

HERO-GRAM

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NEWSLETTER OF THE HERO RESOURCE EXCHANGE

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10802 Condrey Ridge Court
Richmond, Virginia 23236

<<< LETTERS RECEIVED >>>

Thomas Phillips, 1633 Commonwealth Ave., West Newton, Mass. 02165 is half finished with a program called ASTRO which will have HERO point to any object in the sky given RA & Declination.

Ted Poulos, 18 Cushing Road, Brookline, Mass 02146 has interfaced his HERO to the telephone line and a BSR Control System so that he can control any of his house lights and appliances via a phone call and a touch-tone code.

Lee Hooton, 3076 West 8565 South, Salt Lake City, Utah 84084 (801) 562-9050 has started a Robot computer bulletin board. HERO Resource Exchange members can share HERO ideas using this service without charge (other than the cost of the phone call). The board phone number which automatically adjusts for the baud rate of your modem is (801) 561-9500.

<<< PUBLICATIONS >>>

ROBOT READER, P.O. Box 3243, El Paso, Texas 79923 is a "networking publication for all those people interested in personal robotics", says Editor Gregory Glynn. Subscriptions are \$18 for one year (12 issues) in the U.S.

<<< HERO PROGRAM IDEAS >>>

Sometimes the hardest thing about programming this robot is coming up with an idea of what to have the robot do. Here are a few ideas that might make good programs. If you write a program to do one of these, please share it with all of us.

HERO PLAYS A GAME: Shop around in your local toy store to see if there is a simple game that HERO can participate in by using his arm to move an object, speak a random number, etc.---**HERO THE PHOTOGRAPHER:** Fit the robot's gripper with one of those simple one button cameras so that the gripper can trigger it. Have HERO wander around at a party and take pictures randomly by having the motion detector triggered. Later when you process the pictures it should be fun to see what the robot decided was a good shot. ---**HERO'S SLIDE SHOW:** Give the robot the remote control for the slide projector and program him to Narrate a series of slides. You might need to hard-wire a relay of some kind to the experimenters port to actuate the projector. ---**HERO CALENDAR:** Program HERO with all the Holidays, Birthdays, Anniversaries, Vacations, etc. so that when you start the morning by passing the motion detector, HERO will examine the real-time clock to see if today is an important day. If so, the robot can announce it.---**HERO THE ASTROLOGER:** The robot stands announcing for you to enter your date of birth on the keyboard. Example: "Enter Month"...04..."Thank You--Enter Day"...Etc. Next the robot will go to a random file to speak a fortune telling for the day, "Today you will have romance!"..etc. HERO could also read a palm by asking the subject to hold out their hand and have the gripper close about it. This might even be a money maker at Fund raising, Carnivals, etc.---**HERO the Weatherman:**This is a hardware project where you fit HERO with an A to D converter, a Thermometer, etc. If you make some kind of sensor to be interrupted by the wind spinning a device, it would be possible for the experimenters port to time the interruptions and announce the wind speed. HERO could be rolled outside for science demonstrations and even give a verbal weather forecast.

HERO SPEECH DEM / LAWS BY ISAAC ASIMOV
Coded By Bradford R. Howland for HERO Speech
750 Hope Avenue
Waterloo, IA 50703

THE THREE LAWS OF ROBOTICS

38 32 23 03 79 6B 7C 69 03 18 3D 1F 03
32 23 0F 03 6B 75 77 4E 55 63 6A 4B 59
5F 1F 1F 3E 3E

1) A ROBOT MAY NOT INJURE A HUMAN BEING, OR, THROUGH INACTION,
ALLOW A HUMAN BEING TO COME TO HARM

06 21 29 03 6B 75 77 4E 55 63 6A 03 0C 06 09 29 03 0D 15 23 2A
03 4B 49 4D 5E 5A 72 31 2B 03 06 21 29 03 5B 62 76 77 77 2F 00
0D 03 4E 7C 69 0B 09 0D 3E 34 34 2B 3E 79 6B 76 77 03 0B 09 0D
6F 40 59 6A 11 23 0D 03 7D 58 18 35 37 03 06 21 29 03 5B 62 76
77 77 2F 00 0D 03 4E 7C 69 0B 09 0D 03 2A 37 37 03 19 32 23 0C
03 2A 37 37 03 5B 55 6B 4C 03 3E 3E

2) A ROBOT MUST OBEY THE ORDERS GIVEN IT BY HUMAN BEINGS EXCEPT
WHERE SUCH ORDERS WOULD CONFLICT WITH THE FIRST LAW.

