

# ZTerm

Version 0.85  
31 Oct 89

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Latest version and support available from:  
GENie Mac RT, Category 5, Topic 8  
CompuServe: Mac Productivity Forum / Telecom library

ZTerm is a shareware telecommunications program for the Macintosh. It features ZModem, YModem, XModem and CIS Quick-B file transfers, VT100 & ANSI-BBS emulation, including colors, and an efficient scroll back buffer (size is limited by available memory). It uses a Phone List file to hold many Dialing setups. Each setup contains the phone number, port settings and many other settings. Each dial setup appears in the Dial menu to allow easy connection to all of the services you connect to. MultiFinder friendly. It supports 9 and 12 point text and a resizable terminal window. THE FINE PRINT: No scripting yet. It requires 512k, the 128k ROM or later and System 4.1 or later. The shareware fee is \$30 (registration only) or \$40 (registration with disk).

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## Change Summary

31 Oct 89 - v0.85 - program size 145,374 bytes

- Print selection.
- Better ANSI-BBS emulation.
- Auto Detection of certain binary file types and setting an appropriate file creator and type.
- Certain file types will be sent as Binary, such as GIF files.
- Buffered keyboard window (good for online conferences).
- CIS Quick-B uploads.
- XModem downloads will assume its MacBinary and only ask for a file name if its not MacBinary (when the transfer is complete).
- Cancel or ESC during Dialing will hang up the modem. (Return will exit the Dialer, but not hang up.)
- Term window can be scrolled while a transfer or Dial is in progress. (Don't hold down the button for too long or you will hold up the transfer.)
- Break duration can now be set, plus there is now Shift Break (with its own duration) and a Break item in the Misc menu.
- Confirmation of Quit, Hangup and Clear Buffer commands are now optional.
- Option in modem settings to Hangup by dropping DTR for one second.
- Option to ignore BEL characters (this is good if your beep sound is long).
- Option to use a block cursor.
- Option to disable the Xfer Log file.
- If received file already exists, offer NewName, Skip, Overwrite options.
- Added option in batch upload file selection to allow you to enter the name sent to the host. (Also now defaults to 8.3 filenames).
- Added Dial timeout setting in Modem setup.
- Added buffering of received file data (reduces disk accesses).

29 May 89 - v0.8 - program size 133,461 bytes

- Terminal window is now resizable with zoom box.
- You can scroll around in the buffer while data is coming in (it no longer jumps to the bottom).
- CompuServe QuickB protocol now supported for downloads.
- Dialer will now handle various modem responses, including progress messages like DIAL TONE and RINGING.
- Added Set Receive Folder to Settings menu (this is a global setting).
- Added global option to capture text by line (strips escape sequences).
- Added Copy to Modem command (same as Copy, then Paste).
- Added line prompt char to text pacing.
- Shift-Dial Marked will mark all, then start queue dialing; Option-Shift-Dial Marked will unmark all entries.
- Added vt220 codes for the Func keys on the extended keyboard.

19 Feb 89 - v0.75 - program size 120,105 bytes

New Features: (See Change History file for more detail).

- redial until connected and Queue dialing
- hardware handshake support
- YModem-g support
- added cursor positioning by Option-clicking in the terminal window.
- ZModem file transfers (Send) will now adjust the packet size depending on line conditions (when Auto packet size selected)
- the escape control characters option now works for ZModem transfers
- macro strings and modem initialization string can now be changed from ZTerm
- text pacing can now be set to a delay after each character or wait for the character echo
- X/YModem receive now has 3 options: try CRC w/fallback to checksum; checksum only; or CRC with 1K request (sends CK)
- AutoLF can now be turned off.

02 Jan 89 - v0.7 - First public release - program size 104,157 bytes  
28 Sep 88 - v0.7a1 - First test release

## 1. Introduction

### Getting Started

To add a new setup to the Dial menu, select the "Setups..." command from the Dial menu, type the name of the BBS or service, then click the New button. It will ask for the phone # and all other settings are copied from the current settings.

