# MICROCOMPUTER NEWSLETTER

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## NEWS AND ANNOUNCEMENTS

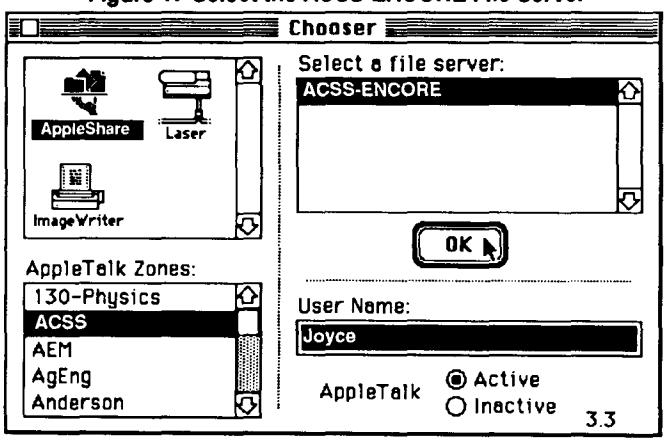
### ● AppleShare File Server Running on ACSS Encore

A networked file server is a machine that acts as a shared hard disk for computers connected together on a network. For Macintosh users, AppleShare file servers are a popular way to access shared hard disks across a network. Since AppleShare is a *protocol* for file serving, AppleShare file server software can run on a variety of hardware. For instance, AppleShare server software runs on Macs, IBM-PCs, UNIX machines, and DEC VAX systems running VMS. Recently the ACSS Encore started running AppleShare server software. Now individuals with accounts on Encore can store Macintosh files on the Encore and access these files using the normal Mac user interface. The advantage of running AppleShare on a large machine, such as the Encore, is that you have access to very large hard disks, and the disks are automatically backed up as part of the large system's normal backup procedures. In fact, files on the Encore are backed up three times a day. This gives you a painless way to back up your work; drag your documents to the AppleShare volume that runs on Encore, and the files are automatically backed up for you.

#### CONNECTING TO ENCORE'S APPLESHARE SERVER

To connect to the Encore's AppleShare file server, your Mac must be connected to the AppleTalk Internet; that is, it must be connected to the campus Ethernet backbone network via a Kinetics FastPath gateway. The Encore AppleShare server is located in the *ACSS* AppleTalk zone. You use the  menu's *Chooser* to select the *ACSS-ENCORE* file server as shown in Figure 1.

**Figure 1: Select the ACSS-ENCORE File Server**

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# TUTORIAL: MICROCOMPUTER DATABASES

One of the most frequently asked questions we hear on the HelpLine is "What database package do you recommend?" The most frequently heard response is "Well, what do you want to do with it?" Based on the answers to this and other questions, we try to suggest appropriate software packages to investigate. The following article discusses the major considerations you should take into account when selecting from among the many database packages on the market.

## WHAT IS A DATABASE?

A database is a collection of information organized in such a way that it can be retrieved easily and efficiently. Notice that there are two parts to this definition: information and organization. Both are required before a mass of data can be considered a database. Let's take some examples. A telephone book is a collection of information — names, addresses, and phone numbers — organized alphabetically by last name. To find an address or a phone number, you simply locate the name in the alphabetical listing. Similarly, an encyclopedia and a dictionary are databases, organized alphabetically by key word. On the other hand, consider a newspaper. It is certainly a collection of information, but the organization is too crude. You can find the sports section or the editorial page by looking in the index, but you cannot efficiently locate every article that makes reference to Lebanon or the Supreme Court. A newspaper is not a database.

All database programs enable you to organize information. Beyond this, they vary in terms of how the data is organized, if the program can handle more than one file, whether the program can be used on a network, if the file can include graphical information, whether it comes with its own programming language, or how easily a user can produce customized reports.

## RELATIONAL VS. HIERARCHICAL

Most databases fall into two major categories: relational and hierarchical. A *relational database* organizes and presents information in the form of a table of rows and columns. Each row, usually called a record, contains all the information about a particular instance. Each column, usually called a field, is a particular piece of information which applies to each record. For example, suppose your department wants to maintain a list of its faculty, staff, and students. For each person you want to keep six pieces of information: name, home address and phone number, office address and phone number, and category (associate professor, graduate teaching assistant, etc.). In this database there is one record for each person and six fields for each record. When the database is displayed on the screen, each row is a person, each column is a field. Relational databases are flexible and easy to understand. You can easily change the structure (add, delete, or modify fields) even after data has been entered.

A *hierarchical database* organizes information in a tree structure. Suppose you have a database of information about the deciduous trees of North America, and in your hand you have a leaf you want to identify. With a hierarchical database you would start by asking if the leaf is simple or compound. If it is simple, you follow that path and go to the next question: is the leaf lobed or not lobed? If not lobed, then is the leaf margin smooth or toothed? If smooth, then are the veins parallel to the margin? In this way you work your way down the branching structure, making decisions at each point, until you find out that this is the leaf of a Red Oak. Generally the hierarchical model is easy to understand, but *it is difficult to change the structure of the hierarchical database once the data has been entered.*

## SINGLE VS. MULTIPLE FILES

Database programs can also be categorized by whether or not they can handle multiple files. Programs which can work with only one file at a time are often called *flat-file* (single) systems. An example of an application which uses only a single file would be a list of bibliographic references. The database contains fields for author, title, date and place of publication, and a field for key words indicating the topic of the reference. The user could find, for example, information on a particular title, everything by a particular author, or everything written about a certain topic published in a given journal after 1980.

More sophisticated programs can handle *multiple files* at the same time; these files are said to be linked or related. (In some publications, authors use the term relational to refer to databases which can handle linked files.) An example of a multiple-file application would be a database kept by a mailorder hardware store which includes customer information, orders, and inventory information. Each customer is given a customer id number. This number is included in the customer file which contains the name, address, phone number, date of last order, and credit information. When a customer places an order, a record of that order is added to the orders file. But, rather than include the customer name and address on each order, only the customer id is included. When the invoice is prepared, the program uses the id number to "look up" the name and address in the customer file; it then prints out the name and address. In addition, the quantities of items in the inventory control file are automatically reduced.

## SINGLE USER VS. NETWORKING

Some database programs are designed to be used by one person at a time. With *single user programs* each person who wants to use the program must purchase and install his or her own copy of it. Each person has total control over his own database files. If more than one person wants access to the same file, individual copies of that file must be distributed to each person who wants it. This creates obvious problems in keeping all copies of the database accurate and up to date.

A growing number of database programs now run on networks. A network, very simply defined, is a collection of microcomputers connected to a computer which functions as a file server. Software and files installed on the file server can be accessed from any computer on the network. If you have a *networked database*, all the users on the network can use the same database file. With a centralized database, all users work with the same file. But networked databases introduce a new layer of complexity. Who can alter the database? Can the same file be used by more than one person at the same time? What happens if one person is printing out the contents of a file while another person is changing those contents? These and many more considerations must be taken into account when deciding whether or not to use a networked database.

### GRAPHICS

Many database programs, especially those running on IBM-type microcomputers, can store only text, numeric values, and dates. Because the Macintosh is oriented to graphics, many Macintosh databases can include pictures in their fields. The picture can originate in any Macintosh software package which can store an image in the Mac's Clipboard. In our example above, the hardware store's inventory file could include a picture of each item in the inventory. This picture field could be printed out to produce a catalog. In another application, a database of a museum collection could include a field showing a sketch of any repairs made, for example, to a piece of antique furniture.

### GENERATING REPORTS

Not only do you want to store and retrieve information, you usually want to print it out in various forms. Printing out stored information is usually referred to as *generating a report*. You first design and save a report form. Then, as needed, you can select which part of the database to print using that form. Reports can be simple listings of all or part of the database. They can be mailing labels, as many across a page as you want. They can be information printed onto an existing form such as a purchase order or a journal voucher. They can also be more elaborate printouts including calculated information such as counts, totals, and subtotals. In the example of the bibliography above, you could design different formats for the styles required by different publishers. Then, when you submit a paper for publication, you simply select the references you want to include and the format appropriate for that particular publisher.

