Microcomputer Newsletter

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• Contents •

The Fine Print:
The Microcomputer Newsletter is published by Microcomputer Systems Group, a part of the University of Minnesota's Academic Computing Services and Systems department.

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News: Macintosh Plus and LaserWriter Plus

The big news in late January (which gives you some idea of our lead time) is Apple's new Macintosh Plus and LaserWriter Plus. Now that Apple has announced (and is shipping) the Mac Plus, we can tell you about it. The Mac Plus could be best described as an *evolutionary* upgrade of the existing Macintosh; the Mac Plus has more memory, higher capacity disk drives, and a better (faster) way of connecting external hard disk drives.

Mac Plus Hardware

Let's look at the Macintosh Plus hardware in detail. The Mac Plus has a lot of memory; it comes with 1M byte RAM. While having twice the memory of the 512K Mac is nice, the exciting part of the Mac Plus is that you will be able to expand the memory to 4M bytes. The memory on the Mac Plus consists of four 256K byte Standard Inline Memory Modules (SIMMs). A SIMM is a standard way of packaging memory. Physically, a SIMM is a small circuit board on which eight (or nine) memory chips are surface-mounted. The Mac Plus has four SIMMs that plug into the Mac's logic board. When the price of 1M byte chips comes down to earth (currently these chips cost about $100 each, and you need eight chips for a bank of 1M byte), you will be able to replace the four 256K SIMMs with four 1M SIMMs; and, voilà!, you will have a Mac with 4M bytes of RAM.

Another improvement in the Mac Plus is the 800K internal disk drive. To get 800K of storage, the new drives write on both sides of the disk rather than using one side (as is the case with the Macintosh 400K drive). The data transfer rate from the 800K drive seems to be a little faster than with the 400K drive, but the difference may be due to different system software on the Mac Plus. In any case, I have already become deeply attached to 800K disks. 800K is a massive amount of storage to have on a floppy disk. You can store the print drivers for the LaserWriter, a wide assortment of fonts, a couple of applications, and still have room for documents all on one disk. By the way, an 800K external disk drive is also available.

The third area of improvement in the Mac Plus is the SCSI (Small Computer System Interface) port. SCSI (pronounced *scuzzy*) is an industry-standard way of connecting mass storage devices (such as hard disk drives) to microcomputers. Six vendors announced mass storage devices for the Mac Plus at the MacWorld Exposition in January. SCSI drives for the Mac should start being shipped in March and April. We

News continued on page 6

BENCHMARKS: IBM PC and Compatibles

If you read microcomputer magazines, you may have seen performance benchmarks of various machines. Typically, the benchmarks are programs that are carefully designed to measure one aspect of a system's performance, such as Central Processing Unit (CPU) speed. One of the most popular benchmark programs does something rather esoteric. It measures the time to calculate the first 100 prime numbers to establish CPU speed. Since calculating prime numbers is not something that many of us do on a regular basis, we decided to perform some benchmarks that were a little more relevant to the tasks for which microcomputers are actually used.

Overview

Using the IBM and IBM-compatible microcomputers that are available through the microcomputer discount program, we selected two popular software packages (dBASE III and Lotus 1-2-3) and set up tasks to simulate normal use of these programs in an office environment. We chose dBASE III because it is easy to set up a disk-intensive task with which we can measure the efficiency of a given system's disk Input/Output (I/O). We chose Lotus 1-2-3 because most operations in Lotus are CPU-intensive. Thus, our dBASE III and Lotus 1-2-3 benchmarks give us a measure of two important aspects of total system performance: CPU speed and disk I/O speed.

When you look at the results of these benchmarks you should bear in mind the fact that we are only measuring isolated aspects of a complete system's performance. One aspect of system performance we are *not* measuring is the speed at which information is written to the screen. (If you have any proposals for a good screen I/O benchmark, please write us.)

dBASE III Benchmark

Many of the functions of dBASE III involve intensive disk activity. Any operation that requires a lot of reading from (or writing to) a disk can take a long time, so for applications that involve mountains of data, disk I/O speed can be crucial.

Suppose you have a mailing list that needs to be printed, and the printed order must be by name. In this scenario you must sort the mailing list (on disk) before you can print it. The most reasonable way to solve the problem is with the dBASE III *index* facility, using the name as the key for indexing the mailing list. When dBASE III indexes a file, dBASE leaves the arrangement of the master data file intact. A separate index file is created that contains a pointer to each record in the order desired. Indexing requires information to be written to the disk for every record that is read, and the *entire* mailing list must be read to construct the index file. With a large mailing list, this can take a considerable amount of time. This *index-a-mailing-list* scenario is the task we chose for our dBASE benchmark.

Our dBASE III benchmark involved indexing 1000 records from the Microcomputer Newsletter mailing list. We used the name as the key for the index. The mailing-list file absorbed 217K and the index file about 75K. We ran the benchmark on all the disk drives available on our machines.

Lotus 1-2-3 Benchmark

While dBASE III is disk intensive, Lotus 1-2-3 performance depends primarily on the CPU speed and how fast the CPU can access memory. A budget plan is a common application for Lotus 1-2-3. One benefit of using Lotus is that you have the ability to make changes in the budget and see the effect of the changes on the ending balance. For example, if you want to see the effect of changing various expenses, Lotus 1-2-3 will recalculate the entire spreadsheet. Not surprisingly, the more calculations there are in a spreadsheet, the longer it will take for the changes to trickle down to the ending balance.

