DIGITAL COMPUTER NEWSLETTER

The purpose of this newsletter is to provide a medium for the interchange among interested persons of information concerning recent developments in various digital computer projects. Distribution is limited to government agencies, contractors, and contributors.

OFFICE OF NAVAL RESEARCH · MATHEMATICAL SCIENCES DIVISION

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TABLE OF CONTENTS

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NAVEXOS P-645

COMPUTERS AND DATA PROCESSORS, NORTH AMERICA

AIR FORCE ARMAMENT CENTER - ARDC - EGLIN AFB, FLORIDA

A standard package of routines is being developed for the Datatron computer for use in Armament test data reduction. Taylor's series and polynomial approximations are both being used for the common function codes. Service routines, including a general debugging trace, are being checked out.

The Digital Flight Test Instrumentation System of magnetic tape data recording and automatic playback to the Univac Scientific 1103 computer has been developing satisfactorily. The MIT-prepared editing program, which searches tape for various kinds of data, tests it for parity and smoothness, and interpolates faulty data points, has been checked out. Manual intervention and Charactron display incorporation in this system awaits only the delivery of hardware this summer. A modest service routine package utilizing this SAGE-like console is being developed for the purpose of streamlining console operations in day-to-day use.

ALWAC 800 - ALWAC, INC. - HAWTHORNE, CALIF.

The ALWAC 800 is a high-speed, high-capacity electronic data processing system combining magnetic core storage, magnetic element logic, and modular construction.

Instruction Code Summary
(Time in microseconds)

Load and Store	Time
02 Clear A	48
04 Load E	56
15 Exchange A and B	56
34 Load A	88
39 Load B	88
40 Store A	88
41 Store Address	88
42 Store B	88
43 Store E	96
Arithmetic	
13 Increase E	56
30 Add	96
31 Subtract	96
32 Minus subtract	96
33 Minus add	96
35 Absolute add	96
36 Absolute subtract	96
63 Decrease E	56
37 Divide	500 (var.)
38 Multiply	300 (var.)
Floating Point	
45 Add and normalize	var.
46 Standardize	var.
47 Divide and normalize	var.
48 Multiply and normalize	var.
49 Subtract and normalize	var.
95 Add	var.
98 Multiply	var.
99 Subtract	var.

Logical and Miscellaneous	Time
01 No operation	48
03 Set flags	48
16 Reverse A sign	48
20 Shift AB left	var.
21 Shift AB right	var.
22 Shift AB left and round off	var.
23 Shift AB right and round off	var.
24 Extract	var.
25 Shift A left	var.
26 Shift A right	var.
66 Set A positive	48
Skips and Tests	
05 Test flags	48
06 Absolute Skip	48
07 Skip if Z ON	48
08 Skip if V non-zero	48
09 Skip if A negative	48
10 Skip if A zero	48
11 Stop skip	48
12 Test E	48
14 Compare A and W	48
19 Skip and set index	48
29 Relative skip	48
57 Skip if Z OFF	48
58 Skip if V zero	48
59 Skip if A positive	48
60 Skip if A non-zero	48

Input-Output and Buffers

		Time			Time
00	Initial Input	56	27	Copy out (memory to buf)	var.
17	Read (input to buffer)	56	28	Copy in (buffer to memory)	var.
18	Write (output from buf)	56	44	Select input-output unit	var.

Word Structure. Twelve decimal digits and algebraic sign. Accumulator has thirteen digits excluding sign. Two decimal digits per alphanumeric character in all modes of storage. Two-digit operation code, four-digit address, and other digits of the word available for control purposes. Floating-point operation with ten-digit mantissa and two-digit exponent index. Within the computer, each digit is represented by a set of four bits, successive positions have the significance 5, 4, 2, 1.

Register

A register	13 digits plus 1 bit to indicate sign) may be combined into
B register	12 digits plus 1 bit to indicate sign) a single register
E_0 register	4 digits.
E_1 register	Ditto.
E_2 register	Ditto.
E_3 register	Ditto.
E_4 register	Ditto.
D register	1 word of memory. 12 digits plus 1 bit to indicate sign.
R register	Address digits of current instruction, modified by E register specified. 4 digits.
Y register	E digit of current instruction.
S register	Address of next order to be obeyed. 4 digits.
T register	Order digits of current instruction. 2 digits.
N register	Buffer digits of current instruction. 2 digits.

A, B, and E registers are all directly affected by programming. A and B are used to hold the results of arithmetic operations, while the E registers are used as counters, and for address modification (q.v.)

The excess digit in the A register is designated by V, and is used to hold any carry or shift past the most significant end. In the case of an increase in V, not a shift, an overflow (Z) indicator is also turned on.

Storage Capacity

Magnetic cores	Minimum 1,000 words, maximum 10,000 words, in increments of 1,000 words
Magnetic drums	20,000 words per drum, 50 drums per buffer, 10 buffers per ALWAC 800
Magnetic tapes	200,000 or 400,000 words per transport, 10 transports per buffer, 10 buffers per ALWAC 800
Total drum store	120 million digits
Total tape store	480 million digits

Buffers

Total, any type, per ALWAC 800, 10 buffers

Drum buffer	40 words (drums have 40-word channels)
Tape buffer	40 words (magnetic tapes have 40-word blocks)
Punch card or tabulator buffer	20 words
Paper tape, typewriter buffer	1 word

All buffers are addressable for commands and data, and any of the 10 buffer connections may be used to link to a second ALWAC 800 by means of a 1,000-word core buffer.

Input

Magnetic tape	15,000 digits/sec
Punch cards	200 cards/min
Paper tape	400 digits/sec
Typewriter	10 digits/sec

Output

Magnetic tape	15,000 digits/sec
Punch cards	100 cards/min
Line printer	150 lines/min
Paper tape	60 digits/sec
Typewriter	10 digits/sec

FERRANTI ELECTRIC LIMITED - TORONTO, ONTARIO

Ferranti's work here during the past twelve months has been mainly concerned with business and industrial projects. The most interesting of these are the Canada Post Office Route Reference Computer and the Trans-Canada Air Lines Reservations System.

Route Reference Computer. This machine was designed to work in conjunction with a mail conveyor system developed by Canada Post Office engineers. The memory, an air bearing magnetic drum, contains 16,000 addresses (street, town & province) with the corresponding 2,250 route codes. Coded addresses on the letters are scanned photoelectrically and the appropriate route is determined by the computer. A gate-selector machine, instructed by the computer, operates release mechanism on the conveyor to effect the sortation.

