ULTIMATERM VERSION 4.0
Documentation Manual

Ultimaterm V4.0 written by Ken Johnston
Documentation written by Ken Johnston

Freeware - March 1988

Voice : (403) 242-3485 MST
Modem (DIGITS) : (403) 242-3515 300/1200 baud

Table of Contents

PREFACE

Documentation. Here's something Ultimaterm has been lacking for such a long, long time. I decided it was about time I stopped pounding away on Ultimaterm just long enough to get some explanations written up.

I'll try to keep in mind that I'm not writing a novel here and explain things as precisely and simply as possible. I'll even make an effort to include original sources of my information so as anyone who actually will read this manual can have a reference should I be unclear.

Just so we're thinking on the same wavelength, I'll designate control key combinations by preceding the key with a caret (^) and designate alternate key combinations by using the sequence [ALT]-[key].

One last thing I should mention here. Many things about Ultimaterm V4.Ø won't be readily apparent just by using the terminal (as I tried to make Ultimaterm V3.Ø). I suggest that even if you don't read through manuals (like me?!) you glance through a few sections just to pick up on some tips I might leave lying around...

Ken Johnston

GETTING STARTED WITH ULTIMATERM V4.Ø

I wouldn't strongly suggest you just LOADM and EXEC Ultimaterm V4.Ø without reading at least this first section. One of the major considerations I kept in mind while writing V4.Ø was the fact that every system is not the same. Especially these days now that everyone has become more confident in making hardware mods due to lower repair or replacement costs.

The first thing you'll have to do is LOADM and EXEC Ultimaterm V4.Ø. You should notice two things above V3.Ø: First, it'll take longer to load (wonder why?!) and second, when it is loaded, you'll see a window that states "Initializing the keyboard and modem strings". A second or two later, that window disappears and the version window pops up that simply states "Ultimaterm V4.Ø". Hit any key to drop to terminal mode.

The Initial Setup

Before you go off playing with all the new ALT keys, you'd best take the time to customize this version to your system. First, press [ALT]-[M] to toggle the display between monochrome and composite (not really necessary if you're using an RGB display). Second, use [ALT]-[<] and [ALT[-[>] to move the screen up or down on your monitor to center it as best as possible. If keyclick annoys you, press [ALT]-[K] to shut keyclick off (press it again to turn it back on).

Press [ALT]-[O] to pop up the "Options Menu". If you had Ultimaterm V3.Ø, you'll probably immediately notice the addition of two new options: "Initialization Strings" and "Miscellaneous Options".

[D] Disk Options

The first step will be setting up the disk options. Simply press [D] and the following window will pop up:

Disk Options

D Default Drive .....Ø
E Default Extension ....BIN
A Auto Clear .....Yes
V Verify .....Off
S Stepping rate .....3Ø ms
B Double sided drives ...No

"Default Drive" and "Default Extension" are both used for the window that asks for a filename. To set the default drive, press [D] and use the left and right arrow keys to rotate through available choices. To set the default extension, press [E] and type in the new extension.

"Auto Clear" is simply a flag that indicates if the buffer should be cleared automatically before LOADing a file from disk. It also decides if the buffer should be cleared upon receiving a file from across the modem. Press [A] to toggle Autoclear on or off.

"Verify" is the same as the VERIFY ON/OFF command under RSDOS. If on, then any sector written to the disk will be reread for verification purposes. This slows down disk output (especially during an X or Ymodem transfer), but greatly improves the chances of catching a possible disk error which could cause you to loose files you just spent much time downloading.

"Stepping rate" just allows you to set the stepping rate at which the DSKCON routine will execute STEP commands.. Most drives will handle the 6 ms rate but if you're not sure just experiment with them to find the fastest your drives will handle.

"Double sided drives" allows you to switch the drive select masks of Ultimaterm V4.0 between 4 single sided drives and 2 double sided drives.

After you have set all the "Disk Options" to your liking, press [BREAK] once to return to the "Set Options" screen.

[M] Modem Options

Press [M] to pop up the "Modem Options" window. The following will appear on your screen:

Modem Options

B Baud Rate 1200
W Word Length 8
P Parity .....None
S Stop bits 1
D Duplex .....Full
L Linefeeds .....Yes
A Auto-Buffer .....No
T Terminal Type .....ANSI
R Deluxe RS232 Pak .....Yes
F Linefeed Filter .....On

I'll assume I don't have to explain what "Baud Rate" is or "Parity", etc. However, I will explain some of the not-so-obvious options and will also explain how to change the options.

There are two ways to change any of the above options. Either pressing the designated key will automatically switch that option between one of two states, or pressing the designated key will hi-light that option and allow you to sequence through all choices with the left and right arrow keys. When the right choice is selected, press [ENTER] to accept the change or [BREAK] to leave it like it was.

NOTE: If in monochrome mode (via the [ALT]-[M] option from terminal mode) the option won't be hi-lighted but will be underlined instead.

There are three duplex settings: Full, Half and Echo. When in FULL, any keys you press in terminal mode will be sent to the modem and any keys received will be sent to the screen. When in HALF, keys you press will also be sent to the screen. When in ECHO, characters received from the modem will be echoed back to the modem and any keys you press will be sent to the screen.

When setting the baud rates, you should keep a few things in mind... If you're using the RS232 pak, all baud rates can be selected with the exception of 450 baud. If you're using the serial port, all baud rates between 450 baud and 2400 baud can be selected (i.e, 450, 50, 75..300, 600...2400). I'm pretty sure 2400 baud through the serial port is reliable for standard communicating considering I sent a 100 block YMODEM file (yes, that's 'Y') using a null-modem cable at 2400 baud with no errors; but a LOT of time goes to interrupt processing and the machine slows down noticeably.

"Autobuffer" is a feature which is very useful for downloading text files from a BBS. When the system you're connected to sends a CHR$(18) (aka DC2), Ultimaterm will open it's receiving buffer. When the system you're connected to sends a CHR$(20) (aka DC4), Ultimaterm will close it's receiving buffer. This feature can be turned on or off with this Autobuffer toggle.

"Terminal Type" switches Ultimaterm's screen driver to act as one of four different types of terminals. The system you are calling should let you know what type (if any) of terminal you should set Ultimaterm to. A more thorough explanation of the terminal types and their control codes will be explained further on in this manual. If the system you are connected to doesn't support any control sequences, just set "Terminal Type" to TTY (Teletype) which acts as a dumb terminal.

"Deluxe RS232 Pak" can only be kept at "Yes" if you have a Deluxe RS232 Pak present. If you do have a pak and want to use the serial port for any reason, this is where you can switch over.

After you have set all the "Modem Options" to your liking, press [BREAK] once to return to the "Set Options" window.

[P] Printer Options

There are three printer options in V4.0. The window will look like this:

Printer Options

B Printer Baud Rate ...9600
L Printer Linefeeds .....No
D Printer Line Delay ...000

These are changed exactly like the "Modem Options" were. "Printer Line Delay" might come in handy for anyone with an older printer. All it does is cause a set delay to occur at the end of each line to the printer.

When the "Printer Options" are set to your taste, press [BREAK] once to return to the "Set Options" window.

