

Computer and Information Services Newsletter

Information Services

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▼ News and Announcements	Page
Undergraduate Computing Issues	113
Central System News:	
LISREL and PRELIS Updates on VX	118
Cleanup of Old Statistical Software	118
New ACM Algorithms on VX	119
▼ Reviews, Services, and Tutorials	Page
E-Mail, Password Tips	120
NetWare File Servers	122
Tales from the Network Woods	124
Engineering Services	
Notebooks, Laptops, Portables	126
Computer Components: Handle with Care	126
Hard Disk Drives	126
Bargains	
POPmail/PC version 3.0	126
Update - Math and Statistical Source Code ..	127
Tips, Tricks, Tutorials:	
System 7 and Cantankerous Keyboards	128
HP LaserJet 4 and 4M Tips	132
Book Center: 625-3854	
IBM ValuePoint Systems	130
New Mac Memory Prices	131
Printers: New and Changed:	
• HP DeskWriter 550C and DeskJet 550C....	131
• HP DeskWriter C and DeskJet C	131
• HP LaserJet 4 and 4M	131
• Apple LaserWriters	132
• HP LaserJets IIP, III, IIISi	132
New Modems:	
• MultiTech and Practical Peripherals	132
Training Resources: 75 new packages	133
1993 Calendar	138

Undergraduate Computing Issues

Don Riley, Acting Associate Provost

Below we present the results of a Delphi study that was conducted (and transmitted) via Electronic mail by Chris Michael at Northwestern University. In this study the participants' answers were edited to remove identifying information. Then the answers were organized into broad categories and representative comments are included for each category. The study provides an interesting comparison to the *Vision and Strategy for Computing and Information Technology*. This report was developed by the University of Minnesota's Advisory User Committee, and it is available on Gopher, as shown in Figure 1.

A. Methodology

The list of issues that follows was obtained using the Delphi technique and represents the collective wisdom of a group of faculty and professionals involved with undergraduate computing.

The Delphi technique is a method of obtaining group consensus using experts who communicate anonymously with each other. Each expert's responses are fed back to the entire group for comment. Because the contributions are anonymous, the ideas can stand or fall on their own merits free from any consideration of rank or position. Since this is a written process, it's well suited to being used by E-mail.



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In this case our group of experts were selected from respondents to a previous survey plus some additional local names. Participation does not, however, imply endorsement of the results. Names of participants are listed at the end.

Participants were asked to "list in order of importance not more than ten issues concerning the use of computers and technology in undergraduate education and to give a brief explanation of why each choice is important." Their answers were edited to remove identifying information and organized into broad categories. This organized information was then sent back to the group with a request that they rank the categories. This process was repeated once more to achieve the final list of issues.

B. Ordered List of Issues Regarding Undergraduate Computing

Nine broad categories were identified as being most important to the support of undergraduate computing. They are listed here in order of most to least importance and representative comments are included for each category.

1. Information Technology Infrastructure

Access to a wide variety of networked information resources should be provided as broadly as possible to the students and faculty of the University. As a favored means of access, computer networking should become available ubiquitously – in faculty offices, dorm rooms, library study areas. To accommodate off-campus uses and speed the overall transition to greater reliance on networked information, telecommunications modems should be strongly supported in the short term.

Campus-wide information systems (CWIS) should be developed to become primary communication media for their universities.

University libraries should provide online bibliographic access to a wide variety of literatures supporting the undergraduate curriculum, and should publicize such access highly.

Almost everything we think of today presupposes existence of easy and reliable methods for electronic communication on campus. We need to insure that students can access the campus network freely and easily from dorms as well as labs.

My top priority would be student access to a high speed network in the dorms. Ideally a "port for every pillow" with the expectation that students will provide their own computers. In conjunction there should be "application servers" using, for example, key server technology to provide student access to selected software. Instructional use of computers won't really take off until students use computers routinely for more than word processing. This is happening and can be sped up by institutional initiatives. But the bottom line prerequisite is for each student to have direct access to a high quality network.

A coherent information technology infrastructure, including campus-wide TCP network, campus servers (file servers, name servers, news servers, information servers, cpu servers, mail store and forward,...), access to internet, strong technical support for a limited range of computer platforms, and committed professional computer support staff. Without such [an] infrastructure many projects will flounder and the critical mass of users will be much slower to develop.

Design an infrastructure that is itself a learning environment. Make the network a place where students can learn things they need to do well in their courses. This requires certainty on the part of faculty that all students can access the network. Access needs to find its way into all the contexts where students learn – e.g. the library, their dorms or homes, classrooms, labs, and even places like museums and lounges. Obstacles such as accounting systems, lack of equal access, and dependence on terminal host relationships need to be eliminated.

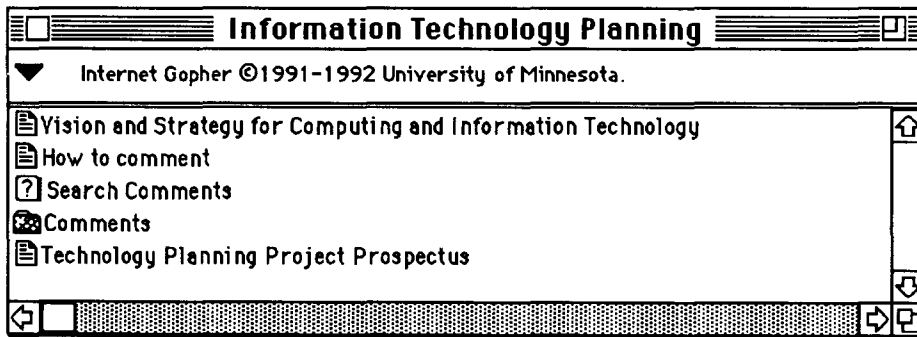
2. Instructional Technology

For Computer[s to become an] integral part of instruction, faculty need easy to use tools that they can mold to meet their own needs and adapt to their discipline.

Mechanisms of support for faculty to incorporate information technology into their teaching – support includes professional consultation; openness to revised curricula; financial, equipment, and staff support for challenging projects which contribute to the institutions strategic goals; a process of evaluating and rewarding faculty achievements in this area.

Curriculum development support – a program to help faculty develop new ways to include computing in their courses (adapting existing materials, developing multimedia or software, learning to use computer-enabled lecture halls or computer classrooms – [is] essential if computer use is to progress beyond the few faculty who undertake

Figure 1
Found under U of M Campus Information/University Planning sections.



development on their own time and talents. Ups – provides a direction to faculty so that there aren't a lot of diverging unsupportable initiatives, provides faculty sense that this is institutionally approved and supported and therefore safe to commit their time to, improves learning environment for students. Downs – more difficult than facility support, faculty harder clients to support, requires new sets of skills (instructional design, media), time consuming, apparently less productive than other demands on technical staff, costly.

- Mechanisms of support for computing, library, instructional design staff who support these efforts. They need to [be] made part of collaborative process and play an appropriately professional role if we are not to turn the faculty into technologists. Thus they need and deserve institutional support, recognition, and rewards for their efforts, including support for continued professional development.
- [The] Computer needs to be fully integrated into courses and used as casually and comfortably as pencil, paper or books.
- Greater encouragement for faculty to integrate computing into their regular worklife should be offered through such mechanisms as subvention for equipment and network connections, the development of "class records management tools," and individualized (perhaps peer-provided) instruction to faculty on the use of software tools which contribute to research productivity.
- Integrate appropriate computing applications into the standard curriculum. Examples: writing courses need to make appropriate use of computer based writing tools. Mathematics (and courses in physics, biology, engineering, economics, and the like that use math) need to use appropriate computer based tools for manipulating mathematics. History courses need to use databases. Statistics courses

need to use appropriate statistical software and data. The tools should support, enhance, and extend learning in courses and on tasks faculty and students view as very valuable. The use of the computing tools in the curriculum is the standard for judging how much to invest and for evaluating how much progress is being made.

3. Labs and Facilities

- Ready access to core computing resources, including personal computers and mainframes. Students need sufficient access to the computing resources necessary to do their tasks. This means access to personal computers at a ratio of 15 to 20 students per workstation with these workstations located in places convenient to the students' work habits (i.e. libraries, residence halls, academic buildings, etc.). When needed, access to other computing resources such as mainframes and supercomputing should be available.

Consistent and Reliable Hardware and Software

- One lab should be the same as another in regard to capabilities. Students should not have to search out the lab they need or move from one lab to another to work on different class assignments. Multimedia products, for example, are very demanding, and we are cultivating a culture of haves and have-nots on university campuses.

Rich Applications and Information Environment

- Most everyone needs some standard production tools (word processing, spreadsheets, programming languages, etc.) but there is a migration towards higher end tools: interactive writers, scientific data analysis and visualization, x windows, electronic publishing etc. CWIS's [campus-wide information systems], access to library holdings and information, and internet are quickly becoming standards.

Experimental Labs

- At some level I think [the] campus ought to stay tuned to the cutting edge. Not everyone can afford a satellite downlink, CD-ROM Towers, multimedia libraries, etc. But, campus[es] cannot afford to miss the opportunity to cultivate that expertise among their students and faculty.
- Dorm and departmental clusters (here assumed to be smaller, and not under central control) – important for convenience of access, particularly to departments with high levels of technical competence or interest in using

computers in learning/teaching, or where public access is inconvenient or unsafe.

Support the Development of Departmental Facilities and Support Personnel

The size and heterogeneity of the environment requires specialization. Personnel with discipline specific knowledge can best integrate technology with the department's academic mission. Central computing needs to make sure that the independently developing units are integrated into a cooperative environment. The advantage is that students are more likely to encounter equipment and software specialized around their needs and personnel able to understand and help them. The disadvantage is that the forging of a new relationship between computing and the institution is organizationally threatening and likely to result in service disruptions.

Support for the Handicapped

10.5% of college students report having a disability of some type according to the *Profiles of Handicapped Students in Postsecondary Education* (Greene and Zimbler, 1989). There is a need for access. Electronic communication and computing creates barriers for those with disabilities.

4. Consulting and Support

Consulting – available in the laboratories on a dependable basis to provide for keeping the lab up and running and to help students. Students have a lot to do and technology should aid rather than hinder them. The need is for training and funding to provide an effective consulting function.

User training and consulting – a program to train and answer questions for faculty and student users – important to reduce resistance to using computers, provide a common floor of skills and understanding, save user time by providing expert help.