06 21 29 03 6B 75 77 4E 55 63 6A 03 4C 72 71 69 03 35 4E 46 61
69 69 03 38 32 23 03 34 34 2B 1E 3A 1F 03 1C 0B 09 0F 0D 0D 03
0B 09 2A 03 0E 15 00 29 03 5B 62 76 77 77 2F 00 0D 03 4E 7C 69
0B 09 0D 1F 3E 02 00 19 03 1F 1F 02 00 25 2A 03 2D 00 05 00 2B
03 1F 32 31 2A 10 03 34 34 2B 1E 3A 1F 03 2D 16 16 1E 03 19 32
0D 5D 58 63 2A 03 2D 0B 09 39 03 38 32 23 03 5D 7A 6B 5F 6A 03
18 3D 3E 3E

3) A ROBOT MUST PROTECT ITS OWN EXISTENCE AS LONG AS SUCH
PROTECTION DOES NOT CONFLICT WITH THE FIRST OR SECOND LAW.

06 21 29 03 6B 75 77 4E 55 63 6A 03 0C 32 31 2A 03 25 2B 32 6A
40 59 6A 03 0B 09 2A 1F 03 75 77 4D 03 02 00 1C 03 12 4B 49 59
2A 02 00 0D 1F 03 2F 00 12 03 18 3D 14 03 2F 00 12 03 1F 32 31
21 10 03 25 2B 32 6A 40 59 6A 11 23 0D 03 1E 32 31 07 03 0D 15
23 2A 03 19 32 0D 5D 58 63 6A 03 2D 0B 09 39 03 38 32 23 03 5D
7A 6B 5F 6A 03 34 34 2B 03 5F 42 40 59 72 4D 5E 03 18 3D 03 FF

INFRARED SENSOR FOR HERO

This issue features two contributions by Kenneth R. Hill.

The first is a modification of a relatively low-priced infrared motion sensor available from Radio Shack (#49-530). This is mounted on top of HERO and attached to the experimental board via a 20 inch length of 4-wire ribbon cable. A simple program for triggering the interrupt in HERO and the cable hookup is shown on the following page.

SONAR MAPPING FOR HERO

Also included by Mr. Hill is a sonar-mapping program that is far improved from the one included in a previous issue. With the HERO BASIC program is a listing of a Radio Shack Color computer program to use the data to display graphically the Sonar map of the room.

IRDETECT/SCW

by K. R. Hill

Experimental Board Interrupt by IR Detector, (Relocatable)

```

0900 B6 B6 LDA W $86
0902 B7 00 50 STA @ 50
0905 B6 01 LDA W $01
0907 B7 00 51 STA @ 51
090A B6 B7 LDA W $B7
090C B7 00 52 STA @ 52
090F B6 00 LDA W $00
0911 B7 00 53 STA @ 53
0914 B6 56 LDA W $56
0916 B7 00 54 STA @ 54
0919 B6 39 LDA W $39
091B B7 00 55 STA @ 55
091E B6 00 LDA W $00
0920 B7 00 56 STA @ 56
0923 B6 7E LDA W $7E
0925 B7 00 2D STA @ 002D
0928 B6 00 LDA W $00
092A B7 00 2E STA @ 002E
092D B6 50 LDA W $50
092F B7 00 2F STA @ 002F
0932 0E CLI
0933 B6 00 LDA W $00
0935 B7 00 56 STA @ 0056
0938 B6 00 56 LDA W contents 0056
093B 26 08 BNE
093D BD F6 4E JSR (REDIS)
0940 BD F7 AD JSR (OUTBYT)
0943 20 F3 BRA
0945 3F R.L.
0946 72 FB 56 SPEAK, WAIT "WAIT-SOMETHING MOVED"
0949 72 FB 9A " " "HELP(X3)-ALARM: EMERGENCY!"
094C 83 M.L.
094D 20 E4 BRA
    
```

(---> Set up 0050-0056 w interrupt routine.

(---> Interrupt vector w address of routine.

or jump to subroutine as in the next example.

