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APPLICATIONS

Manufacturer
Scientific.

NUMERICAL SYSTEM

Internal number system	Binary
Binary digits per word	40
Binary digits per instruction	40
Instructions per word	1
Instructions decoded	256
Arithmetic system	Fixed point
Instruction type	Modified two-address
Number range	$-1 \leq n \leq +1$ multiples of 2^{-39}

A separate arithmetic unit is proposed for floating point operation.

ARITHMETIC UNIT

	Incl. Stor. Access Microsec	Exclud. Stor. Access Microsec
Add time	11.5	3.5
Mult time	285	278
Div time	285	278
Construction	Vacuum tubes and crystal diodes	
Arithmetic mode	Parallel	
Timing	Asynchronous	
Operation	Concurrent	

Multiply times given are maximum, minimum time is 120 microseconds.

STORAGE

Media	Words	Digits	Microsec Access
Magnetic Core	4,096	42/word	2.5
Magnetic Tape	4×10^6	41/word	5 minutes

A complete core memory cycle is 15 microseconds.

INPUT

Media	Speed
Paper Tape	200 char/sec

OUTPUT

Media	Speed
Paper Tape	60 char/sec
Magnetic Tape (Narrow)	3,000 char/sec
Magnetic Tape (Buffer)	200,000 char/sec

CIRCUIT ELEMENTS ENTIRE SYSTEM

Tubes	2,900
Tube types	18
Crystal diodes	2,700
Magnetic cores	163,860
Separate cabinets	6

CHECKING FEATURES

Parity check on paper tape.
Parity check on magnetic tape.
Redundancy check by double writing of information.

POWER, SPACE AND WEIGHT

Power, computer 35 KVA
Air conditioned by building system.

PRODUCTION RECORD

Produced	1
Operating	Under test

COST, PRICE AND RENTAL RATE

Approximate cost of basic system \$500,000. Approximate cost of additional equipment \$235,000.

PERSONNEL REQUIREMENTS

Daily Operation	Engineers	Tech and Operators
1-8 Hour shift	4	2
3-8 Hour shifts	1	6

The one 8-hour shift requirement is for testing period; the 3-8 hour shift is for operation.

FUTURE PLANS

Plan to add 4×10^6 words magnetic tape storage. A CRT curve plotter is planned. A floating point arithmetic unit is planned.

