Chapter

6

Text Editing and Printing

TOPS Terminal has powerful editing and printing capabilities. With TOPS Terminal you can do the following:

- Edit a file on your Macintosh
- Edit a file on a remote computer
- Print all or part of a session transcript or editor document, or print a number of files

You can also log on to a remote computer and use an editor there or edit a file mounted as a local volume from a remote file server using TOPS networking software.

This chapter explains how to use TOPS Terminal for local editing, remote editing, and printing — after a brief discussion of the tools TOPS Terminal provides.

Files You Can Edit with the TOPS Terminal Editor

You can use the TOPS Terminal editor to edit text files, including any plain text (ASCII) files, such as those created with editors such as *emacs, vi,* and *ed* . It also includes files created by the TOPS Terminal editor (by selecting *New* in the *File* menu) and TOPS Terminal editor documents created by saving session transcripts.

Generally, word processing documents cannot be edited with the TOPS Terminal editor — because of the computer-specific or application-specific formatting characters imbedded in the documents. If you are running TOPS

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Terminal and you open a folder with such documents in it, the names of these files will not be displayed in the dialog window.

But most word processors will allow you to save a document as "text only" or "text only with line feeds." If you want to edit a Microsoft Word document with the TOPS Terminal editor, for instance, you can save the document as "Text Only with Line Breaks" from within Word; the file can then be edited by TOPS Terminal.

Saving During an Editing Session

Just as you do for other text editing applications you should save periodically during an editing session, by selecting *Save* from the *File* menu. This will prevent losing a lot of work if there is a power failure or other problem. Note that if you attempt to close the edit session window by clicking on the close box, you will be warned if you have changed the file since the last *Save*, and be given an opportunity to save then.

Editing Tools

Use the *File*, *Edit*, and *Text* menus during local or remote editing on TOPS Terminal, as explained below.

Selecting Text

Select a word by double clicking with the mouse, select lines of text by sweeping down the left side of the edit window while holding the mouse button down, or select a block of text by sweeping across and down the text while holding the mouse button down or by selecting a word and then holding the *Shift* key down, moving the mouse, and pressing the mouse button.

The File Menu - File Handling and Printing

The *File* menu is used for file handling and printing; printing is discussed later in this chapter.

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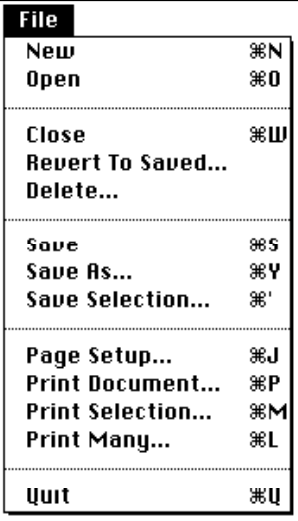

Use the *File* menu for the standard file handling functions: open a new text file (*New*), open an existing text file (*Open*), close the current file (*Close*), save the current file (*Save*), save the current file with a new name (*Save As*), and specify margin and other page layout settings (*Page Layout*).

The *File* menu also has some special-purpose functions:

Revert To Saved
If you make a major error while editing, select *Revert to Saved* to restore the file as it was the last time you saved it:

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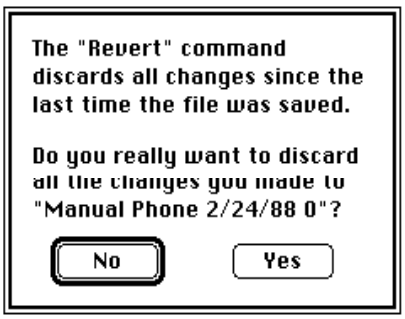
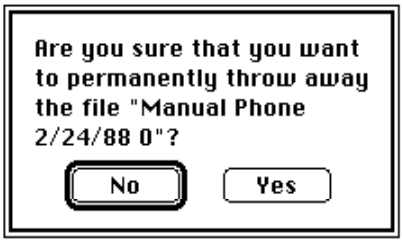
You will be warned that all changes since the last save will be lost:



Delete

You can delete the current file by selecting *Delete*; you will be warned before the file is deleted.



The file be deleted and the edit session window will be closed if you click *Yes*.

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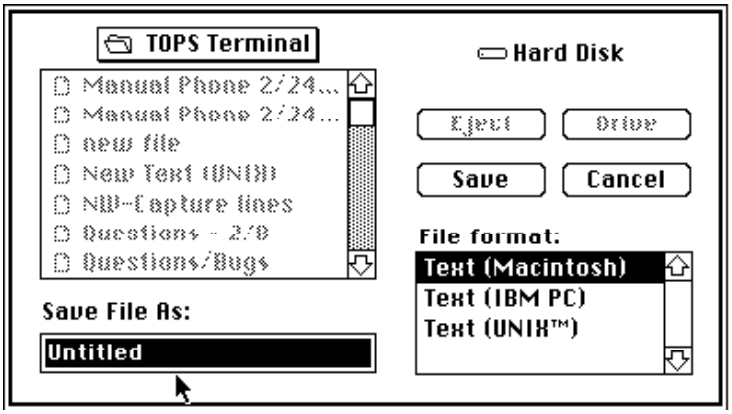
stroke

Save Selection

Select *Save Selection* to save selected text into a new file. You will be asked to name the file:



When you type in a name and select *Save*, a new edit session window will be opened, the selected text will be written into the window, and the window will be closed. If you type the name of a file that exists in the current folder, you will be warned that the old file will be replaced by the new one.

The Edit Menu - Cutting and Pasting

Use the *Edit* menu for the standard Macintosh *Cut***,** *Copy***,** and *Paste* commands in an editor document. The TOPS Terminal *Edit* menu also has a *Select All* option for selecting the entire document and *Clear* to delete selected text without affecting the contents of the Clipboard.

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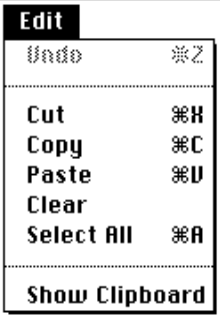

You can use these functions during a TOPS Terminal editing session, and you can also use them to save text from a remote computer during a terminal session. For example, you can read your mail on a remote computer, select a message you want to save, select *Copy* to place the selected message in the Macintosh Clipboard, *Open* a file on your Macintosh, and *Paste* the contents of the Clipboard into the file. Note that you cannot use *Cut* or *Clear* during a terminal session.

The Text Menu - Finding and Replacing

The *Text* menu gives you the functions available in a standard Macintosh *Search* menu, plus a bit more:

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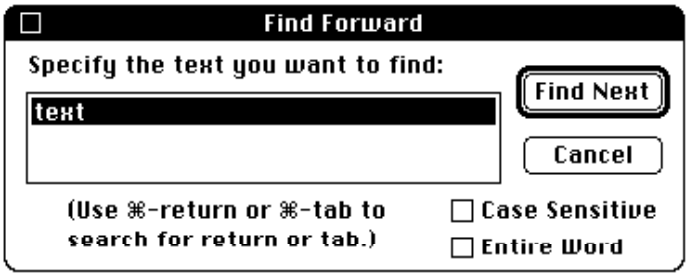
stroke

Shift Left /Shift Right
Moves a line or lines of selected text one tab stop to the left and right, respectively. Use this function to create indented paragraphs or blocks of text.

Jump to Selection or Jump to Insertion
Scrolls the edit window to display selected text if the selection is not already in the window, or the vertical-line insertion point if no text is selected.

Find Selection
Finds the next instance of selected text in forward direction and selects the text when found.

Find Forward
Finds the next instance, in forward direction, of the text you type in the *Find Forward* dialog window and selects the found text.



A note about find wrapping
One of the things you can change in the *Your Preferences* menu is *Find Wrapping*. This determines whether find and replace functions will automatically wrap around the end of a file (if action is in forward direction) or around the front of a file (if action is in backward direction). The default value is for finds and replaces to wrap around. See Appendix B if you want to change the setting.

Case Sensitive Find or Replace
Normally find and replace ignore case: “ABC” is the same as “abc.” If you check the *Case Sensitive* box before doing a find or replace, however, find

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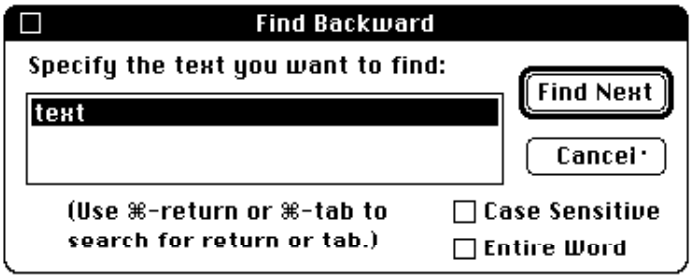
or replace will only find text that matches the text exactly.

Searching for Entire Words
Normally find and replace look for any instance of the selected or typed text: a search for “connect” will find both “connect” and “connection.” If you check the *Entire Word* box before doing a find or replace, however, a search for “connect” will only find separate words that match the search string.

Find Backward
Finds next instance, in backward direction, of the text you type in the *Find Backward* dialog window and selects the found text.



Find Same
Depending on whether you most recently did a forward or backward find, finds next or previous instance, of text you previously typed in *Find* dialog window and selects the found text; this function does not display the *Find* dialog window.

Replace Forward
Starts replace dialog; in forward direction, finds the text you type in *Replace Forward* dialog window and replaces the found text. Note that you can select *Replace All* to replace all instances of the text in one pass, you can find and replace the text one instance at a time with *Find/Replace*, or you can *Find* the text and *Replace* it on a case-by-case basis.

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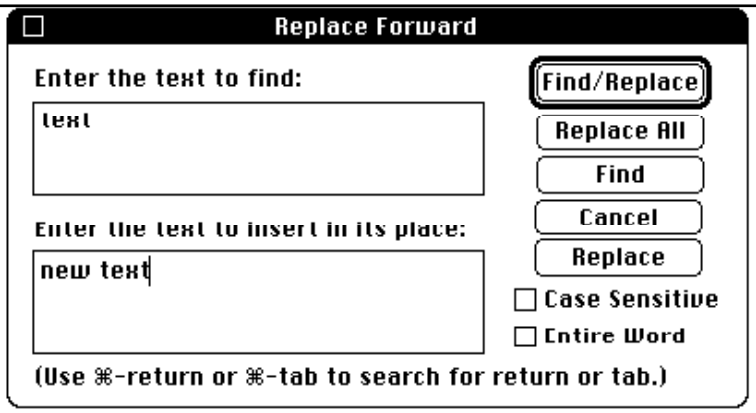
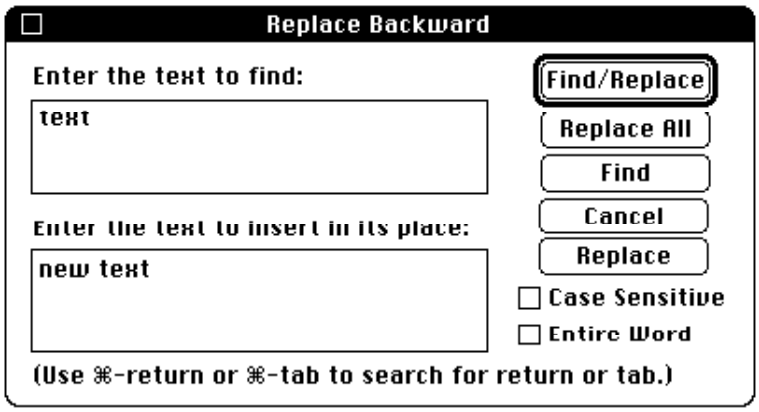


Replace Backward
Starts replace dialog; in backward direction, finds the text you type in replace dialog window and replaces the found text, as you specify.



Repeat Replace
Repeats the *Replace* command, without displaying the *Replace* dialog window.

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stroke

Local Editing

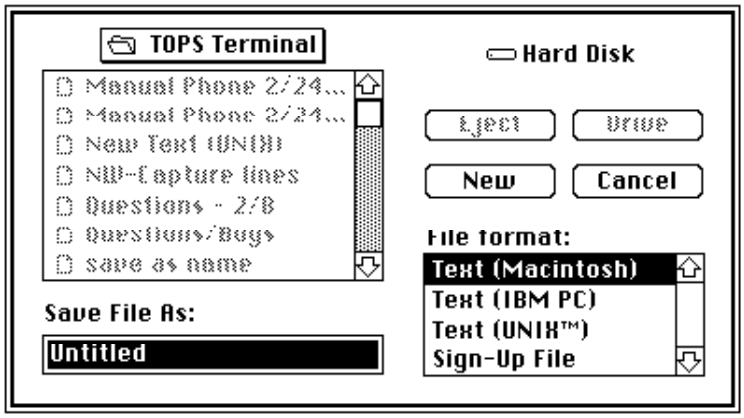
Use the TOPS Terminal editor to edit TOPS Terminal and other plain text files on your Macintosh. Note that if you double click on a TOPS Terminal editor document from the Macintosh Desktop, TOPS Terminal will start up and the selected file will be displayed in a TOPS Terminal editor window. The instructions below are for using the editor once you are in TOPS Terminal.

Create a New Editor Document

After starting up TOPS Terminal do the following to create a new editor document:

1. Select *New* in the *File* menu.

You will be asked what you want to name the new document:



2. Type a name for the file and click *New.*

A new TOPS Terminal editor window will be drawn. The name of the file (“New file” in this case) will be displayed at the top of the

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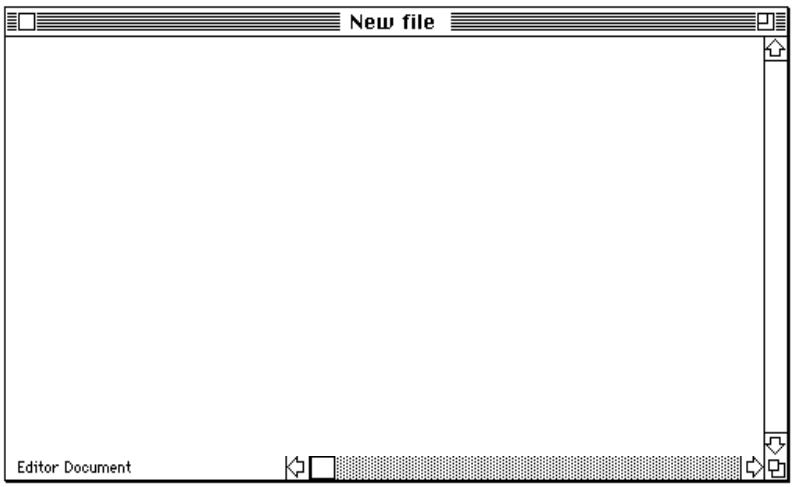
window and the words “Editor Document” will be shown in the status box at the lower-left of the window:



3. Type the new document.

Use the editing tools described earlier in this chapter to create a new editor document.

4. Select *Save* in *File* menu.

This will save the document under the name you gave it when you created it (“New file” in this example).

5. Click the close box.

If you have not just saved the file you will be warned that you have made changes to the file but have not saved them, and you will be given the option of saving or not saving the changes.

6. Click *Yes* or *No.*

Click *Yes* to save the changes since the last *Save* or *No* if you do not want to save the changes. The editor window will be closed.

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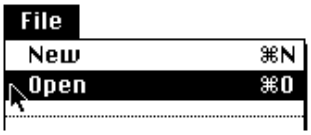
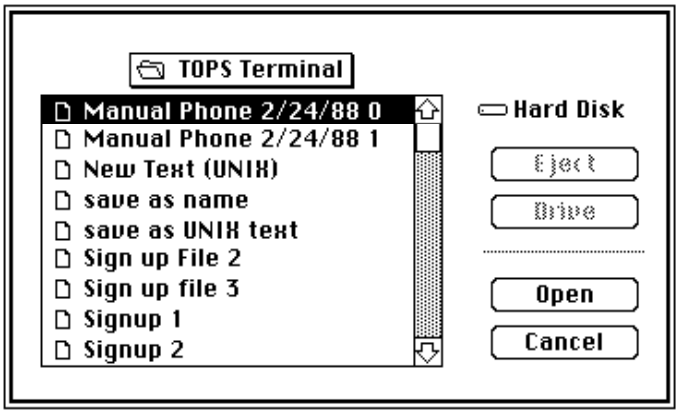
Edit an Existing Editor Document

After starting up TOPS Terminal do the following to edit an existing editor document:

1. Select *Open* in the *File* menu.



You will be given the opportunity to select a document to edit. Select *Open* to open an existing document. Only folders and plain text files will be listed:



2. Select a file and click *Open.*

A new TOPS Terminal editor window will be drawn and the file you selected will be displayed. The name of the file will be displayed at the top of the window (“Manual Phone 2/24/88 0” in this example) and the words *Editor Document* will be shown in the status box at the lower-left of the window:

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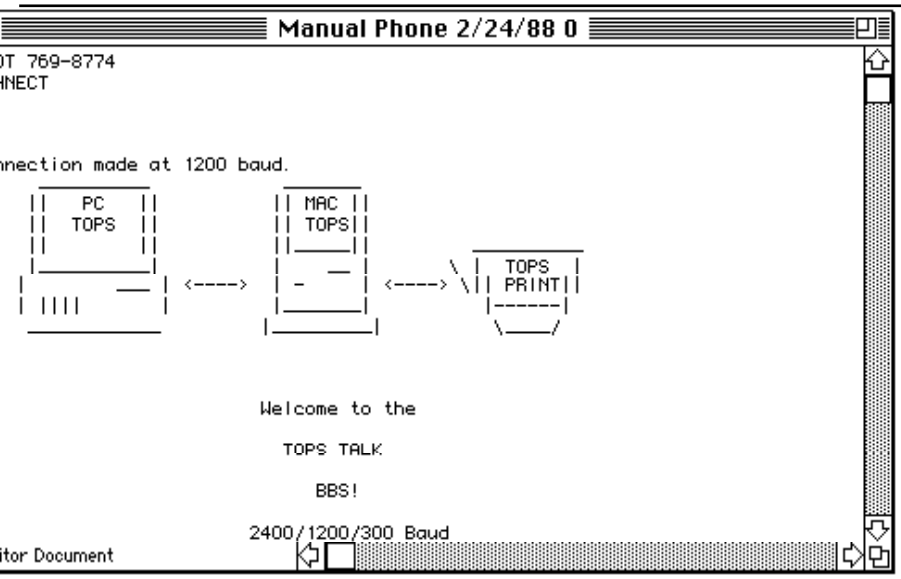

3. Edit the document.

Use the editing tools described earlier in this chapter to edit the document: cut, copy, paste, delete, etc. — changing windows to work in other editor documents or terminal sessions.

4. Select *Save* in *File* menu.

This will save the document under the name it had when you opened it during this edit session. You could select *Save As* if you want to save the document with a new name.

5. Click the close box.

If you have not just saved the document you will be warned that you have made changes to the document but have not saved them, and you will be given the option of saving or not saving the changes.

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stroke

6. Click *Yes* or *No.*

Click *Yes* to save the changes since the last *Save* or *No* if you do not want to save the changes. The edit session window will be closed.

Remote Editing

There are four ways to edit a file residing on a remote computer:

- Use *Edit File* in the *Network* menu
- Copy a file to your Macintosh with *Receive File* and edit the file locally with the TOPS Terminal editor
- Log on to the remote computer and use an editor there
- Mount a volume with TOPS or another file server and edit the file locally with the TOPS Terminal editor

Edit File Command - Network Account

The *Edit File* command in the *Network* menu lets you edit text files residing on remote computers on your local area network. *Edit File* is a combination of *Receive File*, local editing, and *Send File*: the file is copied to your Macintosh where you edit it with the TOPS Terminal editor, and then automatically copied back to the remote computer when you save the file.

To edit a file on a network computer for which you have created a TOPS Terminal account, do the following after starting TOPS Terminal:

1. Select *File Session* in the *Network* menu.

You will be asked to select an account:

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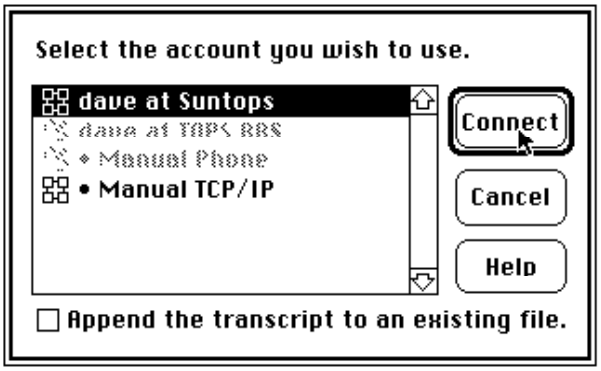
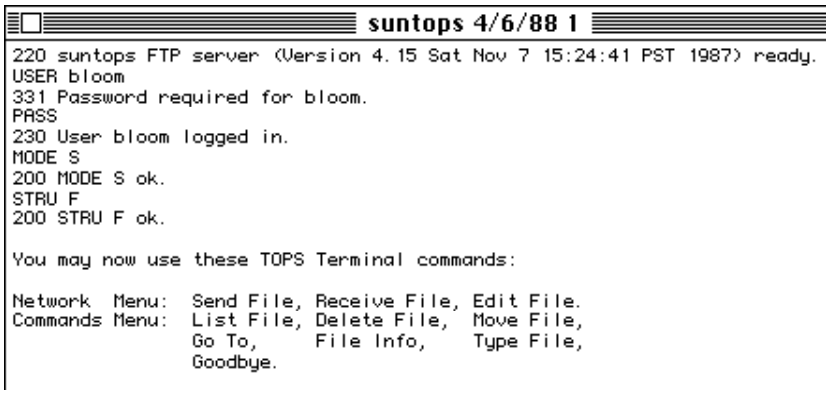


2. Select account and click *Connect.*

A new session window will be drawn and an FTP file session will be started up. If you have not included the password in the account description, you will be asked for the password before the connection is completed. A list of the commands available during a file session is the last item in the window.

Note that these commands are invoked using the *Network* or *Network/Commands* menu; you can't type commands during a file session.



3. Select *Edit File* in the *Network* menu.

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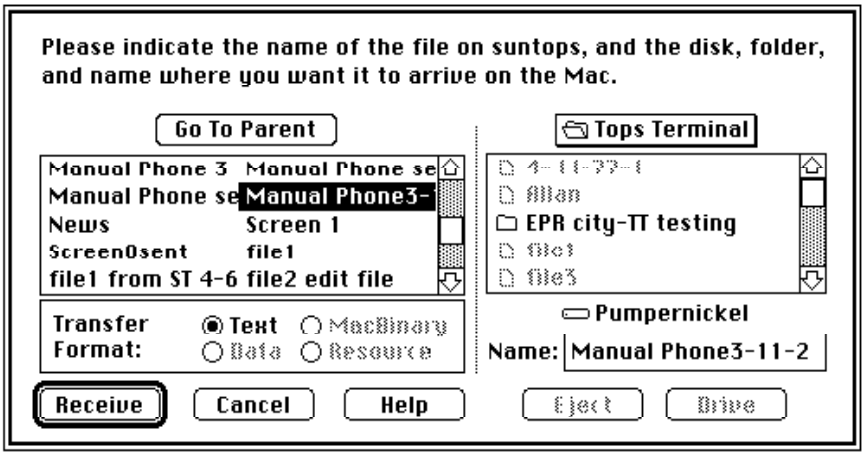
A dialog window (the same window as for Receive File) will be displayed, asking you to select the file you want to edit from a list of files on the remote computer. There may be a brief delay while TOPS Terminal prepares to list the current directory contents.



4. Change directories, if necessary.

The two columns under the *Go To Parent* box list the files and directories in the current directory on the remote computer (Suntops, a UNIX system, in this case). Use the scroll bar to scroll up or down to find the directory or file you want.

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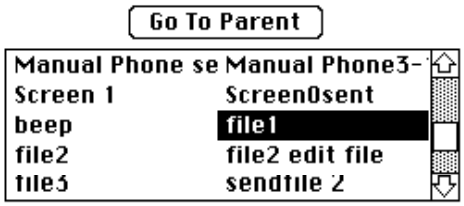


To list the contents of a directory in the list, double click on it; a new list will be displayed. To move up one level in the directory structure, click on *Go To Parent*.

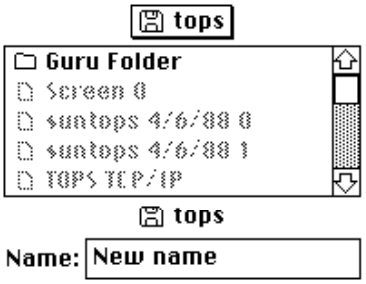
Note to UNIX users: directories and files look the same in the list. If you think one of the entries is a directory, but you're not sure, double-click on the name; if it is a directory, the list of files in the directory will be displayed.