For our benchmark we used both Lotus 1-2-3 (Version 1A) and the newly released Lotus 1-2-3 (Version 2). Our spreadsheet consisted of a starting value that was multiplied by 1.5 in the cell in the adjacent column. This value was then multiplied by 1.5 and placed in a cell in the next adjacent column, and so on. The pattern of multiplying the value in the previous cell was continued for 26 columns. The cell in the row immediately below the first cell took the value in the cell above and divided it by 1.5, and this pattern was repeated across the entire row. Thus, the spreadsheet alternates between a row of multiplication and a row of division for 60 rows. This means whenever the starting value is changed, there are 780 multiplications and 780 divisions performed. While most budgets aren't set up this way, our spreadsheet gives us a good measure of relatively slow (and common) operations: multiplication and division.

Results

To get an idea of the uncertainty in our measurements, we ran the benchmarks five times on the Z-241 and found the variance in our measurements to be four percent. The results are summarized in the table on page 3. The numbers in parenthesis following the Seconds column are the ranking of the machines on the basis of speed.

Conclusions

The results of our benchmarks show that IBM compatibles perform as well as, and in many cases better than, the IBM itself.

The Lotus 1-2-3 (Version 1A) benchmark shows that the best CPU performance was on a Zenith Z-241. Lotus 1-2-3 Version 2 is slower on all machines except the IBM AT. The IBM AT and Zenith Z-241 tied for first place in the Lotus 1-2-3 (Version 2) benchmark. For both the Lotus benchmarks we found that the machines' performance clusters into three groups. At the *high end* are the expensive machines with the advanced 80286 CPUs: the IBM AT, Zenith Z-241, and Hewlett-Packard Vectra. At the *low end* are the machines with the 8088 CPUs running at standard clock speed (4.77 MHz): the IBM PC, IBM XT, Zenith Z-151, Zenith Z-171, and Zenith Z-148. In *the middle* are the AT&T 6300 (with an 8086 CPU) and the Z-148 (with an 8088 CPU running at 8 MHz). It would have been interesting to test the Zenith Z-158 (which can run at either 4.77 or 8 MHz) and the AT&T 6300+ (an IBM AT compatible), but these machines were not available at the HelpLine when we ran our benchmarks. For the Lotus benchmarks, the difference between the fastest (Z-241) and the slowest (Z-171) machine was approximately four

Warning!

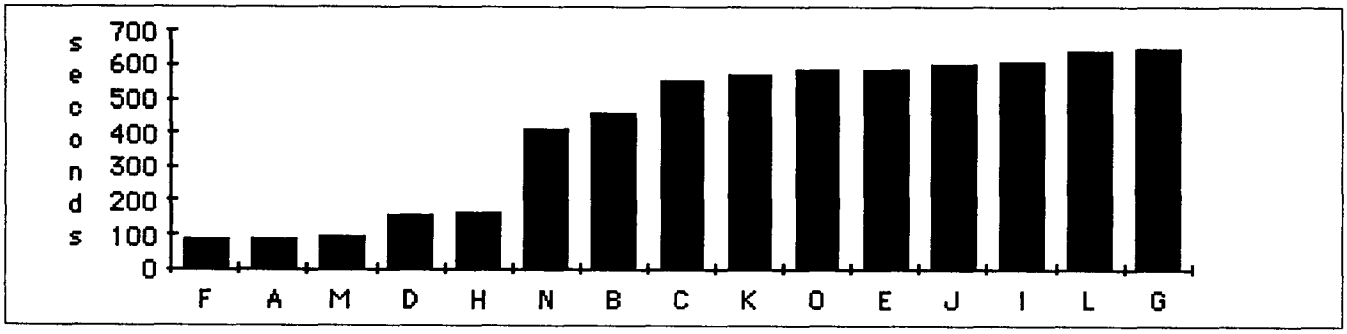
RESULTS TABLE

	Microcomputer	Drive	Lotus Seconds	/ Rank	Lotus II Seconds	/ Rank	dBase III Seconds	/ Rank
A -	IBM AT (512K)	hard drive	1.84	(3)	1.55	(1)*	91.80	(2)
B -	"	1.2MB floppy					458.05	(7)
C -	"	360K floppy					552.33	(8)
D -	IBM XT (512K)	hard drive	4.98	(8)*	5.48	(7)	161.17	(4)
E -	IBM PC (320K)	360K floppy	4.98	(8)*	5.42	(6)	590.65	(11)
F -	Z-241 (512K)	hard drive	1.41	(1)	1.55	(1)*	86.81	(1)
G -	"	1.2MB floppy					651.02	(15)
H -	Z-151 (320K)	hard drive	4.93	(6)	5.36	(5)	171.46	(5)
I -	"	360K floppy					607.27	(13)
J -	Z-148 (512K) 5 MHz	360K floppy	4.96	(7)	5.57	(8)	602.97	(12)
K -	" 8 MHz	"	3.13	(5)	3.36	(4)	573.54	(9)
L -	Z-171 (512K†)	360K floppy	5.31	(9)	5.77	(9)	641.23	(14)
M -	HP Vectra (640K)	hard drive	1.48	(2)	1.59	(2)	100.65	(3)
N -	"	1.2MB floppy					412.37	(6)
O -	AT&T 6300 (256K)	360K floppy	2.72	(4)	2.94	(3)	587.44	(10)