The computer is built entirely of transistors and magnetic core circuits and operates at a digit rate of 180 kc/s. The maximum speed of sortation is about 10 letters per second as presently limited by the conveyors. Two conveyor systems can be operated simultaneously so that "forward" and "final" or "city" sortations can be carried out at the same time.

The computer was completed in January of this year and is now being installed with the conveyor systems in Ottawa, Ontario. A fair history of operation has accumulated which shows the computer to be remarkably reliable and error-free.

T.C.A. Reservations System. This project concerns the development of input apparatus to carry out a demonstration of a reservations scheme using the Ferut Computer at the University of Toronto as the remotely located central computer.

A special device, which should prove valuable in a wide variety of applications, has been designed as the primary input. This machine, presently known as the Ferranti Business Transactor, reads cards marked with ordinary lead-pencil. The information, 285 bits per card, is available in parallel, but is read out in series-parallel by means of a stepping-relay which is operated automatically by the insertion of a card. Great flexibility is achieved since the order of presentation of information is controlled by changes in wiring only. Replies are received from the central computer and appear as punches on the edge of the card. When a reply is received, between 2 and 5 seconds after insertion, the card is automatically released from the transactor and the card cannot be removed until a reply is received. Six transactors, together with local distributing equipment and a computer coupler unit, are expected to be fully installed in June of this year.

The demonstration is a full scale representation of the system requirements and will handle all aspects of the flight reservations problem such as reservation, cancellation, query, multiple-leg routing, limited sale, and so forth.

Component Production. They are now producing a line of plug-in printed circuit transistor modules which provide the basic logical elements in digital machines. The packages consist of flip-flops, gating circuits, emitter-followers, inverters, read-amplifiers (for magnetic drums), counters, shift registers and power packages. Card-file assemblies in basic units accepting 16 packages are also available in a range of multiple-assemblies.

Our production of magnetic drums from two inches in diameter to twelve inches in diameter continues.

New Facilities. A new Electronics Division was formed in Toronto over a year ago to handle quantity production of electronic equipment.

A research team of experienced engineers was also established at Ferranti Electric Inc. in New York City to work primarily in the digital field. This team has recently produced a complete line of delay-line packages (both lumped-constant and nickel lines). Delays ranging from 20 to 5,000 microseconds, at digit frequencies up to one megacycle, are available in the nickel-line series providing storage for 10 to 2,500 bits per line.

BIZMAC II - RCA - CAMDEN, NEW JERSEY

The BIZMAC System was initially designed to meet the requirements of an integrated clerical operation. The overall design philosophy expressed by the System was to fit to this large-scale data processing, a most economical equipment complement. This was accomplished by functionally analyzing studies of operations in public utilities, life insurance companies, government agencies, merchandising firms, and manufacturing firms for the purpose of adapting the equipment of these functions.

As one consequence of these analyses, the BIZMAC I System was designed to handle variable lengths of data. This data compression on tape made it possible to consider using the Computer as a part of the total system where tapes were centrally controlled. The volume and machine speeds considered indicated the use of a fixed program device for sorting, extracting, merging, and similar data-shuffling operations. Finally, to balance the system load, a high degree of flexibility was incorporated into the input-output devices.

Early in 1956, announcement was made of a BIZMAC System that was acceptance-tested and delivered to the Ordnance Tank-Automotive Command (OTAC) of the U.S. Army Ordnance Corps in Detroit, Michigan. Two additional Systems were installed elsewhere during the year and are now in operation.

In order to broaden the market, a set of functional enlargements have been incorporated into the BIZMAC II system, now in production.

The first major innovation was Universal Trunks for the Computer. The original five-input, ten-output trunk scheme was dropped. Now, any computer trunk may be used for either reading or writing. Each trunk is independent and may be switched electronically under program control.

A second change was Simultaneous Operation. A unique scheme for time-sharing of electronics permits write-compute, write-read, or write-write to be handled simultaneously as an integral part of the Computer. No auxiliary equipment is required to accomplish this.

Linear Read has been added. Variability in data organization offers great flexibility in the Computer, especially on a read-in operation from tape where all items may be randomly distributed in the High-Speed Memory. However, in certain file maintenance operations, it is preferable to leave data in compressed form. This may now be done at the programmer's option.

Tape Control has also been greatly enhanced. A decision-making instruction is included which determines the status of magnetic tape operations. Rewind of tape under program control of the Computer simultaneous with any other Computer operation is also provided.

A new High-Speed Memory with a capacity of 8192 characters is now standard equipment (not including 32,000 characters of auxiliary memory storage). The plane used is a 64 x 64 frame and two seven-plane banks are used.

A higher speed Paper Tape Reader is provided at the Computer Console, operating at a rate of 400 characters per second.

Tape Station design for manual handling is available. This new Tape Station was designed specifically to optimize the manual mounting and dismounting of magnetic tape reels.

Other new features have been included in the BIZMAC II System. Worthy of mention is the simplified System Central, the Trancoder, and the Transcribing Card Punch. The Operator, Operator-Verifier and Monitor System Central console functions have been consolidated for smaller systems. The Trancoder and Transcribing Card Punch are all transistor output devices that translate data from magnetic tape to 5-hole punched paper tape and to EAM punched cards, respectively.

It is very important to note that this design program on the BIZMAC System makes available more economical equipment complements for initial installations. Specifically, the BIZMAC II Computer with functional enlargements is reduced in its physical size and is available at no increase in cost.

FLAC I AND II - RCA SERVICE CO. - PATRICK AIR FORCE BASE, FLORIDA

The following is the operating record for the Flac I system at the Missile Test Project during the period from 20 March to 20 May 1957.

Category	No. of Hours	Percentage of manned hours
Data Running	425.6	40.8
Code Checking	206.5	19.8
Analysis	17.7	1.7
Routine Library Maintenance	42.0	4.03

Category	No. of Hours	Percentage of manned hours
Preventive Maintenance	169.1	16.22
Unscheduled Maintenance	111.2	10.67
Scheduled Engineering	61.5	5.9
External Power Failures	5.3	.59
Idle Time	3.1	.29
Total Manned Hours	1,042.0	100.00
Unscheduled Computer	422.0	
Total Available Hours for Period	1,464.0	

On 2 January 1957, the major components of FLAC were moved to the new Technical Laboratory Building. The new 4096 forty eight bit word random access magnetic core memory and a new power supply system were introduced into the computing system at the time of the move.

On 23 January 1957, the first production data routine was run on the new FLAC I. Since 20 March 1957, FLAC I has been scheduled for 24 hours each day, 5 days each week. In addition, some time was made available on weekends for the accomplishment of engineering work.

