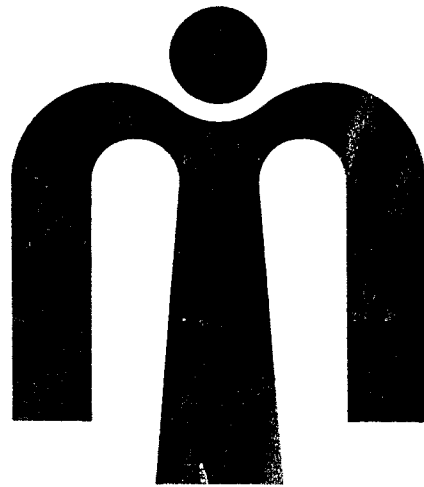


**PRODUCT CATALOG**



**MICROMATION  
INCORPORATED**

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## HERO MEMCOM BOARD

This product provides a means to develop programs for the robot using a personal computer, and expands the robot's memory with an additional 30K of RAM. A large wire-wrapping area is also available on the board for user experimentation. The board connects directly to the CPU Board address, data and control buses.

The product includes:

- \* Two 8-bit bi-directional parallel ports with handshaking lines for superfast data transfers between the robot and a computer (connects directly to our APPLE-HERO COMMUNICATOR BOARD), plus two 16-bit timers (implemented with a 6522 VIA chip).
- \* An RS232 serial port for two-way communication between the robot and any computer having an RS232 serial port (implemented with a 6850 ACIA chip).
- \* Serial communications software in an onboard EPROM (2K) which allows uploading and downloading of programs via the RS232 port.
- \* Fourteen 2K RAM chips in sockets so 2K EPROM chips may be substituted, if desired. "Memory Protect" and "RAM Supply" are used for each RAM chip so programs will not be lost when the robot enters "sleep" mode.
- \* A large (2" x 5") wire-wrap area with CPU address, data and control lines,  $\pm 5V$ , ground and others readily available.
- \* All hardware necessary to mount board on rear door of robot and to connect board to the robot's CPU board.
- \* Has memory from 4000-B7FF; B800-BFFF is used for I/O, B000-B7FF has an EPROM which can be replaced with a RAM chip.
- \* Board is driven from 3 ports on CPU card designated P406, P407, and P408 by Heathkit.
- \* All RAM chips can be replaced with EPROMS.
- \* Baud rates 150, 300, 600, 1200, 2400, 4800, 9600, and 19200.
- \* Complete instruction manual and schematics.

PRICE \$295.00

## VOICE COMMAND SYSTEM FOR HERO

The Voice Command System is a peripheral which elevates the robot to a new level of sophistication. We call this a Voice Command System (or VCS) because it not only consists of a voice recognizer, but also an advanced level machine language program for the robot which actually allows you to program robot movements by voice. We call the voice recognizer, VOREC, and the voice driven program, VOCOL (VOice COmmand Language). Highlights of these two important parts of the VCS are described below.

### VOREC

VOREC is a powerful, microprocessor controlled, speech recognition board which mounts next to and interfaces with our HERO-I MEMCOM BOARD. The recognizer has the following principal features and specifications:

- \* Speaker-dependent recognizer with nearly instantaneous word recognition rates.
- \* Recognition accuracy about 98%.
- \* Vocabulary of up to 256 words (stored as 16 word groups with 16 words in each group for greater recognition accuracy).
- \* 16K of onboard static RAM of which 14K is battery backed to retain recognized word parameters during power down.
- \* RS232 port for receiving commands from, and reporting status and words recognized to, the host (HERO).
- \* Highly sensitive audio input circuitry requires only an external speaker for audio input rather than a microphone. (This allows robot to receive commands from up to 15 feet away.)
- \* Utilizes state-of-the art high speed (HC) CMOS chips and the new CMOS 65C02 microprocessor for ultra low power consumption. Complete board consumes an incredibly low 45 ma while active and 1 ma when inactive.
- \* Speech recognition is accomplished by a software algorithm contained in a 2K EPROM. (Future product updates will require only replacement of this EPROM.)
- \* Complete instructions and installation manual.

- Continued -

## VOCOL

This software is even more amazing than the voice recognition hardware. VOCOL is like a high level language for the robot (such as BASIC) which supports both deferred and immediate execution modes. The only difference is in BASIC you "write it", and in VOCOL you "speak it". The software is provided on an EPROM which plugs into a memory socket on our HERO-I MEMCOM BOARD. VOCOL has the following principal features:

- \* When first run, the robot talks you through a voice training session in which you are asked to repeat words in his command vocabulary three (3) times.
- \* Following this training session, you can then literally talk in a program of movements for later execution, or command immediate movement by voice.
- \* The robot prompts you for a command and when received, repeats it back to you for verification. If verified and if in immediate execution mode, the robot will execute the movement. If in deferred execution mode, the robot proceeds to write a machine language program in his memory for later execution. When your program of movements is complete, you signify this with a "STOP" command. A "GO" command will then cause the robot to execute the program it wrote in memory. After execution, the robot returns to the command mode.