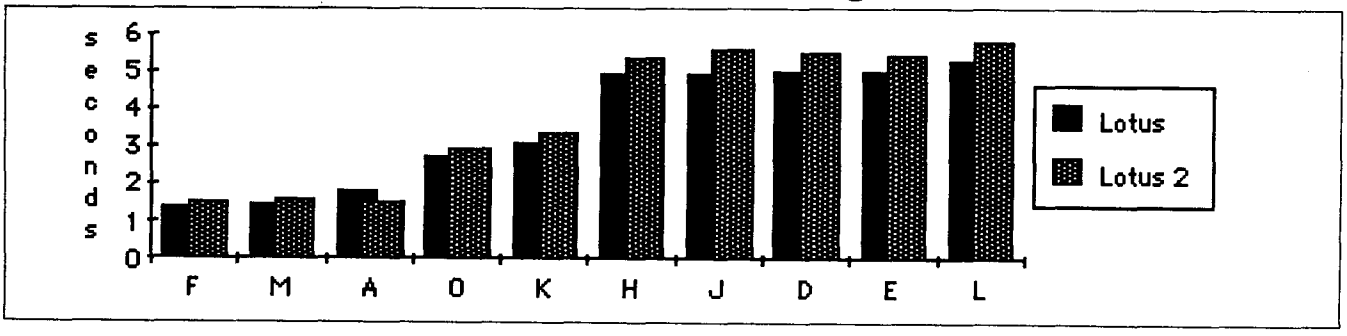
* Denotes a tie in ranking.
† Of the 512K on the Z-171, 24K is taken up by the system.

The bar graphs below present the information from the Results Table.
The machines codes (A through O) correspond to those given in the Results Table.

dBASE III (Disk Access Speed)



Lotus 1-2-3 Timings



This may be your final issue.

seconds. In other words, the Z-241 is about 270% faster than the Z-171.

In our dBASE III benchmark, the Zenith Z-241 hard disk took top honors. The IBM AT hard disk was a close second. As you might expect, all of the hard disk drives are much faster than the floppy disk drives. Interestingly, all the Zenith floppy drives were slower than other vendors' floppy drives (with the exception of the Z-148 when running at 8 MHz). This implies that there is a difference in Zenith's system software, since Zenith is (in many cases) using the same or very similar disk drives used by IBM. Among the IBM AT-class machines, the difference between the slowest hard disk (the Hewlet-Packard Vectra) and the fastest (Zenith Z-241) was 13.84 seconds or 16%. Among the IBM XT-class machines the difference was 10.29 seconds or 6%. There was a wide variation in the speed of floppy disk drives, partly due to the difference between the high capacity (1.2M bytes) floppy drives on the AT-style machines and the 360K floppy drives on the PC-style machines.

If the *price/performance* ratio is the deciding factor in determining the best system, the Z-148 is a strong contender, since it is the least expensive machine of those we tested, yet it out-performs most of the more expensive competition, particularly the IBM PC-class machines. Of course, there are many factors other than price/performance ratio that you should consider when choosing a machine, and these benchmarks are not the definitive tests of system performance.

REVIEW: MacLink

Overview

MacLink is a communications package that allows you to transfer files between an IBM PC and a Macintosh and convert these files into an appropriate format on the receiving machine. For example, a Lotus1-2-3 file sent from the IBM PC to the Macintosh can become a MultiPlan file on the Mac; and a MacWrite file on the Mac can become a WordStar document file on the IBM.

Hardware and Software Requirements

MacLink comes with a manual, one disk for the IBM PC (or compatible), and one disk for the Macintosh. You can also get an optional serial cable to directly connect the IBM PC to the Macintosh. Alternatively, you could use modems and connect the machines over the phone. If you plan to connect the machines over the telephone, you must have *two* 300 or 1200 baud modems: a D.C. Hayes Smartmodem (or equivalent) connected to the IBM and an Apple or a D.C. Hayes equivalent connected to the Mac. If you want to connect an IBM AT and a Macintosh with a direct cable, you must also have a serial adapter connector (IBM part #6450242). The direct (serial) cable supplied with MacLink has a *25-pin* connector, and the IBM AT's serial port has a *9-pin* connector. The serial adapter converts the 9-pin connector (on IBM ATs and Zenith Z-241s) into a 25-pin connector.

After you have sorted out how to connect the two machines, you should check to make certain that your machine's configuration can run the MacLink software. To use MacLink on an IBM, you need at least 192K of memory, one disk drive, and PC-DOS Version 2.0 (or later). The IBM must also have a serial port (an asynchronous communications adapter) so you have somewhere to connect the cable (or modem) that links the IBM to the Macintosh. MacLink runs on both the 128K and 512K Mac. (One potential problem is the serial connector on the Mac Plus. We have not tested MacLink on the Mac Plus. You will need an adapter to connect the cable to the Mac Plus, since the Mac Plus has 8-Pin Mini-DIN connectors rather than the DB-9 connectors found on the other Macs.)

If you plan to transfer large files, it is preferable to have two disk drives on both machines. This will avoid repeated disk-swaps and improve the speed of transfer. MacLink uses extra disk space for its temporary work files.

