

Telecom News

University Telecommunications
The University of Arizona

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Modem Standard Recommended: Compatible Dialup Modems Ordered for UA Network

As the modem market continues to boom, it is becoming more difficult to decide what modem to buy. Modems come in different sizes and shapes, have varying transmission speed capabilities (ranging from 110 bps to 19,200 bps), and offer a wide variety of features. The choice is even more complicated by the fact that many modem manufacturers have developed proprietary standards that conflict with the internationally recognized (CCITT) standards. This means, for example, that if you purchase a 9600 bps modem made by one manufacturer, it may not work with a 9600 bps modem made by another.

For a brief guide to modems and related terms used in this article, see the sidebar "Understanding Modems" on page 2.

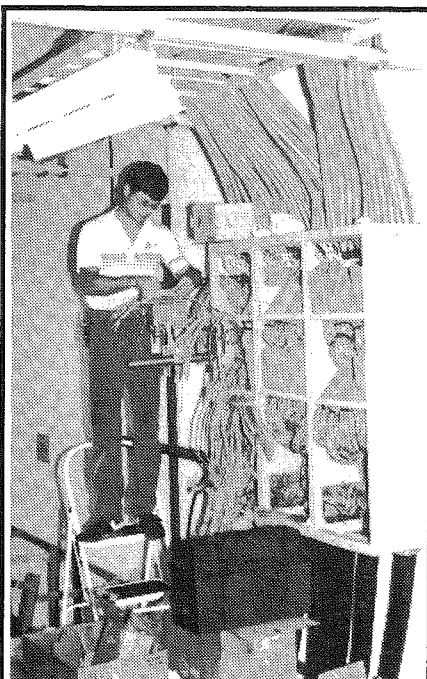
High-Speed Modems Evaluated

These conflicting standards prompted members from a number of UA departments to form a user group, which assumed the task of identifying a recommended modem standard for the University. The user group, under the direction of Joel Snyder in the Management Information Systems (MIS) department, included representatives from the University Telecommunications department, CCIT's Information Technology

Planning and Policy department, the Chemistry department, College of Agriculture, College of Engineering, Computer Science department, and Mathematics department.

In November 1988, the user group released a Request for Proposal (RFP) that solicited information from vendors regarding high-speed modems for access to UA computer systems. Eleven vendors replied to the RFP and submitted 32 sample modems for testing. Modems were put on mini-computers at MIS and rotated out to user group members over a 60-day evaluation period. The

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A technician connects thousands of wires from campus buildings to the UA's new switchroom.

Major Phases of the TIPS Project Are Linking Up

The much-anticipated arrival of the new AT&T 5ESS switch on June 28 provides a major link in the ongoing work of TIPS.

The UA's new telephone system based on the 5ESS switch will offer increased capacity, flexibility, reliability, and service quality for present and future telephone needs. AT&T projects a useful life of 15 years for the 5ESS switch.

The new switchroom of the University Telecommunications department, in the basement of the Computer Center building addition, has been a hive of activity in preparation for the switch.

In June, 48 two-foot tall lead-acid batteries were installed in the switchroom. During normal operation, the switch will draw power from

these batteries, which are continuously fed by building power.

The batteries help isolate the switch from external power fluctuations, such as those experienced during thunderstorms. Also, in the event of a loss of building power, the batteries are capable of maintaining power to the switch until an external diesel power generator can be started.

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user group focused on finding a modem that could be used by faculty, staff, and students for the primary purpose of dialing into UA computers from home for full-screen editing or on-line conferencing.

Findings Summarized

Three main families of signaling standards were proposed by vendors: CCITT V.22 *bis*, CCITT V.32, and vendor proprietary. Vendors that proposed 2400 bps modems based on V.22 *bis* technology also included the Microcom Networking Protocol Level 5 (MNP 5) data compression function. The user group found MNP 5 did not double file transfer throughput as advertised. MNP 5 also caused data to appear in short bursts, which was particularly unacceptable for full-screen editing.

While the low price of modems based on proprietary standards was very appealing, these modems showed the same bursty behavior as the V.22 *bis* modems. In addition, there is no proprietary protocol that interoperates with any other, which would mean that the University would have only one source for modems.

Testing of the 9600 bps modems based on the V.32 standard produced acceptable results. The user group felt that the V.32 modems were a cost-effective solution for most on-line applications.

