

## Implementation/History of Development Notes

The following history log is current up to version 2.9.7 Jan 1,1989

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Program: **MiniTerm**© -- a simple terminal emulation program.

Written in MPW C v2.0

Converted to MPW 3.0b1 Nov 20,1988

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June 3,1987

If you find the program useful and if you can afford it, I would appreciate a donation of \$15.00. In any case I would appreciate any bug reports and suggestions.

### Version 2: Oct 9,1987

Initial Modem settings:

1200 baud, 8 bit data, one stop bit, no parity and the modem port is used. The port can be changed to the printer port by holding down the mouse key during the launch. A popup menu will appear and the user can then choose a port to attach to. The baud menu can be used to set the speed. Permanent changes require program modification.

(The program was designed to satisfy my immediate needs.)

Xmodem notes.

The Program supports three variations of the Xmodem protocol.

- a) MacBinary (the protection bit is never turned on)
- b) Text (only text files may be sent/received and lf's, nulls, and ctlZ's are stripped on reception. lfs are added after cr's on transmission.)
- c) Straight (only text files are sent / received, on reception data is written as received into the data fork of the log file.)

Xon/Xoff flow control is by default enabled,however during an Xmodem transfer flow control is turned off and upon completion is returned to its state before the transmission.

The default error correction is CCITT CRC (actually it is inverted from the data communications standard since the Xmodem protocol specifies transmission of the most significant bit first). On reception the CRC invitation will be offered three times and if not ACK'ed error correction will default to checksum. If you wish CRC's can be disabled, however at low speeds (1200 Baud) the difference is not worth the peace of mind that CRC checking provides. There is an option "Fast Down Load" that can be selected. This protocol delivers error detection but no error correction. The basic idea is that as soon as a packet has been received it will be ACK'ed so that the other end can immediately start sending the next packet while the current packet is being checked for validity. If an error is discovered the transmission will be aborted. I would not recommend this method unless you are running at a very high baud rate over a "noise free" connection.

The user of the program can chose to use 1024 byte buffers (the default of course is 128). This choice is only useful for very high speed connections. If the transfer is MacBinary the first block only contains the 128 byte MacBinary header. While this is wasteful its very easy to implement (just change the value of sectorSize).

Since heirarchial and popup menus are used it is essential that system file 4.1 or greater be used. During initialization the program checks for the existence of the PopUpMenuSelect trap and if not present the program will gracefully terminate.

This program has not been extensively tested but appears to be fairly reliable and the Xmodem transfers are very fast. My VAX 730 allows transfer rates at 103 to 105 bytes/second at 1200 baud (with CRC).

MacPaint takes less than 20 seconds to transfer at 56KB (checksum,1024 byte buffers and fast down load options).

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### **Version 2 additions:**

Version 2 offers a limited vt102 emulation. My keyboard mapping is a total kludge.I have only tested the program on a Mac Plus. All of the Dec Utilities seem to function properly.(ie edit phone mail monitor etc...)

I have completely rewritten the Dialer module. This module has no global variables and easily be ported to other applications needing a dialer.

This version of Miniterm introduces Paced Uploads. The User can specify a "pacing" character and a delay between characters. The program checks to see if there is a pace character on the current line prior to sending the next line.

Users can now specify blink/nonblinking, block/underline, or visible /invisible cursor.

One novelty of this program is the ability to "see" control characters. If Interpret Controls is not checked all control characters are displayed on the screen. This feature is especially helpful when trying to debug protocol problems.

Caveat: This is an experimental program. My main desire is to understand how emulators work in the Macintosh environment.

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### **Version 2.2 additions: Nov 25,1987**

Version 2.2 has added a Print Text File interface. Text files may be printed on either the ImageWriter or the LaserWriter. In addition there is the ability to upload pure PostScript files to the LaserWriter. This is done by using the TextIsPostScript Pic comment. One drawback is that no errors are returned.

Version 2.2 starts the development of an AppleTalk interface. Users of Miniterm can send up to 255 byte messages to one another.The arrival of a message from another person will cause a dialog box to pop up which contains the message. When the MiniTalk menu item is selected a dialog box is brought up. This dialog allows you to send and receive messages.

Two Beeps during the open means that you are not running version 48 or greater of appletalk and will not be able to send messages to yourself.

The "Chooser" User Name is the name used to identify each machine on the network so it is probably a good idea to make sure you have assigned a name with the Chooser.