### INTERACTIVE USE VS. PROGRAMMING

All microcomputer database packages can be used interactively. Commands you enter are executed by the database package. In addition, some database packages come with their own programming language. You can use these programs in two modes: interactively or to write a custom application.

When using a program interactively, you enter or select commands which act directly on the database. For example you would select a command such as *Append* or *New Record* to enter new records into the database. The program would respond by presenting you with a standard input form on the screen. Standard input forms typically list the field names in a column with space alongside to enter the data. With some programs, you type in the commands, with others you select commands from a series of menu options.

Database programs which come with their own programming languages allow you to customize an application to suit your own needs. You can design your own input screens, rather than use a standard one. Such custom input screens could include instructions on the screen to the user and do some error checking. For example, the program could make sure that Social Security numbers all have nine digits or that salaries are within a given range. A custom program could create its own menus. This way, the end user selects only among those options which are necessary for the task, not the myriad options available in the program. An application can be programmed to have some things done automatically, such as deduct items from inventory when an order is entered, or alert the user that the inventory has become so low that the item must be re-stocked. With a custom program, the end users do not have to be familiar with the database program itself; they must simply understand how to use this particular custom application program.

### DATA COMPATIBILITY

All database programs allow you to enter data directly into a database file. Some programs, however, can also accept data from spreadsheets and other applications. Some packages can output data in a form that can be used by word processing or statistical software.

### OTHER CONSIDERATIONS

There are other things you should consider when selecting a database program. Can you protect files with a password? Does it require a hard disk or a certain amount of memory? Can it use expanded memory? What kind of support can you get locally or from the vendor? In upcoming newsletters we will talk about a few of the more commonly used database programs available for the Macintosh and for IBMs and compatibles.

## PUBLIC MICROCOMPUTER LABS AND SPECIAL SERVICES

Current students, faculty, and staff can use several public (public to the University of Minnesota community) microcomputer labs for $30/quarter. To use these labs you must buy a *Microcomputer Access Card* each quarter and show a current university ID to the lab attendants. (Departments who want to use a lab should

contact the department responsible for the lab.) You can buy cards at any Bursars' office and the West Bank Union Periodical Shop (48 Social Sciences). These cards are not transferable; the labs' *Access and Use Policies* are reprinted below.

Individual labs are managed by different departments. The departments set the labs' hours and choose their own hardware and software. The labs have equipment such as IBM and Zenith personal computers, Apple Macintoshes, and impact printers. Some labs have special equipment, such as Apple IIs and laser printers. See the *Laser Printer Services* section below for more information on laser printers. The labs have word processing software such as WordPerfect and Microsoft Word as well as other categories of software. See the *Software* section below for a list of some of the software you can use in the labs which our department, Academic Computing Services and Systems (ACSS), manages.

You can get information about these labs from several sources. The back of the *Microcomputer Access Card* lists the locations and phone numbers of the major labs. You can also pick up a free *Computing Facilities Map* at the ACSS Computing Information Center in 128 Lind Hall; this map lists the locations of public terminals as well as microcomputers.

Although the Microcomputer and Workstation Systems Group does not manage any of these labs, we frequently get questions about microcomputer facilities around campus. So, we're reporting to you what we've gathered about the labs; the labs' phone numbers and the days they will be open during the normal school year are listed below. *You must call the individual labs for detailed information about their available hardware, software, and hours of operation.*

| Building | Room | Phone | Days of Week |
|---|---|---|---|
| **East Bank Labs** | | | |
| ACSS labs, contact Jerry Larson at 625-7850 | | | |
| Folwell Hall † | 14 | 625-4896 | SMTWTFS |
| Lind Hall † | 306B | 625-9032 | MTWTFS |
| Physics † | 130 | 625-6820 | SMTWTFS |
| Walter Library †* | 9 | 626-1899 | SMTWTFS |
| Non-ACSS labs | | | |
| Eddy Hall Annex | 54 | 625-0314 | MTWTF |
| Nicholson Hall | 109 | 624-8376 | MTWTFS |
| Architecture | 148 | 624-9583 | MTWTF |
| Moos Tower | 8-425 | 625-1477 | MTWTFS |
| **West Bank Labs** | | | |
| ACSS labs, contact Shu-Fan DeJarlais at 624-0877 | | | |
| Anderson Hall | 170 | 624-6526 | SMTWTFS |
| Blegen Hall † | 90 | 624-1387 | SMTWTFS |
| Wilson Library | B2 | 626-2205 | SMTWTFS |
| **St. Paul Labs** | | | |
| Non-ACSS labs | | | |
| Central Library † | B50 | 624-3269 | SMTWTF |
| Cla. Office Bldg. | B22 | 625-7030 | MTWTFS |
| McNeal Hall † | 69 | 624-5367 | MTWTFS |
| Vet. Science 436 | 436 | 624-4281 | MTWTF |

* If the Bursars' offices are closed, you can buy Microcomputer Lab Access and Printer Access cards from the lab attendant in Walter Library 9. Please note: attendants do not accept cash.

† Instructors can reserve all or a portion of these labs for their *instructional use*. Generally instructors can reserve a lab for a short period of time at no cost, and extended use can be negotiated. To reserve a lab, contact the department responsible for the lab. The McNeal Hall lab is managed by the College of Home Economics; to use it contact Ruth Hamberg at 624-9700. The Central Library lab is managed by the St. Paul Computer Center; to use it contact Dick Rignell at 624-1248.

## Access and Use Policies

The Microcomputer Access Card affords access to microcomputer labs for University of Minnesota students, faculty, and staff. The card itself is clearly marked non-transferable; this means that it is to be used only by the original purchaser and that person's signature and ID stamp should appear on the card. (The card will be stamped by the Bursars office or stamped the first time it is presented in a lab.) Access to lab facilities by individual card holders may be restricted or denied for the following reasons.

1. Unauthorized use of a Microcomputer Access Card, including but not limited to: ineligibility (lab users must be University of Minnesota students, faculty, or staff); using a stolen, found, or borrowed card; loaning your own card to someone else to use.
2. Unauthorized changes to lab hardware or software, including but not limited to: disconnecting and reconnecting or reconfiguring hardware; removing, changing, or reconfiguring files on lab disks; damaging lab hardware or software or removing any lab property from the lab.
3. Failure to observe lab policies, procedures and protocol, including but not limited to: refusing to sign in and out of the lab properly; moving from the assigned machine onto another without the explicit permission of the lab attendant; refusing to leave the lab promptly at closing time; refusing to respond to, or responding inappropriately to, requests made by the lab attendant (for example, a request to move to another machine or to delay printing due to a class being held in the lab) in the normal course of carrying out their job responsibilities; using threatening or abusive language or behavior directed at anyone in the lab.

Any violation under section 1 (above) will result in confiscation of the Microcomputer Access Card(s) involved and suspension of lab use privileges for at least one quarter. A first offense in either of the other two categories (above) may

result in confiscation of (at the discretion of the lab attendant) the user's Access Card, pending an administrative review of the matter. Repeated violations may result in extended suspension or denial of lab use privileges and/or other sanctions.