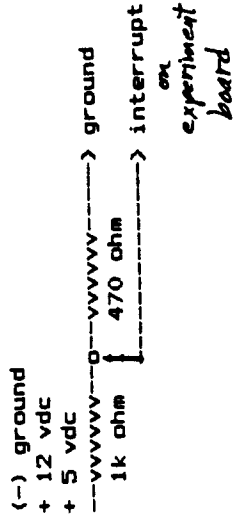
This program is used to put an RTS (39 Hex) in a buffer to enable the IR DETECT program to run without crashing. The RTS is to be replaced by a user subroutine of choice.

SETUPROM

```

AFB0 B6 3E AFB0-AFEC
AFB2 B7 01 00 LDA W $3E
AFB5 B6 3F STA @ 0100
AFB7 B7 01 01 " " 0101 etc.
AFBA B6 FF " "
AFBC B7 01 02 " "
AFBF B6 37 " "
AFC1 B7 01 20 " "
AFC4 B6 37 " "
AFC6 B7 01 21 " "
AFC9 B6 25 " "
AFCB B7 01 22 " "
AFCE B6 1F " "
AFD0 B7 01 23 " "
AFD3 B6 03 " "
AFD5 B7 01 24 " "
AFD8 B6 FF " "
AFDD B6 39 " "
AFDF B7 01 70 " "
AFE2 B6 39 " "
AFE4 B7 01 80 " "
AFE7 B6 39 " "
AFE9 B7 01 90 " "
AFEC 3A RTN TO EXEC (READY)
    
```

