful features not previously available for the Commodore 128. DesTerm has the capability to talk to mainframes using the common VT102 protocol, as well as to many IBM PC Based systems that use the ANSI standard for colour graphics. For those who use Commodore Colour graphics systems, DesTerm can also interact using this format. DesTerm can communicate flawlessly at 2400 baud (which is rapidly becoming THE standard modem speed), but if that isn't fast enough for you, DesTerm can even speak true 9600 baud -- the first and ONLY terminal for the Commodore 128 that can successfully talk to 9600 baud modems. Recently, two independent hardware manufacturers have built special UART/ACIA cards for the C64/C128. DesTerm is able to use these cartridges to realize their full potential. If you have several favourite BBSes that you call, DesTerm can remember information about each, such that each time you call, the terminal is set up properly for that system. DesTerm has many other exciting features which you will learn about as we go...

## 1.1 Distribution Notice

DesTerm is distributed under the SHAREWARE concept, a method of distributing high quality software to the user at low cost. When you start to use this program, you have a short evaluation period in which you must decide if you want to continue using the program. If you do decide to use the program, you are required to send the $25 shareware registration fee; if not, you simply must stop using the program. You may feel that you can get away with not sending any money. Legally, you are compelled to comply with these terms. Shareware authors, like all other authors, depend on the consumer -- if there is no interest in the program, it dies. Shareware is much cheaper than commercial software, and the authors are much more accessible; suggestions, comments and questions are much more likely to be addressed by shareware authors than by commercial publishers. No one is going to get rich from shareware -- the money that does come in is put back into the project, in the form of hardware support, etc. The more people that register, the more hardware additions the program will be able to support!

You may distribute this program freely, providing the following conditions are met:

1) Only a moderate copying fee may be charged.
2) It is made CLEAR to the recipient that any copying charge does NOT cover the registration fee, and that the recipient is still obligated to register his/her copy with the author if they choose to use it.
3) The original archive and its contents --- especially the documentation --- are not modified in any way.



### 1.2 Disclaimer

This program and its accompanying documentation come with no warranty, either express or implied, with respect to accuracy or suitability for any particular application. The author assumes no responsibility whatsoever for any damage, direct or incidental, resulting from their use.

## 2 Getting Started

There are a few standard ways of getting around in DesTerm and, once you know these, the rest is really simple.

To start DesTerm, simply put the disk containing the DesTerm files (obtained either from the author or created from the distribution archive) in your disk drive and enter:

```
RUN "DESBOOT2.00"
```

First, the program will display a brief introductory screen while it initializes its run-time units. Once the initialization is complete, the 80-column screen will display the main terminal screen and a window with some shareware information in it. A tune will be played. You may either wait for the tune to end, or just simply hit a key to enter terminal mode. DesTerm will then send an initialization command to the modem to make sure that it is configured properly. More information on configuring DesTerm and your modem will be given later. Once this command is sent, a check is made to see if a file called 'dsl.startup' exists on the boot disk. This program, if present, is a command file that can be used to configure DesTerm at run time. Once the startup file has finished its work (if any), the main terminal mode is entered, and the terminal is ready to use.

DesTerm is principally a menu-driven program and to get the main menu on-screen, you simply press CTRL/RUNSTOP. This is the most important key-sequence in DesTerm, since from this sequence, ALL features of DesTerm may be accessed.

NOTE: The CTRL and RUNSTOP keys were chosen because they are very rarely used together, and as such will not often be pressed at the same time by mistake. Entering the main menu this way will only work in the main terminal mode when there are no other menus present.

To move around the menus, either set of cursor keys may be used. The current selection is displayed in reverse. The menus wrap, so that moving up when at the top of a menu will jump you to the bottom and vice-versa. To select the current option, simply press the either the RETURN or ENTER key. Many menu items will have one letter highlighted in a different colour -- these selections may be quickly selected by pressing the appropriate letter. If you are done with a certain menu, you may exit it by pressing the ESC key, or by selecting the menu option that quits (usually the last option, if present at all).

Note, for those who wish to, a joystick or mouse (1350 & 1351) in either joystick port will mimic the cursor keys and pressing the fire/left button will mimic the RETURN key. On a 1351, the right mouse button will act like pressing CTRL/RUNSTOP when in terminal mode, and like ESC when a menu is present. The mouse/joystick port may be selected by the user and the behaviour of the mouse when not in menus can be chosen -- see the User setup section. Sometimes it is necessary to enter text into a window (such as a filename or telephone number). It is possible to use the cursor keys while typing to move the cursor back and forth to edit the entry. Using the menus to configure DesTerm is very easy to do, but can sometimes be a little long-winded. To save time, HOTKEY combinations have been included. All of the alphabetic keys, when pressed at the same time as the ALT key (ALT), will perform some action or bring up a menu. For a complete list, press the HELP key while in terminal mode. In most terminal modes, the Commodore key (C=) may be used in place of the ALT key; the only exception is the Commodore emulation mode in which case C= is used as if on a normal Commodore keyboard. You now know how to get around DesTerm and, in the next section, you will learn how to configure DesTerm to work best with your hardware.

## 2.1 Configuring DesTerm for your Hardware

The most frustrating part of computing is the time wasted when a program is not configured correctly to work with peripherals. With telecommunications this problem is particularly bad, since every modem works in a slightly different way and sometimes the technical jargon can overwhelm technically inexperienced users. To use DesTerm 128 to its maximum potential you must have a Hayes compatible modem (with interface), a Commodore 1670, 1650 or 1660 modem. If you do not have one of these types of modems, you may still be able to use DesTerm, but you will at least be unable to make use of the autodialing features. The problems of connecting an RS-232 based modem to the C128 is even worse because the C128's modem port does not connect to a 'standard' RS-232 connector and the voltages of the signals at the C128 are not the same as the modem expects. Many companies have made interfaces but, alas, some invert the polarity of the modem control signals, some leave them alone and some don't even support them. DesTerm requires two of these signals for proper operation: Data Carrier Detect (DCD) and Data Terminal Ready (DTR). The first step in setting up DesTerm is to discover if the interface signals need to be inverted or not...

### 2.1.1 Modem Configuration

For reasons unknown to anyone but the designers at major modem manufacturers, most modems are shipped with a default configuration that is not ideal for any application known to Man. The features of modems (and therefore the default configurations) vary widely from model to model, but there are a few common problems that should be dealt with before we get into the configuration of DesTerm. Most modems come with a set of switches (usually referred to as "DIP switches") that control some basic functions. Your modem's manual should tell you where to find these switches or, if your modem doesn't have any switches, how to program the modem's configuration to get the same effect. Remember: configuration commands typed at the modem do not necessarily become permanent; see your modem's manual for information on making these configurations permanent (making them the "power-up {or reset} default").

NOTE: The DIP switch settings and commands given here are merely the most common ones; your modem may vary. If things don't look right or don't seem to work, consult your modem's manual for the correct way to achieve the desired setting.

DTR Override: DTR is a signal that the computer can use to control the modem. Some computers, interfaces, and cables do not connect the DTR line or don't use it properly, so manufacturers ship their modems configured to ignore it. DesTerm does use the DTR line and re-enabling it may help DesTerm run more efficiently. Normally, DTR override is disabled by putting DIP switch #1 in the UP position, or by giving 'switchless' Hayes-compatible modems the command "AT&D2". If you find that the modem does not obey any commands sent while the DTR override is disabled, you may have to re-enable it, but first see Control Signals under Modem Settings.

Verbal Response Codes: The modem may report its status using numbers or longer strings of characters. DesTerm, by default, is set to accept verbal response codes, but it could be made to work with numeric codes if it were configured to do so. Beginners will find the longer English response codes much easier to interpret. DIP switch 2 UP or "ATV1".

Quiet Mode: The modem may be configured NOT to return status reports; DesTerm (and the user!) depend on these status reports to determine what's going on. DIP switch 3 DOWN or "ATQ0".

Command Mode Echo: The modem may be configured to show you what command you are typing to it. Although DesTerm can work with echo on at speeds under 9600 bps, it reduces overhead and increases accuracy and reliability when command echo is disabled. DIP switch 4 DOWN or "ATE0".

Auto Answer: Perhaps the most annoying habit of modem manufacturers is that they ship their modems set to answer the phone as soon as they detect an incoming call! Disable this feature: DIP switch 5 DOWN or "ATS0=0".

Carrier Detect Override: Modems come configured to indicate that they are connected to something, even when they are not. DesTerm performance is enhanced when this override is disabled. DIP switch 6 UP or "AT&C1".

## 2.2 Modem Type

DesTerm must know which type of modem you are using in order to function properly. The modem type may be selected in the Modem Type menu (in Modem Settings). The choices are Normal Hayes, Inverted Hayes, 1670, 1650 and 1660. If you have one of the latter three modems (or a compatible), simply select the proper one, and you're done. If you are using one of the two cartridge interfaces that DesTerm supports (SwiftLink-232 or HART), then simply select Normal Hayes. If you are not using one of these interfaces, but do use a Hayes compatible modem via the normal style of User port interface, you're in for some fun...

As you may know, the Commodore 128 does not have a standard RS-232 communications port; modems must either be built specifically for it, or connected via an RS-232 interface. The interfaces built fall into two categories: those which invert, and those that don't. All this really means is that the control signals sent to a modem will be inverted with some interfaces and not with others. DesTerm needs to know which style of interface you have so that it may communicate with it correctly. In its normal state, a modem will force the Carrier Detect line inactive when it is not talking with another modem, and active when it is. DesTerm monitors the incoming Carrier Detect line, and will display a capital C just before the modem speed on the top right of the screen. If your modem is on, but not talking to another modem, there should be no C. If there is a C, try selecting the other Hayes option. Be sure to tell your modem to not override the CD and DTR lines! (See the previous section) If you have trouble, ask a friend...

## 2.3 Setting The Hayes Setup options

The HAYES SETUP menus are perhaps the most important in the entire program. If these are not correctly set for your modem, DesTerm will not work well. The next few sections will explain the menu options and how they should be set up.

### 2.3.1 Dial Type

The Dial Type should be set to tone if your phone service can handle touch-tone dialing, otherwise you should probably choose pulse. The None option is used when the P or T needs to be explicitly included within the dial string (i.e. to disable call waiting).

### 2.3.2 Max Baud Rate

This should be set to the maximum speed your modem can handle.

### 2.3.3 Set Connect Rate

Some of the newer modems can speak to the terminal at a totally different speed to that of the remote connection -- thus a modem can be talking to another modem at 300 baud, but talking to DesTerm at 9600. This is known as LOCKING the speed. To do this effectively, you must tell DesTerm to ignore the connect rate. This option dictates whether DesTerm will change speeds when the modem reports a connect. For the automatic setting of the speed, the modem must be able to send the connect speed as part of the connect string (such as CONNECT, CONNECT 1200 and CONNECT 2400 etc). The X register will control how explicit the modem is -- you will normally want the X register set to 1 (or more if the modem supports it).

### 2.3.4 Initial Sequence

When DesTerm first runs, it sends the modem an initialization command so that any 'soft' options may be programmed. This option allows the user to enter the command string he wishes to send to the modem. This string will usually set the X register and some S registers. It is possible to include control and escape codes within this string: If you wish to include a control code, two characters must be entered, a caret (^) followed by the character that would normally be typed in conjunction with CTRL to generate the particular code, i.e.:

| To generate: | | |
|---|---|---|
| BELL | type CTRL/G | enter ^G or ^g |
| RETURN | type CTRL/M | enter ^M or ^m |
| LINEFEED | type CTRL/J | enter ^J or ^j |
| ESCAPE | type CTRL/[ | enter ^[ |

It may also be necessary to generate pauses (after an ATZ for example). To enter a half second pause, use the tilde (^). You may also specify raw hex data by using a $. You simply enter a '$' followed by the two digit hex number (capitals ARE needed for A through F). If you would like to use a tilde or caret within such a string, you should precede it with an oblique, or backslash (\). To include an oblique, simply enter two of them.

The default string is: ATZ^m~~~AT X1 S11=50 S7=50^m

This string will: Send ATZ followed by a carriage return (^m);
Pause one and a half seconds (3 times 1/2);
Tell the modem to set its X register to 1;
Set the tone dial speed to 50 milliseconds;
Set the dial wait time to 50 seconds;
Send a carriage return.

### 2.3.5 Hangup Sequence

To disconnect a call, DesTerm will first try to drop the DTR signal; if the modem is configured correctly, this will immediately hang up the phone. If, after a second, the carrier detect line has not changed, DesTerm will send the Hangup Sequence. The Hangup Sequence should contain the appropriate escape code for the modem (usually +++), together with the appropriate pauses. The string should also instruct the modem to hang up.