5. Select the file you want to edit.

When you are in the right directory, select the file you want to edit. Note that the name of the file is automatically inserted into the *Name* box on the right side of the dialog window. Note also that Text is the only available *Transfer Format*.

6. Change folders and file name (optional).

Select a different folder from the list on the right side of the dialog window, if you want the file copied to a folder other than the current one ("Tops Terminal" in the example above, "tops" below). If you want the file to have a different name on your Macintosh, change or replace the name in the *Name* box.



7. Select *Receive*.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

The file on the other computer will be copied to your Macintosh. Details about the transfer will be displayed in the file session window. The main thing you want to check for, as explained in the discussion of *Send File - Network Account*, is the message "Transfer Complete" (or a similar message).

When the transfer is complete, an edit session window will be opened, displaying a copy of the file you selected from the list on the remote computer.

8. Edit the file.

Use the *File*, *Edit*, and *Text* menus to edit the file, as described in "Editing Tools," starting on page 112.

9. Save the file.

When you are finished editing the file, select *Save* in the *File* menu. The file will be saved on the remote computer and on your Macintosh (see Note below).

Note: the file will not be saved on your Macintosh if you changed the default setting for saving a local copy during remote editing (see *Your Preferences* in Appendix B).

10. Click the close box.

Click on the close box at the top-left of the edit session window. If you have not made any changes since saving the file, the edit session window will be closed, leaving the file session window active (unless you closed it earlier, or the connection to the remote computer was broken somehow. See "Closing the File Session Window before Saving," following step 13 below.)

(If you have not saved since making changes to the file, you will be told that you have made changes and be given a chance to save the changes. Click *Yes* to save the changes on the remote computer, or *No* if you do not wish to save the changes. If you click *Yes,* TOPS Terminal will complete the editing process by updating the file on the remote computer and on your Macintosh, unless you changed the default setting, as discussed in step 9 above).

11. Edit another file, if you wish.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Open another edit session window to edit another file on the same remote computer by selecting *Edit File*, if you wish. Repeat steps 3 to 10 above.

12. Select *Goodbye* from the *Commands* menu.

This is equivalent to logging off from a terminal session; since you can't type during file sessions, you have to use menus. Alternatively, you could hold down the Option and Clover (⌘) keys and press the letter *Y*, which is the keyboard equivalent for *Goodbye.*

13. Close the window.

Click on the close box at the top-left of the window to close the window.

Note: if you click on the close box before selecting *Goodbye* you will be asked if you really want to terminate the connection. Do not do this unless you have good reason to believe there is a serious problem with the session, such as the remote computer crashing.

Closing the File Session Window before Saving

If you close the file session window (or if the connection is broken, somehow) before saving the file during a remote edit, the connection to the remote computer is lost and you are now performing a local edit on the file that was copied from the remote computer. If you make changes to the file and save them, the file will be saved on your Macintosh, but not to the remote computer. You will see the following message:

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

You can still save the file on the remote computer, if you wish: start up a new file session, select the same account as before, switch to the edit session window, and click *Save*. The file will be saved on the remote computer.

Remote Editing - Phone Account

Because file transfer service is not available on phone accounts, it is not practical to use *Edit File* for remote editing on such accounts. To edit a text file on a computer you reach on a phone connection, copy the file to your Macintosh as explained in Chapter 5 (*Receive File*), edit it locally, as explained above, and then copy it back to the remote computer (*Send File*).

Or you might want to log on to the remote computer and edit it with an editor such as *emacs*, *vi*, or *ed*; this method is described below.

Using an Editor on a Remote Computer

This method of editing takes advantage of the terminal emulation capabilities of TOPS Terminal. Once you are connected to a remote computer with TOPS Terminal your Macintosh acts like a terminal connected directly to the computer. You can use any editor that you could use if you were directly connected to the computer, using the type of terminal that TOPS Terminal is emulating.

The process is simple; after starting up TOPS Terminal:

1. **Select *Terminal Session* in the *Network* menu.**

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

2. Select an account and click *Connect.*

3. Start up an editor on the remote computer.

4. Log off when editing is complete.

5. Click the close box to close the session window.

Note: you can use many editors in terminal emulation mode, including *emacs, vi,* and *ed* on a UNIX computer. But you cannot use editors or text processors such as Microsoft Word or MacWrite; these work only on a Macintosh. And since your Macintosh is emulating a terminal during a terminal session, it can't also act like a Macintosh.

Editing Files with TOPS

Since the text editor built into TOPS Terminal allows you to edit local as well as remote files, you may also edit files that you have mounted as a local volume from a remote TOPS server. For example, if you have mounted a directory from an IBM PC or a Sun Workstation located on a TOPS Network, you can use the TOPS Terminal text editor to edit text files within that directory. The file will automatically be converted into the form required by the Macintosh when you open it and reconverted to the proper format when you save the edited file.

Editing text files from TOPS-mounted volumes is a variation of local editing on TOPS Terminal; see “Local Editing” on page 118 for more information.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

TOPS Terminal Printing

You can print a TOPS Terminal session transcript or an editor document during a terminal or edit session with the *Print Document* command; you can also print part of a session transcript or an editor document during a terminal or edit session with *Print Selection.* Use *Print Many* to print one or more documents. You can also select TOPS Terminal text documents from the Macintosh Desktop and print them without starting up TOPS Terminal.

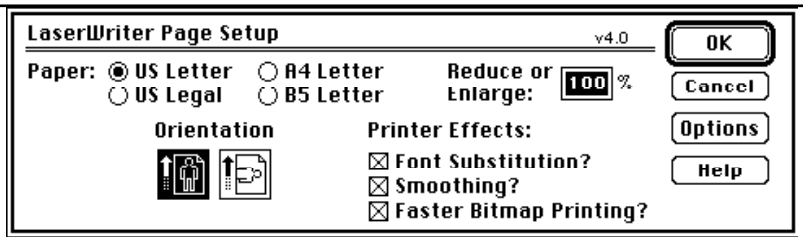
Print Document

After starting TOPS Terminal and during a terminal session or an edit session, do the following to print the current document:

1. **Select *Print Document* in the *File* menu.**

The standard print dialog will be displayed (for a LaserWriter, in this case):

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



2. Modify print instructions (optional) and click *OK*.

The document will be printed; you can cancel the printing with ⌘. (Clover-period).

Print Selection

After starting TOPS Terminal and during a terminal session or an edit session, do the following to print the selected text in the current document:

1. Select the text you wish to print.

Select the text you wish to print, as explained on page 112.

2. Select *Print Selection* in the *File* menu.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

The standard print dialog will be displayed.

3. Modify print instructions and click *OK*.

The selected text will be printed; you can cancel the printing with ⌘. (Clover-period).

Print Many

After starting TOPS Terminal, do the following to print the selected file or group of files:

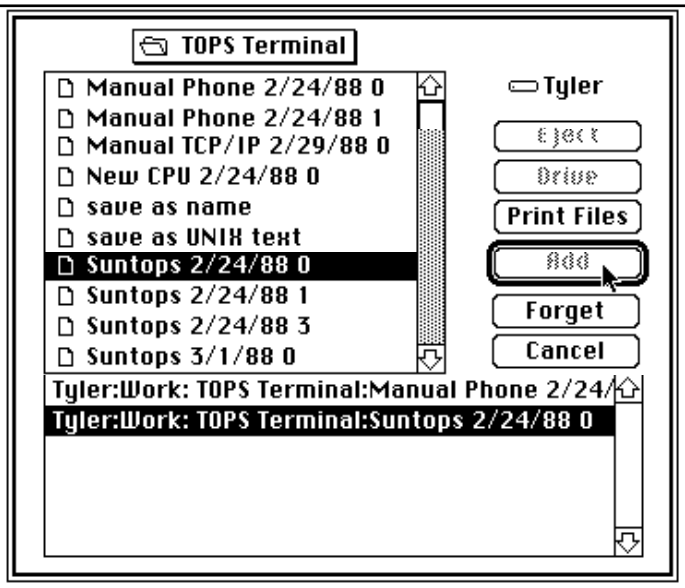
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

1. Select *Print Many* in the *File* menu.

The *Print Many* dialog will be displayed, asking you to select the files you wish to print:

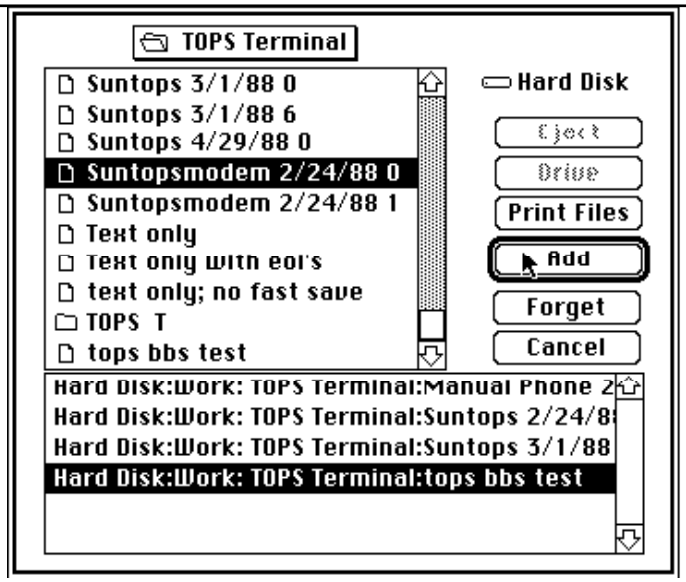
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



2. Select the file(s) you want to print and click *Add*.

Select a file you want to print and click *Add* to add the file name to the list at the bottom of the dialog window. Select more files in the same way, changing to different folders or drives if you wish.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

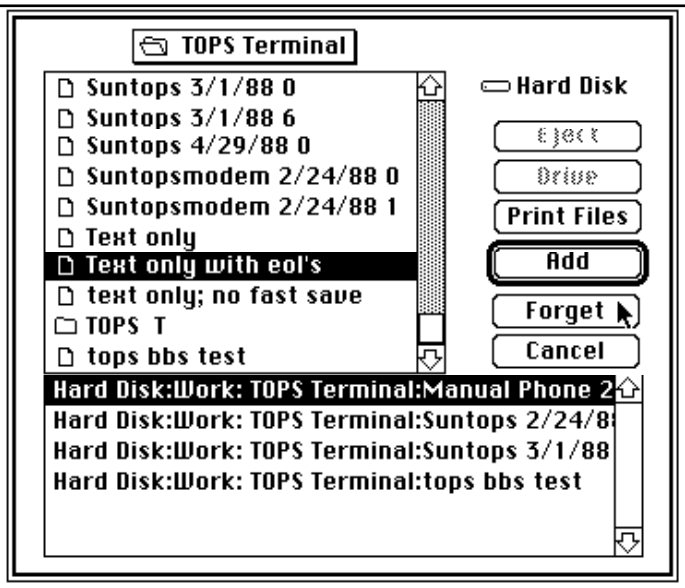


3. Remove files from print list, if you like.

If you decide you don't want to print one of the files you have added to the list, select the file in the list at the bottom and click *Forget*; the file will be removed from the list.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

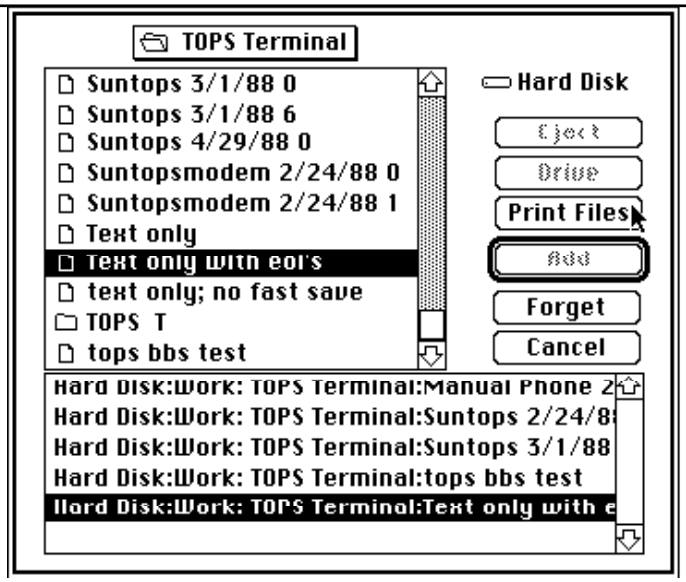


4. Click *Print Files.*

Click *Print Files* when you have selected all the files you want to print; the standard print dialog will begin. You can select the *Cancel* button anytime during the printing process.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



Note: *Print Many* only prints text documents.

Printing Documents from the Desktop

You can print a TOPS Terminal editor document from the Macintosh Desktop just as you print other files. Select the TOPS Terminal files you want to print, and then select *Print* in the *File* menu. TOPS Terminal will start up, you will be asked to click OK, and the selected files will print. When the printing is complete, TOPS Terminal will terminate and you will be back at the Desktop.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Appendix

A

Quick Reference Guide

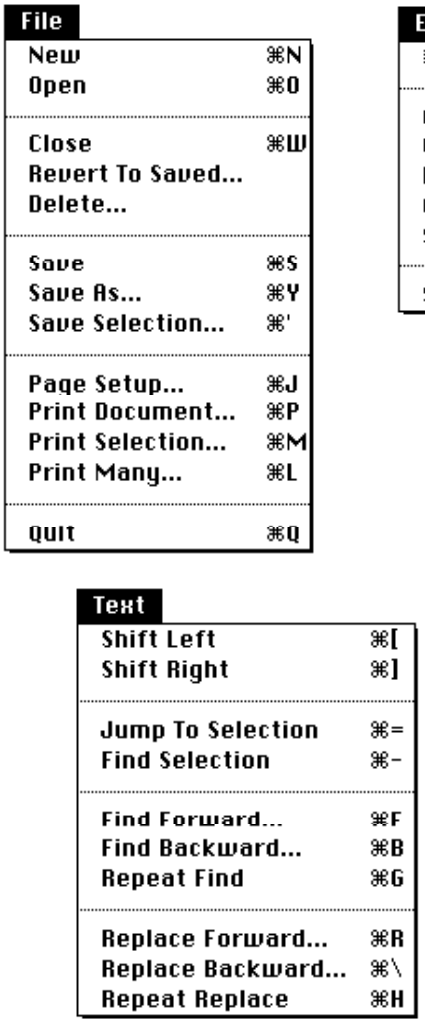
This chapter displays TOPS Terminal menus, which include keyboard equivalents for TOPS Terminal menu functions, and summarizes step-by-step instructions for a number of procedures described in detail elsewhere in the manual.

Menus and Keyboard Equivalents

Many TOPS Terminal menu functions can be performed from the keyboard. To perform most functions, hold down the Clover key (⌘) and press the le character following the Clover. Note: you do not need to use upper case letters.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

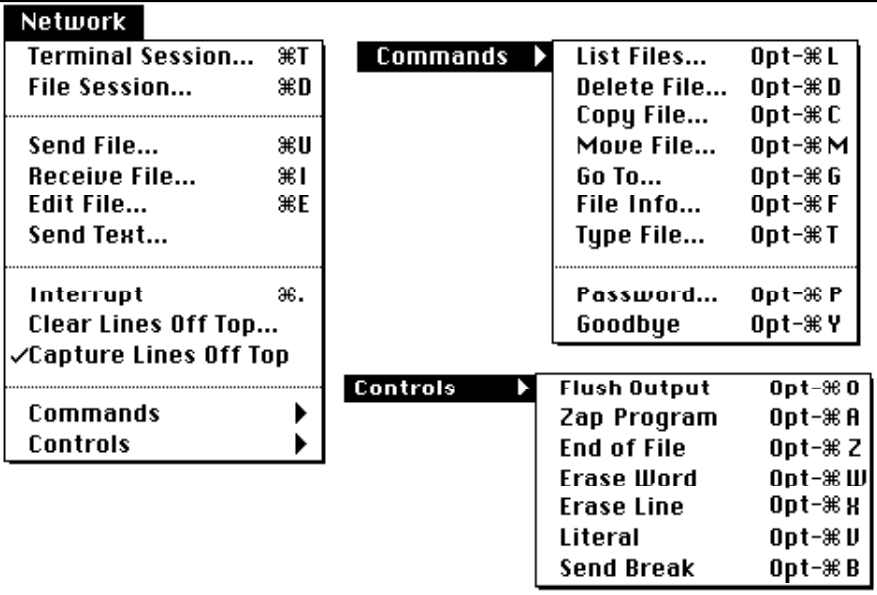
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



Functions in the *Commands* and *Controls* submenus require that you hold down the *Option* and ⌘ keys together, and then press the letter or character.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Manual Connections

Network Account
Chapter 2

1. Select *Terminal Session* in the *Network* menu.
2. Select *Manual TCP/IP* and click *Connect.*
3. Select terminal type and click *OK*.
4. Type computer address and click *OK*.
5. Log on to computer in normal way.
6. Work on the remote computer.
7. Log off in normal way.
8. Click the close box

Phone Account
Chapter 2

1. Select *Terminal Session* in the *Network* menu.
2. Select *Manual Phone* and click *Connect.*
3. Click *Save* or change name and click *Save*.
4. Select terminal type and click *OK*.
5. Select baud rate and click *OK*.
6. Type *ATDT* plus computer phone number and press *Return*.
7. Press *Return* when you see the response *CONNECT*.
8. Log on to computer in normal way.
9. Work on the remote computer.
10. Log off in the normal way.
11. Click the close box.
12. Click *Yes* to kill the connection.
13. Click the close box again.
14. Click *Yes* to save transcript changes, *No* to not save them.

Computer Descriptions

Creating a Description - Network Connection
Chapter 3

1. Select *Computers* from *Settings* menu.
2. Click the *New* button.
3. Type the computer's name, location (optional), and TCP/IP address.
4. Select the operating system.
5. Specify *TCP/IP Timeout*.
6. Click *OK*.
7. Click *Done.*

Creating a Description - Phone Connection
Chapter 3

1. Select *Modem* from *Settings* menu
2. Select modem type.
3. Change phone settings and click *OK*.
4. Select *Computers* from *Settings* menu.
5. Click the *New* button.
6. Type the computer's name, location (optional), and phone number.
7. Select operating system.
8. Select the baud rate for the modem.
9. Change communications settings, if necessary.
10. Click *OK*.
11. Click *Done.*

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Modifying a Computer Description
Chapter 3

1. Select *Computers* from *Settings* menu.
2. Select computer and click *Open*.
3. Modify the computer description.
4. Click *OK*.
5. Click *Done.*

Removing a Computer Description
Chapter 3

1. Select *Computers* from *Settings* menu.
2. Select computer and click *Remove*.

Create a Computer Description
Chapter 3

1. Select *Accounts* from *Settings* menu.
2. Click *New*.
3. Click *New*.
4. Type in a name for the new computer and click *OK*.
5. Type your user name and password (optional) and click *OK*.
6. Select a terminal type and click *OK*.
7. Complete the computer description and click *OK*.
8. Click check boxes in *Description of an Account*, and click *OK*.
9. Click *Done*.

Account Descriptions

Computer from TOPS Terminal Memory
Chapter 3

1. Select *Accounts* from *Settings* menu.
2. Click *New*.
3. Click *Memory*.
4. Select a computer and click *OK*.
5. Type your user name and password (optional) and click *OK*.
6. Select a terminal type and click *OK*.
7. Click check boxes in *Description of an Account*, and click *OK*.
8. Click *Done*.

Computer from a Sign-Up File
Chapter 3

1. Select *Accounts* from *Settings* menu.
2. Click *New*.
3. Click *Sign Up*.
4. Select sign-up file and click *Open*.
5. Select a computer and click *OK*.
6. Type your user name and password (optional) and click *OK*.
7. Select a terminal type and click *OK*.
8. Click check boxes in *Description of an Account*, and click *OK*.
9. Click *Done*.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Modifying an Account Description
Chapter 3

1. Select *Accounts* from *Settings* menu.
2. Select account and click *Open*.
3. Click check boxes and change terminal type, and click *OK*.
4. Click *Done*.

Removing an Account Description
Chapter 3

1. Select *Accounts* from *Settings* menu.
2. Select account you want to remove and click *Remove*.
3. Click *Done* in *List of Known Accounts*.

Automatic Connections

File Session
Chapter 3

1. Select *File Session* in *Network* menu.
2. Select an account and click *Connect*.
3. Type password (if necessary) and press *Return*.

Terminal Session - Save Transcript
Chapter 3

1. Select *Terminal Session* in *Network* menu.
2. Select an account and click *Connect*.
3. Rename the file (optional) and click *Save*.
4. Type password (if necessary) and press *Return.*

Terminal Session - Don't Save Transcript
Chapter 3

1. Select *Terminal Session* in *Network* menu.
2. Select an account and click *Connect*.
3. Type password (if necessary) and press *Return.*

Terminal Session - Append Transcript
Chapter 3

1. Select *Terminal Session* in *Network* menu.
2. Check *Append the transcript to an existing file*.
3. Select an account and click *Connect*.
4. Select a file and click *Open*.
5. Type password (if necessary) and press *Return.*

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

File Transfers

Send File, Network Account
Chapter 5

1. Select *File Session* in *Network* menu.
2. Select an account and click *Connect*.
3. Select *Send File* in the *Network* menu.
4. Select file to send.
5. Select transfer format.
6. Type name for file on remote computer (to change the name).
7. Click *Send*.
8. Select *Goodbye* from the *Commands* menu.
9. Click the close box.

Send File, Phone Account
Chapter 5

1. Select *Terminal Session* in *Network* menu.
2. Select an account and click *Connect*.
3. Start download process on remote computer.
4. Select *Send File* in the *Network* menu.
5. Select file to send.
6. Select transfer format.
7. Type name for file on remote computer (to change the name).
8. Click *Send*.
9. Log off or select *Goodbye* from the *Commands* menu.
10. Click the close box.

Receive File, Network Account
Chapter 5

1. Select *File Session* in *Network* menu.
2. Select an account and click *Connect*.
3. Select *Receive File* in the *Network* menu.
4. Select file to receive (change directories, if necessary).
5. Select transfer format.
6. Type name for file on your Macintosh (to change the name; change folders if you wish).
7. Click *Receive*.
8. Select *Goodbye* from the *Commands* menu.
9. Click the close box.

Receive File, Phone Account
Chapter 5

1. Select *Terminal Session* in *Network* menu.
2. Select an account and click *Connect*.
3. Start upload process on remote computer.
4. Select *Receive File* in the *Network* menu.
5. Type the name of the file you want to copy.
6. Change the file name on your Macintosh (optional).
7. Select transfer format.
8. Click *Receive*.
9. Select *Goodbye* from the *Commands*

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

menu.
10. Click the close box.

Text Editing & Printing

Local Editing - Create a New Document
Chapter 6

1. Select *New* in the *File* menu.
2. Type a file name and click *New*.
3. Type the new document.
4. Select *Save* in the *File* menu.
5. Click the close box.

Local Editing - Edit an Existing Document
Chapter 6

1. Select *Open* in the *File* menu.
2. Select a file and click *Open*.
3. Edit the document.
4. Select *Save* in the *File* menu.
5. Click the close box.

Remote Editing - Network Account
Chapter 6

1. Select *File Session* in the *Network* menu.
2. Select an account and click *Connect*.
3. Select *Edit File* in the *Network* menu.
4. Select a document.
5. Select *Receive*.
6. Edit the document.
7. Select *Save* in the *File* menu.
8. Click the close box.
9. Select *Goodbye* in *Commands* menu when you are finished editing.
10. Click the close box in the terminal session window.

Using an Editor on a Remote Computer
Chapter 6

1. Select *Terminal Session* in the *Network* menu.
2. Select an account and click *Connect*.
3. Start up an editor (e.g., vi, emacs, ed) on the remote computer.
4. Save document and log off when you finish editing.
5. Click the close box.

Printing the Current Document
Chapter 6

1. Select *Print Document* in the *File* menu.
2. Click *OK*.

Printing Selected Text in the Current Document
Chapter 6

1. Select the text you wish to print.
2. Select *Print Selection* in the *File* menu.
3. Click *OK*.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Printing a Number of Documents
Chapter 6

1. Select *Print Many* in the *File* menu.
2. Select the files to print and click *Add*.
3. Click *Print Files*.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Appendix

B

Preference Settings

This appendix explains *Your Preferences* in the *Settings* menu. TOPS Terminal interprets keyboard input, manages screen output, and tends to several other functions according to internal settings stored in your TOPS Terminal Memory. You can change the settings at any time by selecting *Your Preferences* in the *Settings* menu:

You will see the following dialog window:

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

The first word in each entry (Editor, Network, or Terminal) tells you what TOPS Terminal function the entry has to do with. Editor entries have to do with local or remote editing. Network entries are generally about *Network* menu functions. Terminal entries are concerned with terminal sessions on a remote computer. There is some overlap, since terminal sessions are started from the *Network* menu, for instance.