Using MacLink

When we tried to establish a connection between an IBM PC and Macintosh over the phone, MacLink did not automatically place the Hayes modem (attached to the IBM) into auto-answer mode. This is a problem, because when one modem calls another modem, one modem must be in *originate mode* and the other must be in *auto-answer mode*. We had to remove the face plate of the Hayes modem and change the default position of switch 5 from DOWN (Auto-answer disabled) to UP (Auto-answer enabled) in order to establish the connection. This problem is not mentioned in the manual. A more convenient way to use MacLink is to connect the two machines directly with a serial cable (if the machines are located close to each other). With the direct cable connection we did not have any problems.

When you start MacLink on the IBM, you can review the list of initial settings, such as the method of connection (a cable or a modem), baud rate, and the default disk drive. MacLink on the IBM is menu-driven. After you choose the appropriate settings from the menus, you leave the IBM unattended and control the file transfer from the Mac. When you start MacLink on the Mac, it displays all messages in dialog boxes. All you have to do is respond to these messages, and MacLink establishes the connection between the two machines.

MacLink assumes that the direction of file transfer is *from* the IBM *to* the Mac. If you want to transfer files from the Mac to the IBM, you must pull down the *Control* menu and choose the *To IBM PC* option. When you choose the direction of file transfer, MacLink displays the name, size, and format of the files on the **From** (source) disk. When transferring files from the IBM to the Mac, MacLink looks at the suffix of the source file to determine its format, and suggests a format for the same file on the **To** (destination) disk. When transferring files from the Mac to the IBM, MacLink looks for the internal file information on the Mac to define its format. In any case, you have the option of choosing a different format. On the Macintosh, MacLink offers the following formats: MacWrite, text, binary, and MultiPlan spreadsheet. On the IBM, MacLink offers WordStar, text, binary, DIF, MultiMate, Lotus worksheet, and MultiPlan spreadsheet formats.

Warning!

Minor Problems

In the process of using MacLink we discovered a few annoying problems. If you connect the two machines over the phone, you can only dial the telephone from the Macintosh. This limitation can make the process of establishing communication between the machines inconvenient.

You can transfer a file from one machine to another only *once* during the session. In order to transfer the same file again, you must use the *Disconnect/Hangup* option from the *Control* menu to disconnect from the IBM and then the *Connect/Dial* option to re-connect the two machines.

The most irritating problem with MacLink is the lack of consistent error handling. If something doesn't work, you might get an error message; but most likely MacLink will just hang up, and you will have to restart the Macintosh. This is especially inconvenient if you change some settings on the IBM and forget to make the same changes on the Mac, or if you have any problems in establishing the connection. The software doesn't provide you with any help.

Conclusion

If you already have communications packages, such as *COM* for the IBM and *MacTerminal* for the Macintosh, and want to transfer plain text files, you don't need MacLink. However, MacLink is useful software for transferring files in the format required by your application. We recommend using MacLink with a direct cable. MacLink comes with a manual that is clearly written and easy to follow. The manual explains in detail some of the problems you might encounter. MacLink is not copy-protected and can be ordered for $95 (without a cable) or for $125 (with a cable) from DataViz, Inc., P.O. Box 1319, Norwalk, CT 06856, phone (203) 866-4944.

TUTORIAL

Adding Components to a Computer System

If you look through any of today's computer magazines, you will find literally hundreds of add-on components (also called *peripheral devices* or *peripherals*) for your microcomputer system - peripherals include printers, graphics monitors, modems, keyboards, and disk drives. To add such peripherals to your system is a relatively simple task these days (relative to a few years ago), but you can still run into problems if you aren't careful. This is the first of several articles on basic microcomputer topics. In this article we will cover the fundamentals of adding peripheral devices to microcomputer systems and look at some of the common problems involved. In subsequent articles we will cover other topics such as telecommunications, specific interfaces, printers, and cables.

A microcomputer system, in very general terms, consists of a processor (the part that does the *thinking* and resides in the system unit) connected to several peripheral devices. Typically, the computer's processor and a peripheral device will not be able to communicate directly with one another; so an intermediary, called an *interface*, is used between them. The interface is the electronic device that converts the signals from the processor into signals that the peripheral can understand, and vice versa. There will usually be one interface for each peripheral device in a computer system. The interface will also provide the physical means for connecting the peripheral to the system (in the form of a socket or connector, often called a *port*). For example, when you plug your keyboard into your system, the connector you plug it into is part of an interface (the *keyboard interface*) that is connected to the processor. The connector is just the part of the interface you see. If you look on the back of your system unit, you will probably see some other connectors (ports) as well.

The interface required for a specific peripheral, such as a printer, may not already be built into your system unit. If you don't have a built-in interface, you will have to install the interface. The interface you install will be in the form of a plug-in card (board) or adapter. This plug-in adapter contains the port (and the electronics) of the interface. Many system units include *expansion slots* into which you can plug such adapters. Since the internal electronics of an IBM PC, for example, are different from internal electronics of an Apple][, the adapter you would buy for an IBM PC will be different from its Apple][counterpart. The moral: it's a great idea to buy the correct adapter for your microcomputer.

