Running a Main Frame Computer by Modem

Kenneth William Hirsch

A "main frame computer" often consists of racks of CPU (Central Processing Unit) electronics equipment and a variety of other stuff: high capacity tape recorders, disk drives, card readers, optical scanning readers, high speed printers, and other "peripheral" devices which serve the CPU with information much as a queen bee is served by the workers. Usually, main frames appear to serve several "on-line" users simultaneously, much as a cow's udder teats might serve a pair of calves. A familiar example of an on-line main frame computer system "suckling" its users occurs when airline ticket sellers type an inquiry into their terminals to get seat availability for a flight reservation.

I find a main frame computer to be very helpful when working with many data forms. Typical data forms include questionnaire answer sheets, bank checks, application forms, and invoices, none of which require typed input. Optical scanners can read these data forms accurately and swiftly and sophisticated programming systems can perform complex statistical analyses of them.

These statistical packages can perform very large and complicated jobs by stringing together many operations which depend upon successive outcomes for large data sets which might overwhelm a microcomputer. I use S.P.S.S. (Statistical Package for the Social Sciences). A one line statement in S.P.S.S. can activate a sequence of commands equal to several thousand FORTRAN or BASIC program statements.

Requirements

To access and use a main frame computer, we need:

(1) a modem

(2) a terminal program to communicate with the modem (such as Red Ryder, Microphone, Freeterm, Mockterminal, Versaterm, MacTerminal, Smartcom, etc.)

(3) a phone number and account to "access" a main frame. For example, Control Data Corporation (CDC) "Cyber" computers are available through computer centers. (I used CDC for the example but the principles are similar for IBM and others.)

"Access" means one has established an account to pay use charges to the main frame's owner. At most main frame installations account holders receive a unique "username" (or other form of account number) and "password" for computer communication, data security, and billing.

To set up an account on a CDC Cyber computer, one phones the nearest Control Data Corporation facility and asks for "Cybernet" account information. Cyber computer costs usually run around $50 to $130/hour. This may seem like a great deal but is not. S.P.S.S. is such a powerful program that enormous quantities of data can be dealt with in complex ways at high speed for a very small amount of billed computer time. For example, if a set of 2,256 words and numbers were stored as comments attached to an S.P.S.S. data file, and if the computer was commanded to retrieve and print the entire set, the total cost would be around 15 cents. (Other, more complex jobs may escalate into the dollar range.)

Connecting with a Cyber is similar to communicating with The Source, Delphi or CompuServe (which are main frame computers) or any BBS. The difference is the interaction which follows the initial "log on". How to get your microcomputer to communicate with others is dealt with clearly and in detail in :

- the Telecommunications section of the Fall '85 BMUG Newsletter;
- the documentation associated with modems and modem programs (especially Red Ryder).

What is not included in those instructions is an actual main frame computer S.P.S.S. working session sample. Such

a session is shown below.

First, we see how Cyber requested and I provided the proper account "username" and password. Next, we see the S.P.S.S. commands which:

(a) gained access to a copy of a pre-established data file
(b) commanded Cyber to use the S.P.S.S. procedures to do complex and otherwise tedious statistical analyses on the accessed data
(c) produced the results nicely formatted into tables and graphs.

To save the results as they flow by your screen, competent modem programs can automatically transfer the information to disk. One can save access costs by printing the information after having disengaged from the main frame. This is much easier with a second disk drive or hard disk.

How to Read the Example

Cyber transmissions are shown in `ALL CAPITALS`. My responses are shown in **`lower case bold`**. Cyber prompts are usually question marks, but may sometimes be a colon. My press of the return key is indicated by `<CR>`. My comments are `lower case` enclosed by parentheses.

When you dial a main frame computer via a modem which allows you to listen in, you will hear a long "beeeeep", indicating that the main frame computer is responding (unless there is a "busy" signal). You "lock in" the response by doing a `<CR>`. Note: some modems then must also be switched into "data" mode.

An Example Of A Statistical Analysis Session

(The example material is from an S.P.S.S. file of data established by one of my thesis students. The data record the responses of battered women to research questions. We hope the research findings will help reduce the continuation of such violence.)

```
WHAT SYSTEM? 33 <CR>
GO  <CR>  <CR>   .
USER NAME: ncjqf13 <CR>
PASSWORD: edjeref <CR>
TERMINAL:     66, NAMIAF
RECOVER /SYSTEM: spssonl <CR>
SPSS/ONLINE 8.0
USE AN SPSS SYSTEM FILE THIS RUN
? yes,battered  <CR>
USE A RAW DATA FILE THIS RUN
? no <CR>

AUTO-MODE.
? text  <CR>
? get  file;battered  <CR>
?  breakdown;tables=afraidto  to  adivorce  by  escaping  <CR>
?  breakdown;tables=gentlene  to  deserves  by  escaping  <CR>
? <CR>   <CR>
LAST LINE 15.005

? list  <CR>
5.     GET FILE
5.005  BATTERED
10.    BREAKDOWN
```

```
10.005 TABLES=AFRAIDTO TO ADIVORCE BY ESCAPING
15.    BREAKDOWN
15.005 TABLES=GENTLENE TO DESERVES BY ESCAPING
? execute  <CR>

ENTERING SPSS.
077700 CM MAXIMUM FIELD LENGTH

 - - - BREAKDOWN - - -

GIVEN 1 DIMENSIONS,  INITIAL CM ALLOWS FOR    618 CELLS
                     MAXIMUM CM ALLOWS FOR   2431 CELLS

CRITERION VARIABLE   AFRAIDTO -- I AM NOT AFRAID TO BE ALONE.
BROKEN DOWN BY   ESCAPING -- WAS WOMAN ESCAPING FROM ABUSE.

          VARIABLE          CODE      MEAN     STD.DEV.    N    VALUE LABEL

FOR ENTIRE POPULATION       2.163     1.241     98
          ESCAPING          1.        2.213      1.398     47   NOT SHELTERED
          ESCAPING          2.        2.118      1.089     51   IN   SHELTERS

                              TOTAL CASES = 98
```

In the actual set of results from the main frame, there were 12 pages of statistical analyses presented. What follows shows the last portion.

```
                        .
    CODE
           I
        1. ****************************** (    29)
           I  VERY    TRUE
           I
        2. ************ (    11)
           I  SOMEWHAT  TRUE
           I
        3. ****** (     5)
           I  UN  DECIDED
           I
        4. ** (     1)
           I  SOMEWHAT UNTRUE
           I
       5. ** (     1)
           I  NOT AT ALL TRUE
           I
           I.........I.........I.........I.........II.......I
           0         10        20        30        40        50
          FREQUENCY
                                          .                                .

NCJQF13 LOG OFF 16.44.49.                (The statistical analyses)
NCJQF13 SRU 15.242 UNTS.                 (and 12 pages of results)
```

```
IAF CONNECT TIME 00.40.28                (used 15.242 units of time)
LOGGED OUT.                              (which cost about $2.29)
```

At this point, it's possible to disconnect the modem from the telephone line, because the main frame has "hung up."

Main frames accessed over telephone lines are prone to sudden disconnects. Since many communications programs continue to act as though they are still hooked-up to a communicating entity — the main frame. You can continue sending and receiving data if you re-access the main frame and "log on" right away. Re-accessing often allows you to recapture the session in progress at the time of the disconnect (or of the appearance of "garbage" on screen).

From the point at which I sent the command "execute" by doing <CR>, the Cyber main frame computer took about 7 or 8 seconds to complete all calculations, construct outcome tables and graphs and get ready to send the 12 pages of results to my microcomputer. Sending the 12 pages required another 30 minutes of phone time. Instead of my 300 baud modem, had I used a 1200 baud modem, the phone time might have been cut by 75%. Had I been thinking straight, I would have instructed Cyber to print the results on its own high speed printer, gone to bed a half hour earlier and picked up the "printouts" at the computer center in the morning.

A Note on S.P.S.S.

The S.P.S.S. commands used in this entire session are contained in the three lines:

```
get file;battered <CR>
breakdown;tables=afraidto to adivorce by escaping <CR>
breakdown;tables=gentlene to deserves by escaping <CR>
```

Although logon commands may vary, the S.P.S.S. commands are pretty much the same all over the world. This is also the case with another statistics package, S.A.S. There are adherents of each system, but the particular advantage of S.P.S.S. is that it is by far the most frequently encountered system.

I have found learning S.P.S.S. to be easier than BASIC, PASCAL, "C" and other programming languages. Learning the basic elements of S.P.S.S. takes about as much effort as learning "Stat View" or "Statfast". Because the combination of S.P.S.S. and my Mac is much more capable than a microcomputer statistics package, I have chosen to stick with S.P.S.S. (Yes, there is a micro version of S.P.S.S. We have it on a hard-disk IBM micro, but the same input bottleneck prevails.)

Kenneth William Hirsch, co-founder of the Sacramento Osborne Group (SOG) in 1982, looks forward to the day he completes transferring his hundreds of (shudder) Wordstar files to his new Mac. When not watching the American River climb the levee behind his house, he professors at California State University's Communication Studies Department in Sacramento.

In the new roms, which are present in the Mac Plus or the Mac 512K Extended, you may sometimes have an exit from one of those annoying "Please insert the disk… messages. If you cannot comply with the request (for instance, if you used the disk on another Mac without first locking it, so the first Mac thinks it's another disk) you should press command-. (hold down the cloverleaf key and press the period key). This might work, but it might cause the system to bomb. It's worth a try…

You can customize your dialog boxes in any program, the finder, or the system by using ResEdit, the resource editor. It is possible to add any pictures created with MacPaint or FullPaint or MacDraw by copying the picture to the scrapbook (the word PICT) will appear in the lower right corner. Run ResEdit and copy the picture from the Scrapbook file and paste it into your picture. Find the dialog box to change by opening up resource of type DLOG. When you find the one you want, double-click on the picture. The appropriate DITL (dialog item list) will appear. You can add a new item to the list, then display as text. Just click on the PICT button and enter the ID of the picture from you pasted in. Finally, chose "use RSRC rect." You can make very elegant dialogs this way!

Macintosh Bulletin Board Systems: A Comparative Review

Raines Cohen: BMUG BBS SYSOP

A computerized Bulletin Board System (BBS) is, basically, a computer running special software that lets it simulate a bulletin board, by acting as a place where people can post and read messages, by calling it with a modem. BBS Systems go a little farther than real bulletin boards, by letting people also transfer applications and documents to and from the system.

Two of the most popular Macintosh BBS programs are **Mouse Exchange**, from Dreams of the Phoenix, and **Red Ryder Host**, from FreeSoft. BMUG has used both in the last year, and, as a result, we've found out that both are far from bug-free, and that each program has a different idea of what a BBS should be. The following comparison of those two programs is based on one year's experience of runnng the BMUG BBS.

Features

MEBBS contains a fixed set of menus (mail, news, files, misc.), allowing the SYSOP to partially change the contents of the News and Files categories menus. RR HOST allows the SYSOP total flexibility in menu design, so that one RR HOST BBS can look totally unlike another. This has the advantage of encouraging creativity and flexibility in BBS design, but means that using one RR HOST BBS may be very different than using another less standardized BBS. It also means that the SYSOP has to design the menus from scratch, adding each command one by one.

BBS systems usually have two categories of messages: public messages, which anybody can read (like notes on a bulletin board), and private messages (sometimes called mail), directed to a particular person. In MEBBS, there is a mail menu and a news menu, each with different commands and separate internal files. RR HOST uses one big "messages" file containing messages of all types, allowing up to 20 independent public and private message sections accessible from any menu.

Files sections are handled somewhat differently by the two programs. RR HOST allows any number of independent files sections, indexed by whatever menus you create. MEBBS has one master index of files sections which it makes into a menu. RR HOST excels at files maintenance, especially remotely — a task very difficult with MEBBS.

MEBBS uses text files to store menus, messages, files sections, and other related information, making it fairly convenient to edit any of these except menus with a simple text editor, allowing multiple changes to be made easily. RR HOST uses different format files for each type of item, and provides individual, easy-to-use editors for each. This makes it easier to make simple, individual changes, but harder to change several items at a time. The file formats, however, are documented, allowing sophisticated SYSOPs to write their own programs to do gross editing.

With MEBBS, the SYSOP specifies how many public messages are to be kept at one time, and each time a user logs off, it rewrites the entire message file, leaving out any "old" messages beyond the specified number. RR HOST has no on-line automatic deletion capability, but it comes with a separate program that can delete messages beyond a certain date. One quirk of RR HOST is that it does not actually remove messages that you ask it to delete until you run a separate program. Similar problems appear with the Callerlog file; it grows uncontrolled rather than "recycling".

In our experience with BBS systems, we have found none that is totally reliable. MEBBS version 3.72 crashed frequently, usually mixing up the mail and news files, making all current messages undeliverable. RR HOST crashed frequently in the pre-release version, but has done so rarely in the released one (1.01), and when it does, it usually loses just the most recent news message or file uploaded. Both programs appear to be vulnerable to running out of disk space, and MEBBS was extremely sensitive to any alteration of its message file.

Dreams of the Phoenix promised that MEBBS version 4.0 was 2 weeks away from June, 1985 through January, 1986. It was finally released in January, but even then seemed buggy, compared to the version we were using, 3.72. By the time we received version 4.0, we had switched to using RR HOST, because it appeared to be just about as difficult to convert our BBS files to MEBBS 4.0 as to RR HOST.

FreeSoft, Inc. was founded by Scott Watson in order to distribute his user-supported products (at the time, just Red Ryder, a terminal program). RR HOST was originally promised for September, 1985, and was eventually released in January, 1986. BMUG has used RR HOST since it was released.

Figure 1: Portrait of a SYSOP

UW: Unix Windows

UW is the name of a terminal program for the Apple Macintosh. UW stands for "Unix Windows." And if you haven't guessed from the name, the program is designed specifically for use with the Unix operating system; specifically 4.2 BSD Unix systems (as we have at University California at Berkeley).

There are a couple of reasons why UW is my terminal emulator of choice. First, it's free (and you can't beat it at that price!). A gentleman named John Bruner at Lawrence Livermore Labs wrote it for his own use, and then decided to give it to the world. It's available through BMUG, and on better BBS's around the country.

The second reason is it's size. Because UW is so small, it loads very quickly. This is important to me, because sometimes I use my computer just to quickly read my electronic mail. The faster I can log on, the happier I am. It also means that it doesn't take much space on disk.

The third reason is it's configurability. I can set up the keyboard most any way I want it. If I prefer the escape key to be where the backspace key is, I can set it up that way. And the tilde key is wherever I put it. You need ResEdit to change the configuration, also available through BMUG, and on better BBS's around the country. Also, whenever UW starts up, it looks for the file uw.conf, and sets the baud rate, etc. according to this file. As I usually communicate at 2400 baud, I find this very useful.

