

INTRODUCING THE FIRST,  
SMALLEST, LEAST EXPENSIVE,  
STAND-ALONE APL DESKTOP  
COMPUTER

MCM/70

# BRIDGING THE GAP...

between the sophisticated calculators that offer simplicity of operation but fail to provide the information processing capability of the computer . . . and the large, complex computers that require such high degrees of training and experience as to place them beyond the operational capabilities of most people who want to use them.

MCM/700. Sufficiently simple to allow its use by anyone able to operate an electronic calculator and an ordinary typewriter . . . yet sufficiently sophisticated to perform practically any task performed by a large-scale computer.

MCM/700. Designed to serve workaday information processing needs—and also the specialized needs of the high-level computer professional.



The first complete stand-alone micro computer to provide full scale information processing capability—with the power of a large-scale computer and the ease of a programmable calculator. Right at your own desk . . . or anywhere else it may be needed. At a price you can afford.

## WITH MCM/700 YOU CAN . . .

- **BE YOUR OWN PROGRAMMER**

MCM/700 uses the most powerful, versatile, yet simplest of the computer languages—APL. Within less than an hour of following simple step-by-step instructions, you can start programming with APL. You need no longer use your valuable time to describe to a programmer tasks that will quickly become routine. In many cases, you will find describing your problem in APL is quicker and more precise than explaining it to a programmer. And your capability as an APL programmer grows with experience.

- **DEVELOP YOUR OWN INFORMATION PROCESSING LIBRARY.** By using simple plug-in cassettes with MCM/700, you can build your own personal library of programs and data. You will have a full-scale personal store of processed information that you can keep secure right in your own desk drawer.

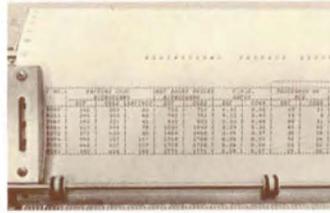
- **BECOME MORE COST-EFFECTIVE**

MCM/700 allows you to be cost-effective in many ways. Your MCM/700 can be purchased outright for what you might pay for a month's lease on a large computer, or a few month's fees to a computer service bureau. A basic MCM/700 costs no more than many of the advanced programmable calculators now on the market. In effect, therefore, you can have total information

processing power for less than any other method now available.

Additional savings are brought about because of the ease with which MCM/700's APL language allows you to be your own programmer. You will be able to develop programming routines in as little as one tenth the time required with other computer languages.

This ease of programming brings about still additional cost-effectiveness because MCM/700 allows you to generate and "debug" programs off line from any large-system computer, or pre-process and test all of your data . . . and then turn the job over to the large system for further processing. The time thus saved on the big mainframe can pay for the MCM/700 in a short period.



- **ENSURE FULL SECURITY OF CONFIDENTIAL DATA**

MCM/700 provides the second level of security for sensitive data. You can provide complete physical security of your cassette tapes. In addition, APL lets you readily cryptocode confidential data for further protection.

- **ENJOY PORTABLE HANDS-ON INFORMATION PROCESSING**

Smaller and lighter than most typewriters, MCM/700 weighs less than 25 pounds and is innovatively compact. MCM/700 operates either from any standard electrical power source or from 14V battery power. You can work with MCM/700 in the office, the conference room, the lab, the field site, anywhere—even take it home—and have full data processing power wherever you need it.

# MCM/700... TOTAL STAND-ALONE PERSONAL INFORMATION PROCESSING



# APPLICATIONS OF THE MCM/700

The MCM/700 has applications in every area of human activity where information processing and calculation are essential.

In small organizations and large . . . in laboratories, factories, classrooms . . . by businessmen, scientists, engineers, educators and students . . . MCM/700 is ready to serve. Because it is the smallest, least expensive full service information processor ever built it can go anywhere it's needed with ease and convenience.

In the large computer-using organization, for example, MCM/700 provides an ideal, inexpensive method for generating and debugging programs off line without tying up mainframe equipment and computer personnel.

In the location not equipped with computers, MCM/700 provides a highly cost-effective way to obtain full service information processing without the large expenditures needed to "computerize" operations now performed manually.

As a complete, stand-alone, full service unit, MCM/700 brings its capabilities to the desktop, the lab table, the school room and the field site with equal ease.