You may have heard such phrases as *parallel printer port*, *asynchronous communications adapter*, or *serial interface*. These phrases refer to different types of interfaces. The common microcomputer interfaces come in two types: *parallel* and *serial*. Most microcomputer peripherals are built to connect to one or the other interface. Realizing that you must connect a serial printer to a serial interface is not enough to guarantee that the printer will work with your microcomputer. You will sometimes need to specify the *communications protocol* to be used by the microcomputer and the peripheral. The cable that connects the peripheral to the port on the microcomputer can be another source of incompatibility. Cables come in different configurations, though physically they may look the same to you. If you look at the plug on the end of a cable, you will see several pins or holes. To successfully connect a peripheral to an interface, the cable must correctly match each pin (or hole) at one end to its corresponding hole (or pin) at the other. The most common serial interface connector has 25 pins; not all peripherals use the same pins. Thus, just because a cable *physically* connects a peripheral to an interface does not guarantee that it will work. It must be configured properly for both the peripheral and the interface.

So far, we have considered only the hardware problems involved in adding peripherals to computer systems. The remaining problem is software compatibility. There is little point in adding a particular peripheral to your system if the software you intend to use won't work with it. So, make certain that the software will work with the peripherals.

Enough of the problems. Let us now consider a solution. When you wish to add a peripheral to your computer, follow this general process: first, find out from the peripheral's manual,

This may be your final issue.

advertisement, or vendor which software packages it is compatible with, and what type of interface the peripheral requires. Next, look in your computer's manual to determine if your computer has the required interface. If not (or if the interface is being used by another peripheral), you will have to add a new interface. Finally, find out the exact cable that is required to connect the peripheral to your computer's interface. If you are lucky, one of your friends will have already gone through the work of determining what cable and interface are required to connect the peripheral in which you are interested to a system *exactly* like yours, and you can buy the same stuff your friend did. If you take this approach, make sure that your friend's system is *really* the same as your system. In any case, you should now know what kinds of questions to ask.

News continued from Page 1 ----------

are working to make some SCSI hard drives available through the microcomputer discount program. There are several advantages to SCSI drives. The SCSI interface can have up to seven mass storage devices connected to it. SCSI drives are up to six times faster than drives connected to the Mac via the external disk drive port. All the SCSI drives we have seen so far allow you to start the Mac directly from the hard disk (without using any floppy disks). There are already six vendors competing in the SCSI market, so the price of SCSI drives should be fairly inexpensive. Given all these advantages, we think SCSI is the way to go if you want an external hard disk connected to a Mac Plus.

The other hardware change in the Mac Plus is the keyboard. The new keyboard includes a numeric keypad and cursor (arrow) keys. Because the new keyboard has a numeric keypad, it is larger than the original Macintosh keyboard and won't fit into the Mac carrying case. While we are on the subject of size, the Mac Plus system unit is exactly the same size as the existing Mac system units. The new 800K external disk drive is slightly longer and about half as tall as the original 400K external disk drive. The Mac Plus does *not* have a larger or color display (the screen is identical to the 512K Mac screen) or expansion slots.

Mac Plus Software

There have been several changes made in the Mac Plus system software. One difference is that the Mac Plus has new Read Only Memories (ROMs). The new ROMs are larger (128K) than the 512K Mac's ROMs. They incorporate several improvements over the original ROMs, such as support for the SCSI interface, the 800K disk drives, AppleTalk, a RAM cache, the Hierarchical File System (HFS), and a faster and enhanced version of QuickDraw. The *Control Panel* desk accessory has been enhanced so you can select how much memory to use as a RAM (Random Access Memory) cache. If the RAM cache is active, the Mac will allocate an area in RAM memory (a cache) to hold information from the disk (such as fonts, resources, and recently accessed sectors of the disk). The RAM cache speeds operation considerably because the Mac accesses the disk less frequently.

QuickDraw has been enhanced in the new ROMs. The new QuickDraw is faster at most drawing operations (which speeds displaying information on the screen from *all* programs). In addition, the new QuickDraw has some added features to improve support (such as letter placement) for the LaserWriter. (New versions of software such as Aldus PageMaker will take advantage of the extended QuickDraw support for the LaserWriter.) The Hierarchical File System (HFS) is an important change in the Macintosh software. Under HFS, a folder on a disk acts like a subdirectory (those of you who are familiar with IBM's PC-DOS know about subdirectories). This is an important change because it allows the Mac to work with higher capacity disk drives than was previously possible. HFS is used with the 800K disks and hard disks.

LaserWriter Plus

The LaserWriter Plus is an enhanced version of the existing LaserWriter. While the mechanical print-engine is the same as the original LaserWriter, the LaserWriter Plus has an expanded ROM. The expanded ROM contains some new fonts: *ITC Avant Garde, ITC Bookman, Helvetica Narrow, ITC Dingbats, New Century Schoolbook, Palantino,* and *ITC Zapf Chancery* in addition to the fonts for the existing LaserWriter (*Times, Helvetica, Courier,* and *Symbol*). The new fonts (as well as the original LaserWriter fonts) are available in a variety of styles (bold, italic, outline, shadow) and nearly unlimited point sizes.

Great, But What Does It Cost?

When Apple announced the Macintosh Plus, they lowered the price on the 512K Mac. The current BookCenter prices are:

- Macintosh Plus with MacWrite and MacPaint: $1580
- Macintosh 512K with MacWrite and MacPaint: $1060
- 800K external disk drive for Mac Plus or 512K Mac: $340
- Imagewriter II printer for Mac Plus or 512K Mac: $435
- LaserWriter printer: $3670
- LaserWriter Plus printer: $4210

The following bundle is available for a very limited time:

- 512K Macintosh with MacWrite and MacPaint and the original Imagewriter printer: $1265.

How Do I Upgrade My Mac?

