Now Look Who's Got DECsystem-10 on Campus...

Caltech, Bowdoin, Stanford, CarnegieMellon, Catholic, WesternOntario, Pittsburgh, Harvard, Oxford, Michigan, MIT, PuertoRico, Claremont, Yale, Essex, Oregon, Bonn, Munich, Cornell...

digital

THE BEST OF BOTH WORLDS...PLUS

Traditionally, university computer centers have offered only batch processing services. It made good economic sense, when computers were much more expensive than they are now, because batch kept computer systems efficient.

But times change. Now users worry about their own efficiency as well as the computer's. That's where DECsystem-10 comes in.

It's a big, flexible, expandable family of computers based on DIGITAL's PDP-10 processors; a family that can give faculty, students and administration the best of both worlds.

Enough multiprogrammed batch capability to handle the heaviest administrative loads. Enough interactive timesharing capacity to support a whole campus of academic users. Plus enough real-time potential to satisfy several scientific or engineering laboratories. All simultaneously; at less than half the cost of comparable systems.

The next several pages summarize what DECsystem-10 has to offer. The configurations typify the more than seventy installations in colleges and universities around the world.

BE READY FOR TOMORROW TODAY...

Meet increasing instructional, research and administrative workloads on campus with DECsystem-10 in your computer center. Choose from single-processor 1040, 1050, and 1070 systems or dual-processor 1055 and 1077 systems to satisfy your immediate needs; then expand as your requirements grow.

DECsystem-10 compatibility lets you start with the smallest 1040 system and upgrade to the largest 1077 system. You keep the same operating system, make no major software changes, experience virtually no service interruption.

As batch processing requirements grow, you can expand your 1040 system from 49,052 to 262,144 directly addressable 36-bit words (over 1 million bytes); or, you can upgrade to a 1050 by adding a swapping system. Upgrade to a 1055 by adding a second PDP-10 processor or trade-up to a PDP-10I-based 1070, then go to a dual-processor 1077. Once the processor upgrade is made, core can be increased to over 4 million words (over 17 million bytes).

As timesharing needs evolve, you can introduce or increase timesharing terminals. DECsystem-10 accommodates up to 127 for concurrent use. It handles FORTRAN, BASIC, COBOL, ALGOL and ASSEMBLER in the timesharing mode. Auxiliary storage for more than 164 million words is easily added.

As remote processing demands arise, you can meet them by connecting remote stations, including small computers, line printers, card readers, and terminals. Remote station operation allows access to all sharable programs and peripherals available to local users, and local users can access the remote station.

As real-time requirements develop, you can tie laboratory instrumentation into DECsystem-10. A unique priority interrupt system maximizes real-time service. Instruments interface with ease.

THE INDUSTRY'S BEST PRICE/PERFORMANCE

When your computer center workload begins squeezing your budget, it's time to consider DECsystem-10. Each model is really four computing systems in one. With it, your computer center could handle up to 127 simultaneous timesharing users, local batch, remote batch, and real-time tasks. All equally well and all at once.

But there's more to DECsystem-10 than versatility; there's compactness; there's efficiency.

For example, DECsystem-10 compilers are reentrant and can serve many users concurrently. This conserves core space, cuts down on swapping, and permits more users to be accommodated.

Efficient, rapid program execution results from the system software repertoire of 366 hard-wired instructions (378 on systems 1070 and 1077). That's far more than any comparable system.

File throughput is also fast and efficient because the operating system optimizes file placement and retrieval.

Then there's cost. The majority of DECsystem-10 campus installations fall within a purchase price range of from $400,000 to $2 million. Full payout lease costs run from $8,000 to $40,000 per month.

And most important, whether you buy or lease, DECsystem-10 will cost you less than half what you might spend for a comparable system.

IT'S RELIABLE, TOO

Of the over 200 DECsystem-10 installations to date, more than two dozen are in timesharing utilities. This is one application where downtime is absolutely intolerable, and that's an acid test of DECsystem-10 reliability.

But just in case, we maintain a highly competent field service organization at strategic locations around the world. Mostly for peace of mind.

We'll gladly put you in touch with DECsystem-10 users in your area for a firsthand impression.

WORRIED ABOUT CONVERSION?

Don't be. Chances are another DECsystem-10 user has already undergone a similar conversion. And to ease your transition, many simulators, translators, and filter programs are available either directly from us or through DECUS, our computer users organization.

