An Introduction

to the

DATAmatic 1000

Electronic Data Processing System

electronic
data

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processing
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by

DATAmatic

A Division of Minneapolis-Honeywell Regulator Company

151 Needham Street . Newton Highlands 61, Massachusetts

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DATAmatic was originally formed through the joint efforts of Minneapolis-Honeywell Regulator Company and Raytheon Manufacturing Company. In October, 1957, DATAmatic became a division of Minneapolis-Honeywell following Honeywell's acquisition of the Raytheon interest.

The experience of DATAmatic's research and engineering staff stretches back to the beginning days of digital computing equipment. Prominent members of this staff were key personnel in the work done at the Harvard Computation Laboratory, at the Aberdeen Proving Grounds, and other such early development areas.

In addition to these personnel, DATAmatic enjoys a well-trained and experienced staff which was developed at Raytheon over many years. This staff designed and built the RAYDAC, an early large-scale computer currently in use by the Department of the Navy, and performed basic research and design projects for various government agencies.

The DATAmatic 1000 began its career as the RAYCOM. Initial work, including drawing of specifications and logical design, was begun over four years ago. This includes the development of the wide magnetic tape which is largely responsible for many of the speed and flexibility advantages of the DATAmatic 1000.

DATAmatic offers to potential customers all the advantages of working with a relatively small, well-trained organization. It also offers the security of doing business with a well-established, national firm. It is the policy of DATAmatic to preserve and protect the unsurpassed reputation of its parent company for engineering accomplishment, for quality of manufacture and for excellence of service.

DATAmatic 1000 ELECTRONIC DATA PROCESSING EQUIPMENT

The DATAmatic 1000 System is a large-scale, general purpose electronic data processing system. It is composed of fully integrated business machines, employing high-speed computer principles designed to expedite all phases of record keeping and accounting.

Incorporated in its design are many features which uniquely suit it to the demands of data processing. Included in these are the high-speed, high-capacity magnetic tapes, the high-speed sorting and file searching modes of operation and others discussed in this Section.

We believe that the many advantages of the DATAmatic 1000 will prove of real importance to you in your data processing operations.

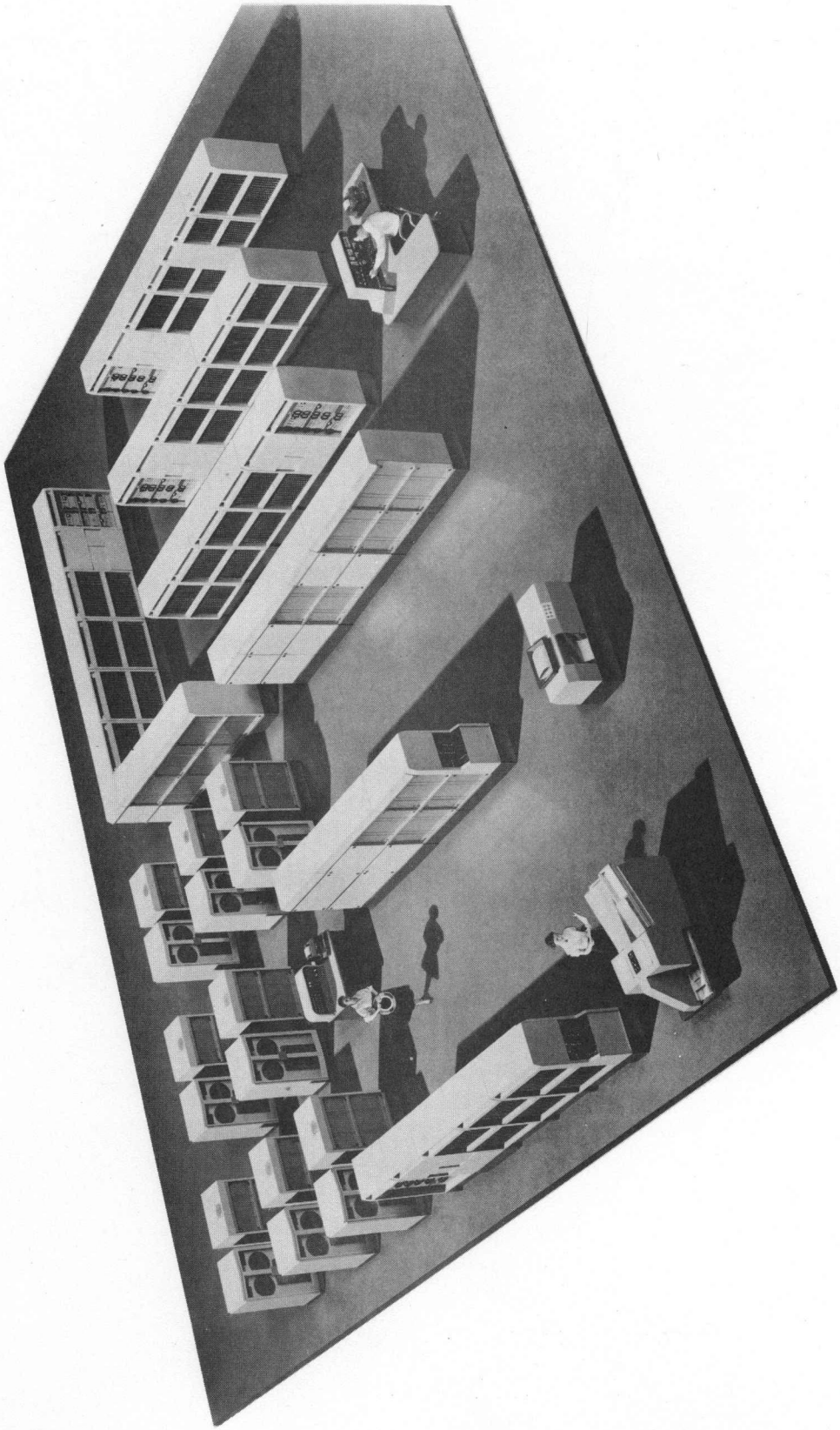
A typical DATAmatic 1000 System contains the following elements:

Central Processor
Magnetic Files
Input Converter
Output Converter
File Switching Device
File Reference Device

The principal features of the DATAmatic 1000 Electronic Data Processing System are described and illustrated on the following pages.

A typical DATAmatic 1000 System Layout appears on the next page.

