

**NOW AVAILABLE IN KITS**

# GEMINI GEMINI II

THE AUTONOMOUS ROBOT

PRODUCT CATALOG



arctec systems

## WELCOME TO THE WORLD OF ROBOTICS!

Whether you are an experienced hobbyist or a newcomer, you are sure to enjoy the many hours of education and excitement built into every GEMINI Component Kit.

### BUY WITH CONFIDENCE

Personal robotics is a young industry with a lot to offer. We will keep up with the new technologies and make them available to you when they are practical. As part of an international corporation with a 15 year history, we plan on being around tomorrow to serve you.

### WE SUPPORT YOU

With all of our products we include detailed information to assist you in the assembly, and support from a member of the GEMINI TEAM to answer any questions that may arise.

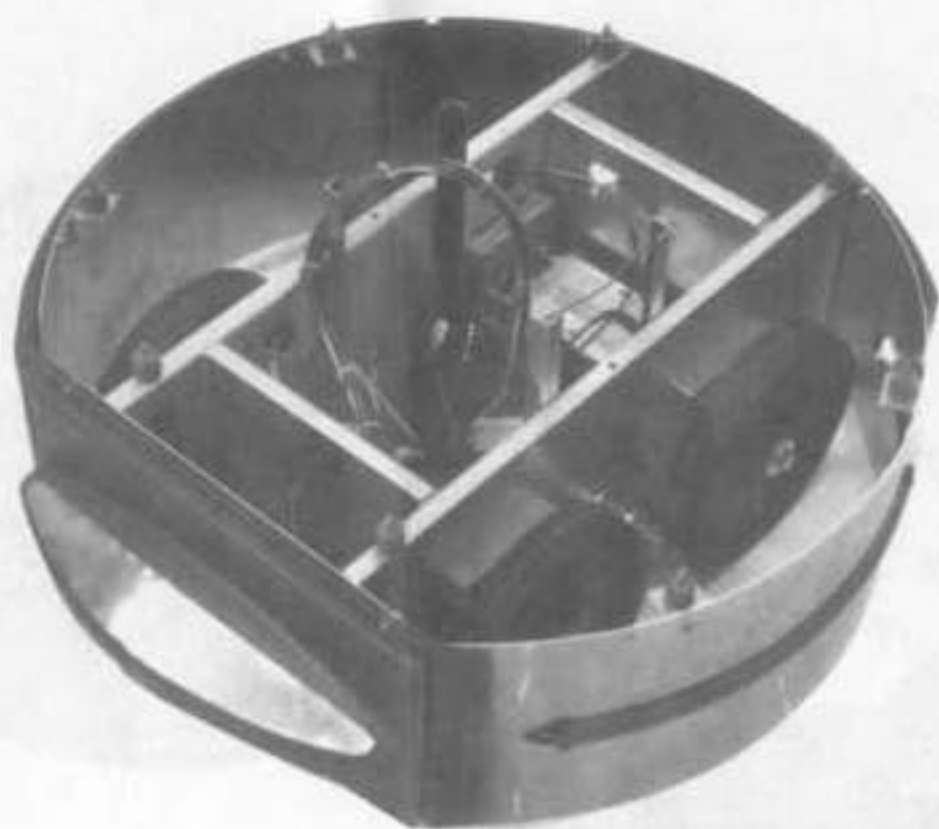
### OUR GOAL

It is quite simple, but we need your help. Our goal is to make the dream of domestic robots happen in our lifetime. You can help us achieve it by keeping us informed of your needs and we can help you achieve your personal goals in this exciting field by making Quality Components at Reasonable Prices with Good Customer Service.

### THE GEMINI TEAM

*Vicki Skelsky*  
*Karen Frankenthal*  
*Dusan Janyman*  
*Michael J. F.*  
*John R. ...*  
*Jane Marsh*

*Debra A. ...*  
*Eddie Andujar*  
*Carol S. Lewis*  
*Ellen*  
*K. Skelsky*  
*J. W. ...*



