EAI 640 Digital Computing System.



EAI® 640 Digital Computing System

The EAI 640 Digital Computing System... a general-purpose, stored program digital computer with a 16-bit word plus protect bit, memory expandable to 32,768 words, a 62-instruction repertoire, 12-levels of priority interrupt and a price which starts under \$30,000.

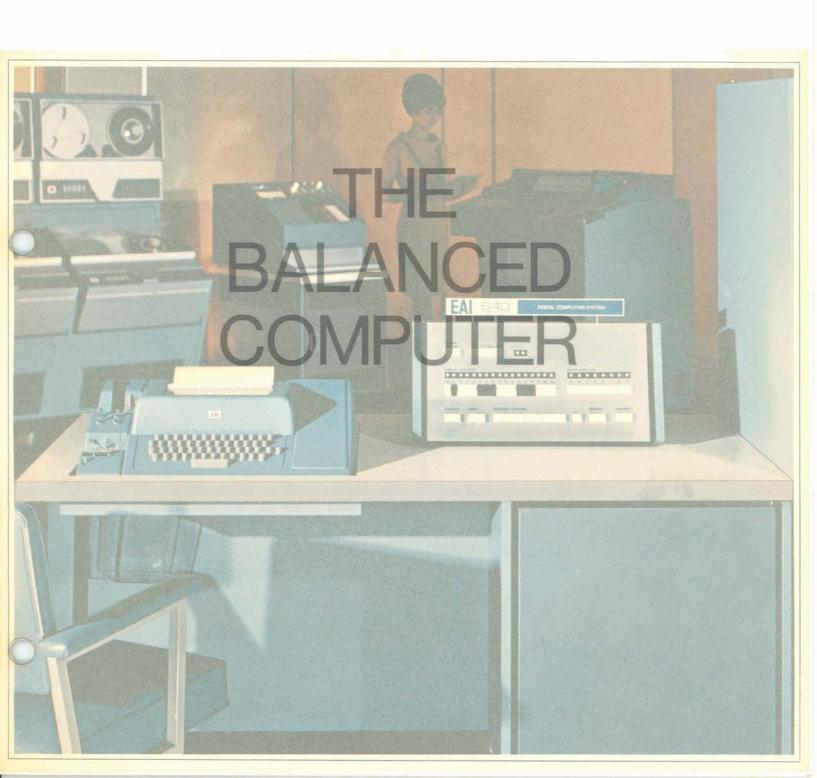
The 640 is the balanced computer.

The System provides the correct balance between price and performance, hardware and software, versatility and economy.

More important, 640 capabilities are equal to a variety of scientific computational requirements. The EAI 640 Digital Computing System serves for both general-purpose and conversational mode computations; as the digital portion for hybrid systems and as the digital computer for systems designed for special-purpose applications.

Most important, the EAI <u>640</u> strikes a balance between the work it can do and the cost to do it. Simply stated, balance means value. The EAI <u>640</u> Digital Computing System offers the best value available in small scale computer systems.

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EQUIPMENT COMPLEMENT Desk Console & Storage Rack

Provides facilities for monitoring all elements in the System. The console includes a computer control panel, teletypewriter with or without paper tape reader/punch, or, optionally, a high-speed paper tape reader/punch with controller. The control panel provides register select and display switches, eight sense switches, and all operating controls. The central processor and up to 16K of core memory is housed in the vertical equipment cabinet. Additional memory and device controllers are housed in expansion cabinets. The 640 Computer may be obtained (at reduced price) with a cabinet-mounted control panel.

Paper Tape Read/Punch Station

Reads 300 characters-per-second and punches 100 characters-per-second. Handles five, seven or eight-level paper tape. Reader and punch are available separately.

Card Reader 640/520

Reads 400 80-column cards-per-minute.

Card Punch 640/550

Punches 100 80-column cards-per-minute.

Line Printer 640/610

Prints 300 lines-per-minute, with 120 column lines (136 optional). Full line buffer.

Magnetic Tape 640/720

Operates at 45 inches-per-second with densi-



ties of 556 and 800 bits-per-inch on half inch 9-track magnetic tape. One controller can handle up to four tape transports and provides word assembly/disassembly. Magnetic Tape System (includes one transport expandable to 4.) Additional Magnetic Tape Transport 640/730.