The default string is: ~~~+++~~~ATH^m.

### 2.3.6 Dial String

In order to dial a number, DesTerm must know what dial command you wish to use -- in most cases this will simply be ATD (remember that the P or T can be selected with dial type). In some cases it may be necessary to include a primary number to disable call waiting, or to dial a '9' to get an outside line. In these cases, the dial string should be modified to have the required effect.

### 2.3.7 Modem Response Codes

During the dial sequence, DesTerm makes use of the report codes that the modem sends. These report codes tell DesTerm at what speed a connect was established, or the reason for a non-connect. It is important for DesTerm to understand what is being sent -- otherwise a connect may never be recognized. DesTerm will ignore anything that is not understood, and wait for something that it does understand. You should modify each of the report codes ("300 Connect." through "Ring.") to match what your particular modem sends. If your modem does not send a particular code, simply leave it alone. If you have your modem set to send numeric codes, then you should change each string to its numeric equivalent.

## 2.4 Resend Init

If you have changed the initial string, or forgot to switch the modem on before running DesTerm, you may wish to resend the initial string. You may do this by selecting Resend Init in the Modem Setup menu.

## 2.5 Setting the User Environment

It is important to be comfortable while working with a terminal, and in this section we will discuss how to set DesTerm's options to your personal liking. The User Environment menu may be found as the fifth menu item in the main menu, or may be summoned with the ALT U HOTKEY sequence from terminal mode.

### 2.5.1 Changing the Colours

The colours that DesTerm uses for menus, prompts and text may be selected with the first seven menu items. The Screen Colour is the colour that is used for the background and border of the 80 column screen. In most cases, remote systems expect this to be black, but you may set it to any of the 16 colours if you wish. The Menu colour is the colour that the menu options are displayed in. The Frame colour is the colour that the frame around menus and windows are drawn in. The Ruler colour is the colour that the TAB ruler (second line on screen) is drawn in. The Prompt colour is the colour that the prompts are displayed in. The Char Colour is the colour that the text displayed in terminal mode will be printed in. It is also used as the character colour for user input. The last colour (Status Colour) is the colour that the status bar is drawn in. You may choose any colours that you wish, as long as they are not the same as the screen colour (or you won't see anything!)

NOTE: If you plan to use DesTerm in the pseudo 40 column mode, the screen colour may have to be black -- some Commodore 128s for some reason have trouble displaying the other colours if not (Try it and see!).

### 2.5.2 Key Click

DesTerm can make a small 'click' each time a key is pressed. This can be either useful or annoying (depending on your tastes or mood), and the click may be enabled or disabled with this option.

### 2.5.3 Printer Device/Sec. Address/Printer Type/Append Linefeed

These three menu items allow you to select certain parameters that pertain directly to your printer. The printer device will normally be set to 4, but for multi-printer situations, this may be anything from 4 trough 7. The Printer Sec Address allows you to select the secondary address to use when talking to the printer: Normally this will be 7 --- consult your printer/interface manual for details. The Printer Type selects whether the printer expects data in Commodore or true ASCII format. This setting will depend on your printer and/or interface.

Some printers will automatically advance the paper when they receive a carriage return (CHR$(13)), while others will only move to the left margin (and thus need linefeed characters to

tell them to advance the paper). If your printer requires line feeds, select Required, else select Automatic.
NOTE: some printer interfaces and printers have a similar option. Make sure that only one is selected to add a linefeed, or you may find your paper advancing several lines for every line of text!

### 2.5.4 Joystick/Mouse

DesTerm allows the use of a joystick, 1350 mouse, or 1351 mouse as substitutes for the RETURN and cursor keys. The 1351 mouse (only) also lets you get in and out of menus quickly. Since a 1350 mouse acts like a joystick, any mention of joysticks in this manual also applies to the 1350.

The basic four directions of the joystick/mouse are equivalent to pressing one of the four cursor keys. This is true whether in menu mode, terminal mode or input mode! Thus, ANSI and VT102 full screen editors will work just by moving the joystick/mouse. The fire/left mouse button will act as if you have pressed the return key. If you are using a 1351 mouse, the right button has a special meaning. Pressing this key while in terminal mode is equivalent to pressing the CTRL/RUNSTOP keys: it calls up the main menu. If you press the right mouse button while in a menu, it has the same effect as pressing the ESC key: it quits the menu!
NOTE: on a 1350, the right button has NO effect.

### 2.5.5 Mouse Mode

DesTerm can be configured to allow mouse/joystick movements to not only select cursor movement during menu selection, but also for your normal BBS activity, as described above. If you enjoy using full-screen editors on your ANSI/Commodore graphics BBS, you may want you use your mouse/joystick to move around the screen easily. This is a great feature, but can be frustrating if you happen to move your mouse when you didn't mean to (a telltale sign is a whole bunch of [A, [B, [C or [D sequences showing up). Thus, you may configure DesTerm to ONLY allow mouse movements in menus, or in all situations.

### 2.5.6 Control Port #

With this option, you may select which control port DesTerm expects to get mouse/joystick operations from. Control Port 1 is the port closest to the front of the keyboard.

### 2.5.7 Information Windows

At certain times during the normal operation of DesTerm, the program will open up a small window on the screen to inform you of a certain event, like the opening or closing of a buffer. There can be no transmission of characters during the time the window is on-screen (1 second), although any incoming characters are buffered. Once you are used to the operation of the terminal, you may wish to disable these Information Windows to save time.

### 2.5.8 Transfer/Dial Tunes

When doing a long upload or download, it is convenient to have DesTerm let you know it has finished. The standard way is to play the introductory tune, but you may wish to select the toneburst option. The toneburst is a series of 4 particularly annoying notes cycled 10 times -- enough to get your attention! You may also wish to have utter peace and quiet. This option also affects what happens when DesTerm connects to a BBS.

### 2.5.9 Overlays/Buffer

DesTerm has the ability to cut down the size of the buffer in order to have space for extra programs, called "overlays". If you wish to use the overlays (such as the script compiler -- see the 'D Script Language Guide') you should select Overlays & Buffer. if you require the full buffer, select Full Buffer. The full buffer size is 733 80 column lines (61K), and the smaller buffer size is 526 80 column lines (42K).

### 2.5.10 NTSC/PAL Mode

This option allows you to tell DesTerm how which video system you are using. This does not affect anything visible, but will affect both the online timer and download timer. Simply set this to whichever video system you use. The NTSC system is used in North America, while PAL is used overseas.

### 2.5.11 Adjust VDC Mode

This option only affects interlace mode, which is used by DesTerm to provide the 50,51 and 52 lines per screen (See Screen Length). There are at least three different models of the VDC chip -- all of which handle interlace mode timing in slightly different ways. If you try interlace and it looks PARTICULARLY bad, you may wish to change the VDC mode setting. NOTE: The change does not take effect until you re-select an interlaced video mode (50, 51 or 52 lines).

## 3 Installing your telephone database

In the previous sections we have discussed how to get DesTerm set up for your particular hardware and personal tastes. You are now ready to enter all of the telephone numbers you use regularly. At this time, it is only possible to have 16 different numbers in memory at one time, but you may have as many different sets on disk as you need. Together with each telephone number and description you will supply a complete set of parameters such that, upon connecting to the remote system, DesTerm will reconfigure itself to match the system connected to. You may even indicate character set and function key files to be loaded at connect time, as well as a logon name and password to be used. Before we enter all the numbers, there are two things in the MODEM SETTINGS menu that need to be taken care of.

### 3.1 Dial Wait/Dial Pause

These are the first two options in the Modem Settings menu, which is the sixth item in the main menu. The first setting, Dial Wait, specifies the number of seconds that DesTerm will wait for a connect to be made. If a connect is not made during this time, the call is aborted - if multiple dialing, however, the next number will then be dialed. This will probably not need to be more than 30 seconds for a local call, but for long distance or international calls it should be set longer.

NOTE: Hayes type modems have a similar function implemented internally (the S7 register). For greatest accuracy, use the modem's S7 register to set the wait time and enter a larger number into the DesTerm configuration. When the modem has waited the specified time and no connection has been made, it should report "NO CONNECT" or "NO CARRIER", and DesTerm will recognize this as the indication that the call failed. The delay should be programmed into the S7 register either when DesTerm is run (using the Initial Sequence) or when the dial command is sent (using the

Dial Prefix).

The second setting, Dial Pause, specifies the amount of time that DesTerm will wait between calls. The minimum time delay that will work is a function of both your modem and the phone company's equipment. If, for example, the phone still reports "BUSY" or "NO DIAL TONE" at the start of a re-dial, then you should increase this value. A setting of two seconds works in most cases.

## 3.2 Entering the Telephone Database

The Telephone Database is edited by selecting the Edit Number File option in the main menu, or you may simply press ALT N from terminal mode. The phone directory contains room for 16 entries -- simply select the one you wish to edit as if it were a menu option. You will see a new menu come up that allows you to specify many parameters that are to be associated with that particular entry. To edit a particular parameter, simply select it in the normal manner.

The Comment may be up to 32 characters long, and serves to remind you about that particular entry. It was designed to hold the name of the system in question, but what you put in it is up to you. The Number is up to 16 characters long, and is sent to the modem without any conversions -- make sure that when combined with the dial string (defined in section 2.3.7) it will make sense to the modem. The Baud Rate selects which speed DesTerm uses when making the call; in most cases, this should be set to the maximum speed your modem can handle (ie Max.) so that the resulting connect will be at the highest common speed. If, for some reason, you would like to call a number at something less than this maximum (e.g. to overcome line noise), enter a lower speed here. The rest of the items, except the last six, are all duplicates of items found in either the Protocol Settings or Emulation Mode menus. For a complete description of each setting, please refer to the Protocol Settings and Emulation Mode sections.

The Character Set parameter allows you to select the particular character set you wish to use with each number. For a description of the format of character sets, refer to the Appendices. If no character set is specified or the specified set does not exist on the DesTerm Files Device (Section [[]]), then the currently loaded character set will be used. The Function File specifies the set of function keys that will be used with each number. The same loading conditions apply as for the character set file. The creation of function key files will be discussed in the next section. The Logon Name and Password options allow you to specify which name and password should be

used for an automatic logon process. NOTE: These will normally need trailing carriage returns, depending on the script. Script File selects which script file should be used to logon. For more about script files, read the DESTERM SCRIPTING LANGUAGE MANUAL.

Once you have entered all of your numbers, or filled up the directory you may save it by selecting the Save Telephone File option. You will be prompted for a filename (the default name is DES.TELEPHONE). If you only need one telephone file, then you may just press return to use the default. If you need multiple telephone files, then you will have to edit the name to make it unique. If the file already exists, you are asked if you want to replace it -- if so, the file is replaced, otherwise the save is aborted. If you need another telephone file, simply edit the old definitions and save the directory again with a new name. Information on how to access multiple telephone files is given in the section 15.1.

## 4 Defining Function Keys

DesTerm allows you to define up to eight function keys, with each one containing up to 32 characters. You may define as many sets of keys as you wish, saving each set on disk to be recalled whenever you need it. To enter function key definitions, select the Define Functions option in the main menu, or press ALT F from terminal mode. To change a definition, simply select the option corresponding to the function key you wish to edit. You may include control and escape sequences in the function definitions in the same way as for the Initial Sequence. To save the function key definitions, simply choose Save Functions. If you only want one set of function keys, you may select the default name (DES.FUNCTIONS) by pressing return. If you will be using several sets of function keys, then give each set a unique name. If the function key file is to be associated with an entry in the telephone directory, be sure the names match! NOTE: The function keys are NOT the four keys that normally people use for function keys, the DesTerm function keys are ALT 1, ALT 2...ALT 8. Due to a hardware problem, some machines have problems with the ALT key when used with the odd numbered keyboard keys -- so you may use the numeric keypad keys too. In any non commodore graphics mode, you may also use C= 1, etc.

## 5 Exploring the Terminal Mode

Before we carry on, it would be a good idea to get acquainted with the main terminal environment. The very top line is the status line. The next is the tab ruler. Unlike many other terminal programs, DesTerm offers a full 25 (52 in interlace

mode) terminal lines plus the extra two lines at the top. The first item on the top line simply announces that you are using DesTerm, and which version you are using.

## 5.1 The Status Lines

```
 LEDS:OOOO  MODE ANSI-25  W:Y  B:C:00001 0:00:00XC1200-N-8-1-F
```

This part of the status line is broken up into several fields. The meaning of each filed is:

LEDS: On a VT102 terminal, there are four Light Emitting Diodes (LEDs) that may be turned on and off by the remote computer. Although only a few programs use them, they have been included for completeness.

