the easy to use

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L. Wheaton Smith

Bendix 5

GENERAL PURPOSE DIGITAL COMPUTER and introducing a new low-cost accessory that enables the G-15 to operate as a digital differential analyzer Computer division of BENDIX AVIATION CORPORATION Bendix

principal features

THE G-15 COMPUTER



- Combines the advantages of a general purpose computer and a digital differential analyzer in one machine.
- Versatile, easy-to-learn programming methods.
- Input-output equipment for every need.
- Paper tape punch and high speed reader as standard equipment.
- Low initial and operating costs.
- Proven reliability in continuous operation.
- Available on either lease or purchase plan.



new simplified programming techniques

With just four hours of instruction, personnel who have had no computer experience can now solve their own problems with the Bendix G-15. Since the G-15 is so low in cost, many companies are finding it profitable to put their computers right in the office or laboratory. There they can be used directly by the personnel who know the problems best. The inefficiency of waiting for "computer center" solutions is eliminated.

The Bendix INTERCOM programming system makes this ease-of-use possible. In this system, a single command results in a number of internal operations. Much programming time is saved, and the operator need know only the simple operating commands. Since INTERCOM is floating point, the user does not need to consider scaling problems.

Without changing commands, INTERCOM will operate with either a five or a twelve decimal digit word, plus two digit decimal exponent. Positive or negative numbers may be used.

INTERCOM commands are single address. Memory addresses may be modified automatically by index registers. The command list contains all arithmetic operations, transfers of control based on various conditions, input-output operations, and special commands for facilitating the use of subroutines. Output may be in either fixed or floating decimal point form.

The portion of a typical Intercom program shown below illustrates the simplicity of problem preparation for the G-15. This program is for the calculation of $(a^2-bc)/d$ where a, b, c and d are stored in memory positions 1100, 1101, 1102 and 1103 respectively. Each operation is performed on the contents of an arithmetic register called the accumulator, and the answer appears in the accumulator.

NOTES	Operation Code	Address
Clear accumulator and add b	42	1101
Multiply b, in accumulator, by c	44	1102
Store bc	49	1104
Clear accumulator and add a	42	1100
Multiply a, in accumulator by a	44	1100
Subtract bc from a ²	41	1104
Divide a2-bc, in accumulator by d	48	1103

A basic programming system is also available for users who want to exercise control over every internal operation performed by the machine. The Bendix G-15 offers this control to a degree unequalled by other computers of its size. Thus it offers versatility in unusual situations that other computers can not match.

specifications

BASIC COMPUTATION TIMES

Addition:

Single precision – 0.54 msec.

Double precision – 0.81 msec.

Multiplication:

Single precision – 16.7 msec. Double precision – 33.1 msec.

Multiplication of arbitrary precision is possible. The factors may be up to 57 binary digits plus sign with the operation time equal to 0.27 msec. for command access plus 0.54 msec. per digit of the multiplier. These times include minimum access to the command with consideration that operands have been programmed to minimum access position.

MAIN DRUM MEMORY

2160 words - 14.5 msec. average access

FAST ACCESS DRUM MEMORY

16 words - 0.54 msec. average access

AUXILIARY MEMORY

Magnetic Tape Units
Capacity: 300,000 words per reel
Block length: arbitrary to 108 words
File length: arbitrary number of blocks
Search Speed: 45 inches per second
Read-Write Speed: 7½ inches per second

NUMBER SYSTEM

Decimal or sexadecimal, input/output Serial binary, internally

WORD SIZE

Single Precision:

7 decimal digits, input/output 29 binary bits, internally

Double Precision:

14 decimal digits, input/output 58 binary bits, internally

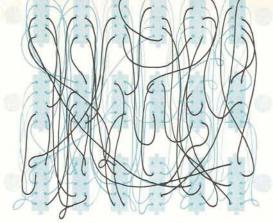
Note:

Any command may be specified to be single or double precision

RELIABILITY

Maximum error-free operating time has been assured the G-15 user, through conservative design and careful selection of components. Reliability checks may be included in G-15 programs, as a further safeguard.