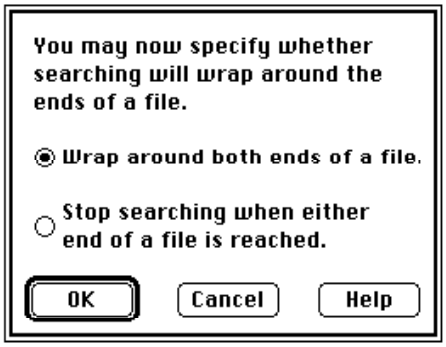
To view or change a setting, double-click the preference item (or select it and click *Open*). If you want to change the setting, select your preference in the displayed dialog window and click *OK*. Whatever changes you make in the settings will take effect immediately and will be saved in TOPS Terminal Memory; they will be in effect for subsequent TOPS Terminal sessions.

If you are unclear about what one of these preferences means, click the *Help* button in the dialog window for the preference you are interested in.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Find Wraparound

Designates whether *Find* and *Replace* (in the *Text* menu) wrap around the bottom or the top of the file (depending on whether it is a forward or backward find or replace). The default is wrap around.

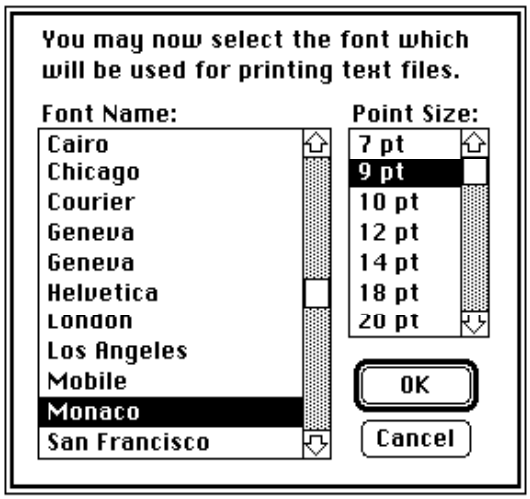


.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Printing Font

Determines what font will be used when you print from TOPS Terminal (*File* menu). The default value is: Monaco 9 point.

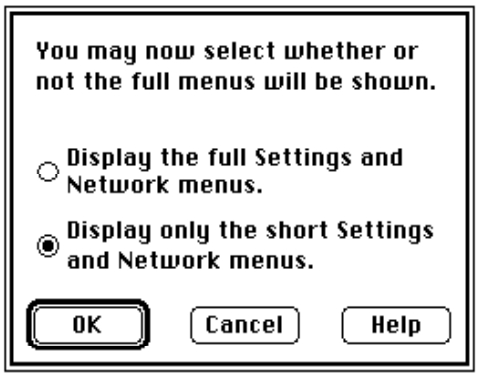


.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Full Menus

Determines whether short or full *Network* and *Settings* menus will be displayed. Short menus are the default.

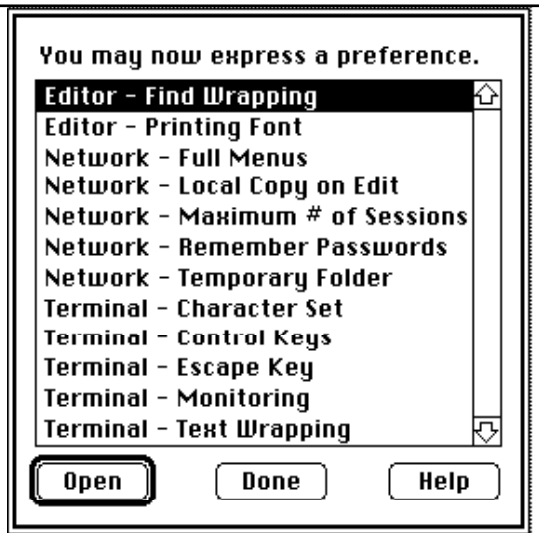


When you first use TOPS Terminal the short versions of the *Network* and *Settings* menus are displayed. Most of the time you can do everything you want with the short menus. If you want to do certain additional functions, you will have to display the full menus. To display the full menus, do the following after starting up TOPS Terminal:

1. Select *Your Preferences* in the *Settings* menu.

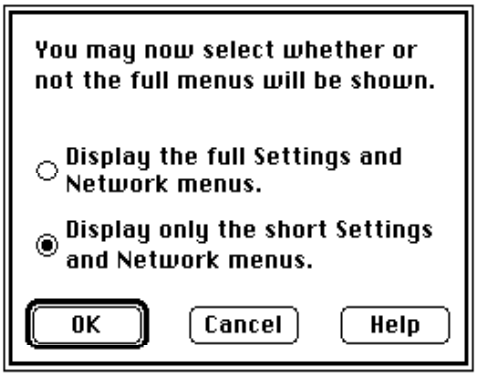
The list of preferences will be displayed:

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



2. Select *Network - Full Menus* and click *Open*.

The following dialog will be displayed:



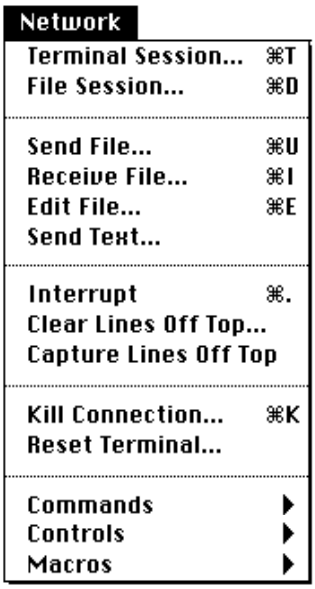
3. Select *Display the full Settings and Network menus* and click *OK*.

When you click *OK,* whatever was displayed before you selected *Your Preferences* will be redisplayed; you will see full *Network* and *Settings* menus if you select those menu headings. The additional functions available with full menus are discussed below.

Additional Network Menu Functions

Three additional functions are available with the full *Network* menu:

- Kill a “stubborn” connection to a remote computer
- Reset the terminal settings on a remote computer
- Execute a macro on a remote computer



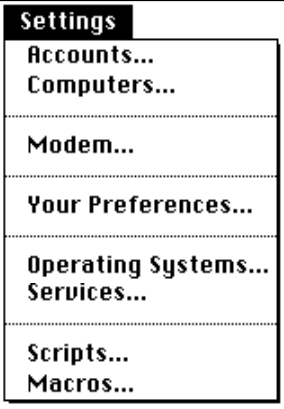
Kill Connection, *Reset Terminal*, and macro execution are described in Chapter 4. See Appendix D to learn how to write a macro.

Additional Settings Menu Functions

The full version of the *Settings* menu has four additional functions:

- Describe or modify an operating system description
- Describe or modify a service description
- Create or modify a script
- Create or modify a macro

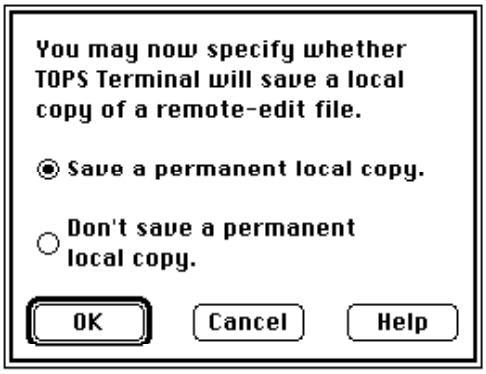
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



See Appendix D for detailed descriptions of scripts and macros. See Appendix E for information about operating system and service descriptions.

Local Copy on Edit

Determines whether TOPS Terminal will retain a local copy (on the Macintosh) of a file you edit with *Edit File* command (*Network* menu). The default is to save a local copy.

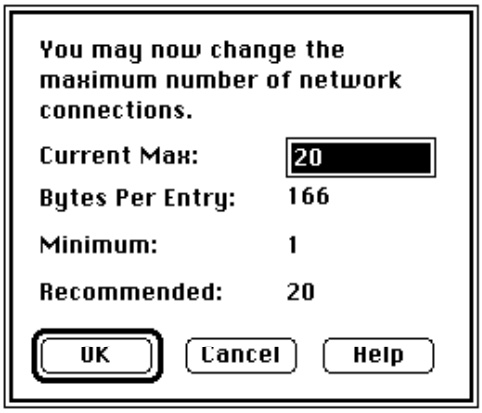


.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Maximum Number of Sessions

Determines the maximum number of network connections allowed at one time; the default value is 20. If you find yourself running out of memory regularly, you might want to reduce the number.



Remember Passwords

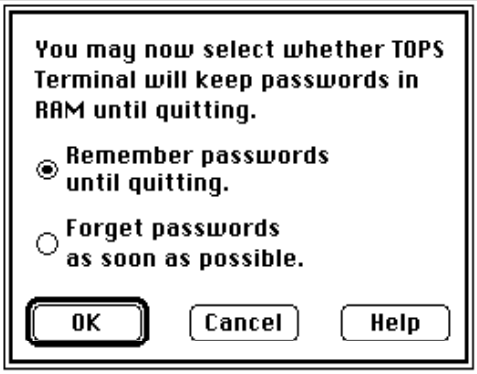
Determines whether a password for an account you connect to is saved in RAM (Random Access Memory) until you quit TOPS Terminal, or if the password will be forgotten immediately. The default option is to remember passwords. This means that you will not have to type the password again if you make a connection with the same account more than once during a TOPS Terminal session. It also means that anyone else who has access to your Macintosh can log on to any computers you have logged onto during the current TOPS Terminal session.

The most secure option is to select *Forget passwords as soon as possible*.

Note that this setting has nothing to do with whether account passwords are saved in TOPS Terminal Memory; you set up each account separately and determine whether or not you want the password stored with the account. See Chapter 3.

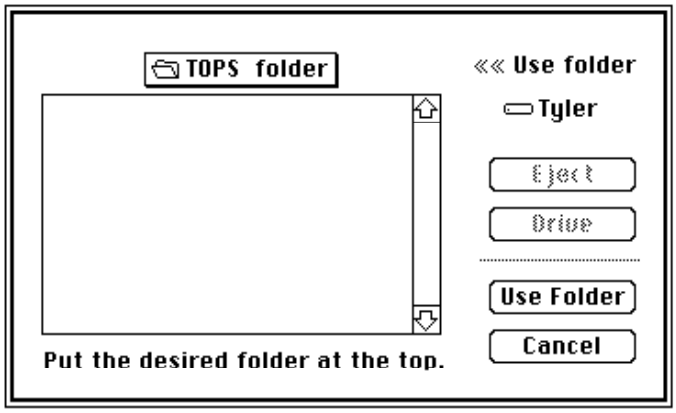
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



Temporary Folder

Allows you to specify where “temporary” session transcripts will be saved; all file session transcripts are temporary, as are terminal session transcripts for accounts in which *Don't Save Session Transcript* has been checked. The folder shown at the top of the list box (“TOPS folder” in the example below) is the folder where transcripts will be saved — should you decide to select *Save* during the session. Double click on a folder in the list box to select it.

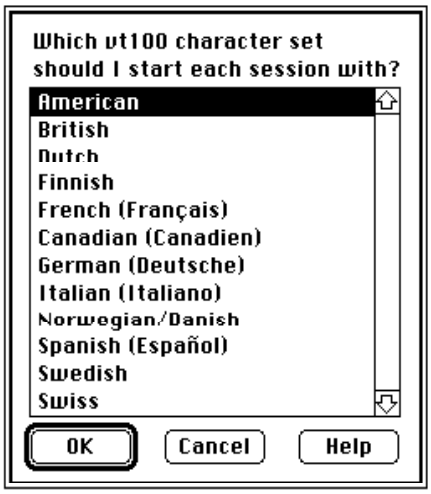


.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Character Set

Determines what VT100 character set should be used during a TOPS Terminal session; American is the default.



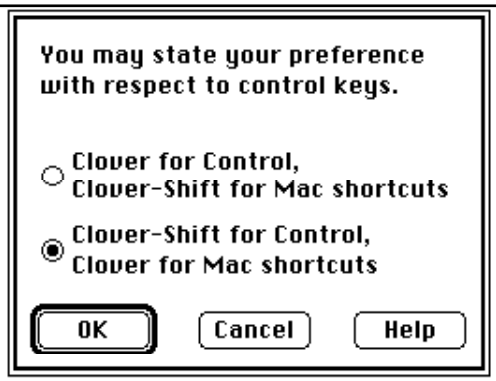
Control Keys

Determines whether the ⌘ (Clover) key or ⌘-Shift will be used as a Control-key equivalent on Macintoshes with no Control key (the Macintosh Plus and below); Clover-Shift for Control is the default.

Mac shortcuts, as described in “Mac Shortcuts for Menu Selection” in Chapter 4, use the Clover or Clover-Shift sequence that control keys do not use. If you tend to use Mac shortcuts more than Control-key sequences, you will probably want to change the setting.

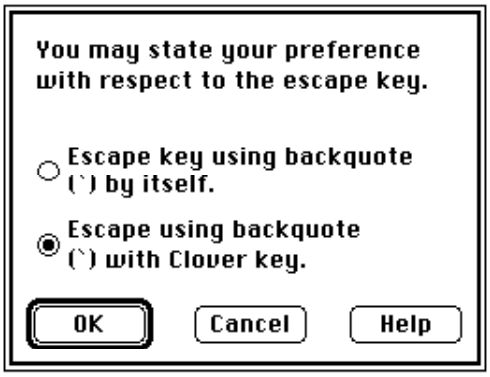
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



Escape Key

Determines whether the backquote key by itself or ⌘-` (Clover-backquote) will be used as escape-key equivalent on Macs with no escape key (the Macintosh Plus and below); Clover-backquote is the default.



Monitoring

Determines whether an exact copy of the characters that come in from the network or the modem are saved in an auxiliary file which can then be

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

viewed with a binary file editor such as Fedit Plus. This may be useful to a system administrator in diagnosing problems. Don't monitor is the default.

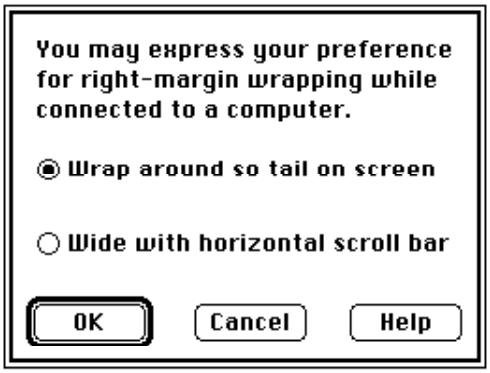
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Text Wrapping

Determines whether text in terminal sessions will extend beyond the right edge of the window, with the horizontal scroll bar active, or if text will automatically wrap around to the left margin when the right edge of the window is reached; wrap around to the left is the default. Note that this is not word wrapping: words may be split in two at the end of a line. Use the *Return* key to prevent word splits.

Note also that this setting does not affect editing sessions on TOPS Terminal; you must press *Return* at the end of lines during editing sessions if you wish the text to continue on the following line.



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Appendix

C

Modems

If you are going to make TOPS Terminal connections to a remote computer with a phone account, you will need to have a modem attached to your Macintosh (or a shared network modem such as Shiva NetModem) and you will have to select a modem type before making a connection.

If no built-in modem description matches the settings of the remote computer you wish to connect to, you will have to create a modem description with the proper modem/phone settings.

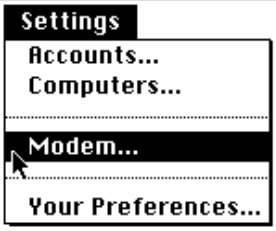
This appendix explains how to select a modem type and how to create, modify, or remove a modem description.

Note: see your system administrator or the system administrator of the remote computer you wish to connect to if you are unsure about modem and phone settings.

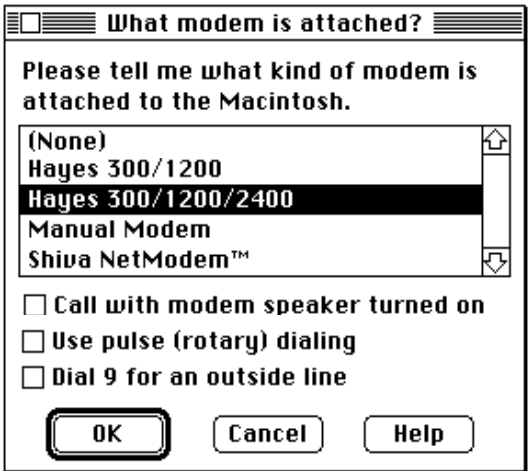
Selecting a Modem Type

To select a modem type, do the following after starting TOPS Terminal:

1. **Select *Modem* from *Settings* menu**



2. Select a modem type and click *OK*.



Creating a Modem Description

To create a modem description to match the modem settings of a remote computer you wish to connect to, do the following:

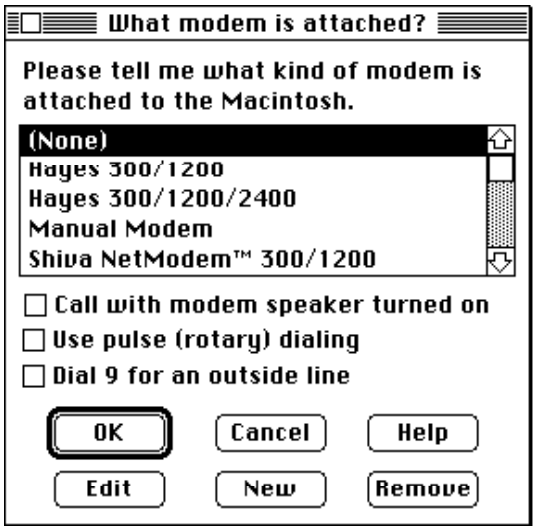
1. Select full menus in *Your Preferences*.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

See the instructions for displaying full *Network* and *Settings* menus on page 143 of Appendix B. You need to display full menus preference settings to create, modify, or remove modem descriptions.

2. Select *Modem* in *Settings* menu.

The list of modem descriptions will be displayed, with *Edit, New,* and *Remove* buttons at the bottom of the dialog window:

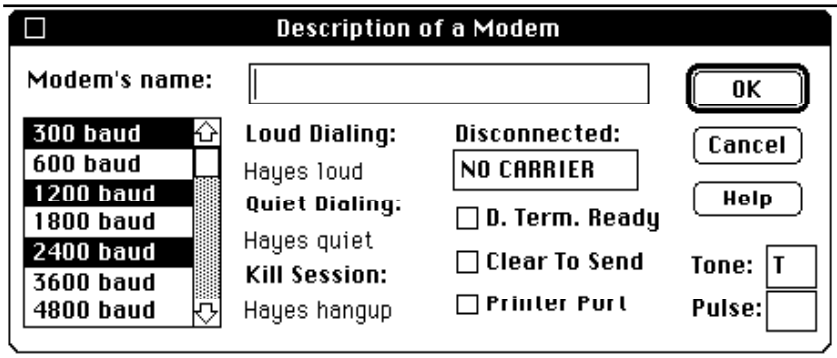


3. Select *New*.

A blank *Description of a Modem* will be displayed:.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



4. Type the name of the modem description.

Use a descriptive name that will remind you of the characteristics of the modem, with reference to the brand name and its speed, for instance.

5. Select baud rate(s) for the modem.

Select a baud rate for the modem, or select a number of baud rates (use ⌘-Option for multiple selections) if the modem has variable rates. We selected 9600 baud in the example below.

6. Select dialing and hangup scripts.

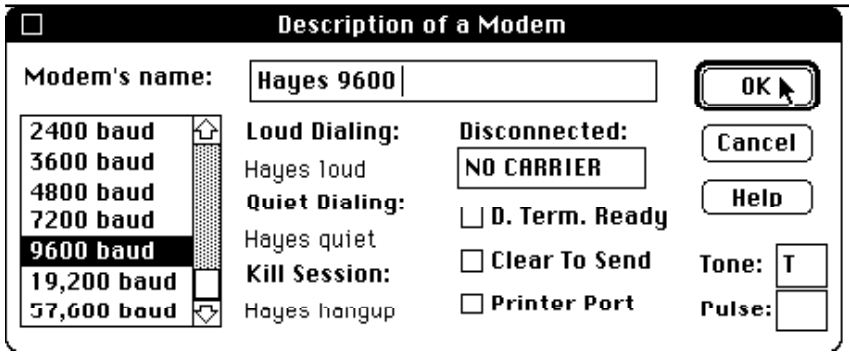
If you need to use different scripts than the default scripts automatically selected, select the script you want to change and select a different script from the list displayed. See Appendix D for a discussion of scripts.

7. Change other settings and click *OK*.

Change the *Disconnected* message and the *D. Term Ready, Clear To Send,* and *Printer Port* settings, if necessary. Also change the designation for *Tone* or *Pulse* dialing, if necessary. Click *OK* when the description is complete.

Here is a completed modem description, for a Hayes 9600 baud modem:

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



Modifying a Modem Description

Note: You cannot modify the built-in modem descriptions that come with TOPS Terminal. You can, however, make changes to one of these descriptions, select *Save As* in the *File* menu, and save the modified description with a different name.

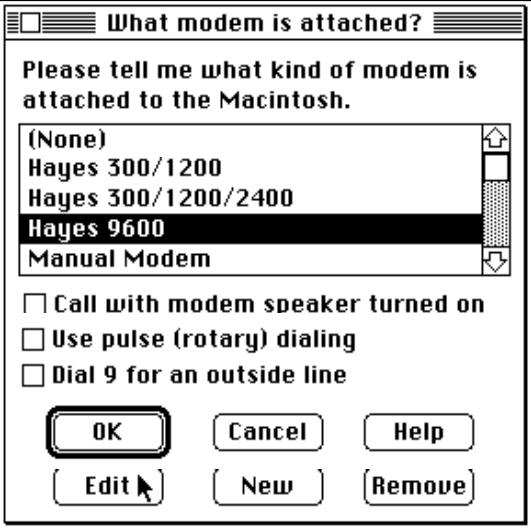
To modify a modem description to match the modem settings of a remote computer you wish to connect to, do the following (with full menus selected):

1. **Select *Modem* in *Settings* menu.**

2. **Select the modem you wish to modify and click *Edit*.**

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



3. Modify the description and click *OK*.

Make changes to any of the settings, including baud rate and dialing or disconnect scripts, and click *OK*.

Removing a Modem Description

To remove a modem description, do the following (with full menus selected):

1. Select *Modem* in *Settings* menu.

2. Select the modem you wish to remove and click *Remove*.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Appendix

D

Scripts & Macros

Scripts and macros are miniature computer programs that execute a sequence of operations during terminal or file sessions. For example, when you start a terminal session and choose an account to connect to a remote computer, TOPS Terminal calls a pre-defined (“built-in”) login script that identifies you to the computer. Other scripts perform functions such as copying files from your Macintosh to a remote computer, listing files on a remote computer, and logging off from a remote computer. Scripts are also invoked by TOPS Terminal when you select a function in the full *Network* menu.

Scripts are matched to particular computers and particular operating systems; each built-in operating system description has a script that performs the login identification function for that operating system. (See Appendix E for a discussion of operating systems.)

Macros are identical in format and syntax to scripts, but they are invoked by you directly. TOPS Terminal doesn't provide any macros; you write them yourself and execute them by selecting *Macros* in the *Network* menu and selecting the macro you want to run from the list.

Writing Scripts and Macros

A number of built-in scripts come with TOPS Terminal, and they may be all you need. If you want to connect to a computer with an operating system for which there is no built-in description in TOPS Terminal, you

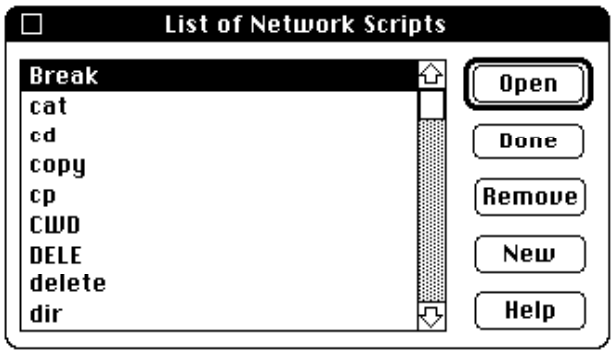
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

may need to write your own scripts.

Before trying to write a script or macro, open up some of TOPS Terminal's built-in scripts to see what they look like. To do this, select *Scripts* from the *Settings* menu (available only when full menus are displayed; see Appendix B to learn how to display full menus).

