

DESTERM 128 V1.02 -- USER GUIDE

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1 What is the DesTerm128 Terminal Program?

DesTerm128 is a program that allows you to use your Commodore128 to enter the world of telecommunications. This program represents nearly two 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 operated systems that use the ANSI standard for colour graphics. For those who use Commodore Colour graphics boards, DesTerm can also display 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 Commodore128 that can successfully talk to 9600 baud modems. 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 to 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 may not use 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.

All rights to the program, fonts and documentation remain with the author: Matthew E. Desmond, except the RS232 and CRC routines which remain with Geoffrey Welsh, and are used with permission.

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 from the distribution archive) in your disk drive and enter:

```
RUN "DESTERM1.02"
```

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, 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 modified. NOTE: These 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 option is denoted by the line which is in reverse field. 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. 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 port two will mimic the cursor keys (at all times!) 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. 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 during an input 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 commodore key (C=), will perform some action or bring up a menu. For a complete list, press the HELP key while in terminal mode. 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 DesTerm128 to its maximum potential you must have a Hayes compatible modem (with interface) or a 1670. 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 would reduce overhead and increase accuracy and reliability if command echo were 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 if this override is disabled. DIP switch 6 UP or "AT&C1".

2.2 Control Signal Inversion

First, make sure that the modem and interface are correctly connected to each other, and that the interface is properly connected to the Commodore128 user port. Make sure that any dip-switches on the modem are configured such that Carrier Detect DTR are normal (that is, NOT OVERRIDDEN). Next, run DesTerm, and wait until the main terminal screen appears (press a key to stop the tune). If you look at the top right hand of the screen, you will see a display that should look like "1200-N-8-1-F". Make sure that the modem is in its initial state (turn it off then on again) -- and watch the space just before the number on the top row. If you see a C, then the control signals are set wrong (The C indicates that the modem is reporting a Carrier, and this can't be so, since we just turned it on!). To change the status of the Inversion, enter the MODEM SETTINGS sub-menu from the main-menu. From here, enter the HAYES SETUP menu and select the CONTROL SIGNALS option. You may now simply choose the option that was not initially selected. As soon as you press return, the C should disappear. If you are unable to get rid of the C, check that the carrier detect is not overridden. It may be useful to find out if you are able to switch the C on and off by this method. If you can, this indicates that the interface does support the line correctly. When you have discovered which inversion mode is needed, you may leave that particular setting alone. If you have major problems, you may wish to contact someone that has some experience with modems. To be sure that you are able to make your modem and DesTerm compatible, ensure that you have the manual, and that you know about the various settings and modes of it. In particular, you should know what the X settings do, and how to set the S registers.

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 Control Signals

This option has been explained in 2.3

2.3.3 Max Baud Rate

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

2.3.4 Set Connect Rate

Some of the newer modems can speak to the terminal at a totally different speed to that of the connect -- 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). 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).

2.3.5 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 they wish 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.

2.3.6 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.

2.3.7 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 normal P or T is 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.

2.3.8 Modem Report 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.

2.3.9 Resend Init

If you have changed the initial string, or forgot 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.

2.4 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 C= U.

2.4.1 Changing the Colours

The colours that DesTerm uses for menus, prompts and text may be selected with the first four menu items. The Screen Colour is the colour that is used for the background and border of the 80 column screen. Most applications expect this to be black, but you may set it to any of the 16 colours if you wish. The Prompt colour is the colour that the menu options and prompts are displayed in -- this may be any colour except the Screen Colour. The User 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. As with Prompt Colour, this may be anything except the Screen Colour. The last colour (Reserve Colour) is the colour that the menu borders and boxes are drawn in -- Again this may be any colour except the one chosen as Screen Colour.

NOTE: If you plan to use DesTerm in the 40 column mode, the screen colour MUST be black -- the VDC for some reason has trouble displaying the other colours if not (Try it and see!)

2.4.2 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.