The magnetic core memory and the power system for the FLAC II computing system have been delivered and are currently being installed. The remaining system components are scheduled for delivery the latter part of the summer 1957.

FLAC II - TECHNITROL ENGINEERING CO. - PHILADELPHIA, PENNA.

FLAC II computer being built for Patrick Air Force Base by Technitrol Engineering Company is now nearing completion. The machine construction is complete and is being checked out. The main computer is scheduled for delivery to Patrick July 15, 1957 where it will be mated to a magnetic core memory manufactured by Telemeter Magnetics, Incorporated.

RESERVATIONS DATA PROCESSOR - TELEREGISTER CORP. - STAMFORD, CONNECTICUT

The Teleregister Corporation, a subsidiary of Ogden Corporation, in conjunction with Pan American World Airways has demonstrated two way radio transmission of airline reservations data processing. This marks the first time that there has been two way transmission of business data overseas with no intermediate record, such as punched tape, punched cards or magnetic tape.

In the demonstration at San Juan, Puerto Rico they operated an agent set which was tied in with Pan American's reservations bureau in Long Island City. Here a data processor stores information on available seats for the entire Pan American network and is capable of handling automatically 36 hundred inquiries per hour. The demonstration remote data link consisted of telephone lines within San Juan, radio from San Juan to Miami, Florida, and land lines from Miami to Long Island City.

Teleregister's conventional system, as used by Pan American, operates as follows: When an agent inserts a destination plate and presses the selected keys, all the elements of the inquiry or the transaction are transmitted in parallel over the cable to the Master Seeker, which connects the Agent Set to the central equipment.

Two methods of "remoting" Agent Sets have been devised. The first, identified as "local" remoting, is used within a metropolitan area and for distances up to about fifty miles. A metallic pair to each Remote Location is required. A Local Remote Transceiver converts the Agent Set message from parallel to serial form, and sends it over one wire of the pair. The second wire is used for sending synchronizing signals to the Local Central Office Transceiver, terminating the pairs, which converts the message back to parallel form, and stores it while waiting for connection to the Processor through the Master Seeker. The reply is returned by the same route.

For distances greater than fifty miles or for locations where metallic pairs are not available, the second method of remoting has been designed. It makes use of 75 or 100 word-per-minute simplex telegraph channels. This system makes possible the sharing of such a line or channel by up to 21 different stations, each being connected to the central office as required for the on-line processing of an inquiry or a transaction. Input-output devices in a distant city, such as an airline Agent Set, gain access to the central data processing equipment through a Distant Remote Transceiver, which converts the data from the Agent Set into serial form for transmission over the channel. The data is in a form similar to teletype code; but whereas in teletype code five elements equal a character, in the Teleregister transmission four of the five elements are information bits and the fifth element is used for checking the accuracy of the transmission.

At the Central Office location, a number of channels terminate in a Distant Line Connector which detects lines requesting service and connects a calling to an idle Distant Central Office Transceiver. As soon as a line is connected to a Transceiver, the Transceiver in conjunction with the Line Connector initiates a roll call of the stations on the line. Each distant station on a line is responsive to a particular station-call letter. Upon receiving its call letter a remote station will respond in one of two ways:

1. If it has no traffic (no Agent Set has requested service) it will transmit the call letter of the next station in the roll call sequence.

2. If it has traffic it will transmit a special character to condition other remote stations so that they cannot read the forth-coming message and will then transmit the message text (Agent Set query).

In brief, a roll call consists of the assigning of station call letters to each station on a channel, the order of call for the stations being determined primarily by geographic locations. When any station on the line requests service it opens the line briefly to inform the Central Office of the service request. When a Central Office Transceiver is connected to the line the call letter of the first station in the sequence is transmitted from the Central Office. If the first station has no traffic it will transmit the call letter of the second station, etc. until a station having an Agent Set connected is reached. This station will transmit its message to the Central Office Transceiver which will convert the received teletype code and store the message. A bid for access to the data processor is made through a seeker. As soon as the Transceiver is granted access to the processor, the latter processes the request or transaction and a reply is given to the Transceiver, this reply being stored and then transmitted over the line. The Distant Transceiver which sent the message is the only station effectively connected into the line at this time, so that the reply is read by this station only. The Distant Transceiver converts the reply from serial to parallel and passes it on to the Agent Set.

Upon completion of the reply from the Central Office the roll call will continue, the call letters of the next station in the sequence being transmitted from the Central Office. It should be noted that the Central Office equipment monitors the progress of a roll call so that it is always in condition to call the next station if necessary. In other words, if any remote station is out of service it cannot respond to its call letter and, consequently cannot call the next station in the sequence, the Central Office equipment is able to detect the failure of a remote station to answer, and it will step in to call the next station.

Through the use of the Transceiver a single channel can serve up to 21 stations, and the Line Connector can handle up to 10 channels. The limiting factor is the total number of queries or transactions which a line can handle without undue delay. This is about 800 per hour.

RAYDAC - U.S. NAVAL AIR MISSILE TEST CENTER - POINT MUGU, CALIF.

The development of the new input equipment for RAYDAC has been completed and will be in operation by 15 June 1957. This equipment will permit the RAYDAC to be used for processing the data reduction workload generated at the NAMTC. The ability to read information from IBM cards and paper tape directly into the RAYDAC at high speed will also expedite the handling of the variety of scientific problems for which the machine has been primarily used in the past.

NAVAL AIR TEST CENTER - U.S. NAVAL AIR STATION - PATUXENT RIVER, MARYLAND

Difficulty has been encountered in attempting to use interchangeably in the ElectroData DataReader, magnetic tape supplied by different manufacturers. Sufficient difference exists in the signal strength of information recorded on the different tapes so that reliable read-back cannot be achieved from the different tapes with a fixed gain in the amplification circuits of the DataReader. This trouble has been overcome by incorporating a means of gain adjustment in the amplification circuits.

The operating statistics (based on an 8.5 hour shift per day) for the three calendar months ending 30 April 1957 are as follows:

	February		March		April	
	Hours	%	Hours	%	Hours	%
Useful Time	176.1	93.2	177.4	97.5	184.5	97.8
Down Time	12.8	6.8	4.5	2.5	4.2	2.2
Total Time	188.9	100.0	181.9	100.0	188.7	100.0
	Analysis of Useful Time					
Code Checking	71.6	37.9	91.6	50.4	71.9	38.1
Production Computing	81.2	43.0	52.0	28.6	73.7	39.1
Demonstration	1.2	0.6	0	0	0.9	0.5
Idle	1.7	0.9	13.0	7.1	18.0	9.5
Scheduled Maintenance	20.4	10.8	20.8	11.4	20.0	10.6
Total	176.1	93.2	177.4	97.5	184.5	97.8

WESTERN RESERVE UNIVERSITY SEARCHING SELECTOR - WESTERN RESERVE UNIVERSITY - CLEVELAND, OHIO

The capabilities of this machine as previously reported (see Digital Computer Newsletter April 1957) have been extended so as to extend its ability to correlate fragmentary information. Additional capabilities have been provided as described below.