MODE: DesTerm offers five different terminal emulation modes -- the mode field simply lets you know which one is currently selected. The possibilities are:

ASCII -- simple ASCII teletype.
ANSI -- Full ANSI X3.64 with IBM ANSI additions.
VT52 -- Digital Equipment Corporation's VT52.
VT102 -- Digital Equipment Corporation's VT102.
C=C/G -- Commodore 64 Colour Graphics.

After the emulation mode is a number indicating the current screen length. Possibilities are 23,24,25,50,51 and 52. The emulation mode and number of screen lines may be altered in the Emulation Mode menu and by ALT G and ALT T from terminal mode.

WRAP: This field is marked as W:. The wrap mode may be either on (Y) or off (N). If wrap mode is enabled, then when the cursor reaches the last column, it will simply jump to the start of the next line and carry on. If wrap is not enabled, then the cursor will stay at the last column, and any more characters will be printed on top of the last. This mode may be changed in the Emulation Mode menu (ALT G).

NOTE: VT102 commands exist to allow the host system to switch this mode; see the Appendices for details.

BUFFER: This field is marked as either B: or S:. If the capture buffer is currently in capture (buffer) mode, then it displays B:, otherwise the buffer is in send mode (S:). The character after the : is either C or O, depending on whether the buffer is closed (C) or open (O). The number after this is the number of lines used in the buffer (max of 526 or 733).

TIMER: The next field is an on-line timer. When you first connect to a remote system, this field gets reset to 0:00:00, and advances (in seconds) while there is a carrier present from the remote system. When the carrier drops, the timer stops (and does not get reset until another carrier becomes present).

NOTE: This is not a clock, and as such cannot be explicitly set! After 9 hours, 59 minutes and 59 seconds, the timer rolls over to 0:00:00.

XON/XOFF: This field has a dual purpose. DesTerm 2.00 will honour incoming XOFF requests. This means that if Desterm sends characters too quickly for the remote system to handle them, the remote system may request that DesTerm shut up for a while. If this happens, a capital X will appear here. XOFF/XON handling can be set up in the Transfer options menu. The second use of this field is to inform you that a script is running. If the field contains a capital S, then a script is running. Scripts may be aborted by pressing CTRL/RUNSTOP.

CARRIER: The next field is the character before the SPEED. If there is a valid carrier present from a remote system, this will display a C, otherwise it will be blank.

SPEED: The speed field simply identifies the speed at which DesTerm is speaking with the remote system.

COMM: The last field specifies the current communications parameters. First comes the data length then parity, number of stop bits and finally the duplex mode.

RULER: The tab ruler (second line from top) displays the position of the current TAB settings. Also displayed are the column numbers (starting at 0). The current tab settings may be changed in the Emulation Mode menu (ALT G). In VT102 mode, there are codes that change the tab stops automatically.

## 5.2 HOTKEYS

Although the menus are very easy to use, they are often long and tedious. To cut down the frustration, "hot keys" have been added. These sequences are accessed by pressing the commodore key (ALT) with one of the alphabetic keys. A list of the functions that each key performs (plus some hints on how to remember them) follows:

| KEYS | ACTION (& COMMENTS) | |
|---|---|---|
| ALT A | Redial the last number | (Again) |
| ALT B | Change Baud Rate | (Baud) |
| ALT C | Toggle Capture Buffer Mode | (Capture) |
| ALT D | Dial a single number from the directory | (Dial) |
| ALT E | Toggle the Duplex | (Echo) |
| ALT F | Define Function Keys | (Function) |
| ALT G | Change Emulation Modes & Parameters | (Graphics) |
| ALT H | Hang Up the Modem. | (Hangup) |
| ALT I | Input a Number and Dial it | (Input) |
| ALT J | Reset Terminal modes | |
| ALT K | Save from Capture Buffer to Disk | (Keep) |
| ALT L | Load to Capture Buffer from Disk | (Load) |
| ALT M | Multiple Number Dial | (Multiple) |
| ALT N | Edit Telephone Number Database | (Numbers) |
| ALT O | Perform Disk Operations | (Operations) |
| ALT P | Print Capture Buffer | (Print) |
| ALT Q | Clear Capture Buffer | |
| ALT R | Receive Files (Download) | (Receive) |
| ALT S | Send Files (Upload) | (Send) |
| ALT T | Change Terminal Emulation mode | (Terminal) |
| ALT U | Change User Environment | (User) |
| ALT V | View Capture Buffer Contents | (View) |
| ALT W | Dump screen to printer | (Wow) |
| ALT X | Execute script | (Xecute) |
| ALT Y | Change Parity Mode | (paritY) |
| ALT Z | Clear Screen (Local Only) | (Zap) |

If you need help to remember some of the more obscure ones, simply press the HELP key from within terminal mode.

## 5.3 DesTerm Keyboard Emulations

In the ASCII character set, there are several codes that the Commodore 128 keyboard does not have legends (keytops) for. In order to generate those characters, the following keys must be used:

| TO GENERATE | PRESS | ASCII |
|---|---|---|
| \ (Oblique or Backslash) | English Pound | 92 |
| ^ (Caret) | Up Arrow | 94 |
| _ (Underscore) | Back Arrow | 95 |
| ` (Back Apostrophe) | ALT < | 96 |
| { (Open Brace) | ALT : | 123 |
| \| (Vertical Bar) | ALT > | 124 |
| } (Close Brace) | ALT ; | 125 |
| ~ (Tilde) | SHIFT = | 126 |
| DEL | HOME or DEL | 127 |

Either the HOME or DEL keys may be used to generate an ASCII DEL character. It is possible to select the code (either BACKSPACE or DEL) that each of these two keys send. They may be programmed in the Emulation Mode menu (or by ALT G).

DesTerm also supports the BREAK signal. The break signal is not a normal character, but more of a gap in transmission. This gap often 'wakes up' certain systems, or can be used to halt certain operations. The use of the break signal is hardware-dependent, and most systems have no use for it. To generate a break, press the ALT and ESC keys simultaneously (ALT ESC).

As mentioned earlier in this document, DesTerm has eight user defined function keys. In order to maintain maximum flexibility while in VT102 and ANSI modes, the regular F1,F3,F5 and F7 keys are *NOT* used for this purpose. Instead, the eight function keys are called by pressing the ALT key together with the appropriate number.
NOTE: the numeric keypad keys will also work as function keys when pressed with ALT.

A real VT102 keyboard has four function keys (marked PF1,PF2,PF3 and PF4). DesTerm uses the F1,F3,F5 and F7 keys to mimic the PF keys -- the mapping is fairly obvious:

| VT102 | Commodore 128 |
|---|---|
| PF1 | F1 |
| PF2 | F3 |
| PF3 | F5 |
| PF4 | F7 |

Also, a real VT102 has a ',' (comma) key in its keypad, while the Commodore 128 has a '+' (plus) key. Since a VT102 keypad has two modes (numeric and application), DesTerm will convert the codes as necessary: If the keyboard is in application mode, pressing '+' will have the same effect as pressing a ',' on a real VT102. If the keypad is in numeric mode, pressing the '+' key will send a the ascii code corresponding to '+' instead of ','. This re-mapping should not cause any confusion since it is usually obvious which mode is being used.

It is also sometimes necessary to generate certain control codes. A list of all 32 control codes and how they may be produced follows.

NOTE: In Commodore Colour graphics mode, some codes are not the same, as to be compatible with Commodore.

| ASCII# | PRESS | ASCII# | PRESS |
|---|---|---|---|
| NUL 0 | CTRL/@ | SOH 1 | CTRL/A |
| STX 2 | CTRL/B | ETX 3 | CTRL/C or RUNSTOP |
| EOT 4 | CTRL/D | ENQ 5 | CTRL/E |
| ACU 6 | CTRL/F | BEL 7 | CTRL/G |
| ES 8 | CTRL/H | HT 9 | CTRL/I or TAB |
| LF 10 | CTRL/J or Linefeed | VT 11 | CTRL/K |
| FF 12 | CTRL/L | CR 13 | CTRL/M or Return |
| SO 14 | CTRL/N | SI 15 | CTRL/O |
| DLE 16 | CTRL/P | DC1 17 | CTRL/Q or SHIFT/NO SCRLL |
| DC2 18 | CTRL/R | DC3 19 | CTRL/S or NO SCROLL |
| DC4 20 | CTRL/T | AAK 21 | CTRL/U |
| SYU 22 | CTRL/V | ETB 23 | CTRL/W |
| CAN 24 | CTRL/X | EM 25 | CTRL/Y |
| SUB 26 | CTRL/Z | ESC 27 | CTRL/[ or ESC |
| FS 28 | CTRL/£ (English Pound) | GS 29 | CTRL/] |
| RS 30 | CTRL/↑ (Up Arrow) | VS 31 | CTRL/← |

## 5.4 Using The Capture Buffer

In the terminal mode, it is possible to enable and disable the capture/send buffer. Pressing ALT + will start the buffer either sending or buffering, while pressing ALT - will stop sending or buffering. If you have Information Windows set on, then when each of these is pressed, a small window will appear describing the action that is starting or finishing. Also, the status line will display an "O" or "C" to indicate the buffer mode. To toggle the buffer from capture to send, you may either select the mode in the Buffer Menu, or simply press ALT C to toggle the mode. Again, if you are in Information Window mode, you will be informed of the new mode. Either way, the status line will display a "B" or "S" to indicate the mode.

NOTE: By toggling the Buffer Mode with ALT C you will reset the send pointer to the start of the buffer, so that any text will now be sent from the start of the buffer. Also, text is always appended to the end of anything in the buffer, unless the buffer is explicitly cleared.

## 6 Selecting the Communications Parameters

Many people have problems with telecommunications simply because they have the communications parameters set up incorrectly. In this section we will learn what the communications parameters are, how to set them up correctly, and how to spot mistakes. The communication parameters are found under the Protocol Settings item in the main menu.

### 6.1 Baud Rate

When two devices (computers, modems, etc.) are talking via an RS-232 style serial link, the most fundamental communication variable that must match is the speed. If this does not match, then a successful transaction is impossible. The communication speed is measured in Bits Per Second (BPS). Most protocols send 10 bits for each byte of information that needs to be sent. Thus, a communications speed of 2400 BPS will send 240 bytes of data per second. There is much confusion as to the difference between BAUD and BPS: BPS is the effective transmission rate, whereas BAUD is the number of signalling elements per second (A 1200 bps modem and 2400 bps modem BOTH speak at 600 BAUD, but the 1200 uses 2 bits per signalling element, whereas 2400 uses 4). When we are concerned with just a computer to computer link, BAUD=BPS. Always be sure that you are talking to the remote device at the same speed it is talking to you. This is especially important for null-modem connections since, unlike modems, other terminals will not automatically detect and match your transmission speed!

### 6.2 Echo mode

In previous versions of DesTerm, this option was called 'Duplex Mode' for accuracy, but Echo mode makes more sense. Duplex is the ability of a device (or communications link) to send and receive data at the same time. A device is full duplex if it can do both simultaneously, and half duplex if it can only do one at a time. In practical terms, however, duplex refers to the local echo mode of a device. A device is in full duplex mode if it expects the remote end to return any data that is sent to it, and in half duplex mode if it displays the data onscreen as

well as sending it to the remote device. In most cases, you will be using DesTerm in Full Duplex mode, since nearly all services will echo your keystrokes back (GEnie is a notable exception). Half duplex mode is useful for testing escape sequences and entering data to the buffer directly.
NOTE: The last character on the status line is "F" or "H" indicating Full or Half duplex.

### 6.3 Local Mode

In some cases, it is handy to be able to use DesTerm as if the modem were disconnected. With local mode on, DesTerm will simply not send anything to the modem. This is good for playing around with ANSI codes -- as the modem would normally get in the way with echo, etc. It can be a frustrating if you forget that it is on because your modem will appear not to be functioning correctly.

### 6.4 Stop Bits

Have you ever wondered how a device knows when a byte of data has started to arrive? Well, it's quite simple: the 'idle' state of a communications line is logic high. When a byte is ready to be sent, the line is brought low for one bit time (called the start bit). Next, each of the data bits is sent and finally the stop bit is sent. This stop bit brings the line high again for at least one bit time, so that the receiver can prepare for the beginning of the next start bit. In some situations, one stop bit is not enough and a stop bit of twice the time (two stop bits) is needed. You may select how many stop bits to send with this setting (1 or 2).