If you already own a Macintosh you can upgrade your Mac to a Mac Plus. There are three steps in the upgrade path. First, you can get the *disk drive* upgrade. The disk drive upgrade replaces the internal disk drive with an 800K drive and gives you the new ROMs. The disk drive upgrade costs $225, including installation. We recommend that everyone upgrade their Macs at least this far. How often do you get to double the storage capacity of your microcomputer for $225? Apple has priced this upgrade aggressively because Apple wants you to upgrade to the new ROMs. Providing an economic incentive is the best way Apple has of moving Mac owners *en-masse* to the new ROMs.

The next step is to get the *logic board* upgrade. If you want, you can stop after you get the disk drive upgrade, but *you must get the disk drive upgrade to use the logic board upgrade.* The logic board upgrade (including installation) costs $425 for 512K Mac owners, and $565 for 128K Mac owners. If you get *both* the disk drive and logic board upgrade at the same time, you *save $25.* So, if you upgrade a 512K Mac disk drive and logic board at

Warning!

the same time the total cost is $625, including installation. The final step in turning a Mac into a Mac Plus is to buy the Mac Plus keyboard for $90.

If you have a LaserWriter and want to upgrade it to a LaserWriter Plus, you can do so for $540, including installation.

Both the Mac and LaserWriter upgrades are handled by ACSS Engineering Services. When you purchase your upgrade at the BookCenter, you will make arrangements to bring your equipment to Engineering Services to have the upgrade installed. We hope that the upgrades will be available by the time you read this; but Apple says it won't ship the upgrades until sometime in March, so have patience. In the HelpLine we have a Mac Plus you can try, and we have samples of the LaserWriter Plus's new fonts.

Zenith

We have two additional Zenith microcomputers in our HelpLine for you to try out: the portable ZFL-171 and the IBM AT-compatible ZW-241.

While supplies last you can buy a Zenith Z-148 with a 1220 (amber) or 1230 (green) composite video monitor and 512K of installed RAM for $1040. Allow 3-4 weeks for delivery.

AT&T PC 6300+

You can order the AT&T PC 6300+ (an IBM-AT compatible) from the BookCenter. The 6300+'s features include an 80286 CPU running at 6 MHz, a socket for an 80287 chip, a clock-calendar with battery back-up, and 512K RAM (expandable to 1M byte on the motherboard).

When you consider what to buy, keep in mind a potential problem when using the 1.2M byte floppy disk drive in an environment with IBM PCs (or compatibles) with 360K drives. The 6300+ can have at most *two* disk drives installed. Disks used (written) on the 1.2M byte drive cannot reliably be used (read) by 360K drives. Even if you format a disk for 360K, once you write on that disk with the 1.2M byte drive, the disks may become unreadable by machines with 360K drives. Disks formatted at 1.2M bytes cannot be read by 360K disk drives. Below we list the 6300+ configurations with university discount prices. *All three configurations include:* 80286 CPU, 512K RAM, a serial interface, a parallel interface, a video controller, a keyboard, a monochrome monitor, and MS-DOS 3.1/GW Basic.

- one 1.2M 5.25" floppy drive, one 360K 5.25" floppy drive: $3275.
- one 1.2M 5.25" floppy drive, one 20M hard drive: $4045.
- one 360K 5.25" floppy drive, one 20M hard drive: $4045.
- If you want a color monitor instead of the monochrome monitor, the configurations will cost $412 more. You can substitute the monochrome display part #37318 (at $188) for the color display part #37313 (at $600).

AT&T has announced that the 6300+ will be able to run UNIX and MS-DOS concurrently using OS-Merge software. OS-Merge is not yet available. As we went to press we had not seen an AT&T PC 6300+. Perhaps we'll have one in the HelpLine by the time you read this.

This may be your final issue.

Announcements

Warning! We're Culling Our Mailing List

Do you want to continue to receive this newsletter? If not, do nothing. We'll delete your name from our mailing list. If yes, act now. Fill out the coupon on the back page of this newsletter and return it to us.

We will remove your name from our newsletter mailing list unless we receive a written request from you to remain on it.

Press Releases

We have press releases which include information on the IBM RT PC and Apple's Macintosh Plus and LaserWriter Plus. Stop in the HelpLine if you want to read the official announcements.

WordPerfect Version 4.1

The BookCenter is selling WordPerfect (WP) 4.1 for $170. We have a WP 4.1 upgrade and the new manual and software in the HelpLine. You can upgrade your old versions, too. If you purchased WP 4.0 on or after 9-1-85, the upgrade is free. If you purchased WP 4.0 before 9-1-85, the upgrade is $45. To get the WP 4.1 upgrade, send your 4.0 manual's title page, your registration number, and check (if applicable) to:

SSI Update Department, 323 North State Street, Orem, UT 84057

Contact SSI Sales at 800/321-4566 if you have any questions about this upgrade procedure. Allow several weeks for delivery.

IBM Publications

The HelpLine and ACSS's Reference Room (Lind Hall, Room 128A) have copies of *IBM PC Seminar Proceedings* for your perusal. Seminar topics include: DOS 2.1, 2.0 and 1.1 Comparison; PC AT Architecture; and Professional Graphics Software. The programmers in the Micro Systems Group recommend these seminar proceedings. There is a wealth of in-depth technical information in these publications.