MINIMUM STAFFING REQUIREMENTS

Typically, our university computer center installations require only one operator per shift. This is because the operating system serves all four operating modes simultaneously and leaves the operator free to handle special user requests as they arise.

In addition, a typical installation requires minimum system programming expertise. The more than three million console hours we've logged in the field have worked out operating system bugs. What few updates are issued can be implemented with ease through SOUP, a special source merging program.

All in all, DECsystem-10's efficiency will keep your staff efficient. Its operating system and language compilers are simple to learn and easy to use. Operating manuals are clear and concise. The system itself was engineered from top to bottom with the user in mind.

ACCOUNTING PACKAGE

We supply a series of accounting programs to control and record machine utilization. One program checks user authorization and the allocation of time period and location. Another records processor time for each user, connect time, user identity, main memory used, disk space used, and so forth. Still another gathers usage data for billing purposes and enables the addition of users or changes in passwords.

USER PROTECTION SCHEME

To ensure user protection, DECsystem-10 maintains the following nested eight-level security scheme: No Privileges • Execute Only • Read • Append • Update • Change Name • Supersede • Change Protection

Should certain jobs require a different priority than originally assigned, the system operator simply adjusts the job queue accordingly.

WIDE SOFTWARE SELECTION

DECsystem-10 offers users a broad choice of software. Listed here are items that might be of special interest to campus computer center users. All languages may be utilized from the timesharing terminals as well as in the local and remote batch mode. Additional user-developed programs are available through membership in DECUS, the Digital Equipment Computer Users Society.

FORTRAN IV. Produces highly efficient object code resulting in programs 30 to 50 percent shorter than most other FORTRAN compiler programs. Reentrant. Device independent. Modular.

BASIC. Extended version. Easy-to-learn conversational problem-solving language. Reentrant. Produces machine language directly. Runs at high speed in minimal core. Has internal debugging, editing capabilities. Dartmouth public library programs written in BASIC are available from DECUS.

COBOL. Compiler based on August, 1968 ANSI Level 2 Specifications. Reentrant. Contains separate report generation program. Both index sequential and random access data modes.

ALGOL. Compiler is a complete subset of ALGOL 60 with added features such as string handling, byte manipulation, double-precision floating point, assignment within expressions, modulus operator, octal constants.

MACRO-10. Two-pass assembler. Direct access to instruction set. Device independent. Offers complete MACRO facilities, conditional assembly features, indefinite repeat operations, unlimited nesting.

TECO. Concise text editing language. Editing is performed on a character, line, or variable character string.

LOADER. Assigns consecutive core space and loads independently assembled or compiled programs prior to execution.

DIAGNOSTICS. Comprehensive set for checking system operation. Most run without system downtime in timesharing mode.

AID. An easy language for engineering and scientific problems. It is based on the JOSS language.

PIP. Transfers files between standard input/output devices, eliminating the need for a satellite computer.

EDITOR. Line editor that produces or modifies MACRO, FORTRAN or other source files from teletype.

DDT-10. On-line debugging program for any MACRO-10, FORTRAN IV, or COBOL program.

TYPESET-10. Very advanced word processing system including editing capability and hyphenated justification algorithm. Quite useful in producing student directories, catalogs, manuals, etc.

LISP. General-purpose language utilizing a list-structure storage scheme for both program and data. This package is a current version of LISP 1.6. (DECUS).

SNOBOL-10. Symbol manipulation language compatible with Version 2.0 of SNOBOL-4 as released by Bell Telephone Laboratories. (DECUS).

SCHOLAR/TEACH. Highly efficient computer-assisted instruction (CAI) system. (DECUS).

GASP II. Discrete simulation language consisting of a set of FORTRAN subprograms. (DECUS).

BLISS. Designed for writing software systems such as compilers and operating systems. (DECUS).

WATFOR. An in-core FORTRAN compiler designed to support heavy FORTRAN batch job streams.

APL. A programming language based on a consistent unification and extension of existing mathematical notations.

ADMINISTRATIVE APPLICATIONS LIBRARY. Includes student registration, course scheduling, grade reporting, college budgeting and general ledger accounting packages. (Available through DECUS and other DECsystem-10 educational users.)

SUPPORTING SERVICES

Our interest in your DECsystem-10 installation doesn't stop with start-up. For your computer center personnel, we offer training courses in programming (two weeks), monitors (two weeks), and maintenance (five weeks). Classes are normally held at our headquarters training center in Maynard, Massachusetts, near Boston. If desired, however, they may be conducted at your installation.