## Software

Although most lab attendants are not hired as consultants, they may be able to answer questions regarding the software their lab owns. Generally the ACSS labs will have the most current versions of software. Software used in classes usually is available only at one or two labs; check with your instructor to learn which lab stocks the software you will need to complete your course work. You can use your own or the lab's software on the lab's equipment, provided you follow the lab's Access and Use Policies. Below is a list of some of the general purpose software which is available in the ACSS labs: a "Y" indicates that the lab has the software. The Mac software is marked with ; IBM-compatible software is unmarked.

| Software | Folwell | Lind | Physics | Walter | Anderson | Wilson |
|---|---|---|---|---|---|---|
| Chart | Y | | | | Y | |
| Chart | Y | | Y | Y | Y | |
| Cricket Graph | Y | | | | Y | |
| dBASE III+ | | | | | Y | Y |
| Data Desk | Y | | | Y | | |
| Excel | Y | | Y | Y | Y | |
| File | Y | | | | Y | |
| Framework | | | | | Y | |
| Freelance | | | | | Y | |
| FullPaint | Y | | | Y | Y | |
| Hypercard | Y | | | | Y | |
| inLARGE | Y | | | Y | | |
| Keychart | | | | | Y | |
| Lotus 1-2-3 | Y | | | Y | Y | Y |
| MacDraw | Y | Y | Y | Y | Y | |
| MacLink | Y | | | Y | | Y |
| MacPaint | Y | Y | Y | Y | | |
| MacProject | | | | | Y | |
| MacWrite | Y | Y | Y | Y | Y | |
| Multiplan | Y | | | | | |
| Minitab | Y | Y | | | Y | Y |
| Norton Utilities | Y | Y | | Y | Y | |
| PageMaker | Y | | | Y | Y | |
| Rbase Sys V | | | | | Y | |
| ReadySetGo! | Y | | | Y | Y | |
| SuperPaint | Y | | Y | Y | Y | |
| Thunderscan | Y | | | Y | | |
| Turbo Pascal | | | | Y | Y | |
| Turbo Pascal | Y | | Y | Y | Y | |
| Word | Y | Y | | Y | Y | |
| Word | Y | | Y | Y | Y | |
| WordPerfect | Y | Y | | Y | Y | Y |
| WordStar | Y | Y | | Y | Y | Y |

## Laser Printer Services

The labs in the table below have laser printers. To use these laser printers you must buy a *Printer Access* card in addition to the Microcomputer Lab Access card. The Printer Access card costs $1 and does not have an expiration date; your cost is 10¢ per page to use these laser printers. The Hewlett-Packard LaserJets are connected to IBM-compatibles; the Apple LaserWriters are connected to Macintoshes. During Fall Quarter 1988, the Walter, Folwell, and Anderson labs plan to have an IBM to Apple LaserWriter connection available.

| Microcomputer Lab | Hewlett-Packard LaserJet | Apple LaserWriter+ |
|---|---|---|
| Anderson Hall | 1 | 3 |
| Central Library | 1 | 0 |
| Eddy Hall Annex | 0 | 1 |
| Folwell Hall | 1 | 2 |
| McNeal | 0 | 1 |
| Moos Tower | 0 | 1 |
| Physics | 0 | 1 |
| Walter Library | 1 | 2 |
| Wilson Library | 1 | 0 |

## Other Output Services

Two labs have other fancy output devices. 170 Anderson has an Epson HI-80 4-color plotter. McNeal Hall has two Hewlett-Packard plotters: a 7475 and a 7570. The HP 7475 is compatible with many business and technical applications, while the HP 7570 has been designed for CAD systems. You must have a Printer Access card to use these plotters. Your cost for using the HP 7475 is 10¢/page; the 7570 costs 30¢/page.

## File Transfer and Disk Conversion

Several ACSS labs have Macintosh and IBM microcomputers connected directly (or via modem) to ACSS-net or another network; these connections provide high speed access to campus mainframes from a microcomputer. ACSS-net computers include the ACSS CYBER, VAX and Encore (UNIX) systems, the St. Paul (SPCS) IBM 4381, and the Health Science (HSCS) CYBER. All of the labs listed on the back of the Microcomputer Access Card have some or all of these capabilities.

Some labs can also help you with disk format conversions. You must not use the equipment in these labs to violate any copyright agreements.

*Macintosh to/from IBM disks:*

The Walter and Folwell labs use MacLink to transfer some kinds of files between a Macintosh and IBM-PC compatibles with a 5 1/4-inch 360K disk drive. MacLink includes translators for Lotus/Multiplan and WordStar/MacWrite. These translators work in both directions and convert the format of the file you wish to send so that the file can be used on the other machine. MacLink also provides DIF, SYLK, text, and binary file transfer.

*IBM-PC compatible 5.25" disks to/from 3.5" disks:*
If you have a Microcomputer Access Card you can use the Anderson, Folwell, or Walter labs to transfer your files from one size disk to another. Contact these labs for specific details concerning which disk types can be converted.

The HelpLine in 125 Shepherd Labs also has a DOS-machine you can use to transfer information one way: from 5.25-inch 360K to 3.5-inch 720K disks. There is no charge for this self-serve HelpLine service. If others are waiting to use the HelpLine machine, your time on the machine is limited to 15 minutes.

### Optical Text Scanner Service

A Kurzweil 4000 optical text scanner is available at the ACSS I/O (Input/Output) station in 128 Lind Hall. This scanner can read both typed and typeset copy which includes mathematical and other non-English characters. The Kurzweil 4000 can create an ASCII or EBCDIC file from the scanned text; it will not convert your text file into a particular word processing software's format.

Using the Kurzweil scanner involves three activities. [1] Training the Kurzweil to recognize most of the letterforms in a document; this process generally takes 15 to 20 minutes. [2] Handling unidentified characters. These characters can be passed over, flagged, or presented for correction. In the fastest mode the scanner can handle 40 to 60 pages/hour. [3] Capturing the scanned text onto your media, such as a microcomputer diskette, or sending the text to your mainframe account.

Users can do their own scanning after a two-hour training session or have ACSS perform all the work. Currently rates are set at $15/hour for university and non-profit accounts who do their own scanning, plus $30 for training. If ACSS performs all the work, then the charge is $30/hour for university and non-profit accounts. The rate for commercial accounts is $45/hour. To use the Kurzweil, or for more information regarding this service, contact Carol Winther at 625-9525, Monday through Friday between 10 am and noon.

### Handicapped Access

Large print and audio hardware and software have been added to two IBM microcomputers connected to ACSS-net in the Walter Library lab. The Folwell lab recently installed a *Visualtek* large screen display on an IBM XT which is also connected to ACSS-net. The Visualtek screen provides a large character display for sight-impaired computer users. These enhancements should make it easier for blind and low vision students to use an IBM personal computer to access the ACSS mainframes as well as to use microcomputer software.

Both the Folwell and Walter lab also have the Mac *inLARGE* software which is used with other software to provide larger screen images on a standard Macintosh screen.

# PC-DOS 4.00: First Look

IBM recently released a new version of the DOS operating system: PC-DOS 4.00. Operating systems are responsible for the day-to-day operations of your computer, such as saving, copying, and erasing files, as well as formatting new disks and starting up applications (e.g., word processors, databases, spreadsheets).

PC-DOS version 4.00 provides several significant additions and enhancements to the DOS operating system. In this article, we will review some of the new features and point out some incompatibilities with existing hardware and software.

### Simplified Installation

PC-DOS 4.00's installation procedure for new users is simpler than the procedure for previous versions of DOS. The installation program consists of a short series of menus that allow you to select the options you desire. The installation program offers this reassurance: If you are uncertain about what to choose or type, you can accept the predefined choice or press the [F1] help key for more information. The directions that appear on the screen are clear, and the accompanying manual is well written. After you have selected your options, you can review and change them before the actual installation begins.

You do not need to reformat your hard disk to install PC-DOS 4.00 unless you wish to change the disk partition size to be greater than the 32 megabytes supported by previous versions of DOS. To complete the installation, you must have at least 1.3 megabytes available on your hard disk. You can also install PC-DOS 4.00 to floppy disks.

### New Graphical User Interface

The most striking difference between PC-DOS 4.00 and its predecessors is the "DOS Shell". The DOS Shell is a new user interface designed to make it easier to use DOS functions and to start running your application programs. The shell lets you perform common DOS operations and start programs by selecting options from a menu rather than by typing the command and options from the Command Prompt.

The DOS Shell can be run in either text or graphics mode. You can use the keyboard and/or a mouse to select options from the shell, although the pulldown menus are easier to use with a mouse. The shell can be installed to be RAM-resident or as a stand-alone application that is reloaded when needed.

The DOS Shell consists of several groups. The Main Group appears when you start the shell; this group consists of a list of programs and subgroups that can be selected. The initial options from the Main Group are to exit to the DOS Command Prompt, enter the File System, change the colors used to

display the DOS Shell, and run the DOS Utilities Subgroup. Pulldown menus at the top of this Main Group screen allow you to customize the shell by adding your own programs and subgroups to the Main Group list of options.