DATAmatic



A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

CENTRAL PROCESSOR - MODEL 1000

The Central Processor performs two principal functions, which are:

Automatic Sequential Control of Processing Operations
Data Manipulation, (Sorting, Merging, Arithmetic Operations)

Physically, the Central Processor contains the electronic elements and circuitry for carrying out, at high speeds, the stored programs. The fast and reliable internal memory is composed of magnetic cores with a capacity of 24,000 decimal digits. Four 62-word buffers are provided for efficient input and output. Access to memory is in parallel and time for reading a word is approximately 10 microseconds.

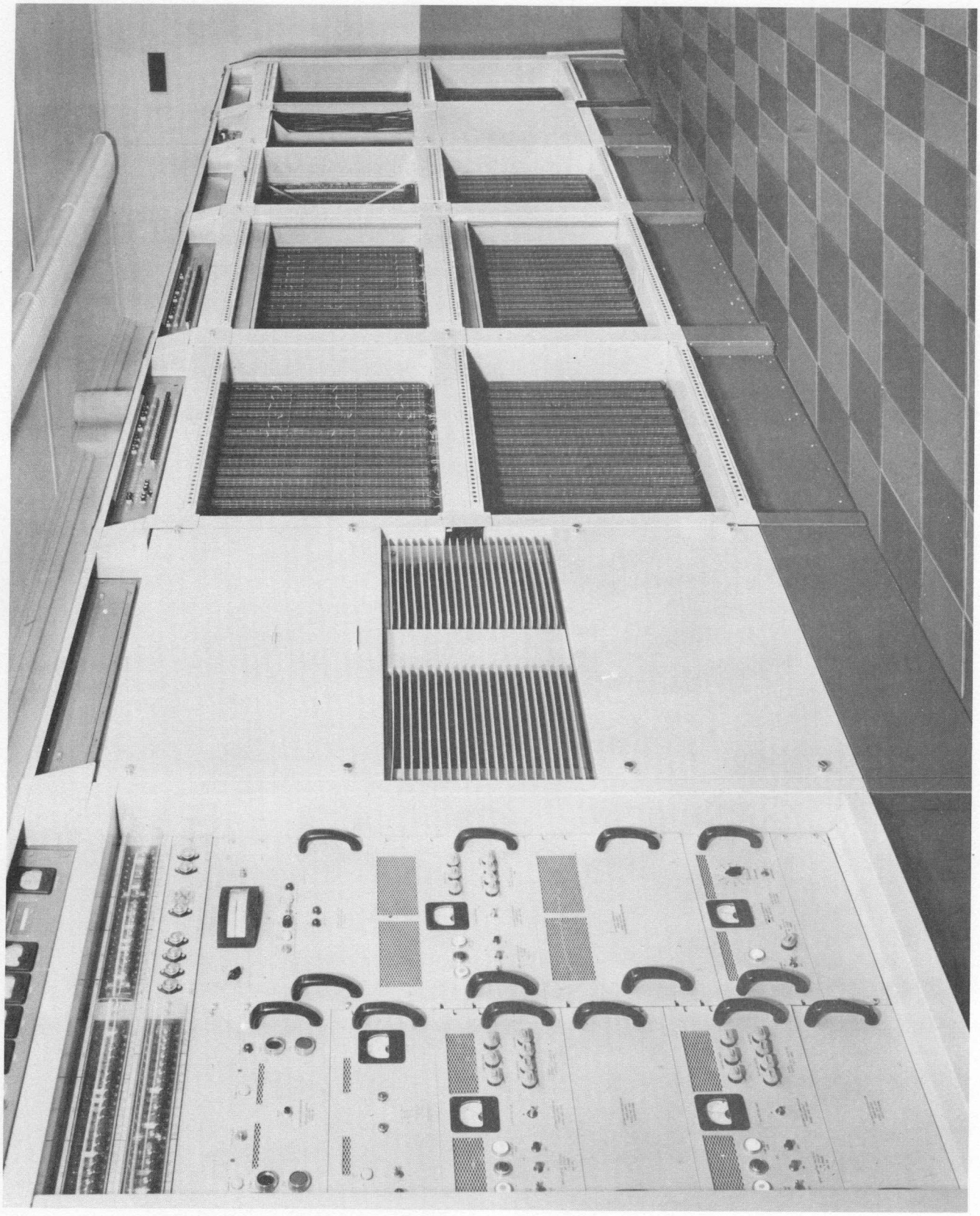
Multiple Tape Search

Searching for items on tape may be accomplished automatically under Central Processor control with the scan being performed on as many as ten magnetic tapes simultaneously. This scanning is performed under the control of standard machine instructions and at the rate of as much as 600,000 decimal digits per second. Due to the availability of buffer storage, searching may be performed while other central machine operations are in progress.

Sorting

Sorting on the DATAmatic 1000 is done rapidly and economically in the Central Processor by either of two methods. Digital sorting, utilizing special sorting orders, is generally superior for large volume sorts on relatively short keys. Merge sorting, using four or more tapes, proves faster for shorter sorts and longer keys.

The High-Speed Memory Section of the Central Processor is illustrated on the next page.