INSTALLATIONS

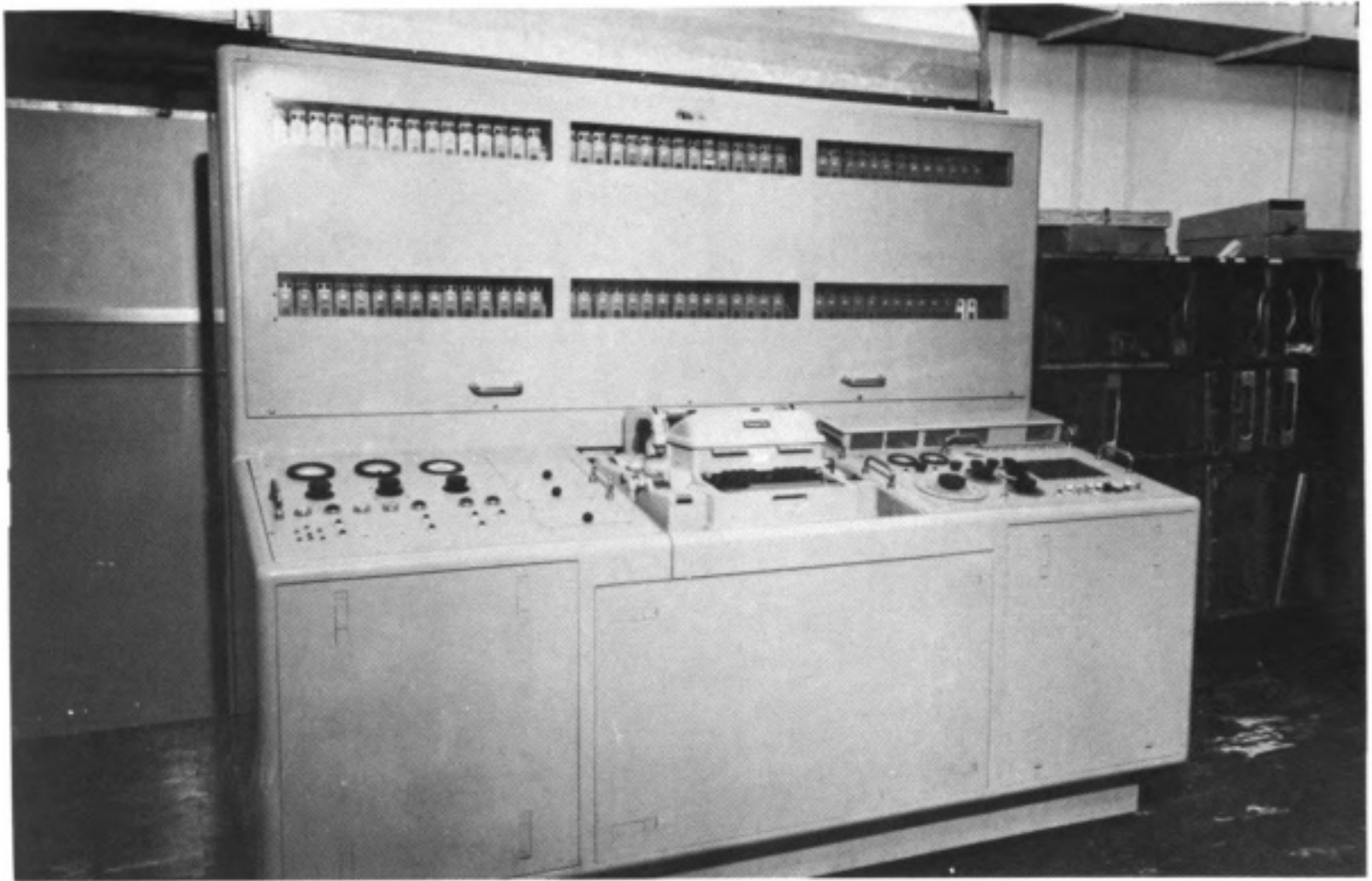
Argonne National Laboratory
University of Chicago
Lemont, Illinois

GUIDANCE FUNCTION

MANUFACTURER

Guidance Function Computer

Northrop Aircraft, Incorporated



Picture by Northrop Aircraft, Incorporated

NUMERICAL SYSTEM

Internal number system	Binary
Binary digits per word	42
Binary digits per instruction	6
Instructions per word	1
Instructions decoded	22
Arithmetic system	Fixed point
Number range	$-1 \leq n < +1$

ARITHMETIC UNIT

	Excl. Stor. Access
	Microsec
Add time	1,000
Mult time	34,000
Div time	34,000
Construction	Vacuum tube flip-flops, drivers, followers, and diode gates
Arithmetic mode	Serial