Selecting one of the programs from the Main Group executes that program. When you exit the program, you are returned to the shell. Selecting a subgroup brings up a new screen containing a list of programs.

The most important part of the DOS Shell is the File System, which is shown in Figure 1. Your disk's directory tree is shown graphically on the left of the screen, and the files in the current directory are shown on the right. You can order the file listing by file name (as shown), or by extension, date, or size. To scroll through the file listing, use your keyboard's cursor keys or use a mouse. You can also change to a new disk and/or directory by using the keyboard or mouse.

You use the keyboard or mouse to select one or more files for some action. Pulldown menus allow you to copy, move, rename, delete, or view the selected file or files.

A convenient option in the File System is called *Associate*. With this feature, you can associate a file extension with an application program. Thereafter, whenever you select a file with this extension, the associated program will execute and load the selected file. For example, you could associate your `.WK1` files with Lotus 1-2-3, your `.DB` files with Paradox2, and `.PAS` files with Turbo Pascal.

Figure 1 shows a Single File List arrangement. Your other arrangement choices are Multiple and System.

A Multiple List arrangement allows you to view the files from two disks simultaneously. A System List arrangement displays all of the files on the disk on the right side of the screen, regardless of the directory in which they reside. The directory the currently selected file resides in is shown on the left side of the screen. This feature is convenient when you have many files with the same name in several directories and want to quickly determine which copy is the most recent.

```
File   Options   Arrange   Exit                    F1=Help

Directory Tree  More: ↓
C:\                          ANSI        .SYS      1,651   03-07-85
 ├─ TURBO4                   APPOINT     .APP          0   08-05-88
 ├─ GRAPHIX                  AUTOEXEC    .ACK        124   02-07-88
 ├─ JACK                     AUTOEXEC    .BAT        180   08-13-88
 │   ├─ INVOICE              COMMAND     .COM     23,210   03-07-85
 │   ├─ CSCI5117             CONFIG      .SYS         86   05-04-88
 │   ├─ QUALITY              CONFIG2     .SYS         69   02-10-88
 │   ├─ PERSONAL             COPY35      .COM      2,366   01-20-87
 │   ├─ BUSINESS             DECEXEC     .BAT         97   06-20-86
 │   ├─ SPAWN                DOSMAN      .DOC     17,468   10-01-87
 │   └─ BROCHURE             IBMBIO      .COM      9,564   03-07-85
 ├─ LIBRARY                  IBMDOS      .COM     27,760   04-22-85
 ├─ MMOUSE                   MAIN        .SC       1,084   07-19-88
 ├─ NORTON                   PROPOSAL              9,608   01-15-88
 └─ UTILITY                  RCD         .EXE     90,462   12-15-86

F10=Actions   Shift+F9=Command Prompt
```

**Figure 1 - DOS Shell File System**

There is context-sensitive on-line help available for each option, making it easy to learn how to use the shell.

We were pleased with the performance and the ease of use of the DOS shell. The screen updates are fast when the shell is run in text mode and surprisingly fast in graphics mode, even on a 6 MHz 80286 based system (we used a 6 MHz IBM AT and a 16 MHz IBM PS/2 Model 80 for our tests).

Experienced DOS users may prefer to continue using the traditional Command Prompt interface. This interface is still available in PC-DOS 4.00; the use of the DOS Shell is completely optional. If you do use the shell, you can exit to the Command Prompt at any time by pressing the Shift and F9 keys. However, even veteran DOS users may succumb to the DOS Shell's speed and convenience.

## LARGE HARD DISK SUPPORT

Previous versions of DOS supported disk partitions up to 32 megabytes. More systems now have hard disks of 40 megabytes or more in size. Some large databases could have files that are larger than the 32 megabyte limit supported by earlier DOS versions. PC-DOS 4.00 removes the partition size limit, allowing you to format your large hard disk with a single partition rather than several partitions of 32 megabytes or less.

Some programs may be incompatible with PC-DOS 4.00. Programs that write directly to a hard disk rather than use DOS system calls to do disk output *could destroy data* on your disk if you have created disk partitions larger than 32 megabytes. This problem is most common with disk management programs, such as *Norton Utilities*, and occurs because PC-DOS 4.00 expands the File Allocation Table to accommodate the larger partition size. This problem occurs only if you create a partition larger than 32 megabytes.

If you create a partition larger than 32 megabytes and use disk management utilities, it is

important to get a new version of the program that is compatible with the DOS upgrade before you use PC-DOS 4.00.

## EMS 4.0 SUPPORT

All versions of DOS have been designed to run on computers with the Intel 8088, 8086, 80286, and 80386 chips. A limitation of the Intel 8088 chip is that only 1 megabyte of RAM (random access memory) can be directly addressed. As the size of applications has grown, more users require more than 1 megabyte of RAM to run their programs. One method that has been developed to allow more than 1 megabyte of RAM to be used in systems running under DOS is called the **Expanded Memory Specification** or EMS.

Under EMS, a block of memory above 1 megabyte is copied into an area of memory below 1 megabyte so that DOS can address it. When a different block of EMS memory is needed, swapping occurs. The first block is copied back to its position above 1 megabyte and the new block is copied into the area below 1 megabyte. (Other IBM personal computer operating systems, such as OS/2 and UNIX, can directly address 16 MB of RAM, but these operating systems will not run on 8088 and 8086 based systems.)

The Expanded Memory Specification requires a memory expansion board that supports the EMS standard and a software driver to perform the memory copying. A further limitation of EMS is that it is only used if your application program is designed to run using the EMS specification.

PC-DOS 4.00 provides a software driver to allow IBM's memory expansion boards to support applications using the EMS 4.0 standard. There is also a driver that allows the RAM above 1 megabyte in the 80386-based IBM PS/2 models 70 and 80 to be configured as EMS. We understand these drivers do not work with third party boards such as the *Intel Above Board* and *AST Rampage*.

## ENHANCED COMMANDS

A few new commands are available in PC-DOS 4.00, and some of the commands that existed before have new options. Some of the changes are described below.

For detailed information on the RAM available in your system, use the new `MEM` command. MEM reports the amount of memory that is below 640K, the amount of EMS memory, and the amount of Extended Memory (memory above 1 megabyte that has not been configured to be EMS memory) that is in your system. For each type of memory, the amount that is currently available for applications is also reported.

A new command called `INSTALL` is now available to load terminate-and-stay-resident programs from your `CONFIG.SYS` file instead of the `AUTOEXEC.BAT` file. Loading the programs from the CONFIG file is supposed to improve system memory utilization.

`DOSSHELL` is the new command which executes the DOS Shell described above.

The `GRAPHICS` command now supports the printing of the screen contents from the Enhanced Graphics Adapter (EGA) and Video Graphics Adapter (VGA) to a variety of IBM printers, such as the IBM 5152 Graphics Printer Model 2, Proprinter, Pageprinter, and 5182 Color Printer. Depending on the printer, the screen contents can be printed in up to 19 shades of grey or up to 8 colors.

The `REPLACE` command, which lets you copy files from one directory to another, now has a `/U` option that will overwrite the original file with the replacement file of the same name only if the replacement file has a more recent date than the original file.

## IMPROVED DOCUMENTATION

There are four manuals in the PC-DOS 4.00 library: two come with your system and two must be purchased separately. The PC-DOS manuals have been rewritten and are easier to read and comprehend than previous versions. *Getting Started with DOS version 4.00* provides information on installing PC-DOS and using the DOS Shell. *Using DOS version 4.00* explains how to use the Command Prompt, change your system configuration, and use batch files. Both these manuals come with your IBM microcomputer. The *DOS version 4.00 Command Reference* contains complete details for all of the PC-DOS commands. Finally, the *DOS version 4.00 Technical Reference and Application Programming* is useful for programmers. Both these manuals must be purchased separately.