### 6.5 Data Bits

The ASCII standard has 128 characters, which can be represented in 7 data bits. Some communications situations require that the data sent have 256 characters, which need 8 bits. This selection allows you to select which of the two standards you wish to use (7 or 8 bits). In general, most privately-owned bulletin board services will use 8 data bits, while mainframe services will use 7 data bits -- ask the sysop or system administrator if you are unsure.

## 6.6 Parity Bit

The parity bit is the cause of most of communications headaches -- and for all intents and purposes it is useless! The idea behind parity is that you count all of the 'one' bits in the data byte. Your goal is to make the number of 'one' bits always odd or always even. You then add on a bit (the parity bit) to make the total number of ones even or odd (depending on the standard). You then transmit the byte. The other end then counts all of the one bits and, if there is an odd number of ones when there should be an even number, there has been an error! Of course, what the error was, we haven't got a clue -- and it may have been the parity bit that was garbaled in the first place. No matter how silly we all think parity is, it is used, and we must use it too! Parity only makes sense when using seven bits (well, no-one ever uses parity with 8 bits!). The parity modes are:

None -N- do not generate a parity bit (used with 8 bits).
Odd -O- make the number of one bits odd.
Even -E- make the number of one bits even.
Mark -M- force the parity bit to be a one.
Space -S- force the parity bit to be a zero.

The most common data/parity/stop bit settings are:

8-N-1, 7-E-1 and 7-M-1.

It is VERY important to get the byte frame set up correctly. For instance, consider when DesTerm is set to 8-N-1 but is talking to something that expects 7-E-1: When DesTerm sends a byte, it will not add a parity bit, and as such the receiver will generate a parity error about half the time. On the other hand, DesTerm will receive eight bits of data, but will interpret the eighth bit as a data bit instead of a parity bit. DesTerm is quite happy to display characters that have the high bit set (after all, that's what 8 bits mean!). Consequently, DesTerm will display about half of the incoming characters as garbage! When DesTerm is in 7 data bit mode, it simply ignores the incoming parity bits, since we the human might as well judge what is garbage and what is not. DesTerm does however transmit parity properly.

### 6.7 Mask High Bit

This option helps overcome the problems caused by incorrect parity. Most systems these days also ignore parity, and so, even though the parities are mismatched, information can still be transferred. If DesTerm is in 8 bit mode, having the high bit stripped will, in effect, allow DesTerm to receive data is if it were 7 bits wide. This feature becomes especially useful when you call a system that has a gateway to other systems. Sometimes, the host uses different settings to that of the services. In such a case, you may set DesTerm to 8-N-1 and comfortably speak to systems that use 7-E-1 or 7-M-1 (if they ignore parity too!).

### 6.8 Xon/Xoff Handshaking

Xon/Xoff handshaking is a widely used method to control the transmission of characters. When a receiving computer does not want to receive any more characters for a short time, it will send an Xoff (DC3) and when it is again ready to receive, it will send an Xon (DC1). DesTerm has a limited input buffer of 256 characters, which is often not enough while receiving text that causes much screen scrolling. If Xon/Xoff handshaking has been enabled, DesTerm will send an Xoff character to the host when the buffer becomes half full, and will send an Xon when the buffer becomes empty (and an Xoff was previously sent). At low baud rates, this option will probably not be used during normal terminal activity. It is often used during heavy menu activity though, since the input buffer is not emptied.

### 6.9 Video Mode

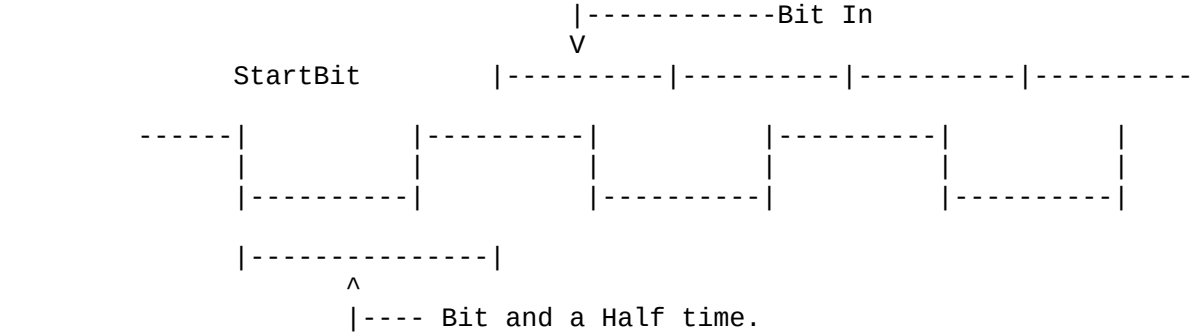
DesTerm can be set up so that any incoming characters are not displayed on the screen. This may seem a little silly, but at very high speeds of transmission, the time taken to update the screen is significant and will slow down the overall transfer speed. So, by turning off the screen, the throughput will grow. You will probably want to have the capture buffer on though, so the text doesn't go to waste! In combination with the ramdisk and automatic buffer save, this option really speeds things up.

## 6.10 Tune Bit Out/Tune Bit In/Tune Half Bit

When DesTerm was being developed, we realized that the success of any communications device was dependent on data quality. The routines that are built in to the Commodore 128 are not reliable above 1200 baud, and simply do not work above 2400. For this reason, we totally re-wrote them! Many hours were spent in front of oscilloscopes making sure that the timing for each speed was accurate. DesTerm is the first and only terminal for the Commodore 128 that is able to talk to 9600 autobaud modems such as the USRobotics Courier HST. These modems require that the Baud Rate be exact. Other commercial 9600 baud terminal programs were close, but no go. Even though we spent many hours adjusting the timing, there are some modems that have a hard time talking to DesTerm even at low speeds. These modems do not speak at the correct speeds (we had a look on a 'scope!). The speeds at which they talk sometimes even change with temperature! Other modems have been designed especially for the Commodore 64/128, and the timing has been intentionally adjusted to suit the old routines. For this reason, DesTerm allows you to fine-tune the speeds at which bits are sent and received. For each speed, there are three parameters:

Bit Out : This is the time of each bit as transmitted.
Bit In : This is the time of each bit as sampled.
Bit Half: This is the bit and a half time so that bit-sampling will occur in the middle of each bit:

Incoming Byte:




Each of the three parameters may be adjusted by +/- 5 units. The units change for each speed, but usually represents increments of approximately 1 percent.

NOTE: This feature has been added so that slight differences in speed can be adjusted for. This is not a cure for line noise, just as it is not a cure for a cheap modem!

NOTE II: If you are using the HART or SwiftLink RS-232 cartridges, this option has NO EFFECT!

## 7 Terminal Emulation Mode Parameters

Among the many features of DesTerm are a number of terminal emulation protocols. Over the last few years, commercial terminal manufacturers have tended towards making the terminals themselves quite smart. By far the most popular terminal protocol -- and one of the most powerful -- is Digital Equipment Corporation's VT100. DesTerm emulates the VT102 (a slightly expanded VT100) protocol, as well as VT52, ANSI X3.64 and the Commodore Graphics protocols. The Terminal Emulation menu (seventh entry in the main menu or ALT G) allows one to change the way in which DesTerm behaves when sending and displaying data.

### 7.1 Emulation Mode

The Emulation Mode menu (ALT T) allows you to choose which of the five emulation modes you wish to use:

ASCII: The ASCII emulation mode is the simplest of all emulation modes, and simply displays data uninterpreted. The only control codes implemented are linefeed, formfeed (clear screen), tab, carriage return, backspace, delete and bell. This emulation mode should be used when talking to systems that have no special emulation handling capabilities (such as BBS64).

ANSI: The ANSI emulation is a full implementation of the ANSI X3.64 standard, with IBM ANSI modifications. The ANSI protocol includes a set of codes to control the position, colour and style of printed text. When IBM included ANSI capability with the PC, they only included a subset, and there is a minor incompatibility with one of the commands. For this reason, most IBM-based bulletin boards that claim to use ANSI also expect this inconsistency. Since most users will be calling IBM based systems, DesTerm also includes this inconsistency. For those people needing exact ANSI X3.64, the VT102 mode should be used. For a

discussion of the ANSI codes, see the appendices.

NOTE: For full IBM style extended graphics, the terminal should have the 'Mask High Bit' protocol option set to 'Do Not Mask High Bit'. The byte frame should be 8-N-1.

VT52: VT52 is an early terminal protocol designed by Digital Equipment Corp. It allows the direct positioning of the cursor, as well as some rudimentary text editing features. Some less-powerful remote systems support this terminal type but not VT100/VT102.

VT102: VT102 is a superset of the already powerful VT100 protocol. VT102 contains all of the features that ANSI graphics has, but also the ability to define a scrolling region. The inclusion of line oriented editing, character insertion and character deletion makes VT102 one of the most powerful terminal protocols invented.

COMMODORE: As most people know, the Commodore 8 bit computers do not speak normal ASCII, but a slight modification to it, called CBMSCII or PETSCII. On the Commodore 64 & 128 computers, CBMSCII included colour commands, graphics, and cursor movement commands. A few bulletin boards in the Commodore community allow communication in CBMSCII as well as normal ASCII. Use Commodore mode to use these services. Be sure that when using Commodore graphics mode, that you first load the DES.CBMCGSET character set, set to 8 bits, and DO NOT have the high bit masked!

FILTER: This is not a terminal emulation mode. This option allows you to filter the incoming control sequences and can be used in conjunction with each of the terminal emulations. When the filter is on, any emulation specific commands will be understood as normal, but they will not be acted on. This could be used to get an idea of what the information might look like if saved in the buffer then printed.

## 7.2 Set Backspace

When using DesTerm, the INST/DEL key is called the Backspace key. The code that this key sends may be either a true backspace (CHR$(8)) or a true delete (CHR$(127)). The code that is sent will depend on the action that is required. On microcomputer systems, you would probably need this to be set to 8. On most mainframes, this key will need to be set to 127. NOTE: In Commodore Colour Graphics mode, the setting of this key has no effect, as the special Commodore backspace (CHR$(20)), or insert (CHR$(148)) are used.

## 7.3 Set Delete

When using DesTerm, the CLR/HOME key is called the Delete key. The code that it sends may, like the Backspace key be either 8 or 127. You will normally set this to be the opposite to the Backspace key. This key is included so that both codes may easily be sent (some mainframe applications require both, and VT102 terminals have both keys).

NOTE: In Commodore Colour Graphics mode, the setting of this key has no effect, as the special Commodore home (19) or screen clear (147) characters are used.

## 7.4 Backspace Mode

As with most things in life, there is some disagreement as to what a 'backspace' should do. DesTerm allows either type of backspace to be used:

| | | |
|---|---|---|
| Non-Destructive | : | The cursor simply moves back, leaving all text on the line alone. |
| Destructive | : | The cursor moves back dragging all the characters that follow with it. That is, it swallows the character to its left. |

NOTE: In VT102 mode, the destructive backspace does not drag characters back, it simply leaves spaces. Non-Destructive mode should be used with VT102 & VT52.

## 7.5 Wrap Mode

Sometimes it is useful to have any characters that do not fit on a line NOT to overflow to the next line. Wrap Mode turns on and off the autowrapping of characters that do not fit on a line. If wrap mode is off, the characters simply start overwriting each other in the last column, otherwise they wrap as you would expect.

NOTE: VT102 has a special command to control autowrap. For this reason, there is a special WRAP flag on the status line. See the EXPLORING TERMINAL MODE section for details.

## 7.6 VT-102 DECID

Over the years, there have been slight improvements on the basic VT100 standard. DesTerm supports VT102 codes, and as such is also compatible with VT101 and VT100. In some applications, the host machine can enquire which particular terminal type is being used. Early programs may not understand the codes for VT102, so you may instruct DesTerm to report that it is a VT100, VT101 or VT102.

## 7.7 Answerback

The VT102 standard includes an enquire code. When received, this code prompts the terminal to send a user-defined string. This is known as the answerback string. You may set this to whatever you like, depending on what your particular need is. To have DesTerm not respond to the Enquire, simply leave the answerback blank.

## 7.8 Setting the tabs

Many programs depend on the terminal's ability to display tabs correctly. DesTerm allows the user to select exactly where the tab stops are to be positioned. To set the tabs, simply select the Set Tabs option in the Emulation Mode menu. Once in the Set Tabs menu, you have several choices. The Reset Tabs option will set the tab stops to be evenly spaced every eight characters. The Clear Tabs option will delete all tab stops. The Edit Tabs option allows you to pick and choose exactly where you want the tabs to be. When you select this option, a cursor will appear on the tab ruler, which you may move left or right with the cursor keys or mouse etc. To place a tab at the current position, press return (or the left/fire button). To clear a tab

at the current position, press space (or the right mouse button). To finish editing the tabs, press ESC. The Default option will restore a set of tabs that have previously been saved with the Store option. The stored tabs are saved to disk with other setup parameters.
NOTE: When you are using VT102 emulation, be aware that some remote systems will reset the tabs as part of the logon sequence.