As previously indicated, if any one of several characteristics, e.g. any one of the raw materials P, S, T, satisfy a search requirement, the plugboard is wired for the logical sum, symbolized for example P+S+T. When at least one characteristic is wired to indicate the corresponding logical product, which might be symbolized by $A_1 .B_1 .C_1 .D_1 .E_1$, where the capital

letters with the subscript 1 denote any one member from the sets of characteristics A, B, C, D, E. It might be noted that the example searches are all formulated on the basis that no more than one characteristic from each set is required. The present capabilities of the equipment permit alternate searches to be defined by specifying that various multiplicities of characteristics from different sets shall be detected when scanning the encoded abstract of a given article. Thus, using subscripts as before, searches symbolized by $A_2.B_3.C_1.D_2.E_4$ may be programmed and carried out.

When programming searches that are satisfied by at least one characteristic each from x groups of characteristics out of a larger plurality of n such groups, newly designed switching circuits are used. Thus it becomes possible to conduct a search for which one characteristic each from three groups of characteristics out of five would be specified. Such a search requirement might be symbolized by:

$$(A_1.B_1.C_1.D_1.E_1)^3_5$$

For the general case, this type of search requirement is symbolized by

$$(A._i\ .B_j\ .C_k\ .D_1\ .E_m\text{----})^x_n$$

where x, n and i, j, k, l, m may have values independent of each other and also independent of x and n. At the present time, x and n in the above expression may have values of ten or less.

The machine now has the capability of conducting ten such searches simultaneously, with automatic indication of fulfillment, by a given encoded abstract, of one or more such search requirements. Those searches which are characterized by larger values of the x index in the above expression will select those information items that more nearly fulfill all the search requirements as expressed by a multiterm logical product. Hence, different searches, characterized by increasing values of x, will select items of less and less fragmentary nature but of pertinent interest to evaluation of a given problem or situation.

COMPUTING CENTERS

WESTERN DATA PROCESSING CENTER - UNIV. OF CALIFORNIA - LOS ANGELES, CALIFORNIA

The Western Data Processing Center, directed by Dr. George W. Brown, has been established within the Graduate School of Business Administration, University of California. The center is a joint venture of the University and IBM, and is the first university computing center devoted primarily to the study of complicated business management problems. Already, thirty colleges and universities in eleven western states and Hawaii have announced their intention to become participating members of the project.

The Center, now using a 650, will consist of 705. The computer will be housed in its own $750,000 research building, the cost of which will be shared by the University and IBM.

APPLIED MATHEMATICS LABORATORY - DAVID TAYLOR MODEL BASIN - WASHINGTON 7, D.C.

The new two story building for the Applied Mathematics Laboratory, David Taylor Model Basin, is nearing completion. Plans are to reassemble the staff of the Laboratory, now scattered in various offices throughout the Model Basin, and to move in on June 1, 1957. Delivery of the UNIVAC-LARC, which will be installed in this building, is expected on or about December 1958. Programming of problems for the LARC has begun and a group has been assigned to conduct research in advanced programming for the LARC.

DATA PROCESSING SERVICE BUREAU - ELECTRO DATA - PASADENA, CALIF.

A large staff of programmers, technical specialists and mathematicians are now providing customer contract service in the Data Processing Service Bureau at the ElectroData Division of Burroughs Corporation in Pasadena, California. Electronic computer service is offered in the fields of scientific, industrial and business data processing at the center. The bureau is one of the West's largest computing centers.

A complete Datatron electronic data processing system is available to clients for any data handling problem. Included in the system are the high-speed medium-size electronic digital Datatron computer, punch card units, punched paper tape units, electric typewriter, magnetic tape and line printer input-output units, and automatic floating point facility for special scientific problems.

The bureau also has available an ElectroData 101 desk-size general purpose electronic computer for problems too complex for desk calculators and too small for economical solution by the Datatron.

A complete library of sub-routines and programs is located at the bureau, which is located in a large, modernistic room at the main plant.

Answers to the client's problems are presented in the form he prefers -- reports, graphs, tabular lists, etc.

COMPUTING CENTER - FRANKLIN INSTITUTE LABORATORIES - PHILADELPHIA, PENNA.

The UNIVAC Computing Center of the Franklin Institute Laboratories is currently operating on a one-shift basis. The facilities are used both by the clients of the Laboratories on a contract basis and by the Philadelphia Service Bureau of the Remington Rand UNIVAC Division of Sperry Rand.

This UNIVAC I installation is maintained and operated by Institute personnel, the staff also includes mathematicians and programmers to aid project sponsors in the formulation and solution of problems.

At present a routines tape library of more than 2500 blocks of coding has been assembled and is constantly being expanded. Optimum use is being made of this library of subroutines and of automatic coding techniques to reduce the time and cost of problem solution.

COMPUTER DEPARTMENT - GENERAL ELECTRIC CO. - TEMPE, ARIZONA

General Electric's new Computer Department has established its Scientific Applications Section on the campus of Arizona State College, Tempe, Arizona. The manager of the Section is Dr. Herbert R. J. Grosch. In addition to working with the college on both training and research problems, they are operating a service bureau providing consultation, mathematical and operations analysis, and programming services in the business and mathematical areas, as well as renting machine time.

The system consists of an IBM 704 with 8192 words of core storage, one drum unit, eight tape units and a full line of peripheral equipment. They offer their computing services to government and private organizations.

RICH ELECTRONIC COMPUTER CENTER - GEORGIA INSTITUTE OF TECHNOLOGY - ATLANTA, GEORGIA

Dr. Eugene K. Ritter has left the Rich Electronic Computer Center, Georgia Institute of Technology, to join the staff of Lockheed Aircraft Corporation, Georgia Division, as Head of

their Mathematical Analysis Department. Moving up as Head of the Computer Center is Dr. William F. Atchison who has headed the center's Programming and Coding Group since 1955.

The Computer Center is in the process of modifying 80-column card-to-tape and tape-to-card conversion equipment to be used in conjunction with its two digital computers, the IBM 650 and UNIVAC SCIENTIFIC (ERA 1101).