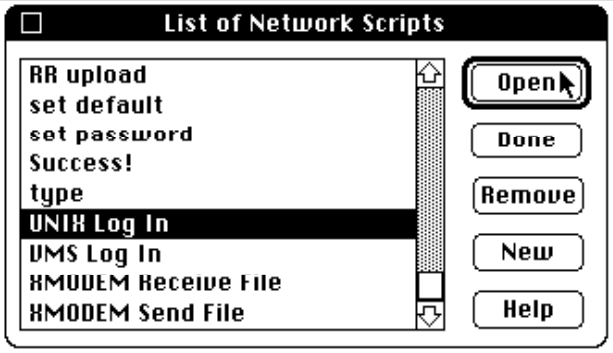
The *List of Network Scripts* will be displayed; scroll through the list to see what is available. Many of the scripts are for commands on UNIX and VMS operating systems.



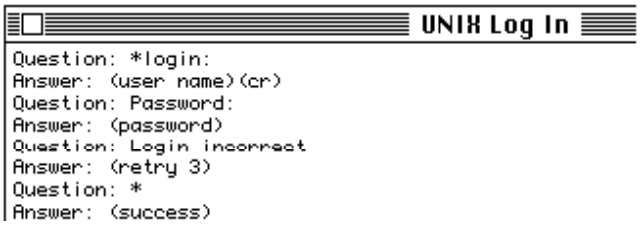
Scroll down the list, select any of the scripts, and click *Open* to display the text of the script. Select the UNIX Log In script, for instance (remember that you can just press the letter *U* to jump immediately to the first entry in the list that starts with *U*).

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



Click *Open* to display the UNIX Log In script:



Look at some other scripts, if you like, and then read on to learn how you can write your own scripts and macros.

Format of Scripts and Macros

As you can see from the example above, scripts and macros take the form of a sequence of questions and answers. When a script is active, TOPS Terminal looks at all the data sent from the remote computer, trying to match the questions in the script. When it sees that the remote computer has asked the Mac one of the listed questions, TOPS Terminal gives the corresponding answer from the list of questions and answers.

Look again at the UNIX login script above. The first two questions it looks for are "*login: " and "Password: ". This is how UNIX asks for your user name and your password. TOPS Terminal spots these questions when they are asked by UNIX, and it gives the corresponding answers, "(user name)(cr)" and "(password)," respectively.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

On the other hand, if TOPS Terminal sees “Login incorrect,” the user name or the password is wrong or garbled. UNIX is telling you something went awry and (implicitly) questions you: Would you like to try again? The answer to “Login incorrect” is “(retry 3)”, meaning to start the login process again a maximum of three times.

Text in a script's question ordinarily matches only identical text from the remote computer, but there are special characters like the asterisk which have special pattern matching implications. One such use was shown in the question “*login: ” above; the asterisk and two other special characters are discussed in “Syntax of Scripts and Macros,” below.

Text in a script's answer is sent directly to the remote computer when the answer is encountered, unless the text is within parentheses. Text in parentheses has a special meaning. In the UNIX script, for instance, “(user name)(cr)” means “Send the user name for the account I'm calling, then send a carriage return.” A list of special answers (“built-in commands”) is shown on page 174.

A script can start with an answer which is not preceded by a question. Consider this Hayes dialing script:

```
Answer: ATM0 (cr)
Question:          OK
Answer: ATD (phone number)
```

The script first turns off the modem speaker with the modem command, “ATM0.” It then looks for “OK,” and upon receiving that, sends “ATD” (the Hayes Modem dialing sequence) plus the phone number of the computer you are trying to connect to.

Syntax of Scripts and Macros

The syntax of questions and answers is described below. Note that script and macro text is case-sensitive; that is, lower-case “word” is different than initial-cap “Word.” Note also that the colon after Question or Answer is followed by one or more spaces or tabs. Normally, no space should be inserted between text and built-in commands.

Question syntax

The text of a question is a sequence of characters, a special character, or a combination of both which is matched against responses from the remote computer. For example, “Question: login:” tells your Macintosh to look

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

for the pattern “login:” from the remote computer, which is the computer's way of saying it is ready for you to type your user ID and log in.

There are three special characters that can be combined with other text to vary the meaning of the question:

- An **asterisk (*)** matches any pattern sent by the remote computer, except an end-of-line character.

  Question: *word:
  will match “Password:”, “password:”, or “suntops password:”.

- The **vertical bar (|)** separates two or more patterns; a match of any of the patterns is a successful match.

  Question: BUSY|NO CARRIER|NO DIALTONE
  will find a match if the remote computer sends any of these character sequences.

- A **back slash (\)** signifies the end of line.

  QUESTION: **entry**
  will find and match any line sent from the remote computer
  which ends with the word “entry”

Answer syntax

The text of an answer is text, a special answer (built-in command) in parentheses, or a combination of both. The text and commands that follow *Answer:* are sent to the remote computer. Example:

Answer: (user name)(cr)

The user name found in the account description for the computer you are connected to is sent to the remote computer, followed by a carriage return. Built-in commands are listed at the end of this chapter, on page 174.

Question-Matching Order

The “current question” is a reference point used by TOPS Terminal when a script or macro is running. When a script or macro starts, the first question is the current question. When a question is matched, the answer or answers

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

that immediately follow are executed, and the next question after the one that was matched becomes the current question.

The script or macro ends when the last answer or the special answers “(success)” or “(failure)” are executed.

The questions in a script or macro may not be processed in the order they are listed. All data is checked against each question in the script to see if it matches the question. Sometimes questions are similar enough to each other that data could match more than one question; when this happens, the order of matching becomes a significant issue.

TOPS Terminal first checks the current question for a match and then checks each succeeding question in order. When the last question is reached, TOPS Terminal goes back to the start and checks the first question and each succeeding question until the current question is encountered again.

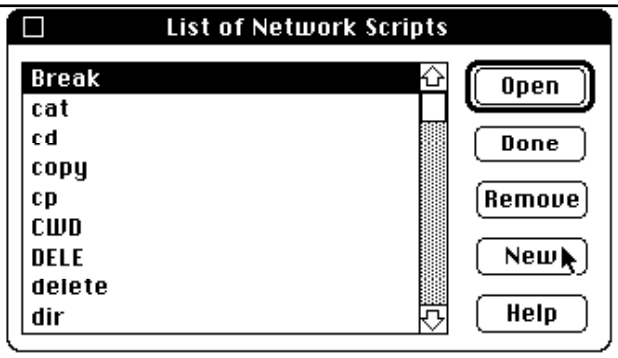
In summary, question matching is cyclical: the script or macro is checked for a successful match with the current question, then for questions between the current question and the end of the script or macro, then from the top again. The checking stops at the first matching question encountered, or when the circle comes back around to the current question, whichever comes first.

Example 1 - a Login Script

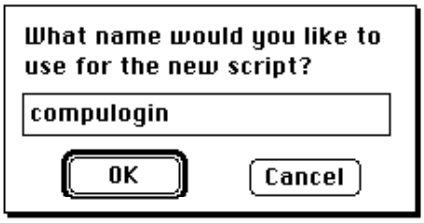
1. Select *Scripts* in the *Settings* menu.

2. Select *New.*

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



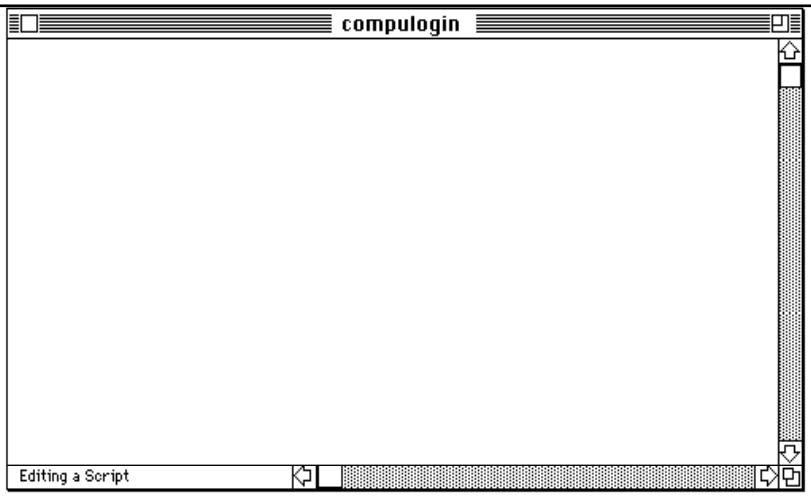
3. Type a name for the script.



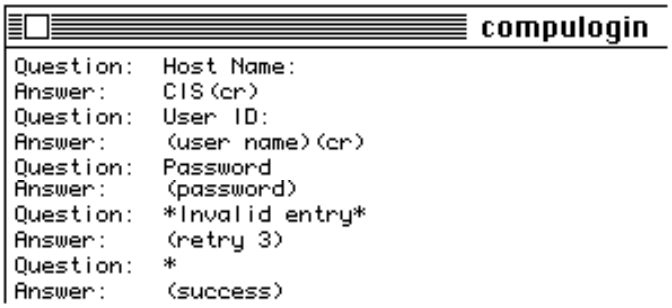
A blank edit window will be displayed:

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



4. Type the script in the edit window.



5. Save the script and click the close box.

Select *Save* in the *File* menu to save the script and click on the close box. The *List of Scripts* will be displayed, with the new script listed.

Analysis of "compulogin":

When CompuServe asks for the "Host Name:", TOPS Terminal answers with "CIS" and a carriage return. When CompuServe asks for the "User ID:" TOPS Terminal answers with a user name (from TOPS Terminal Memory) and a carriage return. When CompuServe asks for a password,

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

TOPS Terminal supplies the password included in the account description, or asks for the password from the user if there is no stored password.

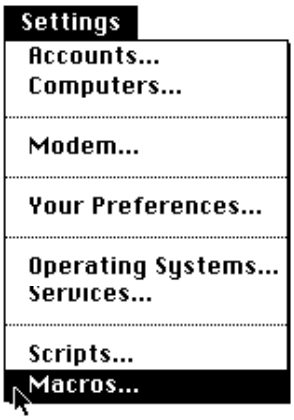
The script keeps an eye out for a question that includes the phrase “Invalid entry.” If this is found (because the password supplied by TOPS Terminal was invalid), it goes back to the very beginning of the script. It will perform this cycle up to three times (“retry 3”). If the user id and password taken from TOPS Terminal Memory fails to work three more consecutive times, the script fails and TOPS Terminal hangs up.

On the other hand, if anything except “Invalid entry” arrives after the password is sent, “Question: *” is matched, and the corresponding answer — “(success)” — finishes the process of identifying you.

Example 2 - a Macro to Read Messages

Consider, now, a macro called “macro 1” which will also be used with CompuServe. This macro will be executed when you select it from the list of macros available under the *Network/Macros* menu. Follow these instructions to create the macro:

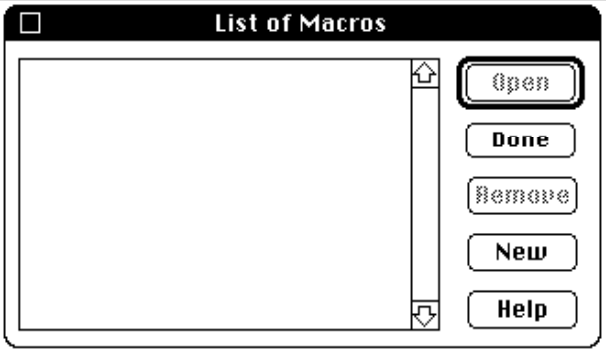
1. **Select *Macros* in the *Settings* menu.**



The *List of Macros* will be displayed; if you have not written any others, none will be listed:

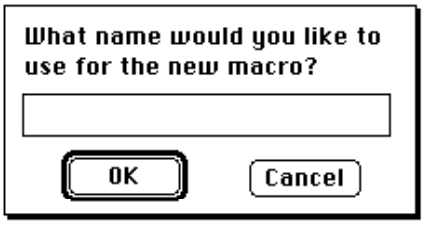
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

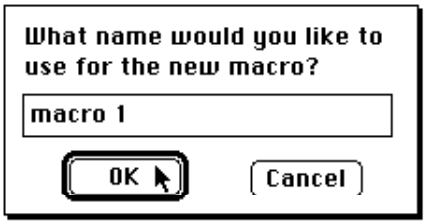


2. Select *New.*

You will be asked to name the macro:



3. Type a name and click *OK.*

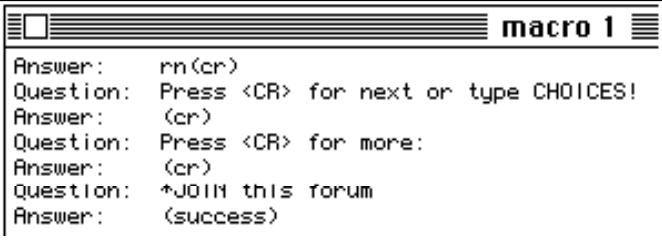


A blank editor document will be opened; the status box at the lower left will read “Editing a Macro.”

4. Type the macro in the edit window.

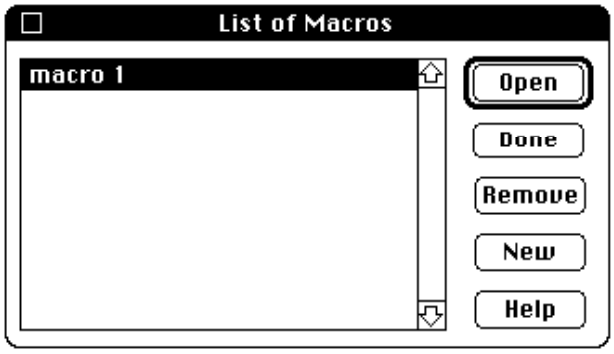
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



5. Save the macro and click the close box.

Select *Save* in the *File* menu to save the macro and click on the close box. The *List of Macros* will be displayed, with the new macro listed:



Analysis of "macro 1":

This macro reads all new messages from the CompuServe bulletin board for a particular "forum" (subject area) and records them in a TOPS Terminal session transcript. Note that you must start the macro at the appropriate time — once inside the forum at the menu relevant to leaving and reading messages.

First the macro sends "rn" and a carriage return, which is a request to Read New messages in a particular CompuServe forum. You want CompuServe to send out the messages one-by-one until the phrase "JOIN this forum" is encountered, which will happen when there are no more messages to read; this will invoke the built-in command "(success)," which indicates that the macro ended successfully.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Two questions will appear in the course of message reading, and they must be answered by the macro to cause CompuServe to continue sending messages. After each message has been read, CompuServe gives you the choice of reading the next message by pressing carriage return or typing "CHOICES!" to display other options. The macro sends the answer "(cr)" to tell CompuServe to send the next message.

The second question occurs when there's not enough room on the screen for the whole message. CompuServe asks for a carriage return to continue the message, which the macro sends when it sees the question "Press <CR> for more:"

Messages are read until there are no more to read and the macro ends successfully.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Testing and Editing Scripts and Macros

Once you have written a script or macro, you will want to test it and edit it if it does not do exactly what you want it to. Since scripts and macros have the same format and syntax, they can be tested in a similar manner. TOPS Terminal provides you with a way to test a script as a macro before you install it in a service description.

Debug Command

Use the built-in command "debug" to tell when a particular answer is reached. For example, "Answer: (debug step 3)" will put "step 3" on the screen when that answer is reached; the text is not sent to the other computer, but is displayed in the session window. You can move the debug answer around to see where the script or macro fails.

Testing or executing a Macro

To test or execute a macro, do the following:

1. **Make a connection to a remote computer.**

   Macros are executed on a remote computer after you have made a connection with TOPS Terminal. The *Macros* menu is only active during a terminal session on a remote computer.

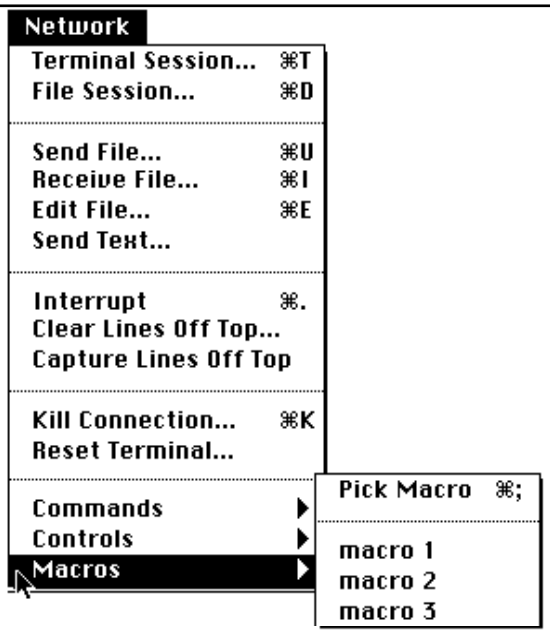
2. **Prepare for the macro on the remote computer.**

   Depending on what the macro does, you may need to change directories or start a process on the remote computer before executing the macro.

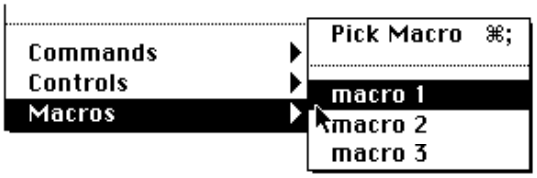
3. **Select *Macros* in the *Network* menu.**

   Click and hold the mouse button on the *Network* menu and move the mouse until *Macros* (available only with full menus) is highlighted, which will display the *Pick Macro* command and a list of the macros you have written:

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



4. Select macro to execute and release the mouse button.



The selected macro will be executed. If it doesn't do what you expected it to, edit the macro and execute it again.

Testing a Script

The process of testing a script is much like that for executing a script. Do the following:

1. Make a connection to a remote computer.

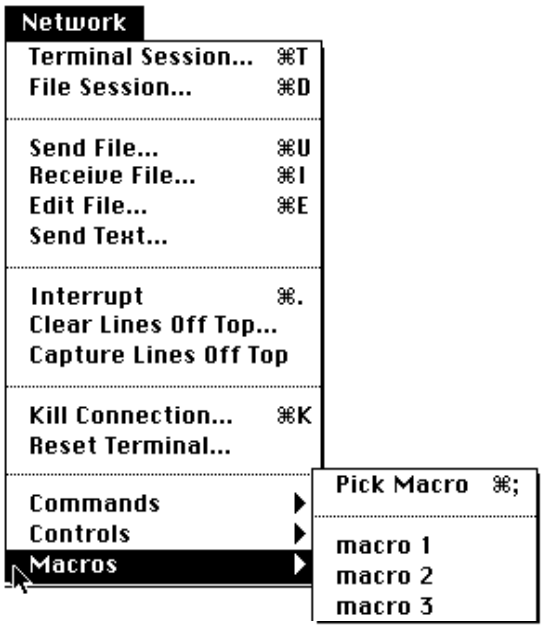
Scripts, like macros, are executed on a remote computer after you have made a connection with TOPS Terminal.

2. Prepare for the script on the remote computer.

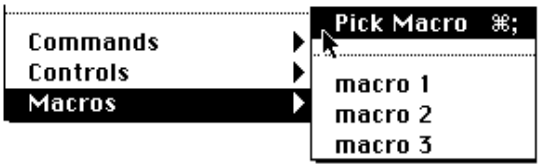
Depending on what the script does, you may need to change directories or start a process on the remote computer before executing the script.

3. Select *Macros* in the *Network* menu.

Click and hold the mouse button on the *Network* menu and move the mouse until *Macros* (available only with full menus) is highlighted, which will display the *Pick Macro* command and a list of the macros you have written:



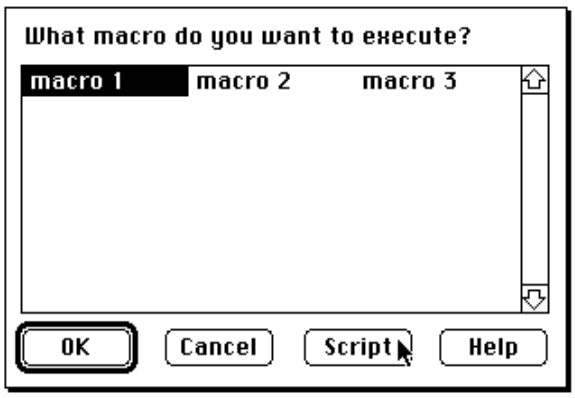
4. Select *Pick Macro* and release the mouse button.



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

The macros you have written will be displayed in a dialog window, with four buttons, including *Script*, at the bottom.

5. Select the *Script* button:



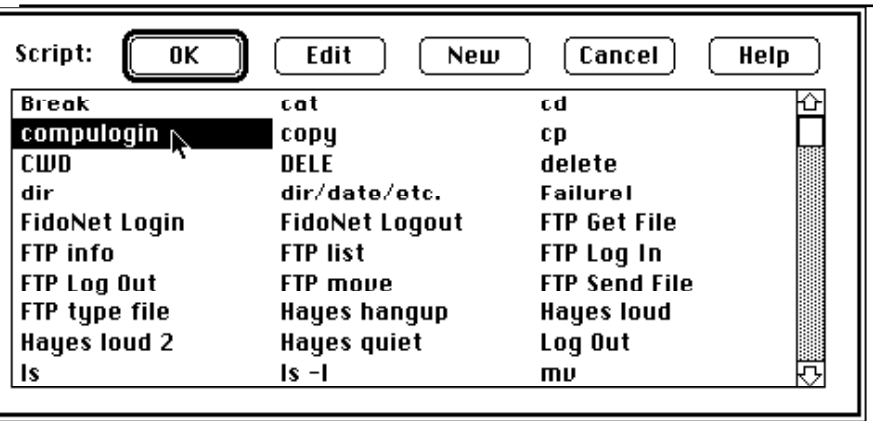
This will display the list of scripts and let you run a script as if it were a macro. You may want do this during a manual terminal session (as described in Chapter 2).

For example, to test the login script for CompuServe from Example 1 above, start up a manual terminal session to CompuServe and then:

6. Select the script you want to test.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



7. Click *OK.*

The script will be executed. If the script does not work properly, edit it and test it again as a macro. Once the script works properly, install it as the login script for the CompuServe service, as described in Appendix E.

Editing a Script or Macro

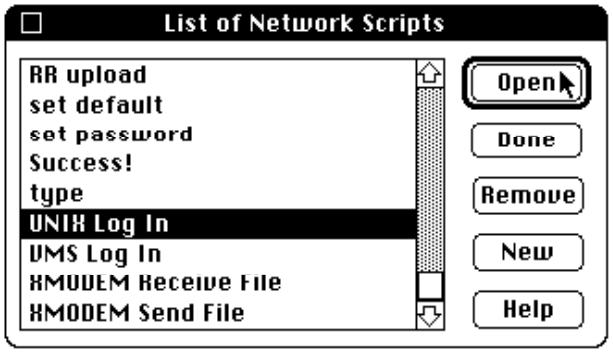
To edit an existing script or macro, do the following:

1. Select *Scripts* or *Macros* from the *Settings* menu:

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

The list of network scripts (or the list of macros you have written) will be displayed.

2. Select a script or macro and click *Open*



3. Edit the script or macro and save it.

Modify the script or macro and save it by selecting *Save* in the *File* menu, and click the close box when you are finished.

Note: you cannot modify a built-in script, but you can make changes to one and rename it using *Save As* in the *File* menu.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Built-In Commands

TOPS Terminal provides various types of built-in commands that you can use in script and macro answers:

CONNECTING AND IDENTIFYING:

first name	send first name from user name
last name	send last name from user name
user name	send user name of this account

FILE NAMES:

source	send name of source file
target	send name of target file

FILE TRANSFER:

file type	send type string entered for file
FTP abort	kill an ongoing FTP transfer
FTP connect	listen for the FTP data port connection
FTP port	negotiate an FTP data port
FTP receive	receive file via FTP
FTP send	send file via FTP
XMODEM send	send file via XMODEM
XMODEM receive	receive file via XMODEM

GENERAL PURPOSE:

debug	print the following string on the screen
hang up	kill the connection rudely
interrupt	send the interrupt control sequence
no operation	don't do anything
pause	wait for one second

MODEM CONTROL:

phone number	send the phone number of this computer

PASSWORDS:

new password	get the new password and send it
password	send password of this account
update password	save the new password (if appropriate)

SPECIAL CHARACTERS:

break	send a special break sequence
cr	send a carriage return
return	send a carriage return
space	send a white space
tab	send a tab character

SUCCESS, FAILURE, AND TRYING AGAIN:

failure	terminate the script and report failure
retry n	go back to the start of script (at most n times)

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

start over	retry the previous question
success	finished with the script, accomplished the goal

TARGET TWIDDLING:

random target	put a random number in the target name
include target	read target file and insert into session transcript
trash target	delete the target file

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

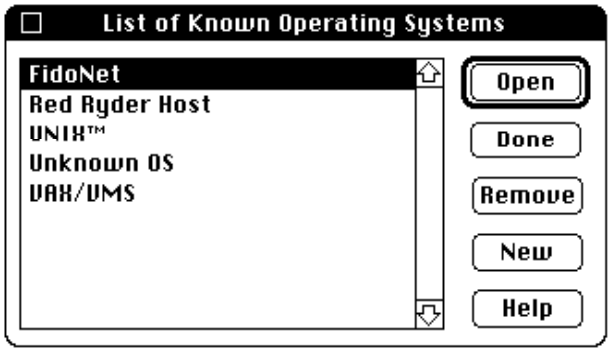
Appendix

E

Operating Systems & Services

This appendix explains how to expand or customize TOPS Terminal's interfacing capability by creating new operating system and service descriptions. Also included is a discussion of the hierarchical structure of TOPS Terminal.