We also provide complete documentation for your DECsystem-10, including comprehensive software handbooks, hardware manuals, periodically updated software notebooks, and application-oriented software bulletins issued as new applications become available.

Also available to you is membership in DECUS, the Digital Equipment Computer Users Society, a voluntary, non-profit users group supported by DIGITAL. The largest group of its kind, the 12,000 DECUS members come from the United States and 40 other countries. The society publishes a newsletter, conducts symposia, and maintains a user-contributed program library for member use. Over seventy colleges and universities contribute programs to the DECUS library.

To fully support your installation, DIGITAL service contracts can be arranged to cover most of your requirements. And in instances where special software, interfacing, logic, or modifications to DIGITAL products are needed, the services of our Special Systems Group can be utilized.

CAMPUS INSTALLATIONS

With over 4000 installations to date, DIGITAL is no stranger on campus. As the world's leading manufacturer of small computers, we pioneered their use in university classrooms and laboratories.

Now we're providing multi-mode computing with our large-scale DECsystem-10—timesharing, local batch processing, remote batch processing, and real-time processing. All concurrently on one system.

We're doing this because campus computation needs are changing. Computer centers can no longer rely on batch processing alone to keep pace with user requirements. Today's faculty and students want to interact with the computer via timesharing terminals.

With DECsystem-10 in your computer center, you have this interaction. And you can handle real-time and batch processing at the same time.

But don't accept our word for the versatility of DECsystem-10. Visit one of our seventy campus installations around the world and see for yourself. In the meantime, here are seven actual configurations to examine, along with application summaries and approximate purchase or lease price.

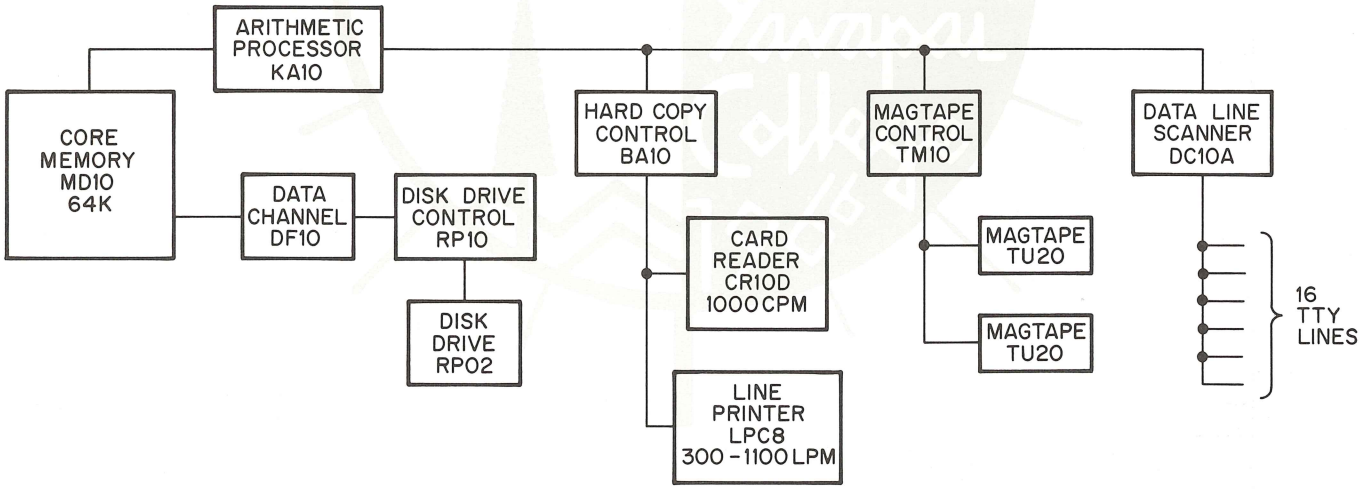
YAVAPAI COLLEGE, PRESCOTT, ARIZONA

Yavapai College, a part of Arizona's junior college system, meets academic and administrative computing requirements with a DEC-system-1040. Remote terminal entry from college classrooms is used to handle on-line academic work. Administrative requirements are satisfied through local batch processing. In addition, remote timesharing services are supplied to state government agencies within Yavapai County.