### 7.9 Transmit EOL

Another big problem area in communications is the lack of any clear standard when it comes to end-of-line characters. To help overcome this trouble, DesTerm allows you to select what exactly is sent when you press Return or Enter. If you wish Return to send only CHR$(13), select Tx EOL = CR, or if you wish to send a carriage return & linefeed pair, select TX EOL = CR/LF.

### 7.10 Receive EOL

In the same manner as Transmit EOL, Receive EOL allows you to decide how DesTerm will interpret a received carriage return. If you wish DesTerm to simply move to the start of the current line when it receives a carriage return, select Rx EOL = CR. Or if you would like DesTerm to move to the start of the next line, select Rx EOL = CR/LF.

NOTE: Setting both Rx and Tx to include linefeeds is the equivalent to setting VT102 NEWLINE mode ON. VT102 commands exist to set this mode from remote; be aware that this can happen.
Commodore Graphics mode requires that Receive EOL be set to the 'Rx EOL = CR/LF' option (which is automatically done when you select Commodore mode).

### 7.11 Colour Mode

Some applications require much scrolling of the screen. Even though DesTerm uses its own custom screen handling routines, it sometimes lags behind at higher speeds. It is possible to double the speed of everything displayed by telling DesTerm not to bother with keeping track of the colours of the characters on-screen. For most VT102 applications, this will not be a problem since colour is not used anyway. The problem is that the VT102 attributes (flash, underline, reverse video and bright) are considered to be colour and therefore also not updated. If you require both colour and high speed transmissions, be sure to tell DesTerm to use Xon/Xoff handshaking.

## 7.12 Screen Length

To be compatible with a number of different systems, DesTerm allows you to select how many screen lines you wish to use. The 23, 24 and 25 line options are available in normal mode, but to display 50, 51 and 52 lines, interlace mode is used. Interlace mode means that the characters will be half the height of what they normally are, but they should be readable on most monitors. The screen will also appear to flicker, which may be lessened to some extent by adjusting the contrast and brightness controls. You may use the 'Adjust VDC Mode' option in the Environment Menu to fine tune the interlace settings to your system.

NOTE: It is not possible to use interlace mode and Thick Pixel mode together (the option that is selected last takes precedence!).

## 7.13 Screen Width

The screen width may be set to either 40 or 80 columns. Most applications will require a full 80 columns, but some applications will work best in 40-column mode (such as when you are using Commodore 64 bulletin boards).

NOTE: This mode simply tells DesTerm how many LOGICAL columns there are per line (ie. when to start using the next line). To select the PHYSICAL number of columns, use the Pixel Mode setting.

## 7.14 Pixel Mode

The 80-column video chip in the Commodore 128 has a special mode that allows it to display just 40 columns (at double the width, to take up the whole screen). If you are using a screen width of 40 columns, you may wish to also select Thick Pixel mode, so that the 40 columns fill the entire screen. If you want to use Thick Pixel and 80 column mode together (good for the vision impaired), you may only see half the screen at a time. To display the left side of the screen, press ALT with the left cursor key. To display the right side of the screen, press ALT with the right cursor key. As mentioned earlier, you may not use Thick Pixel mode with 50, 51 or 52 line mode.
NOTE: When you enter the main menu or use some hotkeys, the screen will temporarily revert to a full 80 columns.

### 7.15 Cursor Mode

DesTerm is able to display the cursor in a number of different modes: Non-Blink, Not Displayed, Fast-Blink and Slow-Blink. Use this parameter to select the mode of the cursor. The default is Slow-Blink.

### 7.16 Cursor Style

The cursor may be displayed as either a solid block or as a line. Use this parameter to select which style of cursor to use. The default is a block cursor.

### 7.17 Screen Mode

The Commodore 128 Video chip is able to invert the complete display. You may select this Reverse screen mode for regular terminal operations if you wish.

NOTE: VT102 has a command that can automatically set or reset this mode.

### 7.18 Hex Display

The Hex Display mode is one of the most unique and powerful features of DesTerm. It allows you to view the incoming data both as HEX bytes and ASCII characters. It is possible with this mode to view incoming ANSI and VT102 sequences, and to do some simple protocol analysis.

### 7.19 Chat Mode

This option will cause the screen to split into an upper and lower portion, and the terminal to enter echo mode. Anything you type will be displayed in the bottom window, and anything being sent back will appear in the top one. This is useful for terminal to terminal chat sessions, but not for BBS chat mode, as they normally echo text for you anyway…

## 7.20 Reset Modes

The Reset Modes option will fully reset the terminal, and may be called from the terminal with ALT J. Reset will clear the screen, reset the colour, VT102 windows, and various terminal flags.

NOTE: This should not be confused with the ALT Z hotkey which simply clears the screen (but it will normally seem to have the same effect).

# 8 Buffer Operations

The Buffer Operations menu is the third option in the main menu. The Capture/Send Buffer is a very useful feature of DesTerm as it allows you to save incoming data in memory for instant review, editing, printing or storage to disk. The Buffer is easy to use and has a massive 60K storage space! To start the buffer either capturing or transmitting, press ALT +, to stop it, simply use ALT -.

## 8.1 Buffer Mode

The DesTerm buffer can be used in either of two modes: Capture (Buffer) and Transmit (Send). When in capture mode, DesTerm is prepared to store text into the buffer, and when in transmit mode, DesTerm is prepared to send text from the buffer. An indication of the mode appears on the status line: At the 49th column there will either be a B (Buffer) or an S (Send). NOTE: The hotkey equivalent of this menu is ALT C. When sending text, the transmission will start at the last place that was either viewed or sent. To reset this position, simply toggle the mode to capture and then back to transmit.

## 8.2 Save Buffer

You may often want to save the capture buffer to disk. The file will be sent to the User Files Device (Section [[]]). You will be prompted for a filename and a filetype. DesTerm will then check to see if the file already exists. If the file does exist, you may replace the file or quit the save. If the file is still to be saved, DesTerm will ask you which format to use, either CBMASCII or normal ASCII.

NOTE: From terminal mode, you may simply press ALT K.

## 8.3 Load Buffer

Another useful option is to load text into the buffer directly from the disk. When you select this item, you will be prompted for the filename. File types of PRG, SEQ and USR are only considered as legal! If the file is not found, the load is aborted. If the file is found, you will be asked if you wish to append to the current buffer contents, or simply overwrite them. You may load text as CBMASCII or normal ASCII. The filename you type may include the ? and * wildcards, but only the first file that matches will be loaded.

NOTE: From terminal mode you may press ALT L, instead of using the menus.

## 8.4 Edit Buffer

The DesTerm editor is entered by typing ALT V at the main terminal screen, or selecting Edit in the Buffer Menu. The DesTerm editor should suffice for your small text editing needs -- it is not a word processor! People familiar with Wordstar (TM) commands should feel right at home, as DesTerm uses the same keys for the functions it supports. For people who are used to using IBM compatible machines, the numeric keypad acts in a similar way.

NOTE: A numeric keypad key is denoted with an 'n' in front. Ie numeric 0 key is n0.

Basic Movement Commands:

| | |
|---|---|
| Character Left | Ctrl-S, Left Arrow or n4 |
| Character Right | Ctrl-D, Right Arrow or n6 |
| Line Up | Ctrl-E, Up Arrow or n8 |
| Line Down | Ctrl-X, Down Arrow or n2 |
| Page Up | Ctrl-R or n9 |
| Page Down | Ctrl-C or n3 |

Extended Movement Commands:

| | |
|---|---|
| Beginning of line | Ctrl-Q S or n7 |
| End of line | Ctrl-Q D or n1 |
| Top of screen | Ctrl-Q E or Ctrl-n7 |
| End of screen | Ctrl-Q X or Ctrl-n1 |
| Beginning of buffer | Ctrl-Q R or Ctrl-n9 |
| End of buffer | Ctrl-Q C or Ctrl-n3 |

Insert and Delete Commands:

| | |
|---|---|
| Insert Line | Ctrl-N |
| Insert mode on/off | Ctrl-V or n0 |
| Delete Line | Ctrl-Y |
| Delete to end of line | Ctrl-Q Y |
| Delete character left of cursor | Ctrl-H,INST/DEL or n. |
| Delete character under cursor | Ctrl-G or CLR/HOME |

Miscellaneous Commands:

| | |
|---|---|
| Control character prefix | Ctrl-P |
| Tab | Ctrl-I or TAB |
| Join Line | Ctrl-J |
| Exit editor | Ctrl-[ or ESC. |

Notes:

Tabs are automatically expanded to up to 8 spaces.
To enter a control code (such as CTRL-G, BELL) press Ctrl-P, then the control code (ie Ctrl-P Ctrl-G).
When using the two-part commands (preceded with Ctrl-Q), a capital Q will appear at the top right of the screen to remind you that you need to press another key.
To load and save, simply use the ALT L and ALT K commands from the main terminal screen or the load and save options in the buffer menu.

## 8.5 Auto

This option will allow you to enter the Autosave buffer menu:

### 8.5.1 AutoSave

This selection allows you to choose if the autosave feature is enabled or disabled. Autosave is the ability to have DesTerm automatically dump the buffer to disk when it fills up, then clear the buffer and receive more data.

### 8.5.2 FileName/FileMode

These two options allow you to select the filename base and text mode for the buffer saves. The filename can be up to 16 characters long, but only up to the first 14 will be used, as the buffers will be saved with sequential numbering, ie:

buffer00
buffer01
buffer02

The filemode specifies ascii or cbmascii format for the text. The filetype is chosen by the default filetype option in the transfer options section.

### 8.5.3 Purge

Using AutoSave the buffer is only saved when it is full -- so to make things easy, you can select purge to save what is in the buffer so far. You will normally use this option when you are finished buffering and wish to save a buffer that is only partially full.

## 8.6 Strip Controls

The primary use of the capture buffer is to save messages so they may be printed out and kept. If you are using an ANSI or VT102 system, the control codes will tend to get in the way (they often cause printers to print garbage). To combat this problem, you should set the Strip Ctrls option to yes. Now, any incoming control codes will not be saved in the buffer, so that only the text that you are interested in is saved.

NOTE: This mode is NOT retroactive; that is, text already in the buffer is NOT affected by this mode. Also, if the Video mode is off, the control codes aren't stripped.

## 8.7 Print Buffer

The Print Buffer option (ALT P) will simply send the contents of the buffer to the printer. You may press ESC to abort the printing at any time. If the printer is not present, you are given an opportunity to turn it on and try again.

NOTE: You must set up the printer parameters in the User Environment menu (ALT U) to make sure the printer will perform correctly.

## 8.8 Clear Buffer

The Clear buffer command (also ALT Q) will reset the buffer pointers to indicate that the buffer is empty. Use this command with care: the contents cannot be restored!

# 9 Disk Operations

DesTerm has a number of built-in utilities so that you may perform simple disk operations without leaving the terminal. To select the Disk Operations mode, choose the second option in the main menu, or press ALT O. DesTerm has added several useful additions to normal Commodore DOS which make using disk drives much easier.

## 9.1 Pattern Matching

Like normal dos, DesTerm supports the ? and * operators, but it handles the * operator slightly differently. The commodore * means 'match anything for the rest of the filename'. DesTerm's * means match 0 or more characters. ie:

*.* means anything with a '.' in it.
*des means anything that ends in des.

You may mix the * and ? operators:

???.* means anything with a . in the forth position.

## 9.2 Drive Representation and Assignments

The Commodore system of accessing disk drives is based on giving each device a unique number (normally in the range 8 to 15). This approach is all very well for BASIC, but is unwieldy for application programs. DesTerm uses the drive letter approach to drive access. In this system, each physical disk device is assigned a letter in the range A to G. In order to specify any given drive, simply use the letter that it is associated with. Thus, if drive device 9 is assigned the letter B, and you wish to load a file from it, the filename would be B:file.
DesTerm supports 7 user definable-drive letters (A: through G:), and M: which is the ramdisk. Whenever you have to type a filename, you may specify a drive letter in front of it and that drive will be used. If you do not specify a drive, the default drive will be used. Depending on the situation, there are two default drives: User Device and DesTerm Device. The user device is used for uploads, downloads. loads and saves. The DesTerm device is used for loading character sets, function keys, scripts and overlays. These devices are fully configurable, and add tremendously to the ease of use.