An operating system is the controlling program of a computer, and it determines how you talk to the computer for such functions as logging in, logging off, listing files, deleting files, etc. To make it easy for you to perform various functions on a remote computer, TOPS Terminal must interface with the computer's operating system. This interface is facilitated by the inclusion of a number of built-in operating system descriptions:



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Hierarchy of Descriptions

Operating system descriptions provide various terminal session and file transfer services for a wide variety of remote computers, and these services are provided under a consistent and uniform interface, hiding many of the details of the interaction with the remote operating system.

This “operating system independence,” as it is called, means that you can perform many common operations on a remote computer without knowing how they get implemented within the operating system of that computer. For instance, you can call a computer and identify yourself, see what files are on that computer, copy one of the files, and log off from the computer, all using the Macintosh's easy menus and dialogs, without knowing anything about the remote operating system.

To perform these functions on the remote computer, TOPS Terminal uses built-in scripts (see Appendix D) that are linked to a particular operating system. Each of the operations under the *Network* menu (*Terminal Session*, *File Session*, *Send File, Receive File*, etc.) and each selection under the *Commands* and *Controls* submenus corresponds to a particular script.

To keep track of which scripts go with which operating system on which computer, TOPS Terminal uses a hierarchical system of descriptions. Each description utilizes information at the next level down in the hierarchy, as illustrated in the chart on the opposite page.

At the top of the hierarchy is the account description (level 1). The account description includes the name of a remote computer, which has been specified in a TOPS Terminal computer description (level 2). The description of the remote computer specifies an operating system description (level 3). The description of the operating system, in turn, specifies its terminal session and file transfer services (level 4). The description of a terminal session or file transfer service includes a catalog of all the scripts (level 5) that are used by TOPS Terminal to perform that service.

What the hierarchy of descriptions means in practice is that whenever you select an account for a terminal emulation or a file transfer session, you are automatically selecting the scripts needed by TOPS Terminal to perform the terminal or file transfer functions you want to perform for that account.

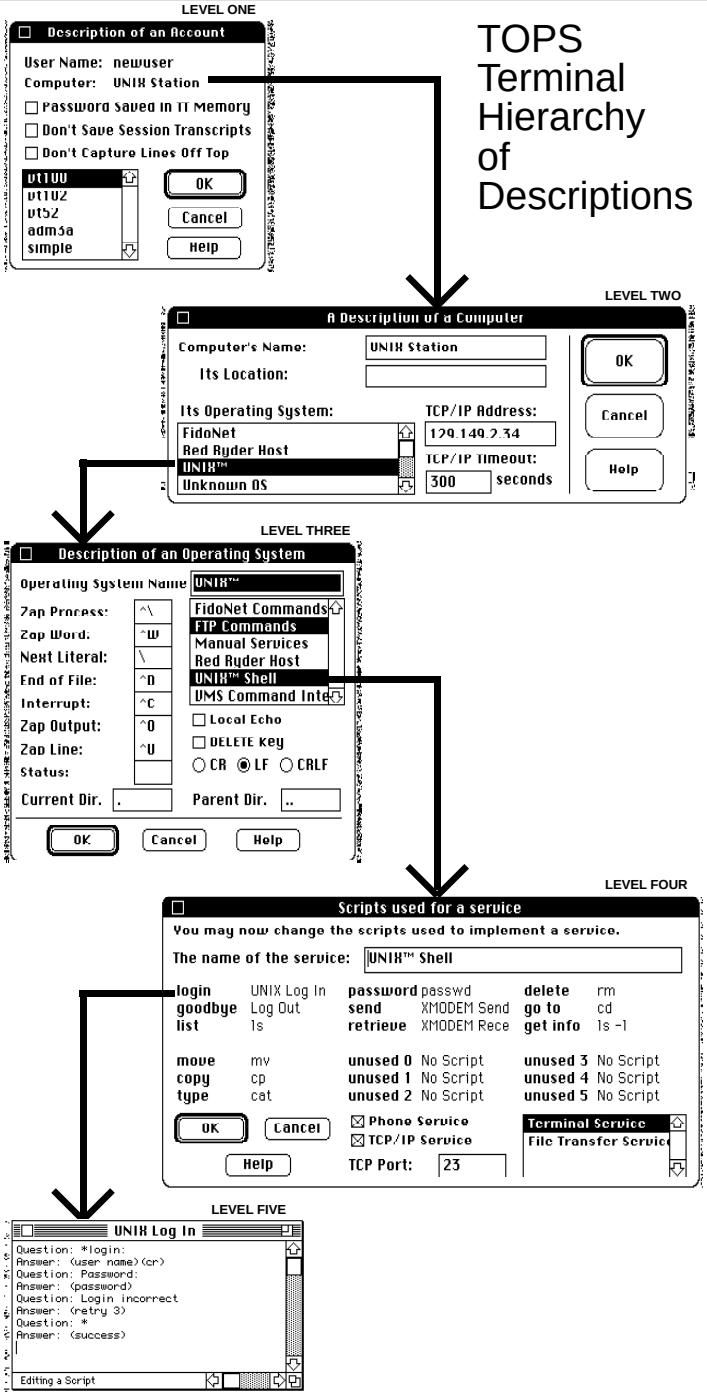
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

If you want to expand or customize TOPS Terminal's interfacing capability, you must write the appropriate scripts, link them to a terminal or file transfer service, and link this service to a new operating system description. These steps are explained on the following pages. The new operating system description is then linked to a computer description, which is linked to an account, as described in Chapter 3.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Built-In Operating Systems & Services

TOPS Terminal's built-in operating system descriptions are shown in the table below along with the terminal service and file transfer service associated with each. Note that some operating system interfaces (UNIX and VAX/VMS) provide terminal service for both phone and network connections, and file transfer service for network connections only. FidoNet and Red Ryder Host provide no network connection services. Note also that no file transfer services are available for phone connections. (File transfers for network and phone accounts are described in Chapter 5.)

erating tem	**Phone Connection**	**Network Connection**			
			Terminal Service	Terminal Service	File Transfer Service
oNet	FidoNet Commands	(None)	(None)		
Ryder Host	Red Ryder Host	(None)	(None)		
IX	UNIX Shell	UNIX Shell	FTP Commands		
X/VMS	VMS Command Interp.	VMS Cmnd Interp	FTP Commands		
known OS	Manual	Manual	FTP Commands		

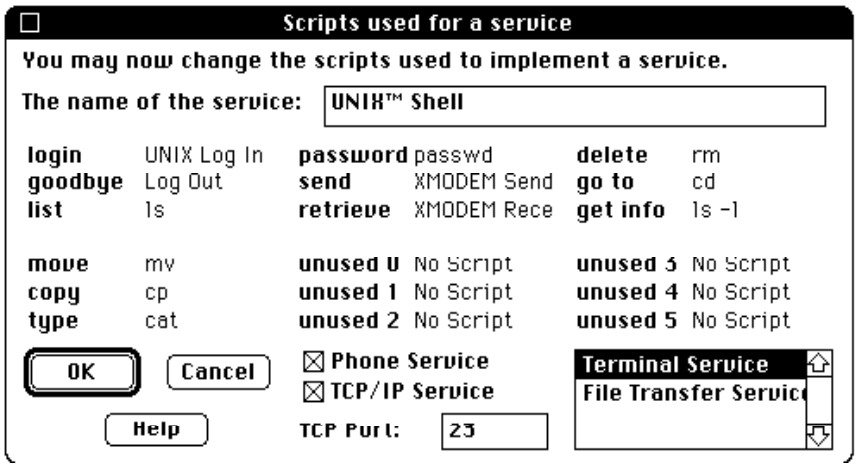
Each of the services in the table represents a group of scripts that TOPS Terminal invokes to perform terminal session (Terminal Service) or file transfer session operations (File Transfer Service).

To see the catalog of scripts used by any service, select *Services* from the *Settings* menu and then select a service from the list. Note that *Services* is available only when full menus are displayed (see Appendix B).

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

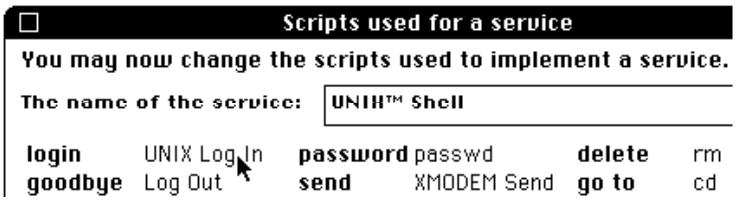
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Here is the UNIX Shell service, for instance:



The bold entries (**login**, **goodbye**, **list**, etc.) are functions under TOPS Terminal's *Network* menu and *Commands* submenu. The text to the right of a function is the name of a script in TOPS Terminal.

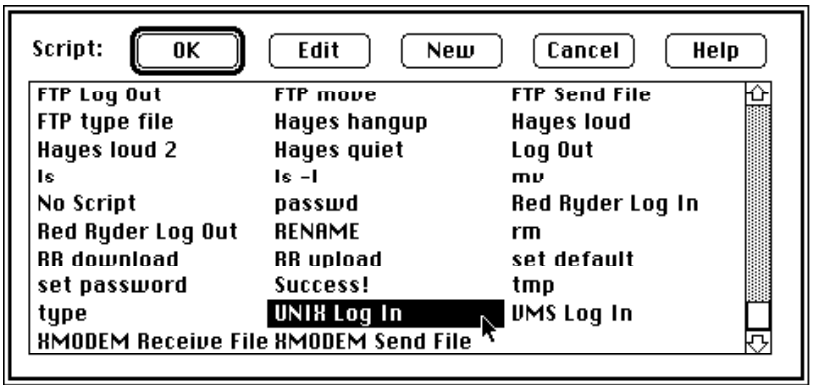
Click on a script to display a list of all available scripts; for example, click on UNIX Log In:



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

The list of TOPS Terminal scripts will be shown, with the one selected highlighted:



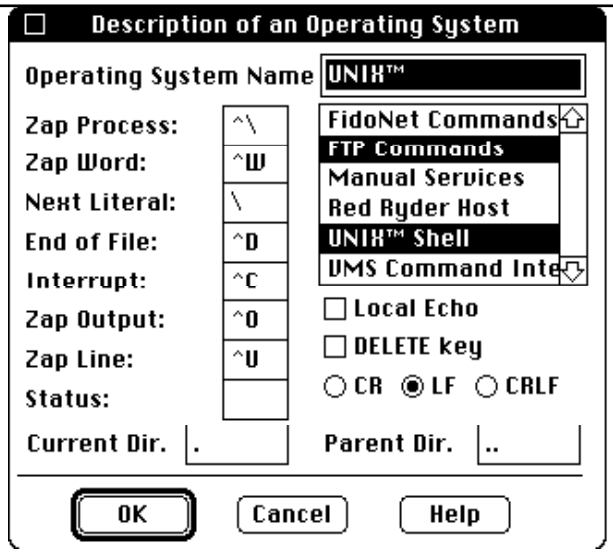
You're just looking at the list now, but you could substitute another script for that function, if you wished to, by selecting a script from the list and clicking *OK*. Or you could click *Edit* if you wanted to modify the script (see Appendix D).

An operating system description, illustrated by the built-in UNIX operating system description below, includes:

- Operating system name (UNIX in the example below)
- Services available with the operating system (FTP Commands and UNIX Shell, in this case)
- Control-key equivalents (Zap Process = Control-backslash, etc.)
- Designation for the current and parent directories (for a UNIX system one period = current directory, two periods = parent directory)
- Whether keyboard entry is echoed by your Macintosh (*Local Echo*)
- Whether backspace (ASCII 8) or DEL (ASCII 127) is sent when you press the Backspace or Delete key
- End-of-line convention for the operating system (Carriage Return, Line Feed, or Carriage Return-Line Feed)

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



Operating System Interface

To create a new operating system interface, you start at the bottom of the hierarchy, using scripts appropriate to the new operating system to create a new terminal or file transfer service. This new service is then used to create a new operating system description.

Suppose, for example, you wish to set up a CompuServe operating system interface that uses the login script shown as an example in Appendix D, “Scripts and Macros.” First you will use the new login script to set up a terminal service description; then you will use the new terminal service description to set up a new operating system description.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

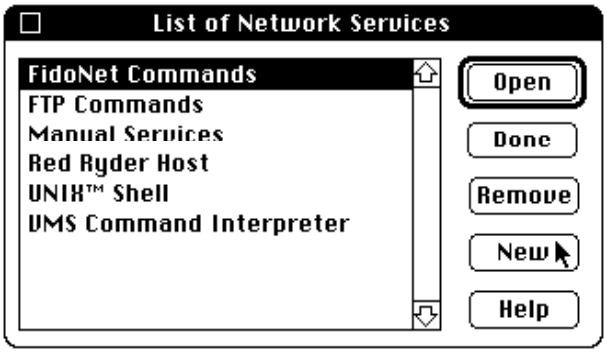
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Service Description

Terminal session and file transfer services are basic elements of an operating system interface. Create a service description, as follows:

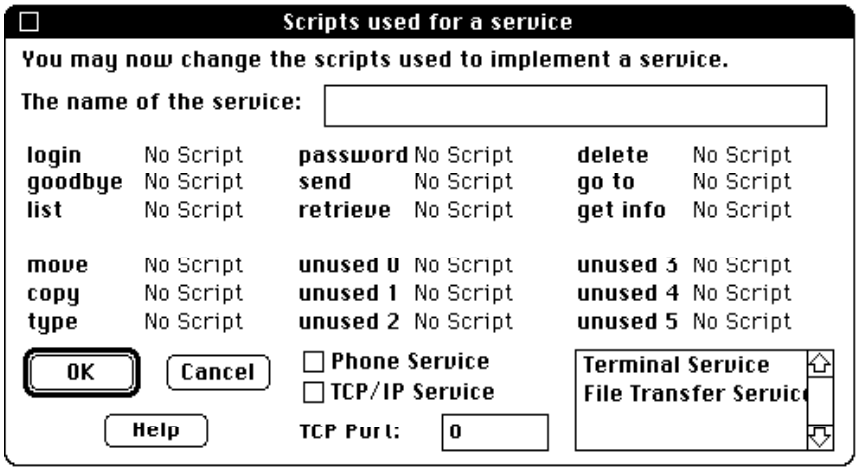
1. Select *Services* from the *Settings* menu.

The list of described services will be displayed:



2. Click *New*.

A blank service description will be displayed:



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

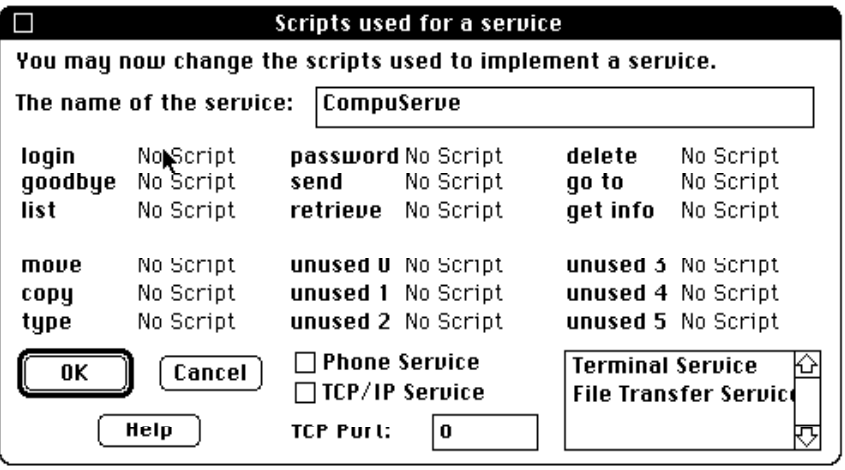
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

3. Type the name of the service.

We will call the service “CompuServe” in this example.

4. Click on a script.

We will click on the login script.

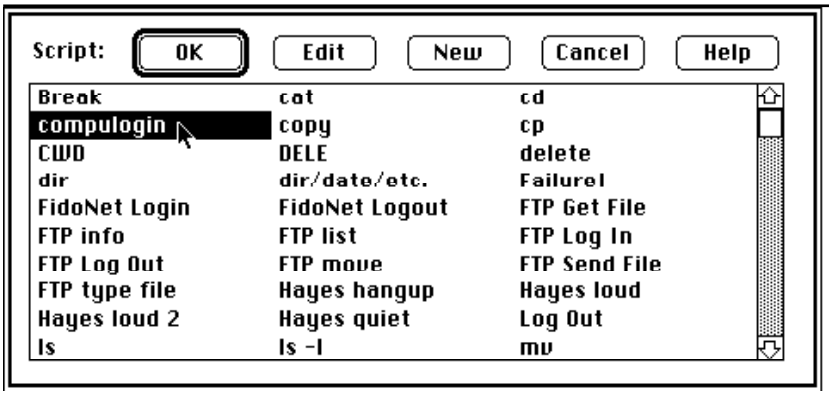


The list of TOPS Terminal scripts will be displayed, with *No Script* selected.

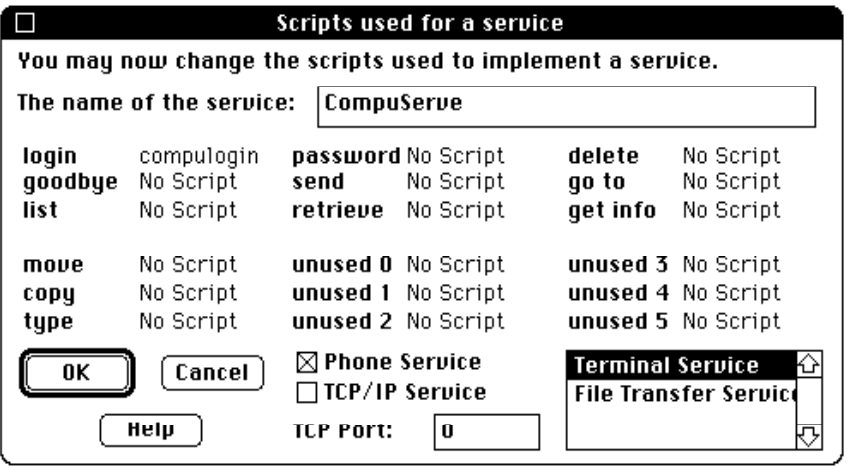
5. Select a script and click *OK.*

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



We have selected “compulogin,” the login script written as an exercise in Appendix D. The CompuServe service will be displayed, with “compulogin” listed as the login script:



If you knew which built-in scripts would work with CompuServe, you could now fill those in as you did for login; you would probably want to include XMODEM send and receive, for instance. In this case, we will only include the login script.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

6. Click in the *Phone Service* and/or *TCP/IP Service* boxes.

Click one or both of the boxes, depending on what kinds of connections are available on the remote computer. We have checked *Phone Service* in the example above.

7. Enter *TCP/IP Port* number.

Check with your system administrator. The standard TCP/IP number for terminal emulation service (TELNET) is 23; the standard number for file transfer service (FTP) is 21. We did not enter a number in the above example, since *TCP/IP Service* was not checked and this number is only needed for a TCP/IP service.

8. Select *Terminal Service* or *File Transfer Service.*

Select one or the other — *Terminal Service* if you are defining a service for making terminal session connections to a remote computer — or *File Transfer Service* if you are defining a service for file session connections. We checked *Terminal Service* in the example; remember that file transfer services are only available for network connections.

9. Click *OK*.

The list of network services will be displayed, with CompuServe now added, in alphanumeric order.

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
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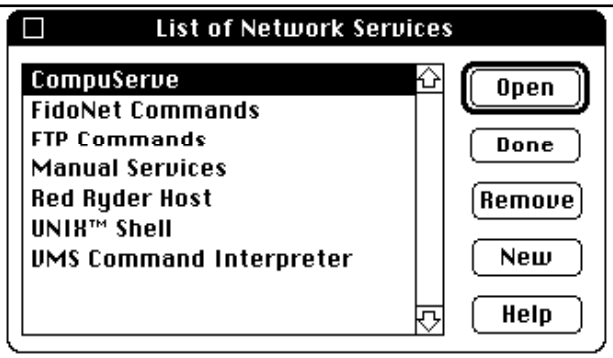

Note: you can modify an existing service description by selecting it from the list of services and clicking *Open*. Note that you cannot modify the built-in service descriptions that come with TOPS Terminal; you can, however, make changes to one of these descriptions and give it another name by selecting *Save as* in the *File* menu. You can remove service descriptions that you create by clicking *Remove*.

Operating System Description

Once you have created scripts and services, you are ready to create an operating system description. Follow these instructions:

1. Select *Operating Systems* from the *Settings* menu.

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

(*Operating Systems* is only available in full *Settings* menu; see Appendix B for information about full or short menus in *Your Preferences*.)

2. Click *New*.

A blank *Description of an Operating System* will be displayed; "CompuServe" will be listed as one of the available services.

3. Type name of operating system.

In this case, we will use "CompuServe" as the name of the operating system.

See your system administrator if you are not sure about any of the settings discussed below.

4. Select services.

Select one or more services from the list of service descriptions; in this case, we have selected CompuServe only. (Hold down the Option and Clover (⌘) keys to select more than one item in a list.)

5. Enter control codes.

Type the control codes appropriate for the operating system.

6. Fill in directory boxes.

Enter the current and parent directory designations for the operating system.

7. Click in check boxes.

Click in the check boxes for *Local Echo*, *DELETE key,* and end of line convention for the operating system, as appropriate.

Local Echo determines whether or not keyboard entry is echoed by your Macintosh.

DELETE key determines what acts as the delete key. Check this box for VMS operating systems.

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

The buttons labeled CR, LF, and CRLF stand for Carriage Return, Line Feed, and Carriage Return Line Feed. This should match the end of line convention used by XMODEM on the other machine. Use LF for UNIX, CRLF for VMS.

8. Click *OK*.

You have completed the operating system description. The final steps in the process of preparing for an automatic connection would be to create a computer description that selects this operating system and to create an account description that specifies that computer description (see Chapter 3).

Note: you can modify an existing operating system description by selecting it from the list of operating systems and clicking *Open*. Note that you cannot modify the built-in descriptions that come with TOPS Terminal; you can, however, make changes to one of these descriptions and give it another name by selecting *Save as* in the *File* menu. You can remove operating system descriptions that you create by clicking *Remove*.

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
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468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Appendix

F

Sign-Up Files

Sign-up files are used to make computer descriptions available to other TOPS Terminal users. A computer description is created in TOPS Terminal Memory and copied to a sign up file, which is made available to other users on a network file server or on a floppy disk.

Generally a sign-up file is created and distributed by the system administrator. If you are a system administrator, you may need to create or modify a sign-up file. TOPS Terminal makes this process extremely easy.

Creating a Sign-Up File

A sign-up file is created by copying computer descriptions from TOPS Terminal Memory on your Macintosh, so be sure the descriptions you want to copy are available before doing the following:

1. **Select full menus in *Your Preferences*.**

   The file format *Sign-Up File* is only available when full menus are selected. See Appendix B if you do not know how to change settings in *Your Preferences*.