[K] Programmable Key Set

This section took a major overhaul when I went through V3.0 fixing up all that needed fixing. You should find much power to the user has been added to this section. Though getting used to pressing [ENTER] and not [BREAK] to exit from entering a macro will take some time.

The keys [0] through [9] can be changed to hold any name, alias, password, etc. that you want to send across the modem with one keystroke. You can send any control character in the programmable key by using the [CTRL] key. If you make a mistake while entering the keystroke, you can just use the [Left Arrow] key to backup and fix that mistake. To add the [ENTER] key as part of the keystroke, use [^M]; to add the [BREAK] key, use [^C] and to add the [Left Arrow] use [^H]. Press [CLEAR] to clear the programmable key, press [BREAK] to leave the key unchanged, or press [ENTER] to accept the key as is.

There are two special CTRL key combinations that can be used in conjunction with ALT-[0] through ALT-[9]. They are [^A] and [^B] and perform time functions during key transmissions.

[^A] in the key causes a single, one-second pause before the next character in the string is processed.

[^B] in the key causes all following characters (up to the next [^B]) to be sent at 1/4 second intervals. This is most useful for PBBSes which don't accept programmable keys at full speed.

The 'F' keys serve a slightly different purpose. Ultimaterm V4.0 was designed with a keyboard buffer in mind to add much power to window control. The 'F' keys are programmable keyboard strings. When you first load V4.0, you'll notice that the keys are set to [ALT]-[X];X, [ALT]-[X];Y, [ALT]-[X];S and [ALT]-[X];U. (In any of the options, any letter that is underlined means it's an ALT-letter). From terminal mode, you can press [ALT]-[F1] and [ALT]-[X];X will be entered into the keyboard input buffer which will take you immediately to Xmodem Receive. The remaining ALT-[F's] are set to Ymodem Receive, Xmodem Send and Ymodem Send. After playing around with V4.0 for a while, you can set these keys up to do whatever you prefer.

When all the programmable keys are to your satisfaction, press [BREAK] once to return to the "Set Options" window.

[I] Initialization Strings

Remember that "Initializing the keyboard and modem strings" window that popped up when you first loaded Ultimaterm? Well, this is where you get to set the Keyboard and Modem strings for your own needs.

The [K]eyboard string is just like one of the [ALT]-[F keys] mentioned in the "Programmable Key Set" section but it is executed when Ultimaterm first loads up and is only executed once. It's basically my version of a safety net that will allow you to set up some parameter I may have overlooked; but most people will find it more useful to execute some command (like dial a phone number) whenever they load up V4.0.

The [M]odem string is just like one of the [ALT]-[0] through [ALT]-[9] keys that gets sent to the modem. Currently, it sends "ATZ [ENTER]", a 2 second pause, "ATS0=0 L0 V1 X4 [ENTER]" to set up some initial parameters on your modem. You can just press [M] and [CLEAR] to clear this string should you not have a smart modem. Sorry this string could not be longer, but you can use the keyboard string to send a couple of [ALT]-[#] keys to set up more complex modem strings.

When the Intialization strings are set to your needs, press [BREAK] to return to the "Set Options" menu.

[Z] Miscellaneous Options

This is probably the most important option you need to look at before you can really do anything with V4.Ø as it allows you to designate which slots of your multi-pak (if you're using one!) you keep your drive controller and RS232 pak in. The window looks like this:

Miscellaneous Options

D Repeat delay time Ø16
R Repeat speed 128
T Keyclick tone Ø32
S Sound .....On
B Destructible BS .....Yes
Y RS232 Pak slot 1
Z Disk drive slot 4

"Repeat delay time" is the length of time you have to hold down a key before it starts to repeat. Just increase or decrease this value to your liking.

"Repeat speed" is how fast the key will repeat. Increase or decrease this value to your liking.

"Keyclick tone" is the tone of the keyclick (if you have the keyclick turned on and the sound turned on).

"Sound" allows you to silence any noise Ultimaterm makes.

"Destructible BS" allows you to change the conditions under which a backspace will be performed. If set to "Yes", then whenever a backspace is received, the character over which you're backspacing will be erased. If set to "No", then the cursor will just move back over the previous character without destroying it.

"RS232 Pak slot" allows you to select which slot in your Multi-Pak you have the RS232 pak in. Please do not neglect this (unless you don't have the RS232 Pak or Multi-Pak!) as the Receiver Interrupt can only be enabled if Ultimaterm knows what slot the pak is in. Otherwise received characters will not cause an interrupt condition and will be ignored by Ultimaterm.

"Disk drive slot" allows you to select which slot in your Multi-Pak you have the disk controller in. Please do not neglect this one either (unless you don't have a Multi-Pak) as it enables the CTS line to the drive controller.

When you have finished with the "Miscellaneous Options" press [BREAK] twice to return to terminal mode.

Other Ultimaterm Parameters

Now it'd be wise to set up the miscellaneous settings on Ultimaterm V4.0 before we save the defaults to disk. The miscellaneous settings include the Mono/Comp toggle ([ALT]-[M]), Screen position ([ALT]-[<] and [ALT]-[>]), Keyclick ([ALT]-[K]), Upper/Lowercase (SHIFT-0), Buffer Opened/Closed ([ALT]-[T]), and VT-Keypad toggle ([ALT]-[Q]).

The Mono/Comp toggle selects the screen between color and B&W and also will enable or disable the colorburst signal. Set [ALT]-[M] according to what's most readable on your display.

Screen position uses the Vertical Fine Scroll register designed for doing a smooth scroll to adjust the display up or down the screen. This should be most useful to those who have to constantly adjust the horizontal on their monitors to get the best centering possible.

Keyclick just enables or disables keyclick. Keyclick can be over-ridden by the "Sound" option in "Miscellaneous Options".

Upper/Lower case really needs no explanation, except for pointing out that when upper-case is selected, a "#" appears on the top status line.

Buffer Opened/Closed simply opens or closes the door to the input buffer. When OPENed, the cursor will change to a block and an "*" will appear on the top line. When closed, the cursor is an underscore.

NOTE: Since VT-100 or VT-52 terminal emulation can alter the state of the cursor, the only sure-fire way of knowing if the buffer is opened or closed is by the "*" on the status line.

VT-Keypad toggle allows for the CoCo 3's keyboard to emulate that of the appropriate VT emulation. When toggled on, a "%" appears on the top line and the certain keys on the keyboard behave differently than usual. They are as follows:

SHIFT-@	Home Cursor
Up Arrow	Sends Cursor Up sequence
Down Arrow	Sends Cursor Down sequence
Right Arrow	Sends Cursor Right sequence
Left Arrow	Sends Cursor Left sequence
CLEAR	Sends Clear Screen sequence
SHIFT-ENTER	Sends Erase to End of Line sequence

[ALT]-[0-9]	Send Keypad Application Mode 0-9 sequences
[ALT]-[-]	Send Keypad Application Mode - (dash) sequence
[ALT]-[,]	Send Keypad Application Mode , (comma) sequence
[ALT]-[.]	Send Keypad Application Mode . (period) sequence
[ALT]-[ENTER]	Send Keypad Application Mode ENTER sequence
[ALT]-[F1-F4]	Send Programmable Function 4 sequence

NOTE: F3 and F4 are SHIFT-F1 and SHIFT-F2 respectively

If you have no idea what the VT-Keypad is for, keep it off (make sure the "%" isn't on the top line by pressing [ALT]-[Q]).

