# A POWERFUL, LOW COST
# Z-80 MICROCOMPUTER

for
- industrial control
- production testing
- instrumentation
- circuit development
- research laboratory
- education
- instructional time-sharing
- business systems

with
- broad peripheral and software support

Shown with
optional bench cabinet

# C Cromemco

Z-2 is supplied for rack mounting.
Attractive bench cabinet shown is also available.

# An advanced professional microcomputer

This new Cromemco Z-2 Computer System provides the engineer, businessman, educator or experimenter with the industry's fastest and most powerful microcomputer in an economical package for dedicated work.

The Z-2 makes available Cromemco's fast Z-80 microprocessor card and a 21-card motherboard in a form such that an almost endless variety of memory, I/O and other peripherals can easily be plugged in — thereby forming a computer tailored to your particular job whether in the laboratory, on the production line, or in an educational time-sharing setup.

### Z-2 System

Here are some of the leading features you get in the new Cromemco Z-2 Computer System:

- The industry's fastest μP board (4 MHz or 250-nanosecond cycle time).
- The power and convenience of the well-known Z-80 microprocessor chip.
- A full-length *shielded* motherboard with 21 card slots to let you plug in almost any conceivable combination of memory, I/O, or your own custom circuits.
- An extremely heavy duty power supply providing 30A from +8V and 15A from +18 and −18V. This will not only power a full set of 21 cards but also has ample additional power for other peripherals such as a floppy disk drive.
- Power-on jump circuitry to begin automatic program execution when power is turned on.
- S-100 bus — important because it is widely supported by a host of peripherals manufacturers. Thus you get the widest possible array of compatible peripherals.
- All-metal chassis and dust case.
- Card retainer that secures cards in sockets.
- Standard rack-mount style construction suited to dedicated applications. Upward compatible with larger systems. Usable with a variety of cabinets. Bench cabinet optional.
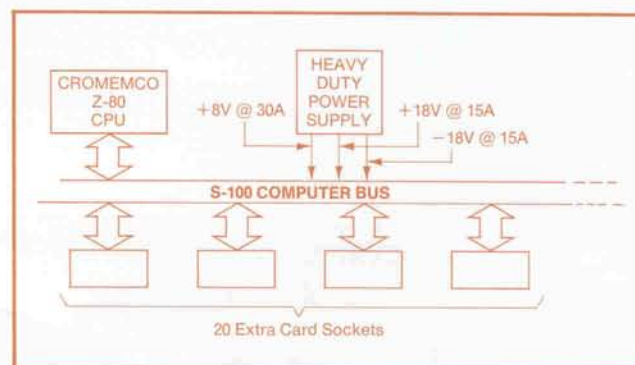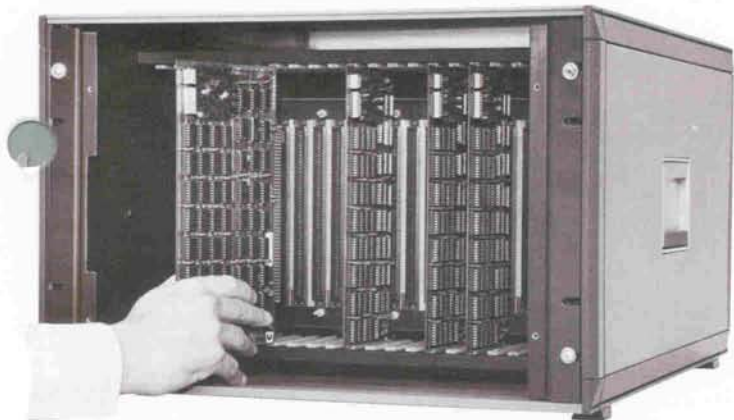- 110 or 220-volt operation.



### High throughput system

The Z-2 is based on Cromemco's fast, powerful microprocessor card, the industry's only card that gives 4 MHz operation (250-nanosecond cycle time). This is about twice the speed of any other microcomputer. The speed and power of this Cromemco card are demonstrated by the fact that the Z-2 will perform real-time operations formerly done only by much larger computers.

Because the card uses the powerful Z-80 microprocessor and, in fact, uses a select one capable of 4 MHz speed, the new Z-2 with Cromemco software has up to 10 times the throughput of microcomputers based on the 8080 and previous microprocessors.

The Z-80 is widely regarded as the standard microprocessor of the future. Besides its high speed, the Z-80 offers a 158-instruction set, 19 internal registers, 10 addressing modes, and 16-bit arithmetic operations.