Some operating statistics of the computers for the last six months are:

IBM 650

Average scheduled maintenance - 7% **
Average unscheduled maintenance - 3% *

UNIVAC SCIENTIFIC (ERA 1101)

Average scheduled maintenance - 13%
Average unscheduled maintenance - negligible

Note: based on a single shift operation

**daily test by the Computer Center
*maintenance is provided by IBM Corporation

COMPUTATION CENTER - M.I.T. - CAMBRIDGE, MASS.

The MIT Computation Center, which was established in July 1956, is an inter-departmental activity located in the new Karl T. Compton Laboratory (Building 26). The principal objective of the Center is to increase the number of students, staff members, and scientists qualified to use modern computing machines to further their research efforts. The Center is an activity which has many assets: qualified staff, modern computing equipment, and a brand new physical plant. The participating personnel in the Center program are located at MIT, IBM, or one of the participating New England Colleges or Universities. Specifically, the Center represents a cooperative activity involving MIT, the IBM Corporation and, at present, 25 New England Colleges and Universities.

An active participation by the staffs of the New England Colleges in the Computation Center program was initiated by the appointment of 24 Research Assistants and Associates at these institutions during the academic year 1956-1957. These appointees provide active liaison between the staff at the Center and the students and staff at their individual institutions. Appointments of this type will be made each year -- to insure a widespread and dynamic participating program.

Physical Plant. The physical plant of the MIT Computation Center consists of 18,000 square feet located in the recently erected Karl T. Compton Laboratory. Specifically, the Center occupies part of the basement, the entire first floor, and part of the second floor of the Compton Laboratory. In addition, a two-story annex is used to house the IBM Type 704 Electronic Data Processing Machine and the associated Electric Accounting Machine equipment.

The first floor contains adequate space for the headquarters staff, the operations staff (analysts, programmers, machine operators, etc.), IBM Institutional Representatives, New England University Research Assistants and Associates, MIT Research Assistants and Associates, classroom and seminar room, as well as the 704 computer. The basement provides space for the EAM machines, the systems research laboratory, dark room facilities, the electrical power plant, and the air conditioning equipment. The second floor provides space for the programming research staff, the visiting professors, and the library and document room. All this area has been furnished in a first-class manner to facilitate the progress of research at the Center.

Computer Installation. Although the 704 Computer was installed sometime ago, there have been unavoidable delays in the completion of the physical plant and associated air conditioning equipment, which prevented earlier operation of the machine. As a matter of fact, it is now expected that the machine will be placed into three shift operation on June 10, 1957. It is therefore too early to make any definite statements regarding the reliability of the machine, or of the results obtained therefrom. Succeeding news reports will contain information of this type.

As noted from previous announcements, the Whirlwind I computer is becoming less used in the Scientific and Engineering Computation Group problems and more actively identified with the Lincoln Laboratory. Accordingly the Whirlwind I reliability figures will be discontinued.

APPLIED MATHEMATICS DIV. - NATIONAL BUREAU OF STANDARDS - WASHINGTON, D.C.

An IBM 704 has been installed at the National Bureau of Standards and operation was begun on May 15. This installation includes 4096 words of core memory, six magnetic tapes, a card reader, a card punch, and an on-line printer. Machine time is available to other government agencies and their contractors at cost ($200/hr). Programming assistance can be provided.

An experimental system for using the 704 computer at the NBS has been developed. This system, called CORBIE, is expected to facilitate rapid and easy code checking as well as problem solution. It does not require the presence of peripheral equipment, a drum, or more than 4096 words of core memory. Codes are to be initially read into the computer in symbolic form from cards. They are then stored on magnetic tape and thereafter are always loaded into the computer from the magnetic tape. If some lines of a code are to be changed, only the changes are read into the computer from symbolic cards. The old code is read into the computer from magnetic tape and the new modified code is written back on to magnetic tape.

Code checking is to be done entirely in symbolic form, and several code checking routines are automatically available. During code checking the progress through the code is recorded by the monitor on-line printer which prints information at various pre-determined break points. The system has provision for the later addition of a symbolic trace or auto-monitoring routine. The codes of numerous programmers are stored on the same tape and each code is identified by a call number. Up to four such tapes may be on the line at the same time. If someone wishes to read a certain code into the computer he drops into the card hopper the control cards which contain the code identification number. The computer automatically finds this code on any of the tapes currently on-line and reads it into the computer. The activity of the computer is controlled by control cards, most of which originate with the programmer.

An important feature of this system is a technique of compressing the symbolic code before it is stored on magnetic tape. The bulk of the code of this system is concerned with automatically up-dating the magnetic tape files of codes and data. It also includes the SHARE assembly program (SAP) as an integral part.

AEC COMPUTING FACILITY - NEW YORK UNIVERSITY - NEW YORK, NEW YORK

UNIVAC System. Employing techniques developed by this group, the engineering staff has maintained a record of 82 per cent good productive machine time during the past 2 year period with 6-8 per cent of the remaining time devoted to routine maintenance procedures.

The design, construction and installation of a useful auxiliary device called "Memory Breakpoint Selector" has resulted in significantly reducing time spent in program debugging. This device permits the programmer to cause a machine halt when any previously specified address is referred to by the machine.

An improved automatic Uniservo Selection System has been installed. A digital-to-analogue converter for cathode ray tube display of high speed information from Univac in the form of plotted curves has been completed. This unit is equipped for photographing the curves obtained by programmed instruction.

The design, installation and testing of 2 new instructions for the computer has been completed. They are termed ψ and O instructions. Briefly the ψ instruction will select from a specified portion of the memory the largest number and store its address. The O instruction permits a search through a specified portion of the memory for equality with a specified word. Applications exist in matrix evaluation, table looking and fast sorting routines. A sort routine using the ψ order is 60 times faster than one using conventional coding.

IBM 704 System. A complete IBM 704 system is being installed in new quarters at 4-6 Washington Place. It is expected that operations will begin on a single-shift during June.

Personnel. Dr. E. Bromberg has been on leave of absence at Los Alamos Scientific Laboratory during the present year. Mr. Max Goldstein has joined the staff of the Computing Facility and will direct the IBM 704 installation.

PRINCETON DIGITAL COMPUTER - PRINCETON UNIV. - PRINCETON, N.J.

By July 1, 1957, the Princeton Digital Computer is expected to be transferred from the Institute for Advanced Study to Princeton University. This has been planned since early 1956 and was the reason for the changes in operation and personnel which we reported in the Digital Computer Newsletter July 1956.

Although the University is to take over the administration and operation of the Computer, the machine will physically remain in the present building, owned by and situated close to the Institute. The Computer will not be part of any department of the University, nor will it form a department by itself, but it will be administered by a Committee on Computer Problems, appointed by the President of Princeton University, with Professor H.D. Smyth acting as Chairman. It has been agreed that members of the Institute for Advanced Study will also have access to the Computer.