#### DRIVE SYSTEM

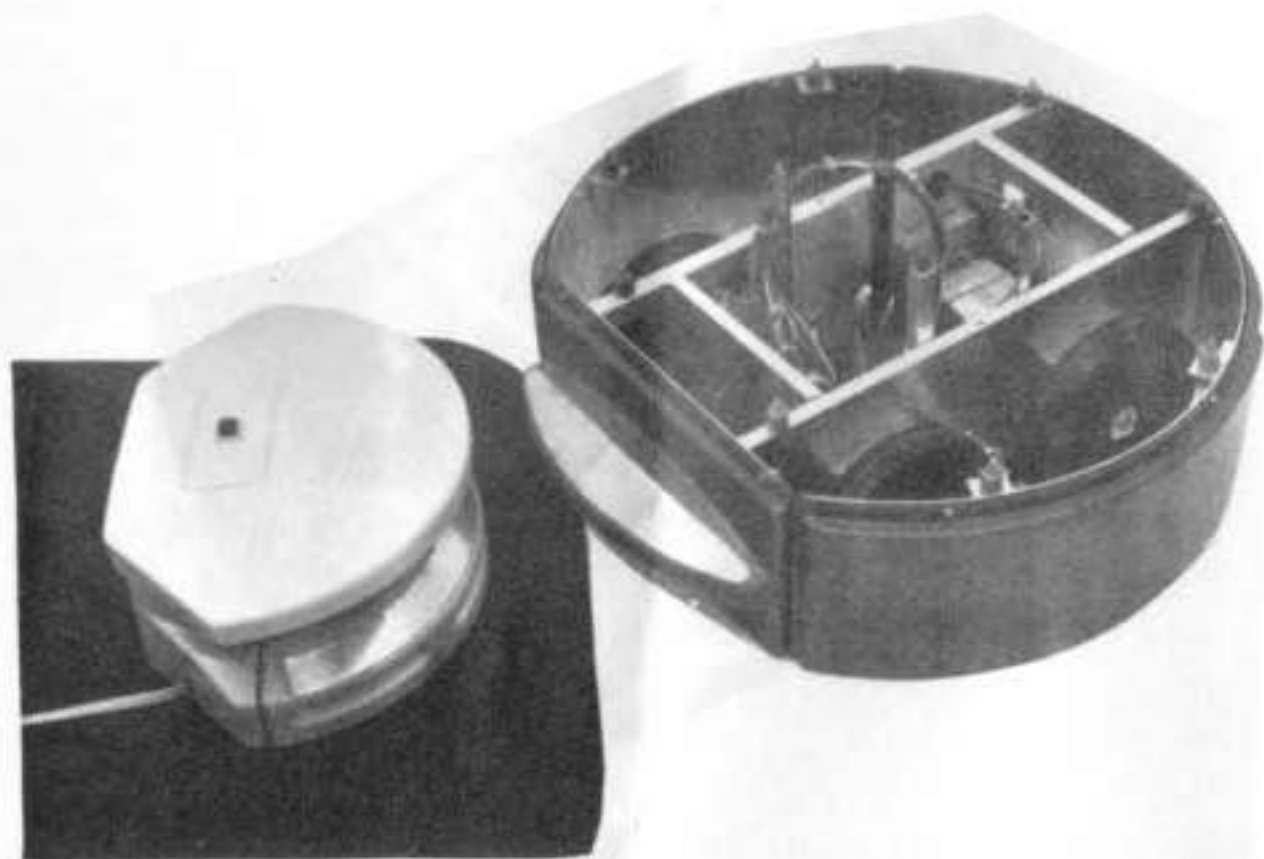
- \* All Metal Construction
- \* 2 Permanent Magnet DC Motors
- \* 20" Diameter
- \* 100 Pound Payload
- \* 4 Ribbon Bumper Switches with Bumpers

This rugged system consists of a belt driven 4-wheel drive capable of traversing most terrains found in a home or business environment, including inclines of up to 25 degrees. The drive contains two (2) worm gear driven DC motors with slotted disks and IR feedback sensors for control of speed and distance traveled. It can rotate 360 degrees within its diameter and will not harm floor surfaces.

Order :	K101	Kit	\$595
	A101	A&T	\$895

Note: A&T - Assembled and Tested

All prices are FOB Columbia, Md. Prices are effective July 13, 1985 and subject to change without notice.

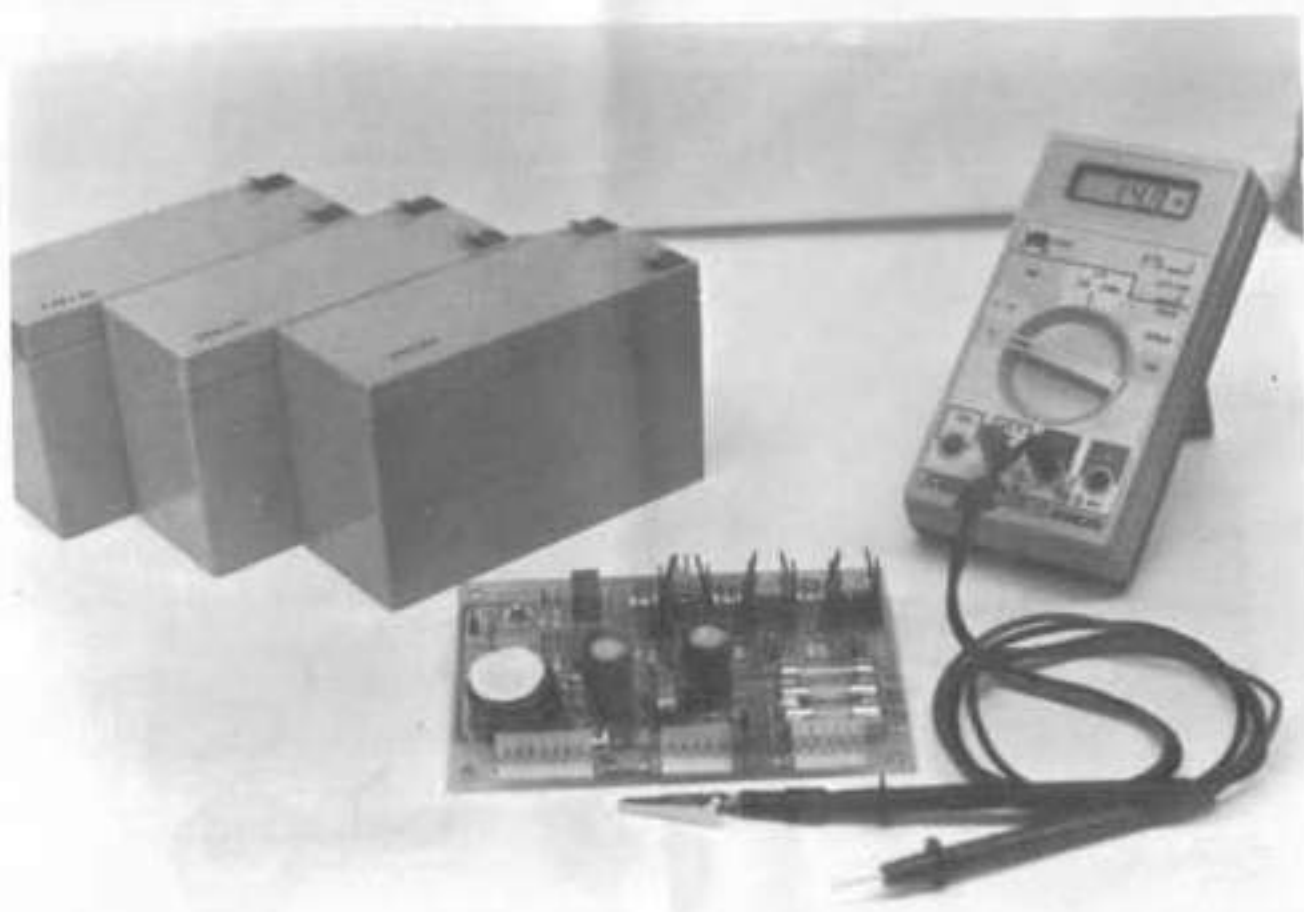


### SELF-CHARGING STATION

- \* 120 Degrees of Charging Surface
- \* 110 Volt, 60 Hz Input
- \* 18-22 Volt DC Output; Full Wave Rectified and Filtered
- \* Protective 2 Amp Slow-Blow Fuse