The fourth reason is compatibility. UW will emulate an adm31 (or adm3a, if you don't have an adm31 termcap handy), a VT52, and a Tektronix 4014 graphics terminal (a la VersaTerm™). The terminal with which you start up is also stored in the uw.conf file.

The last reason (and the main reason) I use it is this: UW allows you to have up to seven (7) windows open at the same time, each window containing a running process. This means that you have in essence 7 terminals in one: each in its own window (of whatever size you like). So in one window you might be reading your mail, in another you're "talk"-ing to someone, in a third your're editing a program, etc. And of course, each window can be one of three terminals! So in a fourth window you might be getting the output of a graphics program (the one you're editing in window #3).

So with all this in a free terminal emulator, you ask "What doesn't it do?" Unfortunately, there is something it doesn't do: download. But this really isn't that much of a problem. Because UW needs only 128K of space, you can run it under Switcher, with another program (Red Ryder perhaps) also resident in memory. Then, whenever you want to download, simply switch between the two programs, and switch back when you're through.

The remaining question then: "How does it work?" It works by running a process on Unix 4.2 BSD (or greater system) that regulates the flow of information to the various processes and windows that they should be going to. Each window gets its own pseudo-port that its processes hand off of. Pseudo-ports are what require Unix to be 4.2 BSD or greater. In reality, there are versions of Unix without pseudo-ports that aren't 4.2 BSD. So you'll have to alter the code for the Unix end to make it work.

The one drawback of this setup is that it's CPU intensive. Don't run the program when the load is high (over 5 or so on most machines). Other than that, "go forth and emulate terminals!"

Dialog!

Need information fast? Information from a recent issue of a computer journal? A short biography on an eminent scientist? A scan of recent literature on your Ph.D. thesis topic to see who your competitors are and what they're doing? Demographics of a small town in a neighboring state that your company is thinking of moving into? No problem. The power of a library the size of the US Library of Congress can be yours almost any time you need it right at home or in your office using your Macintosh, a modem, communications software, and Lockheed's Dialog information service. The same powerful search, citation, and (sometimes) fulltext database used by university and corporate librarians can work for you in a fraction of the time it would take to use your local library's card catalog.

All this power is easy to learn and remarkably inexpensive, too. Your Dialog account will come with a more complete list of commands than I list here, and your local librarian can answer questions about more complicated commands--most of which you will never need! To get your Dialog account, write Dialog Information Services, Marketing Department, 3460 Hillview Avenue, Palo Alto CA 94304, or call 800-227-1927 (800-982-5838 in California).

The first thing you should do, once you have had a little experience with telecommunicating, is to determine how you log on. If you live in the Bay Area, you have the advantage of phoning Dialog directly and avoiding any connection charges (except possibly the toll charge to Palo Alto). If you live elsewhere, you will probably want to use Dialnet, Telenet, Tymnet, or Uninet to reach the service. The information package will list all the phone numbers for your area and explain how to tell the networks to send you to Dialog.

Next, browse through the dozens and dozens of databases that Dialog offers. From LCMarc, listing every book published and registered with the Library of Congress, to A.D. Little Online, containing full consulting reports on various technical topics, choose a few that might be interesting, and develop a few keywords to use in each database. Jot down their numbers (each database has a number from 1 to about 1000 that identifies it to the computer).

Searching a Database

Now, with your keywords and the information packet you received in the mail in front of you, dial up Dialog. You will see a prompt similar to this:

```
DIALOG INFORMATION SERVICES
PLEASE LOGON:
```

At this point, enter the password you were sent, and continue. You'll see something like this:

```
Welcome to DIALOG
Dialog version 2, level 5.7.16
L O G O N            F i l e 0 0 1           2 0 d e c 8 5           0 2 : 4 1 : 5 6
```

```
DIALOG News (Enter ?NEWS for details):
------------------------------------------------------------------------------
Phase 6 DIALNET numbers now available.  Use Phase 6 numbers free now through
January 20!  See ?DIALNET for details.
New DIALNET number for Trenton, NJ:  609/555-1212.
------------------------------------------------------------------------------
Announcements:
 Price change for TRADEMARKSCAN (File 226).  See ?NEWS.
File    1:ERIC - 66-85/OCT
       Set  Items  Description
       ---  -----  -----------
?
```

The ? prompt tells you that Dialog is waiting for you to enter information. So far, you've seen the latest Dialog news, then you've been placed in the lowest-priced full-service database, ERIC. (ERIC is an educational database supported by the US Government.) You can see that its file number is 1, and that it contains information dating from 1966 through October of 1985. Next, tell Dialog which database you would like to search. B stands for "begin" -- if you like, you can type out the word begin. The 154 tells Dialog to take you to Medline, the US National Library of Medicine database of biomedical literature. So, you'll see:

```
?b154
       20dec85 02:42:09 UserXXXXXX
    $0.08    0.003 Hrs File1
    $0.08  Estimated total session cost   0.003 Hrs.
File 154:MEDLINE - 80-85/OCT
       Set  Items  Description
       ---  -----  -----------
?
```

Dialog is again waiting -- this time for you to begin your search. What would you like to know about? Say we're interested in biomedical effects of certain rubber materials. We wish to find out about silicone rubber. (The ss stands for "select sets." You can type save or just s, but when you do more complex searching, ss is more helpful because it displays the results of each individual piece of your search.) Dialog will respond almost immediately with

```
?ss  silicone
       S1   2156  SILICONE
?
```

S1 numbers the "set" for later reference, 2156 says that Dialog found 2156 individual references that included the word silicone (exactly), and SILICONE is Dialog's way of repeating what we asked it. Wow! Over two thousand references. You would spend years reading them all! And probably most will have nothing to do with the problem at hand. No problem. Narrow your search. What if you're interested in the effects of silicone near mammalian cells? Enter

```
?ss mammalian and s1
      S2   10121  MAMMALIAN
            2156  S1
      S3      12  MAMMALIAN AND S1
?
```

Well, now we've gotten things down to a manageable level! We can see on the screen whether we seem to be hitting the mark by typing

```
?t 3/1/1-2
```

We've told Dialog that we want to type set 3, in format 1 (more about formats in a second), and we want to see items 1-2 from that set (not all twelve, only the first two). Type means to our computer screen, not on paper, although most communication programs allow you to either save your search to a file and print out the file at your leisure or to print as information is sent to you. The format we chose (#1) means we will receive only a simple bibliographic citation of a few lines rather than the complete citation with abstract. Each database has its own way of coding formats. So you should check with Dialog about the format codes for the databases you use most often. Dialog will respond to this request with

```
 3/1/1
 Substances originating from the optic nerve of neonatal rabbit induce regeneration -
associated response in the injured optic nerve of adult rabbit.
 Hadani M; Harel A; Solomon A; Belkin M; Lavie V; Schwartz M
 Department of Neurobiology, Weizmann Institute of Science, Rehovot,Israel
 Proc Natl Acad Sci USA (UNITED STATES),Dec 1984,81(24) p7965-9,ISSN 0027-8424 Journal
Code:PV3

3/1/2
 Electromyographic evaluation of a novel surgical preparation to enhance nerve-muscle
specificity that follows mammalian peripheral nerve trunk transection.
 Politis MJ; Steiss JE
 Department of Anatomy, College of Medicine, University of Saskatchewan, Saskatoon, Canada.
 Exp Neurol (UNITED STATES), Feb 1985, 87(2) p326-33, ISSN 0014-4886 Journal Code:EQF
?
```

The references are presented in reverse chronological order, so if you want to see the oldest, ask Dialog for `t 3/1/11-12`. Let's say at this point, you're satisfied. Although the word silicone doesn't appear in the titles, it must be in the abstract (or Dialog wouldn't have found it). So, the titles sound interesting. At this point, rather than waste connect time downloading the complete files, you can ask Dialog to print out the results and mail them to you first class only a day or two later. Instead of type, you ask for a print. Type:

```
?pr 3/5/1-12
```

to get all twelve references in format 5 this time, complete with the abstract. Then logoff

```
P082: PRINT 3/5/1-12 est. cost of $2.40
?1
       20dec85 03:14:10 UserXXXXXX
     $4.02    0.050 Hrs File 154
     $2.40       12 prints File154
     $6.50    Estimated total session cost   0.053 Hrs.
Logoff: level 5.7.16 03:14:11
```

Dialog closes up by letting you know how much you've spent, verifying your logoff, and saying goodbye.

Of course, you could be much more sophisticated with your search and see full records on line, but in just a few minutes, you've managed to scan most of the available literature in a field for all mentions of the terms silicone and mammalian. You've saved yourself countless hours scanning reference works like Indicus Medicus and Chemical Abstracts. (Incidentally, Chemical Abstracts is also available in computer form through Dialog.) You can get references now , or wait just a day or two if you want to reduce on-line charges and have them mailed.

Advanced Commands -- Technical Information

Dialog will send you a simple "owner's manual" when you sign up. The manual includes a complete description of most Dialog commands you'll ever use. Dialog gives you the ability to search through its databases and limit search results by using logical connectors. You can control which fields in the database are searched and can combine words in your search criteria such as **mammalian(f)cell** to return only records where both **mammalian** and **cell** are in the same field of the same record, or **chicken(w)soup** to return only records where both **chicken** and **soup** are adjacent and in the specified order.

The words **an**, **by**, **from**, **the**, **with**, **and**, **for**, **of**, and **to** are "stop words" and give ZERO search results when used as searching words, but they can also be used to logically connect search words. A question mark within a word will retrieve words no matter what comes in the position. Example: **biblio?** will retrieve bioliography, bibliographic, bibliophile, etc.

That's Great, but What Will It Cost Me?

Now, about word about charges. Dialog is one of the few major databases to treat small users respectably. With a reasonable credit record, you can fill out a one-page form and have a logon code within about a week. You pay no "initation" fee and no minimum monthly charge. You only pay for the services you use (computer connect time, communications surcharges, and online and offline print costs). Dialog asks that you log in, for however short a session, once every three months to keep your account active. In addition, at the time of this writing, Lockheed offered first-time customers a special $100 connect time credit for your first full month of use. Connect time sounds expensive, with some databases running up to $300 per hour. However, most of the best cost only between $35 (like Medline, a government-sponsored medical and biological database) and $76 (like Chem Abstracts) per hour. Most searches revealing 30-50 references, printed offline so search results are mailed within 2-3 business days, cost only about $10-15. Dialog's computer is fast! You won't be waiting very long for it to perform searches. If you exercise a little restraint, and spend a few minutes to plan out your sessions before logging on, you will find your Dialog service represents a much better value than most online services. Also, remember that Dialog doesn't charge you for the connect time you use your first month (up to $100), so you have plenty of time to make mistakes and learn the system without having those mistakes send you to the poor house.

Linda Custer is a Ph.D. candidate in the Department of Chemical Engineering at UC Berkeley--and files SYSOP for the BMUG BBS. She has no ties with Dialog or Lockheed except admiration.

Demonstration — Hayes Smartmodem 2400 and Transet

Kathy Handy, a Product Support Representative for Hayes, demonstrated two new Hayes products, the 2400 baud modem and a communications/printer buffer called Transet. The 2400 baud Smartmodem is actually many modems in one: a 300 baud modem, a 1200 baud modem, a 2400 baud CCITT-compatible modem, and a 2400 baud synchronous modem. It looks just like the Hayes Smartmodem 300 and 1200, but has an extra light in the front to tell you whether you are operating at 2400 baud. It has the ability to shift up or down in speed in both originate and answer modes to select the right speed for communication with other modems, and accepts the same commands as the other Smartmodems ... plus some.

The Transet looks just like the other Hayes products, but contains a full Motorola 68000 microprocessor, some ROM (64K, I think), and 128K of RAM. It can act as a printer buffer and can receive messages over a phone line even when there is no computer hooked to it. To retrive messages, you can either connect a computer and have the messages appear on your favorite terminal program, or you can call the Transet and have it send messages over the phone line through a modem. You can also program the 68000 for custom applications. The Transet also includes two DB9 serial ports and one DB15 serial or parallel port in its back. Hayes hopes to have a 512K version of the Transet sometime soon.

Kathy also demonstrated Hayes' newest version of Smartcom II for the Mac. It has the capability to send and receive files via Xmodem, Hayes verification protocol, or Xon-Xoff, and can properly deal with binary files. If used with a Hayes modem, it can send and receive graphics directly with the Macintosh screen of another computer, and the resulting images can be cut, copied, and pasted like MacPaint pictures.

Our logon codes on various telecomputing systems:

Delphi	BMUG
GEnie	BMUG
MCI Mail	BMUG
CompuServe	70007,2271 (sorry they're not more human)

The WELL: Whole Earth 'Lectronic Link

Timothy M. Brace

The WELL, Whole Earth 'Lectronic Link, is a computer bulletin board created by the folks who brought you the *Whole Earth Catalog*, *CoEvolution Quarterly*, *Whole Earth Software Catalog*, and *Whole Earth Software Review*, and, most recently, the quarterly *Whole Earth Review*. It's sort of a cross between the local computer bulletin boards we all love to use, and the major national systems like CompuServe, the Source, and BIX. Therefore, it offers much of the power and versatility of the big national systems, but with the friendliness and informality usually associated with small local systems.

The WELL is participating in Pacific Bell's packet-switching experiment. Packet-switching is a system for sending data in more efficient "packets" of information and may eventually reduce phone charges. Packet-switching is free during the experiment (ends May, 1986). After that, the situation depends on FCC rulings about further use and pricing.

The WELL has had a lot of user participation in its design. New users are joining and starting new discussions in areas from jokes to spirituality, as well as the usual computer talk. BMUG has its own area. The different discussion areas are called conferences. Each conference has many topics, and each topic can include a large number of responses in order by date. Anyone can start a new topic or add a response, but permission is required to start a new conference. The following is a list of current available conferences:

The Real World

Aging	Garage--autos	Music	Sports
Business	Gardening	On The Air	Stock Market
Calendar	Gay	One Person Business	Success
Classifieds	Human Resources	Outdoors	Technical Writers
Curious ?'s	Jokes	Parenting	The Corner Pub
Desktop Publishing	Languages	Peace	The Examiner
Earthstewards	Legal	Philosophy	The Future
Eating	Liberty	Photography	Travel
Education	Library	Politics	Video
Electronics	Magazine Publishing	Psychology	Whole Earth Symposium
Environment	Management	Science Fiction	Women in Telecom
Free U	Medical	Sexuality	Writers
Fun	Mind	Space	
Games	Movies	Spirituality	

Computers

AI	CP/M	Laptop	Programming
Amiga	Currents in the Well	Learning	Spreadsheets
Apple & Dtack	Databasics	Macintosh	Telecommunications
Atari	Fido	MicroPro	Unix
BMUGSIG	Hackers/Homebrew	Packet Radio	Whole Earth Symposium
Commodore	IBM PC	Power Users	
Computer Books	Kaypro	Programmers Net	

The WELL Itself

Design	Hosts	System news
Help	Manual	

The WELL offers the usual teleconferencing features such as electronic mail, on-line "chatting," and downloadable

public domain computer programs. The mail system offers the ability to send mail out through other computer networks, such as UseNet. Users can read postings from UseNet on the WELL at no extra charge. Users can do various other operations, such as compile and run C programs (but not Macintosh-oriented ones), and utilize other Unix™ features such as GREP and MAKE, by using the WELL's Unix™ operating system. However, it is not necessary to know Unix™ to use the WELL, although many who become regular WELL users learn a few Unix™ commands to give them greater flexibility when using the system. Additionally, users can run their text through the WELL's own spelling-checker programs and can play games on-line.