**Default Setup:** Hold down the Command key while choosing a setup from the Dial menu. This will outline the name in the Dial menu and the next time you run ZTerm, it will start with that setup. Also, the default file conversion and send and receive protocols (saved for each setup) are set by holding the Command key when you select the item.

When selecting setups from the Dial menu, holding down Option will change the settings without dialing; holding down Shift will mark the entry (or unmark) for Queue dialing (Dial Marked).

**ZModem Receive:** ZTerm has AutoDownload for ZModem transfers. When the other computer tries to start a ZModem transfer, ZTerm will detect it and start receiving.

**CompuServe Quick-B Receive:** This has no menu entry; CIS will send a sequence that will start the download. Note: You must enable this option in the Xfer Options Settings.

### X Y Z Modem

XModem, YModem and ZModem are names of file transfer protocols, which are a set of rules that two computers can use to send a file from one computer to the other. A protocol will usually provide error detection and correction, by re-sending the portion that was received in error. XModem is the first public domain protocol developed for use with microcomputers and is one of the most widely supported. It was developed by Ward Christensen back in 1977.

YModem is a variation of XModem that sends an additional block of information before the file is sent. This block zero contains the file name, size and modification time and date. Because the file name is sent with the file data, files could be sent in batches, which is why this protocol is sometimes referred to as YModem-Batch. YModem was developed by Chuck Forsberg in his YAM (Yet Another Modem) program.

YModem-G is a variation of YModem that is useful for direct connections to another computer or error correcting modems. The receiver does not send any ACKs, so the sender just pumps it out as fast as it can. If an error is detected, the transfer is stopped. There is no error recovery.

The ZModem protocol was developed for the public domain under a Telenet contract. Its goal was to "alleviate the throughput problems network customers were experiencing with XMODEM and Kermit file transfers." It was developed by Chuck Forsberg/Omen Technology. It overcomes many weaknesses of older protocols and adds several useful capabilities. For additional information on the ZModem protocol, look for the file YZMODEM.ARC available on many BBS's, including TeleGodzilla: 503-621-3746.

### Registration and Support:

After using ZTerm for 30 days, you must either register or delete any copies that you have. Registration has the following benefits: support of the development of quality Mac software, use of ZTerm without a guilty conscience, details of future plans and telephone support. Registration only is \$30; Registration with Disk of current release is \$40. Purchase Orders must order the registration with disk (most companies like to receive something before paying the bill). All payments must be made in US funds. If you don't have the registration form (ZTerm Registration), just send your check and your name, address to:

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### International Users:

Registration must be made in US funds. One user from Australia asked if he could pay by VISA. Sorry, this operation isn't big enough for that at this point.

Support is currently available by leaving me a message on GENie, in the Mac RT Bulletin Board, Category 5, Topic 8. On CompuServe, leave a message in the MacPro forum, section 8 (Telecomm) to 72155,1560. You can also leave a message on the MacCincinnatus/AppleSiders BBS, (606)-572-5375. I also read the EchoMac conference regularly. Registered users will get my phone number for support.

The latest version of ZTerm will always be available in the Mac RT on GENie, in CompuServe's MacPro forum and on MacCincinnatus. Note that MacCincinnatus requires validation by the sysop before download privileges are given. The board is primarily for use by members of AppleSiders; I can't guarantee download privileges to anyone. Also, I am NOT the sysop of MacCincy. They are allowing me to offer ZTerm support on the board because they want to encourage the development of quality Mac software.

### **Acknowledgements:**

I would like to thank my beta testers: Gary Shell, Gary Johnston, Ron Duritsch and Bill Johnson. Also the MacCincinnati Programmers SIG, who provided ideas and comments at our August 1988 meeting. To Chuck Forsberg, for designing a top-notch transfer protocol in ZModem. To my wife, for her understanding and patience. To everyone who has made useful comments and suggestions. And a special thanks to those who have supported ZTerm development by registering.

### **Current Performance:**

Writing to the screen is fairly fast. With a 9600 bps direct link to another computer, I got 600 to 620 cps with some text files and around 350 cps for some program source files. The difference between the two types of files is probably due to the source files having a greater number of short or blank lines, so more scrolling was involved.