This ingenious "nest" allows the robot to charge its batteries without human assistance. It floats on 4 spring loaded legs and has wedge shaped female contact plates which facilitates a near perfect docking every time.

Order : K102 Kit \$95  
A102 A&T \$159

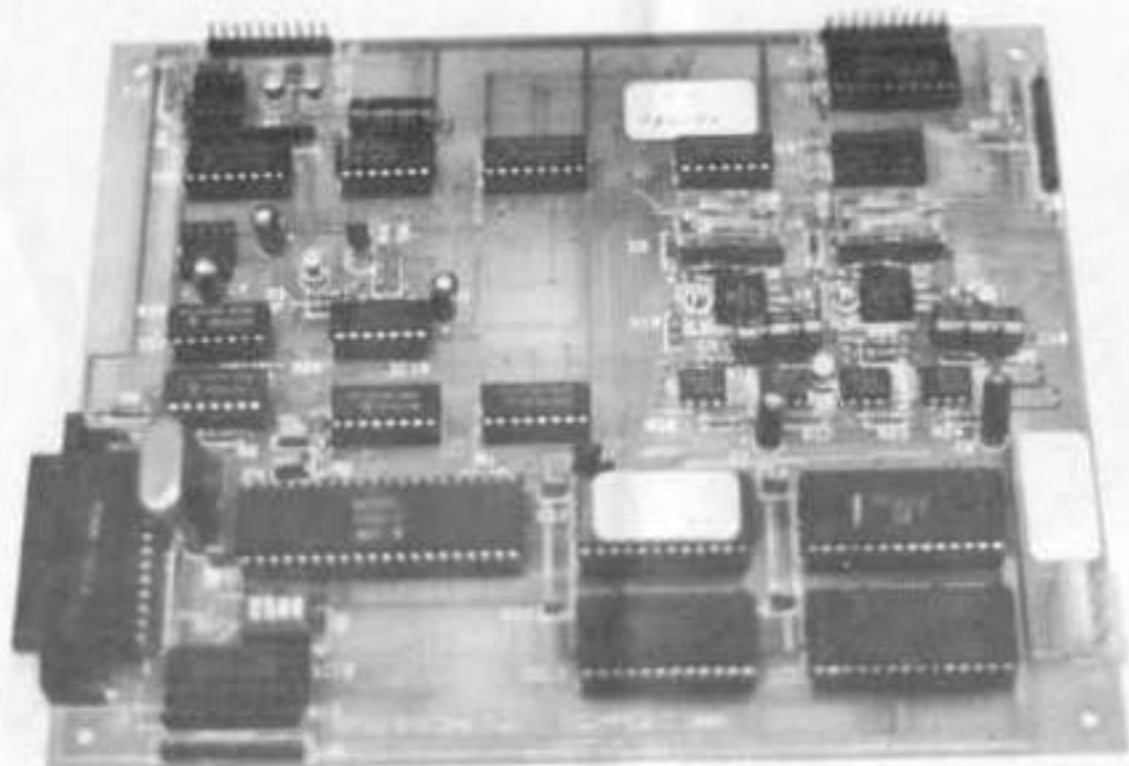


### POWER DISTRIBUTION BOARD

- \* +12V to +5V Switching Regulator
- \* 3 Battery Charging Circuits
- \* On-charge Detection Circuitry
- \* Motor/Logic Ground Connect/Disconnect Circuitry
- \* 3 Protective Fuses

This multifunction board provides power at up to 2 amps, conserves battery energy, and also powers your experimental or peripheral devices. The ground connect/disconnect circuitry offers simultaneous battery recharging or isolation of motor batteries from logic battery during operation. Each battery circuit has a 2 amp slow blow fuse to minimize possible damage to electronic components.