9600 Bps Modems Recommended

Based on these findings, the user group recommends 9600 bps modems using V.32 technology as the standard for the University. In addition, the modems should meet the following requirements: CCITT V.22 *bis* compatible, Bell 212A compatible, MNP Level 4 operation, Hayes AT command set, CTS/RTS (hardware) or XON/XOFF (software) flow control, and a one year minimum warranty.

Understanding Modems

Modems, short for M**OD**ulator/D**EM**odulator, are devices that allow you to transfer information from your terminal or microcomputer to another computer system over phone lines. A modem connected to your phone and terminal will translate computer signals into audio tones which can be carried over phone lines. The audio tones are then translated back to computer signals by a modem connected to the receiving computer system.

A modem's speed is measured in **bits per second** (e.g., 1200, 2400, 9600 bps). Dividing the bps by 10 will give you the approximate number of characters transferred per second (e.g., a 1200 bps modem will transfer about 120 characters per second).

In order for two modems to communicate with each other, they must conform to the same standards. For home use, there are several popular standards. The Bell System (AT&T) 103 and 212 standards deal with 300 and 1200 bps modems, while **CCITT Recommendations V.22 *bis* and V.32** deal with 2400 and 9600 bps modems. CCITT stands for the International Telegraph and Telephone Consultative Committee, an international standards organization in the area of data communications. The suffix ***bis*** means that it is closely related to the V.22 standard for modems.

As the speed at which modems operate increases, there is a greater chance of transmission errors due to line noise. To solve this problem, many vendors have added error correction protocols to their hardware. The **Microcom Networking Protocol (MNP)** is one of the most popular of these hardware-based error correction protocols. The various levels of MNP refer to certain facilities that are provided by it. MNP Level 4, recommended in the accompanying article, provides error correction and a small amount of compression.

The following table lists vendors who have been awarded the bid, their modem models, and current pricing information. These modems operate at 1200, 2400, and 9600 bps.

Vendor	Fastcomm	4Corners	Western
Mfr	Fastcomm	NEC	Multitech
Model	9696	9631	932
Rack Mnt	Yes	Yes*	Yes
MNP4/5	5	4	5
Qty 1	\$ 749	\$ 776	\$ 805
Qty 2	\$ 749	\$ 776	\$ 805
Qty 3	\$ 749	\$ 776	\$ 805
Qty 4	\$ 749	\$ 776	\$ 805
Qty 5	\$ 679	\$ 776	\$ 805
Qty 10	\$ 659	\$ 776	\$ 805
Qty 15	\$ 649	\$ 776	\$ 790
Qty 20	\$ 639	\$ 776	\$ 773
Ind Pur**	\$ 749	\$ 776	\$ 805
Warranty	2 Yrs	1 Yr	2 Yrs

* NEC dual rack-mount modems are available; however, none were bid.

**Ind Pur: refers to price for individuals who go directly to vendor.

Please note that the prices in the table above are maximums, which are subject to change downward. If you are interested in purchasing modems under this proposal, please contact Purchasing and Stores.

Compatible Modems Ordered for UA Computers

The University Telecommunications department has ordered eight rack-mount Multitech modems for dialing into University computers connected to the IDX-3000 switch. These modems are compatible with the recommended modems (see table above); operate at 1200, 2400, and 9600 bps; and provide MNP Level 5.

The rack-mount modems are expected to be installed in August. Watch for an announcement in this newsletter or the *Telecom Bulletin*.

Equipment Maintenance Contracts—Are They Worth It?

If your department's computer equipment fails, can your department continue with its day-to-day operations? Does your department include funds in its budget for unexpected computer repair costs? Are you or anyone else in your department capable of repairing computer equipment? If you answered NO to any of these questions, you may want to consider purchasing an equipment maintenance contract.

Serves as an Insurance Policy

An equipment maintenance contract is similar to a Health Maintenance Organization (HMO) insurance policy. Each month (or year), you pay a set rate, which then covers all hardware repair costs should your computer equipment break down. These costs include all service visits regardless of the number, and include any parts needed in repairing your equipment.

If you don't have a maintenance contract, you pay for repairs on a time-and-parts basis. This means that you pay for the time it takes to repair your equipment and the cost of all replacement parts.

UA departments can obtain equipment maintenance contracts for most brands of microcomputers, terminals, printers, and peripherals from the Equipment and Maintenance Services group in the University Telecommunications department. Equipment and Maintenance Services is located on the second floor of Building 47 at 1301 E. Fifth Street. You can reach them by phone at 621-5050 or in person, Monday through Friday, 8 a.m. to 5 p.m.