Student enrollment: 1,000

Typical purchase price: approximately $400,000

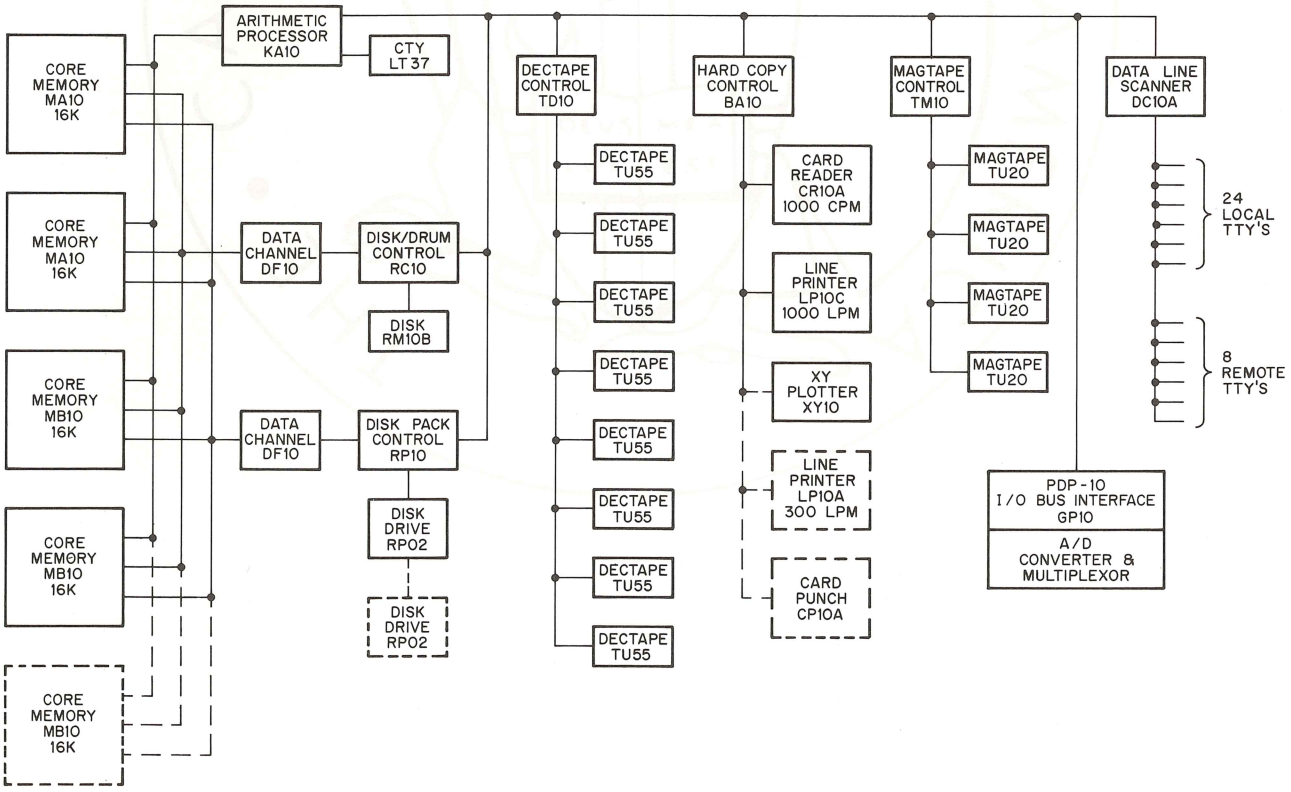
Typical lease price (6-year full payout): approximately $7,500/month



CATHOLIC UNIVERSITY OF AMERICA,
WASHINGTON, D.C.

The DECsystem-1050, installed in the computer center to satisfy the instructional computing needs of all academic departments, is being expanded to handle the entire administrative workload as well. Extensive use is made of the system's timesharing and batch processing capabilities. The heaviest users are the departments of chemistry, civil and mechanical engineering, psychology, physics, aerospace, and atmospheric sciences.

Undergraduate student enrollment: 2,200
Graduate student enrollment: 4,000
Typical purchase price: approximately $750,000
Typical lease price (6-year full payout): approximately $14,000/month