While it cannot match the number of subscribers on big national networks, it has attracted many people deeply involved in the computer world, and others who bring a rich diversity of ideas and information (including Lee Felsenstein, Captain Crunch, Mitchell Waite, Stewart Brand, and John Dvorak). The WELL offers a way to give direct electronic feedback to such publications as the *San Francisco Examiner*, *Computer Currents*, and *MicroTimes*. Some of the postings in the San Francisco Examiner conference have been used in their Letters to the Editor section (including one by Yours Truly).

One stimulating feature for Macintosh users is the weekly conference using Harry Chesley's Visual COnferencing Program (VCO), which allows Mac users to see depictions of the peoples' faces they're chatting with. Users can create face icons and upload them to the WELL, so that others can use those face-pictures on VCO. By designing a set of different facial expressions, users can convey their emotions graphically in VCO mode.

In addition to all these features, the WELL has a lower charge per hour than most major computer teleconferencing systems -- only $3.00 per hour as of April 1, 1986, although there is a monthly fee of $8.00 for everyone. For regular users, that can mean big savings. Like most popular systems, there is some slowdown in processing speed during busy periods.

Although specifically aimed at Bay Area users, the WELL attracts users from all over the country who call in through PC Pursuit (GTE's bargain long-distance BBS-calling service), Ma Bell, or Uninet (a national packet-switching system similar to Telenet; in fact they just merged). Uninet costs $4 per hour in non-prime time, 6 P.M. to 7 A.M. local calling time.

The WELL can be reached by computer at (415) 332-6106 or by voice at (415) 332-4335. Send any correspondence to the WELL at 27 Gate Five Road, Sausalito, California 94965. Currently, it is necessary to have a credit card for billing, and you can sign up online.

Timothy M. Brace is a computer user who got his start on the Macintosh and who oversees the BMUG special interest group on the WELL. He helps Claude Wynne run Bay Connextion (415-621-7561, or 864-3365 for Macintosh users), a computer bulletin board in San Francisco. Additionally, he is the President of the Committee to Preserve Our Sexual and Civil Liberties, a San Francisco-based organization concerned with issues surrounding sexuality.

Demonstration -- RammasVision

RammasVision is a communications program for accessing UNIX systems. It is capable of holding two sessions, one through the modem port and the other through the printer port, both at the same time. If the host mainframe is also running its version of RammasVision, then up to eight individual UNIX sessions can be going on at the same time, each in a separate Macintosh window. For people who like to do 1001 things at a time, this is the ideal program!

RV has macro capability and follows the Mac interface guidelines. It gives you a soft keypad for VT100 emulation and makes window resizing easy using special corners on every window. It supports cmacs, VI, and VT100 mousing, and sends the correct commands to the mainframe to move the cursor to follow the mouse. It works with BSD 4.2 UNIX, and will soon support BSD 4.3 UNIX. Its VT100 emulation passed the John Heckendorn Rogue test, so it follows at least most of the rules

For Mac -- List price: $89.00 Discounted: $69.00 (not copy-protected) Upgrade to rev 2 is free, after that updates are $10 each

UNIX host software -- custom designed for the mainframe system, very expensive, but negotiable

CompuServe Update

Linda Custer

We all know the Mac has a unique personality. It's understandable that she likes to talk on the phone a lot! One of her best friends is CompuServe (CIS -- CompuServe Information Service), a national telecomputing service headquartered in Columbus OH. If you don't already belong, you'll need a CompuServe starter pack, available at many bookstores and computer stores, and a modem. Just follow instructions and watch the clock: after all you really should eat and sleep at least once a day, and so should your Mac.

More Bang for the Buck.

CIS contains its own daily newspaper, games for the whole family, stock quotes, a mail service, and special interest groups (SIG). The SIGs have facilities for real-time chats, active discussion and message boards, and a library of programs and text files for downloading. It competes directly with Delphi, The Source, and GEnie, and in some areas with MCI Mail and Dow Jones News Retrieval. It does not compete at all with Dialog, BRS, or Lexis -- all special purpose data retrieval systems.

CIS is one of the most expensive general-purpose videotext services. However depending on how you use it, you may find it's worth the extra cost. CIS has approximately double the users of The Source, and many times more than Delphi or GEnie (both new and growing). If you are interested in contacting fellow computer users, you will probably find more on CIS who share your interests. You may also feel a bit overwhelmed because there is more to look and navigate through. In the end (and this might be a controversial opinion), what you are looking for in the way of communications, entertainment, and Apple and Apple-related product support is probably more likely to be on CIS than on any other.

Recently, CIS announced that they have linked up with MCI Mail, allowing users from both systems to send mail to each other and to use MCI Mail facilities to send hard copy letters even to people without MCI Mail or CIS addresses … or people without modems.

MAUG™/MacUsers and MAUG™/MacDevelopers

MAUG™ is the MicroNetworked Apple Users Group, and is a section of CIS of interest to Mac owners. Currently MAUG consists of three smaller units, one for Apple // and Apple /// users, one for Macintosh and MacXL users, and one for Macintosh developers. You can reach MAUG by typing GO MAUG at any ! prompt, or go directly to MacUsers by typing GO MACUS.

MAUG's public bulletin board is the fastest place to have any question answered, simple, technical, or somewhere inbetween. Jean-Louis Gassée (Apple's Vice President of Product Development), Ellen Leanse (Apple's User Group Evangelist), Dan Cochran (Apple's Developer Evangelist), and Andy Hertzfeld have all been logging on regularly, almost daily, to answer public questions. Staff from Hayes, Software Ventures, Levco, Microsoft, Micah, MacUser magazine, and many other Mac-related companies show up regularly and handle questions about their products. Although everything can't be said publicly, you would be surprised how much various "luminaries" can and do tell people. Answers usually come within 24 hours.

Unfortunately, since the MACUS forum is so popular, and since CIS's software can only hold about 900 messages at a time, messages tend to stay on the system for only three or four days during the week and two or three days on weekends. After that, they scroll on into oblivion. To follow what's happening, you should log on regularly. You certainly don't have to read each message. Just do a **qs** (quick scan) and decide on the messages dealing with topics that interest you.

Real-time conferencing, both informal chatting and formal question-and-answer with featured guests, is available. If you find that someone you know or would like to know is on line, coax them into the conference area and talk your Mac out. Regularly scheduled conferences on topics like MIDI/music and users' groups are scheduled by Neil Shapiro, Chief SYSOP, and are announced roughly a week or two in advance so all interested users can attend. In the past, special formal conferences with personalities like Andy Hertzfeld and Bill Atkinson have been real hits. In addition, because of recent cooperation between Apple and CIS, both Apple's new product announcements and stockholders' meeting were carried live as John Sculley and others spoke.

The MAUG conference area has been made easier to use and more enjoyable by the recent explosion of visual-voice MAUG conferencing (VMCO). The original concept of VCO by Harry Chesley (whose VCO program works on Delphi and GEnie) was rewirtten and given a different form by Bob Perez to work with CIS. The result is a program that allows users to "see" and "hear" each other by displaying face icons around a table and by using MacInTalk to generate speech corresponding with each participant's text. Hundreds of CIS users have uploaded their face/voice files for each other's enjoyment. This program is difficult to describe -- you really have to see it in action to appreciate it.

The download library of MACUS is probably the most complete collection of public domain, shareware, and other copyrighted-but-distributable software for the Macintosh. Apple has allowed certain applications like Resource Editor and Switcher to appear there, and most major shareware authors like Scott Watson (of Red Ryder fame) post their wares there too. MAUGers also post conference transcripts, product reviews, help files, spreadsheet and database templates, musical compositions, and many other useful files.

Stay tuned to this section for further CIS and MAUG developments. There will undoubtedly be many in the next few years. When you log on, say hi *to BMUG and to me. Our CIS address is 70007,2271.*

Delphi and GEnie Update

Raines Cohen

Delphi, although less well-known than CompuServe or The Source, is rapidly growing into a very nice place for BMUG users to "visit." It has a smaller user base than either of the other major services, and, as a result, is less crowded and more flexible. The overloading problems that I reported on last fall have been cleared up, and it now runs fairly well with the increased number of users. The software has been improved in minor ways that make it slightly more convenient to navigate the system. The rate structure has been changed recently, so there is no additional charge up to **2400** baud!

Delphi's Mac SIG, known as **ICONtact**, is an especially nice place. Delphi is not quite as stingy as is CIS, so you can read **all** the messages, way back to when the SIG began! (none of this "logging on every 4 days or else"

business!) The regular Sunday night CO's are fairly raucous, as the SYSOPs (including *Anti*-SYSOP Alfonso T. Qwerty (editor of the Mouseketeer Newsletter)) are more liberal than those on CIS. The author of VCO (the **original**!) has been collaborating with other Delphites to design several interactive games. Support for software developers is especially good, with many deeply technical questions receiving quick responses. BMUG subscribers may be able to get a special deal on Delphi lifetime memberships. Call General Videotext Corporation at (800) 544-4005 and mention BMUG and ICONtact.

General Electric's information service, known as GEnie, is rapidly becoming attractive to Mac users. Introduced within the last year, it has more of a "home computing" emphasis than the other services, and correspondingly lower rates ($5/hr up to 1200 baud). In most major cities, GE has a local "host" computer, making downloads **incredibly fast** when compared to the other services. In addition, uploads to GEnie are **free**.

GEnie's Mac SIG, Coffee MUG, is small but friendly. Beginner's questions seem more welcome here than on other networks. The threaded nature of the message forum on GEnie makes it harder to read ALL the messages, but easier to read *just the ones you want*. GEnie has been getting a lot of attention lately, because memberships are now included with Red Ryder registration. If you'd rather not register Red Ryder, you can sign up directly by calling GEnie customer assistance at (800) 638-9636X21.

Raines Cohen, BMUG Operations Manager, eats half-completed BMUG order forms for a hobby.

Write Your Own Script

A Comparison of MicroPhone and Red Ryder

Telecomputing for the Mac has come of age! We've gone from the days when the only way to connect a Mac to another computer was to use Dennis Brothers' Microsoft Basic 1.0 program, MacTEP (short for Macintosh Terminal Emulation Program), to the days when Macintosh terminal programs have surpassed anything the Apple/Pro DOS, MS-DOS or CPM worlds can offer -- in just a short two years.

Most experts agree that telecomputing is not an intuitive endeavor. First, users have to wade through the vagueness of baud rates, stop bits, parity, error checking protocols, ASCII, binary, and all the other expressions used by veteran telecomputer types even just to say "Hello world" to another computer. Then they have to remember telephone numbers, passwords, and arcane commands to navigate around in dozens of different systems with their own command sets and conventions.

Some of the pain was removed with other computers' terminal programs that store communication settings and automatically send and receive information, but the user still had to be a bit of a programmer to teach the computer to truly do his work for him. Those days are over! Two current programs out for the Macintosh, *MicroPhone* by Dennis Brothers and *Red Ryder* by Scott Watson, have functions to make writing a script as easy as going through the motions of logging on to a service and performing your task just once. In some cases, you don't have to even know the terminal settings and logon protocol used becase the software comes complete with a pre-written script to edit and use with most major services. In all cases, you will only have to deal with those details once. For ever more, they will be stored away in your telecommunications file, totally transparent to you or to anyone using your program.

What Can Scripts Do for You?

You can click on a **Get MCI Mail** button each morning, have your proverbial cup of coffee, and return to find all your waiting mail in a folder marked **To read**. You can have your Mac automatically call Dow Jones News Retrieval each evening (at the office while you're at home) and prepare a text file including the current value of all your stocks, ready to be opened by Excel when you get in for the morning. You can log onto MAUG™ and download all the latest messages and then leave a message for a friend of yours while you're asleep. The messages (on disk or even from your printer) will be waiting when you wake up. You could use scripts as some companies do for supporting software or hardware products. They use scripts to automate downloading any messages customers have left on major services and then route those messages to the appropriate staff members over their in-house computer network for replies. They then gather the replies to upload later.

With scripts, you can enjoy not having to remember all the required commands to perform routine functions. You'll also enjoy lower telecommunications bills because your time on line will be more efficient. You can take advantage of lower nighttime rates without having to be at your Mac during those hours, and you can devise schemes to keep characters spewing back and forth between computers with no interruptions for slow typing.

Scripts let you set your Mac up as a very simple host -- a computer holding information that other computers can log onto and download. Although this type of host is difficult to make into a full-blown bulletin board system (BBS), it can easily verify that a user knows a password and allow the user to access files remotely. This might be useful to someone wanting to upload a file to a branch office late at night so it will be there the next morning or to someone with a new program or new information they want to share with friends.

Any telecomputing task that requires repetition of the same commands when talking with another computer, or any task that requires remote accessing of information in another Macintosh, would be a prime candidate for a script.

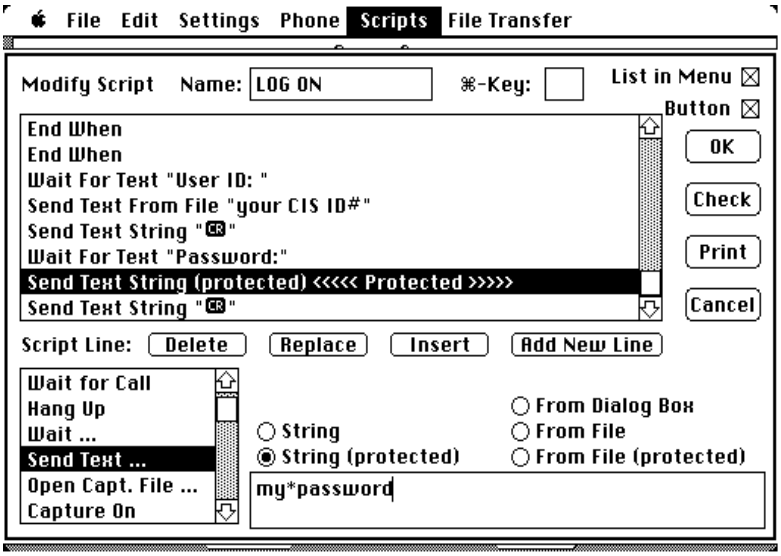
MicroPhone versus Red Ryder

Right from the start, I want to make it clear that I am biased. I have used Red Ryder since I first bought my modem and have watched it evolve from version 5.0. (No, I wasn't into telecomputing when MacTEP was the only solution, nor was I here to see Scott put out Red Ryder initially as a MacTEP variant.) I am comfortable with the choices Scott made about how his program looks and feels because I learned on Red Ryder. I appreciate the time Scott has continually put in with every update to make Red better. I never got used to a MacTerminal-type program (and somewhere, somehow, MicroPhone has the soul of MacTerminal). MicroPhone has its apostles, its groupies, who genuinely think there could be nothing better. They are still sane; there's room for us all. I hold MicroPhone in very high esteem and am sure that if Red wasn't out there, I'd be using MicroPhone and loving every minute of it.