## 9.3 Ramdisk Operation

DesTerm comes complete with very fast ramdisk software that uses your 1700, 1750 or 1764 Ram as a large disk. You may use the ramdisk as if it was any other drive attached to your system. The drive letter for the ramdisk is M:. To access the ramdisk you must:
Select the 'Format Ramdisk' option to be 'Format as Ramdisk'. This tells DesTerm that the REU can be used for a ramdisk.
Select the 'M:' option in the 'Define Devs' option. This will actually format the ramdisk.
Select 'M:' as 'User Device'. This will now use the ramdisk for uploads, downloads, buffer loads and buffer saves. NOTE: The M: option does not show up if the ramdisk is not formatted.

NOTE: In all of the following disk related commands, the drive used will be the one specified by the User Device, unless overridden by a drive letter (A:, B: etc) or by the Pick Device option (Section 9.13).

## 9.4 Directory and Dir Pattern

You may get a directory of files on the current Disk using the Directory command. In some cases, you may wish to use pattern matching to display only a select number of the entries. To do this, you should enter the pattern matching string using the Dir Pattern option. To display all files, either enter an asterisk (*), or leave the entry blank (an asterisk will then be assumed). To select files that begin with an a, you would type a*.

NOTE: Unlike the usual disk directories, the DesTerm disk directory shows the number of free blocks beside the volume name. This is so that you do not need to see the whole directory just to see how much space is free!

## 9.5 Dir > Buffer

This command acts the same as the Directory command, except that the output is sent to the buffer instead of the screen. This is used for the special DesTerm multi-file operation mode. (Section 9.17)

## 9.6 Initialize

This command simply logs in a new disk and should be performed every time you insert a new disk.

## 9.7 Validate

This command will perform the equivalent of the COLLECT or V0 commands. NOTE: This command can take several minutes to finish -- DesTerm will exit the disk menu so that you can continue working. If you re-enter the disk menu, you will be forced to wait until the command is done.

## 9.8 Reset

This command will reset the current drive. There is a pause of 2 seconds when you use this command.

## 9.9 Send Command

This command will prompt you for a string, and DesTerm will send that string straight to the drive. You may use this command to make use of DOS commands that DesTerm does not support, such as RENAME and COPY.

## 9.10 Scratch File

To scratch a file or files, select this option, and enter the filename when prompted. DesTerm pattern matching is fully supported.

## 9.11 Format Disk

This command will format the disk currently in the user files device. Be careful when you use this! To do a complete format, include the disk ID after the name with a comma. Do abort this feature, do not enter a name or id.

## 9.12 Copy Files.

This option allows you to copy multiple files from one device to another, including the ramdisk. If you do not specify the drive letter for the source filename, the DesTerm files device is used. Once you have given the source filename (and drive), you will be prompted for the destination drive. NOTE: Filenames stay the same for the copy. This means you cannot copy to the same device and you cannot rename as you copy.

## 9.13 Pick Device

All disk operations will act on the user device unless you choose another device with this menu. You may pick the User device, DesTerm device or name a device by its letter.

## 9.14 User Device/DesTerm Device

This command allows you to choose both the user and desterm devices to be used with these menus. The user device is used for uploads, downloads. loads and saves. The DesTerm device is used for loading character sets, function keys, scripts and overlays.

NOTE: M: is only a choice if you have the ramdisk activated.

## 9.15 Define Devs

This option allows you to select which physical devices should be associated with the various drive letters. You may choose any device numbers from 8 to 15, and either drive number (0 or 1).

You will see an option for M:. This option will not appear to do anything -- it does, however! To protect data that is already in the REU, DesTerm will not always automatically format it as a ramdisk just because the REU is present. You may choose if DesTerm is to be careful about preserving the data in the REU with the Ram Format option.

If DesTerm didn't format the REU because it was being careful, selecting M: here will format the ramdisk IF the Ram Format has been set specifically to Format as Ramdisk (since boot). You can easily tell if the ramdisk is present: if the M: option appears in the DesTerm or User device menu, it is formatted. Note, in this sense, the REU is only formatted once. The normal DOS format command may be used to mass delete old data as normal.

## 9.16 Ram Format

This option defines whether or not it is safe for DesTerm to format the REU as a ramdisk. If this option is set to 'Leave REU Alone', DesTerm will NEVER touch any data in the unit. If you select 'Format As Ramdisk', you are telling DesTerm that it is ok to overwrite any existing data in the REU. The REU will not actually be formatted until you select M: from the Define Devices menu, however. If the option is set to 'Format As Ramdisk' then the Ramdisk will always be formatted upon boot. If you change this to 'Format As Ramdisk', selecting 'M:' in the Define Devs menu will format the disk.

NOTE: DesTerm looks at the REU during the boot proces to see if there is old DesTerm ramdisk data there.If DesTerm finds valid data in the REU, it will preserve it regardless of the 'Ram Format' setting. Thus, as long as you do not turn off the machine, your DesTerm ramdisk will be left intact between sessions.

## 9.17 File Match

This is a very exciting and powerful feature offered by DesTerm. Pattern matching is a good way to select multiple files for deletion, copying or uploading, but sometimes there are no similarities between the filenames you wish to manipulate. In

combination with the send directory to buffer feature, DesTerm can be told to use the buffer as a source of filenames. You can then scratch, copy or upload (using Ymodem or one of the multiple Punter protocols) multiple files easily. You use this option (and the similar one in the Transfer Options menu) to decide whether filenames come from the buffer (list) or from normal file patterns (pattern). You use the normal scratch, copy and upload options, and let DesTerm sort out the appropriate names.

In order to prepare the filenames to send, select 'Dir > Buffer', which will put a copy of the directory in the buffer. You may then edit the buffer to remove the names of any files you don't wish to copy/scratch/upload. Only lines that begin with a letter (A - G or M) and have a ':' in the second character are treated as filenames (and then only if the file exists!), so there is no need to delete old text, or to get rid of the header line. NOTE: If you wish to add your own names, this will work, but be sure to enter it in the same format as the others (drive, colon, name, spaces and filetype). It is most important to add enough spaces to make the filetype line up.

Now that you have a list of names, you can select 'List' in the File Match menu, and scratch, copy or upload files in the list.

## 10 Dialing Numbers

DesTerm offers four ways to dial numbers. You may choose one number to dial from the directory, input a number directly, redial the last number or choose a selection of numbers to try.

### 10.1 The Dial Environment

Once you have chosen the number (or numbers) to dial, DesTerm will attempt to dial them. You will see a window on the screen that will report the progress of each dial as it happens. In the window, you will see instructions in how to abort the dial, the current number being dialed, the time remaining for the dial and the last report the modem sent. During the dial, pressing ESC will abort the whole dial -- multiple dials will cease completely. Pressing space will abort the current dial and proceed with the next (if there is one). The time will count down, and the current dial will be aborted if it reaches 0 (This time is the Dial Wait, which is set in the Modem Setup menu).

The Status line is useful for certain modems. Some modems will report RINGING when the phone at the other end starts to ring -- in this case, you will see RINGING as the status. Most modems, however do not have this feature. All of the other

reports possible (CONNECT, BUSY, VOICE, NO ANSWER) mean that the dial has either succeeded or failed, in which case the window will be deleted, if you configured DesTerm's Hayes Setup menu properly (section 2.2). If the dial was successful, the emulation protocols will be set, the character set and function keys loaded and a tune will be played. You may abort the tune by pressing any key. If the dial did not work, the dial will either stop (if there was only one number) or will pause (depending on Dial Pause) then dial the next number (for multiple dial).

### 10.2 Dial Number

For this option, you will be given a list of the current numbers, from which you will choose a number to be dialed once. There is only one attempt! You may also use ALT N.

### 10.3 Input Number

When you choose this item (also ALT I), you will be prompted for a number to be dialed -- it will only be attempted once!
NOTE: In this mode, there is no loading of character sets or function keys! This option is useful if you wish to try a new BBS without spending the time to do a complete setup for it.

### 10.4 Redial Last

This option (ALT A, from terminal mode) simply redials the last number attempted.

### 10.5 Multiple Dial

The multiple dial option requires that you select the number(s) to be dialed before the dialing process starts. You are given a menu complete with the available numbers, together with some handy multiple number selectors. By the right side of the numbers is an additional window. This window tells you which numbers have been selected for dialing. If a number is selected, it will have a "<" next to it. To select a number, simply move the inverted bar over it (in the normal manner) and press return. This function acts like a toggle; that is, a selected number when re-selected will become de-selected (and vice versa). At the bottom of the list are three extra options -- Select All Numbers, Deselect All Numbers and Toggle All Numbers, each of which is self-explanatory.
When you have marked the numbers you wish to dial, choose

the Dial Selected Numbers option. The numbers will continually be dialed until there is a success. The number that was successful will be deselected automatically, so that the next multiple dial will not include that number. This selection may also be chosen using ALT M.

## 11 Transfer Options

The transfer options menu allows you to select certain parameters that pertain to the transfer of text and binary files to other computers. This menu may be invoked by the ALT X hotkey.

### 11.1 Character Pause

The character pause is the amount of time that DesTerm will leave between each character during buffer sends and function key operations. This feature is necessary, since certain computer systems (and modems!) are unable to keep up with a constant stream of characters being sent to them. If you find that when you use function keys, the results seem garbled, try increasing the character pause.

NOTE: This is particularly true of Commodore 64 and 128 BBS systems.

### 11.2 Line Pause

This delay is essentially the same as the character pause, except that it is only used after a carriage return is sent, and the delays are 10 times longer.

NOTE: 60 jiffies = 1 second.

### 11.3 Punter Block

The Punter protocol for file transfers allows the sender (uploader) of the files to dictate how big the packets of data will be. In cases of bad line noise, you may wish to decrease the size of the packets.

NOTE: decreasing the size of the blocks will decrease the efficiency of the protocol on clean lines. Thus, you should keep the packet length high whenever possible.

### 11.4 Default File

The Commodore disk operating system dictates that files must be classed into program (PRG), sequential (SEQ), user (USR) and relative (REL) file types. When writing a file, one must select which of these types will be used (DesTerm only allows writing of the first two, however). During a Ymodem download and automatic buffer saves, DesTerm needs to decide which of these two types the file will be (since it would be silly to halt the transfer to just ask you). The type of file that DesTerm will write is selected here, and is also used as the default type when asking you. For Information on Ymodem, see section 12.3.

### 11.5 Ascii Send LF

This option dictates whether a linefeed should be appended to carriage returns when performing ASCII uploads and buffer sends. It works in a similar way to the Transmit EOL option in the Emulation menu, except that it doesn't effect lines you type while in terminal mode.

### 11.6 Incoming Xon/Xoff Timeout

Xon/Xoff is a character-based flow control protocol that is used by most computer systems. A computer will send an XOFF character to tell the other end to stop sending characters, and will send an XON to tell it to restart. DesTerm will adhere to incoming Xoffs and Xon if you select Honour, and will ignore them if you select Ignore. Sometimes, a computer will send an Xoff but no Xon (or line noise generates a fake Xoff) -- in which case DesTerm will be stuck (waiting for the Xon). After a set period of waiting, DesTerm will timeout (quit waiting), and resume sending anyway. You may set the time period (seconds) with the Xoff Timeout option. NOTE: An X will appear before the baud rate in the status bar when an Xoff is in effect. You may escape an Xoff wait loop by pressing CTRL-RUNSTOP.

### 11.7 File Match

This is identical to the File Match option in the Disk Operations menu. It is duplicated for convenience.

## 12 Upload File(s)

Uploading of files is the task of sending a file from the local computer to the remote computer. There are many protocols (methods) used to achieve this. DesTerm includes seven of the most widely used protocols to ensure that you are able to successfully transfer a file. During all of the upload and download techniques, pressing ESC (perhaps more than once) will eventually abort the transfer. During the transfers, a window is displayed that will keep you informed of the status of the transfer. You will be able to see the block number that is being received, the number of bytes that have been received, the number of consecutive errors, the block at which the errors occurred and the filename. For batch uploads, you will be informed of the approximate length (the approximate length could be up to 253 bytes too big!) of the file. For Ymodem downloads, you will be informed of the expected length of the incoming file. During the transfer of the actual data, a timer is shown in the top right hand of the corner. It shows hours, minutes and seconds -- and is only updated once per block!