Saving all the default options

At this point you have just set all the options you need set upon each loading of Ultimaterm. Next step is to save all these default options to disk. This can be accomplished by pressing [ALT]-[D] from terminal mode to pull up the "Disk Commands" menu and then pressing [F1] to save all the parameters to disk. If you're wondering where the parameters are being saved, they take up two sectors on the disk - Track 17, Sector 17 and Track 17, Sector 18 - hidden behind the disk directory in two unused RSDOS sectors.

I'll discuss all the features on the "Disk Commands" menu a bit later in the manual. For now, you're free to roam around Ultimaterm and use the rest of the manual as a reference should you need any further explanation on any commands.

Ultimaterm Commands

When you load up Ultimaterm, you'll find yourself in terminal mode. To pop up one of the many windows that allow you some control over Ultimaterm, simply push the [ALT] key with one other key. In order to see what all the [ALT] key combinations are, press [ALT] in conjunction with the [/] and a command summary window will be displayed on your screen. Actually, this is just one of two command summary windows which are displayed. To see the second command summary window, press any key other than [BREAK].

[ALT]-[@] Credits

I alone can not take credit for what Ultimaterm V4.0 has become over the past 3 months. In an effort to list some of the people who have made significant contributions to Ultimaterm V4.0, I have created this credit section.

Fred McDonald has kept me in touch with Delphi so that I could see what people wanted from Ultimaterm V4.0.

Rex Hebert provided me with the source for a CRC calculation which I used in V3.0. While making every attempt to improve upon various subroutines which I considered too slow in Ultimaterm, I wrote a new CRC calculator from the original which I'll provide further on in the manual.

Laverne Kelly has become my official voice to keep me in touch with Delphi officials and has also done much beta-testing to make sure V4.0 will stand bug-free for a long time.

Jeff Mercer sent me a complete list of VT52 and VT100 control codes which made it possible to write support for these two terminal emulations.

Guy Loucks provided me with the VT52 and VT100 keyboard control sequences and also helped me test the VT emulators out on his account on a local VAX.

Dan Damron was the first to lay eyes on Ultimaterm and spent much of his own time helping me prepare this manual.

I received many, many letters over that last three months (a few even had donations!) of people who were impressed with Ultimaterm V3.0 and previous versions and asked for many of the features now available in Ultimaterm V4.0. Without all this support, I don't think I'd have put as much effort into bringing you version 4.0 as I have. Now that 4.0 is complete, I will take the time to respond to all those letters!?

[ALT]-[A] Autodial

This is the section everyone has been asking for (well, everyone with a smart modem that is). This section replaces both the Autodial and Redial found in V3.0 with a complete and proper dialing directory.

If you're not sure what a dialing directory is, simply put; it's a list of System Names, phone numbers, and terminal parameters that allows you to select a specific system to call and have the terminal program automatically set the parameters for that system and redial until that system is online. (whew!). Anyone vaguely familiar with terminal programs like Telix or Procomm on the IBM will know that we've been lacking a very useful feature for too long.

Creating a dialing directory

The first thing that happens when you select ALT-[A] from terminal mode is Ultimaterm looks for the dialing directory in memory. If found, it will display the directory and allow you to enter or dial various systems. If not in memory, Ultimaterm looks on the current disk to see if the dialing directory is present (under the filename "ULTDIAL.DIR"). If not, it checks to see if there's enough room on the disk for the dialing directory (at least 2 granules) and asks you if you want to create the directory to that disk.

When the directory is finally loaded into memory, it will be displayed on the screen as follows:

```
System Name (30chrs)                    Phone  W P S   Baud    Term
============================== ================  = = =  ======  ======
  .
(15 entries per screen * 3 screens)
  .
============================== ================  = = =  ======  ======
```

The list of possible keypresses will be displayed along the bottom (too wide to display here, but I'll explain 'em!) and an inverted bar will be placed at the top of the entries on the screen.

Cursor Movement

You can move the inverted bar up and down through the entries on screen by using the up and down arrow keys. To move through the three possible screens that can contain fifteen entries each, use [SHIFT] with the up and down arrow keys.

Adding or Changing an entry

Move the inverted bar to the place you'd like to add or change an entry by using the cursor keys. Then press [C] to start changing that entry. The first window that pops up asks you to enter in the "System Name". If you're changing an entry, you can just press [ENTER] to leave the system name unchanged.

The next window that pops up asks you to enter the phone number for the system. Just type in the phone number and NOT any dialing commands (like ATDT). If you're changing an entry, you can just press [ENTER] to leave the phone number unchanged.

The next window asks for the word length, 7 or 8 bits. Press [ENTER] to leave it unchanged.

The next window asks for parity - None, Odd, Even, Mark or Space. Again, press [ENTER] to leave it unchanged.

The next window asks for stop bits - 1 or 2. As always, press [ENTER] to leave it unchanged.

The next window asks for baud rate. Select the baud rate you call that system at or press [ENTER] to leave unchanged.

The last window asks for the terminal emulator you want to use when you call the system. Again, select the emulation or press [ENTER] to leave unchanged.

You will then be taken back to the dialing directory screen in which the entry you just created or changed will be displayed. At this point, go ahead and start adding entries into the dialing directory. The entries do not have to be sequential in the list so you can use one screen for certain types of systems, another screen for other types of systems, or like I do; a screen to hold voice numbers of friends.

When the dialing directory is complete (or any time you make changes) you should use the "[S]-Save Directory" option to save the directory to disk (under the filename "ULTDIAL.DIR"). Should you wish to list the directory to your printer, you can use the "[P]-Print Directory" option which prints all fourty-five possible entries; even if they're blank.

Before you can dial entries, you should first set the dialing prefix [^P] and dialing suffix [^S]. Just so you understand what the dialing 'fixes are, possible dialing prefixes for Hayes compatibles would be "ATDT" or "ATDP 9," while a possible dialing suffix for Hayes compatibles would be "[ENTER]". To slow down the sending of the dialing string to the modem, simply start the dialing prefix with a [^B] and a 1/4 second pause will be performed between each character.

The next thing that needs to be done before an entry can be dialed successfully is the setting of the dialing directory options ([O]-Options). Pressing [O] will display the following screen:

```
                    Dialing  Options

Dial time       : 020 seconds
Hang-up time    : 002 seconds
hang-up String: ue+++uuATH0<cr>
Abort String    : <cr>

Connect string: CONNECT
Busy strings    : BUSY
                : NO CARRIER
                : NO ANSWER
                : ERROR

carrier Method: String
```

A bit of explanation is in order for the "Dialing Options". To make it possible for Ultimaterm V4.0 to work with almost any smart modem, I had to make Ultimaterm a little smart itself. Most smart modems send messages to the terminal so that you can see what the modem detects on the phone line, whether it be a busy signal, or no dialtone, etc. Ultimaterm V4.0 will send the dialing prefix to the modem followed by the phone number selected (with no spaces, unless

you include them in the number or dialing 'fixes) and finished off with the dialing suffix. It then has to assume that the modem is dialing the number and will alert Ultimaterm to the modem's status. If Ultimaterm receives no response from the modem for the set length of the dialing time, it will send the abort string to hang-up the modem and then dial the phone number again. If a connection is made and the modem responds with the connect string or puts DCD on the RS232 pak low, Ultimaterm makes some noise and drops to terminal mode.