Disk Storage Unit 640/250

A single disk, each side stores 256,000 computer words; average access time of 133 milliseconds, transfer rate of 43,000 words/second.

Interval Timer

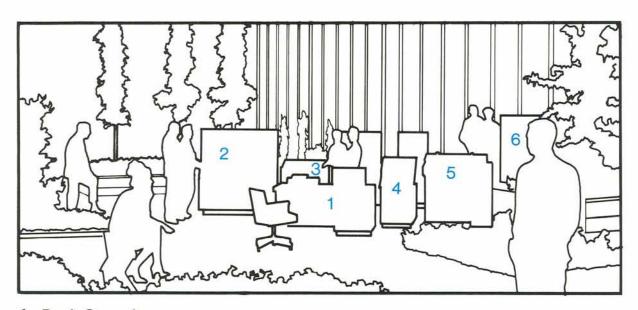
Generates timing pulses in intervals of 1, 10 or 1000 milliseconds. Maximum of four timers per 640 System.

COMPUTER	Memory			
	4096 words	8192 words	Includes : (partial listing)	
Upright Rack Mounted Console	640/004	640/008	4 data channels, 12 inter- rupts, 4 interval timer interfaces, multiply, di-	
Desk Console	640/014	640/018	vide, program protect, teletype control	

TELETYPE AND PAPER TAPE READ/PUNCH

Standard	Ruggedized	Controller
640/410	640/412	v masonosav sarvec
640/411	640/413	Included in Computer
640/421	n/a	640/420
640/422	n/a	
	640/410 640/411 640/421	640/410 640/412 640/411 640/413 640/421 n/a





- 1 Desk Console
- 2 Magnetic Tape 640/720
- 3 Card Punch 640/550
- 4 Card Reader 640/520
- 5 Line Printer 640/610
- 6 Storage Rack

BALANCE

IN HARDWARE AND SOFTWARE

In spite of a substantial equipment complement, a system offering only hardware will not do the user's job. It demands software.

EAI OFFERS A BALANCE BETWEEN 640 HARDWARE AND SOFTWARE.

All assembly and diagnostic programs required for scientific problem solving are offered. All programs except FORTRAN and Operations Interpreter (for digital or hybrid) require 4,096 word memory and teletype/paper tape capability. The FORTRAN and Operations Interpreter programs require an 8,192 word memory.

Symbolic Assembler—a one-pass system which produces a tag table, program listing with error notes as well as the generated object

program. At the user's option, assemblies can be performed in two or three passes to provide complete on-line error correction without reassembly. The object code is in relocatable format for maximum flexibility at run-time.

In addition to symbolic instructions, the assembler recognizes a variety of pseudo-operations for program control, data definition, storage allocation, input/output functions and subroutine calls.

FORTRAN Compiler—a one-pass system similar to FORTRAN IV, designed to specifications for ASA Standard FORTRAN to generate efficient object code from FORTRAN statements. 640 FORTRAN is an expansion of the ASA Standard FORTRAN compiler which provides additional features for real-time operation.

Sub-Routine Library—Three classes of sub-routines are provided. (1) Arithmetic and mathematical functions for real, integer and complex numbers—available in single or double preci-



sion as applicable; (2) format sub-routines to facilitate numeric conversion from integer to real, single or double precision; (3) all necessary input/output sub-routines to provide communication and control for all peripherals.

Operations Interpreter—an on-line interactive language system which permits scientists and engineers to prepare and execute scientific problems.

Once within the capability of only large-scale equipment, the 640 now permits users to solve problems on-line with a real-time conversational mode programming system.

This programming system has benefited from the design and the reported experiences of other systems, notably JOSS, FORTRAN and QUICK-TRAN. All the language generality of compiler systems like FORTRAN exists in this interpreter.

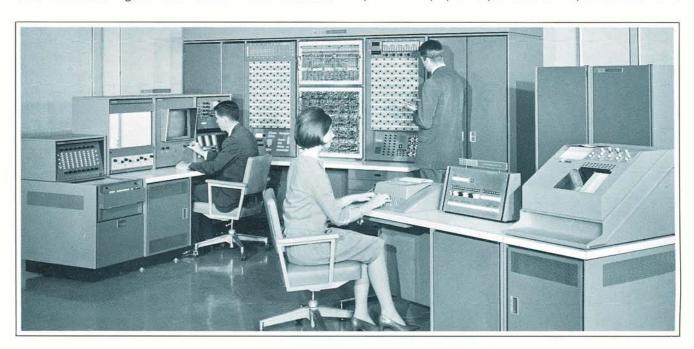
Communications between the user and the system proceed wholly on a request-response basis. This intimate "give and take" man-machine

relationship with the EAI <u>640</u> computer permits problem analysis and programming to be performed in parallel.