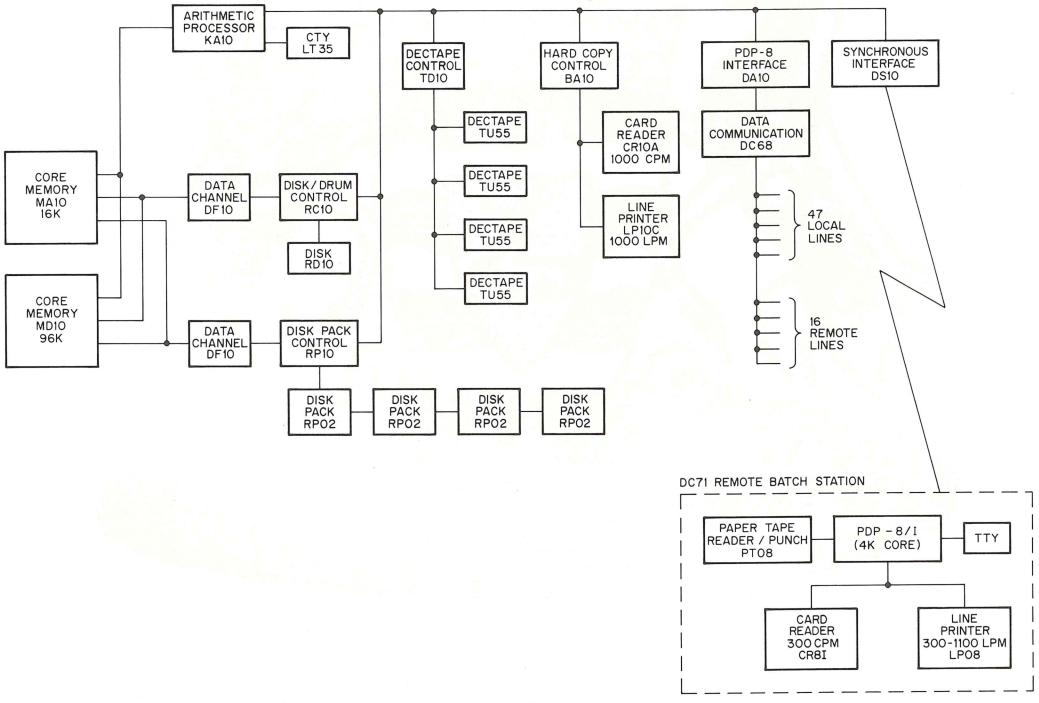


HATFIELD POLYTECHNIC, HATFIELD, HERTFORDSHIRE, U.K.

The DECsystem-1050 at the Hatfield Polytechnic Computer Centre provides computing services for staff and students via 38 on-line terminals and a video display unit. Twenty terminals are installed in individual work booths in a specially designed classroom, while others are available in laboratories for the rapid processing of research data.

Outside the computer centre, nine secondary schools and eleven colleges in the county of Hertfordshire have terminals linked to the DECsystem-10. Many other schools submit work to the centre via twice-weekly courier service which collects programs for batch processing and delivers the results.

Student enrollment: 2,875, (plus approximately 2,000 students outside the Polytechnic)
Typical purchase price: approximately £320,000 ($800,000)
Typical lease price (6-year full payout): approximately $15,000/month



WATFORD COLLEGE OF TECHNOLOGY

The Watford College of Technology, a major center for printing technology courses in the U.K., has a DC71 remote batch station tied into the Hatfield 1050 system. It includes a PDP-8 computer, card reader, line printer and paper tape reader/punch. In addition to printing technology, the Watford installation is used extensively in mathematics, applied physics, and computer studies.