I'll talk about the differences between MicroPhone and Red Ryder here -- first how they write scripts and then about their general features -- and maybe help you choose between them. I am sure you'll find that both programs do almost anything you might need, and you'll have to try them both to see which fits your style. Even then, you might decide that you don't really need scripting capabilities and that you prefer some of the features of Smartcom II, MacTerminal, Versaterm, InTouch, or some other program. Truth is, it's hard to review Macintosh programs because they are all so good. You almost can't go wrong, and that is a nice position to be in.

MicroPhone writes a script as soon as you ask it to **Watch Me™**. It asks you to name your script, and then gives you the chance to put it in as a menu selection, give it a keyboard command-key equivalent, have it as a clickable button on the bottom of the screen, or any combination of these options. You then go through the motions of navigating your way through a session, possibly downloading or uploading information along the way, and finish by logging off. That is the simplest example of what most people would use scripting for. You can also have Microphone write a script in the middle of a telecommunications session to perform a particular task, similar to a subroutine. No need to do anything special -- just do what you normally would.

When you are done writing the script, you can edit it with a unique style of editor developed especially for MicroPhone. (With any scripting program, you may have to edit a procedure if the host computer is inconsistent and responds differently to your commands at different times.) You can insert to, delete from, and alter the script line-by-line by choosing from the whole possible command set in a minifinder-like display. (See figure below.) The scripting language is built of easy-to-understand commands like "Wait…," "Dial service," "Display button…," and "Download file using…." You will never have to carry your MicroPhone manual around with you because the whole universe of possibilities sits in front of you at all times. For commands with various choices, like "Send text…," selecting that command triggers a display of radio buttons with the possible choices. For "Send text…" these choices might include the type of string, protected or unprotected. A protected string (like a string containing your password) will not show up on your Mac's screen while the script is running, or in any printout of the script; an unprotected one will. A protected string will also not appear in any copies of the MicroPhone program or document you make and will not be transmitted to a modem when you send a script over phone lines!



You can also write a script "from scratch" using the MicroPhone editor, and thus include commands that might be hard to demonstrate during a session. You can take advantage of the ability of scripts to call other scripts (like BASIC subroutines), and to branch to other scripts (like BASIC GOTOs), so each script can hold the instructions for a particular operation that you might or might not select once you have logged on. You have the ability to include conditional branching and looping based on what the host does or doesn't do, and the ability to use the Macintosh system clock to perform operations at predetermined times. When I asked Dennis to compare his scripting with that found in Red Ryder, Dennis said he hadn't yet had an opportunity to see Red Ryder 7.0 (6.2 and lower didn't have a scripting capability), but that Scott's script facility couldn't be any more powerful than his because his was mathematically complete. I haven't had a chance to check out Dennis' claim fully, but I guess if you've read *Gödel, Escher, Bach* you know that we can only ask for so much power from computing machines and that it is pretty easy to decide whether a system is mathematically complete. I trust Dennis and believe that there is no function you could ask your Macintosh to perform based on the bits and bytes coming in to and going out of the back port that MicroPhone couldn't handle. However, it will NOT call Domino's and order you a large sausage and mushroom pizza at 6:30 PM on Tuesday unless you've found a way to synthesize the required speech over the phone line. A mere hardware problem, taken care of by BMUG's MacRecorder, and certainly not Dennis' fault.

MicroPhone's script editor is very easy to understand and to use. I think it is clunky because you have to write all your procedures in a dialog box by clicking and selecting instead of by using the keyboard. It follows the Macintosh interface guidelines and is very easy for beginners to use, but I think it might be hard to write long, sophisticated procedures using this editor. At least you never have to memorize commands -- and that is a strong selling point.

Red Ryder's automatic scripting facility, called simply **Write a procedure for me**, grew out of Scott's RSP (remote service procedure) language which debuted on RedRyder 5.0 or so. Programs you had to type in are now handled in much the same way as in MicroPhone. You choose Write a procedure for me… and go through the motions. However, the resulting commands read quite a bit more cryptically than do MicroPhone's:

```
COMM 1200-N-8-1-FULL                    ( set the communication parameters )
MACRO MYDISK:CIS MACROS                 ( load in a file of macro keys )
DIAL ATDT 1 000 555 1212                ( dial a number )
PROMPT NECT                             ( wait for the letters "NECT" )
RESET                                   ( reset timer )
PAUSE                                   ( wait for computer to quiet down )
TYPE ^C                                 ( type control-C )
```

```
PROMPT ID                                   ( wait for "ID" to be sent from host )
PAUSE                                       ( same idea as above commands )
TYPE 73176,61
PROMPT word
PAUSE
TYPE my*password^M                          ( RR has no way to protect passwords )
PROMPT !                                    ( so your password will be displayed )
PAUSE                                       ( in script file )
TYPE GO PCS-23^M
BELL                                        ( sound bell so I know I'm connected )
BELL
BELL
```

Note: If you use this file, don't type comments on the same line as commands; comments go on separate lines surrounded by parentheses.

You can see that this is almost as bad as BASIC, and some of the commands, especially those for opening transfer buffers and sending and receiving files, can be hard to remember. Keep your documentation handy.

The news isn't all bad, though. These procedures are slightly easier to edit than MicroPhone's if you are working with procedures containing lots of commands -- as easy as using a text editor rather than a line editor. I believe that Scott has in his language as mathematically complete a system as MicroPhone's, so pure power is available from either program. However, Scott has commands for doing some pretty sophisticated things like displaying procedure commands in the status bar as you are going along (great for debugging) and for changing the appearance of the terminal window as you go along. He has implemented almost every menu item of the program as an option that can be controlled from a procedure or remotely. This leads to an interesting difference between the two programs: When you start a procedure with Red Ryder, it asks you whether you want all the current settings to be recorded in the beginning of your procedure or whether the settings will already be correct when the procedure is called. MicroPhone has no such method since every script is run within a "shell" that predefines the settings. With Red Ryder, you get the flexibility of altering settings as you go along, while in MicroPhone, you get the convenience of not being asked what kind of script you are writng. Quite handy.

Like MicroPhone, Red Ryder lets you store procedures as buttons to be called at any point. Red Ryder does not have any facility for storing procedures as menu options or activating procedures as command key equivalents. Maybe in a future version, Scott? Procedures can be called as subroutines or as branches, again like with MicroPhone.

Ease-of-use Versus Power

You might say that the whole comparison of MicroPhone and Red Ryder scripting comes down not so much to whether one is better than the other but whether one suits your style better than the other. MicroPhone will do everything most users will need through scripts, in a way that allows non-computer-programmers to take a fair stab at writing useful programs. Nice going. Red Ryder appeals more to the crowd who already knows how to program and wants a few extras attached to the program for special circumstances. I'm sure for some writing Red Ryder procedures would actually be easier than writing code in MicroPhone just because the mouse isn't used as much. I used Red before it had automatic scripting and didn't find the concepts hard at all, so things only got better when they were automated. If you are not too familiar with programming, though, you will probably get more productive work done more quickly with MicroPhone.

In a way, the comparison of scripting styles reflects the personality of the rest of the programs as well. MicroPhone is a very easy product to pick up and use the first time you ever try a modem. It has some nice features like its ability to display text in all available fonts. It stores everything that occurs during a session in its scrolling window (up to the limits imposed by memory; it loses everything that doesn't fit automatically). It supports MacBinary, YModem, 1K Xmodem, and the old MacTerminal protocol, as well as 8-bit Kermit. It is not quite as user-friendly as

Smartcom II, but it still has its share of icons, and I think Smartcom II is just a bit too graphic.

Red, on the other hand, is a little more powerful. It only allows Monaco 9-point, but switches from 40-column to 80-column to a larger column easily. It retains a user-defined number of "screens" (24-line units) before losing information. It supports CompuServe B protocol (a very good, fast protocol for use with CIS when CIS gets touchy), 7-bit MacBinary transfers over Kermit protocol (as well as 8-bit Kermit) , 128 byte Xmodem, Turbo 128 byte Xmodem (sends the acknowledge to host before data is received and speeds up packet-switched networks by 100% at times but fails if any errors occur), and CompuServe RLE graphics. It supports more extensive keyboard mapping than MicroPhone does, and allows users to substitute the option key for the command key if desired, freeing up the command key so many menu options can have command key equivalents. (This is a feature that I almost cannot be without.) Scott's recently released version 9.0 has added support for locking and hiding passwords and for speeding up procedures. He has also installed a new grahpics driver, Nautilus, which will allow you to control mainframe computers and BBS systems by pointing and clicking as soon as the mainframes and BBSs support it.

Sorry if I've overwhelmed you with specifications. If you haven't already chosen a telecom program, ask a friend which program he uses and try it out for a few days. Then try another, and another, until you find one that feels like it was written for you. Unless you have very specific requirements for certain tasks you'll be performing, you've found the best program for you. Congratulations. Here's hoping the competition in the telecom field continues to stay hot for quite some time. We are all benefitting enormously from it with what is some of the best Macintosh software around -- indeed some of the best software around period.

Linda Custer is a Ph.D. candidate in the Department of Chemical Engineering at UC Berkeley--and files SYSOP for the BMUG BBS. She lived in the same undergraduate dorm as Dennis Brothers, albeit about ten years after he did, and kidnapped Scott Watson from a CompuServe party at a recent MacWorld Expo.

Getting the Most out of Your Modem: BBS's

A BBS (Bulletin Board Service) is an electronic version of a bulletin board (plus a few extra things). BBS users can call the BBS from anywhere to post and read information on topics germane to the intent of the BBS. They tend to specialize by geographic location or subject (law, programming, art, etc.) Unlike the "normal" sort of bulletin board, BBSs usually allow you to download programs. This is perhaps the main method of distributing public domain software. Fonts, desk accessories, games, etc. are all to be found on BBSs.

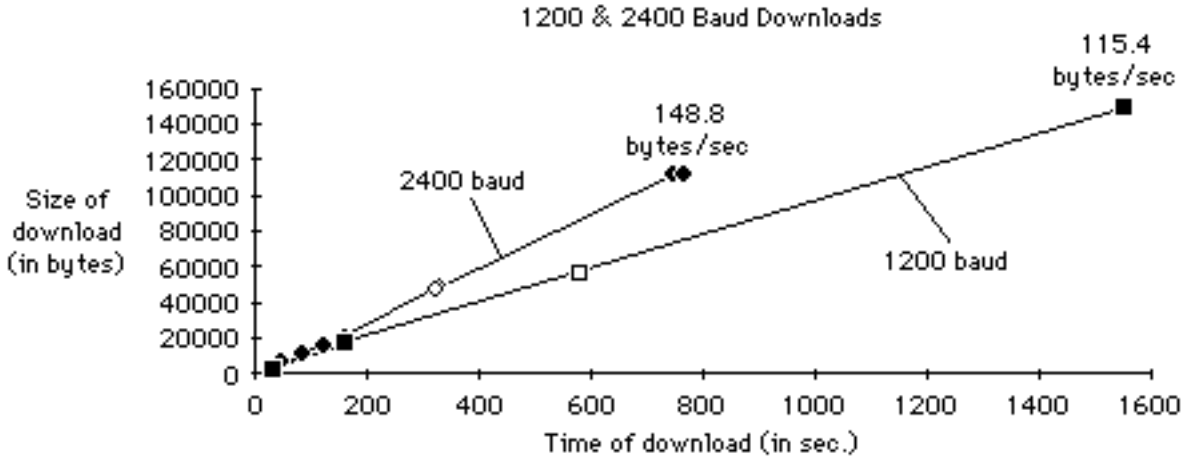
To get access to a BBS you need the following:

1) computer
2) phone outlet with a universal jack (not the old phone jacks with four copper prongs in a square pattern)
3) modem (300, 1200, or 2400 baud)
4) terminal emulator program (or use a real terminal in instead of a computer).

The computer and terminal emulator, or just a real terminal, provide the screen and keyboard you use to talk to the BBS. A printer and disk drive are nice if you care to print what you read and/or download programs. A phone isn't strictly necessary as long as you have a phone outlet to plug into. Most modems come with cables that plug directly into a universal jack. Adaptors for connecting to the old style four prong jacks can be bought a Radio Shack.

Modems transmit the characters you see on your screen, and possibly store in a file on a disk, by sound so they can be transmitted over the phone line. Another modem, phone jack, and computer at the other end of the phone line make up the BBS you are calling.

To get access to a BBS find out its phone number from a user's group or newsletter. Connect up the computer, modem, etc., and bring up your terminal program (such as Red Ryder or MacTerminal). Tell your computer to dial the BBS's phone number, and you're off! The other line will answer (unless busy, which tends to happen a lot with good BBS's) with a high pitched beep, which tells your modem that another modem on the other end is ready and waiting to talk. They then get together and you're connected. Often times you will have to hit return <CR> once or twice to let the BBS figure out how fast you are communicating (300, 1200, or 2400 baud). A comparison of actual downloads with 2400 and 1200 baud modems is shown below.



The best way to start is to have someone set up your computer, modem and terminal program to work with the BBS you want to talk to. (Have them walk you through the entire process.) If you're like most, you won't get it to work the first time you try. If it doesn't, play around trying different different terminal settings and modem switch

settings.

Every BBS is different, and will have it's own interface settings and command set. The better BBSs will allow users to send and receive personal mail, participate in discussions (often called conferences), and download files. BBS's are very public. When you post a public letter, many many people will read it.

The person(s) who run the BBS are known as sysops, short for system operator. Sysops tend to dislike people who use a handle instead of their real name. Once their alloted time is up, they log on again as someone else. This is rude! Consider that the sysop owns the machine, not you. If you want to play with his/her toys, you have to obey the rules, else you spoil it for all.

Most BBS's have lists of other local numbers, so that this list will lead you eventually to thousands. Enjoy

Figure 2: Optional Activity While Redialing A Busy BBS

Redialing the BMUG BBS

Linda Custer

The BMUG BBS is notoriously hard to reach because it gets so much use. Many people have asked what is the most efficient way to redial the BBS. Simple: use a terminal program that supports redialing (like Red Ryder, MicroPhone, VersaTerm, or SmartCom II). Then on a Hayes or Hayes-compatible modem, type ATS7=14. This sets your modem so it will wait only 14 seconds (rather than the usual 30) before redialing. This step is important because times much shorter than 14 seconds may result in your program actually hanging up before the BBS ever gets a chance to respond! Times much longer than 14 seconds may allow other callers to get in before you and will decrease your chances of reaching the BBS. Fourteen seconds seems a nice compromise. Then tell your program to autodial, and wait patiently (usually less than a half hour) until the BBS answers.