Order : K103 KIT \$49.95  
A103 A&T \$69.95

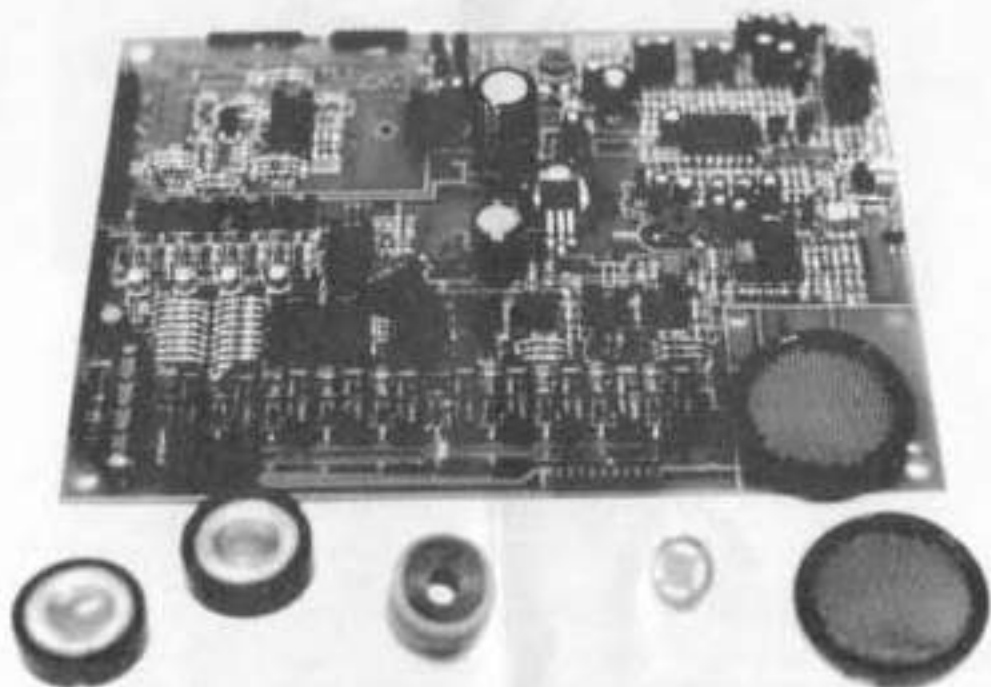


### PROPULSION CONTROL COMPUTER

- \* All CMOS
- \* Rockwell 65C02 Microprocessor
- \* 2 RCA CDP1878 16 Bit Dual Counter/Timers
- \* 2K Static RAM
- \* 2K ROM (Expandable to 4K)
- \* ROM Based Operating System
- \* 2 Serial Ports
- \* Joystick Input Port

This computer features an enhanced version of the 65C02. It uses the counter/timer chips for pulse width modulation speed control and distance measurements. The ROM based operating system has a command oriented structure and controls the Drive System speed and distance with commands sent over a CMOS level serial port from the main computer. In addition, for interfacing and experimentation with other systems, an RS232C port is provided. Expansion of the operating system is made easier with our ROM Emulator board (page 15). All IC's are socketed and opto-couplers are used to interface logic circuitry with motor drive circuitry.

Order :	K104	KIT	\$195.00
	A104	A&T	\$249.95



### SSS BOARD

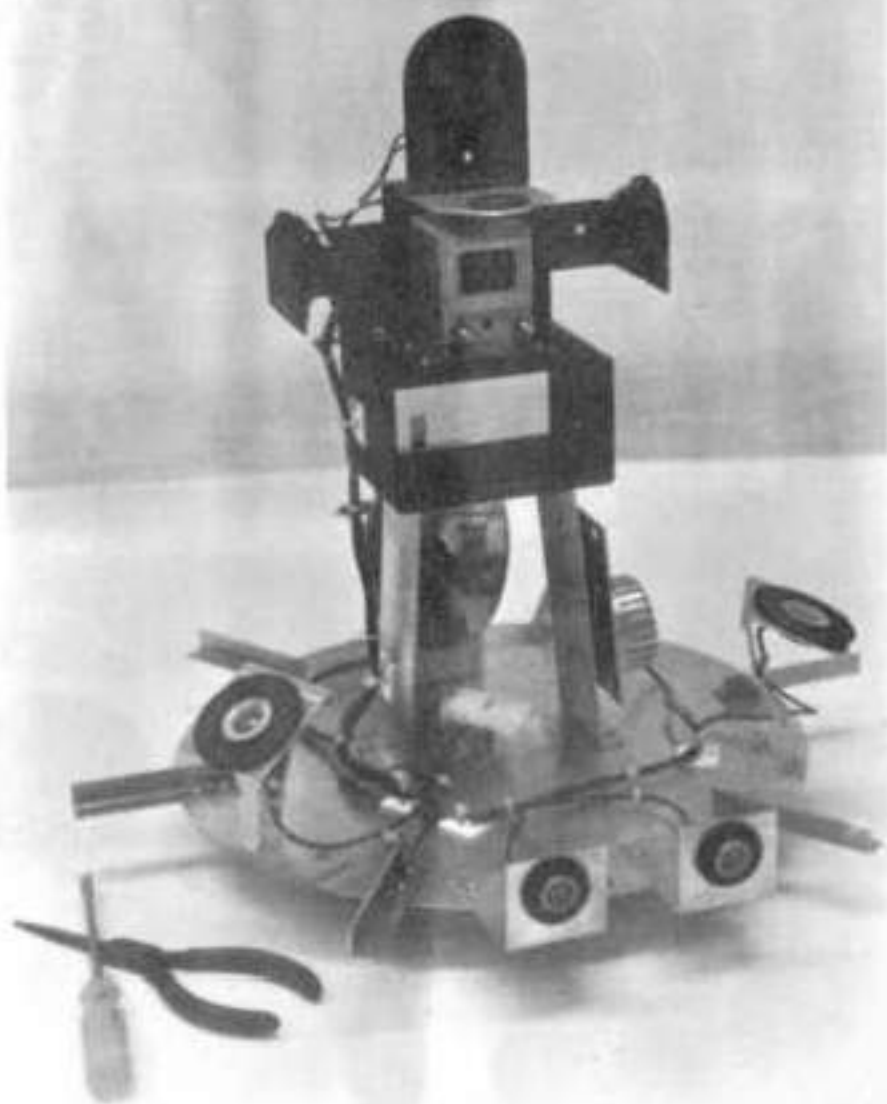
A complete signal conditioning board for Gemini's analog environmental sensors. These include:

- \* Battery Voltage
- \* Sound Level
- \* Light Level
- \* Temperature
- \* Barometric Pressure

It also contains a Polaroid sonar Ranging Module, relays for multiplexing 9 sonar transducers (room for 10), head stepper motor drivers and opto isolators. Temperature sensor included.

Order : K105 KIT \$149.95  
          A105 A&T \$259.95





#### HEAD ASSEMBLY

- \* 3 Polaroid Sonar Transducers
- \* Lightweight Aluminum Construction
- \* 359 Degrees of Rotation
- \* 2 IR Receivers
- \* Ultrasonic Motion Detector
- \* Light Sensor
- \* 3 Microphones

This rotatable head will conserve power by determining the direction the robot will turn, prior to moving its body. It is both lightweight and durable for long use. It is approximately 15" tall and 12" in diameter at the base. The sensors are used in the navigation and security software and for experimentation. Data from each is available through the main computer's enhanced BASIC (page 12).