ZTerm has a feature to test throughput of writing to the screen: if you type Command-RETURN, it will send a return to the other system and will start counting characters received. When the characters stop (one second of nothing received), it will stop the test and report the throughput.

File transfers should be performing very efficiently at 2400 bps and lower. At 2400, I am getting 90 to 95% efficiency on ZModem transfers. At higher speeds, program overhead gets in the way and it's not so efficient. 9600 bps usually gets 80 to 90% efficiency.

High Speed Modem Users: If you are getting errors during file downloads to your hard disk, you might want to try downloading to a floppy. The Mac's floppy disk driver will coordinate with the modem port to reduce the loss of incoming data.

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### **Notes:**

Some options in the ZModem Params dialog are not implemented: Pause when writing and Receive Timeout.

Cut and Clear in the edit menu will not remove text from the current screen (text that has not yet been scrolled into the buffer).

Color - I do not have a Mac II, so it might not be perfect. I have done some testing at local stores and a couple of my beta testers have Mac II's and say it is working fine. One thing I noticed is that sometimes when selecting text, it was not highlighted, but it was selected (save, copy, etc still worked properly).

I have received some comments concerning the Setups dialog (for adding, deleting and renaming setups). I will agree that it is somewhat awkward. I will be changing this in the future.

Lisa and 64k ROM users:

I have tried to make ZTerm tolerant of missing OS features. I don't have access to a Lisa or a 64k ROM machine, but I tested it with System 3.2 and it seemed to work. Hierarchical sub-menus will appear as separate menus. If the Script Manager isn't available, the Option key will not work as a control key. You could set up some macros to get some common control keys.

Several people have asked if I could write a ZModem external protocol driver for Mac based BBS's. That would be impossible at this point because I don't have any information on how to interface an external protocol to any Mac based BBS. Also, I have my work cut out for me on ZTerm.

ZTerm does not save any of its settings in the ZTerm file. All settings are stored in the PhoneList file. You can lock the ZTerm application for some protection against viruses.

## **Future Features**

ZModem RLE Compression.

Macro strings for the function keys on the extended keyboard.

Status bar.

A display of current receive volume & folder (in status bar) and a way to change it.

An option to not save lines in the scroll back buffer.

Scripting!

Additional transfer protocols. If there is a protocol that is supported by Mac-based BBS's, I will consider adding it.

## 2. General Features

### ZModem

The ZModem file transfer protocol is arguably one of the best general purpose file transfer protocols for personal computers. Some of its features include:

- various options to let it operate efficiently in a wide range of communication environments. The most common mode is full streaming, where there is no wait between blocks—the receiver only talks when he has an error.
- the sequence that starts a file transmission can be detected by the receiving communication software, which can then trigger its receive routines. This is sometimes referred to as AutoDownload.
- **Crash Recovery** - A file transfer that is interrupted by modem disconnection (or other reasons) can be restarted and it will pick up where it left off. Note: if the Mac crashes or loses power during a transfer, you may not be able to restart the transfer because the partial file was not closed by ZTerm.
- All ZModem transfers are batch transfers: multiple files can be sent per transfer, each file is sent with its file name, file size and date of last modification.
- 32 or 16 bit CRC's will error check all blocks: data blocks and control messages.

### File Transfers

For receiving files using the ZModem protocol, just start the sender and ZTerm will detect that it should start receiving files with ZModem. On the Opus BBS for example, to download the file “newfiles.txt” just type “dz newfiles.txt” and ZTerm will receive it.

For sending files using ZModem, ZTerm can send a command sequence to put the receiver in a receive ZModem mode. In the Settings menu, ZModem Parms will bring up a dialog that includes the command to send to put the other end into ZModem receive. For Opus, this should be set to “uz” followed by a return. When you select Send ZModem, you will first select what files to send. When you start the transfer, ZTerm will send the sequence from the ZModem Parms and then the transfer will start.

#### • Binary File Type Detection

ZTerm will now detect certain types of binary files, and set the appropriate creator and type for the kind of file. It detects the type by either looking for a specific sequence of bytes at the start of the file (a signature) or by matching the end of the file name (e.g. the extension of an MS-DOS file). See the file ZTerm & Binary files for additional information.