Financial support for 1957-58 has been secured from various sources. Contracts are being negotiated with the Atomic Energy Commission and the Department of Defense to pay for computations to be done in connection with specified projects. In addition, a grant from the National Science Foundation has been received for use of the machine for "non-project research"; a substantial amount of machine time will therefore be available for problems arising in the scientific community of Princeton.

Most of the personnel will continue under the new regime. Dr. Hans J. Maehly will be Chief of the Computer Staff and Gordon Whitney will act as Chief Engineer. The new address is: Princeton Digital Computer, Princeton University, Princeton, N. J.

ELECTRONIC DATA PROCESSING SECTION - RCA - CAMDEN, NEW JERSEY

The BIZMAC Electronic Data Processing Section established in Camden serves the needs of Commercial Electronic Products and other RCA Divisions. Time permitting, Data Processing Service will also be available for interested activities external to RCA.

The complement of equipment presently available includes the large scale BIZMAC Electronic Digital Computer System capable of handling variable non-standard length items with input and output magnetic tape speeds of 10,000 characters per second. The system can handle input data in the form of punched cards (which are processed at the rate of 400 cards per minute) or written documents. The latter are converted to punched paper tape using a

Tapewriter-Verifier. High-speed output is provided by the Electro-Mechanical Printer capable of preparing printed copy at the rate of 600 lines of print per minute. The system also includes numerous conversion and duplicating devices and an Interrogation Unit for furnishing information on data stored within the system on a "rush" basis.

Planned use of the system includes: inventory and material control, production control, accounts receivable, accounts payable, sales analysis, management reporting, etc. The first job to run on a regularly scheduled basis was accomplished during April 1957. It incorporated the file maintenance and reporting associated with Commercial Electronic Products' Finished Goods Inventory.

Computer Operability statistics for the month of March and April are:

	March	April
Productive Time	124.0	184.6
Inoperable Time	5.5	19.8
Total	129.5	204.4

DIGITAL COMPUTING CENTER - THE RAMO-WOOLDRIDGE CORPORATION - LOS ANGELES, CALIFORNIA

Two additions have recently been made to the computing facilities. The first was the replacement of the Univac Scientific Model 1103 by an 1103A computer, with Uniservo tape units and a 600 line per minute printer and plotter. The new computer has 4,096 cells of magnetic core storage and built-in floating point. Most notable feature of the change was the speed with which the new computer was installed in place of the old. After pulling the switch for the last time on the 1103 at 8:00 a.m., Saturday, April 27, the 1103 was taken out, the 1103A was installed, and the new machine was available for beginning systems check by 3:00 p.m., Sunday, April 28. During the checkout period (approximately 2-3 weeks until the computer is turned over for full use), computer time has been purchased at Lockheed Missile Systems Division, Palo Alto, and at Remington Rand in St. Paul. For the latter, a teletype line, with IBM transceivers and teletype receiving-sending units at each end, has been used to send data back and forth. As a result, service on high priority problems was maintained.

The Second addition is the Epsco ADDAVERTER, an analog-digital and digital-analog converter, to connect the 1103A and the 300-amplifier Electronic Associates analog computer. It is expected that by the use of the combined computing equipment, problems of considerably greater complexity can be solved than would be possible with either alone. The connection between the two computers is now being checked out, and preliminary testing is underway.

NAVAL ORDNANCE COMPUTATION CENTER - U.S. NAVAL PROVING GROUND - DAHLGREN, VIRGINIA

The Naval Ordnance Research Calculator (NORC) continues on an around-the-clock schedule, five days per week. To further increase the versatility of this computing facility, a number of projects are now in progress:

Analog to Digital Tape. Design and procurement are under way for a device which converts analog data to digital magnetic tape suitable for input to the NORC.

Universal Data Transcriber. Design work is proceeding on a data transcriber which will achieve great flexibility by means of a stored program and plugboard-tailored instructions. Its primary use will be to convert data from a wide variety of sources to a form suitable for NORC input, but its applicability will not be limited to any particular calculator.

High Speed Printer. A contract is now in force to procure a 16,000-character-per-second printer based on the Charactron cathode ray tube. Features include rather elaborate editing facilities and point-plotting in rectangular coordinates. The printer will be wired direct to the NORC.

COMPUTERS, OVERSEAS

DECCA RADAR LIMITED - LONDON, ENGLAND

DECCA RADAR LIMITED is entering the market with auxiliary equipment for computers and data processing systems. The DECCA TWIN TAPE UNIT contains two independent high speed transport mechanisms for half-inch magnetic tape using pneumatic drive. Built-in automatic loading and unloading facilities make reel changing simple and fast. High-impedance, precision digital TAPE RECORDING HEADS have eight tracks on half-inch tape. Their MAGNETIC DRUM UNIT stores 2560 bits on each of 64 tracks; has ferrite heads for 270 Kc digit frequency. They are interested in expanding the usage of magnetic tape for input and output.

N.V. ELECTROLOGICA - AMSTERDAM, HOLLAND

On the 21st of June 1956 a new company, N.V. Electrologica, was formed, aiming at the production and distribution of logical equipment in the electronic, electromechanical and related fields. The company is primarily concerned with the construction of electronic computers for clerical and scientific purposes.

The formation of the company was made possible by the close cooperation of the Nillmij life-insurance company of the Hague, and the Mathematisch Centrum (Mathematical Centre) of Amsterdam.

Since its foundation in 1946, the Centrum has been concerned with the construction and use of electronic computers and at the time when the N.V. Electrologica came into being the Centrum had at its disposal a group of highly specialized technicians in this field. After the completion of the machines which were then under development the immediate needs for this type of equipment at the M.C. were however satisfied and it was to be feared that this almost unique Dutch group would dissolve for lack of financial support and adequate objectives.

The foundation of the N.V. Electrologica as a result of the cooperation of the parties mentioned has provided a suitable solution for this problem. The company has agreed to have all the research and construction activities necessary to realize its objectives performed by the technical group at the M.C. and to assume the full financial responsibility for its operations. It is understood that the financial relationship between the N.V. Electrologica and the M.C. which results from this arrangement will be in no way detrimental to the scientific activities of the latter but that these activities will in effect be advanced by it. Since 1953 three electronic computers have been built at the M.C. The first of these, named ARRA has been used by the M.C. until the middle of 1956. It was a simple machine which has nevertheless proved to be extremely useful. A copy of this machine was built by the N.V. Koninklijke Vliegtuigfabrieken Fokker in collaboration with the M.C. and this machine (named FERTA) has been in operation there since early 1955 for the scientific-technical computations which must be performed for the design of modern passenger-aircraft. During the period from March 1955 till June 1956 the M.C. developed the electronic computer ARMAC (see ARMAC, this issue of the Newsletter) which has been in operation in this institution since that time.