2. **Select *New* in the *File* menu.**

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
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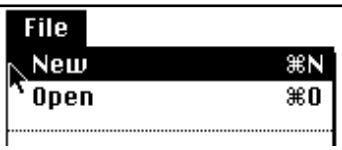
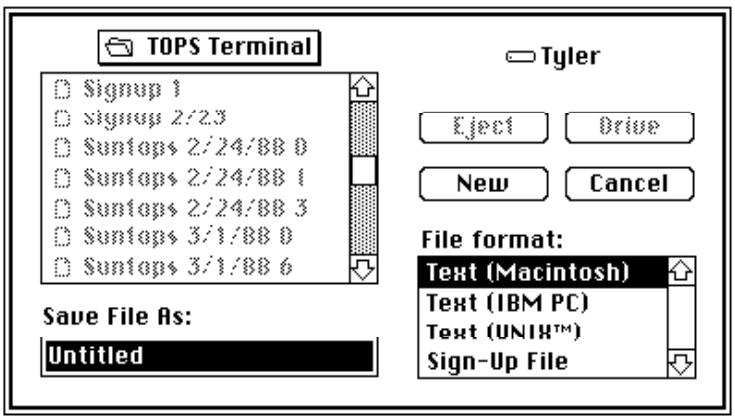
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

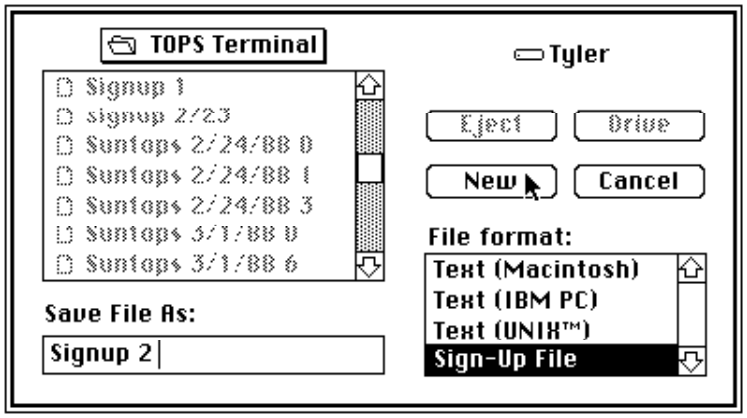


A file selection dialog will be displayed, with the new file name shown as “Untitled” and with *Text (Macintosh)* selected as the file format:



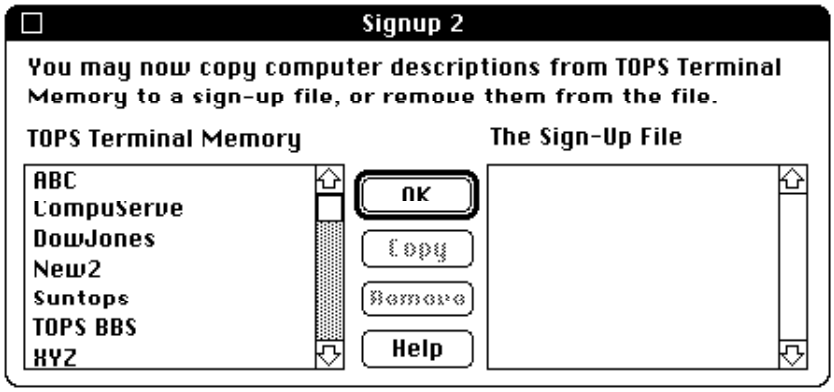
3. Type a file name and select *Sign-Up File* format.

In the example below the sign-up file has been given the name “Signup 2.” There are no special rules for sign-up file names.



4. Click *New*.

The sign-up dialog will be displayed, showing the computers described in TOPS Terminal Memory on the left and the computers in the sign-up file on the right:



There are no computers listed on the right since you are creating a new sign-up file now. You are going to copy computer

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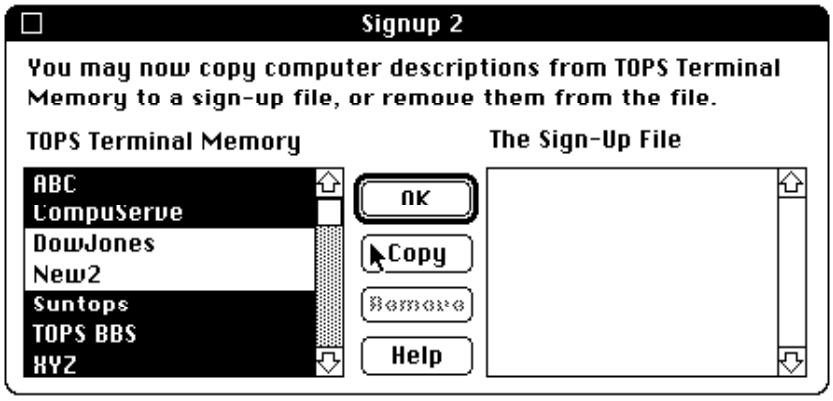
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

descriptions from TOPS Terminal Memory into the new sign-up file.

5. Select computer(s).

Select a computer or a number of computers from the list on the left. You can select and copy them one at a time, but more likely you will want to select all that you want to copy and then copy them all at once. Use the Option-⌘ sequence, as described in Chapter 1, to select multiple computer descriptions.



6. Select *Copy*.

Select *Copy* to copy the computer descriptions that you want in the sign-up file.

When you are finished the sign-up dialog window will look something like this:

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
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stroke

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
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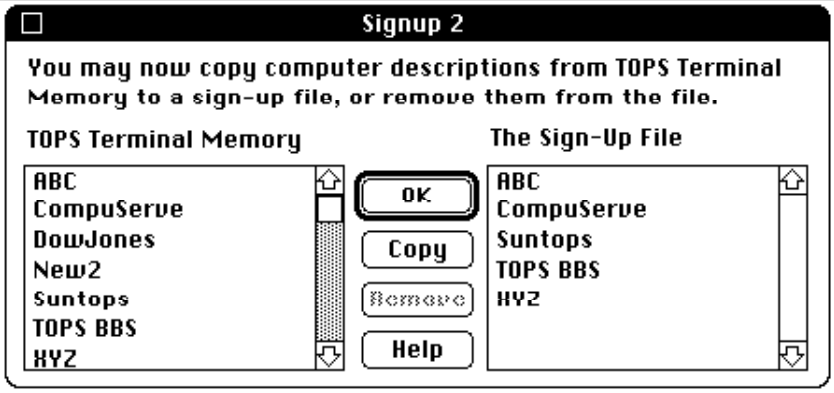
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



7. Click *OK*.

The sign-up dialog will disappear. The new sign-up file is ready to be used for selecting computers when describing a new account (as shown in Chapter 4).

8. Quit TOPS Terminal.

All that is left to do is make the sign-up file available to other TOPS Terminal users. To do this you need to quit TOPS Terminal (*File/Quit*) and distribute the sign-up file.

9. Distribute the sign-up file.

Copy the sign-up file to floppy disks and distribute to TOPS Terminal users or copy the sign-up file to a file server on your local network, for use by TOPS Terminal users when they describe new accounts.

Editing a Sign-Up File

Editing a sign-up file means **copying** new computers to an existing sign-up file or **removing** computers from a sign-up file.

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
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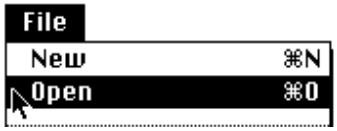
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

With full menus selected in *Your Preferences* in the *Settings* menu:

1. Select *Open* in *File* menu.

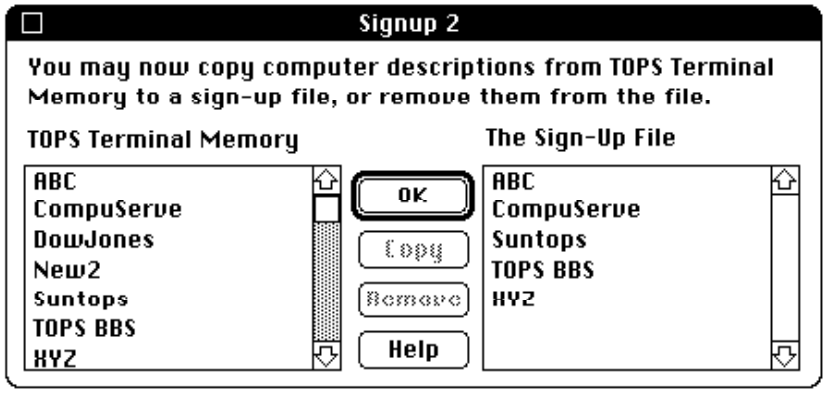


Note that sign-up files will not be listed if you have selected short menus in *Your Preferences*.

2. Select Sign-up file to edit.

3. Click *Open*.

The selected sign-up file will be displayed, with TOPS Terminal Memory computers on the left and sign-up file computers on the right.



4. *Copy* or *Remove* computers.

To copy a computer from TOPS Terminal Memory to the sign-up file, select a computer in the list on the left and click *Copy*; the computer will be copied to the sign-up file. If you specify a computer with the same name as one listed in the sign-up file, the old description will be overwritten.

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
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stroke

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468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

To remove a computer from the sign-up file, select a computer in the list at the right and click *Remove*; the computer will be removed from the sign-up file.

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
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468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Appendix

G

System Administration Guide

This guide discusses a number of topics related to assigning IP addresses to TCP/IP hosts and TOPS Terminal Macintoshes on a local area network. It is intended for use by someone experienced with IP (Internet Protocol) addressing; as such, it is not written at the basic-user level of much of the rest of the manual.

In most situations, TOPS Terminal will be installed on one or more Macintosh stations which are then connected into an existing Ethernet network. The host computers on the Ethernet network will have been assigned IP addresses, and the system administrator's task will be to assign IP addresses to the TOPS Terminal Macintosh stations on the network as well.

If the Macintosh station is directly connected to Ethernet using either an Ethernet card or a SCSI device, the assignment of addresses is relatively straightforward. The Macintoshes are considered to be an extension of the Ethernet network and the same addressing scheme is used as in the remainder of the network.

Normally, however, Macintosh stations will not be directly connected to Ethernet; Macintoshes (on Appletalk) will be connected to Ethernet using an Appletalk/Ethernet gateway. This is a more complex addressing situation and is the main subject of this guide.

- **Basic Concepts** describes the structure of IP addresses and introduces the concept of dynamic addressing.
- **IP Addressing With A Gateway** discusses the situation in which Macintosh stations on an Appletalk network are connected

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468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

to Ethernet through an Appletalk/Ethernet gateway such as the Kinetics FastPath. It explains the "subnetting" approach to IP addressing in a gateway situation.

- **How to Set Up the Kinetics FastPath** explains how to use the GateWayName program and the FastPath Manager program to configure a gateway.

- **Dynamic Addressing With Kipper** explains how to use a KIP server, should you decide to dynamically assign IP addresses to your TOPS Terminal Macintoshes.

Basic Concepts

The Internet Address

Any station on a TCP/IP network must have a unique address — called an Internet or IP address — which specifies both the address of the network on the internet and the address of that station on the network.

Each IP address is made up of four bytes. A byte is an eight-bit binary number which can be represented by decimal (0-255) or hexadecimal (0-FF) equivalents. This guide, and the TOPS Terminal configuration process, refer to the decimal representation only. A sample IP address in decimal form is 191.29.101.16.

IP addresses are divided into two parts: a network number and a local address. The network number identifies your network on a broad internet. It is the same for all stations on a local Ethernet network. The local address is unique for each station on that network.

There are three addressing schemes for dividing the four bytes of the IP address into network number and local address. The scheme used in any network is determined by the first byte or bytes of the address:

0 - 127 = Class A address
128 - 191 = Class B address
192 - 223 = Class C address

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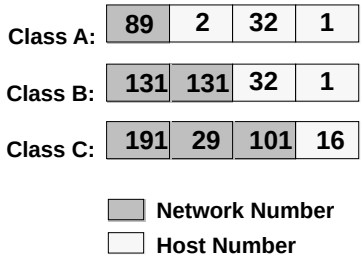
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

With a Class A address, the first byte is the network number, and the other three bytes are the local address; with a Class B address, the first two bytes are the network number and the last two bytes are the local address; and with Class C, the first three bytes are the network number, and the last byte is the local address:



Static vs. Dynamic Addressing

No matter which of these addressing scheme applies to your network, each station on the network must have a unique IP address. One approach to assigning IP addresses is to assign a fixed address to each station. This method, called “static addressing,” requires that you assign each TOPS Terminal station that you install on the network a unique address.

Another approach for addressing TOPS Terminal Macintoshes on an Appletalk or Ethernet network, is to let the network make the address assignments for you. This method, called “dynamic addressing,” is standard for Appletalk addressing, and has been extended to IP addressing with a Macintosh program called Kipper, which is included on your TOPS Terminal master disk. If you are connecting an Appletalk network to an Ethernet network through an Appletalk/Ethernet gateway, you can use Kipper to dynamically assign IP addresses to your TOPS Terminal stations. The use of Kipper is described in the last section of this guide.

IP Addressing with a Gateway

In the case where TOPS Terminal Macintoshes are connected to Ethernnet through an Appletalk/Ethernet gateway, IP addressing is complicated by the

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468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

fact that the gateway must distinguish between IP addresses on the Ethernet side of the gateway and those on the Appletalk side.

One method for assigning IP addresses in this situation is to treat the entire network (Ethernet plus Appletalk) as one logical network on the internet. With this method, called “subnetting,” the network is broken down into two subnetworks (subnets) — one on the Ethernet side of the gateway and one on the Appletalk side. IP addresses are assigned so as to distinguish between the two subnets.

Subnetting generally requires few changes to an existing addressing scheme. It assumes only that you are giving your Appletalk nodes the same network number as your TCP/IP hosts, while assigning them to a different subnet.

Another method for assigning IP addresses, called “fixed routing,” treats the Appletalk and Ethernet sides of the gateway as two separate networks; this is usually more difficult than subnetting.

This guide explains how to assign IP addresses using the subnetting method only. If you want to explore fixed routing, refer to the documentation that comes with your Kinetics FastPath.

Subnetting

The subnetting approach to assigning IP addresses on your network involves dividing your network into two logical subnets, one on the Ethernet side of the gateway and the other on the Appletalk side. All of the stations on Ethertalk are assigned one subnet number and all the stations on Appletalk are assigned a different subnet number.

The subnet number is derived by apportioning the IP address. As explained above, an IP address has two parts — a network number and a local address. In subnetting, the local address is further divided into a subnet number and a host number. The subnet number is the same for all stations on a subnet; the host number is unique for each node or station on that subnet.

The routing code of the FastPath gateway directs data by grabbing packets whose destination subnet is different from its subnet of origin, performing protocol translation, and sending the packet across the gateway.

The FastPath gateway is assigned two IP addresses, one for the EtherTalk side of the gateway and one for the Appletalk side of the gateway. With subnetting, each side of the gateway is on a different subnet, and has a different subnet number. From the point of view of the TOPS Terminal

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
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468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Macintoshes on Appletalk, the Ethernet subnet appears to be just another Appletalk network. From the point of view of the TCP/IP hosts on Ethernet, the Appletalk network appears to be just another Ethernet subnet. The FastPath gateway will view subnet numbers and AppleTalk network numbers as essentially the same thing.

Assigning IP Addresses

In many cases, when you add a gateway and Appletalk network to an existing Ethernet network, the Ethernet hosts already have IP addresses that had been previously assigned without consideration to subnetting. This leaves an administrator with two choices. One choice is to select a simple subnetting scheme and then reassign IP addresses to the Ethernet hosts in accordance with that scheme.

The other choice is to select a subnetting scheme which leaves the current IP addresses on Ethernet unchanged. This may be easy to do, or it may require a complicated subnetting scheme. In some cases it may not be possible. The sections which follow describe the simplest subnetting schemes. In most cases they will satisfy your subnetting needs. For a more comprehensive treatment, you should refer to the documentation that comes with your Kinetics FastPath.

As previously mentioned, in subnetting, the local address portion of the IP address is divided into subnet number and host number. The number of bits selected for the subnet number is referred to as the "subnet size." The number of bits selected for the host number is referred to as the "subnet shift."

The selection of subnet size and subnet shift is somewhat arbitrary. It will depend on which IP addressing scheme — Class A, B, or C — is being used on your Ethernet network, whether you are willing or able to reassign IP addresses to your Ethernet hosts, and on how many Appletalk nodes and gateways are on your network.

The following examples illustrate the simplest Class A, B, and C subnetting schemes, starting with Class B.

Example 1 - Class B Subnetting

The simplest case of subnetting is with Class B addresses. If your Ethernet network uses Class B addressing, the first two bytes (16 bits) of an IP

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72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
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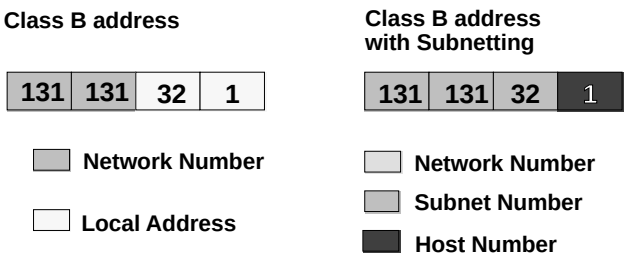
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

address are the network number and the last two bytes (16 bits) are the local address.

The easiest way to divide the local address portion into subnet number and host number is to assign one byte to each, so that both the subnet size and subnet shift are each 8 bits:



Suppose, for example that your existing Ethernet network contains a Sun Server with address 131.131.16.1 and a Sun Workstation with address 131.131.16.2. You are adding a FastPath and a TOPS Terminal Macintosh to this network. Here are the class B addresses you might assign:

Class B Subnetting Address Table

131.131.16.1	Sun Server
131.131.16.2	Sun Workstation
131.131.16.3	Ethernet side of Kinetics FastPath
131.131.32.1	Appletalk side of Kinetics FastPath
131.131.32.2	TOPS Terminal Macintosh

The first two bytes of the IP address are the network number, which is the same for all stations (131.131). In this subnetting scheme, the third byte is the subnet number. This number must be assigned differently for the Ethernet side and the Appletalk side of the gateway.

Since the Ethernet stations in this example already had a subnet number of 16, the Ethernet side of the of the gateway was also assigned subnet number=16. The Appletalk side was arbitrarily assigned subnet number=32, to distinguish it as a separate subnet.

The fourth byte of the IP address is the host number and is assigned so that each station on a subnet has a unique number. Here is a diagram of the above subnetting scheme:

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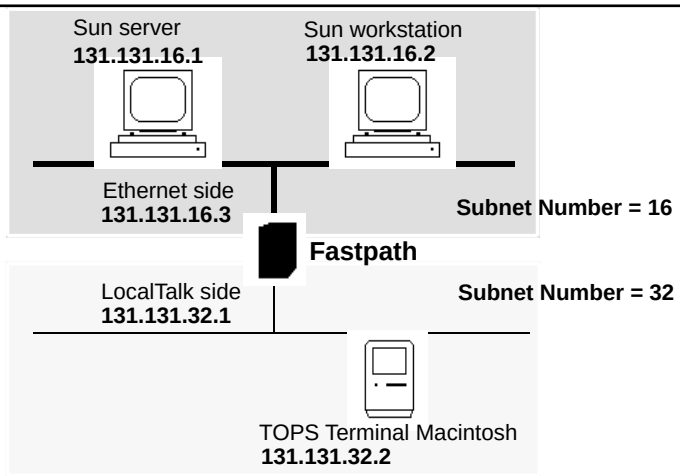
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



The Ethernet side of the FastPath is on a subnet different from the Appletalk side (subnet 16 for Ethernet, and 32 for Appletalk). Notice also that the Macintosh is on the same subnet as the Appletalk side of the FastPath (subnet number 32), just as the Sun stations are on the same subnet as the Ethernet side of the FastPath (subnet number 16). The FastPath routes any packets originating from subnet 32 that are destined for subnet 16, and vice versa.

The selection of an 8-bit subnet size and 8-bit subnet shift in this example was chosen for the sake of convenience: by so doing, the subnet number can be readily identified as the third byte of the IP address. If the subnet size had been chosen as 10 bits and the subnet shift chosen as 6 bits, then the value of the subnet number would not be so evident. You would have to calculate it by converting the IP address to its binary representation, looking at the first 10 bits in the local address portion and converting this 10-bit binary number back to its decimal equivalent.

Size and Performance Limitations:
There are inherent limitations implied in the choice of eight bits for subnet shift and eight bits for subnet size: an eight-bit subnet size allows for 256 subnet numbers. Since Appletalk does not allow a subnet net number of zero, the number of possible subnets is actually 255.

An eight-bit subnet shift similarly limits the number of nodes in each subnet to 256. The effect of our selection, then, is that at most you can have 255 subnets with 256 nodes on each subnet. Since AppleTalk itself

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

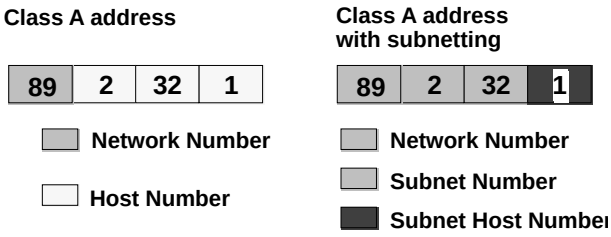
limits the number of nodes per network to 254, the eight-bit subnet shift doesn't present any real limitation.

The performance of a FastPath that had anywhere near 254 nodes on the Appletalk side, however, would be severely degraded. We recommend, in fact, that you restrict your physical configuration to no more than 16 nodes per Appletalk side of the FastPath. This could possibly be exceeded in networks that are not very busy.

Example 2 - Class A Subnetting

Another relatively simple subnetting case is with Class A addresses. If your Ethernet network uses Class A addressing, the first byte (8 bits) of an IP address is the network number and the last three bytes (24 bits) make up the local address.

The simplest method of subnetting with Class A addresses is to divide the local address portion of the IP address so that the subnet size is 16 and the subnet shift is 8.



Suppose, for example that your existing Ethernet network contains a Sun Server with address 89.2.32.1 and a Sun Workstation with address 89.2.32.2. You are adding a FastPath and a TOPS Terminal Macintosh to this network. Here are the class A addresses you might assign:

Class A Subnetting Address Table

89.2.32.1	Sun Server
89.2.32.2	Sun Workstation
89.2.32.3	Ethernet side of Kinetics FastPath
89.1.56.1	Appletalk side of Kinetics FastPath
89.1.56.2	TOPS Terminal Macintosh

The first byte of the IP address is the network number, which is the same for all stations (89). In this subnetting scheme, the second and third bytes

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

together are the subnet number portion. This portion must be assigned differently for the Ethernet side and the Appletalk side of the gateway.

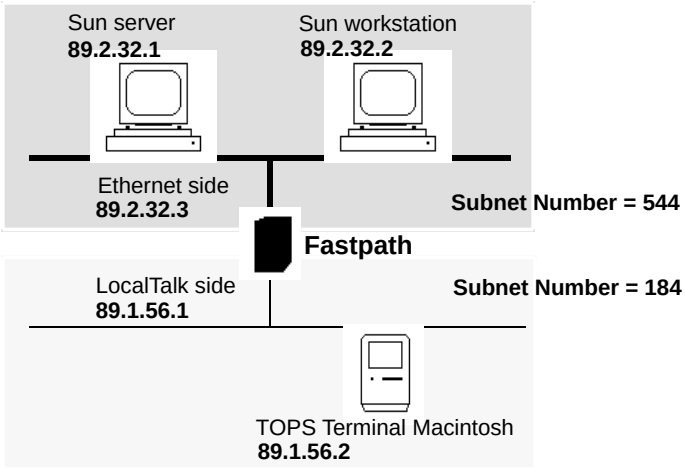
Since the Ethernet stations in this example already had subnet number portions of (2.32), the Ethernet side of the of the gateway was also assigned the same value. The Appletalk side was arbitrarily assigned subnet number portion (1.56), to distinguish it as a separate subnet.

The fourth byte of the IP address is the host number and is assigned so that each station on a subnet has a unique number.

What makes this Class A subnetting example more complicated than the Class B example is that the subnet number is not obvious by merely looking at the subnet number portion of the IP address. In the case above, with subnet number portion (2.32), the corresponding subnet number is 544. This is calculated by stringing together the binary representation of 2 (0000 0010) and 32 (0010 0000). Binary 0000 0010 0010 0000 equals decimal 544. Similarly subnet number portion (1.56) corresponds to subnet number 184.

Note: to avoid doing these calculations, use the GateWayName program described in the "How to set up the Kinetics Fastpath" in the next section of this guide. If you enter the IP address in this program, it will calculate the subnet number directly.

Here is a diagram of the above subnetting scheme:



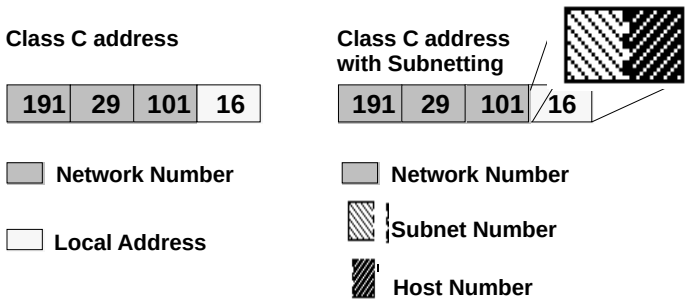
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Class C Subnetting

The most complex case of subnetting is with Class C addressing. Class C subnetting introduces a complication that doesn't enter with the Class A or Class B subnetting schemes described above.

In a Class C address, only the fourth byte (eight bits) is available to represent both the subnet number and host number.



With Class C subnetting you cannot tell at a glance which IP addresses are in the same subnet. Rather, it is necessary to use decimal/binary conversions to determine which subnet numbers and host numbers correspond to any local address portion of an IP address. Since this is a bit involved, Class C subnetting tables are included for your convenience at the end of this appendix. Using these tables, you can quickly assign IP addresses to different subnets without performing decimal/binary conversions.