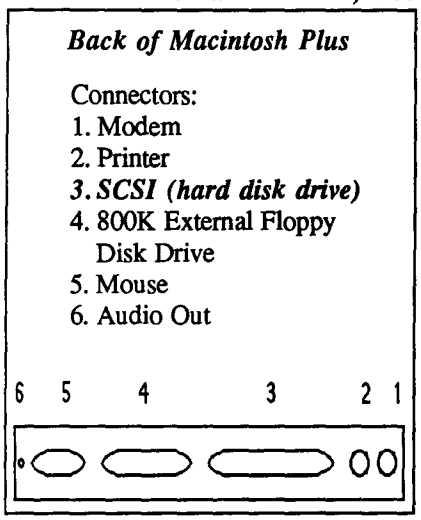
The HelpLine also has the Second Edition (October 1985) of *Engineering and Scientific Programs for IBM PC's available from non-IBM Sources.*

Microcomputer Labs

The lab in Room 9, Walter Library has some new equipment. There are eight IBM PCs, fifteen 512K Macs, six Zenith Z-148s, four Epson FX-80s, and four Imagewriters. By the time you read this newsletter we expect Walter Library will also have an Apple LaserWriter Plus, and a Hewlett-Packard LaserJet Plus. The lab's hours are 8 am-10 pm, Monday-Friday; 10-6 on Saturday; and 4-10 on Sunday. Call 373-4721 or 373-4727 for more information. To use the Walter Library lab, you must buy a *Microcomputer Lab Access Card.* The card costs $20 per quarter and allows you

to use the micro labs managed by the Information Systems department. These other labs are: 167 Social Science (376-3544); St. Paul Campus Library, Room B50 (376-3910); 14 Folwell (376-2741); 148 Architecture (376-9992); 170 Anderson (376-8651); B22 C.O.B. (no phone yet); and 306B Lind Hall (376-5846). To use a laser printer you must also buy a *Printer Access Card*. Printing on laser printers costs 10¢/page. You can purchase printer cards in $1, $2, and $3 increments. Lab Access and Printer Access cards can be bought at the Bursars offices.

Mac Plus Dies a Terrible, Scuzzy Death



The illustration at the left shows the six connectors on the back of the Macintosh Plus. The large "D"-shaped connector next to the two round connectors is a SCSI (pronounced *scuzzy*) interface. You use the SCSI interface to connect SCSI hard disk drives to the Mac Plus. Unfortunately, RS-232 (serial) cables also fit into this SCSI interface. Those who plug anything but a SCSI hard disk drive into the Mac Plus SCSI interface will ***destroy*** their $450 logic board. Don't let anyone plug anything except SCSI hard disk drives into the Mac Plus SCSI connector. Beware! Blowing the logic board by connecting an RS-232 device to the SCSI connector ***is not covered under warranty!***

Student Programmers Needed

From time to time we receive requests for referrals of student programmers. Typically, these requests come from University faculty and departments that have software projects that they need some programmers to complete. We are establishing a data base of University students who are interested in this type of work. If you are interested in being included in this programmer pool, visit the Micro HelpLine and fill out our questionaire. *Note: we do not guarantee that work will be available, only that we will add your name to the pool of student programmers who are interested in work.* We expect that most of the requests for referrals will come from groups that are working on software as part of Project Woksape, so knowledge of IBM PC equipment and programming languages will be a definite plus. However, if you are interested in programming other microcomputers, you are more than welcome to add your name to the data base.

Mac Software Updates

We have three software updates for Macintosh owners. First, if you have an *unmodified* 512K Macintosh and want to use the 800K external disk drive, you need some new software. An *unmodified* 512K Mac is a Macintosh that has not had the disk drive upgraded (and so still has the original ROMs). If your Mac has the new ROMs, you won't need the new software.

If you have an external 800K drive and an *unmodified* 512K Mac, come to the Micro HelpLine with an initialized disk, and we will give you the new software that supports the 800K external drive.

The second update is for MacTerminal Version 2.0. We will update your software if, and only if, you *bring your original* MacTerminal disk to the Microcomputer HelpLine.

The third update is for MacDraw Version 1.9. Again, we will update your software if, and only if, you *bring your original* MacDraw disk to the Microcomputer HelpLine.

Project Woksape

by Don Riley, Project Director

On August 1, 1985, IBM announced a three-year grant of $7.5 million in hardware and software to the University of Minnesota for research and development of educational software. At IBM's request, four colleges (Agriculture, Education, Institute of Technology, and Liberal Arts) participated in writing the original proposal and are currently participating in the first year of the grant. Over the three years of the grant, it is expected that all of the collegiate units on the Twin Cities campus will become part of the grant, on a competitive proposal basis. Unfortunately, IBM stipulated that the grant was for the Twin Cities main campus only.

Within the next month, information will be provided to the collegiate offices on the type of projects that will be considered, the procedure for submitting proposals, and the evaluation criteria. In general, acceptable proposals will be those for small, pilot projects for innovative use of computers in education at the University. Proposals whose main purpose is to merely satisfy a resource or funding problem will not be considered. In general, the vast majority of projects will involve software development. Proposal submission will be from the college office, through your college computing coordinator -- not directly to the Project. I ask that anyone interested should wait until that information gets to the college office, rather than calling my office.

To provide technical support for project Woksape, IBM has two full-time persons assigned to the University, located in the project office: Mr. Al Becker and Mr. Bob Heggestuen. The project office and mailing address is: Project Woksape, 139 Shepherd Labs, 100 Union Street SE. Phone: 612/376-2390.