#### • Text Detection and Conversion

When ZTerm is receiving a file, it inspects the first 128 bytes to determine if it should be treated as a text file. If all of these bytes are Macintosh printable characters (in the range 20 hex to D8 hex) or typical text control characters (return, line feed, tab, etc), then it is considered a text file. The file type will be set to TEXT and ZTerm will perform End of Line conversion. If the text has CR/LF at each line end, ZTerm will filter out the LF. ZTerm currently does not filter any other control characters.

#### • Resume an Interrupted Download

If a download is interrupted by disconnection, Cancel, or whatever (but not a power failure - the file won't be closed properly) it can restart where it left off using ZModem. ZTerm has its own special file types (and icons) until the whole file is there. If you try to download a file and it's already in the current receive folder and it has the ZTerm partial file type, ZTerm will resume the download where it left off.

#### • Current Receive Volume and Folder

The Receive Folder item in the Settings menu lets you select a default download directory. It can be set to a folder on the same volume as ZTerm, or to the first or second floppy drive.

#### • MacBinary II

ZTerm supports the original MacBinary format for the complete transfer of Macintosh files and their additional file information. The MacBinary II standard (dated July 1987) is also supported. The file transfer status dialog will display either ‘MacBinary’ or ‘MacBinary II’ when that format is being used.

## **Performance Log**

Each time you transfer a file with ZTerm, it will place an entry in its performance log file. The file is named "ZTerm Xfer Log" and it is stored in the same directory as ZTerm. It is a standard TEXT file with TABs between each field, so it can be imported to many spreadsheets, databases, etc. If you are an extremely active telecommunicator, this file can grow quite big. You may want to rename the file at the end of the month to something like "Sep Xfer Log" and only retain the log from the last few months. The transfer log can be disabled in Global settings.

## **Transfer Efficiency, Benchmarks and other Lies**

I don't know if there is an accepted procedure for transfer efficiency calculation, so I will just explain how I am currently calculating efficiency. All ZTerm timings use the Macintosh TickCount, which has a resolution of 1/60th of a second.

For receiving files using ZModem or YModem, the clock starts when "block zero" (the block with the file name and other information) is received. This block zero is not the same as the MacBinary header. For XModem file receives, the clock starts just before the initial NAK (or whatever) is sent. The clock stops when all file data is received, written and the file is closed.

For sending files using ZModem or YModem, the clock starts after block zero is sent. For XModem, it starts when ZTerm starts waiting for the initial NAK. The clock stops on ZModem file sends when the ZRINIT response is received for the ZEOF message. For YModem and XModem, it stops when the ACK response is received for the EOT message.

The CPS figure (characters per second) is the total file bytes (does not include block zero) divided by seconds. The efficiency figure is CPS times 10 bits per data byte divided by BPS (bits per second, sometimes called baud rate).

## **MultiFinder**

ZTerm will operate in the background under MultiFinder. Once a file transfer is started, you can move ZTerm into the background.

## **Queue Dialing**

If there are several busy BBS's that you would like to connect to, you can mark them for Queue dialing and ZTerm will call each one, round robin, until you connect to one (or Cancel the dialing). Setups can be marked or unmarked by selecting the setup with the Shift key held down. ZTerm will automatically mark an entry when a dial attempt fails, and will unmark an entry when a connection is made.

## **Scroll Back Buffer**

To me, one of the most important features in terminal program is its scroll back buffer. This allows you to look back at words that zipped by on your screen a few minutes ago. It should be simple, unobtrusive and fast. ZTerm will save lines that are pushed off the screen by a line feed or a clear screen. It will not put more than two blank lines in a row in the buffer. This means if it receives a clear screen code and there are only two lines of information, you will NOT get 22 blank lines in the scroll back buffer (what a waste). The buffer is stored in memory and when the buffer fills up, ZTerm will try to allocate more memory for the buffer. If it cannot get more memory, ZTerm will remove lines from the top of the buffer (the oldest lines). The scroll back buffer does not store any character attributes—it only stores the text.