## INCOMPATIBILITIES

The most serious incompatibility that exists between existing programs and PC-DOS 4.00 is with programs that perform low-level disk write operations, such as the programs noted in the *Large Hard Disk Support* section above. Using the current versions of these programs with a disk partition size greater than 32 megabytes could destroy data on your hard disk. Therefore, if you create a partition greater than 32 megabytes, it is important to obtain versions of these programs that are compatible with PC-DOS 4.00 before you use these programs.

Some RAM-resident programs do not run under PC-DOS 4.00. However, we ran Borland's *SuperKey* and *SideKick* without any problems.

Neither *TOPS* nor *Microsoft Windows version 2.03* currently run under PC-DOS 4.00. Microsoft Windows version 2.1 is required with PC-DOS 4.00.

We found the current version of the *Bernoulli Box* initialization software to be incompatible with PC-DOS 4.00.

Finally, the IBM Token Ring PC-LAN program version 1.2 (see our July 1988 issue for a review) does not run under PC-

DOS 4.00. There is a new release of the Token Ring software, version 1.3; it will run under PC-DOS 4.00 and PC-DOS 3.3.

### Conclusion

PC-DOS 4.00 provides several significant enhancements to the DOS operating system. The DOS Shell is an easy-to-use interface that simplifies file management. Support for the Expanded Memory Specification and for hard disk partitions greater than 32 megabytes are also welcome additions. However, some existing programs are incompatible with PC-DOS 4.00. If you buy PC-DOS today, you will get version 4.00. Departments can order the upgrade to version 4.00 for $61.75 if they mail an upgrade form to IBM. The HelpLine has upgrade forms for 3.5-inch and 5.25-inch media. Currently individuals cannot buy PC-DOS software at the Electronics Desk at the Book Center in Williamson Hall. This means they also cannot buy the upgrade. If you already have PC-DOS, you can contact an authorized IBM dealer to upgrade to version 4.00; the retail price for the upgrade is $95.

# Connections

## LUMINA Telnet Tip

Although anyone can connect to LUMINA with a modem, some departments can also make a higher speed connection to LUMINA over the campus internet using the *NCSA Telnet* communications program. Here's a tip for LUMINA Telnet users: If you can use Telnet to connect to other computers on the campus network but cannot connect to LUMINA, *the problem may be that network access to LUMINA is down.* Provided your computer, Telnet software, and network connection are all intact, but you still cannot connect to LUMINA, call the Administrative Information Services (AIS) LUMINA help line at **624-0555**. AIS is in charge of the LUMINA system and its network access. If you're not sure if your microcomputer configuration is properly set up, call the Micro HelpLine at 626-4276.

For more information on using LUMINA with Telnet, see *Network Access to LUMINA* in our August, 1988 newsletter.

## Piece Mail for Macintosh

Electronic mail (E-mail) is a method of sending messages (mail) from one computer to another. Typically the mail is sent via a network. Many departments are interested in E-mail because it is a way to quickly send messages within the department and to colleagues across the country and around the world. E-mail *augments* phone calls and paper memos; it does not replace these methods of communications, partly because everyone does not have access to E-mail. However, the advantages of E-mail systems (wide connectivity, fast communications, and fewer interruptions from the telephone) are significant enough that many groups use E-mail systems as their primary method of communication.

With most currently available E-mail systems there is a trade-off between connectivity and ease-of-use. While there are some very easy to use E-mail systems for networked Macs, these systems do not currently support messages beyond the boundaries of an AppleTalk network. E-mail systems such as BITNET and UNIX mail span the world but are harder to use, especially for non-technical people. *Piece Mail* is a system developed by the Microcomputer and Workstation Systems Group to bridge the gap between the connectivity of UNIX mail and the ease-of-use that Macintosh users expect.

### How Piece Mail Works

Piece Mail works by converting between UNIX mail messages and Macintosh word processing documents. To read incoming mail with Piece Mail, double-click to open the documents, then use a standard Mac word processor to read the document. The Microsoft Word documents in Figure 1, such as 24Aug88-10.43.39, are incoming mail messages. The strange file names are actually the date and time at which the mail was received.

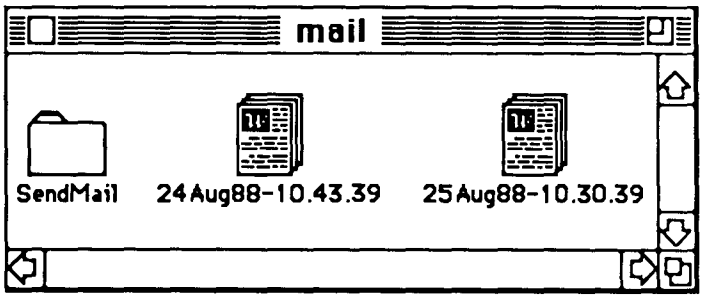



**Figure 1: Piece Mail Volume**

To send Piece Mail documents, you create a document using a Macintosh word processor, such as Word. Documents to be mailed must follow a certain format; *they must have the E-mail address of the recipients on the first line of the document and the subject of the mail on the second line of the document.* The remainder of the document is treated as the body of the message. The E-mail address of the recipients of a mail message are normal UNIX E-mail addresses, such as

```
mpm@berlin.acss.umn.edu
```

or

```
richter@mec.econ.umn.edu
```

For example, to send a mail message to *mpm* and *richter* about an upcoming meeting, the document would look like this:

```
mpm@berlin.acss.umn.edu richter@mec.econ.umn.edu
next committee meeting

The next meeting is scheduled for Monday at
10:30 AM at the usual place. Can you folks make
it? You can E-mail me at fxa@berlin.acss.umn.edu

Thanks, Farhad
```

Once you have composed your E-mail message, you save the document as a text file (generally you will find the text file option under the *Save* or *Save As* selections of the *File* menu). Next, drag the document into the folder named *SendMail*. Piece Mail periodically checks the SendMail folder for documents and submits them to the UNIX mail system.

From this discussion of Piece Mail we hope it is clear that you do not need to know how to use UNIX to send and receive UNIX mail. In fact, Piece Mail is really a layer of Macintosh user interface over the standard UNIX mail system. This makes Piece Mail an appropriate choice for users who already know the Macintosh and want to correspond with people who use either UNIX mail or BITNET.

Piece Mail would be especially useful to departments where some people use UNIX mail and others have Macs but do not use UNIX mail. In this case, Piece Mail would enable all Mac users to correspond with the UNIX mail users and with each other.

Do you want to use BITNET to correspond with colleagues on BITNET? You should note that it is possible for BITNET mail to be forwarded to UNIX mail (and vice versa). This means that although we are using a UNIX machine as a delivery system for Piece Mail, you can also send and receive BITNET mail using Piece Mail.

## IMPLEMENTING PIECE MAIL

Piece Mail is implemented in several parts (programs) – this was the inspiration for its name. One piece: use your favorite Mac word processing software to read and write mail. Two more pieces: a program running on a UNIX machine is used to actually deliver the mail, and another program running on the Mac can be used to notify you when mail arrives. Although Piece Mail is made up of several parts, you (as a normal Mac user) do not notice the parts. You just see mail arriving. But you may be curious to know what goes on behind the scenes. Let's look at how the parts fit together. (If you aren't interested in the details, skip ahead to the section called *Nag*.)

To run Piece Mail you must be at a Mac on an AppleTalk network which has a gateway to an Ethernet network. (An example of this set up is the University's AppleTalk Internet.) The Ethernet network should have a UNIX machine acting as an AppleShare file server (since mail is delivered to you on an AppleShare volume) as shown in Figure 2.

In the Microcomputer Group we have been using Piece Mail on a SUN workstation for the last month and a half. Piece Mail can also be run on the ACSS Encore (another UNIX machine which is accessible from the AppleTalk Internet). This means that departments that have SUN workstations have the option to run Piece Mail on their departmental SUN. If your department does not have a SUN, you can still run Piece Mail by using the ACSS Encore as your UNIX mailbox.