Timing	Synchronous
Operation	Sequential

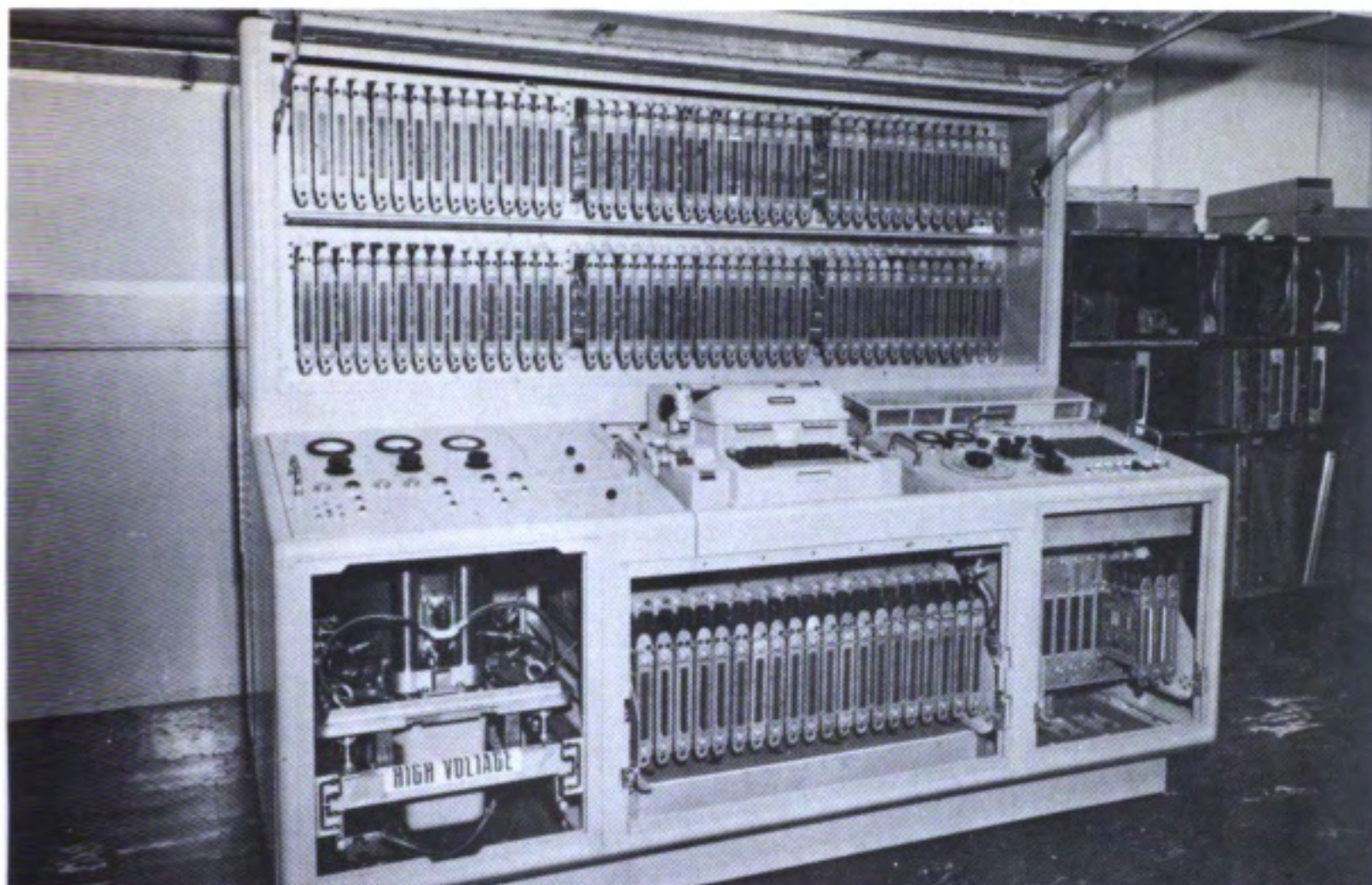
STORAGE

Media	Words	Digits
Magnetic Drum	2,112	88,704

A moving head is used in conjunction with the magnetic drum for the main storage. Thus, random access time will vary from 0 to 2 seconds.

INPUT

Media	Speed
Paper Tape	1.5 sec/word
Typewriter (Flexowriter)	1.5 sec/word



Picture by Northrop Aircraft, Incorporated

OUTPUT

Media	Speed
Paper Tape	1.5 sec/word
Keyboard (Flexowriter)	Manual

Flexowriter operating speed is 132 millisecc/character.

CIRCUIT ELEMENTS ENTIRE SYSTEM

Tubes	292
Tube types	11
Crystal diodes	4,500 2,100 Functional

Types of tubes used are OB2, 6AV6, 12AT7, 5651, 5670, 5687, 5727, 5751, 6005, 6012, 6080.

Separate cabinets 1

CHECKING FEATURES

A built in tester for plug in units is utilized.

POWER, SPACE AND WEIGHT

Power, computer	8 KW
Space, computer	90 cu ft, 18 sq ft
Weight, computer	2,700 lbs
Size, computer	3 by 5 by 6 ft

Power required is 3 phase, 60 cycle. The air conditioner is a self contained forced air unit.

PERSONNEL REQUIREMENTS

Daily Operation	Engineers	Tech and Operators
1-8 Hour shift	1	1

INSTALLATIONS

Northrop Aircraft, Incorporated
Hawthorne, California