There is a need to promote the use of semi-standard software packages and to offset the problem of software piracy. Campus site licenses making software available at low cost are needed.

5. Central Administration

A commitment and support by central administration – it is very important that the administration is committed to provide the best computing environment for the students.

Educational computing is unlikely to be adequately supported until administrations understand what it is about. This will only begin to happen when administrators use computers themselves. This is happening but much more slowly than it is happening with faculty (which in turn is slower than it is happening with students.) If I were running a networking/computing center I would make every effort to offer the best new services to key administrators as soon as possible (this assumes the administrators or their staffs are at least minimally receptive and the service is robust).

6. Funding

Budget planning – a sensible way to provide funds to renew resources provided for undergraduate computing – needed since otherwise progress is dependent on one-shot and opportunity funding, and although undergraduate computing resources are thought of as fundamental like library services, they are not in most base budgets.

Make sustained investments. Examples: expect to replace most computing equipment at least on five year cycles, so replacement of one fifth of the equipment each year is a reasonable pace. By replacing one fifth each year, one fifth of the stock is new every year and so one can buy equipment to support new software every year. Because price-performance will continue to improve, one can expect to get more for one's money over time and expect to see new software that requires more speed, memory, and storage. The frontier for undergraduate computing will continue to expand and so by buying some new machinery annually, one can more easily help faculty keep closer to the frontier.

Seek to support the computing in the curriculum at a low cost. Examples: if student owned machines avoid the expense of dedicated lab space with its necessary security measures and maintenance costs, then promote individual ownership. If relying on a single vendor fails to yield competitive prices, maintain an environment open to several vendors. Look for educational discounts and site license pricing to lower the cost of software. Invest in networks and infrastructure so as to be able to capture economies of scale where they exist, for example, in data storage and in high performance systems. Use competitive bidding wherever possible to lower costs. Computing is expensive and the financial resources should be carefully husbanded so that they do the most good.

7. Vision and Planning

A vision of how information technology could further the academic aims of the institution, coupled with a commitment to realize those aims and institutional (i.e., senior administrative) commitment to a substantive role for information technology. Without institutional commitment and some direction or coherent strategy, sound and innovative applications of information technologies will continue to take place only in small corners where zealots, opportunistic vendors, and faculty heedless of their own self interests happen to coincide.

An openly stated strategy and written plan tell the faculty and students what to expect. Ideally, they also tell how to participate and how directions are set, when to expect what developments, and so on. In the absence of a plan, faculty won't buy into using computers wholeheartedly, and each department or college makes its own conflicting decisions. Upside: coherence, sense of progress, realistic expectations. Downside: significant effort and public commitment, particularly if planning involves broad base and/or consensual participation by faculty. UG [undergraduate] computing strategy is part of bigger picture. Need a total IR [information resources] plan.

8. Electronic Classrooms

Many courses can benefit greatly by having a very good quality computer display setup which is well maintained. This will be increasingly true in the future. Faculty need to be able to develop information displays and show them to their students. If an interactive program is involved (e.g. Maple, Mathematica, simulations) then that software should be available to students and the instructors demonstration materials should be available for students to use and modify.

Computer-enabled lecture halls – rooms where the teacher can use and display the results of using a computer as part of the conventional teaching process. Required to bring computing into the mainstream of instruction, particularly useful with large groups and in curricula where multimedia materials are appropriate and available.

Most campuses need more facilities for incorporating computing into the classroom, but probably not much more. I think that the new facilities planned for * [sic] will go a long way toward relieving the demand. Unlike some, I do not think that there will be much demand for presentation software (I say this as one of the few instructors who have used it regularly in class), and those who actually use computers in their classes will level out at a relatively small percentage of classes offered.

Portable computing equipment for use in “regular” classrooms. I'm finding that more faculty want to use technology in their classroom ad hoc than want to reserve an electronic classroom two months in advance so they can use technology on a daily basis.

9. Off-campus Access and Student Computer Ownership

All students should be offered adequate computing resources upon their admission to the university, so that they understand that their use of computing is to be considered like their use of the library. E-mail should be as accessible as possible and become a standard means of official university communication with individuals.

Give students the opportunity to purchase their own personal computers with institutional backed financing.

Those students who live off campus also need to have good access to networking resources via some kind of communication servers.

C. List of Participants

Brown University

Steve C. Andrade

Indiana University

Susan F. Stager, University Computing Services

Northwestern University

Chris Chen and Brian Nielsen, ACNS

Josh Dranoff, MEAS

John Franks, Math

Notre Dame

James R. Wruck, OUC-Systems

Pennsylvania State University

Jim Kerlin, Center for Academic Computing

University of Chicago

David Bantz, APC

University of Florida

Mark P. Hale, CIRCA

University of Iowa

Donald McClain, Weeg Computing Center

University of Minnesota

Don Riley, Academic Affairs

University of Texas

George Culp

University of Wisconsin-Madison

Tad Pinkerton, Div. of Info Tech.

Vanderbilt

Malcolm Getz

Central System News

▼ LISREL and PRELIS Updates on VX



The LISREL statistical package that analyzes linear structural relationships and its companion program PRELIS are being updated on the VAX VX system on Sunday, December 20.

LISREL goes from version 7.16 to 7.20 and PRELIS goes from version 1.16 to version 1.20.

Because the differences between versions are very minor and are mostly corrections to errors, the

old versions will not be kept on disk. We'll back them up on tape for about three months in case there are any problems. To see a four-page list of the differences between versions, enter this command on VX:

```
LISTDOC LISREL7
```

▼ Cleanup of Old Statistical Software

Because of staff reductions, we will no longer be able to support as many versions of statistical software on our central computers as we did in the past. The many versions also take up valuable disk space. Thus, we'll delete the old versions of the software listed below on Sunday, December 20, 1992.

On December 20 we will delete old versions of the software listed below from VX and VZ.

SAS 5.18

We will remove version 5.18 of the SAS (Statistical Analysis System) package from machines VX and VZ. The only available version after that will be 6.06. To our knowledge, the old version 5.18 isn't being used.

We are in the process of installing version 6.07 which will be announced in a future newsletter.

SPSSX 3.11

We will remove SPSSX (Statistical Package for the Social Sciences) version 3.11 from the VX and VZ machines. The only available version after that will be SPSS 4.0 which is upward-compatible with SPSSX.

EQS 2.0

We will remove the EQS version 2.0 linear structural equation statistical package from the VX machine. The only available version after that will be EQS version 3.0, known as EQS3. It is upward compatible with version 2.0.

*Have you
backed up
your software
documents
lately?*

▼ **New ACM Algorithms on VX**

On a VAX VX disk we keep the ACM (Association for Computing Machinery) collected algorithms as published in the journal *ACM Transactions on Mathematical Software (TOMS)*, starting with algorithm 493 from March, 1975. We also include selected algorithms from 380 to 490. We recently added algorithms 688-701, published in the June, September and December 1991 issues of TOMS and they are listed below.

To access the algorithms on VX, use the CALGOPL program that copies a single algorithm to your designated file. The command is:

```
$ CALGOPL number file
```

where *number* is the algorithm number from 493 through 701 and *file* is the name of the file to which the algorithm will be copied. The default type for *file* is .LIS and, if you don't supply a file name, the default name is *ALGnumber.LIS*.

For example,

```
$ CALGOPL 701 SAM
```

writes algorithm 701 on file SAM.LIS and

```
$ CALGOPL 500
```

writes algorithm 500 on file ALG500.LIS.

We have added the line

```
ALGnumber
```

to the beginning of each algorithm to make it easier to check which algorithm you copied.

For more information about CALGOPL, see the on-line document obtained with the VMS command

```
$ HELP CALGOPL
```

The journal *ACM Transactions on Mathematical Software* is available in the Computing Information Center, 1 Nicholson Hall.

Algorithm	Lines	Description
<i>Volume.Issue 17.2</i>		
ALG688	8819	EPDCOL: A more Efficient PDCOL Code
ALG689	10123	Discretized Collocation and Iterated Collocation for Nonlinear Volterra Integral Equations of the Second Kind
ALG690	8653	Chebyshev Polynomial Software for Elliptic-Parabolic Systems of PDEs
ALG691	4693	Improving QUADPACK Automatic Integration Routines
ALG692	11263	Model Implementation and Test Package for the Sparse Basic Linear Algebra Subprograms
ALG693	9745	A FORTRAN Package for Floating-Point Multiple-Precision Arithmetic
<i>Volume.Issue 17.3</i>		
ALG694	2039	A Collection of Test Matrices in MATLAB
ALG695	1040	Software for a New Modified Cholesky Factorization
ALG696	1493	An Inverse Rayleigh Iteration for Complex Band Matrices
ALG697	1074	Univariate Interpolation that has the Accuracy of a Third-Degree Polynomial
<i>Volume.Issue 17.4</i>		
ALG698	5910	DCUHRE: An Adaptive Multidimensional Integration Routine for a Vector of Integrals
ALG699	611	A New Representation of Patterson's Quadrature Formulae
ALG700	4944	A FORTRAN Software Package for Sturm-Liouville Problems
ALG701	4485	Goliath — A Software System for the Exact Analysis of Rectangular Rank-Deficient Sparse Rational Linear Systems

E-Mail, Password Tips

Passwords are Protection



We encourage everyone to change their password when they first access their E-mail account. Since most initial passwords are student identification numbers or Social Security numbers, passwords can be obtained with little effort. We have already had cases where accounts were compromised, resulting in people sending mail under someone else's account name. Whether the result is malicious or just mischievous, this constitutes inappropriate use of University resources.

Please safeguard against this situation by changing your password. Do not let others use your account as a springboard to attack others or damage your reputation.

Changing Passwords

To change your password you must log into the mail server (host) computer through the Interactive Session. If you are familiar with the Interactive Session, changing your password is rather simple. Start by selecting *Housekeeping* from the *Main Menu*, as shown in Figure 1.

Figure 1: Interactive Session

```

Main Menu

(1) Mail Services
(2) Information Services
(3) Housekeeping
(H) Help
(Q) Quit
  
```

Under the *Housekeeping* menu, select *Change My Password*. As is typical when changing any password, you will first be prompted for your old password followed by a prompt for your new password.