Order : K106 KIT \$249.95  
A106 A&T \$349.95





### TORSO ASSEMBLY

This assembly contains all the mechanical components required to construct a lightweight, sturdy, aluminum inner structure for your robot. It features:

- \* Easy mounting of boards
- \* Accessibility of computers for experiments
- \* Derrick shape to allow turning in place
- \* 5 Polaroid Sonar Transducers
- \* 6 Function and Reset Keys

The torso is approximately 26" tall for a real life robot and has a 19" diameter at the base for stability. Mounting brackets, cable harnesses and miscellaneous hardware are included.

Order :	K107	KIT	\$495
	A107	A&T	\$995



#### MAIN COMPUTER

- \* All CMOS
- \* Rockwell 65C02 Microprocessor
- \* A Real Time Clock with Alarm and Periodic Interrupts
- \* A dual 16 Bit Counter/Timer
- \* Five CMOS Serial Ports
- \* One RS232C Serial Port
- \* Centronics style Parallel Printer Port
- \* A Dual 8 Bit, High speed Parallel Port
- \* A 16 Channel, 8 Bit Analog to Digital Converter
- \* 8K Static, Battery Backed CMOS RAM (Expandable to 56K)
- \* 24 Bit Input lines for Digital Sensing
- \* 24 Bit Output lines for Digital Control
- \* A Hardware Random Number Generator
- \* A Serial to Parallel Asynchronous Communications Interface Adapter (for optional Keyboard)
- \* Four APPLE (tm) style Expansion Slots

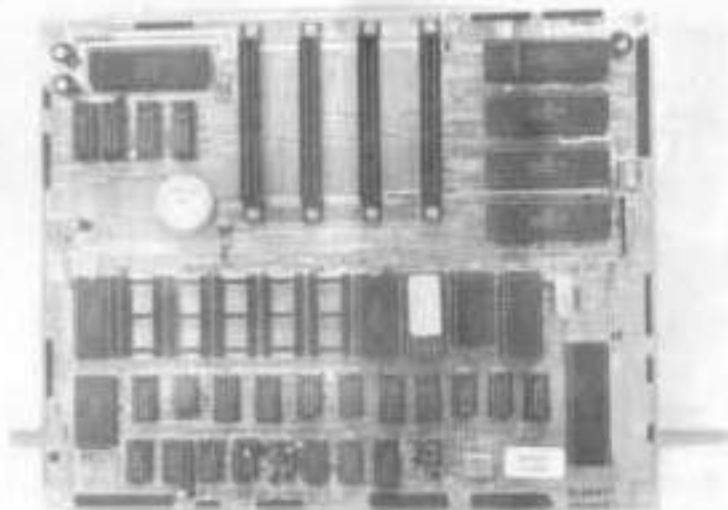
All IC's are socketed. The CPU address, data and control lines are fully buffered. The CPU can operate at 1 or 2 MHz and the speed can be changed under software control. The entire board draws less than 90 ma when running at 2 MHz.

The 7K on board system monitor contains numerous routines for controlling hardware and program debugging. A command language is provided for disassembling code, displaying memory contents, altering RAM memory contents, moving memory, verifying memory, running programs, reading and setting the real time clock and much more. Driver routines for all serial and parallel ports are built in. There are also built-in routines for controlling the head stepper motor, analog to digital conversion, sonar ranging, character display on the LCD and keyboard or RS232C character input. All I/O and interrupts are vectored. There is also a powerful 32 bit, high speed, fractional, integer math pack with trigonometric functions built in. In addition, an on board 8K CMOS ROM contains routines which allow GEMINI to find its charger and navigate from room to room.

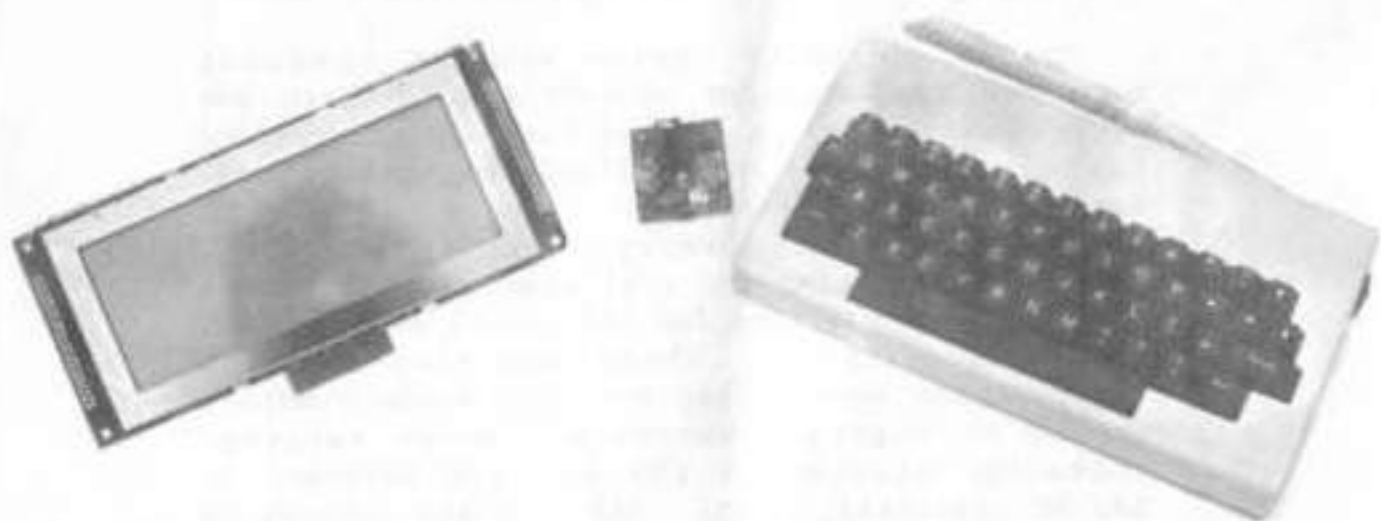
Order :	K108	KIT	\$395
	A108	A&T	\$495

Add the LCD, Keyboard and Manuals for a complete low power robot computer system.