2.4.3 DesTerm Files Device/User Files Device

Many people have more than one disk drive; it is convenient to have DesTerm and its related files in one drive, and another a disk in another drive for uploading/downloading. Using these two options it is possible to set which devices should contain which data. The DesTerm Files Device defaults (on loading) to the device that DesTerm was loaded from. The User Files Device is loaded from the config file and, as such, may be set to which ever device you like. For instance, if you have two drives, devices 8 and 9, you would boot from device 8, and set the User Files Device to 9. Once the parameters have been saved, each time you run DesTerm -- uploads, downloads buffer loads and saves will automatically be done from device 9 -- while character sets, function key files and telephone number files will be loaded from device 8.

2.4.4 Printer Device/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 through 7. 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!

2.4.5 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.

2.4.6 Information Windows

At certain times during the normal operation of DesTerm, the program will open up a small window in the screen that informs the user 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.

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 connect, 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. 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 before it gives up and tries a new number. 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 it should move on to the next number. 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 C= N. 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.

NOTE: in this menu, there is no need to use the down cursor key between edits, since the next item will automatically be chosen for you.

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 use when making the call; in most cases, this should be set to the maximum speed your modem can handle 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 three, 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 the character set, refer to the Appendices. If no character set is specified or the specified set does not exist on the DesTerm Files Device, then the currently loaded character set will be used. The Function File specifies the set of function keys that will be used with each numbers. The same loading conditions apply as for the character set file. The creation of function key files will be discussed in the next section.

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, each one containing up to 32 characters. You may define as many sets of keys as you wish, saving each on disk to be recalled whenever you need them. To enter function key definitions, select the Define Functions option in the main menu, or press C= F. 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) simply 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!

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) 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. The rest of the line will look something like:

```
LEDS:0000  MODE ANSI-25  W:Y  B:C:49152 0:00:00 C1200-N-8-1-F
```

This part of the status line is broken up into several fields, the meaning of each is as follows:

LEDS: On a VT102 terminal, there are four Light Emitting Diodes that may be turned on and off by the host. Although only a few programs use them, they have been included 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. Both of these settings may be altered in the Emulation Mode menu (C= G and C= T).

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 (C= 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 bytes unused in the buffer.

TIMER: The next field is an on-line timer. When a carrier is first detected, this field gets reset to 0:00:00, and advances (in seconds) while the carrier is present. 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 resets.

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

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

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 (C= G). In VT102 mode, there are codes that change the tab stops automatically.

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 (C=) 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)

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

If you need help to remember some of the more obscure ones, simply press HELP.

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

Either the HOME or DEL keys may be used to generate an ASCII DEL character. In actual fact, 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 (C= G).

There exists another key sequence to send a 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 dependant, and most systems have no use for it. To generate a break, press the Commodore and ESC keys simultaneously (C= ESC).

As mentioned earlier in this document, DesTerm has eight user defined function keys -- in order to maintain maximum flexibility whilst 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 Commodore key together with the appropriate number. NOTE: the number key must be part of the main keyboard, the numeric keypad keys do not work for this purpose.

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	Commodore128
-----	-----
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 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 SCROLL
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/- or CTRL/Back Arrow

In the terminal mode, it is also possible to enable and disable the capture/send buffer. Pressing C= + will start the buffer either sending or buffering, while pressing C= - 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 C= 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 C= 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 Protocol Settings is the fourth menu item in the main menu.

6.1 Baud Rate

When two components are talking via an RS232 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 send. Thus, a communications speed of 2400 BPS will send 240 bytes of data per second. We also say that 2400 BPS is the same as 2400 baud. Always be sure that you are talking to the remote device at the same speed it is talking to you -- this is especially true with null-modem connections since, unlike modems, other terminals will not automatically detect and match your transmission speed!

6.2 Duplex Mode

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 on-screen 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. Half duplex mode is useful for testing escape sequences and entering data to the buffer directly. The last character on the status line is "F" or "H" indicating Full or Half duplex.

