

HYDAC<sup>®</sup>

2400

HYBRID DIGITAL/ANALOG COMPUTER

# HYDAC 2400





# HYBRID DIGITAL/ANALOG COMPUTER...





a new discipline and capability in scientific computation....

a completely integrated hybrid computing system to provide solutions to problems beyond the scope of analog or digital computers alone.

## HYDAC 2400 HYBRID DIGITAL/ANALOG COMPUTER

### PACE® 231R-V ANALOG COMPUTING SYSTEM

- Wide bandwidth computing components
- Pre-patch panel programming
- Mode control logic programming
- Solid-state mode switching
- Temperature-stabilized network oven
- Precision computing networks.

### EAI 350 DIGITAL OPERATIONS SYSTEM

- Pre-patch panel programming
- Synchronous logic
- High-speed A-D, D-A conversion
- Complementary outputs
- Individual component indicators.

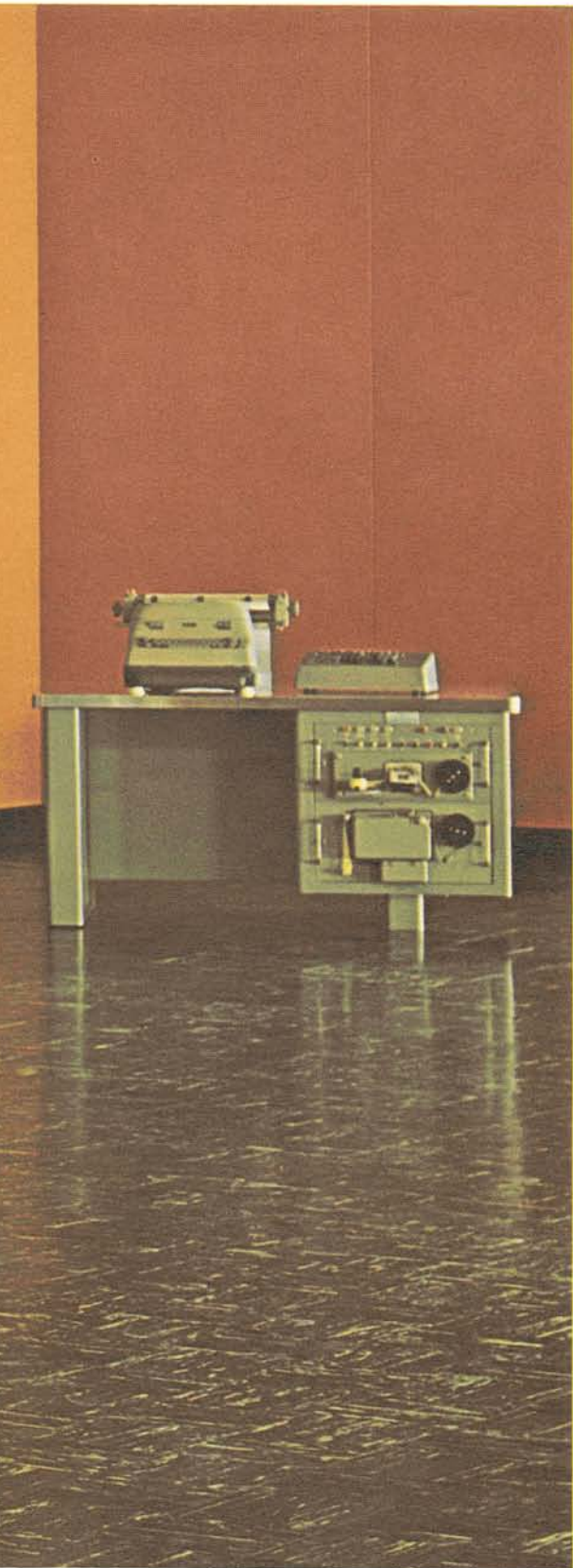
### EAI 375 (3C DDP-24) DIGITAL COMPUTING SYSTEM \*

- Parallel machine organization
- High-speed arithmetic operations
- Extensive input-output facilities
- Punched-tape programming
- Stored program operation
- Random access memory

### PERIPHERAL EQUIPMENT

- High-speed punched tape input-output
- Precision X-Y plotting
- Wide bandwidth recording
- Multi-channel oscilloscope display

\*Computer Control Company, Inc., Framingham, Mass., designed and manufactures the DDP-24, the major digital computing sub-system of the HYDAC 2400.