So you're in the technical fore with the Z-2. But you can also plug in other microprocessor boards if you wish.

Full-width motherboard has slots for 21 cards.

### Dedicated applications

The new Z-2 is specifically designed as a powerful but economical dedicated computer for systems work. Hence, the front panel has been made free and clear of switches and controls of any kind. This makes the Z-2 immune to accidental or incidental misadjustments of operating controls which could be troublesome and costly in dedicated applications such as industrial control.

### Broad peripheral support

Cromemco offers a highly-useful array of peripherals for the Z-2 including a fast 7-channel digital-to-analog and analog-to-digital I/O, high-speed and highly-expandable memory, a PROM card *with programmer*, color graphics interface, and others. See further details on back page.

### Broad software support

For the Z-2 Cromemco offers some of the most advanced software yet developed for microcomputers. One example is the new CONTROL BASIC interpreter which is both easy to use and powerful enough to do jobs that a full BASIC cannot. CONTROL BASIC is designed for such work as process control and automated testing.

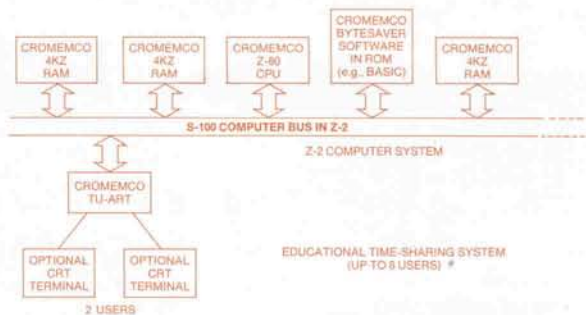Other Cromemco software includes a monitor and an assembler. See back page.

Your present 8080 software can also be used with the Z-2 since the Z-80 is software-compatible with the 8080.

### Low noise

A number of measures have been taken in the design of the Z-2 to achieve reliable operation at its fast 4 MHz speed. Special fast memories (back page) have been developed, the fastest in the industry. Noise has generally been minimized, particularly on the motherboard. A unique ground-plane design has been developed, for example, that reduces ground-current noise by several dB on the bus to prevent erratic operation. This design feature is called 'Blitz-Bus'™.



Heavy-duty retainer bar insures that cards won't jostle out of sockets.



### Educational and other time-sharing

The Z-2's speed and the highly-expandable Cromemco memory boards can be combined to form a surprisingly inexpensive time-share computer which can be used by up to 8 stations.

The setup is shown in the block diagram. Entry to the computer can be through keyboard or other means into Cromemco's TU-ART digital interface card.

Cromemco's fast 4K RAM memory has a bank-select feature that allows each of up to 8 users to have an independent bank of memory. These individual banks can each have up to 64K bytes.

Although extremely simple and low-priced, this time-share computer is fast enough and powerful enough to permit 8 stations to operate with little or no waiting.

Contact Cromemco for further information.

### Rack/Cabinet mounting

The basic Z-2 is supplied in a black-anodized metal case for mounting in a standard 19-inch relay rack. A quality stylized bench cabinet in an attractive blue color is also available.

### Kit or assembled

The Z-2 is available in either kit or assembled form. The kit includes the Z-2 for rack-mounting, the Cromemco Z-80 4 MHz microprocessor card, the full-length 21-card motherboard, power supply, one card socket and card guide, and front panel.
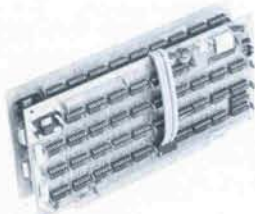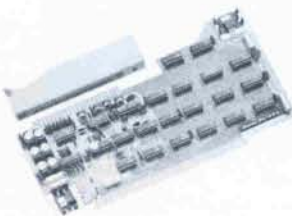
The assembled Z-2 includes the above as well as all 21 sockets and card guides, and a cooling fan.

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### TECHNICAL SPECIFICATIONS
### Z-2 COMPUTER SYSTEM

**Processor:** 4 MHz version Z-80
**Cycle time:** 250 nanoseconds
**Minimum instruction execution time:** 1 microsecond
**Instruction set:** 158 instructions including the 78 instructions of the 8080
**System bus:** industry standard S-100
**Board capacity:** 21 boards
**Power supply:** +8 volts @ 30A, +18 volts @ 15A, −18 volts @ 15A
**Power:** Operates from 110/220 volts; 50/60 cycles.
**Operating environment:** 0-55°C
**Dimensions:** 12¼″ H x 19″ W x 20¾″ D (31.1 x 48.3 x 52.7 cm)
**Weight:** 39 lbs (18 kg)
**Mounting:** For rack mounting (optional bench cabinet available)
**Price:** Model Z-2K Computer System kit: $595.
Model Z-2W Computer System assembled: $995.