### 12.1 Xmodem

Xmodem was designed in 1977, by Ward Christensen, and quickly became the standard for computer to computer file transfers. There are two strains of basic Xmodem, the checksum method and the CRC method. Fortunately, the way that the latter protocol was implemented makes it possible for the sending and receiving computers to negotiate the mode by themselves. For this reason, there is only one basic Xmodem upload (and download) option. You may use this selection if the receiver accepts either Xmodem/checksum or Xmodem/CRC. When you choose this option, you will be prompted for the name of the file you wish to send. If the file exists, the Checksum/CRC negotiations will start to take place, and the transfer will proceed.

### 12.2 Xmodem-1K

Xmodem-1K is a simple extension to the Xmodem standard. Unfortunately, many people have not followed the official documentation of the protocol, and some Xmodem-1K implementations are incompatible. Xmodem-1K DOES still include the CRC/Checksum exchanges, and Checksum Xmodem-1K is possible but not recommended. You should use Xmodem-1K whenever the remote computer also is capable of using the same standard. Xmodem-1K uses packets that are eight times larger than normal Xmodem, and as such, the efficiency is much better. Files are selected in

the same way as for Xmodem.
NOTE: Some systems mistakenly call the Xmodem-1K protocol Ymodem. Many systems clarify matters by calling true Ymodem, Ymodem BATCH. Be sure that you have the correct option.

### 12.3 Ymodem (Batch)

This is the REAL Ymodem BATCH protocol. This is another simple extension of the Xmodem 1K protocol, and again, the CRC/Checksum negotiation is still valid. Like Xmodem and Xmodem-1K, you will be prompted for a filename. You may, if you wish, use wildcards to select more than one name, so that more than one file is sent. The wildcards used in both Ymodem and Multi Punter are an extension of the normal Commodore wildcard system. Like Commodore, ? still means match with any character. Unlike Commodore, the * means, match with any number (possibly zero) of characters. Thus, it is possible to have wildcards such as "a*b", that will match anything that starts with "a" and ends with "b". As you can imagine, this is a much more powerful system than the original.

NOTE: Only two "*"s may be used in each pattern, but as many "?"s may be used as necessary.

### 12.4 Punter (C1)

Steve Punter's C1 protocol is primarily used in the Commodore community, and is hardly ever seen outside Commodore environments. The selection of a filename is identical to that of Xmodem.

### 12.5 Multi Punter #1/Multi Punter #2

"Multi Punter" protocol is an attempt to add batch transfers (like Ymodem) to the C1 protocol. The major problem with Multi Punter protocol is that its designer, Alan Peters, has at least three different (and incompatible) versions of it floating around. DesTerm uses the latest version of it, and is compatible with DarkTerm V4.0 and the DarkStar BBS V3.0, both of which came out in 1987. File selection is identical to Ymodem.

Multi Punter #1 is compatible with Darkstar BBS V3.0
Multi Punter #2 is compatible with most other BBSes that have multi Punter.

### 12.6 Ascii/Cbmscii

This option isn't really a protocol. It simply opens the specified text file and sends it to the remote computer. This is known as a 'raw transfer'. It obeys Xoff/Xon commands, paces the characters and adds linefeeds as necessary, as per the Transfer Options menu. You may select whether the file you are sending is Ascii or Cbmascii.

### 12.7 Vacant

This version of DesTerm supports overlays. This menu item will change to the name of any added protocols if the protocol overlay is in memory.

### 12.8 Advice On Multiple Uploads

Multiple file transfers are an extremely handy method of sending many files between computers. The extended pattern searches that DesTerm employs make the selection of files much easier than with the old Commodore routines, but they are not perfect. If names of all the files you wish to upload do not have a common pattern, use the new 'filename from list' feature explained in Disk Operations, especially section 9.17.

## 13 Download File(s)

Downloading is the opposite of uploading -- files from the remote computer are sent to the local one!

### 13.1 Xmodem (CRC/1K)

DesTerm is smart enough to figure out which of Xmodem, Xmodem CRC or Xmodem-1K is being used. For this reason, there is only one selection for all three protocols. You will be asked for the filename and filetype before the transfer begins.

## 13.2 Ymodem (Batch)

From the receiver's point of view, a Ymodem transfer is totally automatic. As such, the negotiation will start as soon as Ymodem is chosen.

NOTE: The filetype of incoming files is chosen with the Default File parameter. If a file ends up having the wrong type, it may be changed with the FILETYPE CHANGER program supplied with DesTerm. It is possible that a duplicate file name will be received during a Ymodem transfer. In this case, the file will be renamed on the fly. The first character will become a 0 (or 1 or 2...) until an unused file name is composed.

## 13.3 Punter (C1)

Punter downloads require that only the name be specified, since the filetype is automatically sent with the file.

## 13.4 Multi Punter #1/Multi Punter #2

Multi Punter batch downloads are also automatic (like Ymodem), and duplicate files are handled in the same way. Like C1, the file type is automatically transmitted.

## 13.5 Padding

All of the Xmodem-derived protocols suffer from a major problem resulting from the fixed block size they use. It is easy to see that, for most files, the last transmitted block will not be totally filled up with legitimate data. The most popular scheme is to pad the last block with a certain padding character. Xmodem places no restrictions on what each block may contain, so we are unable to simply designate a special byte as the padding character so we use one of two. If the last character in the block is not $1F (CTRL Z), we will use $1F. If the last byte is a $1F, we will use 0 to make sure that the last byte of the file cannot be confused with the padding. To unpad the file, we simply look at the last byte, and count backwards until the byte is not the same as the last -- we then know that is the last legitimate byte in the block.

But what do we do if the file does fit exactly? Well, Ward's official Xmodem document suggests that we send a block FULL of padding in this case. Now, by this standard, there can be no file that is 'immune' to Xmodem padding. Of course, some implementations of Xmodem either do not pad at all, pad with the

wrong byte, or do not send the extra padding block when necessary. DesTerm aims to combat these problems: If the last byte in the last block is neither a 0 nor $1F, no action is taken to remove padding. The Xmodem-1K standard clearly states that any mixture of 128 and 1024 byte blocks may be sent. The intended result of this statement is that, at the end of the file, up to seven 128 byte blocks would be sent, instead of a 1024 byte block. That way, padding will never be greater than 128 extra bytes. At this time, I know of only one terminal that handles this correctly (yes, DesTerm!).

To clarify this: if a file is 1026 bytes long, a proper Xmodem-1K would send a 1024 byte block and a 128 byte block, where 126 padding characters are used. Many terminals will waste time and send two 1024 byte blocks. DesTerm will look as far as the entire 1024 bytes for the padding characters, so these other programs' mistakes will be forgiven (although, if every terminal out there dropped to 128 byte blocks where appropriate, we'd only have to search back 128 bytes...).

NOTE: Beware! Many programs will not bother to remove padding, so files may grow by up to 1024 bytes per transfer... if a file has been up- and downloaded many times, the copy you get may be much longer than the original!

## 14 Answer Phone

The answer phone option will simply wait for the phone to ring. When the phone rings, DesTerm will instruct the modem to answer it (ATA). DesTerm then waits for one of the CONNECT responses, and will set the baud rate accordingly.
NOTE: If a CONNECT is received before a ring, DesTerm will not send "ATA", but will still set the baud rate correctly.
NOTE: This function only works for Hayes compatible modems. 1650 and 1660 modem users will have to rely on themselves.

## 15 Edit Defaults

The Edit Defaults menu is the place that all of the defaults may be modified and saved from.

## 15.1 Load Char/Setup/Function/Phone/Keyboard Files

These options allow you to change many of the parameters of DesTerm by simply loading in new parameter files. The default filename used for each of these files may be changed using this option. You will be prompted for the name of a file to load. The name that is here will be saved in the names file, to be loaded as default. NOTE: Be sure to load files of the correct type, as an incorrect file may crash the program.

## 15.2 Load Overlay

An overlay is a piece of code that can be added to DesTerm to add features or enhance operation. To load an overlay, simply use this option and type the correct filename. The DesTerm script compiler comes as an overlay, and must be loaded in this way. The script compiler is explained in the separate 'The D Script Language' Documentation.
NOTE: In order for an overlay to be placed in memory, you must have the space reserved (cut from the buffer). This is done by selecting 'Overlays & Buffer' from the 'Overlays/Buffer' option in the user environment menu.

## 15.3 Load Script

Use this option to load a script into memory. Use ALT X to start it executing. A script is small programming language used to make certain aspects of DesTerm easier (such as logging on). See the 'The D Script Language' documentation.

## 15.4 Save Setup File

The Setup File contains all of the configurable options in DesTerm. This includes colours, speeds, emulations and transfer options. You may keep a number of different setups on disk by simply giving each one a different filename. This option does not include function keys or telephone numbers. Once you have DesTerm the way you want it, this option will save the parameters to disk so that the next time you use DesTerm everything is set the way you like it.

### 15.5 Save Names File

The names file tells DesTerm which support files to load when it is run. When you save the names file, the filenames that were used most recently for each file will be saved. Using this file, you may make DesTerm load with specific files for character, setup, functions, telephone, overlay and script files.

### 16 Hangup Phone

This option (also, ALT H) will attempt to abort the current connection by hanging up the phone. The first thing that DesTerm does is to drop DTR. If your modem and interface settings are correct, this should hang up the phone instantly. If DesTerm does not detect a transition on the carrier detect line after one second, it will send the Hangup String as defined in Hayes Setup.

### 17 Overlay Start

This option will execute a resident overlay, assuming that there is one in memory.

### 18 About Desterm

This option simply opens a window and gives some useful information, such as where to send your $25 registration fee!

### 19 Exit DesTerm

To stop execution of the DesTerm terminal program, select this option. You will be asked to confirm, so that you will exit by accident. If you have any unsaved text in the buffer, you will be given the option to save it.

# APPENDICES

## Appendix A. DesTerm character sets

At some stage, you may wish to create your own character sets for DesTerm. DesTerm uses normal 8x8 character grids for its characters, and requires only 256 to be defined. Each character set uses 2048 bytes, or 9 Commodore disk blocks. The order that DesTerm stores its characters is the NORMAL ASCII order, not the regular screen code order that Commodore uses. Since most character set editors assume the screen code order, you will probably not be able to read much while editing the characters. To help you with your designs, I suggest that you load one of the supplied sets and modify them. The character sets are:

| | |
|---|---|
| DES.IBMSET | Regular set containing DesTerm graphics. |
| DES.IBMFULLSET | Contains IBM characters instead of DesTerm graphics. |
| DES.VT102SET | VT102 set including VT102 special graphics. |
| DES.VT52SET | VT52 set including VT52 special graphics. |
| DES.CBMSET | Copy of Commodore 128 ROM, in true ASCII order. |
| DES.CBMCGSET | This is for Commodore Colour Graphics. |
| DES.AMIGASET | The Amiga Topaz set including special Amiga graphics |

## Appendix B. Comparison of ASCII vs. CBMSCII

The following table lists the 128 characters that make up the standard computer character set and what each one means in ASCII and CBMSCII.

| HEX | ASC | CBM | HEX | ASC | CBM | HEX | ASC | CBM | HEX | ASC | CBM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | NUL | - | 20 | SP | SP | 40 | @ | @ | 60 | ` | - |
| 1 | SOH | - | 21 | ! | ! | 41 | A | a | 61 | a | A |
| 2 | STX | - | 22 | " | " | 42 | B | b | 62 | b | B |
| 3 | ETX | - | 23 | # | # | 43 | C | c | 63 | c | C |
| 4 | EOT | - | 24 | $ | $ | 44 | D | d | 64 | d | D |
| 5 | ENQ | WHT | 25 | % | % | 45 | E | e | 65 | e | E |
| 6 | ACU | - | 26 | & | & | 46 | F | f | 66 | f | F |
| 7 | BEL | - | 27 | ' | ' | 47 | G | g | 67 | g | G |
| 8 | ES | EALT | 28 | ( | ( | 48 | H | h | 68 | h | H |
| 9 | HT | DALT | 29 | ) | ) | 49 | I | i | 69 | i | I |
| A | LF | - | 2A | * | * | 4A | J | j | 6A | j | J |
| B | VT | - | 2B | + | + | 4B | K | k | 6B | k | K |
| C | FF | - | 2C | , | , | 4C | L | l | 6C | l | L |
| D | CR | CR | 2D | - | - | 4D | M | m | 6D | m | M |
| E | SO | LOW | 2E | . | . | 4E | N | n | 6E | n | N |
| F | SI | - | 2F | / | / | 4F | O | o | 6F | o | O |
| 10 | DLE | - | 30 | 0 | 0 | 50 | P | p | 70 | p | P |
| 11 | DC1 | DWN | 31 | 1 | 1 | 51 | Q | q | 71 | q | Q |
| 12 | DC2 | ROF | 32 | 2 | 2 | 52 | R | r | 72 | r | R |
| 13 | DC3 | HME | 33 | 3 | 3 | 53 | S | s | 73 | s | S |
| 14 | DC4 | DEL | 34 | 4 | 4 | 54 | T | t | 74 | t | T |
| 15 | AAK | - | 35 | 5 | 5 | 55 | U | u | 75 | u | U |
| 16 | SYU | - | 36 | 6 | 6 | 56 | V | v | 76 | v | V |
| 17 | ETB | - | 37 | 7 | 7 | 57 | W | w | 77 | w | W |
| 18 | CAN | - | 38 | 8 | 8 | 58 | X | x | 78 | x | X |
| 19 | EM | - | 39 | 9 | 9 | 59 | Y | y | 79 | y | Y |
| 1A | SUB | - | 3A | : | : | 5A | Z | z | 7A | z | Z |
| 1B | ESC | - | 3B | ; | ; | 5B | [ | [ | 7B | { | - |
| 1C | FS | RED | 3C | < | < | 5C | \ | £ | 7C | \| | - |
| 1D | GS | --> | 3D | = | = | 5D | ] | ] | 7D | } | - |
| 1E | RS | GRN | 3E | > | > | 5E | ^ | ↑ | 7E | ~ | - |
| 1F | VS | BLU | 3F | ? | ? | 5F | _ | ← | 7F | DEL | - |