The HYDAC 2400 provides a system-engineered, thoroughly-integrated computing system — developed by the leading designer and manufacturer of general-purpose simulation equipment. It combines analog and digital techniques to make possible a third computing discipline — hybrid simulation. Each sub-system is an established and accepted computing system in its own right, joined in the HYDAC 2400 on a system-engineered basis, to apply the speed of the analog computer and the accuracy of the digital computer to the solution of problems that are beyond the capabilities of either.

HYDAC 2400 has been designed to meet the unfilled needs of the scientific computing field. Modern technology requires the development of systems which involve discrete and continuous phenomena — and analyses of such systems dictate the necessity for a computer capable of performing continuous (analog) and discrete (digital) operations. The HYDAC 2400 includes the EAI 231R-V Analog Computer, the EAI 375 (3C DDP-24) Digital Computer and the EAI 350 Digital Operations System which serves as the control and communications center for the hybrid computer system.

HYDAC 2400 is more than a device for solving differential equations. By representing physical systems in terms of behavior under operating conditions, it provides a greater insight into the effect of individual system parameters. It offers facilities for real-time or compressed-time, as well as continuous and discrete system simulation — individually or simultaneously.

**Among the variety of new simulation techniques and applications made possible by HYDAC 2400 are:**

- |                                  |   |   |
|----------------------------------|---|---|
| SIMULATION OF DIGITAL DEVICES    | — | space capsule simulation makes use of high-speed digital logic to represent the reaction-jet control system.  |
| ITERATIVE CALCULATIONS           | — | steady-state tubular reactor calculation utilizes high-speed digital logic to permit time-sharing equipment for making heat and material balances.  |
| SIMULATION OF DISCRETE PHENOMENA | — | space vehicle control system simulation employs binary counters for quantizing control energy inputs.   |
| DIGITAL FUNCTION GENERATION      | — | missile terrain guidance simulation utilizes serial memory for storing terrain data generated by radar system.  |
| TRIGONOMETRIC CALCULATIONS       | — | simulation of space vehicle mission involves arithmetic calculations with serial address, etc., to perform coordinate transformation.   |
| EXPONENTIAL CALCULATIONS         | — | nuclear reactor simulation employs serial address, memory, etc., for calculating reactor power which ranges over several decades.   |
| SYSTEM OPTIMIZATION              | — | generalized optimization program makes use of high-speed digital logic to implement automatic search routine and systematic updating of parameters in accordance with an error criterion. |
| HIGH-SPEED PREDICTION            | — | aircraft adaptive control simulation requires repetitive prediction of system response to determine optimum adjustment of control system parameters.                                      |
| FUNCTION STORAGE AND PLAYBACK    | — | solution of heat transfer boundary value problem requires serial memory storage of solutions in the serial solution of partial differential equations.                                    |

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## INVESTMENTS IN HYBRID COMPUTATION

You can now invest in hybrid computation with absolute confidence . . . in the HYDAC 2400 . . . which satisfies every major long-term capital equipment consideration because —

- 1 it is **guaranteed by single-source-supplier responsibility** . . . EAI backs the integrity of digital, analog, interface and all other elements, as well as system designs and fabrication.
- 2 it is engineered, installed and tested, as a **single system**, by a manufacturer with a **demonstrated** capability and an **established** reputation .
- 3 its usefulness and ease of operation are facilitated by computing software — so vital to the successful operation of complex problem-solving facilities.
- 4 it is supported by complete operator training from EAI Computation Centers located throughout the world — where identical equipment is available for training and operations-analysis purposes. In less than one year EAI has formally trained over 150 persons in hybrid computing and has directed seminars for over 1000 attendees. In-facility training courses are also available.
- 5 it has been **developed by the world's most experienced designer and manufacturer of hybrid computation equipment** . . . engineered to satisfy the computing needs of the most advanced simulation laboratory.

**EAI**<sup>®</sup>

ELECTRONIC ASSOCIATES, INC. *Long Branch, New Jersey*

ADVANCED SYSTEMS ANALYSIS AND COMPUTATION SERVICES/ANALOG COMPUTERS/HYBRID ANALOG-DIGITAL COMPUTATION EQUIPMENT/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.