Data subject to change without notice
Prices fob factory

# Cromemco Peripherals for the Z-2 Microcomputer System

- 8K PROM card with integral programmer (for additional PROM memory). This is the well-known Cromemco BYTESAVER which contains its own programmer. Card gives you the capacity for a large memory (8K bytes) in eight high-speed 2708 erasable PROMs. Does not include PROMs. (Monitor in "Software" below allows PROM programming.) Kit (Model BSK-0): $145. Assembled (Model BSW-0): $245. Additional 2708 PROMs available at $50 each.

- 16K PROM card. Gives you capacity for 16 2708 high-speed erasable PROMs (PROMs not included). PROMs can be programmed using Cromemco BYTE-SAVER card listed above.
  Kit (Model 16KPR-K): $145. Assembled (Model 16KPR-W): $245.

- 4K RAM. High speed 4K static RAM card uses exclusive address anticipation to achieve 4 MHz operation. Has bank select feature to allow expanding memory up to 8 banks of 64K bytes each.
  Kit (Model 4KZ-K): $195. Assembled (Model 4KZ-W): $295.

- 16K RAM. High speed 16K dynamic RAM card requires no wait states at its fast 4 MHz operation. Dynamic refresh is completely transparent. Has bank select feature to allow expanding memory to a half megabyte.
  Kit (Model 16KZ-K): $495. Assembled (Model 16KZ-W): $795.

- Fast 7-channel digital-analog I/O. Extremely useful I/O board that inputs 7 analog channels into the Z-2 and outputs 7 Z-2 ports as analog channels for external use. Only 5.5 microsecond conversion time. Also has 8-bit parallel digital channel.
  Kit (Model D + 7A-K): $145. Assembled (Model D + 7AW): $245.

- Digital interface card. Cromemco TU-ART card is for interfacing with teletype, CRT terminals, line printers, other devices. Has two serial I/O ports, two 8-bit parallel I/O ports, ten independent programmable interval timers. Software-selectable baud rates from 110 to 9600 baud.
  Kit (Model TRT-K): $195. Assembled (Model TRT-W): $295.

- PROM programmer. For 2708 erasable PROMs. Contained in BYTESAVER 8K PROM card (Model BSW-0) described above.

- Color graphics interface. Lets you use ordinary color TV set as a full-color computer graphics terminal. You can have full-color games, charts, graphs, educational displays on an extremely modest budget.
  Kit (Model CGI-K): $215. Assembled (Model CGI-W): $350.

## Cromemco Software

- MONITOR. Full capability monitor. Resides in 1K bytes of memory. Allows keyboard commands to examine and change memory, move blocks of memory, display register contents, and program PROMs using Cromemco BYTESAVER memory. Available in paper tape or in 2708 PROM for use in BYTESAVER memory board. In paper tape (Model ZM-PT): $15. In 2708 PROM (Model ZM-108): $50.

- ASSEMBLER. This Cromemco resident assembler accepts standard Z-80 mnemonics and includes editor commands for easy assembly-language programming. Resides in 8K bytes of memory. In paper tape (Model ZA-PT): $30. In eight 2708 PROMs (Model ZA-808): $400.

- BASIC INTERPRETER. Cromemco's CONTROL BASIC is a compact, integer-only BASIC for microprocessor control applications. Requires just 3K bytes of memory but is more powerful than BASICS twice its size. Designed specifically for control, automated testing, and similar applications. Allows use of strings, multiple files, and subroutines. Special "EPROM" command allows files to be saved in Cromemco BYTESAVER memory board. In paper tape (Model CB-PT): $15. In three 2708 PROMs (Model CB-308): $150.

## Z-2 Accessories

- CABINET. High quality all-aluminum cabinet with blue finish. Fold away handles. Outside dimensions 13" x 20" x 26". Weight 25 lbs. Model Z2-CAB: $195.

- FAN. Low noise cooling fan produces 52 CFM air flow. Fan comes standard with assembled Z2. Extra cost option with Z2 kit. Model Z2-FAN: $25.

- SOCKET AND CARD GUIDES. Socket and card guides for use with Z2 21-slot motherboard. Model Z2-SCG: $8.

- BLANK FRONT PANEL. Black-anodized blank front panel for your customized computer system. Model Z2-BFP: $35.

# Cromemco

**incorporated**

**Specialists in computers and peripherals**

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