A few notes: If you use MicroPhone you will have to live with only redialing from your screen and not from a script, unless you don't mind redialing only every 30 seconds. MicroPhone has the annoying habit of sending an ATZ to the modem before performing any script, effectively clearing the modem and doing away with the ATS7 code you sent.

If you have a modem that can detect busy signals like the Hayes Smartmodem 2400 or newer versions of the Smartmodem 1200 (with two phone jacks), most terminal programs will understand a report of a busy signal from the modem immediately and will redial. You don't have to worry about your ATS7 setting in this case because the modem will not hang up on a real ring. Just tell your terminal program to redial. You will be redialing BMUG every five seconds or so. This is the most efficient way to call the BBS. Some terminal programs may not know what to do with a BUSY signal from a modem, so the ATS7=14 is still required.

You can easily tell whether your modem and terminal program are both understanding busy signals by listening to your modem and watching your screen. If you hear only a few seconds of busy and then your modem instantly redials, everything is fine. If you hear only a few seconds of busy, but your program either waits thirty seconds to redial or never redials, the terminal program is not understanding the modem's busy report. Either change your modem (read the manual) so that it gives a verbose report (BUSY, CONNECT 1200, etc.) or a terse report (3 for NO CARRIER, etc.) or try a different terminal program. If you hear many, many seconds of busy, your modem doesn't recognize busy signals. Either reset a dip switch or try another modem.

Be patient, and set aside roughly a half hour to call the BMUG BBS. You'll be rewarded when you finally connect.

BBS Listing

All BBSs listed are 1200 baud, 8 data bits, one stop bit, no parity unless otherwise noted.

Bay Connextion	415-621-7561
Draco-Net Prime	415-474-8608
Etcetera!	408-978-3282
MacCircles EBBS	415-484-4412
Macline	415-775-2125 (2400 /1200/300 baud)
Production World	415-571-6160
SMUG	415-574-SMUG
The Bay	415-775-2384 (2400 /1200/300 baud)

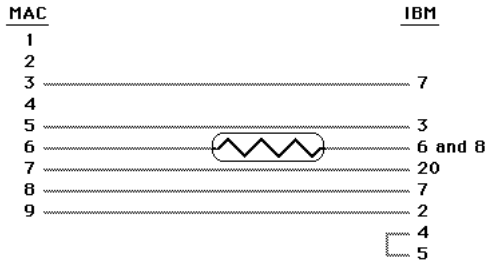
Text-File Détente: IBM PC to Mac

Ken Huie

Ok, so you finally talked the boss into a Mac. She thinks the icons are cute and the graphics are snappy and all that, but wants to know "Can it read all of our IBM files from Wordstar™? Can the secretary work on the files you create?" You force a straight face, and try to explain the advantages of fonts and all the stuff you use at home, but falter as you try to remember anything about Wordstar™. "No problem," you say, but after a second look at MS-DOS or a "too many paragraphs!" error message in MacWrite you are about to toss les doughnuts. Never fear, for it can be done, but it takes a few steps and maybe a bit of tweaking on both ends.

First, get a cable. If wires and such make no sense, have someone make one.

The ImageWriter cable and a null modem adapter may work, but IBMs and compatibles are not all the same. The various serial cards that exist can be programmed different ways and often are. To avoid changing the IBM serial card jumpers (don't get nervous, boss!), you can fool the IBM with a piece of ribbon cable, a 2.2 k ohm resistor, a DB-25 connector to mate with your IBM serial port, and a DB-9 male connector for the Mac.



Note that pin 6 on the Mac is +12 volts and the resistor limits the current. For transfers to work, many serial ports need 6 and 8 to be held high. Install the resistor inside the hood on the DB-25 end to avoid line loss. IBM pins 4 and 5 are not needed on the Mac side, so let them talk to each other. This cable can be long enough to pass through several rooms and still be trouble-free.

Get the Mac programs you need. (Go ahead, pick a terminal, any terminal.) MockTerminal is small and can be installed as a desk accessory on the disk with MacWrite, but while it receives files painlessly, it is difficult to use when sending a file. Red Ryder is better for general use but needs more room on a disk. Or, take your pick of many others (see BMUG disk 2). Don't be afraid to play around with them for a while to find out how to change the baud rate and send/receive files. You should use the slower baud rates, so none of the handshake lines are needed.

Get some IBM programs too. The simplest way is from MS-DOS.... COPY b:WSFILE.TXT com1:

This command sends the file WSFILE.TXT on drive B: to serial port #1. While you can get by using the COPY command in MS-DOS, a terminal program makes the transfer much easier and lets you know what is happening while the transfer takes place. PC-Talk III is cheap (shareware) and simple to use. An additional (but not necessary) MS-DOS program is WSDOS.EXE, found in public domain libraries. This program fixes the weird control characters (like those ^Q's) of Wordstar and changes them into unique character combinations that are easy to find in MacWrite. Re-styling in MacWrite is easier if you keep the old formatting markers next to the underlined or boldfaced words (ever try to find ALL of the underlined words in a 50K file?).

One caveat about Wordstar and its users. Both are notorious users of spaces instead of tabs. Wordstar also inserts spaces on the left hand margin. A text file will be easier to re-format in MacWrite if the left margins of paragraphs are set to zero before you send it. Use the ^B command to re-format the left margin. Yes, you can do it in

MacWrite, but it will be slow and you will most likely miss a few. Wordstar put them there; let Wordstar remove them.

Let's Move Text TO the Mac!

Connect the cable and start both terminal programs. Set both terminals to 1200-N-8-1 (1200 baud, No parity, 8 bits, 1 stop bit). At this speed the files can be transferred without any handshaking. You can sometimes run faster, but you may outrun the machine's ability to write the text to the disk as it is received. Type a few letters on each keyboard to make sure they appear on the other machine's screen. In MockTerminal, just select Start Recording from the menu. If you are using Red Ryder, turn on the STRIP CONTROL CHARACTERS feature and then select receive File-ASCII. (MockTerminal will strip those characters automatically.) Walk over to the IBM and send the file with the COPY command (from MS-DOS) or the ALT-T command in PC-TALK. The disk drives on both machines should start spinning. When they both stop, tell the Mac program to stop receiving text (Stop Recording). That's it, the file is transferred. All that's left is to open that file from MacWrite (select Line Breaks in the dialog box).

Now is the time to repair any tabs needed in the file. Use CHANGE in the search menu to find all occurences of three spaces together and replace them with two spaces. Do this procedure until there are no more occurances of three spaces together. Place a single tab anywhere in the file and copy it with Command-C. Open the CHANGE window and use Command-V to paste the tab character into the CHANGE TO box. Now CHANGE ALL will replace all occurances of two spaces with a tab. If you get text that is scattered across the page, add a few more tab markers to the ruler and watch the text (or those spreadsheet numbers) fall into line. Save the file as you normally would.

Now Move Text FROM the Mac!

First, save the file on the Mac as Text Only, with carriage returns at the ends of Paragraphs. This removes almost all of the formatting of the file. Wordstar will convert the remaining tabs into spaces during its re-formatting (when you do all of those ^B's).

On the IBM end, the COPY command is tricky for receiving files. Auto-time-outs can screw you up as you walk over to the Mac, so use PC-TALK or another terminal program instead of the COPY command (ALT-R in PC-TALK will set the PC to receive a file). Remember that file names can only be 8 letters, a period, and a three letter extension.

MockTerminal has no simple way to send a large file, so use RedRyder. Select SEND FILE--ASCII, and from the minifinder, select the "text only" file you saved and open it. Again, the disks on both computers will spin. When the Mac has stopped, press Command-Z on the Mac keyboard, then walk over and tell the IBM to close the file. That last Command-Z marks the end of the file in MS-DOS and is important to Wordstar. Without it, Wordstar will quietly die when you try to reformat the last paragraph of the file.

When you open the file from Wordstar, all of the paragraphs will be one line long. Set the margins and such in the ruler at the top of the text area and give each paragraph a friendly(?) ^B to make the paragraph look like it should. Save the file normally (^KD) and the transfer and file beautification is done. Exit Wordstar and meditate on Mac add-on boards.

Ken Huie works at the UC School of Optometry. He swears he only uses the IBM for work and only reads the IBM manual as a last resort.

Note: Refer to the Spring 1985 BMUG Newsletter for data transfers to other computers. Refer to the Fall 1985 BMUG Newsletter for other cables.

Transferring Apple IIe ASCII Files

Gordon Firestein, Ph.D.

A friend of mine, Andy Toro, is a naval architect, a U.S. Olympic Committee member and an avid Olympic-style canoer. He spent the last five years writing a book about everything having to do with Olympic canoeing, from canoe hydrodynamics, to how to hold the paddle, to tables of Olympic race results. He wrote the manuscript of this labor of love on an Apple IIe. I offered to help Andy publish the book by typesetting it on my LaserWriter. The book will be a good example of the self-publishing capabilities of the Macintosh and LaserWriter.

The first task we had to face was transferring Andy's Apple IIe files to the Macintosh so that we could use Pagemaker to lay out the pages. Admittedly, the method is limited: it can only transfer text files from the Apple IIe to the Macintosh. If that's all you need, as we did, it might save you some time and headaches.

Andy's associate, Micky Kossa (also a naval architect and a long-time microcomputer user), wrote a short Apple IIe BASIC program that transfers text, character-by-character, through the Apple IIe's 80-column Super Serial Card. The program listing is at the end of this article.

You need a cable to attach the Apple IIe's serial card to the modem port of the Macintosh. After some experimenting, we figured out what the pin connections should be. They are diagrammed below.

512k Mac Male DB-9 pin	Apple IIe Male 25-pin
3	7
5	2
7	20
9	3

You can use a Joystick Extension cable from Radio Shack (Cat. No. 276-1978) and a male 25-pin connector, with hood, to make this cable. Plug the 25-pin end into the Apple IIe's serial port and the 9-pin end into the Mac's modem port and you are ready for action.

On the Macintosh, you will need to open a terminal emulation program like MacTerminal or Versaterm. I used Versaterm, so I'll describe the settings I used. You may have to play around with the settings on other terminal programs until you get the transfer to work.

In Versaterm, I selected Text XModem, 4800 baud, Odd Parity, 7 bits, 2 stop bits and VT100 Emulation. To save the incoming file, select Save Stream and name the file and disk you want to use to store the file.

On the Apple IIe, you need to run the BASIC program listed below. Suppose you name this program "Transfer". To use it, load the program into the Apple IIe's memory (type **`Load Transfer`**). Then run it (type **`Run`**). It will ask for the file name, and whether or not you want the file to be displayed on the screen. Answer no to this question, and when you hit return, you should see the file displayed on the Macintosh screen character-by-character.

Once you've captured the incoming file, use a word processing program to format it (i.e. put boldface, italics, underlining, etc. where you want it). Any formatting you may have done on the Apple IIe will either be lost or will appear as coded characters that should be deleted once the file arrives at the Macintosh. If you have lots of coded characters to delete, copy one to the clipboard. Under the Search Change... Menu in MacWrite you can Paste the coded character into the Find what... and Change to... nothing.

So far, we have only transferred a couple chapters. When the book is finally published, Andy and I have no doubt it

will be a best seller. Now, if only we could interest Hollywood in the film rights...

Transfer Program Listing

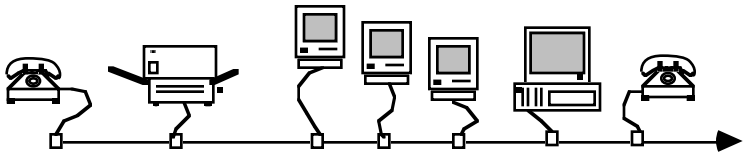
```
100  D$ =-CHR$(4):I$ = CHR$(9)
110  ONERR GOTO 600
120  PRINT D$;"PR#3"
200  INPUT "FILE NAME?";F$
210  PRINT
220  INPUT "OUTPUT TO SCREEN  [Y/N]?";Q$
230  IF Q$ = "Y" THEN 400
300  PRINT D$;"PR#1"
301  REM  LINE 310 SETS THE BAUD RATE
302  REM  AT 4800.  SEE THE SUPER SERIAL
303  REM  CARD REFERENCE CARD FOR OTHER
304  REM  BAUD RATE CODES.
310  PRINT I$;"12B"
400  PRINT D$;"OPEN";F$
410  PRINT D$;"READ";F$
430  GET B$
435  PRINT B$;
440  A$ = A$ + B$
450  IF B$ = CHR$(13) THEN 500
460  IF LEN(A$) = 80 THEN 500
470  GOTO 430
500  PRINT A$;
510  A$ = ""
520  IF PEEK(-16384) > 127 THEN 700
530  GOTO 430
600  IF PEEK(222) = 5 THEN 700
610  GOSUB 900
620  PRINT "ERROR CODE:  ";PEEK(222)
630  GOTO 999
700  GOSUB 900
710  PRINT "DONE"
720  GOTO 999
900  PRINT CHR$(26)
910  PRINT D$;"CLOSE";F$
920  PRINT D$;"PR#3"
940  RETURN
999  END
```

Gordon Firestein is President of Informatech, a company that uses the Macintosh to provide information and research services to engineers and scientists. He is also publisher of the Bay Area Mac Classifieds.

Typical Bay Area Mac Classifieds Reader

Installing a PhoneNET Network

Reese Jones



Networks

A network allows several computers to share expensive or infrequently used peripherals like modems, printers and mass storage devices. Sharing one Apple LaserWriter between several Macintoshes is the most common use for AppleTalk right now. Other uses for AppleTalk are to send mail between users, share programs or files, multi user data bases, process monitoring and control, and other functions where information needs to be shared between the machines on a regular, but not intensive, basis. The ability to have several machines talking over the same wire is primarily a function of the AMD RS-422 driver chips built into each Macintosh (and available on IBM PC cards, and many other interface devices). The sophisticated AppleTalk software drivers in the system file and new ROMs keep track of the messages being sent down the network cable (a complicated task). The AppleTalk (and PhoneNET) hardware is simply to electrically isolate the machines from the cable carrying the signal.