After entering your new password, you will be prompted to reenter the password. This is to ensure that you have typed exactly what you intend your password to be. If you make a mistake, you must choose *Change My Password* again from the *Housekeeping* menu to repeat the process.

See *Accessing the Interactive Session* below for more detail.

Acceptable Passwords

Before entering your new password on the Interactive Session, here are some things to keep in mind.

Do not use the following symbols

@ # \$ or the delete character

Although the system will appear to accept these symbols for your password, the next time you try to log in, your new password will not work.

The minimum number of characters you can use in a password is five; the maximum is eight. We recommend that you use eight. Your challenge is to design a password that you can remember but others cannot guess. The most difficult passwords for a determined thief to obtain tend to be a random sequence of upper and lower case letters, the kind of password obtained from using the leading characters from a phrase. Including some numbers makes the password even more difficult to obtain.

Below is a sentence and two passwords we created using the first character of each word. The passwords also include numbers; we selected 2 because of the word "to" and 5 because it resembles the letter S. Because UNIX (the Interactive Session's operating system) is case sensitive, we can use the same phrase to create different passwords just by changing the mix of upper and lower case characters.

```

He learned to whisper in a saw mill.
HL2WiaSM
hltwIA5m
  
```

For Maximum Security

Keep your password a secret, and be wary of people looking over your shoulder when you type it in.

Thieves look for typical patterns when they try to steal passwords, such as words in a dictionary or words and numbers that are associated with you, including the reverse of any of these. For maximum security, avoid these easy password choices.

If You Forget Your Password

Since we are security conscious, you must follow special procedures to get us to give you a new password. You may need help changing your password if you forgot it or if you used an "illegal" character, that is, @ # \$ or the delete character.

Students passwords can be changed at any Public Computer Facility that Computer and Information Services manages. Our facility attendants have password change request forms. Students must pick up the form in person, and submit the completed form and their student ID to the attendant. If everything checks out, the student will be able to use their E-mail account in a couple of days.

Staff or faculty must call 626-8366 in order to have their passwords changed.

Accessing the Interactive Session

Whether you are off campus or on campus, here are the typical ways to access the Interactive Session:

- A. Use a modem to dial into the University's system using communications software such as Procomm or Tin-Can.
- B. Use a 2400 or 9600 baud modem to dial into the SLIP server, then start up the NCSA Telnet software.
- C. Those with direct network connections, including those in Public Computing Facilities, will use NCSA Telnet and can follow the Telnet instructions below.

Regardless of the access method you use, the process is essentially the same. In addition, since student account information is kept on *gold* and employee account information is kept on *maroon*, each group must access a different machine, i.e.

```
gold.tc.umn.edu
maroon.tc.umn.edu
```

A. Communications Software and Modem

- ① Set up your communications program to dial the appropriate phone number, which is dependent on your modem's baud rate. The phone numbers for Telecommunication's Dial-In Server are: 626-1200 for 1200 baud modems, -2400 for 2400 baud modems, and -9600 for 9600 baud modems.

These numbers also work for people on campus who use STE (standard telephone equipment) phones. However, on campus users with special phones, such as ITE (integrated telephone equipment) or ADI-100 (asynchronous data interface), should dial 626-2400 (they will automatically be assigned access to the highest communication rate available.)

When the screen displays the word *CONNECT*, you must press the `[Return]` or `[Enter]` key to get the attention of the terminal server. Press the `[Return]` or `[Enter]` key repeatedly until you see

```
access>
```

- ② At the `access>` prompt type the name of the appropriate machine, i.e. `gold.tc.umn.edu` for students and `maroon.tc.umn.edu` for employees.

- ③ See steps 4 and 5 below.

B. MacSLIP and SLIPDIAL Access

Regardless of which machine you are using, your first step is to establish a SLIP connection; then you start up Telnet.

Telnet: Using an IBM-compatible

- ① The following change directory (`cd`) command works if you have installed NCSA Telnet in a directory called *nlsa*.

```
cd \nlsa
```

- ② What you type next depends on whether you are a student or an employee. (Student account information is kept on *gold*; employee information is kept on *maroon*.)

```
telnet gold.tc.umn.edu
telnet maroon.tc.umn.edu
```

- ③ See steps 4 and 5 below.

Telnet: Using a Macintosh

- ① Launch Telnet (sometimes called NCSA/BYU Telnet) by double-clicking on its icon.

- ② From the *File* menu choose *Open Connection*. What you type in the dialog box that appears depends on whether you are a student or an employee, i.e. `gold.tc.umn.edu` for students and `maroon.tc.umn.edu` for employees.

- ③ See steps 4 and 5 below.

Steps 4 and 5 for A and B

- ④ Type in your login or username. Below are two examples. The first example is a student username. The second is a staff username.

```
jone0089
jones007
```

- ⑤ Type in your password.

For POPmail Users

POPmail is a program that interacts with a host system, for example to retrieve mail from the host. You cannot change your student, faculty, or staff passwords within POPmail; you must use the Interactive Session to change it.

Once you have changed your password by accessing the gold or maroon host, you will probably want to save those changes in POPmail. To do this, start by selecting POPmail's *Setup* menu. On the Mac select the *Set username and server* menu. On IBM PCs select the *Networks* menu. Both menus let you type in your password to match your password on the host.

Help

Remember, if you are having problems or are unclear about something, you can call the E-mail Help Line at 626-7676.

For more information on Telnet, SLIP, and other topics read *E-mail, Some Basics* in the November issue of our newsletter. (Gopher users should look for the newsletter section under *Computer Information*.)

NetWare File Servers

Overview



Our Microcomputer HelpLine receives enough requests for recommendations regarding NetWare file servers, that we decided a newsletter article was in order. However, before we discuss recommendations for NetWare file servers, we will briefly cover some terminology.

Network

A collection of computer hardware and software that allows computers to talk to each other.

LAN

A Local Area Network, that is, a localized network connecting computers in a relatively small area such as a single department or lab. LANs are often connected together, forming much larger networks like our campus-wide network.

Novell's NetWare

Novell is a company that makes a product called NetWare. NetWare is a network operating system, the software component of a network. NetWare is becoming increasingly popular on campus, especially for networks connecting mostly IBM-compatible computers. We support NetWare and have a site license for it.

File Server

With NetWare, the computers on the network share information and resources by accessing a common computer that is known as the file server.

File Server Hardware Considerations

Now that we have covered some basic terminology, we can give you some recommendations for the kind of computer to buy for your file server.

CPU (Central Processing Unit)

The computer you use for a file server must be based on Intel 80286, 80386, or 80486 chips, which usually means that the computer is an IBM-compatible. Which of these you can use for a file server depends on what version of NetWare you purchase.

NetWare 2.2 works with a file server that has an Intel 80286 or higher CPU. NetWare 3.11 requires that the file server have an Intel 80386 or higher CPU. For more information on the differences between NetWare 2.2 and 3.11, see *Bargains* in our June 1992 newsletter. Look under *Computer Information* on gopher, or on page 274 if you have a paper copy of our newsletter. We recommend NetWare 3.11 for many reasons, for example because it is easier to install, maintain, and upgrade than NetWare 2.2.

Storage: Hard Disk

The size of the hard disk(s) you need depends on how much information you want to store on the file server. When you are making size estimates, count on NetWare to take up about 20MB of disk space. For file servers we recommend you purchase a larger hard disk, such as 200MB. You will probably want to add even more hard disk storage space in the future, so investigate whether or not you can and if so, how.

RAM: Random Access Memory

To run NetWare, the file server needs a minimum 4MB of RAM; 8MB is a more realistic minimum. The NetWare

manuals have a formula for figuring out how much RAM you need. This formula takes into account the size of your hard disk as well as other factors.

Buses: AT, ISA, MCA, EISA

Different IBM and IBM-compatible computers have different buses. The IBM PC/AT has an AT bus, also known as ISA (Industry Standard Architecture). Most IBM PS/2 computers have the MCA (MicroChannel Architecture) bus but some have the old AT-style bus. Some IBM-compatibles have ISA buses and some have EISA (Extended Industry Standard Architecture) buses. IBM's new ValuePoints have ISA buses.

All of these buses work on NetWare file servers. However, over time your network will probably grow and be used more heavily. This can slow down your network. A computer with an MCA or EISA bus will give you more options for increasing the throughput of your network.

Novell Certified

First, some more background. Usually when you use an IBM-compatible computer for anything, the computer has IBM-DOS or MS-DOS installed and running and then other applications are installed and run on top of DOS. In other words, DOS applications, such as WordPerfect and Lotus 1-2-3, do not talk directly to the computer hardware. Instead they talk to DOS and let DOS talk to the hardware. In the file server, NetWare does not run on top of DOS. NetWare needs to talk directly to the file server hardware.

IBM-Compatible versus Novell Certified

The term IBM-compatible means that the computer is compatible with DOS, not necessarily with NetWare. However, you can guarantee that NetWare will run on your file server if you buy a computer that is Novell certified.

Of the computers that have been sold recently and are currently sold in the University bookstore, the following have been certified by Novell for use as NetWare file servers:

- All IBM PC/ATs, PS/2s, and Value Points
- ZEOS Upgradable System 386-25
- ZEOS Upgradable System 386-33
- ZEOS Upgradable System 486-33

In the file server, NetWare does not run on top of DOS. NetWare needs to talk directly to the file server hardware.

If you want to use some other microcomputer for the file server on your NetWare network, we suggest that you find out whether or not it is Novell certified for use as a file server. To do this call the vendor or manufacturer of the microcomputer. AmeriData also handles many Novell products; you can call them at 290-4305 and inquire about Novell certification.

If you already own a computer and want to use it as a file server but it is not certified, you can try to use it anyway. It might work, or it might not.

Incompatibility Insurance

We recommend that you use a Novell certified computer because if you have problems using a Novell certified computer as a file server, Novell will help fix the problem. However, if you are using a computer that is not Novell certified as a file server and are having problems, Novell will attempt to help, but if the problem is not solved easily, Novell will assume that the problem is an incompatibility between your computer hardware and NetWare.

Conclusion

If you are buying a new computer to use as a file server with NetWare version 3.11, we recommend buying a computer with the following attributes:

1. Novell certified for use as a file server
2. at least an 80486 CPU
3. at least 8MB of RAM
4. a large hard disk, such as 200MB
5. an MCA or EISA bus

Additionally, keep in mind the following:

6. investigate options for expanding hard disk space and RAM
 7. use the formula in the NetWare manual to estimate actual RAM requirements
-

Tales from the Network Woods

Lawrence Liddiard liddiard@unet.umn.edu

Member of the One Million Club



In late October an Internet Domain Survey arrived. This year, during the period from July to October, the number of registered hosts on the internet increased to over one million.