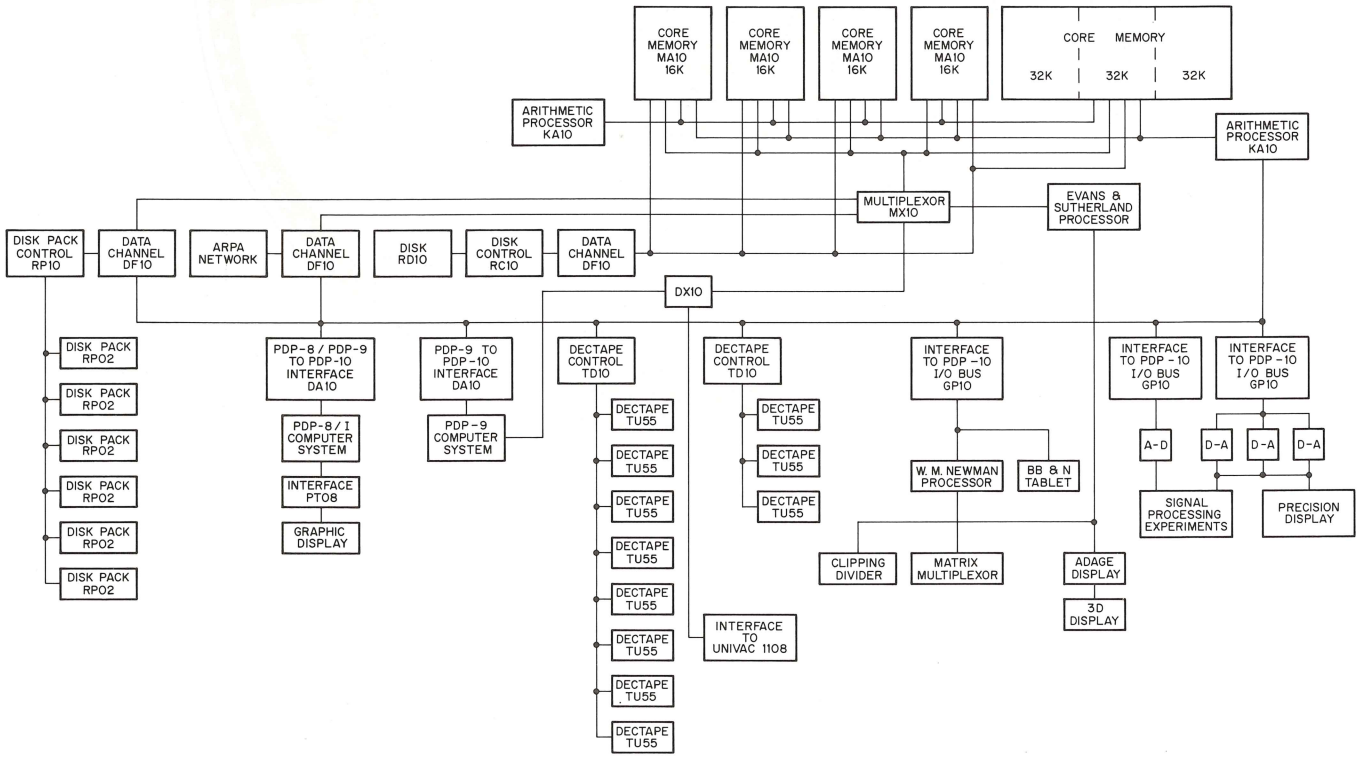
UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

The unique ability of the DECsystem-10 to allow real-time activity to run concurrently with timesharing plays a key role in the computing program at the University of Utah in Salt Lake City. The system uses two processors; one supports a computer science timesharing system for graduate students and the other is designed for graphics research. Digital signal processing experiments and other on-line experiments are carried out through special interfaces.

Part of the graphics research involves a PDP-9 computer connected on-line to the DECsystem-10 through a DA10 Interface. The PDP-9 has four specially-designed Univac 1559 scopes for use in interactive graphics research.

Another part of the graphics research is centered on the Evans and Sutherland Corporation's high performance, three dimensional line drawing display processor which generates perspective drawings that are realistically shaded. The physics department also utilizes the DECsystem-10 via a special-purpose graphic display unit.