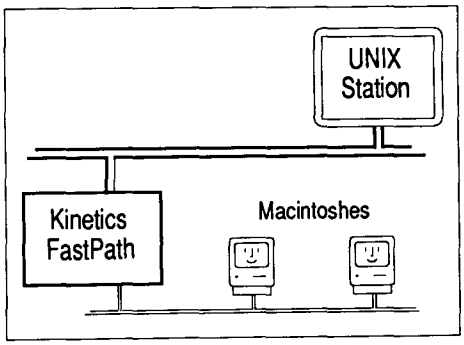



**Figure 2: Ethernet Network**

The first step in running Piece Mail is to connect to an AppleShare file server running on the UNIX machine. You do this by using the *Chooser* desk accessory and selecting the *AppleShare* icon. After you have connected to the AppleShare file server, mail is automatically placed in your mail volume by a background process that runs on the UNIX machine. The AppleShare server software that runs on the UNIX machine makes some of the UNIX file system appear to Macintosh users as a normal Mac disk. This software is a public domain package named CAP (Columbia AppleTalk Package) that was developed at Columbia University. CAP has been successfully run on a variety of UNIX machines including SUNs, DEC VAXes running ULTRIX, and the ACSS Encore.

The background process running on the UNIX machine is a C shell script that periodically checks your UNIX mail to see if any mail has arrived. If mail has arrived, the mail is moved into the part of the UNIX file system that appears as a Mac disk. This same background process on the UNIX machine also checks the Mac folder named SendMail to see if the user has dragged any documents to it. If there are documents, the background process checks to see if the document is a text file. If the document is a text file, the background process submits the file to the UNIX mail system. However, if the document is not a text file, the background process simply rejects it (that is, moves the document back out of the SendMail folder).

Piece Mail should not be expensive to use. Since the background process is only run when you are connected to the AppleShare file server on the UNIX machine, it does not consume excessive resources on the UNIX machine.

## NAG

If you want to be notified whenever new mail arrives, you can run a Macintosh application called Nag. Nag periodically looks at a folder to see if any new files have arrived. When a new file appears, Nag notifies you of this happy event by putting a dialog box on the Macintosh screen. Since you run Nag under MultiFinder, you are notified when mail arrives even if you are running another program. Because Nag is very small (40K), it should fit comfortably into memory with most software even on 1 megabyte Macs. If you don't choose to run Nag, mail still arrives and is still deposited in your mail volume, but you are not notified. Since arriving mail is time-stamped, you can easily tell which mail is new by looking at the name of the mail message (see Figure 1).

### MORE INFORMATION

If you are interested in seeing a demonstration of Piece Mail, stop by the Microcomputer HelpLine. A consultant would be glad to show you the system. If you are interested in implementing Piece Mail on your department's SUN, we can help. Since we wrote the Piece Mail software and put it in the public domain, the software is free. If there is sufficient interest, it is possible to run Piece Mail on the ACSS Encore. Contact the Microcomputer HelpLine if you are interested.

*NEWS CONTINUED FROM..... PAGE 137*

After you have selected the file server, you must log on to the server. If you want to connect to your Encore account, connect to the server as a *Registered User*, rather than as a *Guest*, and enter your name and password as shown in Figure 2. Click the *OK* button when you're done. (The name and password you type in the boxes will be the same name and password you use to connect to the Encore for normal terminal sessions.)

After you have connected to the Encore server, you are presented with a list of AppleShare volumes that you can mount. Select the appropriate volumes; icons for the AppleShare volumes will be displayed on your Macintosh screen. You can use the icons just as you would use a normal Macintosh disk.

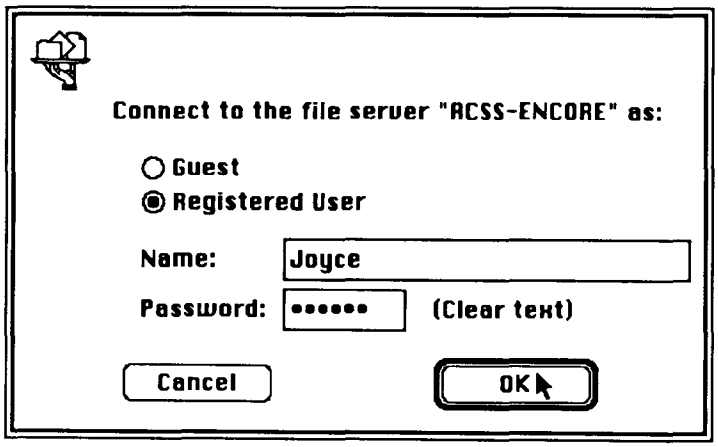



**Figure 2: Log on to the File Server**

### SETTING UP APPLESHARE

If you do not already have an account on the ACSS-Encore, you can get one by calling 625-1511. If you are going to use the account *only* for running AppleShare, you can have the account set up for you so that the proper AppleShare directories are already in place. If this is the case, you don't need to read the remainder of this announcement.

If you already have an account or want to set up the AppleShare directories yourself, here is how to set up the proper directories.

You specify which UNIX subdirectory should be used to hold your AppleShare volume by putting a file named *afpvols* in your home directory on the ACSS-Encore. The afpvols file contains one line for each AppleShare volume. The contents of a sample afpvols file are shown below:

```
~/apple:Encore
```

In this example, the directory named "apple" in the user's home directory (~/apple) is used as an AppleShare volume. On the Mac this volume is referred to as *Encore*. Typically you would create the afpvols file by using a UNIX text editor. Once you have told the AppleShare server software on Encore that it should treat the apple subdirectory as an AppleShare volume, you need to create the subdirectory. The next step is to create a subdirectory named "apple." You can do this with the UNIX `mkdir` command as shown in the sample below:

```
mkdir ~/apple
```

You also need to make two directories in the apple directory. These directories are used by the AppleShare server software to hold the Finder information and the resource information for the Macintosh files you will store on the ACSS-Encore. You also do this with the mkdir command:

```
mkdir ~/apple/.finderinfo
mkdir ~/apple/.resource
```

After you have created these directories, you are finished. Use the *Chooser* on the Macintosh to connect to the ACSS-Encore's AppleShare server and enjoy the fruits of your labor.

Note that you need to set up the directories to hold the AppleShare server volume only *once*. After the volume has been set up, you can use it without any further UNIX commands.

Our July, 1987 *Kinetics FastPath* review and our January, 1988 *AppleTalk Networks* tutorial are good sources for more information on the AppleTalk Internet.

## ● IBM Token Ring Software Upgrade

IBM has given the Microcomputer HelpLine upgrade forms for their Token Ring software. Departments that have older versions of the software can upgrade to version 1.3 for $63. This upgrade offer is not available to individual staff or students; it is only available to departments.

Departments can pick up the forms in 125 Shepherd Labs or ask the HelpLine to send the forms to you in campus mail. *Completed forms should be sent directly to IBM.* Which Upgrade and Certification Order Form you need depends on whether you want the upgrade on a 3 1/2-inch or 5 1/4-inch disk. **This upgrade offer expires 4/28/89.**

### ● New ImageWriter LQ Drivers

The Micro HelpLine has new software drivers for Apple's ImageWriter LQ dot matrix printer. The AppleTalk and plain ImageWriter LQ drivers have the same number: version 2.0. These drivers should fix word spacing problems that occur when printing in *Best* mode from a Macintosh. The drivers are easy to install. Drag the appropriate printer icon to your start-up disk's *System Folder* and restart the Mac. The drivers are free and are available from the Mac Information Server in the *Imagewriter LQ* folder within the *System Software* folder.

### ● Apple Scanner

The Apple Scanner is a flatbed scanner capable of scanning documents that range in size up to 8.5 by 14.0-inches. To use the scanner, place the document you want to scan face down on the scanner glass. Then use one of the two scanning applications that come with the scanner, *AppleScan* or *HyperScan*, to set scanning instructions and to activate the scanner.

To use the Apple Scanner, you need a Macintosh with at least one megabyte of RAM and a hard disk with at least 20 megabytes of storage. AppleScan will perform better if your Macintosh has more than 1 megabyte of RAM; it will take less time to execute most of the commands. Storing scanned images takes up a lot of space on a disk. Depending on what you scan, you may need a hard disk with more than 20 megabytes of storage.

The Apple Scanner connects to the SCSI port on your Mac Plus, SE, or II. The SCSI cables that you'll need to connect the scanner must be purchased separately. Call the HelpLine if you need help determining which SCSI cables you need.