You can scroll around in the buffer while data is coming in, while a file transfer is in progress and when ZTerm is dialing.

The Find command in the Buffer menu allows you to search the scroll back buffer for a sequence of characters. The search always starts at the top of the buffer (the oldest line). After you have found an occurrence, if you click the Find button again it will find the next occurrence. If it beeps, the string could not be found.

When you select text in the scroll back buffer, you can Cut, Copy or Clear it, and you can save it to a text file (Save Selection). Cut and Clear will not remove text from the last 24 lines because it is not in the scroll back buffer yet. If the clipboard has text on it, Paste will start sending the text as if you were typing it, using the options selected in Text Pacing. Command-Period will cancel a Paste command.

### **Bonus Secret Feature #1:**

If you are using an Opus BBS system, and ask for a file listing and you see a file you would like to download, just hold down the Command key and double click on the file name. ZTerm will send "dz" followed by the name that you double clicked, then a RETURN. I would like to eventually make this feature more general to work with different systems.

### **Dial Menu (Setups)**

ZTerm uses the ZPhoneList file to hold setups for the various services or BBS's that you like to call. Each setup will appear in the Dial menu. The ZPhoneList file also contains some global settings that apply to all setups. You can have multiple phone list files. If you open ZTerm, it will look for ZPhoneList in the same folder and if its not there it will create it. However, you can double click on a phone list file and ZTerm will use it. You can create different phone files by renaming or duplicating one that ZTerm has created.

Each Dial setup will save all of the settings from the Settings menu above Global Settings except Show Controls. In addition, the default transfer conversion, and default send and receive protocol are saved with each setup. The default send and receive protocol for the current setup each appear in their own menu item and are accessible with Command-S and Command-R, respectively.

### **Keyboard Mapping**

ZTerm remaps the keyboard using the Toolbox's Script Manager. My primary motivation was to allow me to use the Option key like a control key, and to add arrow keys to my antique original keyboard.

If ZTerm's remapping is not desirable (if you have an international keyboard with a different layout or yours is modified for Dvorak), you can disable the remapping in the Global Settings.

For all keyboards:

Cmd-Enter	send a break
Control-4	^/ (FS)
Control-5	^] (GS)
Control-6	^^ (RS)
Control-7	^_ (US)

The mapping below is only for MacPlus and earlier keyboards:

UP	Option =
LEFT	Option [
Right	Option ]
Down	Option ' (These 4 make up a diamond on the old keyboards.)
ESC	` (Accent grave)

### 3. The Menus

#### The Apple Menu

The Apple menu has information about ZTerm and any desk accessories currently available.

About ZTerm... This brings up a dialog giving information about the program, the version number and registration information.

#### The File Menu

Start Capture... This is ASCII capture that will save all received characters to the selected file. When capture is active, the menu will read Stop Capture.

Send Ascii... After selecting a TEXT file, this will send the characters of the file. The transmission will be paced by options selected in the Text Pacing settings.

Receive File(s)... This menu has a sub-menu for the various protocol receive options. XModem receive will put up the normal Save dialog so you can select the file name and folder to put the received file in. The other options all get a file name from the sender and store the file in the current receive folder (currently the same as the default folder).

XModem XModem is one of the most popular transfer protocols for personal computers. The Xfer Options settings let you select what type of error checking is requested (CRC or Checksum). ZTerm's XModem will accept 1024 or 128 byte blocks; the sender selects the size of blocks.

YModem YModem is based on XModem, but the sending program also sends the file name, the size and the date of the file. This protocol is often called YModem Batch because many files can be sent in a batch.

YModem-G YModem-G is a variation of YModem that is meant for error free connections like a direct connection. There is no wait at the end of a block for the receiver to Acknowledge. The receiver only signals if an error occurs, in which case the transfer is stopped.

ZModem This is normally not needed because ZTerm detects the sender starting a ZModem transfer and automatically starts a ZModem receive. This is called AutoDownload in ZModem parlance. Files are stored in the current receive volume and folder. For example, if you are connected to an Opus BBS, you can type "dz stuffit.sit" and Opus will start the transfer. ZTerm will detect this and receive the file.