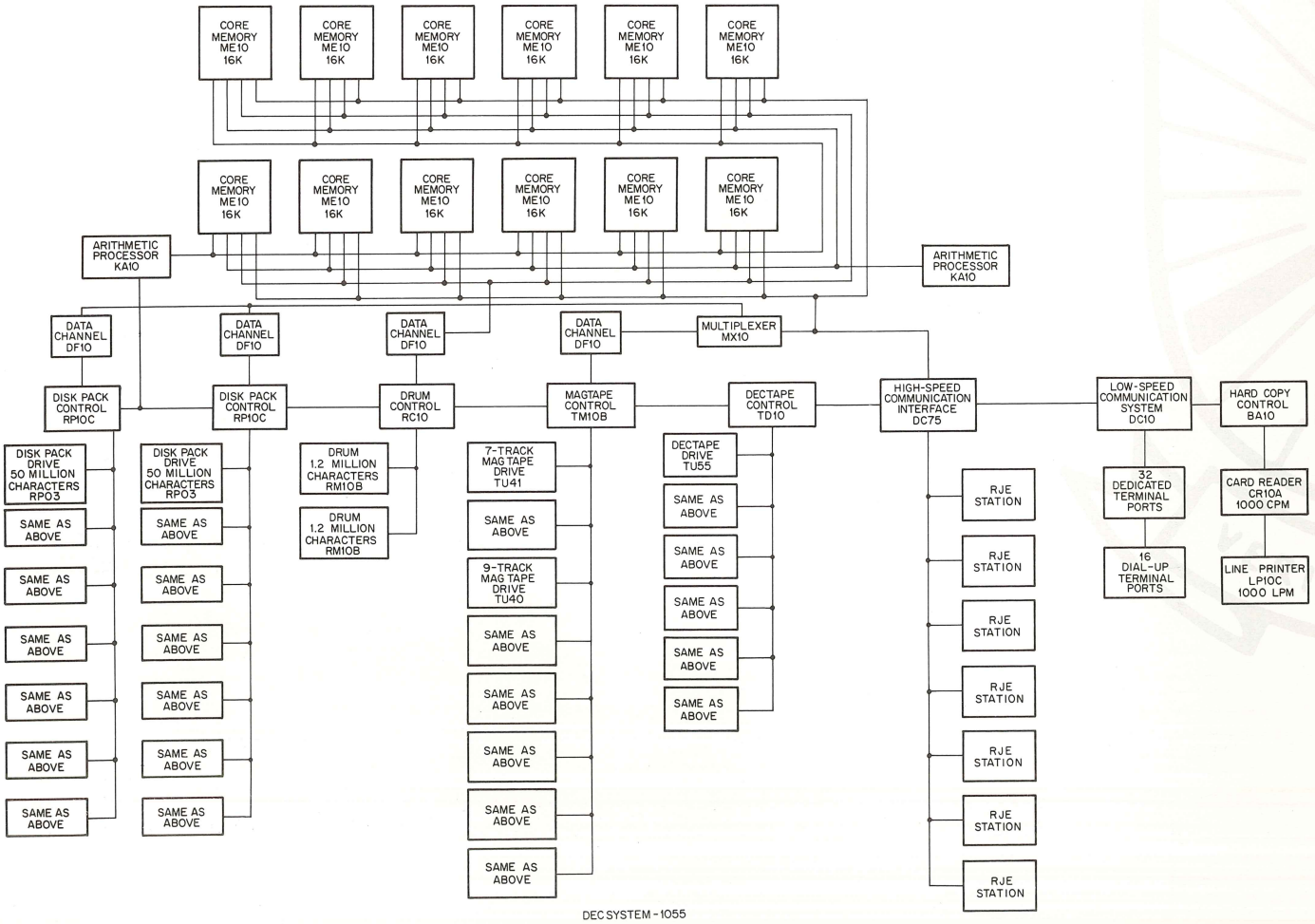
Undergraduate student enrollment: 17,000
Graduate student enrollment: 4,000
Typical purchase price: approximately $1,500,000
Typical lease price (6-year full payout): approximately $28,000/month



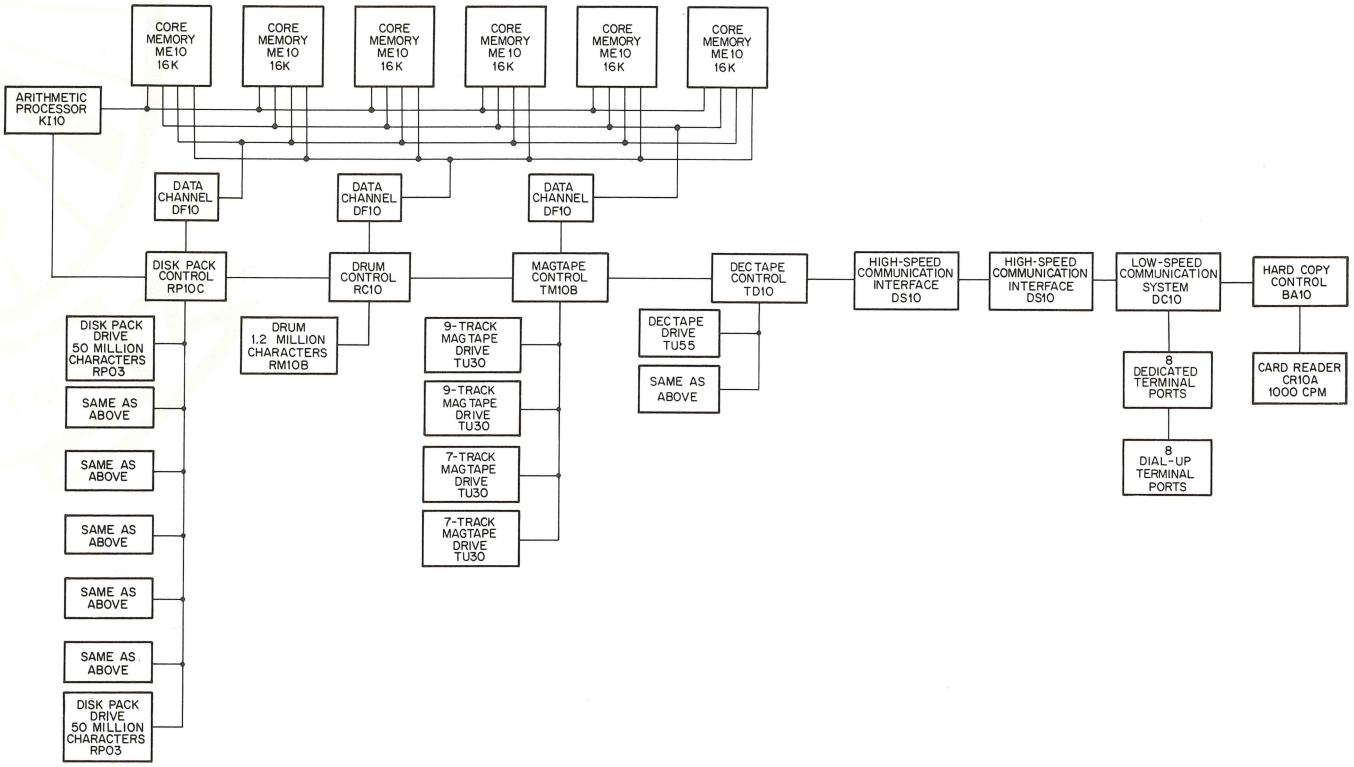
UNIVERSITY OF PITTSBURGH, PITTSBURGH, PENNSYLVANIA
A DECsystem-1055 and a DECsystem-1070 serve the academic computing requirements of the University of Pittsburgh. Plans call for consolidating the two systems into one dual-processor DECsystem-1077 by June, 1973.