Networking Services registers IP hosts for the University of Minnesota. We had 10,716 at the end of July and 12,085 for October. This means either we register more hosts than other institutions or the University is indeed 1.07% of all internet hosts and 3.25% of all edu domain hosts.

Domain Survey

We quote here from the letter from Mark K. Lottor.

The Domain Survey attempts to discover every host on the Internet by doing a complete search of the Domain Name System. The latest results gathered during late October 1992 are listed. For more information see RFC 1296; for detailed data see the pub/zone directory on ftp.nisc.sri.com. This survey was done using the census program developed at the University of California Santa Cruz; see technical report UCSC-CRL-92-34 available on host ftp.cse.ucsc.edu. The statistics below were generated by running the collected host data through a number of utility programs.

The Latest Results

	October 1992	July 1992	Percent Change
Hosts	1,136,000	992,000	14.5%
Domains	18,100	16,300	11.0%

Number of Networks (based on DNS IP addresses)

	October 1992	July 1992	Percent Change
Class A	52	60	-13%
Class B	2985	2714	10%
Class C	4468	3795	18%
Total	7505	6569	14%

Host Names

The host name in an internet address is that name furthest to the left. Thus for Computer and Information Services Networking Services' unet.umn.edu internet address, the host name is

unet

A great thing about computing is that we are able to name our own extensive creation of files and objects. No need to use the first letter of a phrase to get a liability name like RISC (Reduced Instruction Set Computer). We should use our imagination, cultural analogies, and new combinations to achieve host names that speak to all.

Looking at the top 50 host names, certainly makes one proud to be a computer scientist. Table 1 lists the top 50 host names. From past articles you have found that numbers and I enjoy a good relationship, so naturally I want to share some of these numbers with those of you who are also interested.

The internet's Domain survey of the top 50 hosts shows that, with 7,303 entries, macxx and pcx dominate the list of names. Solar system names are next with 3,158 for Mercury, Venus, Mars, Jupiter, Saturn, Neptune and Pluto (missing Earth, Uranus and Sol). The Greek gods enjoy 1,905 positions with Apollo, Athena, Charon, Hermes, Titan, and Zeus, who represent the sun, wisdom, carry the dead, carry messages, is a giant, or king of gods respectively. In the group totals with about 800 entries are routers with cisco and gw (short for gateway); comic strip names of Calvin and Hobbes and Fred; and miscellaneous alpha (first letter of Greek), Merlin (the wizard) and Thor (Norse god of thunder) names. Finally in the 600 group totals are our math heroes, Newton and Gauss; star related names including Orion whose belt points to Sirius (the dog star); and the eagle (who soars high) or phoenix (who rises from the ashes).

Top-Level Names

The University's top-level name is

edu

the name furthest to the right in an internet address. In Table 2, I expanded the short letter codes used for country names by enclosing the full names in []s. Thus to explain

the top-level domain name of kr, I added [South Korea]. Short internet addresses are expected to be expanded completely by host software, but sometimes their use gets unexpected results. A famous example originated in our Computer Science department. A visiting professor could not get back to Czechoslovakia, his home, because of the common short name 'cs' ending for department (Computer Science) and country (Czechoslovakia).

For more internet domain information, you may want to read the Networks Woods article in our April 1992 newsletter.

Table 1: Top 50 Host Names

1.	552 venus	26.	312 gauss
	503 pluto		306 mac11
	487 mars		305 mac8
	462 cisco		302 mac12
5.	456 mac1	30.	299 mac9
	453 zeus		298 pc3
	452 jupiter		298 mac13
	438 mac2		298 hobbes
	427 gw		286 mac14
10.	421 pc1	35.	285 apollo
	412 saturn		284 fred
	403 mercury		283 thor
	393 iris		283 mac15
	386 mac3		278 hermes
15.	361 mac4	40.	276 merlin
	358 pc2		274 mac16
	354 orion		273 titan
	349 neptune		272 sirius
	345 charon		272 calvin
20.	344 mac5	45.	271 athena
	339 eagle		267 alpha
	337 mac10		262 mac17
	325 newton		261 phoenix
	325 mac6		259 mac18
25.	312 mac7	50.	256 pc4

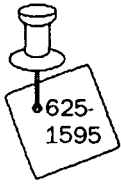
Table 2: Top-Level Domain Names

Please note, although .us is a top-level domain name for the United States, .edu, .com, .gov, .mil, .org, .net, and .int are also official USA DDN top-level domains.

Domain Name	# of Hosts
aq [Antarctica]	4
ar [Argentina]	104
at [Austria]	7,438
au [Australia]	56,913
be [Belgium]	1,705
br [Brazil]	1,529

ca [Canada]	45,105
ch [Switzerland]	20,309
cl [Chile]	302
com [commercial]	304,259
cs [Czechoslovakia]	855
de [Germany]	26,807
dk [Denmark]	4,612
ec [Ecuador]	28
edu [educational]	370,716
ee [Estonia]	76
es [Spain]	4,792
fi [Finland]	18,541
fr [France]	21,597
gb [United Kingdom]	2
gov [government]	71,529
gr [Greece]	673
hk [Hong Kong]	2,767
hu [Hungary]	178
ie [Ireland]	955
il [Israel]	2,930
in [India]	9
int [international]	53
is [Iceland]	670
it [Italy]	6,143
jp [Japan]	20,370
kr [South Korea]	4,029
lu [Luxembourg]	81
mil [military]	60,363
mx [Mexico]	1,297
net [net infrastructure]	12,314
nl [Netherlands]	22,990
no [Norway]	17,089
nz [New Zealand]	1,986
org [organizations]	28,328
pl [Poland]	956
pt [Portugal]	1,536
se [Sweden]	23,600
sg [Singapore]	1,160
su [USSR]	45
th [Thailand]	2
tn [Tunisia]	9
tw [Taiwan]	3,647
uk [United Kingdom]	48,213
us [United States]	480
ve [Venezuela]	6
yu [Yugoslavia]	12
za [South Africa]	2,828

Engineering Services



Engineering Services provides warranty service to University departments, employees, and students on most equipment sold through the discount program. They also provide service on equipment such as workstations, terminals, and peripherals. If you have trouble with your microcomputer equipment, your first call should be to the Microcomputer HelpLine at 626-4276; the consultants will help you determine if the problem is with your hardware or software. If the symptoms point to the hardware, call Engineering Services at 625-1595.

▼ Notebooks, Laptops, Portables: Handle With Care

Notebooks, laptops, portables, and PowerBooks have several things in common.

- They are becoming very popular. They are more powerful, have more features, and have steadily improving price/performance ratios.
- Screen technology continues to improve but tends to be physically "delicate."
- These computers are exposed to all kinds of unusual physical abuse compared to desktop models. Owners take them everywhere.
- Physical damage and breakage is not covered under manufacturer's warranties.
- Repairs can be very expensive. You should use extreme care with these computers.

During recent weeks, one PowerBook owner paid \$800 and another paid \$1600 to repair damage caused by an accident, even though their computers were covered under manufacturer's warranty.

▼ Computer Components: Handle With Care

Be careful of how you store or plug and unplug cables, adapters, and other computer components. Time and handling can cause parts to break down and be unable to perform their intended function.

An Expensive Example

If the computer end of the power adapter plug that is used to power/charge a portable computer is broken, plugging it into the computer can damage the motherboard, thereby rendering your computer useless.

A Less Expensive Example

The plug-in font cartridges that you use with many printers need careful handling. Since most are circuit board components, they can be killed by static electricity or "worn out" by plugging and unplugging them hundreds of times.

▼ Hard Disk Drives

Generally we do not publish hard disk prices because the prices and models change frequently - for example, the Quantum hard drive information in our November newsletter is already out of date.

If you want to purchase or upgrade an internal drive, call us to find out what our current products and prices are.

Bargains

▼ POPmail/PC Version 3.0



On October 29 we sent an announcement about this POPmail/PC upgrade to those on our microcomputer-news mailing list. To subscribe to this list send E-mail to

`news-request@boombox.micro.umn.edu`

To obtain the POPmail/PC upgrade, bring a formatted disk to any Microcomputer HelpLine.

New E-mail Program for IBM/MS-DOS Computers

We're pleased to announce POPmail/PC Version 3.0. POPmail/PC is free; it is a public-domain Electronic mail program for IBM and compatible microcomputers.

With POPmail/PC, a networked PC can exchange E-mail with mainframes and workstations. POPmail uses the SMTP and TCP/IP network protocols. This means

POPmail can exchange mail with the millions of UNIX and other workstations connected to the worldwide Internet.

In addition to simple E-mail messages, POPmail/PC supports file enclosures so you can enclose any PC file, such as PC spreadsheets and word processing documents, with your E-mail message. There is a Macintosh version of POPmail that also supports enclosures. This means that Macintosh and PC users can exchange documents through POPmail.

Works on a Wide Variety of Machines

With POPmail/PC you use a Windows-like user interface, including pull-down menus, dialog boxes, and scroll bars. These provide a user-friendly environment for composing, sending, and receiving electronic mail. Although you can use a mouse, it is not necessary. POPmail/PC was written using Borland's Turbo Pascal TurboVision library and uses the standard IBM character set to emulate a graphical user interface. Because POPmail uses the graphic characters built into every PC, POPmail runs on a wide range of IBM PCs and compatibles, including ancient PCs with monochrome display adapters.

POPmail uses the Crynwr (former Clarkson) packet drivers to interface to the network adapter card in the PC. Since there are Crynwr packet drivers available for most network adapter cards, POPmail works with a wide variety of Ethernet, Token Ring, and AppleTalk network adapter cards.

New Features and Enhancements

POPmail/PC Version 3.0 is upwardly compatible with the previous versions. Version 3.0 has many new features and enhancements.

- A message index for browsing through mail messages.
- Message searching and sorting features for rearranging messages.
- Mail folders for organizing messages into related groups.
- Built-in local and global address books ("finger").
- Improved support for SLIP and BOOTP network protocols.
- On-line context-sensitive help.
- Support for many international character sets.
- Increased reliability, error detection, and recovery.
- Comprehensive 120 page user's manual.
- Very stable due to extensive beta-testing.
- Network testing and evaluation features.