6.3 Stop Bits

Ever wondered how a device knows when a byte of data has started to come? 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 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).

6.4 Data Bits

The ASCII standard has 128 characters, which can be represented in 7 data bits. Some communications situations, require that the data sent has 256 characters, which needs 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.

6.5 Parity Bit

The parity bit is probably 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 garballed 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 bit 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 might as well judge what is garbage and what is not.

6.6 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 as 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!).

6.7 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, but could become useful during heavy menu activity, when the input buffer is not emptied.

NOTE: DesTerm itself will NOT obey incoming Xon/Xoff characters at this stage in development.

6.8 Tune Bit Out/Tune Bit In/Tune Half Bit

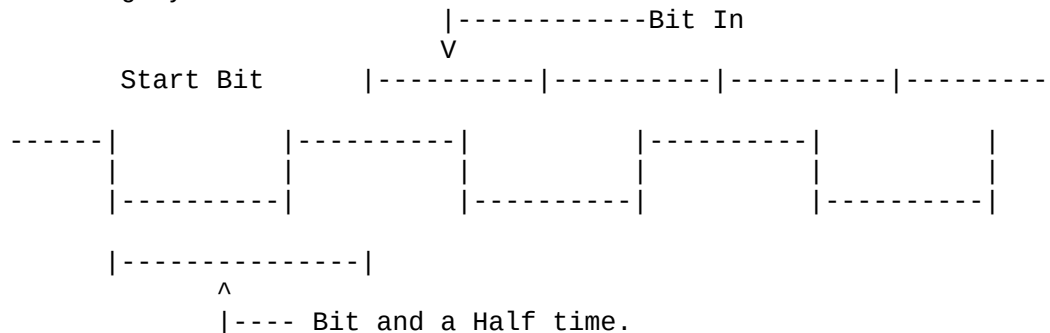
When DesTerm was being developed, we realized that the success of any communications device was dependant on data quality. The routines that are built in to the Commodore 128 are not reliable above 1200 baud, and simply do not work above 2400. For this reason, we totally re-wrote them! Many hours were 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 terminals were close, but no go. Even though we spent many hours adjusting the timing, there are some modems, even at low baud rates that have a hard time talking to DesTerm. These modems do not speak at the correct speeds (we had a look on a 'scope!). The speed they talk sometimes even changes with temperature! Other modems have been designed especially for the Commodore 64/128, and the timing has been intentionally been adjusted to suit the old routines. For this reason, DesTerm allows you to fine-tune the speeds at which bits are send and scanned. 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 represent increments of approximately 1 per cent.

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!

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 C= G) allows one to change the way in which DesTerm behaves when sending and displaying data.

7.1 Emulation Mode

The Emulation Mode menu (C= 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 appendix.
- 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.
- 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, deletion makes VT102 one of the most powerful terminal protocols invented.

COMMODORE: As most people will 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 allows you to filter the incoming control sequences. That is the commands will be understood as normal, but they will not be acted on.

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 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 send may, like the backspace key be either 8 or 127. You will normally set this to the one that backspace isn't. This key is included so that both codes may easily be sent (some mainframe applications require both).

NOTE: In Commodore mode, the setting of this key has no effect, as the special Commodore home (19) or screen clear (147) 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.
Destructive : The cursor moves back dragging all the characters that follow with it.

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, that when received 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 tabs 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.

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. Commodore Graphics mode requires that Receive EOL be set to the latter 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 the colour. For most VT102 applications, this will not be a problem since colour is not used anyway. The problem is that the attributes (flash, underline, reverse video and bright) are 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 will mean 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.

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

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, 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 40 column mode, you may wish to select Thick Pixel mode, so that the 40 columns fills the entire screen. If you want to use Thick Pixel and 80 column mode together, you may only see half the screen at a time. To display the left side of the screen, press C= with the left cursor key and to display the right side of the screen, press C= with the right cursor key. As mentioned earlier, you may not use Thick Pixel mode with 50, 51 or 52 lines. 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.