You may have to update the System Folder on your hard disk in order to use the Apple Scanner. The scanning software that comes with the scanner must be used with System Release 6.0 (System 6.0, Finder 6.1) or later. To print on a LaserWriter with the scanning software, you must also have LaserWriter 5.2 and LaserPrep 5.2 or later in the System Folder.

The Apple Scanner comes with a diskette that has a scanner driver which must be copied into the System Folder on your hard disk. The scanner also comes with two applications: AppleScan and HyperScan. HyperScan is used to scan images directly into a HyperCard stack; HyperScan should be used with HyperCard 1.2. AppleScan is used to scan images that you will work with in AppleScan or that you will use with other applications; AppleScan can save images in TIFF, PICT, or MacPaint formats. AppleScan can scan images at resolutions from 75 dots per inch (dpi) to 300 dpi. Both HyperScan and AppleScan come with on-line tutorials to help get you started. Both applications also have various settings that you can adjust to get the best scan.

You can purchase the Apple Scanner at the Electronics Desk at the Minnesota Book Center in Williamson Hall for $1240. If you are interested in the Apple Scanner, you can stop by the Micro HelpLine in 125 Shepherd Labs to try it out. Since the scanner is part of the HelpLine's demonstration equipment, it is unavailable for public access. That is, you cannot use it to scan multiple images for your research, publications, or other work requirements.

# MA MICRO NOTES

## Redundant System Information

This system information article is primarily aimed at Macintosh hard disk users. We want to be sure you're not inadvertently filling the hard disk with redundant information. However, before we get to the main topic, too many System Folders, we will spend a little time discussing microcomputer operations in general.

On its own, a Macintosh or IBM-type microcomputer is powerless to do anything except look for a very specific set of procedures. Once it finds these procedures, it can recognize that you've typed something, that it should display something on the screen, or accomplish other tasks that the computer must perform for you, it, and the software to work together. These behind the scenes tasks are part of the microcomputer's operating system. Macs and IBM-type microcomputers give these essential procedures different names. When you start up a DOS machine it must find a file called COMMAND.COM before it can do anything. When you start up a Mac, it must find a *System* and a *Finder* file before it can do anything; these Mac files are usually stored in a *System Folder*.

### STARTUP AND BOOTABLE DISKS

Until recently, new microcomputer users were likely to buy a two-floppy disk drive configuration rather than a configuration with one floppy drive and one hard drive. Now more people are buying hard disk configurations or are adding a hard disk to their older machines. Mac software, however, is usually packaged to immediately accommodate the two-floppy drive model; the software includes a startup disk with a *System Folder* on it. This packaging causes problems for some hard disk users. DOS software is not packaged to immediately accommodate the two-floppy drive model; it has no startup disk. Instead the user of DOS software must create a bootable disk with the essential COMMAND.COM file on it.

In the next paragraphs we'll talk about software which Mac users should not copy from floppy disks to the hard disk.

### TOO MANY SYSTEM FOLDERS

Since most people use the hard disk as their working disk, their first task with any new software is to copy the software onto the hard disk. Many Mac users automatically copy everything from the floppy disk icon to an appropriately

named folder on their hard disk. This *copy everything* approach is where the trouble starts.

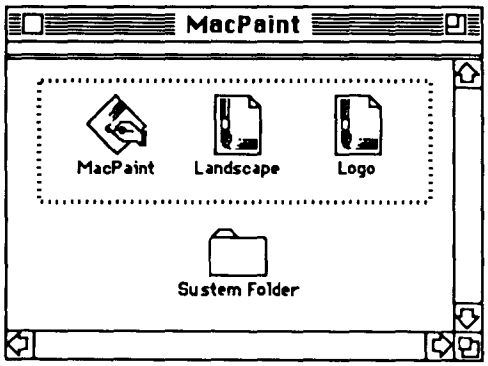
In order for your Macintosh to start up from its hard disk, that hard disk must have a *System Folder* on it. More than one System Folder per hard disk is unnecessary and wastes space. Worse, if your Mac finds more than one System Folder on the hard disk, it may become confused as to which System Folder it should use. Occasionally this confusion causes paralysis. Frequently this confusion means you can't find the Fonts you expect to see in the *Font* menu or the *Scrapbook* doesn't have the pictures you copied to it moments before.

### SELECTIVE COPYING

To avoid wasting space on your hard disk and confusing the Mac, don't copy System Folders from your applications disks. This doesn't mean you must tediously copy one file or icon at a time. You can copy groups of files in three ways: the *Shift-click*, the mouse, and the *Select All* method.

To append one selection to another, you can use the *Shift-click* method. After you've selected one item, hold down the Shift key before you select the next item. *As long as you hold down the Shift key, the previous selections are not unselected.* When all the items you want to copy are darkened (selected), drag any darkened icon to its new destination and the rest of the icons will follow.

You can also use the mouse to select any rectangular group of icons, such as those shown in the MacPaint sample below. To do this, position the mouse's arrow pointer in one corner of the rectangular grouping. Now, hold down the mouse button while you drag around the group. As you drag, you'll create a rectangle that looks like the "running ants" you see in the MacPaint sample. When you release the mouse button, the dotted rectangle will disappear and every icon inside that rectangle will become darkened. You can now drag any darkened icon to its new destination; the rest of the darkened icons will follow.




Finally, you can click on the icon of the disk you want to copy and choose *Select All* from the *Edit* menu. This will select all the files on that disk. To "deselect" the System Folder, hold down the Shift key and click on the System Folder.

### FINDING REDUNDANT FILES

If you know or suspect your hard disk has multiple System Folders on it, use the *Find File* option in the  menu to quickly locate those duplicates. You can use Find File at any time, whether or not you've already started up an application.

If you type *System* in Find File's *Search for* box, every file or folder that has the word System in any part of its title will show up in Find File's list of matches. To start a search, click on the running man icon. When Find File finishes its search, it beeps to let you know it is done.

When you click on a name, such as System Folder, in Find File's list of matches, you can see the path to that folder. The path is useful so you can see exactly which application folders have redundant copies in them. (You may want to read more about the Find File desk accessory in your Macintosh Plus, SE, or II manual.)

### DELETING REDUNDANT FILES

The only System Folder you should have on your hard disk is the one you see when you open up the hard disk's icon. Drag all other System Folders to the trash can. You may get this message when you drag some System Folders to the trash: *That folder/disk contains items that are locked or in use and can't be removed.* This means the Mac is using information from that folder's System and Finder files to operate the machine, and the Mac refuses to commit suicide. To drag that System Folder to the trash you must get the Mac to use a different System Folder. This is easy to do. Start up your Mac with any floppy disk that is a startup disk, for example the *Systems Tools* disk that came with your machine. When you start up your Mac with a floppy disk, you can select any System Folder from your hard disk and drag it to the trash. But don't get carried away. Remember to leave one System Folder on your hard disk.

## Programming the Mac: MacApp

Here's an inquiry we hear frequently on the HelpLine. "I have been using a Macintosh for some time and like the ease with which I can learn to use new applications. I realize that this has to do with applications following the much talked about Macintosh User Interface. Well, I am now trying to write an application for the Mac and am experiencing what my friends have been telling me: the Mac is incredibly difficult to program. Programming what would appear to be simple things on the Mac takes an agonizing amount of work. First, one has to know Pascal or C, which seems straightforward enough. Then one has to gain an understanding of the first three volumes of *Inside Macintosh*, the programmer's reference. This task seems impossible because every section appears to presume that you've read all the other sections. Assuming I get past this initial hurdle, debugging facilities appear quite primitive and oriented toward assembly language. I am quite discouraged. I don't want to write a program that has just a single window and lacks all the features that would make it a good Mac application. *There must be a better way.*"

Well, Gentle Programmer, help may be nearby. Until recently, that cute box was as unfriendly toward programmers using a conventional high-level language like Pascal as it was friendly toward users. As you've seen, a large amount of code is needed to preserve the illusion that is the Macintosh interface. Although the hundreds of procedures in ROM provide most of the building blocks, the programmer must piece these blocks together to form the Mac interface. For small applications, such "non-specific code" can amount to 80 to 90 percent of the application. To-date, solutions such as "copy-and-modify" or "cut-and-paste working fragments" have been an effective way to program the Mac. However, even if you start with a basic skeleton and add to it, most of the functionality that typifies the Mac interface must be constructed anew by each developer...and each "slightly different" reconstruction contains bugs and takes (useless) time and effort.

