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THE MERA 400 SYSTEM. (U)
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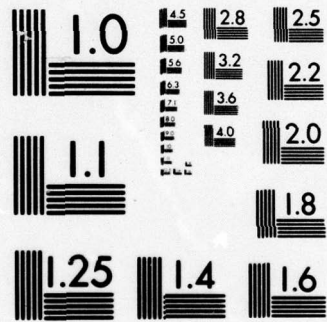
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THE MERA 400 SYSTEM



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THE MERA 400 SYSTEM

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THE MERA 400 SYSTEM

The MERA 400 minicomputer is a universal 16-bit digital computer with logical structure meeting requirements set for present-day digital systems, both in terms of logical structure and technical solutions.

The flexibility of the functional structure of the minicomputer is obtained through the use of a standard interface connecting the processors, channels, and internal memory as well as the use of a base of asynchronous operation of these modules. A developed list of instructions ensures effective operations on data having different forms.

High reliability of operation of the minicomputer is ensured by its technical execution; integrated elements with an intermediate level of integration are installed on two-sided packets. The mechanical structure ensures simple installation of functional units and a suitable selection of peripheral equipment not requiring air conditioning.

Free and rapid access to all functional modules, suitable testing equipment, together with testing programs ensure efficient operation and technical servicing of the system.

Programming, and especially the languages FORTRAN IV, BASIC, MOST, and CEMMA which are supported by a vast library of numerical programs offered with reliable equipment, give users convenient and reliable equipment for various applications of computers.

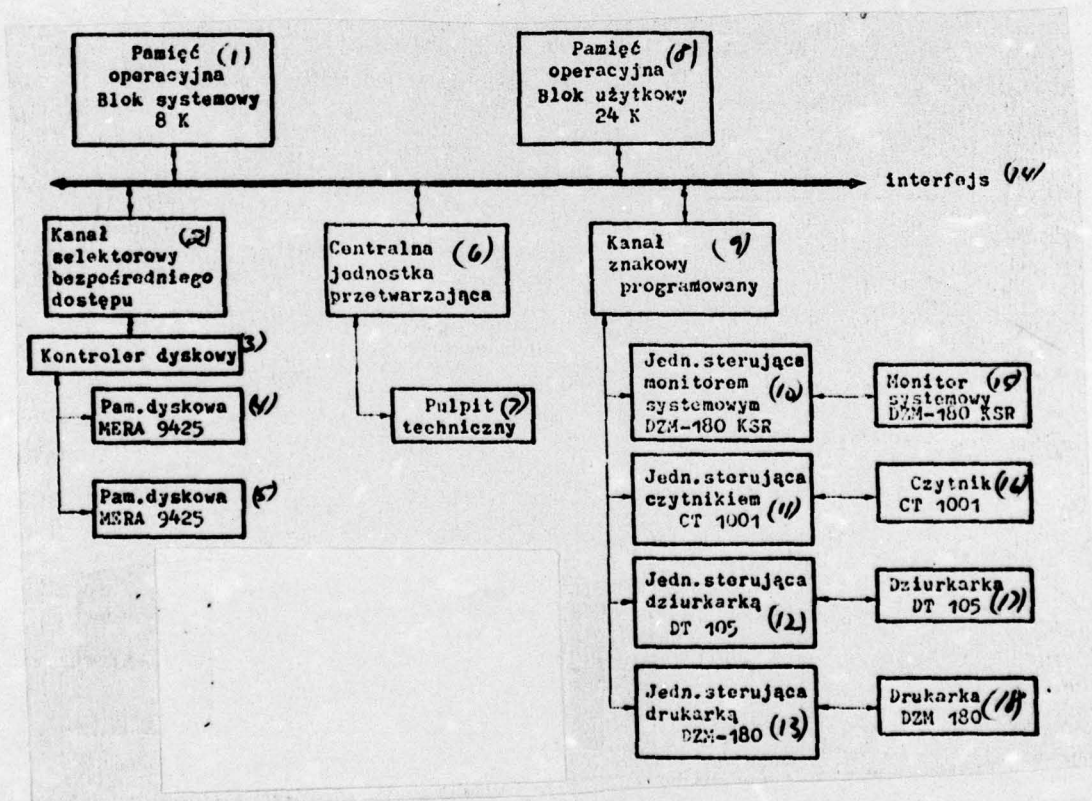
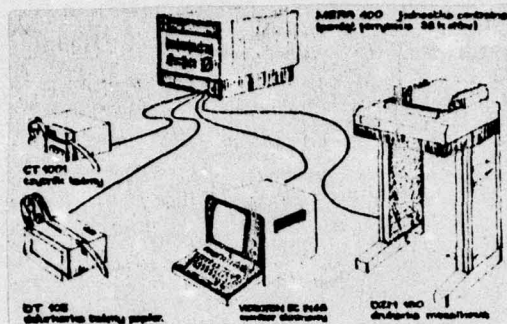