Digital De-Bug—an aid used in on-line program debugging. The interactive system is initiated by action characters from the teletype keyboard. Program responses are returned by the teleprinter. Debug provides flexibility in reading and changing memory locations and permits snapshot printouts at specified locations while program testing. The modified portion of the program can be recovered via punched paper tape.

Librarian—a small executive program which eliminates the manual loading of programs stored on paper tape. Librarian responds to teletype keyboard control by calling system programs to or from mass storage memory or by purging user programs from the library.

Update—a service program used to edit punched paper tape source input to the 640



Symbolic Assembler and FORTRAN. Source statement records may be inserted, changed, deleted or duplicated. The result of updating is a corrected source statement tape ready for assembly or compilation.

Program Loader—accepts programs from paper tape, magnetic tape, card reader or disk in relocatable format produced by the Assembler or FORTRAN. The object program starting address (in core memory) is assigned from the teletype at load time.

Hardware Diagnostics—provide indication of machine status and fault analysis. Diagnostic routines are included for testing all sub-systems of the EAI <u>640</u> Computer and peripherals.

Because of its versatile hardware configuration coupled with the scope of its software repertoire, the EAI <u>640</u> Digital Computer can easily serve as the digital computer for either hybrid systems or systems designed for special-purpose applications. Additional software programs available for these user requirements include:

Hybrid FORTRAN—a complete FORTRAN system for utilizing the 640 in a hybrid environment. In addition to standard features, the 640 HYBRID FORTRAN compiler includes real-time capability, mixed mode arithmetic and Time and Delay statements. This package also includes a complete system of hybrid linkage subroutines.

HYTRAN Operations Interpreter—an online inter-active language system created specifically for scientists and engineers engaged in hybrid computation. It is similar in design to the EAI 640 Operations Interpreter.

In addition to the features of the 640 Operations Interpreter, this interpreter also provides complete control of the hybrid system.

Hybrid Debug—an extension of the basic debug program used primarily for testing hybrid programs. This program provides a method for checking the digital portion of a program independent of or in conjunction with the combined hybrid system.

BALANCE

IN VERSATILITY AND ECONOMY

No matter the number and variety of software packages offered with any digital computer, there exists the requirement for some special or different program. In addition to developing inhouse programs—an often costly investment in personnel and time—the EAI 640 user/purchaser may enjoy the economic advantages of obtaining his programs through the EAI Research and Computation Division.

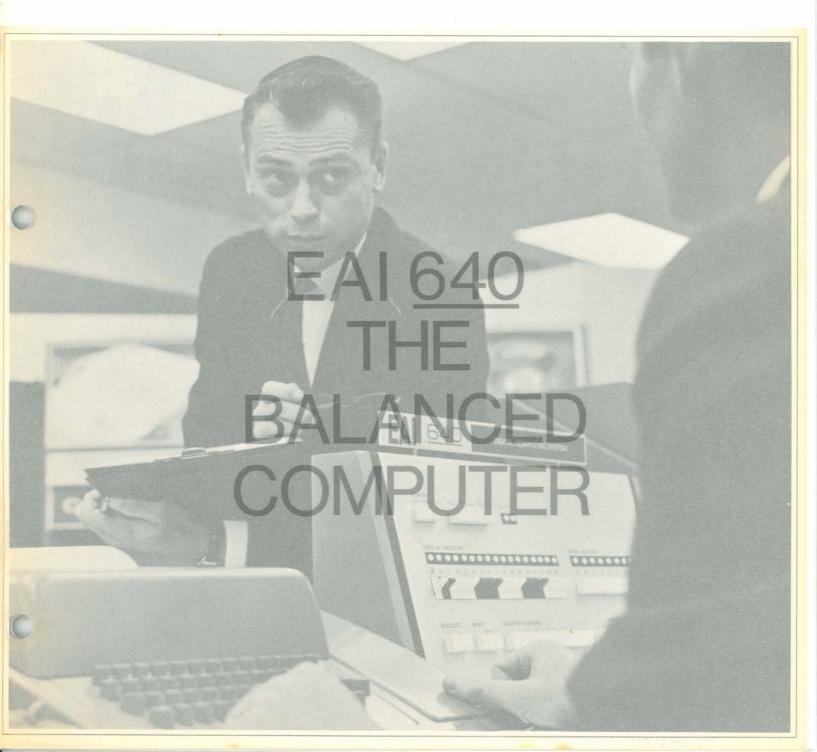
This Division of Electronic Associates Inc. is staffed by professionals experienced in all aspects of scientific computation. In addition to electronic resources, application engineers are available—on instant call—to answer specific problems.