▼ Update - Math and Statistical Source Code Available via E-mail



You can use a special E-mail system to obtain source code for mathematical and statistical routines you might use in writing your own software. This system reads E-mail sent to it and automatically responds to requests by sending an E-mail reply to the person who sent the request.

NETLIB and STATLIB

NETLIB and STATLIB are automated E-mail systems that distribute public domain source code for mathematical and statistical routines.

NETLIB contains a wide range of mathematical software, including numerical linear algebra, linear programming, nonlinear optimization, curve fitting, special functions, fast Fourier transforms, the numerical solution of ordinary and partial differential equations, and more.

As you might expect, STATLIB contains a wide range of statistical routines.

Since you get source code, you must have a compiler (such as Fortran, C, or Pascal) to use these routines. Because this is public domain software, there are no guarantees. However, much of the code is nationally recognized for its quality. We recommend that you carefully test and check each routine and look for machine constants in the codes. Machine constants for an IBM PC might produce incorrect results when used on Cray.

NETLIB Update

Two U.S. locations run the NETLIB E-mail system. Although they don't have exactly the same software, the differences are small. We understand that the system managers periodically try to make them match.

NETLIB@RESEARCH.ATT.COM recently added PDES.

- *PDES*: Partial differential equation packages

NETLIB@ORNL.GOV recently added ICKP, JGRAPH, and XNETLIB.

- *ICKP*: Checkpoint programs on Intel iPSC/2 and iPSC/860
- *JGRAPH*: Program to plot graphs in Postscript
- *XNETLIB*: X-windows netlib for retrieval applications

STATLIB Update

STATLIB@LIB.STAT.CMU.EDU recently added 1993.EXPO and JCGS.

- *1993.EXPO*: Data for the 1993 ASA Graphics and Data Exposition
- *JCGS*: Algorithms and abstracts from the Journal of Computational and Graphical Statistics

Accessing NETLIB and STATLIB

Since all the University's central systems can send and receive internet E-mail, anyone with an account on one of our systems can access NETLIB and STATLIB. Moreover, Macintosh and IBM-compatible users who run POPmail and workstation users connected to the campus internet can also send internet E-mail to access these systems. Figure 1 contains E-mail addresses for the NETLIB and STATLIB E-mail systems. Use these addresses to obtain index files and software.

Figure 1: E-Mail Addresses

```
netlib@ornl.gov
netlib@research.att.com
statlib@lib.stat.cmu.edu
```

To use the systems, you also need to know what commands the NETLIB and STATLIB servers understand. The requests are one-line commands that can be the subject part of your mail message or the message itself. In response to commands you send, NETLIB and STATLIB will E-mail an appropriate response to you. We recommend that you suppress any signature text that automatically appears at the end of your mail messages.

Commands and Descriptions

To get a current list of the NETLIB and STATLIB libraries and descriptions of the commands, send an E-mail message to the appropriate server. Use this subject line

```
send index
```

Keep Your Requests Small

When you access NETLIB or STATLIB, don't ask for an entire library, such as LAPACK. Complete libraries are much too large to send. Instead, ask for specific routines.

Central System Copies of Libraries

Some of the NETLIB and STATLIB libraries are already on the VAX VX central system. If you have an account on VX, you can find out more about these libraries by using

the LISTDOC command followed by a space and NETLIB or STATLIB.

FTP Access

Both NETLIB and STATLIB allow FTP access. FTP is a file transfer protocol program available on most computers on the campus internet. Use the command *ftp* followed by a space and then the site name from Figure 1. Log in with user name *netlib* or *statlib* (both lower case). Enter your user name as the password. You may need to use the *ftp binary* command before transferring files. Use the *ftp ls* and *cd* commands to list directories and change directories. Use the *ftp get* or *mget* commands to retrieve files. Several files have a *.Z* suffix indicating you must use the UNIX *uncompress* command to expand the files to text mode after you have transferred them. (UNIX users can use the UNIX command *man uncompress* to see how to use the *uncompress* command.)

Note that if you use E-mail to retrieve routines, any subordinate routines are also automatically provided to you. However, if you use FTP to retrieve routines, you must discover and copy the subordinate routines yourself.

Tips, Tricks, and Tutorials

System 7 and Cantankerous Keyboards

Many Macintosh users use Apple's System 7 operating system software. System 7 includes many features that you can use to customize your working environment. But sometimes a feature may cause confusion. Does this sound familiar?

I need the number to Engineering Services! I'm afraid my Mac is defective, or at the very least, the keyboard is bad. Sometimes, even though the Caps Lock key is not on, everything I type is in uppercase. Other times, when I'm typing, I get weird characters like $\sim\beta\delta$ $\emptyset\sim\mu''''$ $\wedge\uparrow$. Then, a dialog box appears out of nowhere. My Mac also keeps making weird beeping and kazoo-like noises.

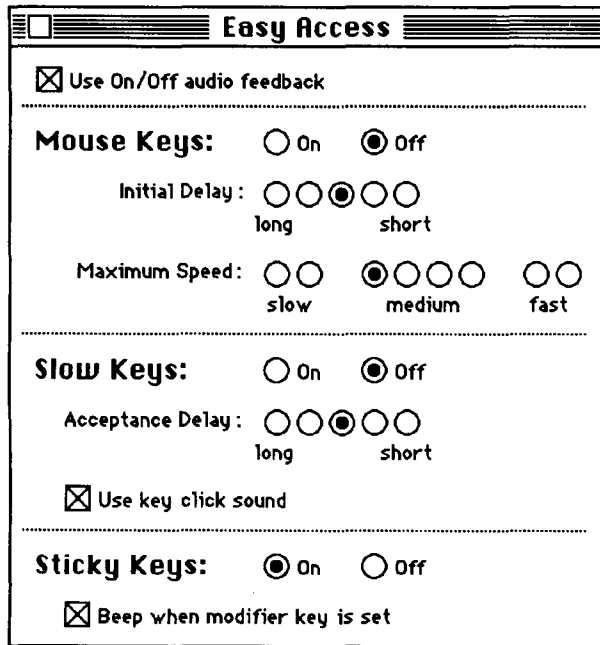
The Macintosh system software includes components designed to assist people who have difficulty using the keyboard. One part of this software, Sticky Keys, lets you type combination keystrokes, like $\text{[} \text{C} \text{]} \text{[} \text{P} \text{]}$, without actually pressing the keys simultaneously. When your Mac shows

symptoms like those described above, you've probably inadvertently turned on Sticky Keys.

Using Sticky Keys

The Sticky Keys feature is controlled in two ways: by pressing the **[Shift]** key five times without moving the mouse or from the *Easy Access* control panel, as shown in Figure 1.

Figure 1. Easy Access Control Panel



The system software lets you know the feature is on by making unique sounds and displaying an icon at the far right of the menu bar, next to the icon for the Application menu. Sticky Keys has three icons, shown in Figure 2, that indicate that

1. the feature is on,
2. a modifier key has been pressed, or
3. a modifier key has been locked by pressing it twice.




To turn off Sticky Keys, press the **[Shift]** key five times or press any two modifier keys at the same time.

Avoiding Sticky Keys

To prevent Sticky Keys from appearing, you have two options. If you have a tendency to jiggle keys, avoid jiggling the **[Shift]** key. To permanently get rid of the feature, drag the Easy Access control panel out of the System Folder and trash it or store it in another folder.

Restart your Mac, and the feature will be just a confusing memory.

Figure 2. Sticky Keys Icons

-  Indicates Sticky Keys feature is on.
-  Indicates a modifier key (**[Command]**, **[Shift]**, **[Control]**, or **[Option]**) has been pressed.
-  Indicates a modifier key is locked.

Book Center: 625-3854



The offers listed here are made to University departments, employees, and students, and are subject to the eligibility rules of the Micro-computer Discount Program. If you have questions about availability, phone the Computer Desk in Williamson Hall at 625-3854. The Computer Desk is open Monday-Friday from 8:30 am to 5:30 pm.

You can get product and price change bulletins for the products sold through the Computer Desk via E-mail. To be added to the mailing list, E-mail a request to:

request@boombox.micro.umn.edu

Once you are on the mailing list, you will receive notification via E-mail as soon as we have new prices or products.

▼ Sales Tax, Credit Cards, Handouts

Individuals must add 7% sales tax to all prices listed here or in our handouts. University departments do not have to pay sales tax. You can charge your purchases on your MasterCard and Visa accounts.

For more complete descriptions of the hardware products listed here or of those available through the discount program, consult our handouts. Paper handouts are available at all Microcomputer HelpLines. Electronic versions are available from the Computer Consultant (gopher). Our current handouts are: IBM PS/2 Computers, ZEOS MS-DOS Compatibles, Printers for IBM-Compatible Computers, Apple Macintosh Computers, Macintosh Printers and Peripherals, NeXT, and Networks. Some specialized handouts are also available.

▼ IBM ValuePoint Systems

Here are brief descriptions of the latest personal computers from IBM PC Company: Personal System ValuePoints. (IBM is not one company any more. The IBM PC Company was established in September 1992 and is organized by distinct brands.) The ValuePoints were developed in Boca Raton, Florida, assembled in Raleigh, N.C., and are offered at competitive prices.

The key differences between IBM's Personal System ValuePoints and IBM Personal System 2s are shown in the Table 1.

Table 1: ValuePoint versus PS/2

Features	ValuePoint	PS/ 2
Display	SVGA	XGA-2
Floppy Disk Drive: 3.5"	1.44MB	2.8MB
Hard Disk Interface	IDE	SCSI
Architecture (Bus)	ISA	MicroChannel

Distinguishing Features by Model

The ValuePoint 325T system has an 8 kilobyte (KB) internal cache. The ValuePoints 425SX and 433DX are upgradeable to take advantage of the 25/50 MHz and 33/66 MHz processor. Topping the ValuePoint line is the 466DX2 with its clock-doubling 33/66 MHz micro-processor.

HelpWare

All ValuePoint models come with HelpWare, an 800 number to call for technical support and on-site service during warranty.

ValuePoint Displays

IBM PC Company also introduced new multiscan color monitors. They support non-interlaced, high refresh rates for video graphics array (VGA), super video graphics array (SVGA), and extended video graphics array (XGA) resolutions.