**Dec 3,1987...**Miniterm is now multifinder compatible. XMODEM will run in the background(but a little slower). The main event loop will also run in the background so that text files can be up/down loaded.

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### **Ver 2.3 Dec 30 1987**

When I got the Mac II I found that I had been calling FlushVol with only one (and not the required two) parameters. This version also remaps the Keypad so that the VT100 stuff works for the Mac II and (hopefully) the SE. I also found that I had forgotten to place a break after a case in one of the switch statements.

I have developed a problem with running under Multifinder on a Mac II On the second call to WaitNextEvent the system crashes. The problem appears to be Menu related. My fix was to call WaitNextEvent several times prior to inserting any menus into the MenuBar.

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### **Ver 2.4 Feb 4,1988**

I have added 1K Xmodem using the YMODEM recommendations. This protocol allows either 1K or 128 byte packets. The 1K packets are introduced by an STX character rather than the SOH which is used for the 128 byte packets. On the send side if the 1024 byte buffer option is checked and a "C" arrives the clock is set with a two second timeout if a character arrives in time and is a "K" the 1024 byte buffers will be used. If no character arrives in time then 128 byte sized buffers will be used with CRC's. If a character arrives in time but is not a "K" then the previous "C" is ignored.

This version also uses MacBinary II format for all MacBinary uploads. If MacBinary is checked in the Xmodem Preferences menu then downloads are checked for both MacBinary and MacBinary II format.

In prior releases flow control was disabled for both send and receive xmodem. I have decided that during the send operation no harm can come from having flow control enabled and have modified the code to not disable flow control during SEND xmodem operations.

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### **Ver 2.5 Feb 20,1988**

This versions introduces big screen support. The program now supports screen sizes from 12 rows by 40 columns to 48 rows by 132 columns. In addition a "Zoom" box has been added the "standard configuration" is 24 rows by 80 columns. The initial Zoomed position is the minimum of 48 rows by 132 columns and the screen size. (38x101) on a bw monitor on a MAC II. VAX/VMS users need to do something like:

```
Set Term/Page=38/Width=101
```

So the DEC utilities can use the big screen.

Unix (System V) users need to define environmental variables and export them as follows:

```
LINES = 38
export LINES
COLUMNS = 101
export COLUMNS
TERM = vt100
```

export TERM

then vi can be invoked as

vi -w38 foo.baz

and the full screen will be used, I have been told that CURSES will also use the full screen.

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## **Version 2.6 Feb 23, 1988**

Added "Track Cursor" to options menu to show cursor position coordinates.

### **Feb 29,1987**

I had an interesting conversation with Don Wiedman at NASA/Ames Research Center near San Francisco, CA. A need was expressed for:

- a) User Managable Timeouts for Xmodem
- b) User manageable Parity and DataBits
- c) A Break Key
- d) Fixing problem with 1k Transfers. Some BBS's Use a "C" instead of "CK" invitation.

### **March 1,1988**

Mapped "Option Enter" to short (350 ms) break and "Shift Option Enter" to a long (3.5 Seconds) break.

Added an xmodem timeout dialog which allows the user to set variable timeouts. It is now possible to specify:

- 1) How long to wait for the initial handshake before timing out.
- 2) How long to wait for a ACK/NAK after sending a packet.
- 3) How long to wait for the start of a packet (SOH/STX)
- 4) How long to wait for the remainder of the packet after the SOH/STX has arrived.

Added a Use "C" or "CK" handshake for 1K packets via a menu choice. Enabled the parity and datasize menu items. I don't know if the modem also needs to be set. I simply reset the serial port. I also have fixed the xmodem transfer items to secretly set the serial port to 8 bits no parity prior to transmission /reception and then restore the original settings upon return.

Now I have to figure out how to test all the changes...

### **March 3,1988**

It appears that the Mac does NOT supply outgoing parity. I have rewritten output routines so that characters are supplied with the appropriate parity prior to being written to the port. I now keep the port in "noParity" condition and manage parity myself. All incoming characters are stripped to seven bits (except during XMODEM transfers) and parity is provided on output via software (except during XMODEM transfers). I have fixed the menus so that if eight bit is chosen from the data menu then even and odd on the parity menu are disabled. Parity is then set to None. When seven bit is picked on the Data Menu the even and odd items are enabled in the Parity Menu. When the Size is picked I do a SerReset to set the size, I have not found any problems so far...