(Default Receive) The item after "Receive Files" in the File menu is the default receive option for the current Setup. You should set the default to the normal method you use to receive files for each setup. Then you can just select this item (or Command-R) to receive a file. The default can be set by holding down the Command key while selecting the desired method from the Receive Files menu.

Send File(s)... This menu has a sub-menu for the various protocol file send options.

XModem Send a file using the XModem protocol (with 128 byte blocks). The receiving program determines whether CRC or checksum is used for error detection; ZTerm will handle either.

XModem-1K Like XModem, above, but using 1024 byte blocks. Some communication software (including BBS's) mistakenly refer to this as YModem.

YModem-128 Send file(s) using the YModem protocol with 128 byte blocks. This is not normally used. You would usually want to use 1024 byte blocks whenever possible.

YModem-1K	Send file(s) using the YModem protocol with 1024 byte blocks.
ZModem	Send file(s) using the ZModem protocol. After the files are selected and Start is clicked, ZTerm will first send the characters set up in the ZModem Parms dialog. This is usually needed to get the other computer ready to receive files using the ZModem protocol. After these characters are sent, the transfer will begin.
(Default Send)	The next item in the File menu is the default send option for the current Setup. You should set the default to the normal method you use to send files for each setup. Then you can just select this item (or Command-S) to send a file. The default can be set by holding down the Command key while selecting the desired method from the Send Files menu.
Xfer Convert	This menu has a sub-menu to select the desired file transfer conversion option. You can set the default conversion for each setup by holding the Command key while you select the desired conversion option.
Smart MacBinary	On receive, MacBinary files and text file are automatically detected and converted as appropriate. All other files are received as binary. On send, TEXT files are sent as text, files received as binary by ZTerm are sent as binary and all other files are sent as MacBinary II. This is the best option if you will be sending a mix of MacBinary files and other files.
Always MacBinary	This option would be useful when connected to another Macintosh. All files are sent as MacBinary II, even text files. Receive uses the same detection of Text and MacBinary files used by Smart MacBinary.
Binary Data	On receive, all files will be received as binary files with no conversion. On send, all files will be sent as binary and only the data fork will be sent.
Text	Receive with this option is a little more lenient in its text detection than Smart MacBinary. On send, the data fork of a file is sent with appropriate text conversion.
Save Selection	If there is a block of text selected in the scroll back buffer, this will put up the standard Save dialog to save the selection to disk.
Print Selection	This will print the text selection to the printer.
Quit	This will exit ZTerm. If the current setup has been changed, it will ask if the setup should be saved.

## **Edit Menu**

Undo	For use by DA's. Not used by ZTerm.
Cut	Copy the selection to the clipboard and then remove it from the scroll back buffer.
Copy	Copy the selection to the clipboard.
Paste	Start sending the text that is on the clipboard. This can be stopped by pressing Command-period.
Clear	This will remove the selection from the scroll back buffer.
Copy to Modem	Copy the selection to the clipboard, then paste.

Buffered Kbd This will open the Buffered Keyboard window. You can enter a line here and when you hit RETURN, the whole line is sent out the serial channel. This is especially useful for online conferences.

## Buffer Menu

This menu deals with the Scroll Back buffer, which holds all lines that have been scrolled off the screen (by a line feed or a clear screen). This buffer is in memory and if ZTerm cannot allocate more memory when the current buffer is full, it will throw away lines from the top of the buffer (the oldest lines). Also, it will not save more than two blank lines in a row.

Find... This will let you search the Scroll Back buffer. The search is case insensitive; searching for MAC will find Macintosh and Mac. The line that the match appears in will be selected (and highlighted). The search begins from the top of the buffer (the oldest line). Clicking on the Find button again will find the next occurrence. If you change the find string, it will reset the find position so that it will start again at the top of the buffer when you click Find again.

Clear Buffer... This option will clear all lines from the Scroll Back buffer. After you log off a service and have reviewed the buffer and printed or saved any portions that you want to preserve, you might clear the buffer before calling another service. This item will prompt you to make sure you want to clear the buffer if the confirmation option is enabled.