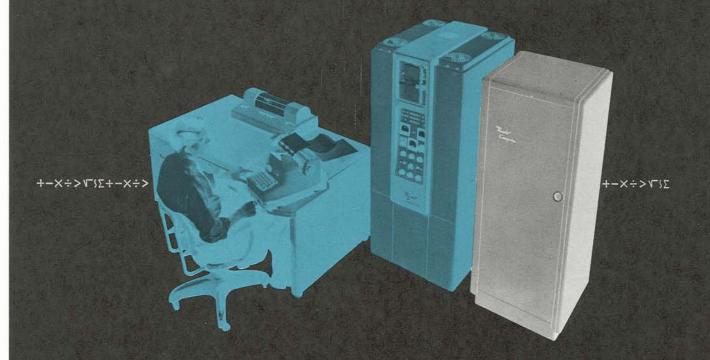


$input\ and\ output\ accessories$

	UNIT	DESCRIPTION	SPEED
2	MODEL MTA-2 MAGNETIC TAPE UNIT	For auxiliary storage, up to four of these units may be connected to one G-15. Each stores up to 300,000 words, and can be searched for blocks of up to 108 words or for file sections of any number of blocks.	Input and Output: 430 char./sec.
10 Marie 10	MODEL AN-1 ALPHA-NUMERIC PAPER TAPE ACCESSORY	The AN-1 provides compatibility between the G-15 and other computing, data handling and communication systems. Any alpha-numeric code punched into 5 or 7 hole paper tape can be read into the computer, operated on, and punched out in the same or another alphanumeric code. The AN-1 can also be connected directly to your own input-output equipment.	Input and Output: Up to 225 characters/sec., depending upon type of input and output equipment used.
111 mm 1 + 1 - 11 1 + 0 - 11 11 - 1	MODEL CA-1 PUNCHED CARD COUPLER	Punched card input and output equipment may be connected to the G-15 through the CA-1 Coupler. One or two IBM 026 reader/ punches may be used with one coupler.	Input: 17 columns/sec. max. Output: 11 columns/sec. max.
MmM/m	MODEL PA-2 GRAPH-PLOTTER	Will plot output of the DDA accessory in .01 inch increments.	Output: 20 increments/sec.
	•		
	THE REAL PROPERTY.		



THE DIGITAL DIFFERENTIAL ANALYZER ACCESSORY



With the addition of a Model DA-1 Digital Differential Analyzer Accessory, the G-15 assumes a dual role. It combines the wide applicability of the general purpose computer with the simple programming for the solution of linear and nonlinear differential equations which is characteristic of the digital differential analyzer. As a general purpose computer it is identical with a standard G-15. As a differential analyzer it has greater capacity than other digital differential analyzers, and comparable speed. When used as a combination machine it is a new and powerful tool for solving the problems of engineering and automatic control.

The differential analyzer of this combination incorporates many features of the Bendix Model D-12 Digital Differential Analyzer, which has earned an enviable record of performance. These include coding which is simplified to the bare essentials, improved stability and accuracy made possible by ternary transfer of incremental information, improved performance of servo and adder units, and the facility for efficient use of tabular empirical functions.

6.15 applications







Real-Time Data

Aircraft Industry

Numerical Control of Machine Tool Operations



Electrical

Transmission

and Pipe Lines



Petroleum Exploration and Refining



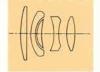
A Teaching Tool for Universities



Construction Engineering

Hydroelectric Factors

Correlation of



Optical Lens Design

Many industrial and scientific organizations are finding imaginative solutions to a wide range of problems through new mathematical and data processing methods. Bendix G-15 computers are playing an important role in many of these firms.

With its unusually flexible programming schemes, the G-15 is ideally suited to both repetitive and non-repetitive problems, regardless of complexity. Examples of the hundreds of possible applications are illustrated here.

You are invited to discuss the application of the G-15 to your own specific requirements. Contact your nearest Bendix Computer Regional Office, staffed by experienced personnel who will be happy to advise you.



BENDIX AVIATION CORPORATION

5630 ARBOR VITAE STREET . LOS ANGELES 45, CALIFORNIA

REGIONAL OFFICES

205 E. 42nd Street, New York 17, N.Y. ORegon 9-6990 919 No. Michigan Ave., Chicago 11, III. MIchigan 2-6692 1000 Connecticut Ave., N.W., Washington 6, D.C. STerling 3-1508

1511 Bryan Street, Dallas 1, Texas Riverside 7-8805 5630 Arbor Vitae St., Los Angeles 45, Calif. ORegon 8-6262

EXPORT REPRESENTATIVES

Canada Computing Devices of Canada P.O. Box 508 Ottawa 4, Ontario Parkway 8-1761 Other Countries Bendix International

205 East 42nd Street New York 17, N. Y. MUrrayhill 3-1100