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.

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 mode 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 useful 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 Reset Modes

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

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

7.20 Hints and Tips

What follows is a list of hints and tips that will aid you in selecting the correct terminal emulation.

Character Sets:

DesTerm comes complete with several character sets, it is suggested that you use the following combinations:

```
ASCII      - DES.IBMSET or DES.CBMSET
ANSI       - DES.IBMSET or DES.IBMFULLSET
VT52      - DES.VT52SET
VT102     - DES.VT102SET
COMMODORE - DES.CBMCGSET
```

Note: all of the character sets are interchangeable, but it is nice to see graphics the way they intended.

Interfacing with an AMIGA:

It is possible to connect a Commodore128 and an Amiga together via a NULL MODEM. If you have the V1.3 Operating system for the Amiga, it is possible to use your Commodore128 (with DesTerm) as a highspeed workstation. Make sure to set the DesTerm and the Amiga serial to 9600 baud, 8 bits, no parity, and do not mask the high bit. To function properly, you should set DesTerm to VT102 mode. To make you feel totally comfortable, a character set called DES.AMIGASET has been included, and should be used. There are two ways in which to use DesTerm: as a text only CLI or as a dumb printer type terminal. If you plan to use DesTerm as a CLI, you should set DesTerm Rx and Tx EOF to just CR. On the Amiga open a SHELL and type:

```
MOUNT AUX:          <- This may not be needed
NEWSHELL AUX:
```

DesTerm should respond with a prompt such as:

```
New Shell Process 2
DF0:>
```

You may now use your Commodore128 as an additional keyboard and monitor for your Amiga. It is also possible to use your Commodore128 as a simple text output device. Any text that would normally be sent to the Amiga screen may be sent across to DesTerm, for example:

```
dir >aux: df0:
```

may display something on the Commodore128 such as:

```
Trashcan (dir)
System (dir)
C (dir)
  Install          Install.info
```

NOTE: In some instances it may be necessary to set both Rx and Tx EOL to CR/LF in order to view text properly. In most cases this will be when you use COPY. (ie COPY file aux:)

Interfacing with an IBM or compatible:

Interfacing to a PC is essentially the same as with an Amiga, except the commands to type are different. To use the Commodore128 as a DOS shell, type CTTY COM1:. Output is redirected in the same way as for an Amiga. You should use DesTerm in regular ANSI mode, with the DES.IBMSET character set. For more information on interfacing to other computers, read the relevant section in the user guide.

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 -- the ability to save incoming data in memory for instant review, printing or storage to disk. The Buffer is easy to use, and has a massive 48K storage space! To start the buffer either capturing or transmitting, press C= +, to stop it, simply use C= -.

8.1 Buffer Mode

The DesTerm buffer can be switched to 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 C= 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 back to transmit.

8.2 Save Buffer

You may often want to save the capture buffer to disk, you may do so with this option. The file will be sent to the User Files Device. 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 C= 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 name. The file will be looked for on the disk, file types of PRG, SEQ and USR only will be 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. Again, 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 C= L, instead of using the menus.

8.4 View Buffer

It is often useful to be able to see exactly what is in the buffer -- the view buffer option (C= V from terminal mode) allows you to examine the buffer in this way. The text in the buffer will be displayed one page at a time -- a page either being what will fit on the screen, or a number of bytes ended by a formfeed character (^L). All control codes are displayed as inverse video characters, and may be decoded by examining the control codes table in section 5. At the end of each page, press any key to continue, or ESC to quit.

8.5 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 (the printer will start displaying much garbage). To combat this problem, you should set the Strip Ctrl's 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.

8.6 Print Buffer

The Print Buffer option (C= 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 (C= U), to make sure the printer will perform correctly.

8.7 Clear Buffer

The Clear buffer command (also C= 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 C= 0.

NOTE: All disk operations take place on the User Files Device.