Order :	K003	KIT	\$829
	A003	A&T	\$995



## I/O DEVICES



### KEYBOARD WITH IR LINK

- \* HD6303 CMOS Microcomputer
- \* 2K CMOS ROM
- \* IR Circuitry
- \* Nicad Battery

This full function QWERTY keyboard has a mind of its own. An Hitachi HD6303 microcomputer with a ROM based operating system handles the I/O. Rechargeable nicad batteries support the IR link or a telephone type chord can be connected to the robot or main computer.

Order : K109 KIT \$195  
          A109 A&T \$259

### LIQUID CRYSTAL DISPLAY

- \* Low Power
- \* 40 Character by 8 Line Display
- \* Adjustable Viewing Angle

The LCD is capable of displaying 96 ASCII characters and 64 Japanese Katakana characters. The Monitor contains routines to manipulate the characters on the screen.

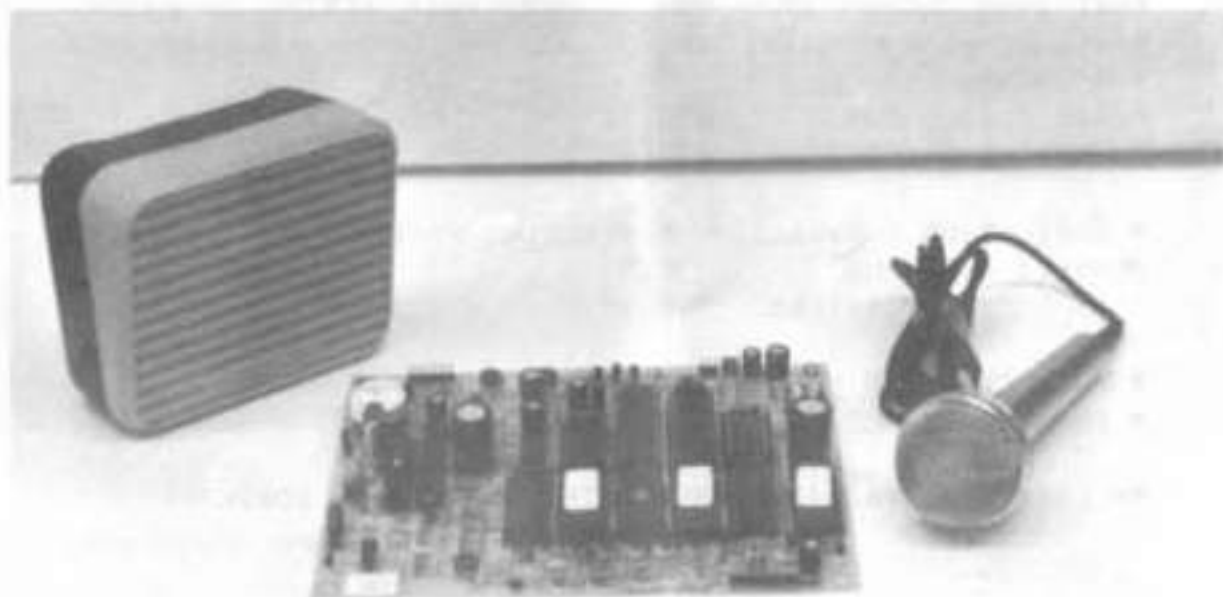
Order : A119 A&T \$195

## VOICE I/O AND SOUND COMPUTER

- \* Rockwell 65C02 Microprocessor
- \* 256 Word Voice Recognition
- \* SSI263 Speech Chip
- \* AY-3-8913 3 Channel Sound Chip
- \* 2 Serial Ports
- \* 32K ROM Operating System
- \* 16K Static Battery Backed RAM

The 32K operating system provides for four separate operating modes: (1) Speech Recognition; (2) Speech Synthesis; (3) Sound/Music Generation; and (4) Self Test. The Speech Recognition mode provides recognition of up to 256 words or phrases with up to 98% recognition accuracy. It also contains a unique dynamic learning capability which actually allows the recognition to improve with use! The Speech Synthesis function provides for Text-to-Speech conversion and 5 different voices. Simply type in what you want to hear and you will get about a 95% correct pronunciation score on most commonly used words. The Sound Generation mode provides numerous built-in canned sounds and over 15 minutes of beautiful songs, many of which have accompanying vocals. A CMOS serial port is used for main CPU communications and an RS232C port can be hooked up to any personal computer.

Order :	K110	KIT	\$295.95
	A110	A&T	\$449.95



Note: A&T - Assembled and Tested

## OPTIONAL FIRMWARE AND LISTINGS

### \* LIVING MODE OPERATING SYSTEM (LMOS)

The GEMINI Robot Operating System includes System Self-Check, Demo and more.

Order : A142 ROM \$39.95  
A150 LISTING \$39.95

### \* CATALOG

All of GEMINI's messages are stored here for access by other software.

Order : A147 ROM \$19.95

### \* SCHEDULER

This is a menu driven, user friendly, timed-task programming option. Simply answer the questions the robot asks, and at the specified time GEMINI will perform.

Order : A143 ROM \$59.95  
A151 LISTING \$39.95

### \* BASIC

This is a scientific, floating point Basic Language which includes commands to access the robot's many functions like SPEAK (message), MOVETO (room), HOME (charger), and more.