Save Money and Budget Repair Costs

Over the past year the Office of Business Services in the College of Arts and Sciences realized the cost savings from equipment maintenance contracts when several hard disks on their PC's failed. Thanks to their

equipment maintenance contracts which cost \$114 annually per system, they were able to save \$472. Without a maintenance contract, it would have cost approximately \$350 per hard disk for parts and labor.

"In addition to cost-savings, equipment maintenance contracts have saved me a lot of time and grief," says Bill Wright, Business Manager in the College of Arts and Sciences. "Equipment and Maintenance Services is conveniently located on campus and the technicians are very service-oriented."

Equipment maintenance contracts also provide the following benefits:

- Allow you to budget repair costs; eliminate surprise bills and unexpected costs.
- Provide annual preventive maintenance checks which ensure optimal performance and extend the life of your equipment.
- Include priority same-day service which will minimize your downtime. Equipment and Maintenance Services will make every attempt to repair your equipment the same day, provided that the parts are available.

If your equipment is currently under warranty, arrangements can be made for it to be covered by a maintenance contract once the warranty expires. Equipment and Maintenance Services guarantees their work and uses parts that are under warranty. Contract customers also receive installation of minor system upgrades (e.g., memory board replacement and add-on hard disks) at no charge.

Pay on a Monthly or Yearly Basis

Maintenance contracts may be paid on a monthly or yearly basis. Monthly contract rates are listed in the table on this page. You receive a 4% discount for purchasing a yearly contract. Quantity discounts are also available. Payment for services may be made with an Interdepartmental

Requisition. For more information, call 621-5050.

A Small Price to Pay...

An equipment maintenance contract is a small price to pay considering the cost of computers and our dependence on them in day-to-day operations. It's an insurance policy that may make the difference between an inconvenience and a catastrophe. If you need assistance in deciding if an equipment maintenance contract is cost-effective, call 621-5050.

Maintenance Contract Rates

Note: Rates are subject to change.

Equipment	Monthly Rates
Microcomputers	
IBM PC, XT, & compatibles	\$ 9.50
IBM AT & compatibles	10.50
PS/2	Call for Quote
Workstations	
NeXT Computer	Call for Info.
Printers	
Dot matrix	5.00
Near-letter quality	7.00
Solid font letter quality	12.00
Laser	25.00
Modems	5.00
Terminals	8.00

TIPS Q & A

This column is featured each month in *Telecom News*. It provides answers to frequently asked questions about the TIPS project. If you have any questions, please call 621-TIPS (621-8477), Monday through Friday, 9 a.m. to 4 p.m.

Q. My department installed its own wiring. Will this wiring be affected by the TIPS project?

A. Network wiring and wiring installed by individual departments will not be replaced by TIPS wiring. We encourage users to let us know what circuits or wiring exists in order to avoid any service disruptions during TIPS wiring installation. To reach us, please call 621-TIPS.

TIPS, continued from page 1

Because the switch is sensitive to static electricity and dust, a professional "clean team" spent several days mopping and dusting the switchroom from top to bottom and then coated the floor with an anti-static wax.

Thirty-six hundred copper wires are now being released from the black plastic casing of each new 3-inch-in-diameter communications cable that enters the switchroom from around campus. The switch will make the connection between all campus phones over these wires.

Each of these wires must be connected (spliced) to a wire leading to the main distribution frame where connection can be made to telecom-

munications equipment within the room (see photo on page 1).

Additionally, a significant number of cables entering the switchroom from the new campus cable system will be used for future data communications.

TIPS digging of trenches and the placement of underground conduit has been completed. This underground system will support communications between present UA buildings as well as new buildings planned for the 1990's.

Some 3-inch communications cables are now being pulled into newly buried conduit north of Speedway Boulevard and will connect UA buildings there to the main campus.

Cable sections of a manageable length, often the distance between 2 manholes, are pulled into the underground conduit. The ends of these lengths of cable meet in manholes and are spliced together—each of the 3600 wires of one cable length is connected to one of the 3600 wires in the next length of cable. Over 2 million such splices will be made by the time TIPS is completed.

Two hundred technicians in 55 buildings are busy wiring—pulling new wire between floors, stringing wire to offices, and installing new phone and data jacks. This wiring will help complete the link between individual campus offices and the powerful new 5ESS switch.

Telecom News

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Inquiries and suggestions are welcome and should be addressed to *Telecom News*, University Telecommunications, Computer Center 73A, Rm. 131, or call 621-TIPS.

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