9.1 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*. It is also possible to select certain filetypes, to do this, you type the pattern as you normally would, but you append to it =p, =s, =u, =r or =c. (for PRG, SEQ, USR, REL and CBM). For example, to display all the sequential files that start with the word "des.", you would type: des.*=s.

9.2 Initialize

This command simply logs in a new disk -- and should be performed every time you insert a new disk, while in Disk Operations. DesTerm automatically performs this before all other disk related operations.

9.3 Validate

This command will perform the equivalent of the COLLECT or V0 commands.

9.4 Drive Num

This option allows you to select the particular drive that will be used. In most cases this will be 0, unless you have a dual drive or partitioned hard drive.

9.5 Send Command

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

9.6 Scratch File

To scratch a file, select this option, and enter the filename when prompted. If there is enough room in the prompt box, you may enter multiple filenames, each separated by a comma. You may also use wildcards, but be careful -- this command uses Commodore pattern matching -- not the special DesTerm pattern matching as found in the Upload Files section!

9.7 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.

9.8 Copy Files.

With this option, you may copy files from the DesTerm Files device to the User Files Device. You may specify DesTerm wildcards to select multiple files.

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 section 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 only 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) and 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 C= N.

10.3 Input Number

When you choose this item (also C= 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!

10.4 Redial Last

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

10.5 Multiple Dial

The multiple dial option requires that the user 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 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 C= M.

11 Transfer Options

The transfer options menu allows you to select certain parameters that pertain to the transfer of text/files to other computers. This menu may be invoked by the C= 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 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.

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) files. 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, DesTerm needs to decide which of these two types the file will be (since it would be silly to halt the transfer just ask the user). The type of file that DesTerm will write is selected here, and is also used as the default type when asking the user. For Information on Ymodem, see the appropriate section.

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 five 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 (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 sender and receiver 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 uses the standard. As it 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

"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. At this time, the author has no information on the previous Multi Punter protocols, which is why they have not been included. If you try a multi-punter protocol transfer and it doesn't work, you are most probably trying to use incompatible versions. File selection is identical to Ymodem.

12.6 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, you can copy the files to an empty disk (or 1581 partition), and specify a pattern of "*".

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. Filetype 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

Multi Punter batch downloads are also automatic (like Ymodem), and duplicate files are handled in the same way. Like C1, 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. Up to 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.

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 Files

The current filename used for each of these files may be changed using this option. You will be prompted for the name of a character set to load. The name that is here will be saved in the names file, to be loaded as default.

15.2 Save Setup File

The Setup File contains all of the user settable options in DesTerm. That 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.

15.3 Save Names File

The names file tells DesTerm which support files to load when it is run. When you save names, 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 set, setup, functions and telephone numbers.

16 Hangup Phone

This option (also, C= 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 About Desterm

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

18 Exit DesTerm

To stop execution of the DesTerm Terminal program, select this option. You will be asked to confirm, so that you will not do it 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 poke code order that Commodore uses. This will most probably mean that you will be working blind. 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.IBMFULL 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 Commodore128 rom, in true ASCII order (+chars)
DES.CBMCGSET Special copy of Commodore128 -- note the order for
 graphics.
DES.AMIGASET The Amiga Topaz/8 set including special Amiga graphics