Order : A144 ROM \$149.95

### \* VOCOL

Allows up to three users to command the robot by voice. Both immediate and deferred execution.

Order : A146 ROM \$79.95  
A153 LISTING \$39.95

### \* SECURITY

Feel more secure when you're away with GEMINI on guard. Preventive monitoring and/or action taken if intruders are found.

Order : A148 ROM \$59.95  
A154 LISTING \$39.95

### \* NAVIGATION - Exclusive Navigation software.

Order : A145 ROM \$59.95  
A152 LISTING \$39.95

\* MAIN COMPUTER MONITOR LISTING - A149 \$39.95

\* PROPULSION MONITOR LISTING - A155 \$19.95

\*\* LISTINGS AVAILABLE ONLY WITH PURCHASE OF SOFTWARE

### ROM/RAM EXPANSION CARD

Contains sockets for seven (7) 8K ROM or RAM chips. Required for BASIC, SCHEDULER, SECURITY or LMOS firmware.

Order : K112 KIT \$29.95  
A112 A&T \$39.95

## IR NAVIGATION PERIPHERALS

### ROOM BEACONS

These devices are used by the robot to determine which room it is in. The beacons produce a 100% modulated square wave of IR radiation at about 40 KHz. The receiver is located in the robot's head assembly. The period varies and is selectable by a 4 position dip switch. This allows the robot to have access to up to 15 different areas.

Order : K111 KIT \$29.95  
A111 A&T \$49.95

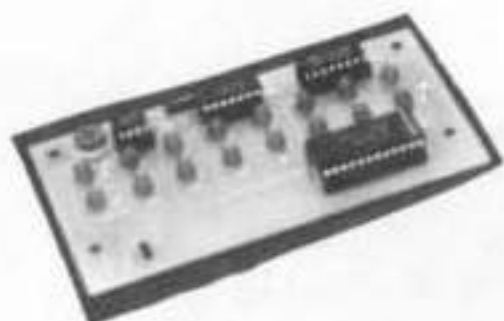
### DOOR EDGE DETECTORS

To aid the robot in locating doors, a semi-circular block covered with reflective tape capable of reflecting infrared radiation is placed near each door. An IR transceiver located in the robot's head assembly then uses it for positioning prior to passing through the doorway.

Order : A120 A&T (only) \$2.50

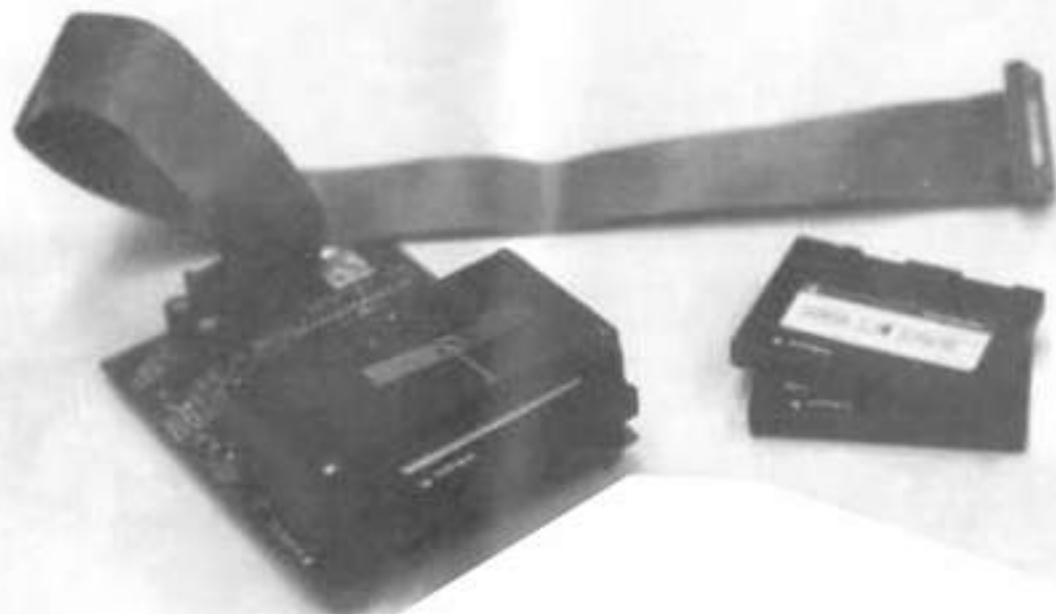






### GEMINI ACCESSORIES

Life Lites - GEMINI's heartbeat! (Pictured)	K113 \$49.95 A113 \$69.95
Barometer - Mounts on SSS Board. (Pictured)	K114 \$49.95 A114 \$79.95
Charger Static Mat - Allows for safe static discharge before recharging.	A116 \$19.95
Smoke Detector - Detects visible and non-visible particles in the air.	A121 \$24.95
IR Motion Sensor - Mounts in head assembly. Detects both Heat and Motion.	A122 \$119.95
Wafer Tape Drive - Convenient mass storage of up to 128K bytes on this convenient Entrepo digital drive. Controller included.	A123 \$209.95



## GEMINI PERIPHERALS AND SOFTWARE

### Apple/Gemini Communicator

- \* High Speed Data Transfer
- \* Interfaces with Dual Parallel Port on GEMINI
- \* Upload/Download Software on 2K Eprom

Order : (Apple)	K201	KIT	\$89.95
	A201	A&T	\$159.95
(IBM)	K202	KIT	soon
	A202	A&T	soon

### Apple ROM Emulator

This card provides a very inexpensive way to bring up any new microcomputer. Cross assemblers for almost any microprocessor are available for the Apple and these can be used to assemble code for transfer into the 2K ROM Emulation RAM (\$C800-\$CFFF space on Apple) on the card. A cable (provided) runs from the card to the ROM on the target computer. Tips on how to bring up a computer using this card are provided.