**Mar 5,1988**

Well it turns out that the Mac DOES support outbound parity. I was forgetting to place a "break" after selecting seven bits. This caused a fall through to the "select 8 bit" menu item. Evidently the Mac unconditionally sets parity to none/space when eight bit is chosen. Everything appears Ok...

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**Ver 2.7 March 6,1988**

I have added a Bundle Resource to Miniterm. Parity is now done by hardware. I have added the capability of a "settings" file. After adjusting the settings for the program the user can choose "Create Settings File..." from the File menu. Most of the settings will be written to a Settings file. The most notable exception is the Current Port. Phone numbers stay with the program and do not go to the setting file.

The menu choice "Use Settings File..." will bring a dialog box up and allow the user to select a settings file. If selected the file will be read and the new settings will be used until program termination or additional user choices.

Double clicking a "Settings" file will cause MiniTerm to be started with the parameters in the file.

I need to work on a way for making changes permanent...

I need to work on a way for saving selected phone numbers in the settings file.

Warning: "Reset terminal" only cleans up the screen.

Warning: The implementation of settings files are overly simple. Changes of versions will probably invalidate old settings files.

**March 8,1988**

I have added the ability to "permanently" change the "default" settings.

Choosing "Default<-Current Settings" from the file menu causes the current settings to be written to a resource "GLBS" which is used on booting the program (unless we selected a settings file). The standard settings can be restored by choosing "Default<-Factory Settings" from the file menu. Neither of these choices modify the current settings.

Port information is now stored in the global variables and is used when the program is started ( but selecting a settings file will not change the port on the fly).

I have added a "Send" Button to the Phone Manager Dialog. Hitting the Send button causes the "number" string to be sent to the modem without the "ATDT" Hayes prefix. This provides a primitive "Macro" facility and allows the use of non-Hayes modems. Currently there is no delay between the characters. Hopefully user feedback will tell me it is needed.

Well I found out right away that a delay might be needed. Found out that my own modem would not dial properly if parity was set to none and data size was set to seven bits.

I have emplaced a 5/60 of a second delay between each character sent with the "Dial" or "Send" button. This has fixed the problem for my hardware.

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### **Ver 2.72 March 20,1988**

Corrected a scrolling problem, when the cursor was out of the scrolling region a linefeed at the bottom of the page would not scroll and I was writing into the bottom scroll bar. Linefeeds and reverse linefeeds now "pin" at the page boundaries unless the page boundary is also the scroll region boundary.

I have received a request to have the MiniTalk module send the message without clicking the mouse and also to have the received message alert "blast" its way into the front layer.

### **March 21,1988**

I have fixed the MiniTalk dialog so that an enter key will send the message. The dialog does not react to a <cr> so that multiple lines can be sent.

I have also wrapped the MiniTalk module in its own application. This application is identical to the version in MiniTerm except that if it is running in the background and a message is received the MiniTalk application will bring itself to the front and display the message. I am still undecided if I should put this feature into MiniTerm.

### **Mar 22, 1988**

I have added a "priority notification" menu item to the communication menu by default this item is unchecked. If checked and a minitalk request completes the code will force the application to the front layer by calling OpenDeskAcc. I suspect that this is not the best of all possible ways to force the application to the front layer. The dialog is not always correctly drawn and the cursor does not flash. I have added an extra "start\_cursor()" to see if this will get the cursor going again.

Something is not perfectly clear. If a background job puts up an alert then it appears to me that when the job is brought to the front layer that a Suspend/Resume event is not passed through to the main program ie the alert eats it. Will have to check on this problem. I have had to set the "Suspended" flag on activate/deactivate events in order to control the cursor blinking.

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### **Ver 2.8 March 24,1988**

At Don's request I have added a "Tone" and "Pulse" button to the Dial Dialog. These buttons allow the user to specify either the Hayes tone dial command or the pulse dial command. The default is tone dial but the user can configure to suit their situation.

### **March 26,1988**

I have removed most of the "beeps" caused by opening and closing AppleTalk.

Note: Some people have asked how to move Phone Numbers from one version to the next. Phone Numbers are stored as 'DIAL' resources in MiniTerm. Resedit can be use to copy and paste these resources between different versions of MiniTalk.

I added a close box to the MiniTerm window. Clicking in the close box has the same effect as choosing "quit" from the file menu. When either option is selected the "Text File Send" and "Text File Receive" files are closed if necessary. The serial port is closed and MiniTalk is shut down if active.