The "Dial time" can be changed by pressing [D] and typing in a new time. "Dial time" is how long Ultimaterm will wait for a response from the modem before attempting the dial again. If you're going through many switchboards (i.e., long distance calls) you can lengthen the dial time. If you're calling a local number that rings right away, you might choose to shorten the dial time to get in more autodial attempts (and therefore a better chance at being the next' caller on the system).

The "Hang-up time" can be changed by pressing [H] and typing in a new time. "Hang-up time" is the length of time to wait after sending the abort string and before attempting to dial again. This is useful for making sure the modem is ready to accept the dialing string (preventing half the string from being ignored by the modem).

The "hang-up String" is actually used by the ALT-[H] while in terminal mode and not by the dialing directory. The reason I chose to place the hang-up string here is these options are modem-specific options, while "Modem Options" are general settings. I use a hang-up string of "[^A][^B]+++[^A][^A]ATH0 [ENTER]" which sends a one-second pause (^A), sets the rest of the string to be sent at 1/4 second intervals (^B), sends +++ which returns my modem to the command state, pauses for 2 seconds (^A^A) to give the modem a chance to catch it's breath, and finally sends the hang-up command ATH0 followed by a carriage return (^M).

The "Abort string" is the string that is sent to abort the current dial attempt and prepare for the next attempt. On Hayes compatibles, one simply pushes [ENTER] or [SPACE] and the dialing command is immediately aborted and the modem returned back to command mode. I use a hang-up string of just one carriage return (^M).

The "Connect string" is used to identify the response the modem gives to indicate it has connected to the system being dialed. On Hayes compatibles, "CONNECT" will cover "CONNECT 300", "CONNECT 1200" and "CONNECT 2400".

The "Busy strings" are used to identify the responses the modem gives to indicate it cannot make a connection and a redial should take place. I've squeezed room for four possible busy strings such as "BUSY", "NO CARRIER", "NO ANSWER" and "ERROR".

"carrier Method" is used to decide the best way to recognize that a successful connection has been made. If set to "String", then the "Connect string" and "Busy strings" will be used in autodialing. If set to "DCD", then the CD status of the RS232 pak will be monitored until a connection has been made. DCD is by far the most reliable but will only work if you have an RS232 pak AND DCD on your modem is set to active (or normal).

When all the "Dialing Options" are set to work with your modem, you can use the "Default Option Save" available from the "Disk Commands" window (ALT-[D] from terminal mode) to permanently save them to disk.

Dialing a number

There are two ways to dial a number from the dialing directory. You can select [M]anual dial whereby you get to enter the phone number you wish to dial (basically for a once-only dial) or press [ENTER] or [SPACE] to dial the inverted entry.

When the dialing process starts, you will be shown the "Autodialer" window which is basically for your own entertainment. It displays the number being dialed, the number of times it's been redialed, the countdown to the next dialing attempt, and the status of the last attempt. The "Autodialer" window also allows you quick changing of both the "Dial time" and the "Hang-up time" to quickly and easily adjust the autodialer to the fastest possible dialing attempts. The window also allows you to manually abort the current dial attempt and try again, to abort the dial attempt and exit from the dial window or to just exit from the dial window while leaving the number dialing away. The "Autodialer" window looks like this:

Autodialer

```
Dialing      : 242-3515
Attempt #    : 15
Countdown    : 005 seconds
Last attempt: Not connected

[D]ial time : 020 seconds
[H]ang-up   : 002 seconds

[SPACE] to restart
[ENTER] to exit
[BREAK] to abort and exit
```

The phone number following "Dialing" will be displayed one digit at a time as the digit gets sent to the modem. The "Attempt #" counts down from the "Dial time" to zero, at which time it sends the abort string and redials the number; printing the words "Not connected" for the "Last attempt". If you're using the connect and busy strings, then "Last attempt" will also display "BUSY" or "NO ANSWER" or whatever busy string was received by the modem.

Before an autodial is started, the parameters for that selection are set and then initialized. If you have a switch on your modem that manually selects 300 or 1200 baud, you must set that switch to the baud rate you choose to call the system at before you can autodial the number.

[ALT]-[B] Buffer Commands

Buffer Commands gives you minimal control over a few buffer functions. Pressing [ALT]-[B] will give you the following menu:

Buffer Commands

C	Clear Buffer
D	Display Buffer
P	Print Buffer
S	Buffer Status

"Clear Buffer" simply resets all the buffer end pointers so that the buffer is cleared and ready for taking in new text or receiving new files across the modem.

"Display Buffer" simply dumps the contents of the buffer in a straight list. You can pause the display by pressing any key and abort it by pressing [BREAK].

"Print Buffer" does the same as "Display Buffer" but directs the contents to the printer.

"Buffer Status" shows you how much memory is used, how much is free, how many disk granules it will require to save the contents of the buffer and how many Xmodem and Ymodem blocks it will take to send the buffer.

[ALT]-[C] Conference Mode

Sometimes known as "Chat Mode", Ultimaterm's conference mode allows separate entry of text from the received text so that many people can hold a conference without incoming text splitting apart text you're trying to type.

When you press [ALT]-[C] the Conference Mode window pops up which asks you how many lines you want to use for your personal text entry. Remember that the more lines you allocate for yourself, the fewer there will be to view received text on. You might want to limit yourself to using one or two lines at the most just to ensure you don't babble on!

After you select how many lines you would like for the conference mode, the screen will clear and a bar will split the lines you have to type in text (on the bottom of the screen) with the lines that received text will appear in. Each section of the screen will have it's own cursor. If you wish to capture the incoming text in your own buffer, press [ALT]-[T] to open the buffer. The cursor in the top section will turn from an underscore to a box and a "*" will appear on the top status line.

While in conference mode all [ALT]-[key] options will be available to you with the exception of [ALT]-[A] (autodial), [ALT]-[C] (conference) and [ALT]-[Q] (VT Keypad toggle). To exit from conference mode, simple press [BREAK].

[ALT]-[D] Disk Commands

Disk Commands provides you with a bit of control over disk files. Pressing [ALT]-[D] will bring up the following window:

Disk Commands

L	Load from disk to buffer
S	Save buffer to disk
D	Directory
K	Kill File
F	Format Ramdisk
R	Backup to Ramdisk
B	Backup to Floppy
F1	Default Option Save
F2	Default Option Load

"Load from disk to buffer" allows you to load any RSDOS file from an RSDOS disk into Ultimaterm's buffer. You can then send that file using one of the transfer methods.

If the file being loaded is in ASCII format, you will be asked if you want to add linefeeds to the file while it's being loaded. If you answer yes, then any linefeeds in the file will be ignored and any carriage returns in the file will be complemented with a linefeed.