## BUSINESS AND INDUSTRY

MCM/700 is applicable to business and industry at two levels.

For the organization with existing computer equipment, MCM/700 provides computer oriented personnel with a low cost means of developing new programs, debugging existing programs, performing off-line data processing and handling calculations without tying up large mainframe equipment.

For the firm wishing to initiate in-house computer capability, MCM/700 provides a total, compact data handling system that is so simple to operate and so economical to purchase that costs for leasing large scale equipment or paying a service bureau cannot compete with the freedom of personal ownership of this new information processor.

Studies of a number of commercial facilities show that computers are often used at times when simple calculators would be more cost effective. Conversely, indications are that the computer is often not used when it could be, due to the necessity for collaboration between the manager or executive, having the requirement, and the analysts and programmers, capable of interfacing with the computer. Thanks to the simplicity of APL, the user can now solve problems, access information, and manipulate data directly. The resultant savings in time and skilled personnel readily offset the costs of MCM/700 ownership.

In both cases, MCM/700 provides the ideal solution for bridging the gap where calculators leave off and large scale systems begin. With MCM/700, each computer and calculator user can now have a full-service information processing system at a truly affordable price.

Now, total management and record control, inventory control, word processing, accounting functions, market planning, and all other activities where calculators and computers are traditionally used . . . can be served by the low-cost, stand-alone power of MCM/700.

## ENGINEERING AND SCIENCE

In all areas of engineering and scientific work MCM/700 provides the ideal solution for truly personal, portable problem solving.

In addition to standard computational and mathematical operations, MCM/700 is capable of performing any task that large scale computers can.

Now, with on-the-spot convenience, MCM/700 can be put to work in the laboratory, the office, the production floor or the test station. It can be brought easily to the assembly line area, the conference room, the field site and even the home.

The simple, powerful language of APL makes MCM/700 the perfect tool for engineering and scientific requirements. Through easily attached peripheral equipment, the small, low-cost unit can be applied everywhere . . . in data acquisition and control, physiological analysis, circuit design, network simulation, structural design and stress analysis, chemical process analysis and control, or anywhere else where computers and calculators are now used.

Using the mathematical shorthand notation of APL, all trigonometric functions, logs to any base, sorting, maximizing, minimizing, factorials, random number generation, as well as qualitative and logical comparisons are accomplished in single or two key depressions. All matrix operations are APL notations as are encoding and decoding from one numbering system to another. The ease of APL combined with the vast libraries of statistical, engineering and mathematical programs already available in APL, makes the MCM/700 a unique tool for problem solving in the sciences and engineering.



## EDUCATION

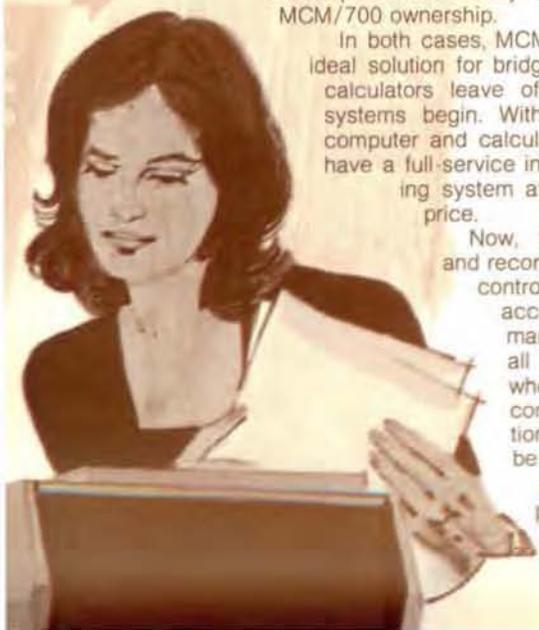
MCM/700 is ideally suited for use in the three key educational applications—the object of instruction; the vehicle for instruction; and the means for administrative management of instruction.

For classroom use, the MCM/700 provides a full service computer at a price comparable to that of a shared terminal or advanced calculator. More important, however, is the fact that because of the APL language, students can spend more time using the computer as a learning tool . . . rather than expending hour after hour just learning to program.