DATAmatic 1000 INSTALLATION, CENTRAL PROCESSOR SECTION

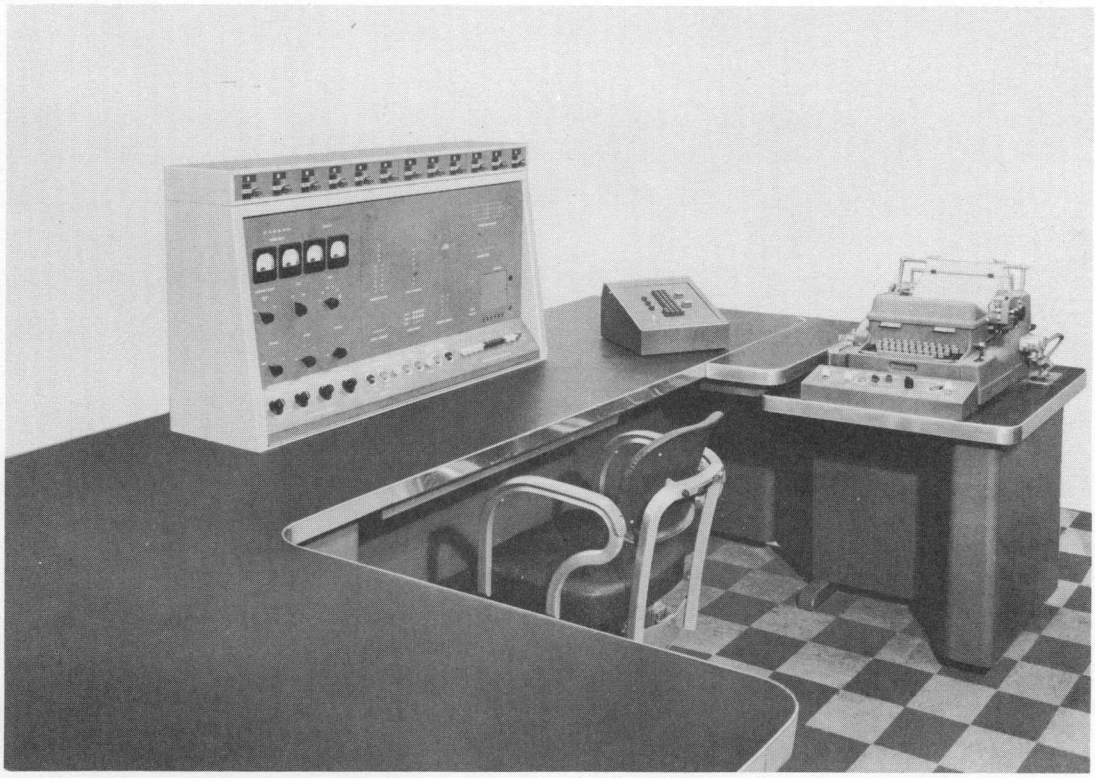
CENTRAL CONSOLE

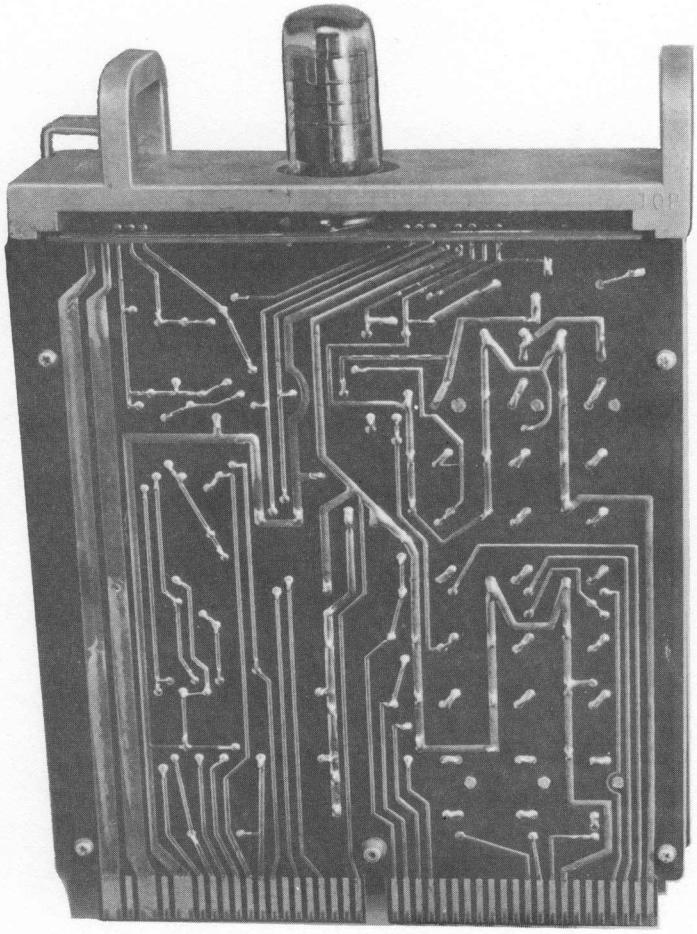
The supervision and master control of the System is exercised through the Central Console. This unit also enables the operator to communicate directly with any element of the system under control of the Processor, when required for diagnostic purposes, and receive printed answers to any interrogation of the machine. Under normal operations, the Central Console permits monitoring of the machine. It monitors the condition of key components in the system and permits the location of potential trouble before it actually occurs.

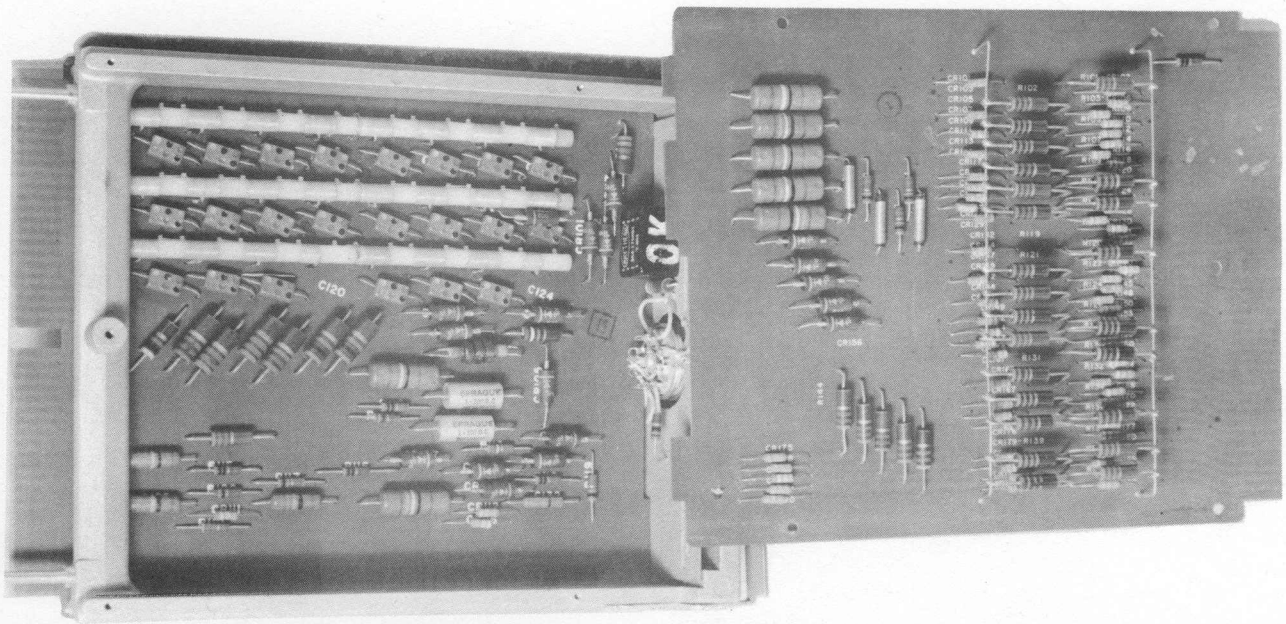
Each unit in the DATAmatic 1000 System is an individual "building block". Enough building blocks are integrated into a system to handle the requirements of the records being processed. However, if the work load increases or new applications are developed, additional units can be added Conversely, if the work load should diminish, units may be removed from the system.