Advisory Board

I have formed and have been meeting with a Project Woksape Advisory Board, to serve in an overall project advisory/guidance function, to assist in proposal/phase solicitation and review, etc. Currently this group includes: Keith Wharton, Agriculture; Carol Carrier, Education; Russ Hobbie, I.T.; Jean Cameron, Liberal Arts; Shih-Pau Yen, Academic Computing Services and Systems; and Mary Marshall, IBM. As we begin to solicit proposals for the next phases, I expect to expand this group to include representation from other college units.

Warning!

PILOT: Authoring System

The University has obtained a site license for PC/Pilot, an authoring system, from the University of Washington. IBM has a license to market this software under the name IBM/PILOT. Copies of the software can be obtained from either the Micro HelpLine or the Learning Resources Center in Diehl Hall -- *bring two formatted disks.* Manuals must be ordered directly from the University of Washington. They cost $25 with a pretty blue binder that says Pilot on the outside or $18 without a binder.

Pilot was designed to provide capabilities for the presentation of instructional material. One of the things that seems to be most useful and provides tremendous flexibility is that compiled programs can be called by a Pilot program. The Pilot program can be used as a flexible command interface to "front-end" existing stand-alone programs.

ADVICE: Ask Dr. Micro

Q: I understand that the University is installing a new telephone system, and that this new phone system will let me use my microcomputer to communicate with other computers without using a modem. Is this true? Someone told me that I won't be able to use the modem I already have with the new phone system. Why not?

A: Yes, the University is installing a new phone system and one of the capabilities of the new phone system is the ability to use microcomputers (and dumb terminals, for that matter) to communicate without using modems. To communicate without modems, you must have the proper equipment installed. There are two types of phones you can have installed as part of the new phone system. One of the two types of phones uses a digital phone line. (The telecommunications people refer to a digital phone as an ITE or *Integrated Telephone Equipment.*) As an option on the ITE you can get a *Data Option Board* (also known as a DOB). If you have an ITE with a DOB, the data option board replaces the modems we have been using until now. To use the DOB you will connect your microcomputer (or terminal) to the DOB connector on your new telephone. The high speed communications that will be available through the new phone system (typically 9600 baud) is one of the reasons that using a digital phone line and a DOB, instead of a modem, is so attractive. The modems you have now probably have a top speed of 1200 baud. High speed communications are possible because most of the phone lines in the new phone system are *digital.* When you are talking (using your voice) over a digital phone line, your voice is translated into a digital stream of information; and this digital stream is transmitted through the phone system. Since the phone system is dealing with voices as digits, it is easy for the phone system to send computer data (since computer data is also a digital stream of information).

So far we have talked only about communications *within* the University phone system. You will also want to communicate with computers that are located *outside* the University, or call computers inside the University from home. If you think about it, when a computer needs to communicate with another computer and the call crosses the boundary between the University phone system and the rest of the world, some magic must happen. The rest of the world is not necessarily using a digital phone system, so if you have a digital phone line, some translation (i.e., magic) must occur. The magic is accomplished by having a pool of modems that are connected to the outside world. Whenever you use your microcomputer to call a computer in the outside world from a digital phone line, one of the modems in the modem pool will be used, so the computer in the outside world gets what it is expecting: a modem. When a computer from the outside world calls a DOB on a digital phone line, one of the modems in the modem pool is used as an intermediary between the University phone system and the incoming call. We told you it was magic, right? The good part of this magic is that digital phone lines give you high speed communications within the University, and you are still able to communicate outside the University. If you have a DOB, all this good stuff happens, and you don't need to have a modem between your microcomputer and the phone system.

Alas, magic always has a few cases it *doesn't cover*, and this is also true of the new phone system. First, the characteristics of a digital phone system are such that the modem you already own won't work over a digital phone line. So (at least if you want high speed communications), it is likely that you will stop using the modem you have now and start using a digital phone line and a DOB once the new phone system is operational. There is an alternative to using a digital phone line, and this alternative does allow you to use the modem you already have. If you get an *analog phone line*, you will be able to use the modem you already have. The drawback to analog phone lines is that the communications speed you are limited to is the top speed your modem will handle (probably 1200 baud). (The type of phone you will get if you have an analog line is called an STE or *Standard Telephone Equipment.*)

There are a few unresolved issues on which we and the Telecommunications Department are currently working. One potential annoyance is that you *might* need to purchase a different cable to connect your microcomputer to the DOBs on the new telephones. (The cable you use now to connect to your modem may not work.) If new cables are necessary, we will make the cables available through the Minnesota BookCenter.

Another potential problem will affect people who get digital phone lines (and DOBs) and use software that relies on having a D.C. Hayes (or compatible) modem. The D.C. Hayes modem won't work over a digital phone line, and quite a bit of the software that is written for the D.C. Hayes modem expects to use the Hayes modem to automatically dial the phone (from program control). While the new phone system has the capability of automatically dialing the phone from program control (or from a terminal keyboard), the protocol used to tell the DOB to dial a number is incompatible with the D.C. Hayes protocol. It *may* be possible to make the new phone system's automatic dialing commands Hayes compatible. We are looking into the issue. As the new phone system gets closer to becoming operational, we will have more information for you.

This may be your final issue.

Please be Legible.

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March 1986

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