The fact that MCM/700 is operable from standard electrical current means that any classroom can become the "computer" room. No special wiring is needed, no communications lines to remote locations and no rescheduling of learning activities because the big, distant computer is not available. The MCM/700 is ready to start students in the learning process as soon as it's plugged in.

At the college and the university, the MCM/700 is able to provide full service information processing in the laboratory, and even off campus.

Students, instructors, and professors can have personal use of stand-alone, go-anywhere information processing whatever their needs. With the simple cassette system MCM/700 uses, each person employing the computer can now have a personal library of both data and programs for study projects, research programs and direct teaching/learning activities throughout the semester.



# HERE'S WHAT MCM/700 PROVIDES ITS USERS

## • TOTAL SYSTEM CAPABILITY

Despite its small size, MCM/700 can perform almost any operation and execute any task that a large-scale computer can. Within its compact chassis are all the features and capabilities of a total data processing system.

These include a 46 key, IBM compatible keyboard, a high legibility 32 character plasma display panel, a Central Processing Unit with 2000 words of Read/Write Memory that is expandable to 8000 words. Housings for up to two integrated Magnetic Tape Cassette



storage drives that expand the memory capacity by more than 200,000 words. Also included is a resident operating system which includes: a Virtual Operating System, Omniport Input/Output Interface, a complete APL interpreter, and a battery-operated Power Fail Protection System

## • FULL SCALE FLEXIBILITY

One of the optional features MCM/700 offers, for added flexibility, is practically unlimited expansion of user work space by selecting the unit's dual cassette feature. This allows the user to input both programs and data from a self-developed cassette library that can be made as personally useful and flexible as notebooks, workfiles and other business tools.

Also adding to MCM/700's flexibility is its basic feature of virtual memory cassette control and its self-contained Input/Output interface hardware. This, in addition to its built-in protection against damage or loss of data because of power failure, are all part of MCM/700's total system flexibility.

## • UNIVERSAL INTERFACING

MCM/700's Omniport Interface feature allows it to present parallel data to a wide selection of external peripheral equipment and attachments just as with any large-scale computer. Utilizing available interface modules, MCM/700 can drive printers, plotters, remote displays, diskettes and analog/digital converters. Attachment of the MCM Communications Subsystem provides serial data I/O compatible with EIA Standard Interface specification RS232/C, as well as standard protocols for ASCII, IBM Correspondence Code and Tektronix 4013 Graphics.



# SPECIFICATIONS

## HARDWIRED APL INTERPRETER AND OPERATING SYSTEM

Size: 32768 bytes Read-Only Memory  
Expandable: Yes  
Built-in Primitive Functions: 87  
Built-in System Functions: 29  
Range:  $-7 \times 10^{75}$  to  $+7 \times 10^{75}$   
Precision: 16 digits

Built-in Trigonometric Functions include:  
Sine, Cosine, Tangent, Arcsin, Arcos, Arctan, Pi, Hyperbolics

Built-in Logical and Relational Functions:  
< ≤ ≥ > And, Or, Nand, Nor, Not, Membership

Built-in Data Structuring Functions include:  
Reshape, Reverse, Rotate, Transpose, Ravel, Catenate, Take, Drop, Compress, Expand

Built-in Mathematical and Data Manipulation Functions include:  
All Arithmetic Functions, Sort, Power, Root, Factorial, Random Number, Inner Product, Outer Product, Natural Log, Base X Log, Reduction, Scan, Absolute Value, Encode, Decode, Minimum, Maximum, Format

## MCM/APL

Compatibility: APL/360; APL.SV  
Extension to APL/360: Execute, Dyadic Null, Extended Format, Scan, Quad System Functions and Variables, Dyadic Quote-Quad, Advanced Function Editing  
Data Types: Character, Integer, Real, Logical  
Data Structures: Scalar, Vector, Matrix, Arrays to Rank 32

## AVS VIRTUAL OPERATING SYSTEM

Groups per Volume: Up to 256  
Names per Group: Up to 256  
Built-in Functions: Read, Write, Names, Initialize, Select, Close, Create, Append, Delete

## POWER — FAILURE PROTECTION

Method: Internal Batteries  
Transient Power Loss: System continues under battery power  
Extended Power Loss: Initiates orderly shutdown; workspace saved; automatically reloads and continues when power restored.