This building block principle is followed within system units which are constructed of small individual packages which contain a limited number of components. These packages may be plugged into the system or removed as required. Consequently, when there is an indication on the Central Console of a weakening component, the package containing the declining component can simply be removed and replaced with a spare package.

The Central Console and typical packages are illustrated.





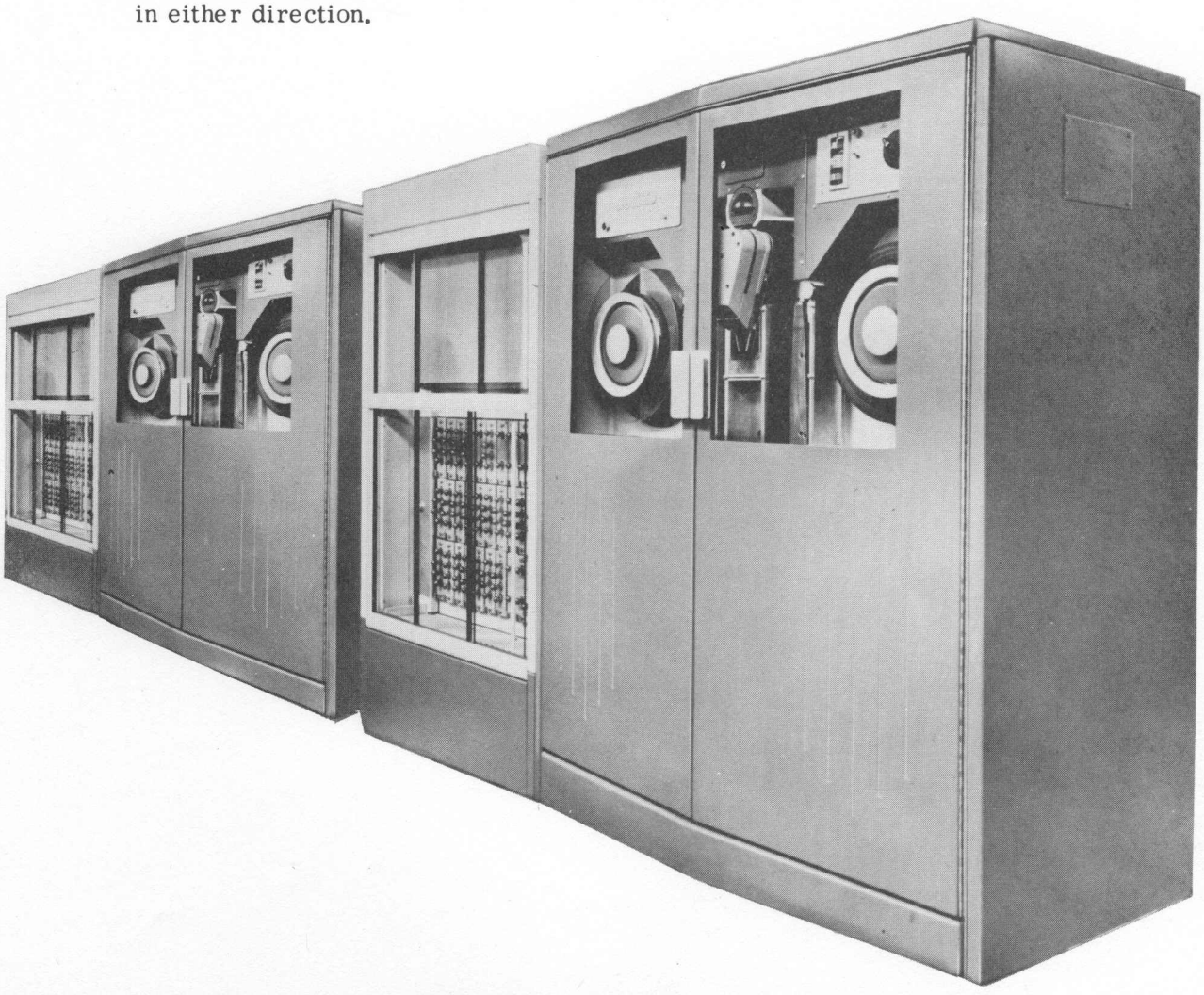

C120
C124

MAGNETIC FILE UNIT - MODEL 1100

The Magnetic File handles magnetic tape for five principal functions:

Record data on magnetic tape from the Input Converter
Read data from magnetic tape to the Output Converter
Read data from magnetic tape to the File Reference Device
Transfer data to the Central Processor
Record data from the Central Processor

The volume of transactions and the complexity of operations govern the number of Magnetic Files used in a DATAmatic system. The "building block" plan is followed here, also. As many as 100 Magnetic Files with a capacity of billions of digits can be actively engaged in a single system. A single Magnetic File is capable of reading or recording as many as 60,000 decimal digits or 40,000 alphanumeric characters per second. This is not a peak reading rate but a rate of continuous information flow which can actually be realized. Magnetic tape moves under the reading - recording head at 100 inches per second and can be scanned while the tape is moving in either direction.

