

the computer for the college and university with **TOO MUCH TO DO ON A TIGHT BUDGET**

LET'S FACE IT!

If you're a researcher, mathematician, scientist, or engineer at a college or university, you know it's rough getting by without full-time access to a computer. Yet because of overstretched budgets, many critical projects are limping along with sporadic use of overburdened computers.

As a result, time is lost waiting for programs to be processed -- to get through the maze of scheduling and procedures -- and for the results to get back to the originator. Accuracy and efficiency are often sacrificed. Many times, errors that could be corrected instantly with direct access to the computer are not observed until days or even weeks later when the entire program is run and the erroneous results are returned to the programmer. Students and educators alike are losing out on valuable *hands-on* computer experience. With insufficient direct interaction with the computer, much of the computer's vast potential remains inaccessible to the user.

You need an exceptional computer

The solution to this dilemma is to put each user in direct touch with the problem-solving power of the computer. But to do this on today's tight budgets, you need a truly exceptional computer. It must be low in cost, yet have the capabilities needed to handle the ever-increasing workload arising from endeavors in research and education.

SYSTEMS 72 does the job within your budget

SYSTEMS 72 is the computer designed specifically to meet these requirements. You see, SYSTEMS 72 has the efficiency and capability of computers many times its size and price. Even the smallest machine comes with 32K of memory and has the power to invert a 100 X 100 matrix. With BASIC and FORTRAN IV available on every configuration, SYSTEMS 72 is ideally suited to a host of other academic chores, like mathematical modeling, simulation, data retrieval, statistical analysis, data reduction, and multiple regression analysis. Yet with all its potential, SYSTEMS 72 is well within the reach of most colleges and universities. With a leasing arrangement, you can put SYSTEMS 72 to work on your

campus for as little as \$555 per month, or purchase it outright for less than \$19,000.

Time sharing with an in-house system

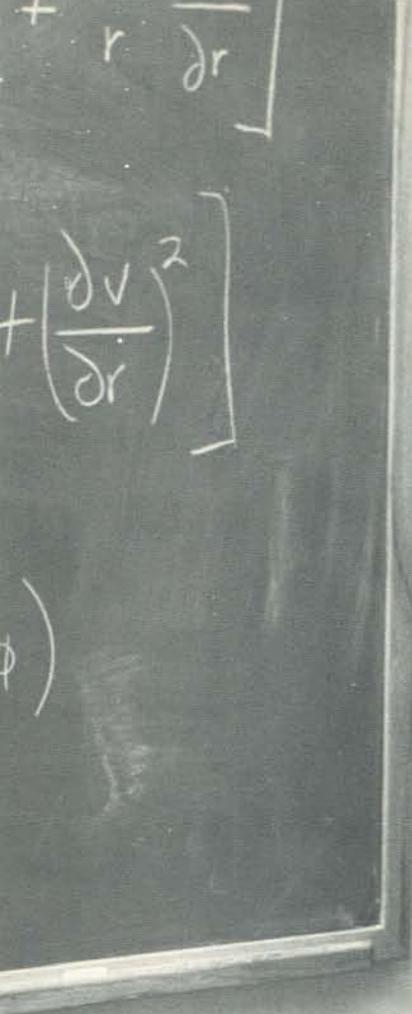
Like its more expensive counterparts, SYSTEMS 72 can expand into a full-blown, foreground-background system with multi-user, time-sharing facilities. If your school is already subscribing to time-sharing services, chances are that SYSTEMS 72 can do the same job and more at a lower cost. And with SYSTEMS 72, you gain the availability of an in-house system that provides better response. With an expanded configuration, as many as 32 users can simultaneously apply SYSTEMS 72 to their individual problems. The total workload can represent a diverse blend of real-time and batch operations, and both kinds of processing can proceed concurrently.

Instant access to problem-solving power

On-line terminals can be linked to SYSTEMS 72 and placed in research laboratories, classrooms, or at any other location where instant access to the problem-solving power of the computer is needed. By operating the terminals in a conversational mode, users in each of these areas can compile, assemble, debug, and execute their programs. Each terminal operator converses with SYSTEMS 72 as though he were the exclusive user, receiving the information he needs when he needs it.

Capabilities for all fields of endeavor

With the full power of SYSTEMS 72 at his fingertips, the researcher receives instantaneous feedback from experimental data. He can perform statistical analysis, forecasting, simulation, and much more. The student learns the ins and outs of programming and computer operation faster, avoiding the scheduling pitfalls experienced in the past. Once the student masters the rudiments of programming, he can apply SYSTEMS 72 to his mathematical and engineering problems. In the laboratory, SYSTEMS 72 can be linked directly to scientific instruments. It can be programmed to automatically acquire and analyze data from the instruments thereby eliminating hundreds of time-consuming, repetitive operations. These are but a few of the countless applications of SYSTEMS 72. When used with imagination, SYSTEMS 72 offers powerful



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new capabilities for virtually all fields of endeavor on today's campus.

Large-system power at lower cost

What makes SYSTEMS 72 such an outstanding performer? Basically, it has to do with a new, cost-effective hardware design that provides large-system capabilities while reducing the total expense to you.

One of the most significant features of this design is SYSTEMS 72's virtual memory. In place of the expensive, all-core memory of other machines, SYSTEMS 72 uses a small quantity of core linked to a much larger volume of disc storage. The core-disc combination is called virtual memory because it yields the virtual programming capability of a large memory composed entirely of core. In its smallest configuration, SYSTEMS 72 contains 4K of core and 32K of disc. The storage capacity can be expanded to include up to 65K of core and 524K of disc.