## MacApp

If you know Pascal and have already made the initial time investment getting somewhat familiar with *Inside Macintosh*, then **MacApp** (The Expandable Macintosh Application) might help. MacApp is the most sophisticated and comprehensive of a number of program "shells" that attempt to extract the essence of non-specific Mac applications (other shells are MEWS, TranSkel, MacExpress). You just write the code that does the things unique to your application; the program shell handles Mac interface stuff which is common to any application. Most shells suffer from two problems: first, not enough essence of Mac has been extracted in a useful form; second, the "black-box" approach breaks down for even a moderately complex application. And when you start patching the shell, you are re-engineering someone else's code. MacApp has a different approach from all the others; it implements the Mac user interface in an Object-oriented environment.

## Object-Oriented Programming

Object-oriented programming is a technique in which a complex system is structured as a set of interacting Objects. In a conventional high level language, the programmer defines procedures and then passes data to appropriate procedures; the procedures act on the data, and we have a *procedure centered* view of the world. Whereas an Object-oriented programming language allows one to bind data and procedure together into Objects. Each Object thus defines its own data structure and algorithms. Instead of examining the data and selecting an appropriate procedure to act on it, you tell the Object (the data plus procedure) to perform the action needed. In Object-oriented parlance, you send a Message to the Object. You could think of an Object as *smart data*. Consequently, a high degree of modularity and data-abstraction can be achieved.

Since the Mac interface is Object-oriented, the Object-oriented paradigm fits in very well. An example here might make the Object concept clearer. Let's say you select an icon (Object) in the Finder. Next, you choose *Open* from the *File* menu (you send the Object an "Open yourself" message). The icon (Object) is smart. And if it is a MacWrite document, it "knows" how to do its thing in a MacWrite-ish way; if it is a HyperCard stack, it knows its workings; if it is a folder, it opens like a folder. You just pick any Object and tell it: Open or Print or whatever.

You can specify Types (or Classes) of Objects just as you can specify Types for data in Pascal. A second characteristic of Object-oriented programming systems is Inheritance: new types of Objects can inherit the characteristics (data + procedures) of the ancestral types from which they were derived.

MacApp, written in Object Pascal (Apple's superset of standard Pascal), consists of a handful of carefully designed Objects. To create a Macintosh application, you expand MacApp by creating Objects that inherit (and expand) the behavior of the original Object types. You can thus customize the behavior of an Object without rooting around in the original Object. Instead you override the behavior you don't want and add new behaviors. For example, if a window Object already knows how to create itself, destroy itself, scroll, resize, and drag itself, your customized window Object could inherit all these capabilities and just add the smarts that will place your view of the data in the window. You could do this without learning how to print, scroll, or resize.

## MacApp Basics

MacApp will not eliminate the lengthy learning curve. Although you won't have to absorb as much of *Inside Macintosh*, putting it all together into a first application takes effort. But after this first effort, things can improve dramatically.

MacApp implements these Mac features automatically:

- the main event loop
- support for multiple documents
- window management (move, resize, etc.)
- menu management; uniform UNDO facility
- scrolling (manual and automatic)
- clipboard support
- printing
- memory and segment management
- exception handling and error reporting.

You must program:

- drawing window contents
- reading and writing document files
- performing application specific commands
- handling mouse clicks to your windows
- checking for errors.

MacApp can pay off in a faster development cycle, cleaner design, smaller source code, better adherence to Mac Interface Guidelines, ease of re-using common code, enhancing and modifying applications, as well as providing access to a symbolic (not assembly level) debugger.

You may be concerned that your application built using MacApp may become very large or run slowly. Happily, MacApp does not have a high level of overhead.

Tiny applications probably won't be perceptibly slower and may be 10 to 20K larger. Large, complex applications *may be faster;* and as your applications get more complex, you may end up with a space advantage rather than a space penalty.

To use MacApp for development you need:

- 1 MB memory or better (preferrably better)
- 10 MB free space on your hard disk (preferably SCSI)
- Macintosh Programmer's Workshop software
- Macintosh Programmer's Workshop Pascal.

The application you create should run on any Mac, subject of course to the memory demands your application makes.

MacApp is available from Apple Programmer's and Developer's Association, 290 Southwest 43rd Street, Renton, WA 98055 for $450. (The $450 includes $200 for Macintosh Programmer's Workshop, $150 for MPW Pascal, and $100 for MacApp.) If you plan to commercially distribute the application(s) you build using MacApp, you must obtain a $100 license from Apple Computer, Inc. MacApp is available at the Microcomputer HelpLine.

# Site License Forum

Sandra Welch, 625-9091

In order to make it easier for University of Minnesota microcomputer users to take advantage of site licenses and volume discount agreements for microcomputer software, the Microcomputer Newsletter is providing this forum. The forum is for people who want to participate in an agreement the University presently holds or who want to find participants for new site licenses. For further questions or to participate in this forum, call Sandra Welch, forum coordinator, at 625-9091.

If you have favorite or interesting software packages for which you want to pursue a site-license or volume discount, please provide me with a short description of the software and the equipment it can be run on. You can submit this information along with your name, campus address, and phone number to Sandra Welch, Information Systems, 141 Shepherd Labs. However, once we're aware of your interest, we still need three to five months to complete our evaluation process.

## MACSYMA

In the final negotiations to purchase MACSYMA, we were unable to obtain an agreeable package price. Consequently, we are **not** obtaining a University-wide license for MACSYMA. We don't expect this outcome to be a hardship for University users at the workstation and personal computer level because the software package called Mathematica (see below) will probably replace MACSYMA for these users.

## Mathematica

Mathematica, from Wolfram Research, Inc., acts like an electronic blackboard that solves mathematical equations in either numeric or symbolic form. Mathematica comes with a library of more than 400 built-in mathematical functions, including elliptical, hypergeometric, Bessel, and zeta. Mathematica is presently available for the Mac II and the Mac SE and will be available for a variety of other operating systems soon.

We feel that Mathematica is a basic application for multipurpose educational use. Currently we are negotiating an agreement to obtain Mathematica at a reasonable price. The main problem is that Mathematica requires at least 2 megabytes of RAM, and memory chips are scarce. Stay tuned for an update. As the memory chips become more available, we will obtain a discount agreement in some form for Mathematica.

## Proposed License: STATGRAPHICS

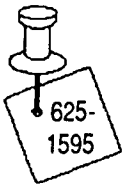
STATGRAPHICS is a fully integrated statistical graphics system for IBM-compatible microcomputers. STATGRAPHICS contains a wide variety of graphics programs, including two- and three-dimensional plots, bar and pie charts, histograms, time sequence plots, and quality control charts. You can control many aspects of the display, change colors, labels, scaling, and line and point types, or display several plots on the same screen. Graphics are supported on a variety of output devices, including high-resolution color and monochrome graphics adapters, dot-matrix printers, and pen plotters.

STATGRAPHICS operates on IBM PCs, XTs, ATs, and compatibles under DOS version 2.0 or later. A minimum of 512K RAM, a graphics adapter and compatible monitor, and two double-sided disk drives or a hard disk are required. A math co-processor and 640K RAM are recommended. If you are interested in this software package, please contact Sandra Welch at 625-9091.

# Engineering Services Notes

Don Clark, ACSS Engineering Services

## We're Moving




In October ACSS Engineering Services will move to a new address. You will find us at the ACSS Lauderdale facility at the corner of Highway 280 and Broadway Drive. *Here's our new address and phone number: 2520 Broadway Drive, Lauderdale, MN 55113 at phone 625-1595.* Arrangements are being made to provide parking for customer pick-up and delivery at our entrance to the Lauderdale facility.

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