The DECsystem-10's, located ten miles from the main campus at the university's new computing center, are accessed from remote job entry terminals on campus via high-speed communications lines and from remote timesharing terminals.

Undergraduate student enrollment: 19,500
Graduate student enrollment: 6,600
Typical purchase price: approximately $2,800,000
Typical lease price (6-year full payout): approximately $50,000/month



DEC SYSTEM-1055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ARITHMETIC PROCESSOR KI10
DATA CHANNEL DF10
DATA CHANNEL DF10
DATA CHANNEL DF10
DISK PACK CONTROL RP10C
DRUM CONTROL RC10
MAGTAPE CONTROL TM10B
DEC TAPE CONTROL TD10
HIGH-SPEED COMMUNICATION INTERFACE DS10
HIGH-SPEED COMMUNICATION INTERFACE DS10
LOW-SPEED COMMUNICATION SYSTEM DC10
HARD COPY CONTROL BA10
DISK PACK DRIVE 50 MILLION CHARACTERS RP03
SAME AS ABOVE
SAME AS ABOVE
SAME AS ABOVE
SAME AS ABOVE
SAME AS ABOVE
DISK PACK DRIVE 50 MILLION CHARACTERS RP03
DRUM 1.2 MILLION CHARACTERS RM10B
9-TRACK MAGTAPE DRIVE TU30
9-TRACK MAGTAPE DRIVE TU30
7-TRACK MAGTAPE DRIVE TU30
7-TRACK MAGTAPE DRIVE TU30
DEC TAPE DRIVE TU55
SAME AS ABOVE
8 DEDICATED TERMINAL PORTS
8 DIAL-UP TERMINAL PORTS
CARD READER CR10A 1000 CPM

KEEP US IN MIND

Chances are, another computer for your center is still off in the future. We understand. But we'd like to be included when the time comes. In fact, now may be the perfect opportunity to take a close look at DECsystem-10. Start with a call to your local DIGITAL office. If you're ready, suggest a visit from one of our sales engineers. If you'd rather browse through more literature, just ask what's new, take your choice, and have it sent. Our pleasure.

Maybe you'll be reading about you in the next edition of this brochure. We hope so.

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For more information about DECsystem-10, simply complete, staple and mail this reply card.

☐ Have an applications engineer call.

Send me the following literature:

☐ Introduction to DECsystem-10 Software (10)
☐ DECsystem-10 Technical Summary (10)
☐ DECsystem-10 in the Sciences (10-S)
☐ Applications in Science (10-S)
☐ 1,000,000 Students (DIGITAL in Education) (E)
☐ DECsystem-10 COBOL (10)

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