Part	Monitor Description	Discount Price
6312	14-inch color with a tilt-swivel base	\$393
6319	15-inch flat screen color with a tilt-swivel base	640

Table 2: ValuePoint Features and Discount Prices

ValuePoint Model	325T		425SX		433DX		466DX2
Standard Features: IBM's familiar enhanced keyboard, a 145-watt power supply, one parallel port, one mouse port, two 9-pin serial ports, one 16-bit SVGA (super video graphics array) adapter, and five Advanced Technology (AT) bus expansion slots. You must purchase an SVGA compatible monitor separately.							
Fixed Features							
Processor	80386 SLC		80486 SX		80486 DX		80486 DX2
• speed: MHz	25		25		33		66/33
Memory: megabytes							
• standard	2		8		8		8
• maximum	16		32		32		32
Operating System							
• IBM DOS 5.0	Y		-		-		-
• OS/2 2.00.1	-		Y		Y		Y
Variables							
Part Number	6484-C20	6384-C40	6384-F20	6384-F40	6384-M20	6384-M40	6384-W52
Price	\$910	1100	\$1180	1390	\$1550	1750	\$2360
Hard Drive							
• capacity: megabytes	80	170	80	170	120	212	212
• access time (msec)	16	16	16	16	15	15	15

▼ **New Mac Memory Prices**

The prices of Macintosh memory at the Book Center and at Engineering services changed in November. The new prices for desktop machines are listed by SIMM (Single Inline Memory Module). The prices for these 80 nanosecond SIMMs includes installation.

Desktops	Discount Price
One 1MB SIMM (1x8x80)	\$60
One 2MB SIMM (2x8x80)	96
One 4MB SIMM (4x8x80)	165

PowerBooks

How you upgrade Macintosh Portables and PowerBooks varies. Complete prices and descriptions are in our Mac handout.

Memory Purchases

The Computer Desk sells memory upgrade products for new computers for those who wish to have more memory installed before they pick up their machine. Engineering Services sells and installs memory upgrade products for all others.

Which SIMMs and how much memory you should purchase varies according to the computer you have and how much memory it already has. If you have questions about upgrading memory, call the Microcomputer HelpLine.

▼ **Printers: New and Changed**

There have been several changes in the printer products handled through the Microcomputer Discount Program. For more complete descriptions pick up a printers handout at any Microcomputer HelpLine or search *Computer Information* on gopher. For immediate notification of price changes and new product prices, subscribe to the *Bookstore-prices* mailing list. To get on this list E-mail a request to

request@boombbox.micro.umn.edu

New: HP DeskWriter 550C and DeskJet 550C

The Hewlett-Packard DeskWriter 550C and DeskJet 550C are inkjet printers that print in both black and color. In best and normal modes they print at 300 dots per inch (dpi), and at 150 dpi in draft mode. Their built-in sheet feeder can hold up to 100 sheets of paper.

Like other printers in HP's line, the DeskWriter is packaged specifically for the Macintosh; the DeskJet is packaged for IBM-compatibles. The DeskWriter 550C comes with an RS-422 serial and AppleTalk interface; its discount price is \$660. The DeskJet 550C comes with a parallel and a serial interface; its discount price is \$660.

550Cs	Dot Resolution	PPM*	MPP*
		Black	Color
Best	300 x 300	1	7
Normal (Faster)	300 x 300	2	4
Draft	150 x 150	3	3

* Average page per minute (PPM) and minute per page (MPP) print speeds. Actual speed depends on the document's complexity, the amount of ink used, and the type of computer used.

Price Changes: HP DeskJet C and DeskWriter C

Hewlett-Packard recently dropped the price for their older DeskJet C for IBM-compatibles to \$565, and the price for the DeskWriter C for Macintoshes to \$625. Both printers are 300 dots-per-inch color inkjet printers.

New: HP LaserJet 4 and 4M

The Hewlett-Packard LaserJet 4 prints at 600 dots per inch (dpi); its maximum print speed is 8 pages per minute. The LaserJet 4 and 4M are the same basic printer. The difference is that the 4M is packaged for the Macintosh. The Microcomputer HelpLine in 152 Shepherd Lab has a demonstration model of the LaserJet 4.

The standard input paper tray for the LaserJet 4s holds 250 sheets of paper, and you can purchase an optional 500 sheet paper holder.

Toner

The 4s use *microfine* toner cartridge No. 92298A, a different cartridge than the LaserJet IIISi. The Book Store's price for this 92298A toner is \$113. The LaserJet 4's manual includes the usual caution that the life of the toner cartridge depends on the amount of toner your jobs require and includes these guidelines: a cartridge will print approximately 6000 pages where each page's coverage is

5%, typical of many business letters. The shelf life of an opened toner cartridge is approximately six months. Do not open a toner package until you are ready to use it.

To obtain 600 dpi, your software may require a printer driver written specifically for the LaserJet 4.

Part No.	LaserJet Description	Discount Price
C20001A	"4" – 2MB memory, parallel and serial interfaces, HP PCL 5	\$ 1280
C2021A	"4M" – 6MB memory, PostScript Level 2, AppleTalk, parallel, and serial interfaces	1745

Price Changes: Apple LaserWriters

The prices of the LaserWriters IIf and IIg decreased. The LaserWriter LS reverted to its pre-Fall Special price.

Laser Printer	Discount Price
<i>PostScript</i>	
LaserWriter IIf	\$1935
LaserWriter IIg	2455
<i>Non-PostScript</i>	
Personal LaserWriter LS	\$800

Changed: HP LaserJets IIP, III, IIISi

The Hewlett-Packard LaserJets IIP and III PostScript printers with AppleTalk have been discontinued. The Hewlett-Packard LaserJet IIISi PostScript package now comes with either an AppleTalk or EtherTalk interface. The discount price for either IIISi package is \$3735.

▼ New Modems

Below is an overview of modems we have not listed here before. Like the other modems the Computer Desk carries, we recommend these modems for those who want to use SLIP software.

MultiTech, Data/FAX

The MultiTech MT1432-MU is an external data/fax modem. The packaging includes a battery; you can run off this battery for two hours. This MultiTech is capable of sending data at 14,400 bps (bits per second) and fax at 9600. It also can communicate with the Telecommunications department's dial-in server at 9600 baud.

To connect to Telecomm's 9600 bps ports of the dial-in server, a modem must support the V.32 standard. The MultiTech modem supports V.32 and MNP level 5 error correction. This error correction enables the MultiTech

HP LaserJet 4 and 4M Tips

Setting Up

Here is a caution we received about setting up the LaserJet 4s: Be sure to follow step number 10 in the *Setting Up Your HP LaserJet 4 Guide*. The guide refers to two levers which need to be pushed down before operating the printer. These levers engage the fusing assembly. The print will not fuse to the paper and will smear if the levers are not pushed down.

Printer Driver

We've added the printer driver for Microsoft Windows 3.1 for the Hewlett-Packard LaserJet 4 to the IBM Information Server. To copy this driver bring formatted disks to any Microcomputer HelpLine. The driver is on the p: (public) drive in this directory:

```
distrib\prntdrv\hp\lj4win31
```

modem and the dial-in server's modem to correct transmission errors caused by phone line noise. While there are several levels of MNP data compression (e.g., levels 5, 7, and 9) and the higher levels can result in better than 9600 bps throughput, the Telecomm dial-in server is configured for 9600 bps throughput only.

Practical Peripherals

We've added two similar low-cost external Practical Peripheral data/fax modems. Both packages send data at 2400 bps and fax at 9600 bps.

Modem Part	Description	Discount Price
<i>These IBM-Compatible Packages include DOS software.</i>		
MT1432-MU	MultiTech	\$355
	(also includes cables for 9- or 25-pin connections)	
PM2400FX96 SA	Practical Peripheral	100
<i>These Macintosh Packages include Mac software and a computer to modem cable.</i>		
MT1432-MU-Mac	MultiTech	\$355
PM2400SA MAC	Practical Peripheral	145

Modem Cables

If you need to purchase modem cables, you can purchase these at the Computer Desk.

Cable	Description	Discount Price
C-28-6	Mac to Hayes (25-pin) Modem	\$15
C-31-6	IBM 25-pin	12
C-37-6	IBM 9-pin	12

Training Resources: 625-1300

We recently added 75 packages to our training library, covering beginning to advanced topics. Each package is described briefly below.

▼ Who is Eligible?

These and the other training packages we own are available to University of Minnesota departments and current employees and students. There is no fee for using these packages, and you may check them out for 48 hours. However, before you can check them out, you must sign a *Usage Agreement* and leave your University of Minnesota ID card with us. We will return your ID when you return the training materials.

The training disks that come with Macintosh packages are 800K (double density). The size and storage capacity varies on the disks that come with the IBM/MS-DOS and Windows packages. Before reserving or checking out IBM software, be sure the package has the kinds of disks that are compatible with your equipment.

▼ Reservations Required

To reserve or check out these materials, phone 625-1300 or stop in our Shepherd Labs office in room 190 (formerly room 132), Monday-Friday, 8 am to 4 pm. Unless you use our Self-Paced Training Centers, you must supply your own software and equipment, such as computer and cassette player, to use these training materials.

Self-Paced Training Centers

Location	M-F Hours
1 Nicholson Hall	8 am to 7 pm
99 Coffey Hall	9 am to 4 pm

▼ Networks

Network Concepts: Five Videos

We have five videos from Learn PC.

Course 1: covers topics by providing analogies; it is a basic introduction to media, topology, protocols, and other terminology.

Course 2: examines typical wire and cables (such as twisted pair, coaxial cable, and fiber optic) and wiring methods (bus, ring, and star).

Course 3: controlling LAN communications - protocol descriptions are compared to the seven OSI layers and each layer's function and relationship is explained; IEEE 802 standards are also described.

Course 4: internetworking: examines network differences and the hardware used to overcome them, as well as equipment such as repeaters, bridges, routers, and gateways.

Course 5: selecting, installing, expanding, and maintaining LANs.

Novell: Netware 3.11 System Manager: Video

This video from Learn PC provides generalized examples to familiarize the viewer with the decision making process related to installing, expanding, and maintaining networks.

▼ OS/2

Working with OS/2 version 2: Video

This video from IBM covers the following topics: OS/2 desktop; getting on-line help; using DOS and windows programs; and customizing your desktop.