Figure. Key: (1) internal storage, system block 8K; (2) direct access selector channel; (3) disc controller; (4) MERA 9425 disc memory; (5) MERA 9425 disc memory; (6) central processing unit; (7) control panel; (8) internal storage, use block 24 K; (9) program symbol channel; (10) DZM-180 KSR system monitor control unit; (11) CT 1001 reader control unit; (12) DT-105 punch control unit; (13) DZM-180 printer control unit; (14) interface; (15) DZM-180 KSR system monitor; (16) CT 1001 reader; (17) DT 105 punch; (18) DZM 180 printer

GENERAL CHARACTERISTICS

Applications

- scientific and engineering calculations
- processing of economic and administrative data
- automatic control of engineering operations
- processing in real time
- collection of data
- process control
- remote batch processing
- remote access

EQUIPMENT CHARACTERISTICS

Central processing unit

- word length 16 bits
- 6 16-bit universal registers
- 32-bit breakdown announcing register
- breakdown masking on 10 service levels
- equipment organization of pile breakdown
- automatic bootstrapping
- alarm feed system and automatic program restart
- 120 instructions including
 - bootstrapping and memory instructions
 - instructions for operations on short fixed decimal numbers
 - logical operation instructions
 - byte operation instructions
 - comparison instructions

shift instructions

jump instructions

testing and branching instructions

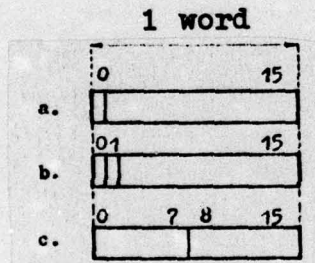
input-output instructions

instructions for arithmetic operations on long fixed

decimal numbers and variable decimal numbers (extra-code realization)

complemented binary arithmetic

information form



a) short fixed decimal number

position ϕ -number symbol

positions 1+15-number complement

b) logical information

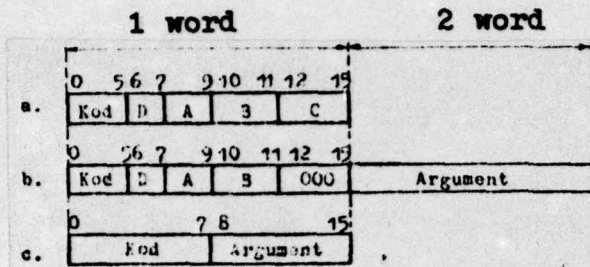
positions 0+15-series of independent bits

c) alphanumeric information

positions ϕ +7-alphanumeric symbol 1

positions 8+15-alphanumeric symbol 2

form of instructions:



a) basic form of instructions

position 0+5	instruction code
position 6	intermediate argument bit (D-modification) <i>sign of the argument of the instruction.</i>
positions 7+9	<i>continuation of construction code.</i> number of universal register
positions 10+12	continuation of instruction code number of index register (B-modification)
positions 13+15	continuation of instruction code indicate instruction argument

b) instruction with direct argument occupying word following basic word of instruction

c) instructions with direct byte argument

positions 0+7	instruction code
positions 8+15	direct argument of instruction

three types of instruction modification:

premodification (using special instruction)