With SYSTEMS 72's virtual memory, core and disc storage are combined in such a way that even the largest programs can be written without regard to the capacity of core. Each user's programs are automatically segmented, loaded into core, and unloaded onto the disc as necessary without external intervention.

Advanced hardware in all areas

The advanced hardware design, exemplified by the virtual memory, extends into all areas of SYSTEMS 72. For example, SYSTEMS 72 includes such large-system features as program status doublewords for rapid context switching, privileged instructions, a multilevel interrupt structure, memory write protection, pre- and post-indexing, displacement indexing, and eight addressable registers. A programmable input/output processor and a direct access to memory port are also available.

Versatile programming

Just as SYSTEMS 72's large-system power stems from advanced hardware technology, the ability to efficiently harness this power to a diverse blend of real-time and batch operations rests on its software.

For problem solving in a conversational mode, SYSTEMS 72 offers the easy-to-learn BASIC language with facilities for matrix arithmetic, file handling, and string manipulation.

FORTRAN IV is provided and includes extensive compile-time and run-time diagnostics, compile-time error correction, and statement trace. The programmer has the option of either compiling his FORTRAN programs directly in memory, where they will be available for immediate execution, or compiling them in relocatable format and then loading them into memory as needed.

The roster of SYSTEMS 72 software also includes a complete debugging package and a conversational symbolic editor that makes program modification as easy and convenient as it is with a deck of cards.

Operating systems geared to your needs

Programs run under either of two operating systems, called MA/10 and MA/20. Each is geared to a specific range of user needs. For users with the minimum hardware configuration, MA/10 provides the convenience of a disc operating system. It eliminates repetitive loading by maintaining all programs in virtual memory. MA/20 provides full multiprogramming capabilities for users with an expanded configuration. It provides time-sharing facilities and permits programs to be initiated by scheduling and by direct interrupt control.

The system to handle your level of work

With SYSTEMS 72, you get the hardware-software configuration designed specifically to handle your level of work. You can start with the minimum configuration and use it as an autonomous problem solver or as a terminal appended to your school's computer center. Then as your workload and budgets increase, you can expand SYSTEMS 72 all the way up to a full-blown time-sharing configuration.

Wide choice of peripherals

As your system expands, you can fill your needs from a wide selection of peripherals. Choose from seven- and nine-track magnetic tape transports, disc drives with capacities ranging from seven to twenty-four megabytes, impact and jet-ink line printers, 300 and 600 cpm card readers, CRT displays, teletypewriters, data set interfaces, mark-sense readers, and paper tape equipment. There's even an extremely low-cost cassette magnetic tape drive that's program compatible with the nine-track system. For I/O capabilities usually found only in much higher priced systems, you can equip SYSTEMS 72 with a multiplexor I/O processor that handles data exchanges with as many as 64 devices simultaneously.

Want to know more?

For more about SYSTEMS 72 and what it can do for you, call the Sales Engineer at the nearest SYSTEMS office. He'll be over with full equipment specifications including pricing and delivery. And while you're at it, ask him for our two new brochures: "Need Virtual Memory in a Small Computer?" and "MA/20 for SYSTEMS 72 Multi-programming." They'll give you hundreds of more reasons why SYSTEMS 72 totals out to a lot more machine for the price than anything else on the market.

Prices subject to change without notice.

Offices Located in **BOSTON**, 1420 Providence Turnpike, Norwood, Mass. 02062, (617) 762-7884; **CHICAGO**, Suite 205-2775 Algonquin Rd., Rolling Meadows, Illinois 60008, (312) 259-6060; **DALLAS**, P.O. Box 674, 506 North Central Expressway, Richardson, Texas 75080, (214) 238-9548; **DENVER**, Suite 110-1449 W. Littleton Blvd., Littleton, Colorado 80120, (303) 798-4559; **DETROIT**, 24655 Southfield Rd., Southfield, Michigan 48075, (313) 354-1980; **FT. LAUDERDALE**, 6901 W. Sunrise Blvd., Ft. Lauderdale, Florida 33313, (305) 587-2900; **HOUSTON**, Suite 412, 6420 Hillcroft, Houston, Texas 77036, (713) 771-7194; **HUNTSVILLE**, Suite 128-2109 W. Clinton Ave., P.O. Box 1566, Huntsville, Alabama 35805, (205) 539-2181; **LOS ANGELES**, 7300 Bolsa Ave., Westminster, California 92683, (714) 892-8347 or (213) 598-1377; **NEW YORK**, 300 Madison Avenue, New York, New York 10017, (212) 986-6766; **PHILADELPHIA**, 1030 W. Germantown Pike, Norristown, Pa. 19401, (215) 539-6699; **ST. LOUIS**, Suite 212, Creve Coeur Bank Bldg., Creve Coeur, Mo. 63141, (314) 872-8625; **SAN FRANCISCO**, Suite 11-2175 De La Cruz Blvd., Santa Clara, California 95050; **WASHINGTON, D.C.**, 5707 East West Highway, Riverdale, Maryland 20840, (301) 779-5050; **OTTAWA (SELCAN)**, Suite 911-75 Albert St., Ottawa, Ontario, Canada, (613) 237-0551; **PARIS**, 85 bis, Avenue Albert 1^{er}, 92, Rueil-Malmaison, France; **FRANKFURT**, 6 Frankfurt/Main, Niddastrasse 42/44, Germany; and **LONDON**, Radix House, Central Trading Estate, Staines, Middlesex, England.

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