For the N.V. Electrologica a completely new type of computer (called X-1) is now being developed. It differs in many respects from the previous machines and owing to its input-output arrangements will be very well adapted to solve the problems of administration and

management. As the machines can be used in combination with punched-card machines they will find application in many cases where mechanical punched-card equipment is now in use. The technical construction of the X-1 is very modern. The electronic valves used in previous machines have now been completely replaced by transistors; as a result both physical dimensions and power-consumption have been drastically reduced. The memory of the machine is magnetic ferrite cores. The speed has been considerably increased with respect to the earlier machines. The X-1 will carry out an addition of 2 numbers and 8 decimal digits in 64 microsecond; this means that the machine can perform more than 15000 additions of this type per second. It is intended that the prototype of this machine, which will be used by Nillmij, be finished before the end of 1957. The life insurance company will use the machine to perform administrative tasks. Already an important part of this administration is being done by electronic means and the many years of experience with electronic equipment which are thus available to N.V. Electrologica will prove to be of great importance to future users of this machine.

ENGLISH ELECTRIC EXPORT & TRADING COMPANY LIMITED - STAFFORD, ENGLAND

Their special purpose digital computer to form part of Kinetic Heat Simulator Equipment, is now operating at the Royal Aircraft Establishment, Farnborough. The Computer is designed to solve the equation:

$e = + A_0X_0 + A_1X_1 + A_2X_2 + A_3X_3 + A_4X_4$

where e = the difference between heat flow measured and heat flow demanded.

and where

$-X_0$ = heat flow.

A_0 = heat flow co-efficient.

$-X_1$ = temperature of skin.

X_2 = temperature of laboratory.

X_3 = representative aerodynamic temperature.

A_1, A_2, A_3 = aerodynamic heat co-efficient.

$A_4\ X_4$ = spare channel.

The computer and input feed for aerodynamic functions are time-shared (multiplex) between the various heat stations distributed over the structure under test.

Computer Specification.

Synchronous computer clock frequency 100 Kc/s, operating in parallel mode.
Computation time to evaluate e = 550 microseconds.
Addition time for two 18-bit binary numbers = 10 microseconds.
Input from punched tape reader, and analogue to digital convertor.

Maintenance Aids.

Plug-in packages.
Marginal Check Facility.
Special built in check circuits.
All providing easy servicing and maintenance.

INSTITUT FUER PRAKTISCHE MATHEMATIK (IPM) der TECHNISCHEN HOCHSCHULE - DARMSTADT, GERMANY

An electronic digital computer IBM 650 was installed at the IPM Darmstadt (Director Prof. Dr. A. Walther) in January 1957. This is the first of a group of computers given to Universities and Institutes of Technology in Germany by the German government via the Deutsche Forschungsgemeinschaft (i.e. Council for Research in Germany). The next computers will go to the University Hamburg and the Technische Hochschule Hannover in a near future.

Operation of the IBM 650 at Darmstadt started February 11, 1957. This computer is being used for problems of scientific research and for training of students. It relieves the other electronic digital computer at the IPM, i.e. the DERA computer (see DCN, Oct. 1955), from the routine workload thereby leaving it for development work in computer technology and research on automatic programming.

The electronic digital computer IBM 650 is now fabricated in Germany at the plant of IBM-Deutschland in Sindelfingen near Stuttgart.

ARMAC - MATHEMATICAL CENTRE - AMSTERDAM, HOLLAND

The ARMAC (Automatische Rekenmachine MAthematisch Centrum) was described in the Digital Computer Newsletter January 1957. A recent announcement lists the following additional details:

The memory consists of a magnetic drum storing 3584 words in 112 tracks of 32 words each and 64 words of magnetic core storage. One half of the magnetic core memory is used as a buffer store for instructions. A full track of the drum (64 instructions) can be copied into the buffer: the transfer from drum to buffer is automatic. (i.e. need not be programmed). A record is kept in the machine of the number of the track in the buffer store to enable the control to determine whether the next instruction is available in the buffer. If it is found that the next instruction is not available in the buffer, a drum to core storage transfer automatically precedes its extraction.

The other 32 words of fast storage can be used for any purpose and may contain either numbers or instructions. Whole track and quarter track transfer instructions between this part of the core storage and the drum are provided.

Both drum and core storage are checked by the use of two parity bits per word (one for each half word). The speed of the machine is 412 microseconds for an addition and approximately 5 milliseconds for a multiplication. In normal programs the average overall speed is about 1000 operations per second. In ARMAC the same germanium-diode and tube circuitry of conventional design were used which proved successful in the previous machines ARRA and FERTA.

COMPONENTS

MODEL S ELECTROPLOTTER - BENSON-LEHNER CORP. - LOS ANGELES, CALIF.

The Electroplotter S, a flexible, high-speed plotter developed by the Benson-Lehner Corporation, offers users of general purpose computers four degrees of freedom in presenting output data in graphic form. Accepting information from punched paper tape, punched cards or magnetic tape, the plotter operates as a computer output by printing a complete, four-dimensional graphic display in one reading.

The simplest output of the machine is a two-dimensional X-Y point-to-point plot. The more complex displays include (1) the presentation of digital information at demandable positions over the plotting area; (2) the plotting of discrete points at any position, "flagged" by a line of digital and symbolic information; (3) the rotation of the entire printing mechanism forming the plotted point, or any simultaneous combination of the three.

The machine operates at rates of between 70 and 100 complete displays per minute. Significant fields for the application of the Electroplotter S include: magnetic and gravimetric mapping, topographical surveying, stress mapping in structures, geophysical subsection mapping, trajector flight tracing of ballistic and powered missiles, tabulation of data for production control, automatic drafting and lofting, and the plotting of aerodynamics pressures and stresses on solid sections.

The development of the Electroplotter Model S was completed about five months ago and the first unit was recently delivered to Standard Oil Company in Houston. The next two units are scheduled to go to other oil companies in Houston and these will be followed by shipments to Pratt & Whitney Aircraft and the Army Map Service in Washington, D.C. These machines will be operating with the following computers: ELECOM 125, UNIVAC, IBM 650, IBM 704, and Bendix. The Model S will also be compatible for operation with the ElectroData and Logistics Research computers.

CHARACTER SENSING - INTELLIGENT MACHINES RESEARCH CO. - ALEXANDRIA, VA.