Note that closing the port does not "drop" the line. For a Hayes modem the line can be disconnected by slowly typing "+++" and after the OK appears type an "ATH0". Also for Hayes compatible modems the last command can be repeated by typing "A/" (assuming that the modem is in command mode).

This can be used to quickly redial a number if the dialer returns a busy code.

**March 31, 1988** Discovered major league error. On downloads the same routine is used to send the initial CRCChar as is used to send a NAK on errors. A logic error prevented the initial 'C' or 'CK' from being changed to a NAK so no errors could be corrected. I have no idea when I introduced the error. This fix creates v2.8a

**April 1,1988** Apple has notified me that the use of OPENDESKACC is NOT a good idea for driving a background application to the front. They have indicated that a new manager will be available in the next system software release which will allow driving background tasks to the foreground.

Don Wiedman has pointed out that if an Imagewriter is connected to the printer port that a portInUse error (-97) dialog is displayed at program boot time. v2.8b now silently traps both portNotConf (-98) and portInUse(-97) and disables the MiniTalk menu item.

**April 3,1988** I noticed that the errorhandler in XSend() was not correctly printing the blocknumber on fatal errors. I was not declaring the appropriate variable with the static attribute.

**April 14,1988** Some users have reported that the "Start Text Capture..." menu item will not toggle. (functionality is not impaired however). Apple suggested that the problem may be buggy init resources. Don Wiedman verified that this is the case and on his system the "QuickFolder" init was the culprit.

**April 30,1988** Found bug in vt100 emulation when running UNIX Help utility. I simulate bold by using the bold textstyle attribute but this requires shrinking the font by one point.  
<esc>1;7m sets bold and inverted...I had unconditionally set the font size to 9 on inverted but this messes up the bold attributes. I have deleted the resizing of the font when inverting.  
The above fix produces version 2.8c.

**June 4,1988** Richard Davis reported that his DEC 20 system would send NUL characters in the middle of an escape sequence. I now ignore NUL characters while processing escape sequences (I hope)

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## **Version 2.9**

**Sept 29,1988** added Copy to clipboard and Paste to Modem. The Paste command simply blasts the contents of the clipboard to the modem. The text file pacing menu has a character delay that is used while the scrap is being dumped. The characters are dumped in a tight loop so that echoing will not occur until the last character is sent.

The copy command trims trailing blanks on each line. The info is taken from the screen display this means that tabs are lost. If the selection is only one line a trailing cr is NOT sent. This will allow editing of commands. Note that vt100 graphics do not survive the trip through the clipboard. Almost anything that could move characters on the screen causes the selection to be reset. If the shift key is down when the mouse button is pressed the selection will be contiguously extended.

**Sept 30,1988** I have modified the paste command so that it will dump one character each time through the main event loop. Line Pacing and character delays are implemented just as in text file uploads. I have been able to dump an entire screen (38 lines) into a Vax/Vms file at 2400 baud ( Create foo.baz --then paste). In System V Unix "cat > foo --then paste" works. In vi you need to turn off autoindent or the lines string out.

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**Version 2.9.1** I have added the capability to remember the window size and location in the configuration file (or default settings) This was requested by Dan MacCabe.

Whoops found out that I was sending one character too many on paste (Fixed Sep 30,1988).

**Oct 2,1988** I have added the ibeam cursor ie whenever the cursor is in the terminal window the shape should be an ibeam(if it is the front window). I have also modified the selection algorithm so that the feedback is a little more intuitive.

**Oct 2,1988** I have added "double click" processing for selecting a single blank delimited word.

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#### **Version 2.9.2 Oct 11,1988**

I had been creating bold font style by shrinking the vt100 font by 1 point and then letting the font manager make a bold font. I found out that at 2400 baud that stuff was getting mashed together. I think this was due to the fact that the main event loop now has enough stuff to do so that the serial port read is picking up more than 1 character at a shot and drawstring was being used instead of drawcharacter...This evidently messed up the metrics. I have included a bold font in the resource fork to overcome this problem. This undoubtedly will cause problems somewhere else! I have also fixed the "Reset Terminal" menu item to reset the scrolling region to the entire page.

#### **Oct 24,1988**

Jeff Keegan pointed out that not all control codes could be sent ( in particular ctl-]) which is a code needed on a computer that he accesses. The problem was that the "arrow" keys return values in the control range (0..31). I now check if the clover key or control key is down. If at least one of the keys is down then the character is sent. If the clover key is down then the character is masked to 5 bits prior to being sent. Otherwise the arrow keys are mapped to vt100 escape sequences.