▼ IBM/MS-DOS

❖ DOS 5.0: Video

We have three videos from Learn PC.

Course 1: navigate in the DOS shell, manage files and directories.

Course 2: manage disks and programs and use the DOS editor.

Course 3: use DOS commands, run batch files, work with DOSKEY, and create and use macros.

❖ DOS 5.0: Professor DOS: Diskettes

This diskette-based tutorial from Individual covers PC and DOS concepts, using a hard disk, and DOS 5 and its shell.

❖ **Lotus 1-2-3 Rel. 2.2/2.3 and 3.1/3.1+: Diskettes**

This tutorial from Individual covers: basic skills, worksheets, databases and data tables, graphics, and keyboard macros.

❖ **Lotus 1-2-3 Release 2.3: Audio**

This package from FlipTrack covers: values, labels, formulas, formats, functions, graphs; moving and copying cells or ranges; automating procedures with formulas and macros; searching, sorting, extracting records from database worksheets; and printing report-quality spreadsheets.

❖ **Paradox 2 or higher: Audio**

Here are the key topics covered in the tapes from FlipTrack.

Advanced Training, Managing Data: database graphics; create and customize bar graphs; 3D graphs; multi-table forms; adding, sorting, and deleting records through instant scripts; linking tables; writing scripts; and using PAL.

Advanced Training, Using the Personal Programmer: design and develop a custom application to automate your work; generate form letters from mailing list tables; create a help menu; and use PAL to automate data management tasks.

❖ **Quattro Pro - How to Use (up to rel. 3.0): Audio**

This package from FlipTrack includes four tapes. The topics it covers include: values, labels, formulas, formats, functions; copying cells and blocks; multiple views; using macros; searching, sorting, and extracting records from database worksheets; producing high-quality printouts; and creating, annotating, and printing graphs.

❖ **Quattro Pro - Advanced (up to release 3.0): Audio**

Here are the key topics in the tapes from FlipTrack.

Formulas and Functions: calculate and analyze financial data in depth; combine and link files; complex lookup functions; and predicting future values with linear regression analysis and what-if commands.

Graphs and Charts: single and multiple range charts; editing graphs and adding legends and text; choosing the right graph; using fonts and special effects.

Macros: creating and debugging, macro programming; special purpose macros; and user-interactive macros.

❖ **Quattro Pro: Video**

Here are the key topics in the videos from Micro Video Learning Systems.

Learning: create, edit, format, and print spreadsheets as well as graph data.

Advanced Features: work with databases; sort and search for records; extract records to different parts of spreadsheet; use multiple windows; macros; and advanced data analysis.

Advanced Graphics: 3D graphs; annotating graphs; building and viewing slide shows; and using Proview Powerpack.

❖ **WordPerfect 5.1, Desktop Publishing with: Diskette**

This self-study guide from Dun and Bradstreet introduces you to the basics of desktop publishing with WordPerfect and covers creation and manipulation of columns, tables, and graphics.



▼ Windows

This software requires Windows 3.0 or later.

❖ Windows 3.1: Audio

This audio package from Personal Training is for the experienced DOS user who wants to: use Windows to perform DOS functions; master the Control Panel; launch applications and associate files; perform functions common to all Windows applications; and understand the Print Manager.

❖ Windows 3.1: Audio

This package from FlipTrack includes four tapes and covers these topics: navigate the desktop and menus; manage files and directories; customize the desktop; add icons; use the calculator, calendar, clipboard, and Windows Paintbrush; create, edit, and print documents; change fonts; create a group of windows; move and copy between groups; and object linking and embedding.

❖ Windows 3.1: Video

Here are the key topics in the videos from Anderson Soft-Teach.

Volume 1: exploring Windows and using single and multiple applications.

Volume 2: understand file manager; navigate through a directory and change information; manage files and directories; and work with disks.

Volume 3: use desktop accessories; understand and use object linking and embedding; work with groups; and extras for experts.

❖ Excel 4.0 for Windows: Video

Here are the key topics in the videos from Anderson Soft-Teach.

Volume 1: use, edit, format, and enhance worksheets.

Volume 2: create a chart using ChartWizard to embed a chart; work with names; and use functions and macros.

Volume 3: work with large worksheets; use databases and data forms; find and extract data; print large worksheets; and extras for experts.

❖ Excel 4.0 for Windows: Audio

Here are the key topics on the tapes from Personal Training.

ZXL 1 Beginning: for new users who want to enter and format words, numbers, and percentages; create formulas and functions; create and use templates; and print.

ZXL 2 Intermediate: create forms and custom formats; use absolute reference and data arithmetic; master sorting; use IF statements.

ZXL 4 Business Graphs: design single and multiple series charts; chart non-adjacent columns; create overlays; 3D and custom charts; embed charts in worksheets.

❖ Lotus 1-2-3: Audio

This package from FlipTrack covers: values, labels, formulas, formats, functions, and graphs; moving and coping cells or ranges; automating procedures with formulas and macros; searching, sorting, extracting records from database worksheets; and printing report-quality spreadsheets.

❖ PageMaker 4.0: Diskette

This tutorial from Individual includes an overview of PageMaker and covers text and graphics as well as design topics for non-designers.

❖ PageMaker 4.0: Audio

This audio series is from Personal Training.

Module 1, Beginning: topics include place text and graphics; create headlines and captions; and printing.

Module 2, Intermediate: build a manual, flyer, price list, and coupon while learning to create, change, and override master pages, reshape text and modify styles, and create uneven and mixed columns.

Module 3, Tips and Techniques: topics include shortcuts, creating pull quotes, kerning, creating large caps and drop shadows, and changing default settings.

Module 4, Advanced: topics include creating style sheets, flowing text around graphics, assigning color, and changing image boundaries.

❖ PageMaker 4.0: Audio

This package from FlipTrack has seven tapes and includes these topics: planning publications; using PageMaker's tools; using Windows; placing text and graphics; setting up the layout grid; the Story Editor; style sheets; master pages and templates; sizing, cropping, and manipulating graphics; kerning and tracking; keyboard shortcuts; and using special effects.

❖ **Quattro Pro: Audio**

The topics covered in this audio package from Personal Training Systems include: create multipage notebooks; move and sort data; apply styles and advanced formatting; and make changes with Direct Drive features.

❖ **WordPerfect for Windows: Audio**

This package from FlipTrack contains four tapes and covers the following topics: enter, edit, align, save, and print text; margins and tabs; use the ruler and button bar; define columns, headers, and footers; macros; graphics; spell checking; thesaurus; form letters and print merge; and create, delete, rename, open, close, and save files.

❖ **World of ObjectVision: Video**

This video from Borland covers the basics of creating Windows applications - from designing forms and creating Decision Trees to linking to databases and other advanced features.

❖ **World of ObjectVision for Turbo Pascal: Video**

This video from Borland is for those who want to create Windows applications and use the ObjectWindows framework. Lessons include object oriented programming; frames for framework; window objects, device independent graphics, and standard dialogs.

▼ **Macintosh**

🍏 **Macintosh: Video**

Here are the topics covered in the videos from Apple Computer.

1. How computers are changing the way we learn: this video includes demonstrations of tools for collaborative learning and writing, multimedia, and high speed networks.

2. Innovations in technology: this video explores how educators are preparing for and influencing the development of technologies.

3. Mac solutions for math and science: this video includes examinations of several programs that encourage students to explore and think critically.

4. Multimedia in language and literacy: this video explores how Mac technology is enhancing literacy.

🍏 **4th Dimension: Video**

Here are the topics covers in the videos from MacAcademy.

Tape 1: fields, subfields, layouts, new records, tool palette, formatting, defaults, buttons, menu editor, passwords, lists, menu bar, scripts, and add to layout.

Tape 2: file relations, indexing, relational data, user mode, included layout, choose file layout, apply formula, search editor, sort selection, sort file, report menu, labels, graphs, and preferences.

Tape 3: data format, entry filter, exporting/importing, relations differences, file editor, programming, 4D language, using code, arrays, layout procedures, execution cycles, commits, and problems.

Tape 4: overview, inventory, designing and managing layouts, output layout, included layout, custom layouts, array set up, debugger, using sets, search command programming, and possible problems.

🍏 **ClarisWorks: Audio**

In this audio package from Personal Training Systems you will get started with ClarisWorks by learning to: type a document using the word processor; create spreadsheets; and develop an address book database.

🍏 **Excel 4.0: Audio**

Here are the topics covered on the tapes from Personal Training Systems.

XL 1, Beginning: what's a spreadsheet; creating a spreadsheet; enter labels and formulas; create function formulas; improve the appearance; make changes; create templates; and print.

XL 2, Intermediate: absolute reference; creating IF formulas; print partial spreadsheets; sort; calculate dates; create number formats; format fractions; and create forms.

XL 3, Advanced: tips and techniques for experienced Excel users includes - create look up tables; control precision; link spreadsheets; add notes to cells; and protect and audit spreadsheets.

XL 4, Creating Business Graphs: chart guidelines; creating and changing charts; create multiple columns; embellish charts; chart non-adjacent columns; create special charts and templates; and print.

Freehand 3.0: Audio

Here are the topics covered in the tapes from Personal Training Systems.

Beginning: convert existing graphics; fill, rotate, scale, and reflect images; enter, format, and align text; create lines; and group elements.

Intermediate: create artwork from scratch; add, remove, convert, and move points; cut, close, and fill shapes.

Creating Special Effects: for experienced users who want to control text spacing and horizontal scaling; join text to a path; assign special effects; use blending; customize fills and patterns; and create spot and process colors.

Precision Drawing Techniques: for seasoned users who need precision to create elements aligned to grids; rearrange elements; hide and inactivate layers; create 3D isometric drawings; export; create bleeds; and print tiles.

PageMaker 4.0: Diskette

This tutorial from Individual covers the following topics: an overview of PageMaker, working with text and graphics, and design topics for non-designers.

Persuasion 2.0: Audio

Here are the topics covered in the tapes from Personal Training Systems.

1. *Beginning:* create, modify, and print outlines; check spelling; produce slides, speaker notes, and handouts.

2. *Intermediate:* create and modify business graphs; design tables; organization and layered charts; override Autotemplates.

3. *Creating Autotemplates:* for experienced users - covers building text, chart, and organization templates; importing graphics; and understanding and applying color.