"Save buffer to disk" allows you to save any file you've received (or loaded) into the buffer to an RSDOS formatted disk. When you select save you will first be asked for the filename to save the file under and then asked for the file type. The file types are as follows:

File type	appear as
ASCII File	1 A XX
BASIC ASCII File	0 A XX
BASIC Binary File	1 B XX
Machine Language File	2 B XX
Text Editor Source File	3 A XX

If the file saved is an ASCII File, and it is too long to fit on the current disk, you will be asked if you would like a multiple save performed. In a multiple save, the file is saved as much as can be on the current disk and then you will be prompted to insert another disk to continue saving the file (under the same name) on.

If the file saved is any other type and it is too long to fit on the current disk, you will be told the file will not fit and the save will be halted.

If the file saved is an ASCII File, you will be asked if you want to strip linefeeds during the save. If you reply yes, then any time a linefeed is encountered in the file, it will be ignored and won't make it to the file on disk.

If the filename you wish to save under already exists on the disk, you will be told so and asked if you want to save the file anyway.

"Directory" simply allows you to take a directory of the RSDOS disk or ramdrive (if 512K is present). It will also display the number of granules that are free.

"Kill File" allows you to kill a file on the RSDOS disk or ramdrive (if 512K is present). It is the same as the KILL command under RSDOS.

"Format Ramdisk" allows you to erase the contents of the ramdisk giving you 68 granules free.

"Backup to Ramdisk" allows you to BACKUP from a floppy to the ramdisk to make file transfers go much faster. Of course, this will only work if 512K is present.

"Backup to Floppy" allows you to do just the opposite of the previous. The disk you want to backup onto must be formatted in RSDOS or an error will occur.

"Default Option Save" allows you to save all the changeable parameters of Ultimaterm onto disk. The parameters are saved onto track 17, sectors 17 and 18 where they are out of the way of regular RSDOS operation.

"Default Option Load" allows you to load all the changeable parameters of Ultimaterm from disk. Although these parameters are loaded upon the initial execution of Ultimaterm, you may have changed a few of the parameters and would like to load the originals back. For this reason, I've provided "Default Option Load".

[ALT]-[E] Exit

This command allows you a clean exit back to RSDOS to save you the trouble of pressing [ALT]-[CTRL]-[RESET] or turning your Coco 3 off and on. When you select EXIT, the ROMS are copied back to RAM and the reset vector is called to perform a warm start.

[ALT]-[F] Freeze Screen

For those of you who hate watching text scroll by you at 2400 baud with no means of stopping it temporarily, I've provided a screen freeze command that will halt screen display while still giving you all the [ALT]-[commands] at your fingertips. To enable text-to-screen again, simply press any key other than one of the [ALT]-[commands].

** NOTE ** Only 3K of text will be buffered. When the buffer is full it will start to write over the text that has already been received.

[ALT]-[H] Hang-up Modem

This command will try to hang-up the modem in one of two ways. If you have an RS232 pak, the first thing that the modem tries is dropping DTR for a second and then raising it again. If a connection is still present, it tries the second method.

The second method is the only method tried if you don't have the RS232 pak. The hang-up string (changeable from the Autodial Options) is sent to the modem.

If none of these work, you can always unplug your modem from the wall or turn it off?!

[ALT]-[I] Freeware Information

This is the section that asks you to send me a donation for my efforts in bringing you Ultimaterm. Please remember that Ultimaterm is Freeware which means you are under no obligation to support any future efforts I might decide to bring to the CoCo 3 world...

If you do decide to send some money, I will send you back a licensed copy of Ultimaterm with a printed copy of the manual. If anyone should send a donation to me and says they got it from "such and such"'s serialized copy (please include the serial number) then I will send them back 10% of your donation.

** NOTE ** The only copy of Ultimaterm that will appear on Delphi or CIS or any other major network will be '000000' to be fair to everyone else who has donated.

[ALT]-[K] Keyclick toggle

Keyclick is simply a sound that is generated each time you press a key on the keyboard that the computer picks up (in case you didn't know!). I find it very useful myself while others find it annoying. You can toggle keyclick on and off by pressing [ALT]-[K].

[ALT]-[M] Monochrome/Composite toggle

Not everyone is blessed with an RGB monitor of any brand. If you are using a television or monochrome monitor, [ALT]-[M] will be especially of interest to you. This command toggles the display between black on white and shades. When in "black on white", the colorburst will be disabled to make an even clearer picture on a TV set.

[ALT]-[O] Set Options

Please refer to the beginning of this manual so I don't have to type this section in all over..!

[ALT]-[P] Print Screen

This does a straight dump of the screen to an 80 column printer so that you can forever keep a copy of the current display on the screen. If the printer is not ready, the screen dump will be aborted so as Ultimaterm doesn't sit around waiting for a printer to come online. If you have to, use [ALT]-[F] to freeze the screen while you get your printer ready.

[ALT]-[Q] VT Keypad Toggle

For all you people who use your terminal program on a VAX network of any kind, Ultimaterm will not only support screen controls sent out by these systems, but will also do it's best to emulate the keyboard of one. When [ALT]-[Q] is turned on, you will see a "%" on the top status line and some keys will be reassigned new values. They are as follows:

VT-100 or ANSI emulation

Key	New Assignment	Transmitted codes
Shift @	Home cursor	(1B5B48)
Up arrow	Cursor up	(1B5B41)
Down arrow	Cursor down	(1B5B42)
Right arrow	Cursor right	(1B5B43)
Left arrow	Cursor left	(1B5B44)
CLEAR	Clear screen	(1B5B481B5B324A)
Shift ENTER	Erase to end of line	(1B5B4B)

VT-52 emulation

Key	New Assignment	Transmitted codes
Shift @	Home cursor	(1B48)
Up arrow	Cursor up	(1B41)
Down arrow	Cursor down	(1B42)
Right arrow	Cursor right	(1B43)
Left arrow	Cursor left	(1B44)
CLEAR	Clear screen	(1B481B4A)
Shift ENTER	Erase to end of line	(1B4B)

If in VT-100 emulation and the host asks for application control functions, then Ultimaterm will change all the "1B5B" sequences in cursor movements to "1B4F".

If you're not familiar with what I mean by "Transmitted codes", all I'm saying is that when you press a key (e.g., CLEAR under VT52), the codes 1B (ESCape) 48 ("H") 1B (ESCape) 4A ("J") will be transmitted across the modem.

[ALT]-[S] Buffer checksum

This command adds together the 8-bit values of the bytes in the buffer and comes out with an 8-bit checksum value. The only real use for this is to check a file after it's been received to make sure the receiver got the file properly. Since Xmodem and Ymodem have their own error detection and correction processes, this command's value will lie in ASCII transfers.

The larger the file is, the longer you'll have to wait to be told the calculation of the CRC.

[ALT]-[T] Buffer Toggle

Any incoming text can be stored in the text buffer for future saving to disk or transmission. To open or close the buffer, press [ALT]-[T]. When the buffer is open, the cursor will change to a block and an "*" will appear on the top status line. When closed, the cursor will appear as an underscore.

[ALT]-[V] Ultimaterm Version

This is just a single window that serves no other purpose than to display the version of Ultimaterm that you are using.