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#### **Version 2.9.3 Nov 1,1988**

I have added a font menu to allow the user to select other fonts (Monaco Courier and the vt100 font) and sizes. Debugging is getting nasty. Adding various sizes of fonts has introduced a number of problems ie where should the cursor go, what happens if the vt100 font is missing,etc. The font manager does ugly things if a real font is not selected...the output is basically illegible. (however when the screen refreshes the output is readable...must be the difference between drawstring and drawchar?) If you are a user please note that the control characters are visible only if the vt100 font is selected. Similarly the vt100 graphics are only available if the vt100 font is selected. I have remapped "esc[1m" aka "bold" to be treated as underline mode if the vt100 font is not selected. This at least gives legible results. The least confusing way to change fonts is to start with a clean screen.

#### **Nov 2,1988**

Today I added the capability of saving the font size and name in the configuration files. I currently skip setting the font and size if the user has selected "Use Configuration File..." Changing the font/size and marking the menu on the fly is a hassle.(maybe tomorrow...)

#### **Nov 3,1988**

This morning I fixed the Fonts Menu so that only "real" fonts can be selected. Dealing with scaled fonts is beyond my ability at this time. (I think that when a font becomes scaled it is no longer a fixed width font). I have made Courier 12 my personal default font/size...much more legible.



### **Nov 3,1988**

Well I finally figured out how to deal with Bold fonts. The font manager makes the characters wider and I was forgetting to reset font information. I have remapped esc[1m back to bold. It is still necessary to keep the vt100 bold font available so that the font metrics don't change ie the columns will still line up if vt100 bold is used.

### **Nov 3,1988**

Damn near had a heart attack this evening...Logged on to the Vax and none of the editors worked! After several hours of staring at escape codes and wondering how I was going to find where I broke the code, I finally realized that the esc[0m code was calling a routine which remeasured the font metrics. This code was originally called by the resize window routine and it had a side effect of resetting the scrolling region to the entire page! Current code simple resets lineHeight, charWidth and maxCol variables. The editors seem to be working OK now.

### **Nov 7,1988**

I realized that it was possible to turn off control character interpretation and then change the font. Fixed the font menu so that it is disabled while control interpretation is turned off. (if vt100 font is not chosen it is not possible to turn off control interpretation.)

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### **Version 2.9.4 Nov 17,1988**

I noticed that the "show clock" menu item no longer worked! Further investigation showed that the "Suspend" flag no longer was being set properly. The problem is that I did not clearly understand the difference between the "Mouse Moved" event message and the "Suspend/Resume" event message. Sigh... This fix creates version 2.9.4

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### **Version 2.9.5 Nov 20,1988**

MPW 3.0.b1 arrived yesterday! Spent all day converting to new formats. Most trouble was had with the MiniTalk module. I found an error in the Compiler...NBPEExtract does not properly unpack the typeStr and zoneStr fields into the Entity data structure. It makes each field 34 bytes long instead of 33. I have notified Apple.

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### **Version 2.9.6 Dec 5,1988**

I have added the Notification manager routine to notify the user when a MiniTalk message has arrived. This is the simplest version version possible...I simply ask the Notification manager to beep and put up a dialog which advises the user that a message has arrived.

### **Dec 6,1988**

Today I have added Notification Manager routines to the Xmodem send/receive routines. If the user is running in the background and Xmodem terminates (normal or error) a dialog box is brought to the front by the Notification manager. The dialog advises the user if an error has occurred or completion was normal. In order for this service to be available the user must check the Priority Notification item in the Communication Menu. The Notification Manager requires a Mac OS version >= 6.0. If the version number is too small the Notification Manager is not invoked. Note that if the user is using a Multifinder with the "Set Aside.." feature that after a Xmodem transfer is started the MiniTerm application can be "hidden" by holding down the Option key and clicking on the small icon in the menu bar. After the Notification manager puts up its dialog advising the end of the transfer the Miniterm application windows can be made visible by selecting the Miniterm item in the apple menu or by option clicking the small icon in the menu bar (enough times).