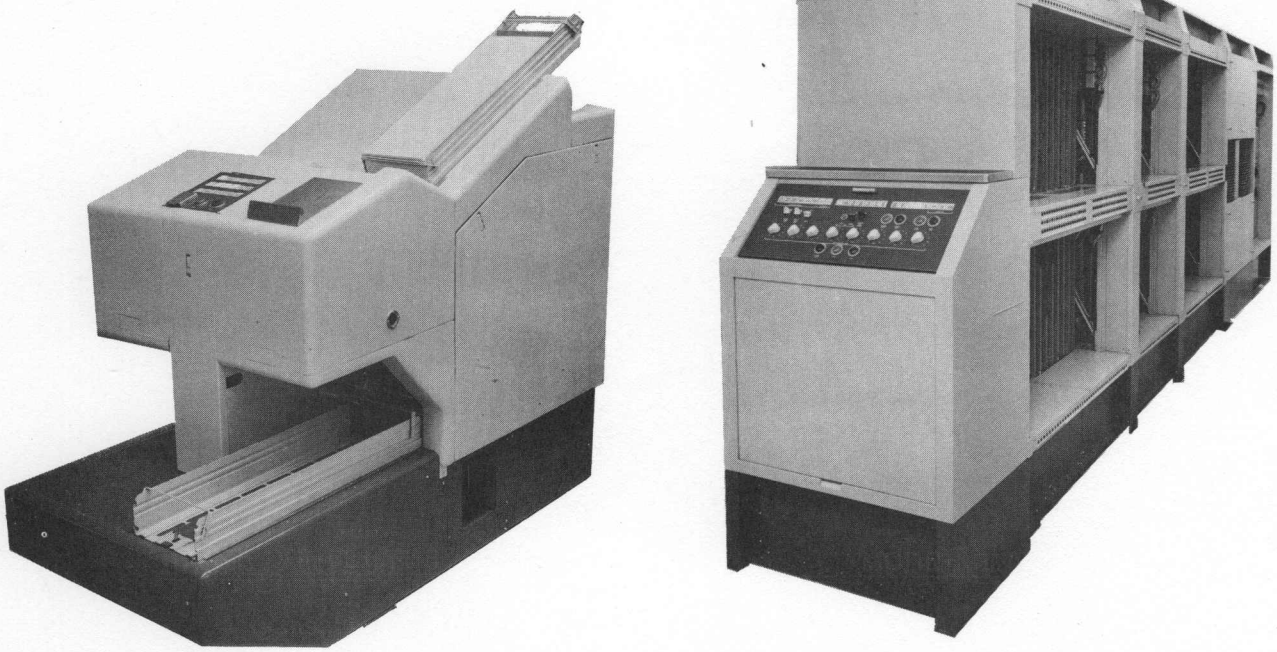


INPUT CONVERTER AND CARD ANALYZER - MODEL 1200

A transcription device known as the Input Converter is used to convert source data in the form of punched cards into recorded data on magnetic tape. The Input Converter feeds, translates, edits and arranges format for 900 fully punched cards per minute.

In the operation of the converter, the punched cards are loaded into the feeding mechanism in quantities of over 3,000 cards at a time, and are then automatically fed sequentially through two stations. The stations are used to read and check data from cards and the information is immediately recorded on magnetic tape.

The Input Converter operates independently of all other system elements, which means that input, output and central processing can take place simultaneously on separate procedures.

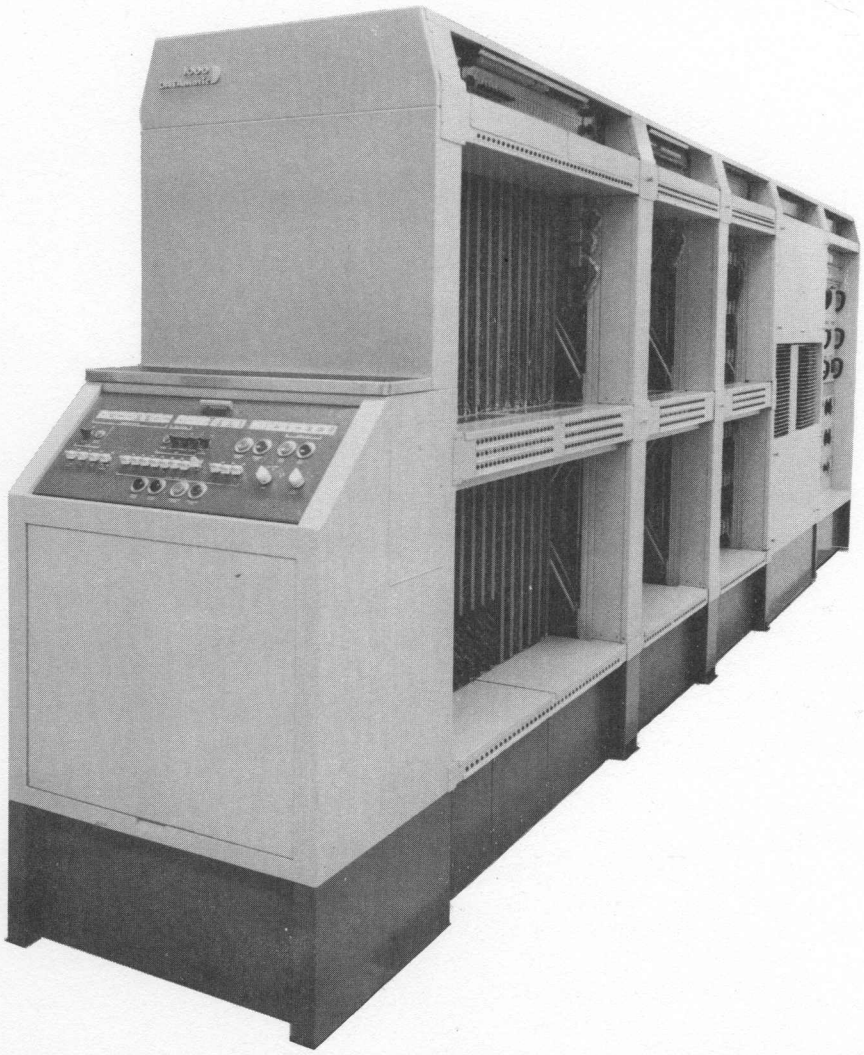


DATAmatic 1000 OUTPUT CONVERTER-MODEL 1300

The purpose of the DATAmatic 1000 output system is to accept information recorded on DATAmatic Magnetic Tape and to generate suitable electrical signals to permit the printing or punching of this information by specific equipment. Because the applications of business are so diversified, two such converters have been designed, the Standard Speed Output Converter, Model 1300, and the High-Speed Output Converter, Model 1400. An installation may contain one or both of these systems depending on its particular need. The operation of these units is entirely independent of the main machine except when the tape supplying data for the converters is involved in processing by the main machine.

Description

The Output Converter, Model 1300, produces the electrical equivalent of a punched card having 120 columns. This in turn is processed through a line printer or a card punch.



DATAmatic 1000 HIGH-SPEED OUTPUT CONVERTER AND PRINTER - MODEL 1400

Description

The Model 1400 DATAmatic High-Speed Output Converter and Printer is specifically designed for heavy-duty electronic data processing requiring a high document-per-hour printing rate.

The converter unit accepts information from magnetic tape, provides any editing or format arrangement desired and converts the information signals into impulses which operate the High-Speed Printer.