Before using the tables, however, you must decide which subnet shift and subnet size combination you want to use. A primary consideration in this decision is the number of Appletalk subnets you have in your network (that is, the number of FastPath gateways) and the number of nodes per subnet.

With Class C addresses, the combined subnet shift and subnet size is limited to eight bits (remember that the subnet size equals the number of bits for the subnet number and that the subnet shift equals the number of bits for the local address). If you chose a subnet shift of three bits, this would allow for eight possible local addresss (decimal 0 to 7), or eight nodes. The larger the subnet shift you define, the more nodes per subnet are available; with four bits, the limit is 16 (decimal 0 to 15). For performance reasons, we recommend that you try to limit the number of nodes on the Appletalk side of the FastPath to 16.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Example 3 - Class C Addressing

In the following example, we will arbitrarily divide the available 8 bits into 4 for the subnet shift and 4 for the subnet size. This happens to be a fairly good real world choice because it will allow 16 nodes per subnet and 15 subnets (Appletalk does not allow subnet net number 0).

Suppose, for example that your existing Ethernet network contains a Sun Server with address 192.29.101.16 and a Sun Workstation with address 192.29.101.17. You are adding a FastPath and a TOPS Terminal Macintosh to this network. Here are the class C addresses you might assign:

Class C Subnetting Address Table

192.29.101.16	Sun Server
192.29.101.17	Sun Workstation
192.29.101.18	Ethernet side of Kinetics FastPath
192.29.101.32	Appletalk side of Kinetics FastPath
192.29.101.33	Macintosh with TOPS Terminal on Local Talk

If you look at Table 3 in the Class C subnetting tables at the end of this guide, you can see that the first three IP addresses (16, 17, 18) have subnet number 1 (which includes local addresss between 16 and 31) and the last two addresses (32, 33) were chosen to have subnet number 2.

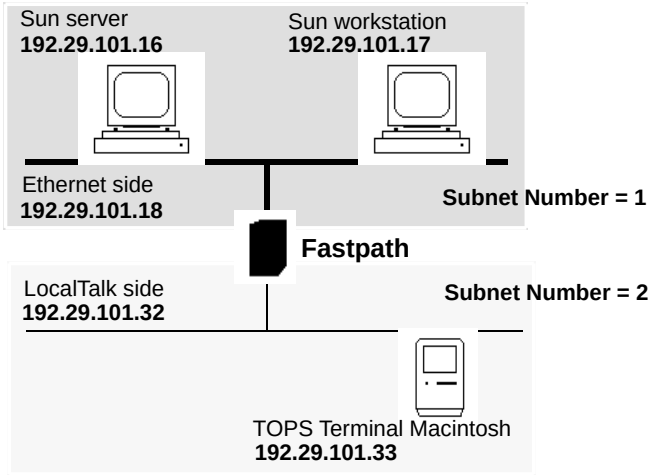
The local address of the IP addresses jumped from 18 for the Ethernet side of the FastPath, to 32 for the Appletalk side because of the requirement that the FastPath's Appletalk and Ethernet sides must be in different subnets.

Note: You can also see from the tables that since subnet number zero is invalid, local addresss 0 to 15 are also invalid. If your Ethernet stations had been previously assigned local addresss 0 to 15, you would have to change them in order to accomplish Class C subnetting.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Here is a diagram of the above subnetting scheme:



If you choose not to use the Class C subnetting tables, you could perform the decimal/binary conversion shown below:

Station	**Subnet #**		**Host #**		**Host # IP Address**	
	Dec.	**Binary**	**Dec.**	**Binary**	**Dec.**	**Binary**
Sun Server	1	(0001)	0	(0000)	16	(0001 0000)
Sun Workstation	1	(0001)	1	(0001)	17	(0001 0001)
Ethernet side FastPath	1	(0001)	1	(0001)	18	(0001 0001)
L-Talk side FastPath	2	(0010)	0	(0000)	32	(0010 0000)
Macintosh	2	(0010)	1	(0001)	33	(0010 0001)

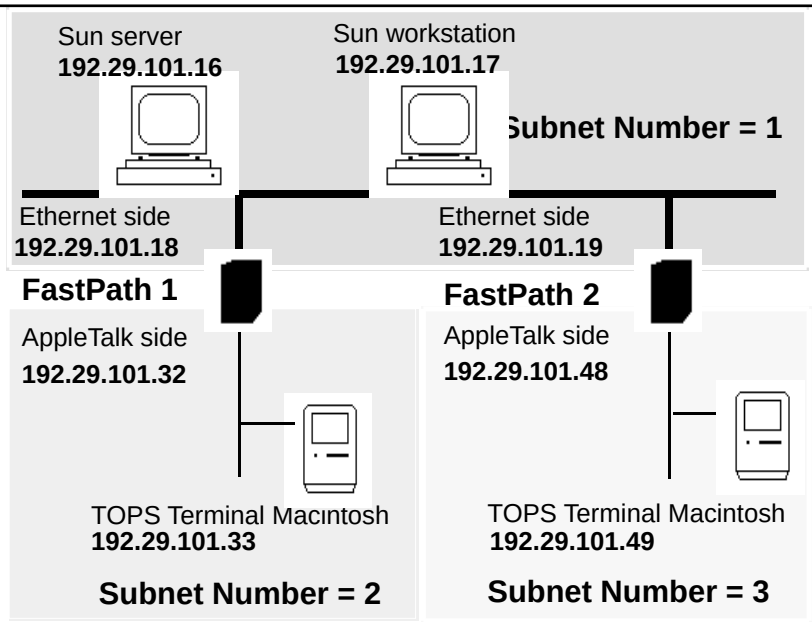
Considerations using multiple FastPaths

With the FastPath, remember that all TCP/IP hosts that are to communicate through the FastPath with an Appletalk network must be in the same logical subnet as the Ethernet side of the FastPath. If you are using multiple FastPaths to connect to an Ethernet backbone, you must configure all Ethernet sides of the FastPaths in the same logical subnet.

The Appletalk sides of each FastPath must have different subnet numbers as shown in the diagram below (for the case of Class C subnetting):

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

How to set up the Kinetics FastPath

Once you have decided upon a subnetting scheme (that is, chosen your subnet size and subnet shift) and assigned IP addresses to the Ethernet and AppleTalk sides of your Kinetics FastPath gateway, you are ready to configure your FastPath software. This is accomplished using a program called the FastPath Manager, which is part of FastPath.

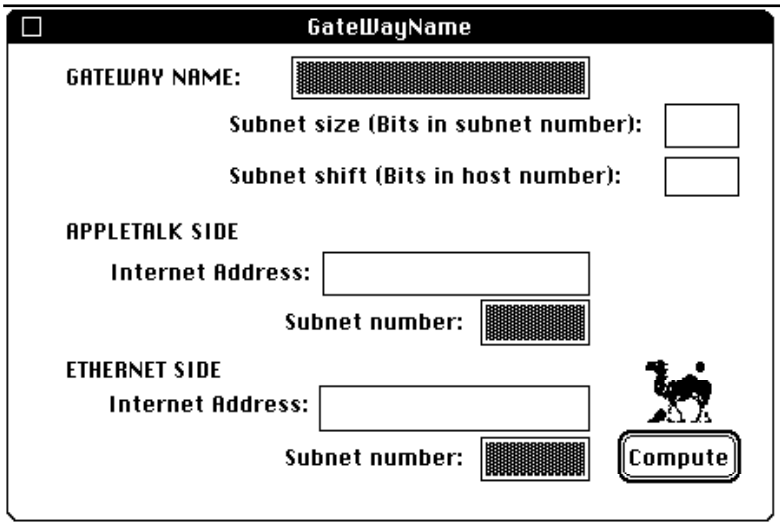
Computing the Gateway Name

The first thing you will need to specify in the FastPath Manager program is a gateway name. The gateway name is a hexadecimal string combining the AppleTalk side and Ethernet side FastPath addresses, preceded by a header specifying the subnet shift and subnet size in your subnetting scheme.

If you are comfortable with decimal to hexadecimal conversions, you can learn how to name your gateway by reading the Kinetics documentation. To make naming the gateway easier, we have provided a gateway naming program called GateWayName, included in the TOPS Terminal System Administrator folder. Below is the screen from the program:

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

To calculate the gateway name, do the following:

1. Type subnet shift and subnet size.

In the Class A and Class B subnetting examples described in this guide, we recommended a subnet shift of eight and a subnet size of eight. In Class C subnetting they will vary. If you are using Class C subnetting, refer to the previous section to determine the best choice of subnet shift and subnet size for your needs.

2. Type IP (internet) addresses.

Type the Internet addresses for the AppleTalk and Ethernet sides of the FastPath, respectively.

3. Check subnet numbers

As you enter the IP addresses for the FastPath, the resulting subnet numbers for each side will automatically be displayed. Check to make sure they are consistent with your subnetting scheme. Remember that subnet numbers are equivalent to AppleTalk network numbers. When you run the Kinetics FastPath Manager (next section), you will need to supply these numbers, so make note of them.

4. Click *Compute.*

The gateway name will appear in the name field at the top of the screen. When you quit GateWayName, the name (which is actually a number) will be copied to your Macintosh Clipboard, so you can paste it into the Kinetics FastPath Manager program. Note this number if you are not going to be running FastPath Manager immediately.

Using the FastPath Manager

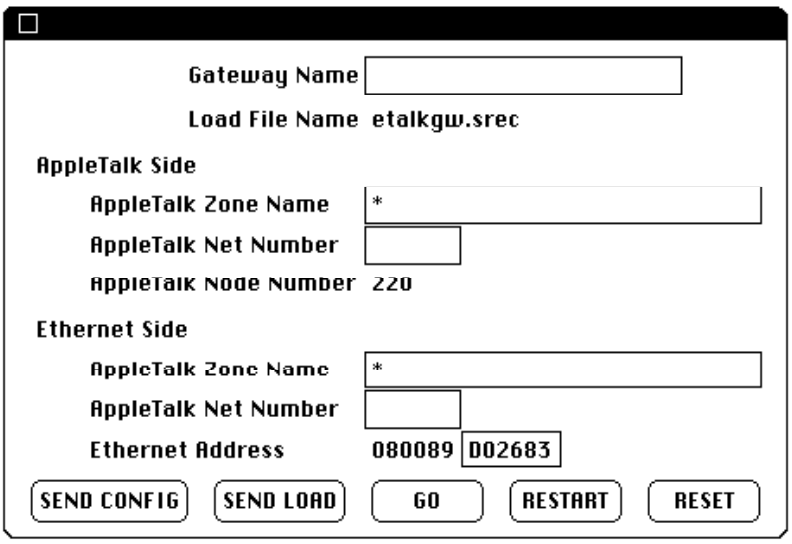
The Kinetics FastPath Manager requires several inputs relating to the IP addressing scheme that you are using. When completed, the configuration information in the FastPath Manager program is downloaded into the FastPath's static memory.

1. Launch FastPath Manager.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Double click on *FastPath Manager*. The FastPath Manager configuration dialog window will be displayed:



2. Enter Gateway Name.

Select the Gateway Name field and select *Paste* from the *Edit* menu to enter the hexadecimal name calculated in the previous section.

3. Enter LoadFile name.

The LoadFile is the packet-routing code that will run in the FastPath. The name of the LoadFile you should use is “Etalkgw.srec.” Select the *Select LoadFile* option from the *File* menu and choose “Etalkgw.srec.”

4. Enter Zone Names (optional).

The zone is an AppleTalk concept, and is optional. A zone is a logical partition of a network. It is most useful in networks with many nodes, to reduce the network traffic in local work groups. The zone names that you choose in this configuration are arbitrary. If you give both the AppleTalk side and Ethernet side of the FastPath different zones names, you have created two zones. The names must be 32 characters or less (don't use asterisks or colons).

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

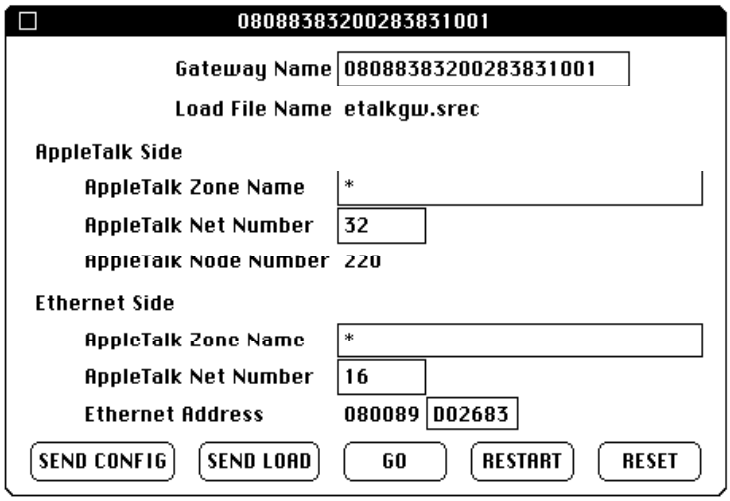
If you give both sides the same name, both subnets will be part of the same zone. You can also leave the default asterisks in the field for zone names, in which case you will use existing zone names, if there are any. If no other bridge or gateway product exist on your network, there will be no zones.

5. Enter AppleTalk Net Numbers (subnet numbers)

Since the FastPath routes packets from one subnet (Ethernet side) to another subnet (AppleTalk side), the FastPath configuration must specify the subnet numbers on both the AppleTalk and Ethernet sides of the FastPath. These are the subnet numbers provided by the GateWayName program described in the previous section.

For example, in the Class B subnetting example in this guide, the Ethernet side of the FastPath has a subnet number of 16 while the AppleTalk side has a subnet number of 32.

Type in the subnet numbers (be sure they do not conflict with other subnet numbers on your network):



6. Enter second half of the Ethernet address.

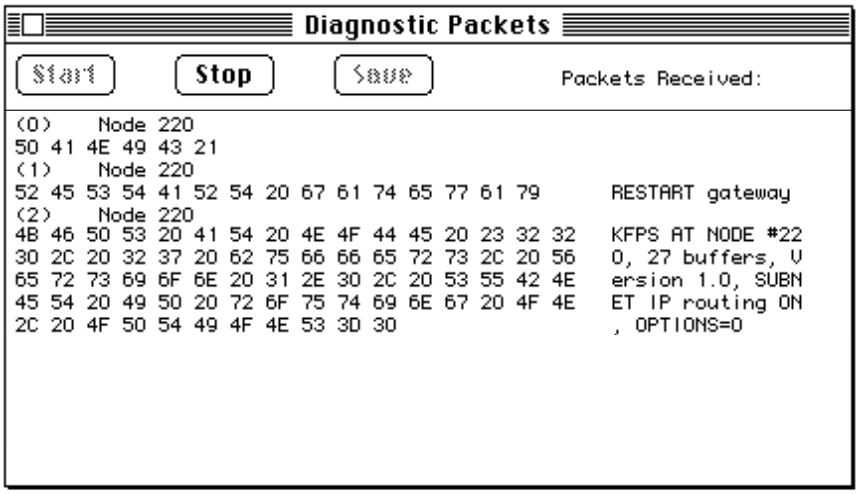
.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

The first part of the Ethernet address on the Ethernet side of the FastPath is already assigned by the manufacturer. The second part of the address is chosen by you, however, and it must be different than any other FastPath on your internet. For this reason, Kinetics recommends that you use the FastPath serial number.

7. Save Configuration and Download to FastPath.

Once the dialog windows are completed, save the configuration by selecting *Save Configuration* in the *File* menu. After saving the configuration, send it to the FastPath by clicking *Send Config*. Then click *Send Load* (the Etalkgw.srec routing code), and finally, click *GO***.**

If the download goes all right and your addressing is correct, a diagnostic window will be displayed:



Among other things, it will indicate “SUBNET routing is ON” if you did the FastPath configuration correctly. Watch this window for a few minutes to make sure that no other messages appear. Any IP addressing problems will return error messages.

If no error messages appear, click *Stop* and quit the program by choosing *Quit* in the *File* menu.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Dynamic Addressing with Kipper

Once you have chosen your subnetting scheme and set up your Kinetics FastPath, you are ready to assign IP addresses to every station on your network. Depending on your subnetting scheme you may need to reassign addresses on the Ethernet side of the network.

When this has been done you are ready to assign addresses to the stations on the AppleTalk side of the network; this address assignment can be done statically, providing each Macintosh with a unique IP address.

As an alternative to static IP addressing, TOPS Terminal comes with Kipper, a program which dynamically assigns IP addresses. One Macintosh on the network is configured with a pool of valid IP addresses; other Macintoshes can then draw an address from this IP pool. The Macintosh with this address pool becomes a dynamic address server to other TOPS Terminal Macintoshes and gateways on the network.

Kipper is a database of addresses that a designated (non-dedicated) Macintosh can assign to the AppleTalk network. You will probably want to leave the KIP Server running all of the time, and you will want to have a second machine on the network with the identical database (a file called Kipper memory, which resides in the System folder). This machine would act as a backup KIP Server in case the first server developed mechanical problems. See “Configuring and Installing Kipper” below for information about installing a KIP server and a backup.

Note: See the TOPS Terminal Help entries “KIP” and “AppleTalk TCP/IP” and related topics for more details about this subject.

Should you use Kipper? Kipper is a way to simplify address management, but it may or may not work in your situation; system administration may be difficult because of the possibility that users may be assigned different addresses each time they boot. This would seem to be a small price to pay for the convenience Kipper provides.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Naming the KIP Server

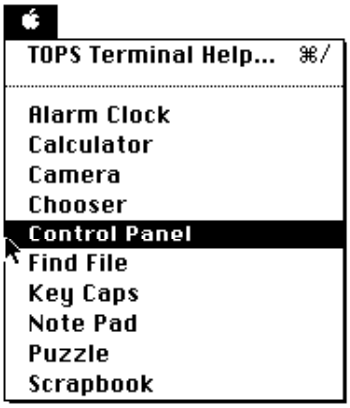
The Macintosh that is the KIP Server must be given a name on the internet. You do this through the TOPS TCP/IP module in the Control Panel.

1. Copy TOPS TCP/IP to your system folder.

If you haven't already done so, copy TOPS TCP/IP from the TOPS Terminal floppy to the system folder of your hard disk or floppy.

2. Select the *Control Panel* Desk Accessory.

Select the Control Panel, which is one of the accessories listed in the Apple (□) menu at the top left of the Macintosh screen.



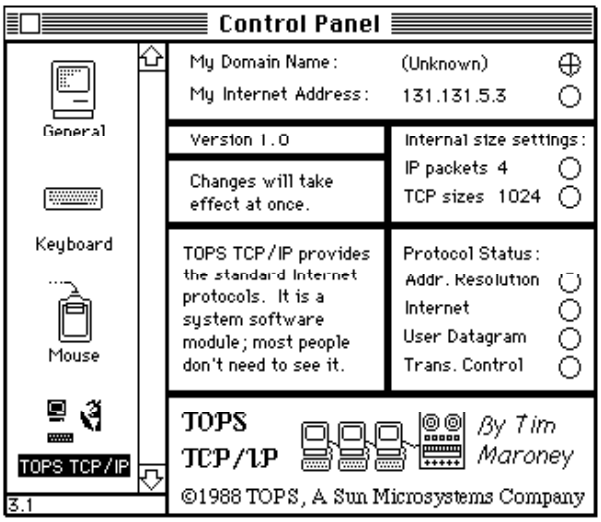
The Control Panel will be displayed. TOPS TCP/IP should be one of the entries. (Resources are arranged alphabetically along the left side, so you may need to scroll downward to find TOPS TCP/IP.)

3. Click on the TOPS TCP/IP icon.

The Control Panel will display TOPS Terminal information.

4. Click on the *My Domain Name* button.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke



5. Type a domain name and click *OK*.

Type a domain name in the dialog window that appears and click *OK*. Choose any name you wish.

Now you are ready to configure and install Kipper.

Configuring and Installing Kipper

To configure and install Kipper, do the following:

1. Copy Kipper to system folder of KIP server.

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stroke

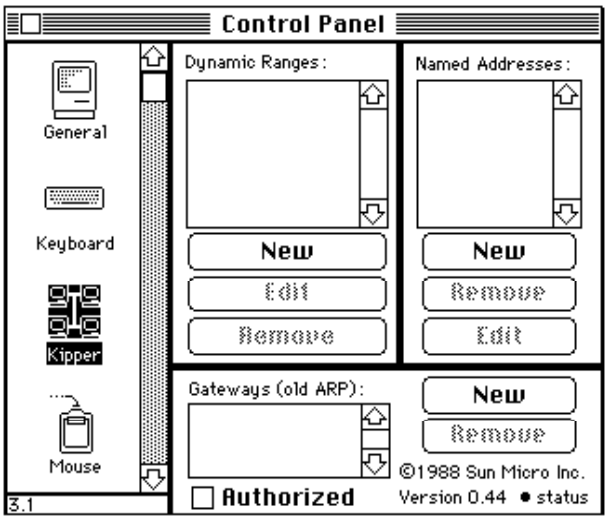
Copy Kipper from the Administrator Folder of your TOPS Terminal disk into the system folder of the Macintosh that is to be the KIP server.

2. Display the Control Panel.

3. Select the Kipper icon.

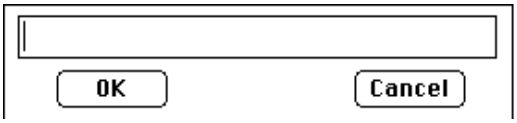
Click on the Kipper icon that appears on the left hand side.

The Kipper address dialog will be displayed; it includes three address boxes for you to fill in: Dynamic Ranges, Named Addresses, and Gateways:



4. Enter Dynamic Ranges.

Click *New* in the Dynamic Ranges box to begin entering ranges of IP addresses by subnet number; a dialog window like the following will be displayed:



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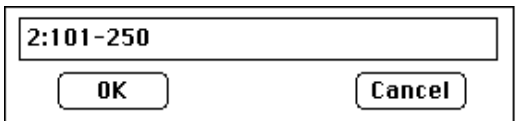
Type a subnet number and the range of host numbers available for your networked Macintoshes on that subnet, depending on your subnetting approach. The proper form for a subnet dynamic range is:

[subnet number]: (m)-(n), . . ., (o)-(p)

That is, enter a subnet number followed by a colon and one or more ranges of host numbers, separated by commas. A range can be one address long. To allow all host numbers between 101 and 250 to be dynamically assigned on subnet 2, for example, type the following:



After each subnet range of addresses is typed, click *OK* and then select *New* again for the next subnet range of addresses. Be sure to include only those host numbers which are valid for your subnetting scheme.

Note: You can let all user addresses be randomly assigned by Kipper, but if there are some user addresses that you do not want randomly assigned, do not include them in Kipper.

Note 2: Be sure that fixed addresses of hosts on the Ethernet side of the FastPath are not included in the dynamic ranges.

5. Enter Named Addresses.

Named Addresses include those for TCP/IP hosts, which cannot be dynamically assigned. To input the loghosts, click *New* under the Named Addresses heading. A good way to input those addresses is to associate the name with the address, as the diagram below shows.

Named addresses are a convenient way to address a host machine by a logical name (“sunhost” in this example) rather than an IP address (129.149.32.1). When setting up an account description or making a manual connection, machines defined in this way can be referenced simply by their name.

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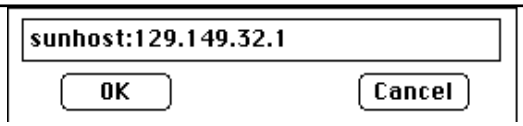
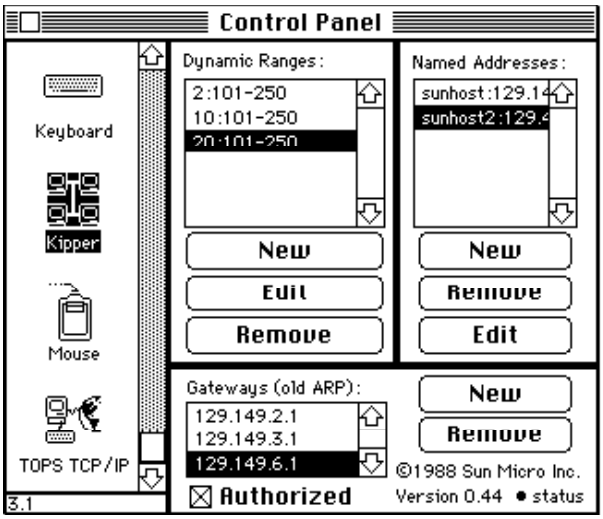


6. Enter gateway addresses.

You also need to input the addresses on the AppleTalk side of any gateways (such as the FastPath) on the network. For this, click *New* under the heading Gateways.