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### **Version 2.9.6a Dec 9,1988**

Don Wiedman called up this evening and told me that CheckSum option on XMODEM no longer worked! I was comparing (char) and (unsigned char) after computing the checksum. Casting the computed checksum from (unsigned char) to (char) cleaned up the problem. This was not a problem in MPW 2.0x

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#### **Version 2.9.7 Dec 16,1988**

Started YMODEM implementation. The Ymodem menu has 5 items:

Create Batch List...(Not yet implemented)

Send Ymodem...(Not yet implemented)

Send Ymodem-G...(Not yet implemented)

Receive Ymodem... This item will bring up a dialog which will allow the user to select a target directory to receive the files. The user must hit the big button labeled "Select Current Directory" which is under the scrolling list of folders. The directory which is selected is the one in the box ABOVE the scrolling list of folders. Be careful here, go back and reread that last sentence! After selecting a default directory, the progress box is popped up which will monitor the transactions. Prior to starting the transfer some stuff must be set up. Under the Xmodem preferences menu the user must chose one of MacBinary, Straight, or Text Xmodem. This determines how the received packets will be interpreted. CRC must NOT be disabled. "Fast Download" will be ignored and "1K Uses C Handshake" should be checked. And of course the timeouts should be adjusted for the possible use of 1 K packets. I have tested against the "sb" program on our unix machines and everything actually seems to work! (What happens under load is not yet clear.)

Receive Ymodem-G...(Not Yet Implemented).

#### **Dec 17,1988**

I tried batch downloading from my test BBS and found that the second file was not getting picked up properly. By simulating the protocol I found that they do not have a standard implementation! After completing a file transfer the sender "speaks" a sentence announcing the commencement of the next file transfer! By increasing the error retries the extraneous dialog is eventually eaten up and the next file transfer can begin. I have added a menu item which allows a delay after sending the ACK to the EOT which marks the end of the file transfer. If this is set to 15 the entire dialog can be cleaned up in one swallow. After this problem was cleaned up I found that the packet which marked the end of the transfer was being prematurely sent. The protocol manual says that a end of session packet is sent just like a regular packet. ie After the receiver ACKs the EOT, the next (header)packet should not be sent until requested by the receiver (send 'C'). The test BBS sends the 'final' header packet immediately upon receiving the ACK for the EOT. Since I flush the line prior to reading this will eat this special packet. My kludge was to examine the characters as they are being purged from the input buffer. If I find a SOH or STX I assume I have found the start of a packet and drop into the read packet routine. The program still runs with the Forsberg "sb" program and will also download from the test BBS.

#### **Dec 18,1988**

Today I implemented the G variant of YMODEM (receive only) in this version the header packet is acknowledged with a 'G' the file is then sent nonstop in the usual fashion. The only wait occurs when the EOT is sent. At 2400 baud for a single file there was not a significant increase in speed. (215 bytes/second vs 210 bytes/second.) If any errors occur I send a couple of CAN characters but strange things can happen to the terminal settings on both ends since there is so much data in the "pipe".

*UNIX hint: If you are connected to a UNIX system an a Upload/Download fails and the terminal emulator is acting funny (no echo no response to a <cr> ...etc) try typing <ctl>j stty sane <ctl>j ,<ctl>j is a linefeed character.*

#### **Dec 21,1988**

Modified Ymodem so that if "Disable CRC" is checked in the Xmodem Preferences Menu a NAK will be sent to invite the file name block and the first block of the file. The effect of this is force the use of checksums instead of CRCs. Note that the protocol definition requires CRC for the "G" option. The Disable CRC check is therefore ignored when the G option is used on the download. Note that unlike the XMODEM implementation there is no fallback to checksum from the CRC mode. ie in this implementation of YMODEM you must chose CRC or CHECKSUM. The "C" or "CK" handshake option is now ignored for YMODEM downloads.

**Jan 1,1989**

Added "Create Batch List..." to the Ymodem menu. This item will bring up a modified standard file dialog box which has an additional scrolling list. Ultimately this list will determine which files get uploaded on the "Send Ymodem.." menu choice. Double clicking a file in the standard file list will add the file to the "send" list. A selected file can also be added by clicking the add button or hitting the carriage return or enter key. A file in the "send" list can be deleted by selecting it and clicking on the delete key. The list can be cleared by clicking the "clear" button. The dialog is dismissed by clicking the "Done" button. Double clicking a file in the send list will cause a dialog to appear which will list interesting facts about the selected file. The dialog will show all files if MacBinary is checked under the Xmodem Preferences dialog. If MacBinary is not checked then only text files will be shown. It does not appear that I will have time to add the actual YMODEM upload code prior to starting my leave.