## Appendix C. ANSI and VT102 control sequences

The following is a list of ANSI and VT102 control sequences supported by DesTerm. Labels starting in DEC denote VT102 only. Pn, Ps, Pl, Pc Pt and Pb are all numeric parameters.

| Mnemonic | code | Meaning |
|---|---|---|
| ESC | $1B | Escape character |
| CSI | ESC [ or $9B | Control Sequence Introducer |
| SM | CSI Ps;...;Ps h | Set all present Ps modes to on. |
| RM | CSI Ps;...;Ps l | Set all present Ps modes to off. |
| DECSTBM | CSI Pt ; Pb r | Set top margin to Pt, bottom to Pb. |
| DECOM | CSI ? 6 h | Relative origin mode. |
| | CSI ? 6 l | Absolute origin mode. |
| CUU | CSI Pn A | Move cursor up Pn lines. Stop at top |
| CUD | CSI Pb B | Move cursor dn Pn lines. Stop at bot |
| CUF | CSI Pb C | Move cursor rt Pn cols. Stop at edge |
| CUB | CSI Pb D | Move cursor lf Pn cols. Stop at edge |
| CUP | CSI Pl ; Pc H | Move cursor to Pl,Pc from origin. |
| HVP | CSI Pl ; Pc f | Move cursor to Pl,Pc from origin. |
| IND | ESC D or $84 | Move cursor down. Scroll up if necc |
| RI | ESC M or $8D | Move cursor up. Scroll down if necc |
| NEL | ESC E or $85 | Move start of next line. Can scroll |
| DECSC | ESC 7 | Save cursor position & graphic mode |
| DECRC | ESC 8 | Restore cursor pos or Home if none |
| DECAWM | CSI ? 7 h | Select Auto wrap. |
| | CSI ? 7 l | Turn off Auto wrap. |
| DECSCNM | CSI ? 5 h or l | Select light or dark screen. |
| LNM | CSI 20 h or l | Select linefeed/newline mode. |
| DECANM | CSI ? 2 l | Select VT52 compatibility. |
| SRM | CSI 12 h or l | Select local echo. |
| DECCKM | CSI ? 1 h or l | Select cursor key mode. |
| DECKPAM | ESC = | Application keypad mode. |
| DECKPNM | ESC > | Numeric Keypad mode. |
| SCS | ESC ( A,B,0,1 or 2 | Select character set as G0. |
| | ESC ) A,B,0,1 or 2 | Select character set as G1. |
| SGR | CSI Pn;...;Pn m | Set Graphics Rendition |
| HTS | ESC H or $88 | Set tab at cursor position. |
| TBC | CSI g or CSI 0 g | Clear tab at cursor position. |
| | CSI 3 g | Clear all tabs. |
| EL | CSI K or CSI 0 K | Clear cursor to end of line. |
| | CSI 1 K | Clear start of line to cursor. |
| | CSI 2 K | Clear entire line. Cursor stays put. |
| ED | CSI J or CSI 0 J | Clear cursor to end of screen. |
| | CSI 1 J | Clear start of screen to cursor. |
| | CSI 2 J | Clear whole display. Curs stays put. |
| DCH | CSI Pn P | Delete Pn characters. |
| ICH | CSI Pn @ | Insert Pn characters. |

| | | |
|---|---|---|
| IL | CSI Pn L | Insert Pn Lines. |
| DL | CSI Pn M | Delete Pn Lines. |
| IRM | CSI 4 h or l | Select auto insert mode. |
| DSR | CSI 5 n | Computer request: status report. |
| | CSI 0 n | Response : OK. |
| | CSI ? 15 n | Computer request: printer status. |
| | CSI ? 13 n | Response : NOT CONNECTED. |
| | CSI 6 n | Computer request: cursor position. |
| | CSI Pl ; Pc R | Response: Pl line, Pc column. |
| DA | CSI c or CSI 0 c | Computer request: device attributes |
| DECID | ESC Z | Computer request: device attributes |
| DA | CSI ? 6 c | Response: VT102 |
| | CSI ? 1 ; 0 c | Response: VT101 |
| | CSI ? 1 ; 2 c | Response: VT100 |
| RIS | ESC c | Reset |
| DECALN | ESC # 8 | Fill screen with capital E's |
| DECLL | CSI 0 q | Reset all LEDs |
| | CSI Pn;...;Pn q | Enable LEDs Pn;...;Pn (1,2,3 or 4) |

NOTES:
------

SGR CODES:
0 - Turn off all attributes.
1 - Select bold (bright).
4 - Select underline.
5 - select blink.
7 - select inverse video.
3x - select character colour x.
4x - select background colour x.

NOTE: for the 3x code, if x would make characters invisible, x+1 is chosen.

NOTE: VDC cannot show a separate background colour for each character. The background change will only take effect when the screen is cleared. Then, the whole screen will become this colour. When using menus, the user selected background colour is temporarily used.

x:
   0 black
   1 red
   2 green
   3 yellow
   4 blue
   5 magenta
   6 cyan
   7 grey

Cursor Key Modes:
-----------------

Mode change:  ESC [ ? 1 l  ESC [ ? 1 h

| Cursor Key | Cursor Mode | Application Cursor |
|---|---|---|
| UP | ESC [ A | ESC O A |
| DOWN | ESC [ B | ESC O B |
| LEFT | ESC [ C | ESC O C |
| RIGHT | ESC [ D | ESC O D |

Keypad Key Modes:
-----------------

Mode Change:  ESC >  ESC =

| | | VT102 | VT52 |
|---|---|---|---|
| Numeric Key | Keypad Mode | Application Mode | Application Mode |
| 0 | 0 | ESC O p | ESC ? p |
| 1 | 1 | ESC O q | ESC ? q |
| 2 | 2 | ESC O r | ESC ? r |
| 3 | 3 | ESC O s | ESC ? s |
| 4 | 4 | ESC O t | ESC ? t |
| 5 | 5 | ESC O u | ESC ? u |
| 6 | 6 | ESC O v | ESC ? v |
| 7 | 7 | ESC O w | ESC ? w |
| 8 | 8 | ESC O x | ESC ? x |
| 9 | 9 | ESC O y | ESC ? y |
| - (minus) | - (minus) | ESC O m | ESC ? m |
| + (plus) | + (plus) | ESC O l | ESC ? l |
| . (period) | . (period) | ESC O n | ESC ? n |
| ENTER | CR or CR/LF | ESC O M | ESC ? M |
| PF1 (F1) | ESC O P | ESC O P | ESC P (same in num.) |
| PF2 (F3) | ESC O Q | ESC O Q | ESC Q (same in num.) |
| PF3 (F5) | ESC O R | ESC O R | ESC R (same in num.) |
| PF4 (F7) | ESC O S | ESC O S | ESC S (same in num.) |

Linefeed/Newline mode:
----------------------

| Mode | Key Pressed | Code Sent | Code Rec'd | Action |
|---|---|---|---|---|
| Off | RETURN | CR | CR | Cursor to start of line |
| Off | LINEFEED | LF | LF/FF/VT | Cursor Down 1 line |
| On | RETURN | CR/LF | CR | Cursor to start of line |
| On | LINEFEED | LF | LF/FF/VT | Cursor new line |

IBM ANSI differences:

The ED command, ESC [ 2 J , will also home the cursor.

## Appendix D. VT52 Sequences

| | | |
|---|---|---|
| DECANM | ESC < | Select VT102/ANSI mode. |
| CUU | ESC A | Cursor up one line. Stop at top. |
| CUD | ESC B | Cursor down one line. Stop at bottom. |
| CUR | ESC C | Cursor right one line. Stop at marg. |
| CUL | ESC D | Cursor left one line. Stop at marg. |
| HOME | ESC H | Cursor home. |
| DCA | ESC Y Pl Pc | Cursor to (Pl-$30,Pc-$30) |
| RLF | ESC I | Reverse linefeed. Can scroll down. |
| DECKPAM | ESC = | Enter keypad application mode. |
| DECKPNM | ESC > | Enter keypad numeric mode. |
| EGM | ESC F | Enter graphics mode. |
| XGM | ESC G | Exit graphics mode. |
| EEL | ESC K | Erase to end of line. |
| EES | ESC J | Erase to end of screen. |
| ID | ESC Z | Request: Identify. |
| | ESC / Z | Response: VT52. |

## QUICK REFERENCE SECTION

Mouse: Left Button -- same as carriage return.
Right Button - opens/closes windows -- also acts as escape.

KeyStrokes:

| Chr: | Press: | Chr: | Press: | For HELP on the hotkeys, press HELP. |
|---|---|---|---|---|
| \ | £ | { | ALT : or SHIFT + | |
| ^ | ↑ | \| | ALT > or SHIFT £ | |
| _ | ← | } | ALT ; or SHIFT - | To open main menu press CTRL/RUNSTOP. |
| ` | ALT < | ~ | SHIFT = or SHIFT ↑ | |
| DEL | HOME or DEL | BREAK | ALT ESC | |

Start Buffer: ALT + Stop Buffer: ALT -

The C= key is equivalent to ALT except in the Commodore emulation mode.

Control Codes:

| ASCII# | PRESS | ASCII# | PRESS |
|---|---|---|---|
| NUL 0 | CTRL/@ | SOH 1 | CTRL/A |
| STX 2 | CTRL/B | ETX 3 | CTRL/C or RUNSTOP |
| EOT 4 | CTRL/D | ENQ 5 | CTRL/E |
| ACU 6 | CTRL/F | BEL 7 | CTRL/G |
| ES 8 | CTRL/H | HT 9 | CTRL/I or TAB |
| LF 10 | CTRL/J or LINEFEED | VT 11 | CTRL/K |
| FF 12 | CTRL/L | CR 13 | CTRL/M or RETURN/ENTER |
| SO 14 | CTRL/N | SI 15 | CTRL/O |
| DLE 16 | CTRL/P | DC1 17 | CTRL/Q or SH FT/NOSCRL |
| DC2 18 | CTRL/R | DC3 19 | CTRL/S or NO SCROLL |
| DC4 20 | CTRL/T | AAK 21 | CTRL/U |
| SYU 22 | CTRL/V | ETB 23 | CTRL/W |
| CAN 24 | CTRL/X | EM 25 | CTRL/Y |
| SUB 26 | CTRL/Z | ESC 27 | CTRL/[ or ESC |
| FS 28 | CTRL/£ (English Pound) | GS 29 | CTRL/] |
| RS 30 | CTRL/↑ (Up Arrow) | VS 31 | CTRL/BACK ARROW |

8 Function keys: ALT 1, ALT 2, .... ALT 8.

Function Key control codes:

Type ↑ then the appropriate character from above: ie BEL is ^g or ^G (↑g or ↑G). For a 1/2 second pause, use ~ (SHIFT =). To include a ^,~ or \, use \^, \~ or \\ (£↑, £ SHIFT = or ££)

VT102 function key maps: PF1 = F1 PF2 = F3 PF3 = F5 PF4 = F7.

## Addendum (August 2023)

This document was updated in Summer 2023 by Matthew Desmond (the original author). The bulk of the content has not been changed save to fix a couple of spelling mistakes and omissions plus removal of outdated contact information. For more information, please visit factorofmatt.com.