The Intelligent Machines Research Co. develops and manufactures character sensing machines to convert from print to machine language. The company's first commercial equipment went into daily use over a year ago at the Readers Digest's circulation department. The equipment scans a typewritten Remington Rand Card and then punches a portion of the abstracted data onto the same card. Speed is 150 cards per minute.

Four other machines have been delivered for different applications. These include Oil Companies and the Ohio Bell Telephone Co.

Although punched cards has been the most frequently required output, punched tape and other outputs are available. The document to be read may be paper or a punched card, and in the latter case models are available which punch the information into the same card. Paper feeds for several different types of documents are available.

The material to be read should be of reasonably good quality, and while models capable of reading handwritten material are not standardly available, any type face or combination of type faces may be specified. However, for extra reliability, a special numeric font designed for proof against common printing, typing and imprinting imperfections is recommended. Alphabetic equipment is currently constructed on a custom basis only.

The standard machines sell for between $15,000 and $35,000 with custom equipment more expensive. Standard equipment may be rented, but special purpose equipment is for sale only. Maintenance is available in key U.S. cities. Before assuming any specific application is, or is not, feasible, the company should be contacted.

BANK POSTING MACHINE - NATIONAL CASH REGISTER CO. - DAYTON, OHIO

The National Cash Register Company has installed their first electronic bank posting machines in Passaic, New Jersey. They expect to accomplish the work of 15 conventional-type posting machines, and also eliminate more than 75 per cent of the man hours required to locate and correct errors.

The Post-Tronic electronically:

1. Determines whether the correct account has been selected.
2. Picks up and verifies the old balance.
3. Determines whether a balance is "good" or if an account is overdrawn.
4. Picks up and verifies accumulated check count.
5. Selects the correct posting line.
6. Detects accounts with stop payments and "holds."
7. Picks up, adds and verifies trial balances.
8. Picks up and verifies balance transfers and all other encoded information when a new ledger card is prepared.

MISCELLANEOUS

SYSTEMS DIV. - BECKMAN INSTRUMENTS, INC. - ANAHEIM, CALIF.

BECKMAN Instruments, Inc. announces the formation of the "Systems Division" to merge the activities of the Data and Control Systems Department of the Scientific Instruments Division and the Systems Department of the Berkeley Division.

The new Systems Division will have its headquarters at 325 North Muller Avenue, Anaheim, California. Research and manufacturing of complete automatic data reduction systems will utilize the capabilities of other divisions of the company toward the goal of supplying industry, test facilities, and research groups with complete data reduction systems.

G15 - BENDIX COMPUTER DIVISION - LOS ANGELES, CALIF.

Twenty-five conferees representing 14 organizations attended the second meeting of the Bendix Computer Users' Subcommittee on Highway Design held in Chicago, April 17.

Purposes for organizing the group are to coordinate the efforts of all Bendix Computer users in the highway design field and the Bendix Computer Division in order to avoid duplication of programming efforts and to utilize the professional skills available in the most efficient manner in the fields of engineering, mathematics, programming and coding.

Additional purposes are to establish a system of interchange of information which will best benefit the individual user and to participate most effectively as an organized group in the establishment of a computer program library in the Bureau of Public Roads.

Members took additional action at this second meeting to help materialize the establishing of a formal Highway Design Program Library in the Bureau of Public Roads. Such a library will expedite the interchange of programming information.

COUNCIL FOR ECONOMIC AND INDUSTRY RESEARCH, INC. - ARLINGTON, VIRGINIA

An IBM Type 704 computer has been installed at the Research Center of the Council for Economic and Industry Research, Inc., 1200 Jefferson Davis Highway, Arlington 2, Virginia.

Containing two magnetic core units with a total capacity of 8192 words, an equal amount of drum storage capacity, and presently five magnetic tape units, the computer is serving two purposes: It is being used in conjunction with current research contracts of C·E·I·R and it is also available on an hourly service basis to others who have a need for high-speed computer facilities. There are presently available blocks of computer time which can be committed to an organization desiring a continuing and regular allocation of machine time.

Information about programming assistance, which is available, and machine time may be obtained from the Computer Services Division of the Council. The Mathematical and Statistical Services Division offers a wide range of analytical services in such fields as numerical analysis, system simulation, Monte Carlo methods and operations research. Assistance in these fields may be secured in conjunction with, or independent of, machine computation.

DATATRON USERS ORGANIZATION

The basic purposes of this organization are to provide a mechanism for exchange of relevant experience between companies and other institutions which operate, or plan to operate, computing and/or data processing facilities consisting of Datatron Digital Computers and related peripheral equipment, and to work for continuous improvement in design, capabilities, maintenance, and related features of Datatron and related equipment.

The owners or leasers of Datatron Computer Models 203, 204, 205, or any future models which are so similar in logic and design as to be considered later models of the same computer (either installed or on order), are qualified for membership in this organization.

NEWSLETTER - OFFICE OF NAVAL RESEARCH - WASHINGTON, D.C.

Effective with this issue of the NEWSLETTER, the joint editorship by Mr. Gordon D. Goldstein and Mr. Albrecht J. Neumann has been discontinued. Mr. Goldstein will continue as the Editor, however, Mr. Neumann will no longer be associated with the NEWSLETTER. Mr. Neumann is occupied full time with his duties in ONR's Office of the Development Coordinator.

ERMA MEMORY - TELEMETER MAGNETICS, INC. - LOS ANGELES, CALIF.

Telemeter Magnetics, Inc., of Los Angeles a subsidiary of International Telemetering Corporation, has been awarded the contract by General Electric to build magnetic core memory systems for the ERMA computer. The computer is designed for automatic processing of commercial bank checking accounts and is under construction at General Electric's Phoenix plant.

CONTRIBUTIONS FOR DIGITAL COMPUTER NEWSLETTER

The Office of Naval Research welcomes contributions to the NEWSLETTER. It is hoped to continuously improve the contents of this newsletter and to make it an even better medium of exchange of information, between government laboratories, academic institutions, and industry. It is hoped that the readers will participate to an even greater extent than in the past in transmitting suggestions and technical material to this Office for inclusion in future issues. Because of limited time and personnel, it is often impossible for the editor to acknowledge individually all material which has been sent to this Office for publication.

The NEWSLETTER is published four times a year on the first of January, April, July, and October and material should be in the hands of the editor at least one month before the publication date in order to be included in that issue.

The NEWSLETTER is circulated to all interested military and government agencies, and the contractors of the Federal Government. In addition, it is being reprinted in the Journal of the Association for Computing Machinery.

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