[ALT]-[X] Transfer Files

The "Transfer Files" section allows you to transmit or receive files using three different methods. Ultimaterm also allows files to be sent from the text buffer or right from disk (or ramdisk if 512K is present). When you select [ALT]-[X] the following window will appear:

Transfer Files

T	Transmit Buffer
R	Receive Buffer
S	Xmodem Send
U	Ymodem Send
X	Xmodem Receive
Y	Ymodem Receive
D	File Transfers to DISK

"Transmit Buffer" simply sends the contents of the buffer across the modem in a straight ASCII dump. If a CAN (^X) is received from across the modem or you press [SHIFT]-[BREAK] (ESC), the transmission will be aborted.

"Receive Buffer" simply waits for an ASCII transmission from across the modem and then opens the buffer and captures all incoming text. If no text is received within one minute of selecting "Receive Buffer" then the message "Timed out on Remote" will be displayed. If, after the transmission is started, no text is received within two seconds, then Ultimaterm will assume a successful transmission and close the buffer. If "Auto-Clear" is enabled, Ultimaterm will not clear the buffer until the first character is received. This allows you to abort the transmission with [SHIFT]-[BREAK] and not loose any contents in the buffer.

Pressing [D] allows you to perform Xmodem or Ymodem transfers to/from disk. When disk is selected, the choice on the menu will change from "File Transfers to DISK" to "File Transfers to BUFFER". Press [B] and Xmodem or Ymodem transfers will be performed to/from buffer. The status of the disk/buffer flag is saved with the default options.

If transfers to disk are selected and you choose Xmodem or Ymodem Receive then the top five lines are scanned for a filename. First it looks for the word "File" in any case. Then it looks for a ":" within ten characters from the word "File". Finally it skips over any spaces (up to ten) to the filename which it reads in and converts to uppercase. Correct formats which Sysops might want to implement in their file sections could be as follows:

```
    File     : Ultimate.bin
or  FILENAME: ULTIMATE.BIN
or       File:      Ultimate.BIN
```

I'm sure you get the idea.

"Xmodem Send" allows you to transmit a file from either disk or buffer using Ward Christensen's original protocol or the CRC option as explained by John Byrns in "XMODEM/YMODEM PROTOCOL REFERENCE" edited by Chuck Forsberg.

"Ymodem Send" allows you to transmit a file from either disk or buffer using the Ymodem protocol explained by John Byrns in the aforementioned document.

"Xmodem Receive" allows you to receive a file to disk or buffer using either the original Xmodem checksum protocol designed by Ward Christensen or the Xmodem CRC protocol explained by John Byrns.

"Ymodem Receive" allows you to receive a file to disk or buffer using the Ymodem protocol explained by John Byrns.

If you are receiving to disk, you will be asked for the filename, extension and drive to receive to (select drive 4 to receive to ramdrive) and then you will be asked for the file type (ASCII, BASIC binary, etc.).

If you are transmitting from disk, you will be asked for the filename, extension and drive of the file you wish to send.

The X/Ymodem window will pop up and transmission will start. First thing that happens is the CRC option is attempted. A "C" is sent across the line signaling the transmitter that Ultimaterm will accept the transmission using CRC protocol. If the receiver doesn't work with CRC, it will ignore the three attempts Ultimaterm makes at CRC and should catch when Ultimaterm switches over to checksum.

If, after ten attempts at checksum, no response is received from the transmitter, Ultimaterm will print the window "Timed Out" and ask if you would like to try again. If you select yes, Ultimaterm will restart the transmission making three attempts at CRC and ten attempts at checksum. If you say no, you will be returned to terminal mode.

While the transmission is coming across, you will get to watch it through a 20 byte window along the bottom of the Xmodem Receive window.

At any time during ANY transmission (be it Xmodem or Ymodem) you can abort the transfer by pressing [SHIFT]-[BREAK] (ESC). If you're receiving a file, Ultimaterm will wait until the transmitter stops sending the current block and then let the sender know the transmission is aborted.

If you are receiving a file to disk, and the disk becomes full to capacity, the transmission will be aborted to save you any further charges on long distance transmissions.

The formal definition of the CRC calculation is "The message polynomial is first multiplied by X^16 and then divided by the generator polynomial (X^16 + X^12 + X^5 + 1) using modulo two arithmetic. The remainder left after the division is the desired CRC" (XMODEM/YMODEM PROTOCOL REFERENCE, Edited by Chuck Forsberg, 5.1.1 Formal Definition (CRC Calculation)).

A sample calculation under 'C' (right from the above source) is

```
/* This function calculates the CRC used by the XMODEM/CRC
   Protocol.
 * The first argument is a pointer to the message block.
 * The second argument is the number of bytes in the message
   block.
 * The function returns an integer which contains the CRC.
 * The low order 16 bits are the coefficients of the CRC.
 */

int calcrc (ptr, count)
char *ptr;
int count;


    int crc, i;

    crc = 0;
    while(--count >= 0)
        crc = crc ^ (int)*ptr++ << 8;
        for (i=0; i < 8; ++i)
             if(crc & 0x8000)
                 crc = crc << 1 ^ 0x1021;
             else
                 crc = crc << 1;

    return (crc & 0xFFFF);
```

Since I don't understand 'C' yet, and the formal definition went above my head, CRC seemed an impossibility until Rex Hebert sent me the OS9 assembled source under the 6809 which he in turn got from Delphi. In Ultimaterm V3.0 I waited until the block was received and then calculated the CRC on the block. In Ymodem transmissions, block lengths of 1024 characters caused a noticeable delay while the CRC was being calculated and I realized that this delay would be costing users of DELPHI and CIS a bit extra money. I rewrote my CRC calculation subroutine so that as each character was received, it would be added to the 16 bit CRC which would be started at zero.

Because the original CRC calculator was not written by me, I would like to offer the subroutine used in Ultimaterm to public consumption. It is as follows:

```
*
* CRC Calculator for X/Ymodem
*
* enter with (A) holding the byte to add
* to the CRC.  Exit with the two-byte
* variable 'CRC' holding the updated CRC
* calculation.
*
CRC     FDB   $0000     Variable to hold the CRC
CRCVAR  FCB   $00       Variable to count the SHIFTs
*
CALCRC  PSHS  D         Preserve registers used
        LDB   #8        Get ready for the 8 bit shift
        STB   CRCVAR    Hold it for later
        EORA  CRC       XOR byte to the CRC
        LDB   CRC+1     Make (D) the entire CRC value
CRC1    ASLB            Rotate the (D) register to get the
        ROLA            dropped bit (X^16) in the carry flag
        BCC   CRC2      Branch if not X^16
        EORA  #$10      Otherwise XOR with the rest of
        EORB  #$21      the polynomial (X^12 + X^5 + 1)
CRC2    DEC   CRCVAR    All 8 bits shifted through?
        BNE   CRC1      Not yet
        STD   CRC       Else save the new CRC
        PULS  D,PC      and return
*
```

With the CoCo 3 running at double speed, the above CRC routine doesn't seem to slow down any running 2400 baud through the serial port. To save a few extra cycles, I have the CRC variables in direct page ram.

Ultimaterm Clock files

One thing Ultimaterm had that many people liked was the ability to support a hardware or software clock. To add the clock display to Ultimaterm, one had to run a program called "ADDCLOCK.BAS" which appended the ML clock to Ultimaterm so they would both be loaded at the same time. Unfortunately, in the course of it's travel to Delphi, Ultimaterm ended up some 512 bytes shorter than when it left me, and the appending of the clock didn't work.