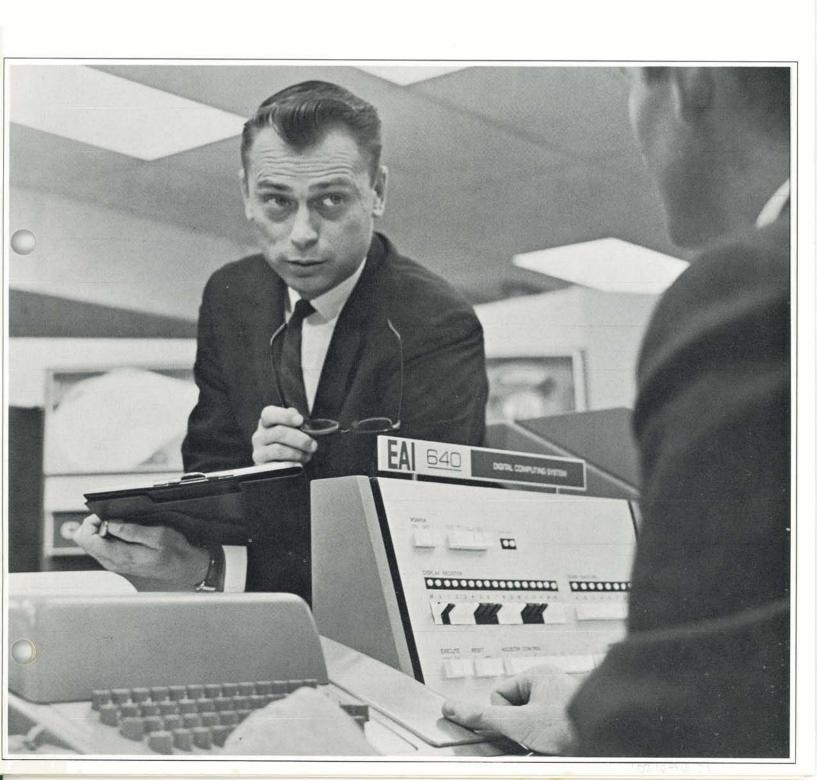
This group looks beyond conventional computer equipment design and method concepts. It

studies and develops new applications, unusual simulation tasks, mathematical analysis of computations, programming techniques, systems and logic design, and new electronic component development. The EAI 640 user with unusual applications will find, within this group, personnel to carry projects to a successful conclusion.

FULL CUSTOMER TRAINING

Experienced engineer-instructors teach the basic programming, operation and maintenance courses to selected customer personnel. In addition, advanced courses are offered in such scientific computation fields as chemical process, aerospace and bio-medicine. When not actually engaged in classroom work, the 640 instructors are involved in analyzing problems which keep them informed on the latest developments in their specialties.







ELECTRONIC ASSOCIATES, INC. West Long Branch, New Jersey 07764

ADVANCED SYSTEMS ANALYSIS AND COMPUTATION SERVICES/ANALOG COMPUTERS/DIGITAL COMPUTERS/HYBRID ANALOG-DIGITAL COMPUTATION EQUIPMENT/ANALOG AND DIGITAL PLOTTERS; SIMULATION SYSTEMS/SCIENTIFIC AND LABORATORY INSTRUMENTS/INDUSTRIAL PROCESS CONTROL SYSTEMS/PHOTOGRAMMETRIC EQUIPMENT/RANGE INSTRUMENTATION SYSTEMS/TEST AND CHECK-OUT SYSTEMS/MILITARY AND INDUSTRIAL RESEARCH AND DEVELOPMENT SERVICES/FIELD ENGINEERING AND EQUIPMENT MAINTENANCE SERVICES.

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