Converter Editing Features

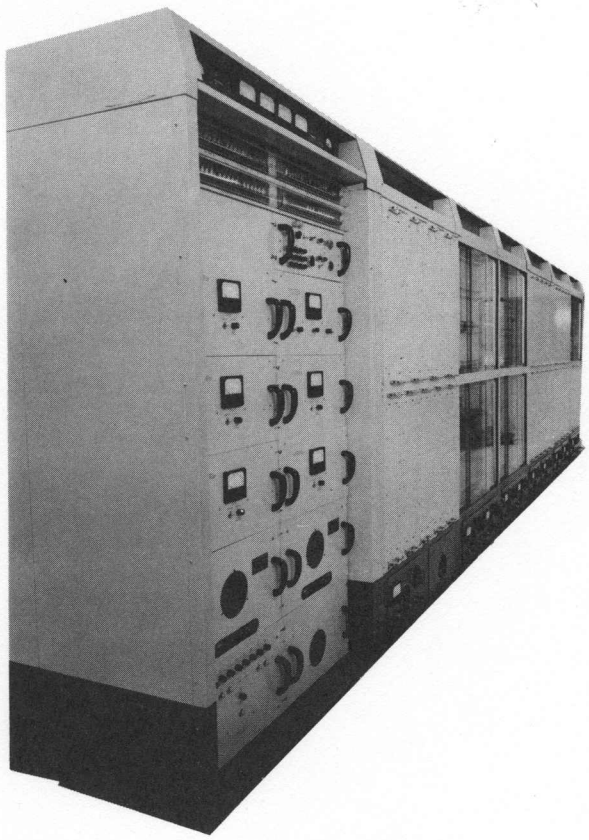
1. Any number of characters may be deleted from a given line of print
2. Any combination of characters may be emitted on a constant or variable basis
3. The information to be printed can control its position on a given line
4. Control of field information is completely flexible
5. Data columns may be interchanged to any extent desired
6. Several fields of information may be printed on a given line
7. Floating dollar sign provides definitive protection of dollar amounts
8. The category of successive items of information on tape can be used to determine whether or not given information should be printed
9. A given block of information on tape may be printed in any of several different formats in the course of a single run

Converter Operating Features

1. Every phase of information transmission from magnetic tape to print hammer is verified automatically utilizing special weight count, parity and echo-back checking
2. High inter-form spacing rate speeds output
3. Automatic eight-way vertical form control is achieved through perforated control tape
4. Fail - safe controls govern paper and carbon ribbon feeding
5. All Magnetic File Unit functions can be governed at the printer unit

Printer Specifications

Printing Speed	900 120-character-lines per minute
Printing Symbols	26 alphabetic characters 10 numerals, 0 through 9 20 special symbols common to business use
Columnar Positions	Up to 120 print positions over a range of 160 columnar positions
Horizontal Spacing	10 characters to the inch
Vertical Spacing	6 lines to the inch
Paper Stock	Any commercially available continuous tabulating forms with or without multiple carbons



DATAMATIC 1000 HIGH SPEED CONVERTER AND PRINTER
MODEL 1400

DATAmatic 1000 MAGNETIC TAPE-TO-PAPER TAPE CONVERTER MODEL 1500

The Model 1500 Magnetic Tape-to-Paper Tape Converter produces from a magnetic tape, which has had a minimum of editing, a perforated tape capable of operating standard teletype equipment, paper tape controlled electric typewriters, calculators or card punching devices. Consisting of a Magnetic File Unit, a Translator and Control Unit, and two Paper Tape Punches, this output conversion system may be employed to produce either 5, 6, 7, or 8 level tapes with the tape feed holes either transversly centered or of the advance feed type. The specific type of tape to be produced is governed by the choice of Translator unit, several of which are available. Both chad and chadless type tapes may be produced.

The Converter is capable of operating at the rate of 240 characters per second. Since the fastest high-speed punch now in existance operates at only 60 characters per second, the Converter speed is limited by the speed of the available output punch.

Any or all of the data on the magnetic tape may be selected to be read and converted. Twenty-two rules of conversion are available which not only permit the correct alphabetic and numeric interpretations, but in addition provide for editing features such as the insertion of decimal points, dollar signs, spaces, blanks, and carriage return or line feed instructions to the electric typewriter.

The sequence in which the data on tape is read is governed by a Program Selection Control Panel. This same panel can be used to select one of six conversion programs, to be active at a given time, to control the conversion of data in storage to paper tape code.

FILE SWITCHING UNIT - MODEL 1170

The flow of information between the various Magnetic File Units and the Central Processor is ordinarily governed by a switching unit within the Central Processor. It controls up to eight magnetic tape files. An installation which utilizes more than eight Magnetic File Units would require additional switching facilities.

The File Switching Unit is an additional switching facility by means of which additional tapes can be connected to the Central Processor. It also permits switching of connections between tapes and peripheral equipment such as Input or Output Converters or File Reference Units.

FILE REFERENCE UNIT - MODEL 1150

In general, the File Reference Unit provides a means of obtaining information stored on magnetic tape without disturbing scheduled Central Processor operations. The stored information is obtained through the use of a keyboard and paper tape reader for interrogating the file, and by printing out the desired information on a console typewriter.

It is emphasized that this operation is performed "off-line" and that the average access time to any one item on a full DATAmatic tape is less than three minutes.

MAGNETIC TAPE

The DATAmatic 1000 uses a three-inch-wide magnetic tape of heavy duty construction. There are thirty-one recording channels on the tape which may be used simultaneously. An extraordinary amount of data can be stored on each reel of 2700 feet. Actually, one reel of tape can store 37. 200, 000 decimal digits of information, which is the equivalent of data that would require 465. 000 fully punched cards. Data on the tape can be erased selectively or totally by controlled programs and the tape can be reused many times for new or changed data.

FLEXIBILITY

The DATAmatic 1000 incorporates a set of orders which guarantees a balance between the rate of reading data from and recording data onto tape, and the processing of the Central Processor. Several of these orders are specifically designed for sorting, merging and file maintenance operations.

In accordance with the "building block" principle, any number of magnetic files ranging from a minimum of four to a maximum of one-hundred may be used with any one DATAmatic 1000 installation. The more units used the greater the active file capacity available, providing the system with complete flexibility, both in program planning and custom fitting of a system installation. Further flexibility is achieved through the independence of Input Converter, Output Converter and Central Processor. Added converter capacity can be achieved through the use of additional units.

RELIABILITY

Three important features which insure reliable operation are:

1. A unique magnetic tape recording system
2. A complete integrated, self-checking system
3. Conservative design of unitized circuit components

Data is recorded on tape in a pattern of magnetic spots for each decimal digit or alphabetic character.