7. Click *Authorized* and reboot the Macintosh.

The last step is to click the button labeled *Authorized* at the bottom of the window and then reboot the Macintosh. If you forget this step, the KIP Server will not work.



Note: it takes about five minutes after server reboot for all address resolution to be processed. In general, you need to leave the KIP Server running all the time.

8. Create a backup KIP server.

To be sure a KIP server is always available, create a backup server. Repeat the steps in “Naming the KIP Server” (page 211) — but give the server a different domain name in step 5 — and repeat steps 1 to 7 in this procedure, “Configuring and Installing Kipper.”

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stroke

You should be able to leave both servers running at once with no conflicts.

Checking Kipper Status

Click in the “status” area of the Kipper dialog described above to see statistics about Kipper usage; a window will display KIP protocol statistics, including number of packets sent and received, error statistics, free addresses, and gateway requests.

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Class C Subnetting Tables

How to use the Class C Subnetting Tables

1. Choose a subnet size and shift for your subnetting scheme.

Choose your subnet size and subnet shift, based on the number of subnets you require and the number of stations per subnet. (For one FastPath, two subnets are required. Each additional FastPath will require an additional subnet.)

2. Consult the subnetting tables.

Choose the appropriate table for your choice of subnet size and subnet shift.

3. Choose subnet numbers.

Choose a subnet number for the AppleTalk side of your FastPath and a different subnet number for the Ethernet side. Under the subnet number in the table you will find the range of valid host numbers for that subnet.

4. Assign IP addresses.

For each node (or station) in a subnet, assign an IP address using the list of valid host numbers. (Remember, in a Class C address, the first three bytes — the network number — are the same for every IP address on the network. The host number is the fourth byte in the IP address.)

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stroke

Table 1

2-bit subnet size (3 subnets)
6-bit subnet shift (64 nodes per subnet)

Subnet Number (1 - 3)

	0	1	2	3	
IP Host #	-	64 - 127	128 - 191	192 - 254	

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Table 2

3-bit subnet size (7 subnets)
5-bit subnet shift (32 nodes per subnet)

Subnet Number (1 - 7)

	0	1	2	3
IP Host #	-	32 - 63	64 - 95	96 - 127
	4	**5**	**6**	**7**
IP Host #	128-159	160 - 191	192 - 223	224 - 255

Table 3

4-bit subnet size (15 subnets)
4-bit subnet shift (16 nodes per subnet)

Subnet Number (1 - 15)

	0	1	2	3
IP Host #	-	16 - 31	32 - 47	48 - 63
	4	**5**	**6**	**7**
IP Host #	64 - 79	80 - 95	96 - 111	112 - 127
	8	**9**	**10**	**11**
IP Host #	128 - 143	144 - 159	160 - 175	176 - 191
	12	**13**	**14**	**15**
IP Host #	192 - 207	208 - 223	224 - 239	240 - 255

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stroke

Table 4

5-bit subnet size (31 subnets)
3-bit subnet shift (8 nodes per subnet)

Subnet Number (1 - 31)

	0	1	2	3
IP Host #	-	8 - 15	16 - 23	24 - 31
	4	5	6	7
IP Host #	32 - 39	40 - 47	48 - 55	56 - 63
	8	9	10	11
IP Host #	64 - 71	72 - 79	80 - 87	88 - 95
	12	13	14	15
IP Host #	96 - 103	104 - 111	112 - 119	120 - 127
	16	17	18	19
IP Host #	128 - 135	136 - 143	144 - 151	152 - 159
	20	21	22	23
IP Host #	160 - 167	168 - 175	176 - 183	184 - 191
	24	25	26	27
IP Host #	192 - 199	200 - 207	208 - 215	216 - 223
	28	29	30	31
IP Host #	224 - 231	232 - 239	240 - 247	248 - 255

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stroke

Table 5

6-bit subnet size (63 subnets)
2-bit subnet shift (4 nodes per subnet)

Subnet Number (1 - 63)

	0	1	2	3
IP Host #	-	4 - 7	8 - 11	12 - 15
	4	5	6	7
IP Host #	16 - 19	20 - 23	24 - 27	28 - 31
	8	9	10	11
IP Host #	32 - 35	36 - 39	40 - 43	44 - 47
	12	13	14	15
IP Host #	48 - 51	52 - 55	56 - 59	60 - 63
	16	17	18	19
IP Host #	64 - 67	68 - 71	72 - 75	76 - 79
	20	21	22	23
IP Host #	80 - 83	84 - 87	88 - 91	92 - 95
	24	25	26	27
IP Host #	96 - 99	100 - 103	104 - 107	108 - 111
	28	29	30	31
IP Host #	112 - 115	116 - 119	120 - 123	124 - 127
	32	33	34	35
IP Host #	128 - 131	132 - 135	136 - 139	140 - 143
	36	37	38	39
IP Host #	144 - 147	148 - 151	152 - 155	156 - 159
	40	41	42	43
IP Host #	160 - 163	164 - 167	168 - 171	172 - 175
	44	45	46	47
IP Host #	176 - 179	180 - 183	184 - 187	188 - 191
	48	49	50	51
IP Host #	192 - 195	196 - 199	200 - 203	204 - 207
	52	53	54	55
IP Host #	208 - 211	212 - 215	216 - 219	220 - 223
	56	57	58	59
IP Host #	224 - 227	228 - 231	232 - 235	236 - 239

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	60	61	62	63
IP Host #	240 - 243	244 - 247	248 - 251	252 - 255

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H

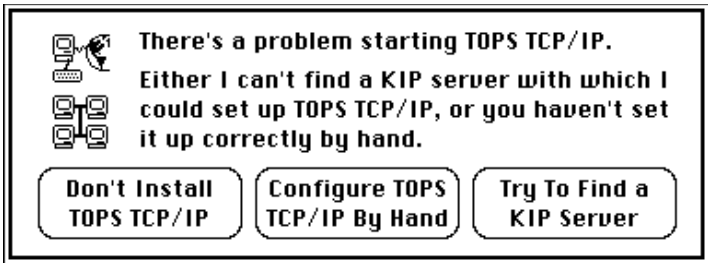
Troubleshooting

Network (TCP/IP) Connections

Listed below are error messages that you might see or problems that you might encounter in making a network connection.

There's a Problem Starting TOPS TCP/IP

You may see the following message while booting-up your Macintosh:



Solution: Try one of the following:

- Click on “Try to find a KIP Server,” (only if you've got a KIP Server on your network, of course) and KIP will give you a default address. This generally works only if there is a bad connection somewhere in the network.

- Select “Configure TOPS TCP/IP By Hand,” and make sure that the addresses of your local gateway and the subnet shift and subnet size are set properly.

- Select “Don’t Install TOPS TCP/IP.” You then can only make a phone connection with a non-TCP/IP bulletin-board or remote service. You will still be able to configure TCP/IP by hand in the Control Panel later, if you wish.

Cannot Connect to Computer By TCP/IP

The symptoms of this problem are that you give a "Terminal Session" command to call another computer, and the session transcript window is created normally, but the other computer never answers. The session window status box (in the lower left hand corner) says "Connecting to [computer name]" until you close the window.

Solution: The other computer may indeed not be answering: it may be down or overloaded. The problem may, however, be in your TCP/IP configuration or the intervening network. Possible solutions in this case are:

- Check whether the host computer is down.

- Verify that the cabling is secure and terminated (resistors at each end of the AppleTalk network) if you are using a TOPS TeleConnector, Farallon PhoneNET, or similar type of cabling. One way to make sure your cabling is secure is to go to the Chooser to verify that you can see AppleTalk devices (such as an Apple LaserWriter) on the network.

- Check to make sure you have the correct IP address set up for your Macintosh in the Control Panel TCP/IP file (see page xiv in the Preface). Also check that the IP address of the remote computer is accurate in its computer description.

- Check your FastPath or other AppleTalk/Ethernet gateway to ensure that it is installed and configured correctly (and that the FastPath has version 3.0 ROMs). Then make sure that the Ethernet subnet number and the AppleTalk subnet number are different from each other; in addition, both of these numbers must be different from zero (0) and unique in your internetwork. We have included an application called “GateWayName” which aids in

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stroke

configuring the FastPath. You may also refer to Appendix G ("System Administration Guide") for more help.

- Make sure that the Ethernet is connected and working properly. A program, "TOPS Peek," available on our BBS (415-555-1212) can help you diagnose the problem. Consult the "readme" file provided with TOPS Peek.

- If you have a Hayes (or compatible) InterBridge on your internetwork, confirm that it has 1.08 ROMs, and that it can be seen on the network with the InterBridge Manager. Try powering-off the InterBridge and restarting.

  Note: You cannot use two InterBridges and a FastPath daisy- chained in series at this time.

- Try a manual connection, typing in the IP address, to see if the connection works that way.

AppleTalk Network # Does Not Match Subnet #

If you see this message, it's an indication that the subnet number of your Macintosh's IP address is wrong. The subnet number has to match the AppleTalk network number. The Macintosh discovers its AppleTalk network number when it starts up; the AppleTalk network number is controlled by the bridges and gateways attached to the network.

Solution: Pull down the Control Panel from the Apple menu, select TOPS TCP/IP, click on the button next to *My Internet Address*, and enter the correct IP address, Subnet Shift, and Subnet Size. If an error still occurs, you need to check that each AppleTalk-Ethernet gateway is set up with matching subnet nubers and AppleTalk network numbers. Be sure that all bridges and gateways agree on all network numbers.

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stroke

Socket Listener for IP Could Not Be Installed

This message might be displayed if there is a conflicting init file in the System folder of your Macintosh.

Solution: Try moving other inits out of the System folder. If you experience this trouble on a Macintosh Plus, you may need to copy the AppleTalk file into your System folder. A disk error when reading in the AppleTalk software could also bring up the message; copy a new System File and AppleTalk file (if any) from the TOPS Terminal disk to your Macintosh System folder. You might also consider running Apple's Disk First Aid utility on the disk in question.

Gateway Address Not On Same Wire as the Mac

The network model of TCP/IP requires that each TCP/IP computer be on the same physical network as a TCP/IP gateway. Two TCP/IP addresses are on the same physical network if they match in both network and subnet numbers. Therefore, the Macintosh TCP/IP address and the gateway TCP/IP address must match in both network and subnet numbers. You will see this message if these numbers do not match.

Solution: If you get this message after configuring TCP/IP in the Control Panel, go back to the configuration dialog and make sure the network and subnet numbers of the two TCP/IP addresses match.

The AppleTalk (.MPP) Driver Cannot Be Opened

A corrupted System file can cause this error message to be displayed.

Solution: Run the Installer on Apple’s System Tools disk (Utilities folder). If the problem still occurs, you need to copy over a new System file to your Macintosh System folder. Again, Apple's Disk First Aid utility might help.

TOPS TCP/IP Can’t Get Enough Resources to Connect

You might see this message if there are too many sessions going at once on a Macintosh with limited memory. You may also see this message if the maximum number of network connections under preferences is set too high.

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stroke

Solution: In addition to reducing the TCP buffer size (in the Control Panel) and rebooting, as the message suggests, try reducing the number of concurrent sessions.

Trying to connect, network accounts not enabled

If network accounts are "grayed out," indicating that they cannot be used, TOPS Terminal cannot find a valid TCP/IP address for your Macintosh.

Solution: You may have to enter a TCP/IP address (as explained in the Preface, starting on page xii), or you may need to reboot your Macintosh.

Phone Connections

Listed below are error messages that you might see or problems that you might encounter in making a phone connection.

Trying to connect, phone accounts not enabled

If modem accounts are not enabled, there are three likely problems:

- You have not designated a modem type
- The modem is in use for another connection
- You are trying a phone connection during a file session

Solutions: Select a modem type (see Appendix B for details), close the other connection, or select *Terminal Session* for phone connections.

Phone account - don't get CONNECT response

If nothing happens after you click *Connect* when making a phone connection, the modem speed may be wrong.

Solution: Select *Send Break* in the *Controls* submenu of the *Network* menu to drop the baud rate of the remote computer's modem down one step (from 2400 to 1200 baud, for instance) and press *Return*. If that doesn't work, you may have to hange the baud rate in the *Description of an Account*. You will have to close the connection first and try the connection again after you have changed the baud rate.

Phone account - no response after CONNECT

If you reach the remote computer successfully and see the response “CONNECT” (or a similar response), but you can't do anything, your modem settings may be wrong. Some connections require two carriage returns, some require a Control-C, for example. These settings are set in the attention line in the description of a computer.

Solution: Check with the system administrator on the remote computer to find out what you need to do, and what settings are necessary.

General Troubleshooting

Listed below are general problems you might encounter or error messages that might be displayed for either network or phone connections.

Using TOPS Terminal with MultiFinder

TOPS Terminal works fine under MultiFinder; however, there are some limitations you should be aware of. If you limit TOPS Terminal to 350K or less in the Get Info window, the following problems may occur:

- Large text files may fail to open.
- An out of memory error message may come up on screen.
- You may need to save smaller amounts of data in a session transcript.
- TOPS Terminal might disconnect your current session.
- TOPS Terminal may crash.

Solution: Set TOPS Terminal to 350K or larger under MultiFinder.

If TOPS Terminal crashes, select the *resume* button, which will be highlighted in most circumstances. If you use Macsbug 5.4 or later, you can type “es” in order to exit to the Finder.

Trying to connect to KIP Server

If there are two Kippers on the network and one assigns an IP address already in use (due to overlapping address ranges in the databases on the two Kippers), this message will appear.

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stroke

Solution: To prevent the problem, configure the two Kippers so that there is no overlap of IP addresses. If the problem occurs, which is not very likely even with overlapping addresses in the databases of the two Kippers, reboot your Macintosh; another IP address will be found.

Unable to create TOPS Terminal Memory file

If this message appears, your TOPS Terminal Memory may be corrupted, there may be a disk error, or you may be running two separate copies of TOPS Terminal under MultiFinder.

Solution: Discard the TOPS Terminal Memory file in your System Folder, replace it with a backup copy, and reboot your Macintosh. If you don't have a usable backup copy, create a new one after discarding the old one; a new TOPS Terminal Memory is created when you quit TOPS Terminal after starting up TOPS Terminal and creating a new description.

Trying to connect, automatic account; no response

There are a number of reasons that this might happen, including an incorrect IP address for the remote computer, an incorrect user name, or an incorrect password.

Solution: Be sure the remote computer is up and that it is enabled for logins.

Also check the computer description to be sure you have specified the appropriate operating system (UNIX is the default for new computer descriptions).

Try a manual connection to the computer, typing in the IP address when it is requested. See Chapter 2 for a description of manual connections.

Check the FastPath Manager setup (or ask your system administrator to check it).

Invalid login message when trying to connect

Check your user name for misspellings, extra spaces, incorrect capitalization, or extraneous characters.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Solution: Re-enter your password by checking the *Password saved in TT Memory* box in the account description and following the instructions provided. You will have to check the box twice — once to 'uncheck' it and the second time to tell TOPS Terminal that you want to enter a password for the account. Click *OK* when you have entered the new password.

If the connection doesn't work after you have checked and modified your user name and password, try a manual connection, as described in Chapter 2.

If it still doesn't work, check with the system administrator on the remote computer to be sure your user name and password are set up as you think they are.

Established connection - stops responding

If you were working on a remote computer in a terminal session and the computer stops responding, the connection to the remote computer has probably been broken. This may happen because the remote computer was disconnected from the network, was rebooted, or went down. This could also happen because of a network or modem problem.

The status box at the lower left will change from “Connected to [computer name” to “Editor Document,” but no error or kill connection message will be displayed.

Solution: Try to make another connection by selecting the same account after selecting *Terminal Session* in the *Network* menu. (This won't work if the remote computer or the network is down, of course.) Save the transcript if you wish.

Screen displays meaningless characters

This can happen if you try to display the contents of a non-ASCII file during a terminal session.

Solution: To clean up the screen, select *Reset Terminal* from the *Network* menu. If *Reset Terminal* is not available in the *Network* menu, display the full menu by following the instructions in Appendix B. It may be necessary to press *Return* if you are in a shell to get the prompt again. If you are in an editor, you will have to select the editor's redraw screen command to get the prompt again.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Script stuck in a loop

If no question in a script is matched, it may get stuck in a loop.

Solution: Terminate the script with the interrupt command, ⌘ -. (Clover-period).

Running out of memory

A session transcript is kept in memory during a TOPS Terminal session, unless you select *Don't Capture Lines Off Top* in the account description or you toggle *Capture Lines Off Top* to the off position (no check mark) during a session. If your Macintosh runs out of memory, a dialog window with several options will be displayed.

Solution: Follow the instructions in the dialog window. Click on *Capture Lines Off Top* to free up the memory used to store the transcript; save the transcript before you do this (if you wish).

UNIX users - User name or password invalid

If your user name is all lower-case letters in the UNIX password file, it will not be recognized if you type it with initial caps. UNIX operating systems are case-sensitive, meaning that upper-case letters are not the same as lower-case letters in file or directory names — nor in the password file, where your user name and password are stored.

Solution: Type your user name and password in a TOPS Terminal account description exactly as it entered in the password file on the UNIX system.

UNIX users - "No such file or directory" message

If you try to send a file with slashes (/) in its name to a UNIX computer, the file will not be saved and you will see the message "No such file or directory." (This happens because slashes are used to designate directories in the UNIX hierarchical file system.)

Solution: Change the name of the file before trying to send it to the UNIX computer; substitute hyphens for slashes in dates, for example.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

UNIX users - flashing screen when invoke vi editor

This indicates that the UNIX stty is set to 34 rows, 80 columns (9400 baud). Type “stty all” to check the row and column settings.

Solution: Reset the rows to 24.

VAX users - screen problems with VT100 setup

If you have told TOPS Terminal to emulate a VT100, but the characters on the screen do not look right, you may be missing a line in a file.

Solution: Be sure you have the following line in your login.com file on the VAX: set term/inquire

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

Glossary

Some of the terminology employed in the manual may be unfamiliar to you, especially if you are new to network communications or telecommunications. We have collected the most important of these terms into the following list for handy reference purposes. You may also obtain useful information and hints by selecting the TOPS Terminal Help selection under the Apple menu, or by clicking **Help** in many of the dialog windows.

Account Description
The information which TOPS Terminal uses to make an automatic connection to a remote computer. The account description includes the name of the remote computer and information about your login ID on the computer.

AppleTalk Personal Network
A collection of computers and peripherals linked together (using LocalTalk, PhoneNET, TOPS Teleconnector, or another compatible network cable system), allowing communication, file transfer, and document printing. Your AppleTalk network must be connected to Ethernet using an AppleTalk/Ethernet gateway in order for TOPS Terminal to be able to access remote computers on Ethernet. You can also connect most Macintoshes directly to Ethernet by adding Ethernet hardware.

Automatic Connection
The process by which a communications software package (such as TOPS Terminal) automatically connects and logs on to one computer from another computer — either on a network or through a modem over a phone line. TOPS Terminal accomplishes this by invoking built-in scripts which are linked to a particular remote computer through an account description.

Baud Rate
The speed at which two computing devices communicate with each other. For modems, 1200 baud (or bits per second) is the standard communication

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

speed, although 300 baud is still common and 2400 baud is becoming increasingly available. For direct connections between a terminal and a computer, 9600 baud is very common.

Command Line
The standard user interface on some computer systems such as MS-DOS or UNIX. The computer will issue a "prompt" character (such as "%") indicating that it is ready to accept user commands; the user then issues a command line. The Macintosh generally avoids the need for command lines by using dialog windows, a mouse, and menus.

Ethernet
A collection of computers and peripherals linked together using Ethernet network cables, usually communicating with one another using the TCP/IP protocol suite. An Ethernet network can be linked with an AppleTalk Personal Network using an AppleTalk/Ethernet gateway (such as the Kinetics FastPath).

File Session
A session on a remote computer for the purpose of copying files to or from that computer and your Macintosh. file session is started when you log on to a remote computer after selecting *File Session* in the *Network* menu.

File Transfer
The process of copying a file from one computer to another. File transfer may occur over network cables or over phone lines.

FTP
Stands for 'File Transfer Protocol'. FTP is a part of the TCP/IP protocol suite which allows file transfer between disparate computers.

Gateway
Any hardware device that connects two physically distinct networks, whether they are of the same kind (such as two Ethernets) or of different

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

kinds (such as an AppleTalk network and an Ethernet network). The Kinetics FastPath is an AppleTalk/Ethernet gateway.

Internet
A collection of networks, all of which contain computers using the TCP/IP network protocols, hooked together by TCP/IP gateway hardware.

IP Address
A unique (Internet Protocol) address which specifies both the address of a network on an internet and the address of a particular station on that network.

KIP
A protocol for dynamically assigning IP addresses to your TOPS Terminal Macintoshes. Addresses are assigned when a Macintosh is started up.

LocalTalk
A physical network, including connectors and cables, that implements AppleTalk network protocols. TOPS Teleconnector and PhoneNET are other compatible systems.

Log in (or log on)
To connect and gain access to a computer system. For most multi-user systems, the login process involves giving a user name and a password.

Log out (or log off)
To disconnect from a computer system.

Macro
A kind of computer program that executes a sequence of operations during terminal or file sessions. A macro has the same format and syntax as a script, but it is executed when you select it explicitly from the list of macros available.

Modem
A device that allows two computers (or a terminal and a computer) to communicate over normal telephone lines. “Modem” stands for “modulator/demodulator.”

Network
A group of computers, printers, terminals, file servers, and other devices

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

connected to each other by means of hardware and software that allows the various computers and devices to communicate with each other.

Operating System
An operating system is the "program" that manages the resources of a computer (memory, central processor, peripheral devices, etc.) and allows it to run other programs. The operating system of a computer also determines how you interface with the computer — how you log in and log out, execute programs, list files and directories, and copy or delete files, for example.

Operating System Description
The way operating systems are described in TOPS Terminal. The built-in operating system descriptions that TOPS Terminal knows about are UNIX, VMS, Red Ryder Host, and FidoNet.

PhoneNET
A physical network, including connectors and cables, that implements AppleTalk network protocols. TOPS Teleconnector and LocalTalk are other compatible systems.

Protocol
A set of rules ensuring that data communication takes place reliably and without error. TOPS Terminal uses TCP/IP protocols for network communication and the XMODEM protocols for phone communication. .

Remote Computer
A remote computer is any computer that you log on to from your Macintosh using TOPS Terminal — using either network or phone connections.

Script
A kind of computer program that is executed when you select functions in the *Network* menu. For example, when you start a terminal session and choose an account to connect to a remote computer, TOPS Terminal calls a "built-in" login script that identifies you to the computer. Other scripts perform functions such as copying files from your Macintosh to a remote computer, listing files on a remote computer, and logging off from a remote computer.

Service
A set of functions or operations that can be performed on a remote computer using TOPS Terminal menus. Services are grouped into terminal session

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

and file transfer services, and are provided by TOPS Terminal through scripts.

TCP/IP
A protocol suite allowing error-free communication over an arbitrary network. TCP/IP is an abbreviation for 'Transmission Control Protocol/Internet Protocol'. This set of protocols is more properly called "the Internet Protocol Suite," but is commonly named TCP/IP since TCP and IP are the two main protocols used by Internet network services.

TELNET
A protocol which is built on top of TCP/IP and is used for managing terminal sessions over a network.

Terminal
A device for communicating with a computer. Typically, a terminal is just a screen and a keyboard that is directly connected to the computer through a serial cable or remotely through a modem.

Terminal Emulation
The process whereby a computer such a Macintosh can "pretend" to be a specific type of terminal and carry on an interactive terminal session with a remote computer. TOPS Terminal allows the Macintosh to emulate a generic "dumb" terminal, a VT52, a VT100, a VT102, and an adm3a.

Terminal Session
A session on a remote computer for the purpose of using your Macintosh in terminal emulation mode. A terminal session is started when you log on to a remote computer after selecting *Terminal Session* in the *Network* menu.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

TOPS Teleconnector
A physical network, including connectors and cables, that implements AppleTalk network protocols. LocalTalk and PhoneNET are other compatible systems.

User Interface
The way that a computer "looks" and "feels" as you interact with it. On the Macintosh, operations are usually performed within windows using the mouse to select text or commands from menus. On more traditional operating systems, the typical user interface is command-line oriented, although recent improvements to some of these systems incorporate many of the Macintosh features.

XMODEM
A file-transfer protocol designed for modem communication. TOPS Terminal automatically uses the XMODEM protocol when transferring files over a modem.

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
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468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
stroke

.page. newpath
72 144 moveto 0 9 rlineto 0 -9 rmoveto 9 0 rlineto
72 756 moveto 0 -9 rlineto 0 9 rmoveto 9 0 rlineto
468 144 moveto 0 9 rlineto 0 -9 rmoveto -9 0 rlineto
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468 756 moveto 0 -9 rlineto 0 9 rmoveto -9 0 rlineto
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