Appendix B. Comparison of ASCII vs. CBMSCII

The following table lists 128 characters, 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	EC=	28	(	(	48	H	h	68	h	H
9	HT	DC=	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 down Pn lines. Stop at bot
CUF	CSI Pb C	Move cursor right Pn cols. Stop at edge
CUB	CSI Pb D	Move cursor left 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 needed
RI	ESC M or \$8D	Move cursor up. Scroll down if needed
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 position 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 entire display. Cursor 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. NOTE: if x would make characters invisible, x+1 is chosen.
 4x - select background colour x. NOTE: VDC cannot do this. It will only take effect when the screen is cleared. Then, the whole screen will become this colour. When using menus, user selected background colour 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 =	
Numeric Key	Keypad Mode	VT102 Application Mode	VT52 Application Mode
-----	-----	-----	-----
0	0	ESC 0 p	ESC ? p
1	1	ESC 0 q	ESC ? q
2	2	ESC 0 r	ESC ? r
3	3	ESC 0 s	ESC ? s
4	4	ESC 0 t	ESC ? t
5	5	ESC 0 u	ESC ? u
6	6	ESC 0 v	ESC ? v
7	7	ESC 0 w	ESC ? w
8	8	ESC 0 x	ESC ? x
9	9	ESC 0 y	ESC ? y
- (minus)	- (minus)	ESC 0 m	ESC ? m
+ (plus)	+ (plus)	ESC 0 l	ESC ? l
. (period)	. (period)	ESC 0 n	ESC ? n
ENTER	CR or CR/LF	ESC 0 M	ESC ? M
PF1 (F1)	ESC 0 P	ESC 0 P	ESC P (same in numeric)
PF2 (F3)	ESC 0 Q	ESC 0 Q	ESC Q (same in numeric)
PF3 (F5)	ESC 0 R	ESC 0 R	ESC R (same in numeric)
PF4 (F7)	ESC 0 S	ESC 0 S	ESC S (same in numeric)

Linefeed/Newline mode:

Mode	Key Pressed	Code Sent	Code Received	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 to start of next line.

IBM ANSI differences:

ED, 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 margin.
CUL	ESC D	Cursor left one line. Stop at margin.
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
\	£	{	C= :	HELP.
^	↑	|	shift/up arrow	
-	← or shift/-	}	C= ;	To open main menu
`	shift/+	~	shift/=	press CTRL/RUNSTOP.
DEL	home or del	BREAK	C= ESC	

Start Buffer: C= + Stop Buffer C= -

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 SHIFT/NO SCROLL
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/- or CTRL/BACK ARROW

8 Function keys: C= 1, C= 2, C= 8.

Function Key control codes:

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

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

ADDENDA

The following paragraphs explain several features that have been added to DesTerm since the manual was printed:

SELECT DEVICE

The select device option in the Disk Operations menu allows you to select which of the "DESTERM DEVICE" or "USER FILES DEVICE" is used for the disk commands. This defaults to User Files Device at the start of each disk session. NOTE: This command makes the last sentence on page 25 obsolete.

COPY FILES

The copy files function will copy a number of files from the DesTerm Files device to the User File device (you need at least two drives to use this function). You will be asked for a filename to copy, which may consist of DesTerm wildcards (* and ?). DesTerm will display its progress by showing the name of the file it is copying.

RAMDOS SUPPORT

If you have a Ram Expansion Unit, you may use it with DesTerm to provide a fast, large ramdisk. You will first need to get hold of Fred Bowen's RAMDOS program. To install the ramdisk, simply run the RAMDOS program supplied with DesTerm -- this uses the RAMDOS file "ramdos128.bin" and will run DesTerm automatically. This program sets the interface page to 27, and uses device 10. There are a few restrictions as to what operations may be done with the RAMDISK:

For some reason, Reading SEQ and USR files from the RamDisk does not work (it gives an error after the first byte). For this reason, it is recommended that you only use PRG files when using the RamDos software when you need to upload or read to the buffer.

Multiple uploads and File copying both use special DesTerm pattern matching, and as such you may not copy or batch upload from the ramdisk device. The program will not crash but simply will not find any matching files.

The Ramdos is great for FAST downloading of files (at 2400 baud we got 85% efficiency!!), and for saving buffer text. The "re-use ramdos" file supplied with DesTerm will allow RAMDOS to access files left in the REU after DesTerm reets C128 (when you quit).

MOUSE MODE

If you use a 1351 mouse, DesTerm allows you to control the cursor with it at all times. Occasionally, you may wish to use the mouse to move around menus, but not interfere with terminal operation (even slight vibrations can result in cursor codes being sent over the modem because of mouse movements). To use the mouse only with menus, select "Menus Only." in this subpart of the User Environment menu.

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.