This unique system depends upon the length rather than upon the strength of magnetic spots representing the dot-dash codes for digits or letters. As a result, it can even distinquish between weak signals, thus eliminating a prominent cause of error in conventional systems.

An arithmetic system of error detection is applied to all numerical and alphabetic information processed in the system through the use of a satellite check number for each unit of coded information. Each transfer of a word during processing is then checked by recreating the satellite of the transferred word and comparing it with the satellite of the original word. Each arithmetic computation is checked in the same manner. This system of checking insures against undetected errors, the failure of the satellites to compare properly would immediately indicate an error and stop the machine.

The electronic and mechanical design of the system insures reliable operation and efficient service through the use of packaged circuitry, printed wire techniques and easily accessible components.

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DATAmatic 1000 Order Summary

Order	Symbol	Operation Code	A	B	C	Word Type	Effect of Order	Word‡ Cycles
CALCULATING ORDERS								
Add	ADD	FF				1	(A) + (B) → C If overflow, subsequence to 1988	8
Subtract	SUB	GG				1	(A) − (B) → C See ADD	8
Multiply	MUL	FE				1	(A) × (B) → C High-order 11 digits (rounded). Low-order 11 digits with 5 added to high-order position → 1995.	35
Divide	DIV	EE				1	(B) ÷ (A) → C If overflow, subsequence to 1986 Remainder → 1995	31-130
Shift left, Preserving sign	SLP	5G				4	Shift (A) N decimal places left and send to C. Sign does not move, N = Bh	7 + N
Shift right, Preserving sign	SRP	6G				4	Same as SLP, except for direction	7 + N
Shift left, Word	SLW	4F				4	Shift (A) 4Bh . Bt binary places left and send to C. Whole word moves.	7 + N(†)
Shift right, Word	SRW	7F				4	Same as SLW, except for direction	7 + N(†)
Substitute	SST	GD				1	Replace (C) by (A) as specified by (B)	7
TRANSFER ORDERS**								
Transfer In	TI(A,B,S,D)	Bp = 0	G3		S	2	A = 01, B = 10, S = 00, D = 11 → Br; If sentinel is sensed store in 1997	4 + n
Transfer In bypassing interlock	TB(A,B,S,D)	Bp = 1	G3		S	2	A = 01, B = 10, S = 00, D = 11 → Br; If sentinel is sensed store in 1997	4 + n
Double Transfer and Select	DT(A,B,S,D)	Bp = 0	GB		S	2	A = 01, B = 10, S = 00, D = 11 → Br; If sentinel is sensed store in 1997	6 + n
Double Transfer and Select, bypassing interlock	DB(A,B,S,D)	Bp = 1	GB		S	2	A = 01, B = 10, S = 00, D = 11 → Br; If sentinel is sensed store in 1997	6 + n
Transfer and Select	TS(A,B,S,D)	Bp = 0	FC		S	2	A = 01, B = 10, S = 00, D = 11 → Br; If sentinel is sensed store in 1997	6 + n
Transfer and Select, bypassing interlock	BS(A,B,S,D)	Bp = 1	FC		S	2	A = 01, B = 10, S = 00, D = 11 → Br; If sentinel is sensed store in 1997	4 + n
Transfer Out	TXO		G0		S	2		
Transfer Internally	TXI		E1			3	Transfer n words from A to B. n = lowest 5 bits of C	3 + 2n
Transfer and Subsequence Call	TXS		D0		S	1	Transfer one word from A to B	5
Twin Transfer	TTX		E2			1	(SOR) → A and (B) → C	5
Internal Select	ISL		D9		S	1	Subsequence Call to location (C) + d, where d is digit formed by extracting (A) against (B). This order stores itself in 1994.	6
TAPE ORDERS								
Read Forward	RF (A,B,D,K)	36	Seq.		S	1	(Da,Ah) = 0,2 A; 0,8 B; 0,0 D; 0,6 K	AtAu specifies tape mechanism	7
Read Backward	RB (A,B,D,K)	24	Seq.		S	1	(Da,Ah) = 0,2 A; 0,8 B; 0,0 D; 0,6 K	AtAu specifies tape mechanism	7
Search Forward	SF (R,W)	36	Seq.		S	1	(Da,Ah) = 1,2 R; 1,4 W	AtAu specifies tape mechanism	7
Search Backward	SB (R,W)	24	Seq.		S	1	(Da,Ah) = 1,2 R; 1,4 W	AtAu specifies tape mechanism	7
Write Forward	WF (A,P)	17	Seq.		S	1	Ah = 0 for WFA, 2 for WFP	AtAu specifies tape mechanism	7
Rewind Tape	REW	05	Seq.		S	1	(Da,Ah) = 0,0	AtAu specifies tape mechanism	7
Switch Tape to First Half	SWF	05	Seq.		S	1	Position tape unit At Au to first half	(Da,Ah) = 0,2	7
Switch Tape to Second Half	SWS	05	Seq.		S	1	Position tape unit At Au to second half	(Da,Ah) = 0,8	7
DECISION ORDERS								
Less than Comparison, Numeric	LCN	3D				1	If (A) ≤ (B), change (SR) to "C"		7 or 6*
Less than Comparison, Alphabetic	LCA	2E				1	If (A) ≤ (B), change (SR) to "C"		7 or 6*
Inequality Comparison, Numeric	ICN	0D				1	If (A) not equal to (B), change (SR) to "C"		7 or 6*
Inequality Comparison, Alphabetic	ICA	1E				1	If (A) not equal to (B), change (SR) to "C"		7 or 6*
First Key Comparison	FKC	78				1	Au ≡ input buffer A channel; If (B) ≤ (A), go to C		8 or 7*
Second Key Comparison	SKC	69				1	Au ≡ input buffer A channel; If (B) ≥ (A), go to C		8 or 7*
CONTROL ORDERS								
Sequence Change	SCS	00	Seq.		S	1	Changes Sequence Register to B (unless B = 0) Causes next order performed to be a subsequence call to C (unless C = 0)		6
Branch and Return	BAR	42	Seq.		S	1	Stores "SCS000(SR)000" at A		7
Pass	PSS	82				1	Consults Sequence Register for next order to be performed		2
Optional Stop	OST	G6	Con.		S	1	Programmed stop		5
PRINT ORDERS								
Print Alphabetic	PRA	11	Seq.		S	1	Print (A) on console typewriter		6
Print Numeric	PRN	21	Seq.		S	1	Print (A) on console typewriter		6