Stats... This will display information about the Scroll Back buffer: the number of characters and lines saved in the buffer, and the amount of memory allocated for the buffer.

## Dial Menu

Setups... This lets you create new entries in the Dial menu (new setups), and rename or delete existing setups. To make a new setup, type the new name into the Setups dialog and click on New. It will then put up the Phone number dialog so you can set that. The new setup will be added to the bottom of the menu. The next time you start ZTerm, it will be in its correct sorted position. To rename the current setup, enter the new name, then click on Rename.

Save Setup This will save the current settings to the current setup.

Dial Marked This will start queued dialing of all marked entries in the Dial menu. If no entries are marked, it will mark the current setup and just dial that one. Entries are marked by holding down Shift and selecting the entry. An entry is automatically marked when a dial attempt returns a non-CONNECT response. Hold down Shift when you select this and it will mark all entries; hold down Shift-Option and it will unmark all entries.

(setups) Selecting the name of a setup will change the settings as they were saved for the setup, then dial the phone number (if any) until a connection is made or the dialing is Canceled.

If you hold down Option when you select a setup, it will change the settings, but won't dial the phone number. If you hold down the Command key when you select a setup, that setup will become the default setup (and the menu item will be outlined). If you hold down Shift, the entry will be marked (or unmarked) for Queue Dialing.

## Settings Menu

Data Rate	This lets you set the data rate to the other device, be it a modem or another computer. The rate is in Bits Per Second.
Bits	This lets you set the number of data bits, stop bits and the parity. The most common settings are 8 data bits, 1 stop bit and no parity. Another common setting is 7 data bits, 1 stop bit and even parity.
Local Echo	When this is checked, characters that you type are immediately displayed on the screen by ZTerm. If the service you are calling echos the characters you type, Local Echo should not be checked. If it is, you will see double printing, LLIKKEE TTHHISS!! If you see double printing of what you type, you should remove the check on Local Echo.
Flow Control	Xon-Xoff Receive will enable ZTerm to send XOff when its serial input buffer is almost full. Xon-Xoff Send will cause ZTerm to stop sending data when Xoff is received from the other computer. Normally you will want these two to be the same: both on or both off. HW Handshake enables hardware handshaking for flow control. You must have a MacPlus or later to use this, and your cable must be wired correctly for hardware handshake. Also, Apple's serial driver seems to have a problem with input hardware handshaking, but it has been fixed in System 6.0.0 and later. With earlier System files, the Mac can freeze when it turns off the "DTR" line.
Show Controls	This is primarily a diagnostic tool to let you see control characters and escape sequences. This does not affect what is already on the screen; it only affects the display of incoming characters. The characters of an escape sequence will be displayed, but the function will not be performed (except carriage return and line feed).
Phone #...	This allows you to set or change the phone number to be dialed when the current service is selected. If the setup is for a direct connection, leave the phone number blank.
Terminal...	The terminal settings dialog lets you select various terminal emulation options. You can select if extended characters should be displayed. Turning Auto Line Feed on will cause a line feed when a return is received. Line feeds are ignored when they directly follow a return. If VT100 keypad is turned off, it will just send the character marked on the key.  You can select if the Backspace key should produce a RUBOUT (or DELETE) character code, which many DEC systems expect. Enabling Destructive Backspace will cause the previous character to be erased when the backspace code is received. You can select VT100 or PC ANSI-BBS emulation.
Text Pacing...	These options are used for ASCII send and Paste. Wait for character echo will wait for the host to echo the character. There is a five second timeout. If wait for echo is not selected, it will use the Delay between Characters and Delay between Lines (which is used after a return is sent).  If a Line Prompt Char is specified, it will wait for that character to be received after sending a Return. You can set this to a prompt character that your host uses when it is ready for the next line of text.
Xfer Options...	These options affect XModem and YModem file receives. Try CRC and fallback to Checksum is the normal procedure for X/YModem. Send CK for CRC-1K should be used for systems (like RRHost) which use this popular XModem extension to allow the receiver to request 1k blocks. Use Checksum Only could be used with systems that don't support XModem CRC error checking.