AppleTalk is an intermediate speed network protocol running at **230,000 BAUD** (bits per second), considerably faster than an RS232 serial line (9600 BAUD), telephone modem (2400 BAUD), and the new ISDN telecommunications protocols (68K or 128K BAUD). Yet AppleTalk runs slower than the Macintosh floppy disk drive and HD20 Hard disk (500,000 BAUD), or the faster network Ethernet (1,000,000 BAUD) or the new SCSI port on the MacPlus (2.5M BAUD). These speed differences are important to keep in mind when deciding what to use an AppleTalk network for. *It is better to have many smart devices connected together than many dumb devices connected to one very smart one*. AppleTalk should not be used for high traffic situations, like using one hard disk server, with every user running applications off the same disk. This configuration will run at half the speed of floppy drives; if you must share one hard disk, try to run the applications locally on each machine (off floppies or RAM disks) and use the hard disk for the files that **must** be shared.

AppleTalk is much faster than modems or dedicated serial lines, yet slower than local processing. Its main advantage is its low cost. If you must run from a centralized device (mainframe etc.), consider one of the smarter distributed processing Macintosh front ends, where much or the display processing is handled on the Macintosh end and the volume of communication is minimized (for example UW-*UNIX Windows*, MacStation, or the Cray screen editors under development). By the end of the summer, an intrinsically more expensive, a fast direct SCSI to Ethernet interface (>1M BAUD) for the Macintosh should be available from Kinetics.

Try to arrange your computer such that the things that you need intensively are the faster to access (more costly):

(>>500,000 BAUD direct connect - ROM, RAM disks, local Hard Disk, local CD-ROM, Floppy Disk or high speed LAN)

The things you need less often are accessed a little slower but less expensive per user:

(>200,000 BAUD - LAN shared - LaserPrinters, FileServers, DiskServers, Medium Libraries, building-wide network, local mainframe, etc.)

The things you need rarely can be accessed much slower but much less expensive per user:

(>1200 BAUD - Distant mainframes, Wire Services, very large online data bases, BBSs and libraries, Electronic mail and banking, etc.)

Obviously your system should be configured at the cost that you can afford. Deciding which types of data you access by which method should be evaluated by the volume of the data and how often you will need to refer to it (if you should move it at higher/faster level). You need to consider whether it is faster to transfer a file over the LAN or walk down the hall to get a floppy disk, or across campus to pick up a CD-ROM disk, or modem a file across the country vs. FedExing a floppy disk.

Over the next 10 years a new telephone transmission protocol is being introduced by the phone company. Known as **ISDN** for *Integrated Services Digital Network* that will give two data channels running at 68,000 BAUD (128K to the phone company, which will fill the gap between the 230,000 BAUD speed of PhoneNET within the building and the 9600 BAUD speed of dedicated lines to the phone company now, all of these running through standard telephone cables in the building. The ISDN will allow you to connect at reasonably high speed (68K BAUD) between district offices, distant mainframes or online services. The 68K BAUD ISDN network coming to the building could then be bridged to a 230K BAUD PhoneNET/AppleTalk within the building to give quick access between machines and from any machine to the ISDN.

PhoneNET™— an Alternative to AppleTalk™

The remainder of this article describes some of the factors to be considered when installing a PhoneNET™-AppleTalk™ compatible network. PhoneNET™ is a system of AppleTalk-compatible local area network hardware that is the latest incarnation of the designs that we called BMUGNET in the Fall '85 BMUG newsletter. PhoneNET™ Boxes ($39) and a complete line of LAN products are being distributed by **Farallon Computing** Berkeley (1442A Walnut St. #64, Berkeley CA 94709 (415) 849-2331). PhoneNET™ boxes are completely compatible with several of the AppleTalk compatible hardware and software products including Centram IBM PC cards and TOPS™ and Kinetics Bridges and will be distributed with some of these. PhoneNET™ Board kits (solder it yourself hackers version) are completely compatible with PhoneNET™ Boxes and AppleTalk™ and are still available from BMUG (see below).

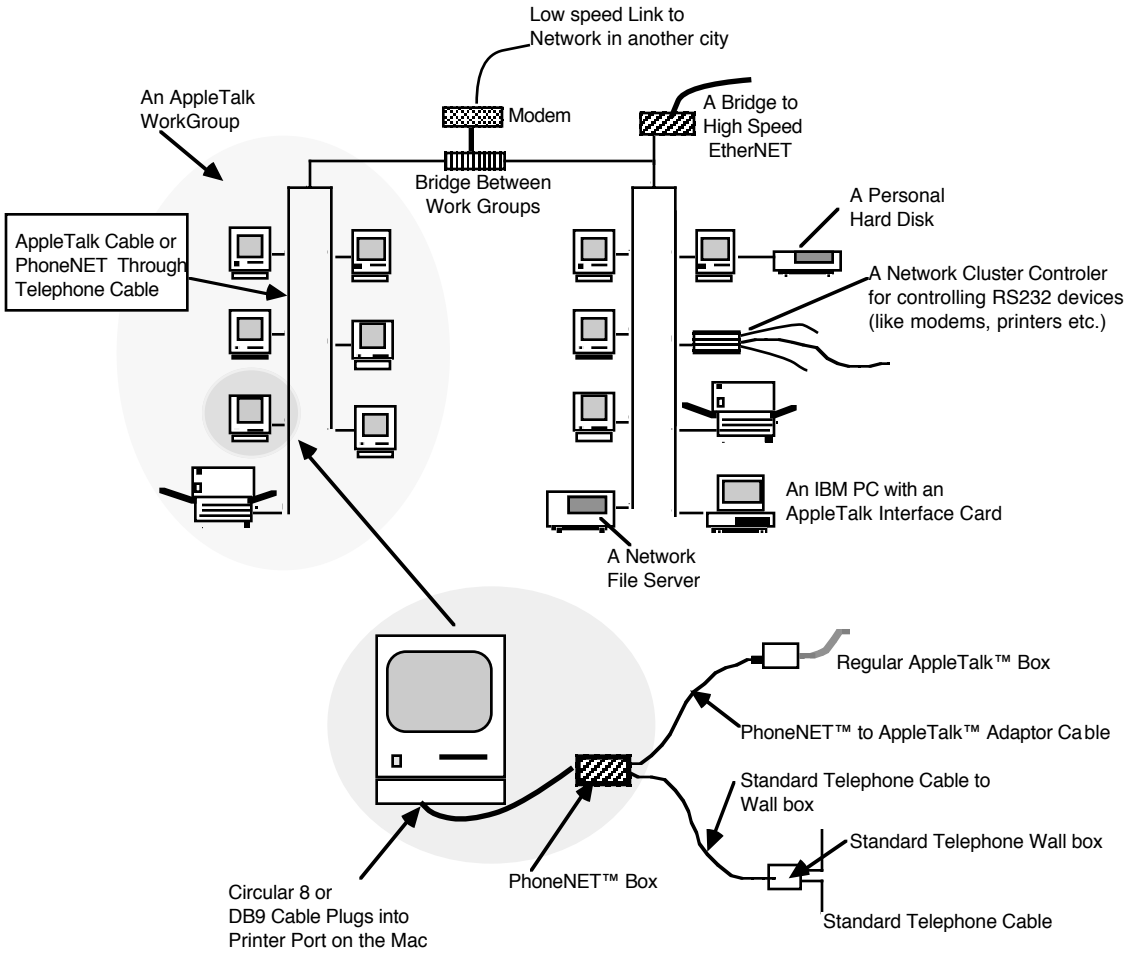
The major cost of installing a large local area network LAN is installing additional special cable. PhoneNET™ was designed to run through the existing telephone cables in the building and to make use of the same low cost modular omponents used extensively by the telephone company. Thus, with PhoneNET the major cost of installing a network is avoided, i.e., installing new cables to each room in the building.

PhoneNET™ also offers several distinct advantages over standard AppleTalk™ hardware while remaining completely compatible (both harware and software). Some of the advantages of PhoneNET™ over AppleTalk™ (and other LAN standards) are:

- The use of Bell standard modular RJ11 phone type connectors and accessories (positive locking, inexpensive and widely available).
- The ability to add and remove devices without disturbing the network.
- The use of a low resistance floating ground circuit allowing much longer cable lengths with standard telephone wire and connectors.
- Compatibility with *single line phones* and *PBX systems* allowing users to **run networks through existing wiring in conjunction with their telephone systems,** thus drastically cutting the cost of installing a LAN in a home or office that runs at 230K BAUD.
- Hardware and software compatibility with AppleTalk™ and TOPS™.
- Compatible with IBM PC/AppleTalk cards and the Kinetics Ethernet bridge
- Low cost per node ($39) and *very low overall network installation cost*
  (Typically less than half the cost of an AppleTalk)

Macintoshes, Laserwriters, IBM PCs, XTs, ATs and UNIX machines can easily be connector together over the same PhoneNET™ network and these machines can share data through the network by using the Centram TOPS™ software. The network can be bridged to other PhoneNET or AppleTalk networks in other cities by use of the Hayes Bridge for mail or automated file transfers. You can also bridge from the PhoneNET network directly to high speed Ethernet and the TCPIP protocol by use of the Kinetics Bridge.

A Local Area Network Layout Using PhoneNET™



AppleTalk™ vs PhoneNET™ (Boring tech notes — skip if you like)
AppleTalk hardware runs on the EIA RS-422 data bus (a standard set by the Electronics Industry Association for balanced voltage digital interface). The AMD Am26LS30/32 Quad Driver/Receiver chip sets as used in the Macintosh are capable of driving a 4000 ft cable at over 1M BAUD. The standard established for AppleTalk is to run at 230K BAUD, which should allow for even longer cable runs, but, because of the cables used, the grounding method, the plug design, the connector design as well as other reasons, AppleTalk is only rated to 1000 ft. and often has problems with much shorter distances (as well as being more expensive than necessary). The AppleTalk hardware uses a transformer to electrically isolate each Mac from the wires running between the various Macs while still allowing the Mac to send and receive data through the transformer to the wires. There are also some signal line balance resistors, and some protection ground circuitry (a pre-transformer resistor and a post-transformer resistor and capicitor to drain line voltages and suppress line noise). Apple has also incorporated a balance terminating resistor as part of the plug to the network cable, so that when the plug is disconnected a terminating resistance is added across the signal lines.

With this in mind we designed PhoneNET to follow the AppleTalk standard but with several important improvements over AppleTalk. Apple's AppleTalk hardware runs through expensive ($1.50/ft) shielded twisted pair cable with the shield attached to the ground of each Macintosh, which leads to problems of ground loops between machines caused by voltage differentials, which can cause problems with the network performance. Thus PhoneNET was designed to still incorporate ground protection and noise suppression circuitry, yet use a floating ground circuit

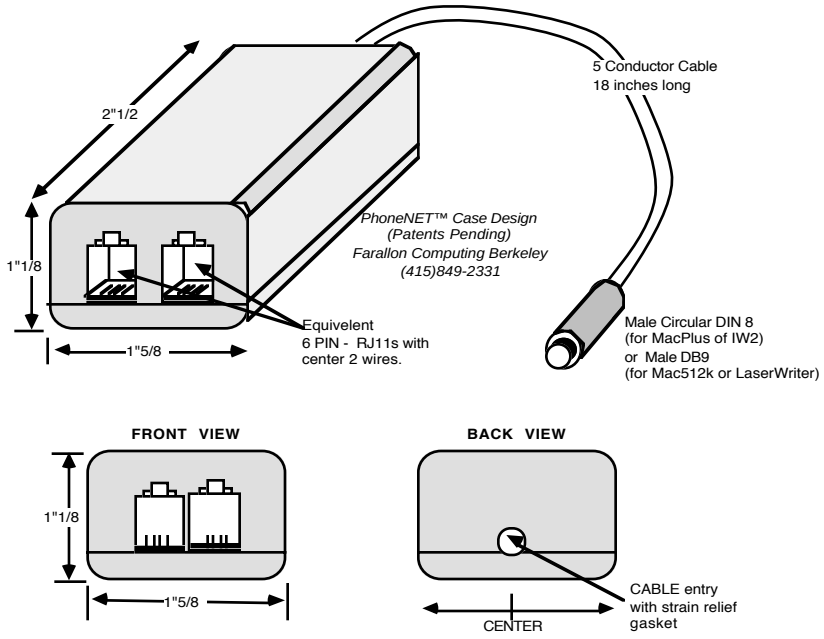
between the machines (the same as a telephone company uses to get the signal from their office to you) thus avoiding the problems of ground loops and allowing you to make longer cable runs.

Another big advantage of the PhoneNET circuit is that it requires only two wires between machines, rather than AppleTalk's three wires. The enormous advantage of this feature is that the phone company always installs 4 conductor cable (or more) in every building, while the telephone only uses two of the lines in the cable, leaving the other 2 lines for PhoneNET (yea!). Most people have a phone along side their Macintosh so it makes sense to run the newtork through the unused pair in these telephone wires. Thus, a low-resistance transformer was used in PhoneNET to match well with the standard 22 guage wire used in a telephone installation. Crosstalk between the network and the telephone is not a problem because the network runs at such a high speed, its carrier frequency is in an entirely different frequency space than the telephone uses. The protection circuits on the PhoneNET and the 700Volt isolation of the transformer protect the Mac from any accidential shorts between the telephone line and the network lines. Plugging a telephone into the network has no effect, nor does accidentally connecting a line phone line onto the network; it has no effect except that the phone company will think that your phone is off the hook.

By using the standard RJ-11 modular telephone plugs in PhoneNET means that a couple of the unforseen design problems in AppleTalk are overcome. If the circular connectors used in AppleTalk are left unplugged, the plug shield acts as a resonator at the carrier frequency of AppleTalk, thus causing reflections off the exposed cable end, killing the network's transmission ability. Another big advantage of the RJ11 connector used in PhoneNET is that it is positive locking and cannot come loose of unplugged like the AppleTalk connector, and because of the parallel circuit used by PhoneNET, even if it is unplugged, the network is not disturbed, unlike the serial design of AppleTalk where if one plug comes loose (even a little) the whole network goes down, a very serious problem for large networks with plugs installed in out of the way places.

These are some of the many advantages of PhoneNET™ over AppleTalk™ but PhoneNET maintains absolute software compatibility with AppleTalk and essential hardware compatibility with AppleTalk allowing you to mix and match PhoneNET with existing AppleTalk connectors and cables through the use of a PhoneNET to AppleTalk adaptor cable ($15 from Farallon). A pure PhoneNET system will allow you to run longer distances than AppleTalk and over the existing unused telephone wires in your building.