SIGNIFICANT ADDRESSES

1981	Input Converter Error Subsequence
1982	Special Start Subsequence
1983	Illegal Punch Subsequence
1984	Output Buffer Filler Subsequence
1985	Input Buffer Filler Subsequence
1986	Division Overcapacity Subsequence
1987	Input Error Subsequence
1988	Accumulator Overflow
1989	End of Tape
1990	Control Register
1992	Output Buffer Register
1993	Extractor Register
1994	Select Order Register
1995	Remainder Register
1997	Sentinel Register
1999	Current Order Register

NOTES

CON.	Digits used to define order in addition to operation code
SEQ.	Change (SR) to B. If not used, subtract one word cycle
S	Subsequence call to C. If used, subtract one word cycle
SR	Sequence Register
SOR	Select Order Register
(A)	Contents of Address A
(B)	Contents of Address B
Bh	Hundreds digit of B address
Bt	Tens digit of B address
(C)	Contents of Address C
A	Da, Ah, At, Au
n	Number of words to be transferred
N	Number of four-bit positions to be shifted
m	Number of word used for extraction
*	Applies if sequence is changed
(†)	Rounded to next higher integer
‡	One word cycle is equivalent to 28.8 microseconds
**	"B" Address of Buffer Transfer Orders

50, 28,27,26,25 (B₁ = n − m) | 24 (Bp) | 23,22 (Br) | 21,20,19,18,17 (B₂ = n)

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THE DATAMATIC WORD

BIT POSITION	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
TRANSFER WEIGHT	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1

ORDER WORD NORMAL (TYPE 1)	D_s	memory designator D_a	memory designator D_b	memory designator D_c	OPERATION CODE O_p	ADDRESS A hundreds digits	ADDRESS A tens digits	ADDRESS A units digits	ADDRESS B hundreds digits	ADDRESS B tens digits	ADDRESS B units digits	ADDRESS C hundreds digits	ADDRESS C tens digits	ADDRESS C units digits	WEIGHT COUNT W

ORDER WORD BUFFER TRANSFER (TYPE 2)	D_s	D_a	B_1	D_c	OPERATION CODE O_p	ADDRESS A hundreds digits	ADDRESS A tens digits	ADDRESS A units digits	B_1	B_p	B_r	B_2	ADDRESS C hundreds digits	ADDRESS C tens digits	ADDRESS C units digits	WEIGHT COUNT W

ORDER WORD INTERNAL TRANSFER (TYPE 3)	D_s	memory designator D_a	memory designator D_b	*	OPERATION CODE O_p	ADDRESS A hundreds digits	ADDRESS A tens digits	ADDRESS A units digits	ADDRESS B hundreds digits	ADDRESS B tens digits	ADDRESS B units digits	*	C_2	WEIGHT COUNT W

ORDER WORD SHIFT (TYPE 4)	D_s	memory designator D_a	*	memory designator D_c	OPERATION CODE O_p	ADDRESS A hundreds digits	ADDRESS A tens digits	ADDRESS A units digits	B_h	B_t	*	ADDRESS C hundreds digits	ADDRESS C tens digits	ADDRESS C units digits	WEIGHT COUNT W

NUMERIC WORD	SIGN / 1 / 0 / 1 / or / 12TH DIGIT	11^{th} DIGIT	10^{th} DIGIT	9^{th} DIGIT	8^{th} DIGIT	7^{th} DIGIT	6^{th} DIGIT	5^{th} DIGIT	4^{th} DIGIT	3^{rd} DIGIT	2^{nd} DIGIT	1^{st} DIGIT	WEIGHT COUNT W

ALPHANUMERIC WORD	8^{th} CHARACTER (most significant)	7^{th} CHARACTER	6^{th} CHARACTER	5^{th} CHARACTER	4^{th} CHARACTER	3^{rd} CHARACTER	2^{nd} CHARACTER	1^{st} CHARACTER (least significant)	WEIGHT COUNT W

LEGEND

- B_h, B_t — Determines Number of Binary Places to be Shifted
- B_p — Determines if Interlock is to be Bypassed
- B_r — Determines Buffer Involved
- B_1 — Determines Word Inspected
- B_2 — Determines Number of Words Transferred
- C_2 — Determines Number of Words Transferred
- D_a — The Memory Designator (Thousands Digit) of Address A
- D_b — The Memory Designator (Thousands Digit) of Address B
- D_c — The Memory Designator (Thousands Digit) of Address C
- D_s — The Sign of the Order
- * — Irrelevant

SUMMARY OF INSTALLATION REQUIREMENTS

The installation requirements of a DATAmatic 1000 Electronic Data Processing System will vary depending on the number of "building block" units included in a given application. The following requirements represent those of a typical system consisting of:

One Central Processor	Model 1000
Eight Magnetic File Units	Model 1100
One Input Converter	Model 1200
One Output Converter	Model 1300
One Output Converter	Model 1400
One File Switching Unit	Model 1170
One Power Central Group	

SPACE REQUIREMENTS

Equipment	Approx. 4500 sq. ft.
Power Central	600 sq. ft.
Service Engineering	400 sq. ft.
Test Equipment and Parts Storage	300 sq. ft.
Ceiling Clearance	9 ft. 4 in., minimum
False Floor	9 in.
Floor Loading	30 to 125 lbs. per sq. ft.

AIR CONDITIONING REQUIREMENTS

CENTRAL PROCESSOR AND CONVERTERS: Equipped with built-in cooling units with sufficient capacity to provide comfortable room temperatures in addition to optimum equipment cooling. Cooling units require either a continuous water supply of 100 gallons per minute or, if a closed loop chilled water system is used, the equivalent of 35 tons of cooling.

MAGNETIC FILE UNITS: Equipped with circulating fans which utilize room air for cooling. Air conditioning is required for the area, including control of relative humidity (40% to 60%), dust removal and 15 tons of cooling.

POWER REQUIREMENTS

POWER SUPPLY: Four-wire, three phase, 208 volts, 60 cycles

POWER CONSUMPTION:

Central Processor (includes cooling units)	50 KVA
8 Magnetic File Units at 4 KVA	32 KVA
Input Converter, Model 1200 (includes card analyzer and cooling units)	7 KVA
Output Converter, Model 1300 (includes printer and cooling units)	8.5 KVA
Output Converter, Model 1400 (includes printer)	8.0 KVA
Air Compressor	36
Vacuum Pump	5 KVA