The Voice Command System manual contains a complete description of how to use the VOREC board under program control from HERO. The 6808 Source Code for VOCOL is available on an APPLE DOS 3.3 disk at additional cost. This source code is compatible with the SC-6800 CROSS ASSEMBLER.

TOTAL SYSTEM PRICE \$595.00

VOCOL Source Code \$55.00 (not sold separately)

## APPLE-HERO COMMUNICATOR

This product provides the hardware and software necessary to implement two-way, high speed parallel communications between an APPLE computer and a HERO-1 robot equipped with our HERO MEMCOM BOARD.

This product includes:

- \* A peripheral card for an APPLE that contains two 8-bit parallel ports with handshaking lines, and two 16-bit timers (implemented with a 6522 VIA chip).
- \* A ribbon cable (about 5' long) with connectors for connecting the parallel ports on the card to those on the HERO MEMCOM BOARD.
- \* Data transfer software for the COMMUNICATOR board and for the HERO MEMCOM BOARD burned into 2716 EPROMs. These programs provide ultra fast, two-way communication for rapid uploading and downloading of programs.
- \* A disk containing heavily commented 6808 and 6502 source codes for the communications software. These source codes are compatible with the S-C MACRO ASSEMBLER and the S-C 6800 CROSS ASSEMBLER available for the APPLE from the S-C SOFTWARE CORPORATION or MICROMATION, Incorporated. Programs developed using the S-C 6800 CROSS ASSEMBLER can be immediately downloaded and run on the robot using this product and our HERO MEMCOM BOARD.

PRICE \$159.00

## STORYTELLER

This is an Artificial Intelligence program which turns HERO into a teller of galactic tales. This program, based on the works of John Krutch, lets the robot speak self-generated, random sentences concerning his space voyages. The spoken sentences are grammatically correct and amusing. After listening to HERO for awhile, one gets the impression that the robot has just returned from heavy space combat with alien invaders and is in a dazed state.

The program (machine code only) comes in a ready-to-run cassette tape. The 6808 source code (S-C MACRO ASSEMBLER/6800 CROSS ASSEMBLER) is also available on an APPLE II+ (DOS 3.3 compatible) disk. This heavily commented source code provides a great deal of insight into artificial intelligence and techniques for its implementation in machine language.

PRICE: TAPE (machine code) \$15.00  
PRICE: DISK (source code) \$25.00

## POET

This is an Artificial Intelligence program similar to Storyteller except one step further. This program, based on the works of John Krutch, lets the robot speak self-generated, random poems on an endless list of subjects. After HERO speaks a 3 line Haiku poem and likes it enough, he will make a comment about it or do some meaningful body movement.

The program (machine code only) comes in a ready to run cassette tape. The 6808 source code (S-C MACRO ASSEMBLER/6800 CROSS ASSEMBLER) is also available on an APPLE II+ (DOS 3.3 compatible) disk. This heavily commented source code provides a great deal of insight into artificial intelligence and techniques for its implementation in machine language.

PRICE: TAPE (machine code) \$20.00  
PRICE: DISK (source code) \$30.00

### ROBOT LANGUAGE MACRO

The HEATHKIT robot possesses a unique interpreter in its monitor which allows processing of pseudo-opcodes called Robot Language. Our product consists of Macros which allow the S-C MACRO ASSEMBLER and the 6800 S-C CROSS ASSEMBLER owner to develop source code on his APPLE using the Robot Language mnemonics directly. This program when combined with the APPLE-HERO COMMUNICATOR and HERO MEMCOM BOARD probably provides the fastest means for programming a personal robot in existence today. After you've used this equipment, you'll be able to develop long complicated programs for HERO that simply would take too long to develop practically with the hand coding system currently available on this robot.

PRICE \$35.00

### 6808 CROSS DISASSEMBLER

Disassembles 6808 machine code resident in the APPLE's memory onto the screen in a format similar to that used by the APPLE's monitor, and optionally into text files which can later be EXEC'ed into the S-C CROSS ASSEMBLER. Machine code located in HERO's memory can be transferred to the APPLE's memory for disassembly using the APPLE-HERO COMMUNICATOR. This product allows the user to study programming techniques used in the HERO monitor and programs developed for HERO by others.

PRICE: Program Only \$35.00      Program and Source Code \$55.00

### THE S-C MACRO ASSEMBLER

The S-C Software MACRO ASSEMBLER has 29 commands including a convenient EDIT command with 15 subcommands. Twenty assembler directories (Pseudo-Ops) provide all features necessary for professional software development. Operates in any APPLE II, APPLE II+, or APPLE IIe with at least 32K RAM and one disk drive. (In our opinion, this Assembler is the best one available for the APPLE).

PRICE \$80.00

### S-C 6800 CROSS ASSEMBLER

The S-C 6800 CROSS ASSEMBLER is identical in operation to the S-C MACRO ASSEMBLER; only the language assembled is different. It is sold as an up-graded package to the S-C MACRO ASSEMBLER. (This makes the S-C ASSEMBLER even greater. You can't beat this price anywhere).

PRICE \$32.50