All you have to do for Ultimaterm V4.0 is rename the clock file you wish loaded to "ULTCLOCK.BIN" and when you LOADM Ultimaterm, it will load that file automatically. I have included three sample clock files with Ultimaterm for some of the more common real time clocks that are available for the CoCo. The first of these files is called "MC146818.CLK" and allows the displaying of time using that particular clock chip. The Speech Systems RTC will work with that clock file as will most home-made clocks. The second file is called "DISTO.CLK" and will work with the Disto clock or any other clock that uses the MSM5832 chip.

The third clock file that comes with Ultimaterm is a software clock. If the software clock is selected and loaded into memory by Ultimaterm, then the time can be set from the terminal mode with [ALT]-[Z]. The software clock is by no means reliable, but will give you a general impression of just how long you've been using a system. The clock speed will vary with what baud rate you have and whether you use the serial port or the RS232 pak.

Ultimaterm Clock files

One thing Ultimaterm had that many people liked was the ability to support a hardware or software clock. To add the clock display to Ultimaterm, one had to run a program called "ADDCLOCK.BAS" which appended the ML clock to Ultimaterm so they would both be loaded at the same time. Unfortunately, in the course of it's travel to Delphi, Ultimaterm ended up some 512 bytes shorter than when it left me, and the appending of the clock didn't work.

All you have to do for Ultimaterm V4.0 is rename the clock file you wish loaded to "ULTCLOCK.BIN" and when you LOADM Ultimaterm, it will load that file automatically. I have included three sample clock files with Ultimaterm for some of the more common real time clocks that are available for the CoCo. The first of these files is called "MC146818.CLK" and allows the displaying of time using that particular clock chip. The Speech Systems RTC will work with that clock file as will most home-made clocks. The second file is called "DISTO.CLK" and will work with the Disto clock or any other clock that uses the MSM5832 chip.

The third clock file that comes with Ultimaterm is a software clock. If the software clock is selected and loaded into memory by Ultimaterm, then the time can be set from the terminal mode with [ALT]-[Z]. The software clock is by no means reliable, but will give you a general impression of just how long you've been using a system. The clock speed will vary with what baud rate you have and whether you use the serial port or the RS232 pak.

Ultimaterm's Keyboard

Another area of Ultimaterm not left untouched was the keyboard driver. I wrote a new one that allows much better control over the speed and delay of the key repeat.

Besides all the regular keys (like [A], [S], [D] and [F]) I have assigned a few unique values to a few keys or key combinations (some you know of course). They are as follows:

To generate		Press
Up arrow pic		[^@]
Caret	^	[SHIFT]-[@]
Underscore	_	[SHIFT]-[up arrow]
Left Brace	[	[SHIFT]-[dn arrow]
Right Brace	]	[SHIFT]-[rt arrow]
DELETE ($7F)		[SHIFT]-[lf arrow]
Right parenthesis		[F1]
Pipe		[F2]
Left parenthesis		[SHIFT]-[F1]
Tilde		[SHIFT]-[F2]
^C ($03)		[BREAK]
BS ($08)		[lf arrow]
TAB ($09)		[rt arrow]
LF ($0A)		[dn arrow]
VT ($0B)		[up arrow]
FF ($0C)		[CLEAR]
CR ($0D)		[ENTER]
ESC ($1B)		[SHIFT]-[BREAK]

All [CTRL] key combinations are also enabled.

Screen Control

Certain characters or combinations of characters will perform various controls over the screen. The following lists the characters and what they do no matter what terminal emulation is set:

Character rcvd		What it does
BEL	($07)	Rings Ultimaterm's bell
BS	($08)	Backs the cursor up one column
HT	($09)	Moves the cursor to the next 10's column
LF	($0A)	Moves the cursor down one row
VT	($0B)	Moves the cursor up one row
FF	($0C)	Clears the screen, homes the cursor
CR	($0D)	Moves cursor to column 0 of the same row

DEC VT-52 Control Codes

The following is a list of the supported VT-52 control codes that are received or transmitted when Terminal Type is set to VT52:

<ESC> A	Move cursor up
<ESC> B	Move cursor down
<ESC> C	Move cursor right
<ESC> D	Move cursor left
<ESC> E	Erase screen
<ESC> H	Home cursor
<ESC> I	Reverse LF with scroll
<ESC> J	Erase from cursor to end of screen
<ESC> K	Erase from cursor to end of line
<ESC> Yrc	Move cursor to row (r-32), column (c-32)
<ESC> Z	Identify
<ESC> /Z	Response to Identify
<ESC> b	Erase from cursor to start of screen
<ESC> j	Save cursor position
<ESC> k	Restore cursor position
<ESC> l	Erase line
<ESC> o	Erase from cursor to start of line
<ESC> p	Light background
<ESC> q	Dark background
<ESC> x2	Key click off
<ESC> x5	Cursor invisible
<ESC> y2	Key click on
<ESC> y5	Cursor visible
<ESC> <	Use VT-100 escape sequences

The following is a list of the supported VT-52 functions and the keys they are assigned to when Terminal Type is set to VT52 and the VT Keypad is on (ALT-Q):

Ultimaterm keys	DEC VT-52 FUNCTION	TRANSMITTED CODES (hex)
Control-I	Horizontal Tab	09
Shift Left Arrow	Character Delete	7F
Shift @	Home Cursor	1B48
Up Arrow	Cursor Up	1B41
Down Arrow	Cursor Down	1B42
Right Arrow	Cursor Right	1B43
Left Arrow	Cursor Left	1B44
CLEAR	Clear Screen	1B481B4A
Shift ENTER	Erase end of line	1B4B
ALT 0	Keypad Application mode 0	1B3F70
ALT 1	Keypad Application mode 1	1B3F71
ALT 2	Keypad Application mode 2	1B3F72
ALT 3	Keypad Application mode 3	1B3F73
ALT 4	Keypad Application mode 4	1B3F74
ALT 5	Keypad Application mode 5	1B3F75
ALT 6	Keypad Application mode 6	1B3F76
ALT 7	Keypad Application mode 7	1B3F77
ALT 8	Keypad Application mode 8	1B3F78
ALT 9	Keypad Application mode 9	1B3F79
ALT - (dash)	Keypad Application mode - (dash)	1B3F6D
ALT , (comma)	Keypad Application mode , (comma)	1B3F6C
ALT . (period)	Keypad Application mode . (period)	1B3F6E
ALT ENTER	Keypad Application mode ENTER	1B3F4D
ALT F1	Program Function 1 (PF1)	1B50
ALT F2	Program Function 2 (PF2)	1B51
ALT F3	Program Function 3 (PF3)	1B52
ALT F4	Program Function 4 (PF4)	1B52

DEC VT-100 Control Codes

The following is a list of the supported VT-100 control codes that are received or transmitted when Terminal Type is set to VT100:

<ESC> 7	Store cursor location and attributes
<ESC> 8	Get cursor location and attributes
<ESC> D	Index (same as linefeed)
<ESC> E	New line (go to first column of next line)
<ESC> M	Reverse linefeed
<ESC> Z	Identify (not recommended.. see ESC [c)
<ESC> <	Sets terminal for ANSI escape sequences
<ESC> >	Sets auxiliary keypad to numeric
<ESC> =	Sets auxiliary keypad to escape sequences
<ESC> [xA	Move cursor up x lines
<ESC> [xB	Move cursor down x lines
<ESC> [xC	Move cursor right x lines
<ESC> [xD	Move cursor left x lines
<ESC> [r;cH	Move cursor to row r, column c
<ESC> [0J	Erase from cursor to end of screen
<ESC> [1J	Erase from cursor to start of screen
<ESC> [2J	Erase entire screen
<ESC> [0K	Erase from cursor to end of line
<ESC> [1K	Erase from cursor to start of line
<ESC> [2K	Erase entire line
<ESC> [0c	Identify
<ESC> [?1;0c	Response to Identify
<ESC> [r;cf	Move cursor to row r, column c
<ESC> [?1h	Cursor keys generate application control functions
<ESC> [?2h	Use VT-52 escape sequences
<ESC> [?5h	White screen background
<ESC> [>4h	Home and Clear on FF
<ESC> [>14h	Half duplex
<ESC> [?1l	Cursor keys generate ANSI cursor control sequences
<ESC> [?5l	Black screen background
<ESC> [>4l	LF on FF
<ESC> [>14l	Full duplex
<ESC> [m	Default attributes (white on black, no attributes)
<ESC> [0m	Default attributes (white on black, no attributes)
<ESC> [4m	Turn underline attribute on
<ESC> [7m	Inverse letters
<ESC> [5n	Device Status Report
<ESC> [0n	Term OK (echoed back for DSR)
<ESC> [6n	Cursor Position Report
<ESC> [r;cR	Cursor is at row r, column c (echoed back for CPR)
<ESC> [t;br	Set top and bottom margins (for scroll)
<ESC> [h;m;st	Set time to h:m:s
<ESC> [0v	Visible cursor
<ESC> [1v	Invisible cursor
<ESC> [2v	Cursor is underline
<ESC> [3v	Cursor is block

The following is a list of the supported VT-100 functions and the keys they are assigned to when Terminal Type is set to VT100 and the VT Keypad is on (ALT-Q):

Ultimaterm keys	DEC VT-100 FUNCTION	TRANSMITTED CODES (hex)
Control-I	Horizontal Tab	09
Shift Left Arrow	Character Delete	7F
Shift @	Home Cursor	1B5B48
Up Arrow	Cursor Up	1B5B41
Down Arrow	Cursor Down	1B5B42
Right Arrow	Cursor Right	1B5B43
Left Arrow	Cursor Left	1B5B44
CLEAR	Clear Screen	1B5B481B5B324A
Shift ENTER	Erase end of line	1B5B4B
ALT 0	Keypad Application mode 0	1B4F70
ALT 1	Keypad Application mode 1	1B4F71
ALT 2	Keypad Application mode 2	1B4F72
ALT 3	Keypad Application mode 3	1B4F73
ALT 4	Keypad Application mode 4	1B4F74
ALT 5	Keypad Application mode 5	1B4F75
ALT 6	Keypad Application mode 6	1B4F76
ALT 7	Keypad Application mode 7	1B4F77
ALT 8	Keypad Application mode 8	1B4F78
ALT 9	Keypad Application mode 9	1B4F79
ALT - (dash)	Keypad Application mode - (dash)	1B4F6D
ALT , (comma)	Keypad Application mode , (comma)	1B4F6C
ALT . (period)	Keypad Application mode . (period)	1B4F6E
ALT ENTER	Keypad Application mode ENTER	1B4F4D
ALT F1	Program Function 1 (PF1)	1B4F50
ALT F2	Program Function 2 (PF2)	1B4F51
ALT F3	Program Function 3 (PF3)	1B4F52
ALT F4	Program Function 4 (PF4)	1B4F52

ANSI-BBS Control Codes

The following is a list of the supported ANSI-BBS control codes that are received or transmitted when Terminal Type is set to ANSI:

<ESC> [xA	Move cursor up x lines
<ESC> [xB	Move cursor down x lines
<ESC> [xC	Move cursor right x lines
<ESC> [xD	Move cursor left x lines
<ESC> [r;cH	Move cursor to row r, column c
<ESC> [0J	Erase from cursor to end of screen
<ESC> [1J	Erase from cursor to start of screen
<ESC> [2J	Erase entire screen
<ESC> [0K	Erase from cursor to end of line
<ESC> [1K	Erase from cursor to start of line
<ESC> [2K	Erase entire line
<ESC> [xL	Inserts x blank lines at cursor line
<ESC> [xM	Deletes x lines including cursor line
<ESC> [x@	Inserts x blank characters at cursor
<ESC> [xP	Deletes x characters including cursor character
<ESC> [r;cf	Same as <ESC> [r;cH (not recommended)
<ESC> [6n	Cursor Position Report
<ESC> [r;cR	Cursor is at row r, column c (echoed back for CPR)
<ESC> [s	Save cursor position
<ESC> [u	Restore cursor position
<ESC> [m	Default attributes (white on black)
<ESC> [4m	Set underline attribute
<ESC> [5m	Set flashing attribute
<ESC> [7m	Invert colors
<ESC> [3xm	Set foreground color to 'x'
<ESC> [4xm	Set background color to 'x'

For foreground and background colors,

when 'x' is '0', color selected is black
when 'x' is '1', color selected is red
when 'x' is '2', color selected is green
when 'x' is '3', color selected is yellow
when 'x' is '4', color selected is blue
when 'x' is '5', color selected is magenta
when 'x' is '6', color selected is cyan
when 'x' is '7', color selected is white

NOTE: In a default save, the current attribute is saved, so you can select a color display you like and save it for each time you use Ultimaterm.

Vidtex Control Codes

These are taken from the manual to "Greg-E-Term" with only three differences to GETERM.. Ultimaterm responds with "ULTIMATERM 4.Ø" for the Interrogate command.. Ultimaterm will always reset to it's default palettes and not those according to Extended Color Basic.. and Ultimaterm will not allow it's screen to be altered from the 8Øx28 display it is at. It returns a NAK for the screen mode command.

The following is a list of supported Vidtex control codes that are received or transmitted when Terminal Type is set to Vidtex:

<ESC> A	Move cursor up
<ESC> B	Move cursor down
<ESC> C	Move cursor right
<ESC> D	Move cursor left
<ESC> H	Home cursor
<ESC> I	Interrogate: Ultimaterm responds "ULTIMATERM 4.Ø"
<ESC> J	Clear to end of screen
<ESC> K	Clear to end of line
<ESC> Yrc	Move cursor to row (r-32), column (c-32)
<ESC> j	Clear screen, home cursor
<ESC><EOT> Ax	Set attribute to 'x'
<ESC><EOT> Bx	Set border color to 'x'
<ESC><EOT> C	Returns $FF for CoCo 3
<ESC><EOT> D	Forces Ultimaterm to 8n1
<ESC><EOT> I	Interrogate: Ultimaterm responds with $Ø7 for CoCo III 8Øx24 screen
<ESC><EOT> Ppc	Set palette 'p' to color 'c'
<ESC><EOT> Rx	Set palettes to default; ignores x
<ESC><EOT> Sx	Ignores this command, returns NAK ($15)