B-modification

D-modification

time for performing basic instructions

jump instructions 1.3 ns

register-register instructions 1.3 ns

arithmetic operation instructions 1.5 μ s

premodification increases performance time of instruction
by 300 ns

B-modification extends it by 300 ns

D-modification extends it by 660 ns

Internal storage

capacity: maximum of 17 blocks each with 4K to 32K

16-bit words

direct addressing: 32K words

program division of internal storage

storage on ferrite cores or thin cylindrical magnetic
layers

cycle time: 700 ns

Channels

symbol channel for eight units which control external
equipment

selector channel for eight units which control external
storage

External equipment

monitor for system: symbol-mosaic printer with DZM-180 KSR
keyboard

specifications:

printing speed	180 symbols/s
number of symbols/line	133 or 158
symbol density	10 or 12/inch
paper width	4...14.5 inches

symbol code	ISO 7
number of different symbols	64
speed of paper movement	10 lines/s
environment temperature	+5° ... +40°
printer power	220V, 50Hz
power input through printer	250 VA
high-speed CT 1001 paper tape reader	
maximum data input speed	1000 symbols/s, start-stop
tape movement	
high-speed DT-105 paper tape punch	
maximum speed of punching	150 symbols/sec
DZM-180 symbol-mosaic printer	
maximum printing speed	180 symbols/s
number of symbols in a line	133 or 158
ISO 7 code	
EC 7168 alphanumeric screen monitor (user option)	
screen diagonal	28 cm
number of lines	16
number of symbols per line	80
code	ISO 7
interface	V24 wg CCITT
	150-1200
editing possibilities	tabulation
	margins retained
erasing of symbol, line, screen	
change in symbol, line	
marker shift	

External storage (user option)

MERA 9425 disc memory

50 M bit capacity

two discs: fixed and variable

speed: 156,000 16-bit words/s

average access time 35 ms

Mechanical structure

dimensions 445 x 530 x 564

weight 45 kg

frame welded construction; metal removable housing

equipment: technical panel, chassis with casset with maximum content of 32 packets, feeder

sloped panel ensuring access to chassis and feeder

exhaust ventilation independent of cassette and chassis

packet with dimensions 300 x 300 mm, two-side print,

medium scale integration integrated units, chassis mounted by conductor winding method

power

single phase grid 220V+10%-15% 50 Hz

power input: 1.5 kVA

automated devices ensuring protection of internal storage when turning voltage on and off

protection of units of central processing unit with voltage increases and temperature overload

drawer construction

voltage source stabilization: +5V, +14V, +30V, -5V, -6V, -12V

Operating conditions

operating temperature $+5^{\circ}\text{C}-40^{\circ}\text{C}$

Relative humidity 95% at a temperature of 30°C

vibration resistance: amplitude 0.15 mm in a range 10-60 Hz,

acceleration 2 g in the range 60-150 Hz

thermal resistance $-40-+55^{\circ}\text{C}$

PROGRAMMING

SOM-1 single program operating system with conversational operational language; contains broad sets of directives and extra-codes

loading and starting program directives

debugging directives

input/output extra-codes

number conversion extra-codes

extra-codes for basic complete and variable-decimal arithmetic functions

MASS basic assembler

FORTRAN IV-language designed mainly for scientific and engineering calculations, permits writing of large, composite programs intended for engineering calculations

BASIC-conversational language designed for engineering computations; used in design bureaus

MOST-400-automatic programming language; designed primarily for programming scientific and engineering computations; MOST has a symbolism somewhat like that of mathematics and is designed for the description of such computations

as the solution of quadratic equations, integrals, matrices, etc.

CEMMA-special problem oriented language designed for automation engineers; used for simulation and modeling on a digital computer continuous processes with control and regulation of classical automatic equipment

CSL-language for modelling and simulation taking into account real time of industrial processes, financial systems, management, marketing, etc.; permits use of information with characteristics of a simulated process without activating it and performing experiments on it.

Library of numerical programs including about 80 programs from statistics, integral and differential calculus, algebra, analytic functions, optimization problems, linear programming, etc.

Developed by MERA Institute of Mathematical Machines Microcomputer Experimental Plant

Produced by MERA-ZSM Zakłady Systemów Minikomputerowych (Mini-computer systems) 02-232 Warszawa, ul. Lopuszanska 117/123; telephone 23-70-44, telex 81 36 17

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