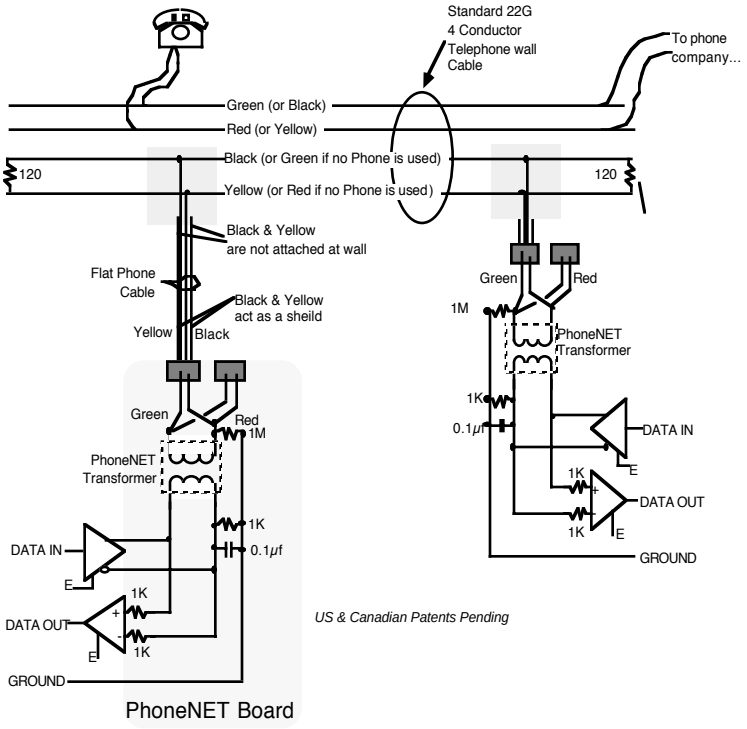
New PhoneNET™ Box Design



PhoneNET™ Network Circuit Design

The circuit for the used in the PhoneNET Box is basically compatible with the circuit in the PhoneNET board (kits and assembled versions) and the BMUGNET RevC designs. In these other designs there is only one modular RJ11 connector and instead of the 2 in the PhoneNET Box. In the earlier designs there are 4 pins in the connector with the outside 2 (yellow & black) being connected to the ground on the board. These units are plug in compatible with the PhoneNET Box, but when attaching them to a wall box we now recommend leaving RJ11's yellow and black wires disconnected in the the wall box (don't connect these to the yellow & black in the wall wires between machines). With the old BMUGNET RevA & B designs note that the signal lines are connected red and green wires now.

The Network Circuit Diagram for the PhoneNET™ Box, and PhoneNET™ Boards (Patents Pending)



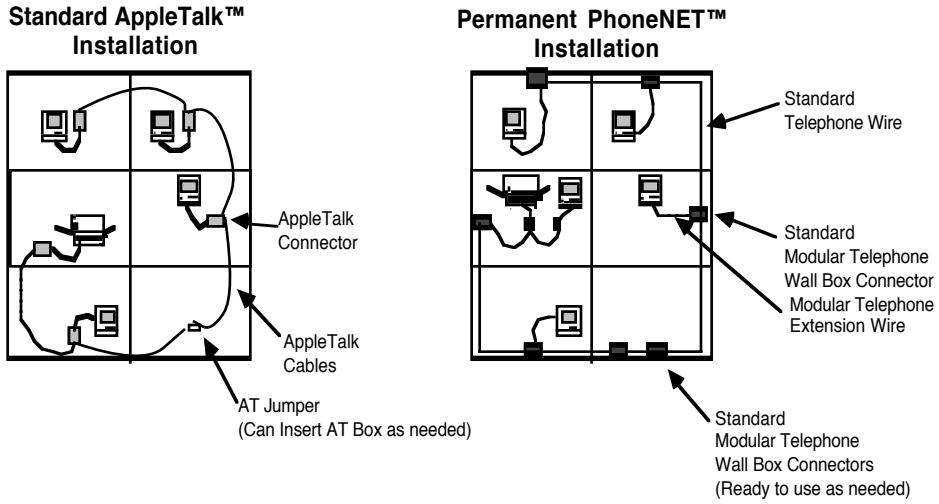
Hooking up a PhoneNET Network

Hooking up a PhoneNET network is similar to connecting an AppleTalk network where the boxes can be daisychained together. PhoneNET uses ordinary telephone extension cables to connect between the boxes. Installing the phone wires for a permanent PhoneNET network should be done exactly as you would install the wires for a telephone, with the same telephone number going to each room. A good how-to book on the subject *Installing Your Own Telephones* by Master Publishing Inc., Dallas, Texas, is available at RadioShack.

Installing a Daisychain PhoneNET™ Network

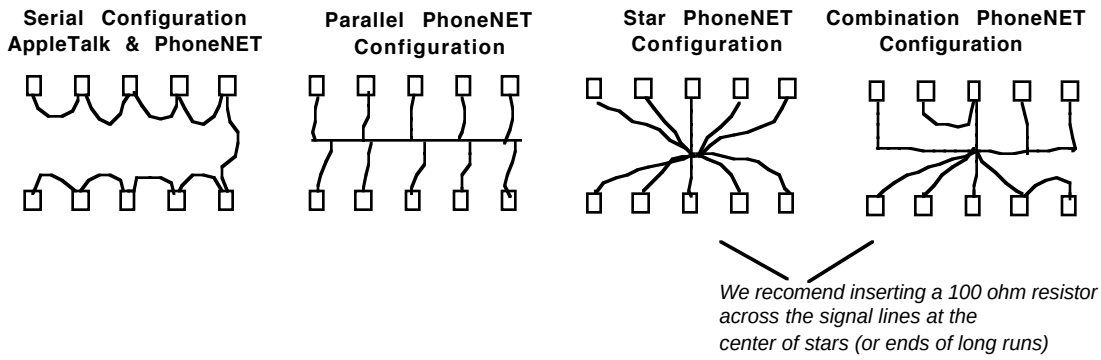
For temporary installations, you can use a modular telephone extension cord (wall-type, **exactly** the same as the ones for connecting your phone to the wall, not handset-type) to go between the PhoneNET boxes. You need one PhoneNET Box or PhoneNET board for each machine on the network. You can also attach to existing AppleTalk Boxes with a PhoneNET-to-AppleTAlk Adaptor cable available from Farallon. If you want to add more Macs, you can simply daisychain additional PhoneNET™ Boxes together (or use standard modular telephone "Y" adaptors to daisychain the PhoneNET board kits together). PhoneNET™ is designed to use **exactly** the same cables used for a telephone. You can get the pre-made cables and modular Y adaptors at most hardware stores or Farallon. It is OK to have a temporary daisychain attached to a permanent (wall mounted) PhoneNET installation. For example if you want to connect a Mac and LaserWriter on the same table to the installed network, you daisychain the Mac to the LaserWriter then the LaserWriter to the wall box.

Laying out the Network in a Building



Serial, Parallel, Stars and Combinations

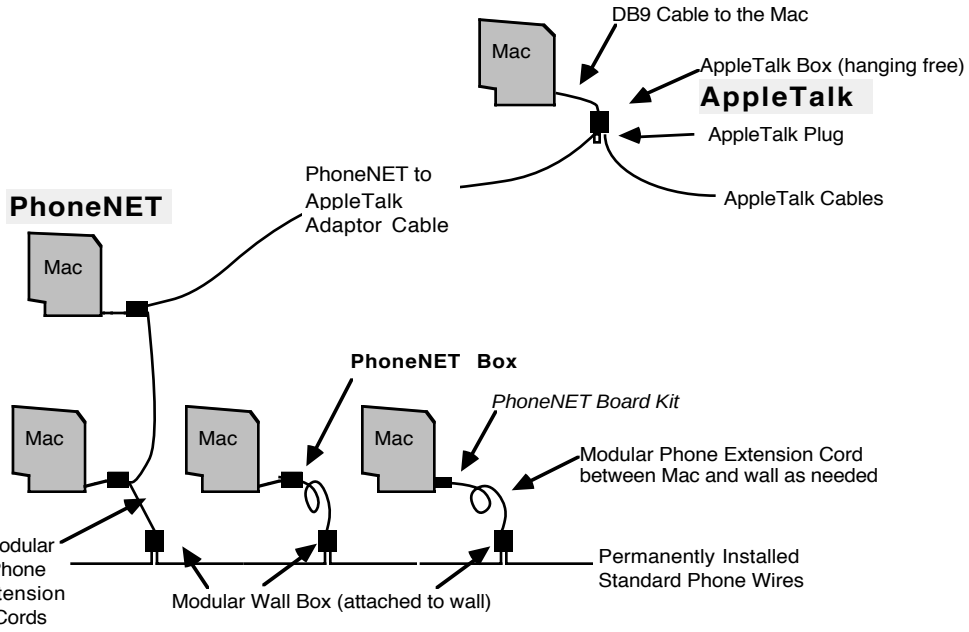
Normal AppleTalk can only be laid out in a serial configuration (daisychain) where, if any device on the network is unplugged, the network continuity is broken. PhoneNET can also be incorporated into an AppleTalk daisychain, but PhoneNET can, in most cases, be used in several other configurations including Parallel, Star, or combinations of any three. The parallel and star configurations have the advantage of allowing you to disconnect or add any device without disturbing the continuity of the network. Telephone cables are connected in parallel and often have combinations of stars and branches. PhoneNET is designed to be connected in parallel and works well in most all configurations ("T"s, Branches, stars and combinations). We recommend putting a small resistor (~100 ohm) across the signal lines at the center of stars or at the end of long runs. Thus PhoneNET can be installed into the existing telephone cables in the building without problem in most cases, limited mostly by the total length of cable attached (up to 3000 ft in most cases, and upto 5000+ ft in some cases, in contrast to 1000 ft for AppleTalk). Farallon is currently beta testing a PhoneNET line booster that could be inserted every 3000 ft or so to go longer distances if necessary.



Connecting the PhoneNET to the Macintosh (or other devices)

The PhoneNET Box is available from Farallon in two cable configurations, a **DB9 version** for a Mac128k, 512k, LaserWriter, Kinetics Ethernet Bridge, Centram IBMPC Card, Tangent Technologies IBMPC card and other DB9 devices, and a **Circular 8** version for connection to a MacPlus, ImageWriter2 and other new products from Apple and others. The **PhoneNET Board Kit** version available from BMUG have a DB9 interface that plugs directly into the back of the Mac of Laserwriter, you will need an adaptor cable (available from BMUG or Farallon) to use with a MacPlus, Imagewriter2, or Lisa/MacXL. Farallon also has **AppleTalk-to-PhoneNET adaptor cables** for adding PhoneNETs to existing AppleTalk networks or devices that use the AppleTalk Circular 3 connector.

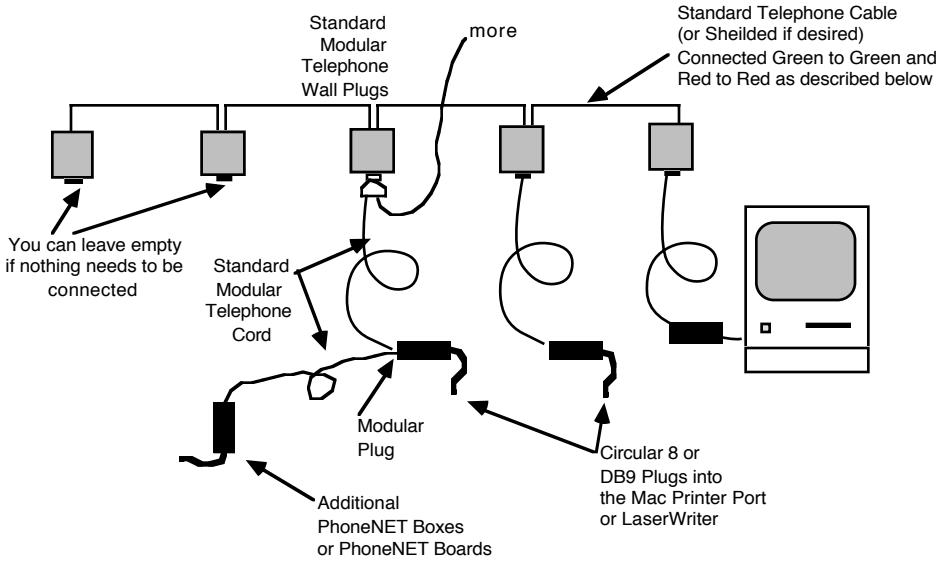
Connecting PhoneNET Box to the Macintosh and to Standard AppleTalk



Configuration for Permanent PhoneNET Installation on a Dedicated Cable

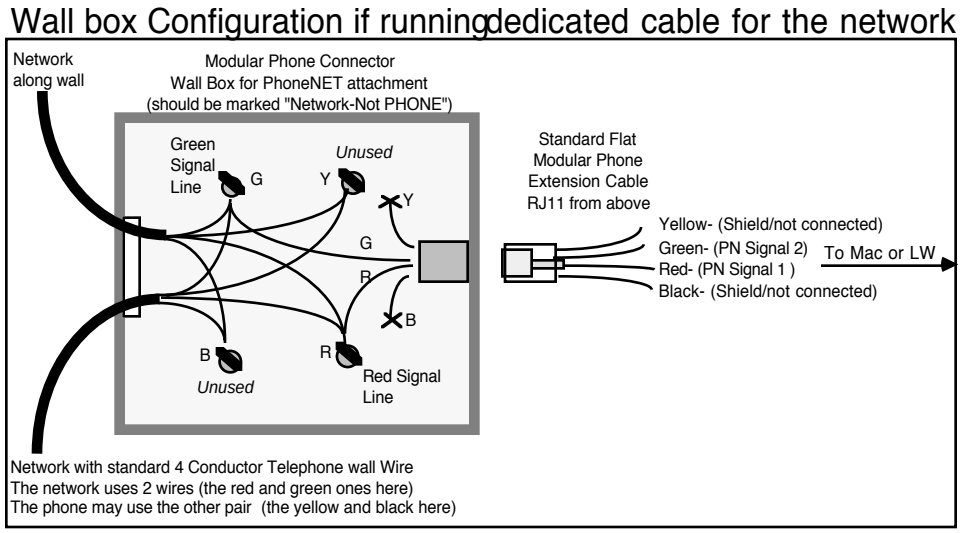
If you are doing a *permanent* installation, you will want use the modular phone wall boxes described above. The boxes used are identical to those used for your phone; you can get them anywhere phone parts are sold. Install the PhoneNET™ wall boxes just as you would install extension phones, by running the wire along or through the walls from one box to the next. Be sure to attach the same color wires to the screws in each box.