4. *Creating artwork:* for experienced users - covers mastering drawing tools; understanding layers, grouping, and reshaping; and sharing artwork between Autotemplates.

Photoshop: Audio

Here are the topics covered in the tapes from Personal Training Systems.

Basics: create blends and soft-focus edges; fill borders with patterns and create masks; change color balance and add color with airbrush.

Basics 2: for experienced users - covers retouching color photos; add color to black and white photos; master the pen tool; create transparent blends; and use text to create special effects.

Quark XPress 3.1: Audio

Here are the topics covered in the tapes from Personal Training Systems.

Module 1, Beginning: create two newsletters and a brochure - learn to manipulate text and graphics; create frames, lines and shading; use the spell checker.

Module 2, Master Pages: create two manuals - learn how to apply multiple master pages; use the document layout palate; anchor text and picture boxes; create sections and spreads.

Module 3, Text Formats: for experienced users - covers editing and applying style sheets; creating tabs, indents, and hanging indents; hyphenating and justifying text; controlling widows and orphans.

Module 4, Color and Type: apply spot, process, or Pantone colors; create three types of drop caps; use advanced typographic controls.

Module 5, Tips and Techniques: - for seasoned users - covers assigning and customizing runarounds; creating library palettes; editing frames, and many shortcuts.

Word 5.0: Audio

Module 4, Additional Features from Personal Training Systems is designed for seasoned Word users. It covers creating columns; using hyphenation; working with graphics; linking documents; using Word's proofing tools; outlining documents.



Computer and Information Services' Help Lines

Microcomputer 626-4276. Central Systems 626-5592, 624-6235. MEDLINE 626-8366. E-mail 626-7676. LUMINA 626-2272.

1 9 9 3

Holidays: Jan 1 New Year, Jan 18 Martin Luther King Jr., May 31 Memorial Day, July 4 Independence, Sept 6 Labor Day, Nov 25 Thanksgiving, Dec 25 Christmas

		Feb	Mar		June	July	Aug	Sept	Oct	Nov	Dec
S							1				
M		1	1				2			1	
T		2	2		1		3			Vote	Dec
W		3	3	Apr	2	July	4	1		3	1
Th	Jan	4	4	1	3	1	5	2	Oct	4	2
F	1	5	5	2	May	2	6	3	1	5	3
S	2	6	6	3	1	3	7	4	2	6	4
S	3	7	7	DLS	2	4	8	5	3	7	5
M	4	8	8	5	3	7	9	6	4	8	6
T	5	9	9	6	4	6	10	7	5	9	7
W	6	10	10	7	5	7	11	8	6	10	8
Th	7	11	11	8	6	8	12	9	7	11	9
F	8	12	12	9	7	9	13	10	8	12	10
S	9	13	13	10	8	10	14	11	9	13	11
S	10	14	14	11	9	11	15	12	10	14	12
M	11	15	15	12	10	12	16	13	11	15	13
T	12	16	16	13	11	13	17	14	12	16	14
W	13	17	17	14	12	14	18	15	13	17	15
Th	14	18	18	15	13	15	19	16	14	18	16
F	15	19	19	16	14	16	20	17	15	19	17
S	16	20	20	17	15	17	21	18	16	20	18
S	17	21	21	18	16	18	22	19	17	21	19
M	18	22	22	19	17	19	23	20	18	22	20
T	19	23	23	20	18	20	24	21	19	23	21
W	20	24	24	21	19	21	25	22	20	24	22
Th	21	25	25	22	20	22	26	23	21	25	23
F	22	26	26	23	21	23	27	24	22	26	24
S	23	27	27	24	22	24	28	25	23	27	25
S	24	28	28	25	23	25	29	26	24	28	26
M	25		29	26	24	26	30	27	25	29	27
T	26		30	27	25	27	31	28	26	30	28
W	27		31	28	26	28		29	27		29
Th	28			29	27	29		30	28		30
F	29			30	28	30			29		31
S	30				29	31			30		
S	31				30				DLS		
M					31						

Computer Desk, Williamson Hall Book Center 625-3854. Normal hours: Monday-Friday, 8:30 am to 5:30 pm. Master and Visa charges accepted.

DLS = DAY LIGHT SAVINGS CHANGES.

Help: Computer and Information Services

Distributed Services and Planning

Phone

Help Line Hours

Computer Services Information Line

625-1555 anytime

If you do not know which computer service phone number to call, dial the Computer Services Information Line.

E-Mail (Electronic Mail) Help Line

626-7676 Monday-Friday 9 am to 10 pm

Call this help line for assistance in using and setting up your University E-Mail account.

Walk-in help is also available during open hours in most campus Public Computer Facilities.

Central Systems Help Lines

To use these systems, you need a user name and password, which you get when you open an account.

Qualified users can apply for grants to handle some computing-related costs.

Machine ID

- EPX (UNIX), NVE (NOS/VE), VX (VMS), VZ (VMS) 626-5592 Monday-Friday 9 am to 4 pm
1 Nicholson Hall Walk-in Consulting Monday-Friday 10 am to 4 pm
- VM1 (IBM/CMS), 99B Coffey Hall Walk-in Consulting 624-6235 Monday-Friday 9 am to 4 pm
- MEDLINE (MinnesotaMEDLINE on NVE) 626-8366 Monday-Friday 9 am to 4 pm

LUMINA Help Line

If you have trouble connecting to LUMINA call 626-2272 Monday-Friday 9 am to 4 pm

Microcomputers and Workstations HelpLine

Software, hardware, peripherals, local area networks 626-4276 Monday-Friday 9 am to 4 pm

- East Bank 152 Shepherd Labs above above
- West Bank 93 Blegen above Tuesday and Friday 1-4, Thursday 9-noon
- St. Paul 99B Coffey Hall above Monday and Friday 9-noon, Wednesday 1-4 pm

General Information

Acting Associate Provost with Special Responsibility for Computing & Information Systems on the Twin Cities Campus
Donald R. Riley 626-9816

Computer and Information Services



- Distributed Services and Planning, Shih-Pau Yen;
Engineering Services, Don Clark; Networking Services,
Lawrence Liddiard; Software Services and Operations,
Lee Croatt; St. Paul Services, Mel Sauve
- Central System Accounts, IBM CMS 624-7788
- EPX, VX, VZ, NVE (includes MEDLINE) 6-8366
- Disability and Computing Services, voice 6-0365
- TDD 6-0569
- Equipment Repair and Warranties (Engr. Serv.) 5-1595
- Faculty Resource Center (to make an appointment) ... 5-1300
- Network Addresses (130 Lind) 5-8888
- Public Computer Facilities (obtaining access) 5-1300
- Software Services (includes contract programming) ... 5-2303
- Data Entry Services, Minneapolis 6-8351
- Data Entry Services, St. Paul 4-7297
- Tape Librarians (Central Systems)
- EPX, NVE, VX, VZ (Lauderdale Computer Facility) ... 6-1838
- VM1 (IBM/CMS in St. Paul) 4-3482
- Training, Course Registration (190 ShepLab) 5-1300

Other Departments



- Computer Desk, Williamson Hall Book Center 625-3854
- AIS (Admin. Info. Services) Customer Assistance 4-0555
- Supercomputer Center Help (3030 SCC) 6-0808
- Telecommunications, Networking Services
- Information 6-7800
- Repair 5-0006




Access Information




SLIP: 2400/9600 626-1920




-  Terminal settings for these systems are 8-1-N (8 data bits, 1 stop bit, no parity) unless otherwise noted. The number you dial may depend on the modem's bps or baud rate.
-  Dial-in Server: 626-0300, -1200, -2400, -9600.
 - At 9600 Telecomm supports V.32 and MNP level 5 error correction.
 - On campus ADI-100 and ITE setups use 626-2400.



 Internet addresses.

LUMINA: 300/1200/2400 625-6009 
LUMINA.LIB.UMN.EDU 


VM1 (IBM/CMS) at 7-1-even
1200/2400 624-4220 
up to 19.2 campus data phone 4-4220 
VM1.SPCS.UMN.EDU 

EPX, VX (includes INFO), VZ, NVE (includes MEDLINE)
300, 1200, 2400, 9600 see Dial-in Server 
300/1200/2400 at 7-1-even 626-1630 
EPX or VX or VZ or NVE.CIS.UMN.EDU 

EPX, NVE (includes MEDLINE)
300/1200/2400 625-1445 
up to 19.2 campus data phone 3-2400 
EPX or NVE.HSCS.UMN.EDU 

Gopher or Computer Consultant (log in as gopher)
300, 1200, 2400, 9600 see Dial-in Server 
CONSULTANT.MICRO.UMN.EDU 

Consulting via E-mail: *low-priority Central Systems questions*

- Format CONSULT@MACHINE.NAME.UMN.EDU
- Example CONSULT@EPX.CIS.UMN.EDU 

Please be legible. Help us keep our costs down by using a campus mailing address whenever possible; thanks.

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University of Minnesota Affiliation. Please check one box.

Department Faculty Staff Student Alumni Other

E-mail and FAX Options: You can also send us your subscription requests by fax or E-mail. Fax a subscription request "coupon" to 612/625-6817 or E-mail your request to this internet address: newsletter-subscription@boombox.micro.umn.edu

Computer and Information Services

The University of Minnesota is committed to the policy that all persons should have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

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Free E-mail Services (also see Book Center Notes)

- We receive notices of software and hardware fixes, seminars, helpful hints, and various computer related items from many sources. This information may be of immediate importance or interest to the University community. To make this information available in a timely manner, we periodically send out E-mail "news" bulletins. To subscribe to this service, send E-mail to: news-request@boombox.micro.umn.edu
- POPmail users can receive notices about updates and upgrades by sending E-mail to: popmail-news-request@boombox.micro.umn.edu
- Our Vacation/Sick Leave software users can join a forum that includes update information and usage hints by sending E-mail to: VSL-news-request@boombox.micro.umn.edu

The Duplicate Problem

Dear Reader, we need help eliminating duplicates from our mailing list. Minor differences in addresses and names frequently prevent us from automatically eliminating duplicates. When you receive an unwanted duplicate, mail or fax us the mailing label or call 612/625-1300.

Computer and Information Services Newsletter

University of Minnesota
Room 190, Shepherd Labs
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Minneapolis, MN 55455-0421

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University Archives

10

WaLib

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