## OMNIPOINT I/O INTERFACE

Addressable Devices: 199  
Data: 8 bits parallel  
Address: 8 bits parallel  
Status: 8 bits parallel  
Character transfer rate: 120 characters per second  
Bit mode transfer rate: 24 bits per second  
Input buffer: 132 characters  
Output buffer: 132 characters  
Logic Levels: 5 - volt CMOS; TTL Compatible

## READ/WRITE MEMORY

Word length: 8-bit byte  
Capacity: 2048 bytes expandable to 4096 or 8192 bytes  
Storage: Instruction characters: 1 byte each  
Data characters: 1 byte each  
Integer numbers: 1 to 8 bytes each  
Decimal Numbers: 8 bytes each

## MAGNETIC TAPE CASSETTE

Capacity: 102,400 bytes per 300 foot cassette  
Drives: Up to 2 drives built into unit. Maximum 6 external drives addressable additionally.

Block size: 128 bytes  
Read/Write Speed: 10 inches per second  
Search Speed: 40 inches per second  
Recording Density: 650 bits per inch  
Transfer Rate: 810 bytes per second  
Recording Method: Bi-phase level encoding  
Checking: Read-after-write; Byte parity; Block check sum

System Access: Virtual (AVS) or Externally Addressable (EASY)

## DISPLAY

Capacity: 1 line of 32 characters  
Type: Plasma  
Character format: 5 x 7 dot matrix  
Response indicators: 3  
Latency: 0.1 seconds to 25.5 seconds  
0.1 to 25.5 seconds; or infinite

## KEYBOARD

Compatibility: IBM 2741 plus start and control keys  
Input buffer: 85 characters

## POWER:

AC Input: 85-140 VRMS; 1 Amp; 50 - 500 Hz  
OR  
DC Input: 14 Volts DC at 5 Amps  
External DC Source via 2 prong connector at rear.

## ENVIRONMENT:

Operating Temperature 10° C to 45° C  
50° F to 114° F  
Storage Temperature -18° C to 70° C  
(0° F to 158° F)  
Relative Humidity 10% to 90% without condensation

## DIMENSIONS:

Height 6.0 in. (15.3 cm)  
Width 14.75 in. (37.5 cm)  
Depth 15.75 in. (40 cm)

## WEIGHT:

Approx. 21 lb. (9.5 kg)

## PERIPHERALS & ATTACHMENTS (optional)

All peripherals below are fully supported, including special software drivers, hard-wired into computer, and are attached to the computer through the omniport cable.

## SC1 - 1200 COMMUNICATIONS SUBSYSTEM

Compatibility: RS 232C; Teletype® terminals; Bell 103 Dataset; Bell standard telephone handset; IBM Correspondence-code; DECwriter® terminals; DECscope® CRT terminals; Tektronix 4013 terminal; compatible with all terminals and computers.

## Code Tables:

APL/ASCII  
ASCII  
IBM Correspondence  
Any 5, 6, 7, or 8-level code table may be entered from tape cassette or keyboard  
110, 134.5, 150, 300, 600, 1200 baud user-selected under program control

## Speeds:

## MCP - 132 PRINTER/PLOTTER

Printer Speed: 30 to 45 characters per second  
Print Line: 132 columns  
Forms Width: 15 inches  
Character fonts: APL, Elite, Pica, Courier, Manifold, French, German, Scandia, Kana

## PMR - 400 CARD READER

Speed: 400 cards per minute  
Type: Punch or Mark 80-column cards  
Hopper Capacity: 1000  
Stacker Capacity: 500

## SDS - 250 SINGLE DISKETTE AND DDS - 500 DUAL DISKETTE SYSTEMS

Capacity: 250 Kilobytes per diskette  
Access Time (Average): 260 ms  
Head Load Time: 35 ms  
Rotating Speed: 360 RPM  
Tracks: 77  
Physical Sectors: 16  
Index: 1

## VDU - 2480 CRT

Character Set: APL/ASCII  
ASCII (Upper and Lower Case)  
Per Line: 80 characters  
Lines: 24  
Screen Size: 12 inch

## MICRO COMPUTER MACHINES INC.

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WORLD'S FIRST PORTABLE FULL-SERVICE APL COMPUTER

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