Order : K200	KIT	\$164.95
	A200	A&T \$295.00

### S-C Macro Assembler

6502 Macro Assembler with 29 commands, including a convenient EDIT command with 15 subcommands. Twenty (20) directories provide all features necessary for professional software development. Requires 32K RAM.

Version 1 (Apple II, II+, IIe)	A202	\$79.95
Version 2 (Supports 80 Col., IIe, IIc)	A203	\$99.95

### S-C 65C02 Cross Assembler

Supports all additional op-codes available for programming the CMOS 6502.

Version 1 (Requires A202)	A204	\$32.50
Version 2 (Requires A203)	A205	\$49.95



### GEMINI ACCESSORIES

Manuals - Includes User's Guide, Technical Reference and Circuit Diagrams.

A140 \$74.95

8K RAM Expansion - CMOS 6264LP-12

A128 \$24.95

8K ROM Expansion - CMOS 27C64

A129 \$18.95

Video Tape

A141 soon

Joystick Controller

A156 \$11.95

Wafer Tapes

A124 \$2.25

Battery - 12V, 6.5 Amp-hour Gel Cell

A115 \$22.95

Shells - Protect your Investment!

Torso Shells (5 Pieces)

A118 \$124.95

Head Shell

A117 \$34.95



## VOICE RECOGNITION PRODUCTS FOR COMPUTERS

### MICRO\*EAR

- \* 256 Word Vocabulary
- \* Speaker Dependent
- \* 98% Recognition Accuracy
- \* Recognition in Milliseconds
- \* Upload/Download Feature for More Words or People
- \* 4K ROM and 16K CMOS Battery Backed RAM
- \* RS232C Communication at Baud Rates of 110, 300 and 1200.
- \* Demo Software for Apple II and IBM PC
- \* Ear\*Dos for IBM allows voice control of most application software!

This CMOS microprocessor controlled system offers you fast, dependable operation you can count on. System includes a User's Manual and all items pictured above.

Order : K300 KIT        soon  
          A300 A&T        \$595.00

**\*\* New Product \*\*** The GEMINI VIOS Computer will be soon be available for your computer.

Micro\*Ear brochures available upon request.

## OTHER QUALITY PRODUCTS FROM ARCTEC SYSTEMS

### HERO PERIPHERALS AND SOFTWARE

#### Memcom Board

- \* Expands Memory with 30K of RAM
- \* Parallel & Serial Ports and Software

NMOS Order : A400 A&T (only) \$345.00

CMOS Order : A401 A&T (only) \$425.00

#### Voice Command System

A low power, microprocessor controlled Voice Recognition board with a Command Language for voice control of your Hero.

Order : A402 A&T (only) \$595.00

Vocol Source Code A403 \$ 55.00

#### Voice Command System with Memcom

Order : A404 A&T (only) \$920.00

#### Apple/Hero Communicator Card

- \* 2 Parallel Ports with Software for Memcom
- \* 2 16 Bit Timers
- \* Communication Software for Memcom on EPROM and LISTING.

Order : A405 A&T (only) \$159.95

Storyteller - AI program enables the robot to generate Galactic Tales.

Order : A406 (Tape) \$15.00

A407 (Apple Disk) \$25.00

Poet - AI program in which the robot generates Haiku Poetry. Order : A408 (Tape) \$20.00

A409 (Apple Disk) \$25.00

Robot Language Macro - This Macro provides the user with a very fast means of developing programs for the robot when used in conjunction with our Apple/Hero Communicator and Memcom board.

Order : A410 (Requires A413) \$35.00

### ASSEMBLERS

6808 Cross Disassembler (Apple) A411 \$35.00

A411 with Source Code A412 \$55.00

S-C Cross Assembler

(Requires A202 or A203) A413 \$32.50

Brochures available upon request.



#### SMART MOBILE BASE

##### INCLUDES:

- \* DRIVE SYSTEM
- \* SELF-CHARGING STATION
- \* POWER DISTRIBUTION BOARD
- \* PROPULSION CONTROL COMPUTER
- \* CHARGER STATIC MAT
- \* 3 GEL CELL BATTERIES
- \* MANUALS

CONTAINS ALL YOU NEED TO START YOUR ROBOT OFF  
ON A GOOD FOUNDATION.

ORDER :	K000	KIT	\$995
	A000	A&T	\$1695



**GEMINI EXPERIMENTER KIT  
GEMINEX**

**INCLUDES:**

- \* SMART MOBILE BASE plus
- \* SSS BOARD
- \* HEAD ASSEMBLY
- \* TORSO ASSEMBLY
- \* MAIN COMPUTER (8K RAM, 8K ROM)
- \* 2 ROOM BEACONS
- \* 2 DOOR EDGE REFLECTORS
- \* NAVIGATION ROM

CONTAINS ALL THE HARDWARE AND SOFTWARE NECESSARY TO BUILD A SELF-CHARGING, SELF-NAVIGATING ROBOT. IT CAN ALSO BE EXPANDED TO A FULL GEMINI. THE UNIT REQUIRES A REMOTE TERMINAL.





THE GEMINI ROBOT

INCLUDES:

- \* GEMINEX plus
- \* VIOS COMPUTER
- \* KEYBOARD WITH IR LINK
- \* LIQUID CRYSTAL DISPLAY
- \* ROM/RAM EXPANSION CARD
- \* 56K TOTAL RAM ON MAIN COMPUTER
- \* ENHANCED BASIC LANGUAGE
- \* SCHEDULER
- \* LMOS
- \* CATALOG
- \* VOCOL
- \* SMOKE DETECTOR
- \* PROTECTIVE TORSO AND HEAD SHELLS

THIS KIT CONTAINS ALL THE HARDWARE AND SOFTWARE  
NECESSARY TO BUILD A FULLY FUNCTIONAL GEMINI.

ORDER : K002 KIT \$3595  
A002 A&T \$6995