CompuServe Quick-B Protocol should be checked in your setup for CIS (if you have one). This will enable ZTerm to respond to the sequences that CIS uses to initiate QuickB transfers. Also, make sure you have 8 data bits, no parity selected, and the Strip Hi bits option on.

ZModem Parm... Some of the items in this dialog are not implemented yet. "Command to start receive at other end" lets you define the character sequence that will be sent to the other system when you want to start sending file(s) to it using ZModem. For Opus it should be "uz^M". ZTerm will send this string when you start a ZModem file send.

The next part of the dialog lets you select the SubPacket length for ZModem file sends. The sending system always makes this choice. The "Auto" option will choose a size depending on the data rate.

Escape Controls can be checked if any part of your transmission path chokes on control characters. ZModem always escapes ^P, ^Q, ^S, ^X and their high bit set counterparts. Escape controls will cause it to escape all control characters.

Global Settings... This dialog lets you select the type size for the terminal window (9 or 12 point), which serial port to use (printer or modem) and what creator code to use for TEXT files. The creator code is a 4 character sequence that identifies an application program. This will affect the icon displayed for a text file created by ZTerm and also selects the application that should be opened if you double clicked on the text file.

The logging of file transfers is enabled with the Log File XFers option. Capture Text by line will cause the capture function to write out the current line of text when a line feed is performed. This will strip out any escape sequences. If this is not checked, all characters (except LF) are written to a capture file. The Ignore Bell option will tell ZTerm not to beep when a bell character is received.

You can enable a confirmation request before Quit, Hang Up or Clear Buffer is performed. The duration of the break signal (and Shift Break) is set here, in 60ths of a second.

Macros... You can define the string that is sent for each macro key (Command-1 thru Command-0). Control characters can be entered with a ^ (caret) followed by the letter (^M for a return).

Modem... You can modify the modem initialization string in this dialog. This string is sent when ZTerm starts up (except when the default setup has no phone number, i.e. a direct connection). The string is also sent if you hold down Option when selecting Reset Term. You can also select Pulse dialing with the check box.

The Dial timeout is how many seconds ZTerm will wait for a response from the modem after sending a dial command. The Hardware Hangup option is an alternative (faster) way to tell a modem to hang up. The DTR line is only available on MacPlus and later machines. Your modem cable must be wired correctly for this to work, and your modem has to be set up correctly. (Some have a switch to ignore the DTR line.)

Color... This dialog lets you enable the use of color and make some color settings. Swap Black & White reverses the meaning of the escape sequences that set the foreground or background color to black or white. I don't know if it helps any, but I put this in because Opus likes to show colored text on a black background, which is the norm for the PC world. This option should make it more normal for the Mac world (white background). The Text and Background Default Colors are used when no ANSI sequence sets the colors to something else. The defaults are also used when you view text in the scroll back buffer.

Receive Folder... This will let you select a default receive folder for ZModem, YModem and Quick-B transfers. It can be set to a folder on the same volume as ZTerm, or to the first or second floppy drive.

## Misc Menu

Clear Screen Need I say more?

Send Break This will send a break signal. If the Shift key is down, it will use a different duration. The durations are set in Global settings.

Reset Term This function clears the screen, and resets many screen settings to a normal setting. If you hold down the Option key, it will also send the modem initialization string.

Purge Buffer This will purge any characters in the serial input buffer until there is two seconds of no data. It will timeout after 20 seconds of purging. If you hold down Option, it will write out a file with the contents of the serial input buffer (to help diagnose the garbage/noise problem).

Release Output If an XOFF was received, but no XON was received, output from ZTerm is held by the serial driver. The Release Output function will let the serial driver transmit data again. When output is held, the cursor is changed to a stop sign with a capital O in it and a slash through it.

Read Stats... This shows some statistics about the maximum number of characters that have been waiting in the serial driver's input buffer.

HangUp This will attempt to hang up your modem.

Help... This will display a dialog of ZTerm basics.

Support... This will display a dialog giving information on how to reach me.