A Typical PhoneNET Layout in Dedicated Cable (without Telephones also)

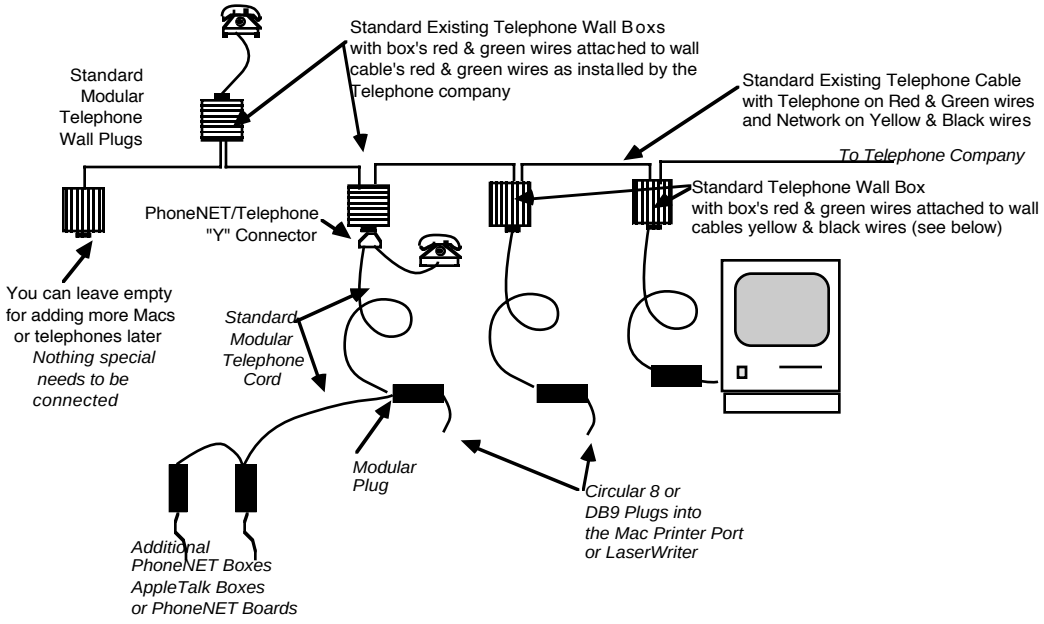


Wall Box Configuration for Dedicated Wires

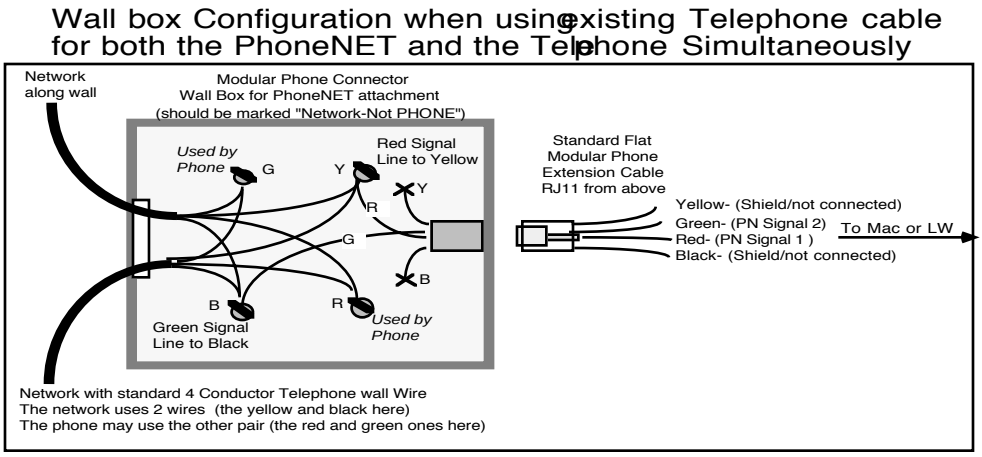
You can use regular 4 conductor telephone wire to connect the PhoneNET™ boxes together. If you are installing a lot of boxes, we recommend getting a Modular Crimping Tool (Radio Shack 279-388A, $7.95), a roll of Telephone Cable (Radio Shack, Modular Type, 4 Conductor, 278-366, $10.98 for 100 feet), and a pack of Modular Connectors (Radio Shack 279-384, $2.29 for a 10-Pack). If you don't use these for PhoneNET™, you can always use them for your phones.



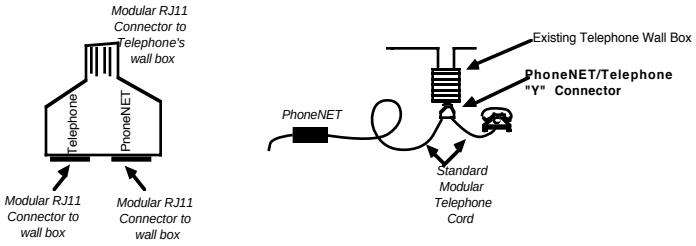
A Typical PhoneNET Layout with Network Sharing the Existing Telephone Cable with the Telephone



Wall Box Configuration for PhoneNET to Share the Existing Telephone Cable with the Telephone

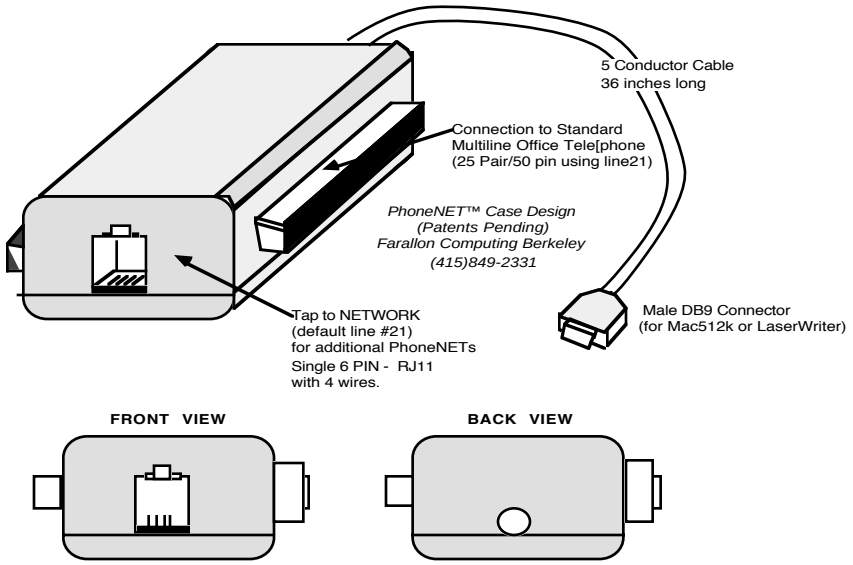


PhoneNET/Telephone "Y" adaptor for adding PhoneNET to Existing Telephone Wall Boxes along with Telephone (without the modifications as described above)



PhoneNET for Multiline PBX Type Office Phones

PhoneNET can also be installed in a multiline office PBX type telephone system where you simply plug a PhoneNET Multiline Box (available from Farallon for $65) into your multiline office telephone and the network automatically runs over line-pair #21 (others available on request). It is recommended installing a resistor across the lines in the phone closet (call Farallon for more information)



PhoneNET Network Testers, Boosters

Farallon Computing is currently beta-testing an inexpensive PhoneNET line booster/repeater (approximately $100) that can be used to effectively amplify the AppleTalk signal allowing you to run networks over much longer distances. The self-powered booster would be inserted into the PhoneNET network after each 3000-5000 ft., for example to run between buildings or wire a very large building. Farallon is currently producing a network signal tester ($120) that plugs into the network and generated a series of standard AppleTalk square waves (1s or 0s) into the network that can be viewed on an ocilloscope (60MHz or greater). By looking at different points in an installed network with the tester, noise problems can be tracked down in order to optimize the networks performance.

Bridges and Network Modems

Hayes Microcomputer Products (makers of the Hayes Modem) has introduced an AppleTalk bridge (approximately $700) that allows you bridge between multiple AppleTalk work groups. Without a bridge, AppleTalk is software limited to about 32 machines per group. With bridges, the maximum number of machines up to several thousand attached to the same network. Because the Hayes bridge isolates the two halves of the network, it also acts as a booster/repeater such that each side of the network can, with PhoneNET, be up to 3000+ ft in length (6000+ ft with one booster).

The most impressive feature of the Hayes Bridge is its ability to connect two networks in different cities, together over a dedicated telephone line (you need two bridges, two modems, and a dedicated line). This type of bridge is a little slow for printing or multi user database applications but adequate for mail between offices and some file transfers. Prometheus is also developing a multi-user modem that attaches to the network and can be accessed by any of the users on the network.

Shared Devices, Cluster Controllers

In addition to the devices that have the AppleTalk hardware built-in (like the Mac, LaserWriter, QMS Postscript Laserprinters, ImageWriter2 (with AT card), Hayes Bridge/modem, etc), you will be able to attach any device to the network (making it accessible to any user) with the addition of a AppleTalk-Cluster-Controller. New World Technologies (San Diego) is developing a cluster controller (approximately $400) that is actually a Z80 based computer that controls up to 8 serial or parallel ports and interfaces to the network. With the cluster controller, you will be able to attach many types of devices to the network for shared access, including daisywheel printers, modems, other laser printers, cash registers, or data connection and control devices. The cluster controller can also be used as a multiplexer to connect multiple RS232 terminals to a single fast data line (PhoneNET) to multiplex into a mainframe computer with an AppleTalk interface card.

Adding IBM PCs to the Network and Centram TOPS™
With the addition of an AppleTalk interface card and special software Macintoshes and IBM PCs can be interconnected over the same AppleTalk/PhoneNET network, sharing files and sharing LaserWriters. There are currently two IBM-PC to AppleTalk/PhoneNET boards on the market from Centram Systems (Berkeley (415) 644-8244, ~$400) and from Tangent Technologies (Georgia (404) 662-0366, ~$595). Both boards work well with PhoneNET and both companies offer additional software for the PC to print to the Apple LaserWriter.

Centram Systems (Berkeley) is introducing their TOPS™ package in June. The TOPS™ package is a software interpreter that translates the computers' file structures to a standard network packet structure. If each machine on the network has a translator from the standard network packet structure to its own file structure and the other way around, it communicate with any other type of machine with a translator of its own. Centram currently has TOPS translators for the IBM PC/XT/AT computers and the Macintosh; coming soon will be a translator for UNIX and other machines. The Centram IBM-PC Card and TOPS package works well with PhoneNET, allowing you to share and exchange files between these two most common types of machines over the same network. This combined package (TOPS and PhoneNET) solves two significant problems — connecting Macintoshes to IBM PCs, and providing a very low cost/high performance network that can run through the existing wires already in a building. In many cases, if the IBM is connected to another network (Ethernet or Token Ring) the link is transparent; files available to the PC over the 2nd network are also available to the Macintosh over the TOPS/PhoneNET network.

UNIX, Ethernet and the Kinetics Bridge
An problem for the Macintosh in the University environment is the difficulty of connecting the Macintosh to Ethernet, the most common network type used in Universities (and many corporations). Kinetics Inc. (Walnut Creek, CA (415) 947-0998) has introduced the FastPath **AppleTalk/Ethernet-Bridge** (~$2500) that attaches directly to Ethernet then bridges to AppleTalk. The bridge works well with PhoneNET and a typical application might be to run Ethernet from the computing center to a building with a Kinetics bridge on each floor, then PhoneNET running on the existing telephone wires on the floor.

With the **MacIP** software developed at Carnegie Mellon University (available from Kinetics for $10) the Macintosh (or IBM PC) can communicate over the PhoneNET to the Kinetics Bridge (which is acting as a gateway) then to the Ethernet using the TCP/IP Protocol, all transparent to the user. Following the conventional Ethernet path link the Macintosh then can logon to any machine on the Ethernet network as a VT100 running at 230K Baud (depending on network traffic/through-put). More sophisticated Macintosh front ends, like MacStation, could easily be adapted to operate in this configuration for sophisticated courseware applications or generic access to UNIX. Kinetics also makes cards for **Q-Bus** and **Multibus** to AppleTalk/PhoneNET so that DEC and other common mini- and mainframe- computers can be connected directly to an AppleTalk or PhoneNET network. Kinetics is also developing a direct MacPlus/SCSI to Ethernet interface for connecting the MacPlus directly to Ethernet (which will probably cost around $600).

Other AppleTalk/PhoneNET Network Compatible Products
There are a number of new products coming out for AppleTalk, and because PhoneNET is completely hardware and software compatible with AppleTalk, each should be compatible (if not work better) with PhoneNET. See the Fall 1985 BMUG Newsletter for more information about some of the many AppleTalk compatible products on the market. Also look for the Fall 1986 BMMUG newsletter where we will discuss SCSI networks and other networking products.

PhoneNET Kits are Available from BMUG
PhoneNET is basically compatible with all versions of BMUGNET as discussed above and is available as a minimum cost solder-it-yourself kit from BMUG in addition to the MacRecorderII (also available assembled/tested from Farallon).

Ordering a PhoneNET Board Kit from BMUG

PhoneNET board kits (the minimum cost hacker's version) are available from BMUG for $18. When you order a PhoneNET™ kit from BMUG it will include the parts listed below and instructions for putting it together. Please remember that we are providing this information and these kits for fun. Thus, **none of our information is guaranteed to be correct** and the kits are not guaranteed to work. You are using PhoneNET™ at your own risk. We have tested PhoneNET™ and it has worked reliably in numereous installations for some time now. These kits are an experimental project for BMUG, so the PhoneNET™ kit prices, designs, and specifications are subject to (and will likely) change at any time without notice. The PhoneNET™ kits are **very** easy to put together as well as being fun and *emotionally satisfying*. So if you have never touched a soldering iron, give it a try. For those who don't want to deal with assembly you can get the boards assembled/tested boards from Farallon or get the commercial PhoneNET Box version. For those interested in a large number of kits or who need help with assembly or installation, simply call or write BMUG.

Instructions for Rev C PhoneNET Board Kit from BMUG

The Rev C design of PhoneNET is easy to assemble because it uses only PC-mount and modular components. Thus, you don't have to solder any loose wires onto the printed circuit board. The board has a PC mount DB9 connector that is positioned such that it can plug directly into the female DB9 on the printer port of the Mac 512k of Laserwriter. Soldering the other parts onto the board is very simple, even if you have never done any soldering before. We recommend starting with the resistors. Gently bend the wires to fit into the appropriate holes and push them through. Once the wires are through, bend them out to hold the resistor close to the board, turn the board on its back and heat a small drop of solder onto the holes where the wire goes through. Next, add the capacitor (the pancake-shaped part), then the transformer, PC mount DB9 connector, and finally the PC mount modular phone connector. You're done!

If you are using a MacPlus, Imagewriter2 or Lisa/MacXL you will need an adaptor cable as described in "Cable Notes" to adapt to the DB9 port on the PhoneNET™. The DB9 on the PhoneNET™ board is pin compatible with the standard AppleTalk Connecter Box, so the PhoneNET™ board can be used with the LaserWriter or any other AppleTalk device that uses the DB9 connector. The board kits do not come with a plastic box, but you don't really need one. Once assembling the board we wrap it with plastic electricians tape to make it a cleaner package. The PhoneNET Box from Farallon may be more aesthetically pleasing but it is slightly more expensive.

The Contents of a PhoneNET™ Board Kit ($18 each through BMUG)

1	Assembly Instructions
1	Custom printed Circuit Board
1	Custom Transformer
3	1K Resistors
1	1M Resistor
1	0.1μfd Capacitor
1	PC Mount DB9
1	PC Mount Modular Phone Connector (RJ11)

Things you might need for building a kit:

Soldering Iron, Solder, Wire Cutters/Strippers
MacPlus (8-9) or Lisa/XL Adaptor Cable (25-9)