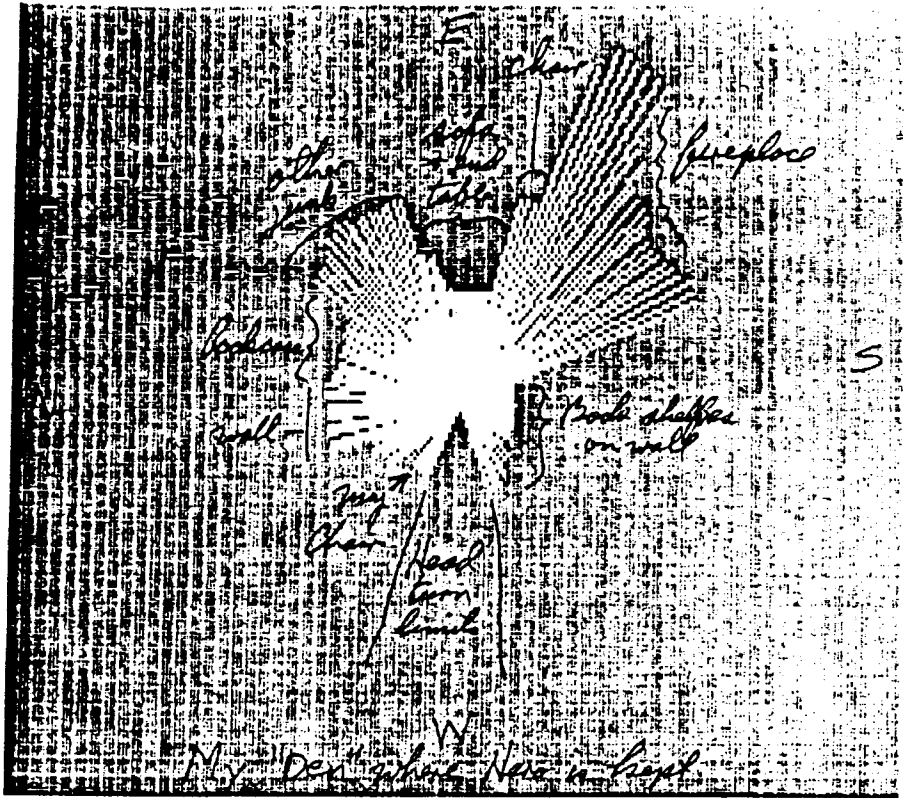
Experimental board connections



SONARMAP for HERO 1

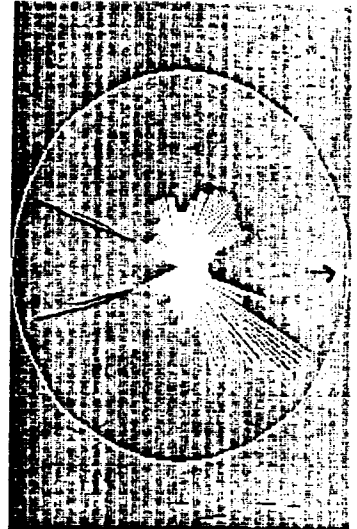
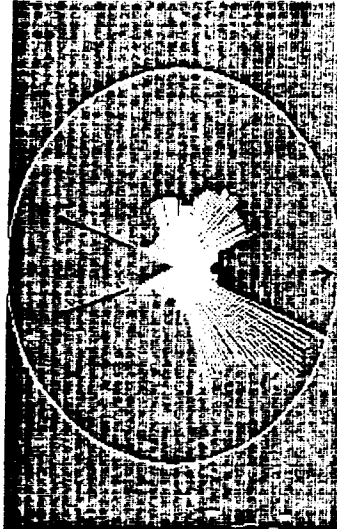
By Kenneth R. Hill
 404 Ben Oaks Drive E.
 Severna Park, Maryland 21146
 (301) 987-0466

This program collects "range" data from HERO into the computers buffer, using whatever terminal program is in operation to communicate with HERO. That data can then be used with your graphics program to print a graphic of the room as mapped by sonar. The buffer data must be saved to a data file such as "SONAR-1/DAT, SONAR-2/DAT, etc. Remember to open buffer after typing "RUN" but before hitting "enter" key.



```

5 REM SONARMAP
10 HEAD=0:X=0:N=1000
15 PRINT N;:PRINT " DATA";
20 FOR H=-160 TO 160 STEP2
30 HEAD=H:DPR"$":DPR H
34 S=SON
35 IF S<8 THEN PRINT"99";:ELSE PRINT S;
36 X=X+1:IF X=64 THEN 100
40 PRINT",,";
45 DPR ""
50 NEXT H
52 PRINT CHR(8)
60 HEAD=0
70 DPR "$"
80 END
100 N=N+1000
110 PRINT CHR(13)
120 PRINT N;:PRINT " DATA";
130 X=0:GOTO 50
    
```



SONARMAP SCREEN DISPLAY In Radio Shack Color Computer Basic (a version of Microsoft)

```

10 'SONARMAP SCREEN DISPLAY
20 'MERGE "SONAR" N / "DAT" FIRST
30 PMODE 4:CLS:PRINT 1
40 R=57.29581:CONVERTS DEGREES TO RADIAN
50 'READ SONAR DATA FROM ROBOT
60 CIRCLE(128,96),95:"RADIUS=ABOUT 20 FEET
70 POKE65495,0:RESTORE
80 X1=128:Y1=96
90 FOR A=66 TO 2 STEP-2
100 READ H
110 IF H>96 THEN H=96
120 X=128-H:Y=96
130 Y=96+H*SIN(A/R)
140 LINE(X,Y)-(X1,Y1),PSET
150 NEXT A
160 READ H
170 IF H>96 THEN H=96
180 X=128-H:Y=96
190 LINE(X,Y)-(X1,Y1),PSET
200 FOR A=2 TO 88 STEP2
210 READ H
220 IF H>96 THEN H=96
230 X=128-H:Y=96
240 Y=96+H*SIN(A/R)
250 LINE(X,Y)-(X1,Y1),PSET
260 NEXT A
270 READ H
280 IF H>96 THEN H=96
290 X=128-H:Y=96
300 LINE(X,Y)-(X1,Y1),PSET
310 FOR A=88 TO 2 STEP-2
320 READ H
330 IF H>96 THEN H=96
340 X=128-H:Y=96
350 Y=96+H*SIN(A/R)
360 LINE(X,Y)-(X1,Y1),PSET
370 NEXT A
380 READ H
390 IF H>96 THEN H=96
400 X=128-H:Y=96
410 LINE(X,Y)-(X1,Y1),PSET
420 FOR A=2 TO 66 STEP2
430 READ H
440 IF H>96 THEN H=96
450 X=128-H:Y=96
460 Y=96+H*SIN(A/R)
470 LINE(X,Y)-(X1,Y1),PSET
480 NEXT A
490 IF INKEY="" THEN 490
500 POKE65494,0:END
    
```

The Data file from HERO should be added here with a MERGE command. It starts with line number 1000 (added automatically by the SONARMAP programs. The screen display can be printed by the users own "screen dump" program.

what robots can do

BY SONNIE SAMPSON

ROMULUS — One of the most popular teachers at Romulus Elementary School this year is a pint-sized robot called "Hero."

A talkative little guy — Hero has a voice similar to that of R2-D2 of "Star Wars" fame — he is being used by remedial math and reading teacher Frank Crosby to show students what robots can do.

Twice a month, a different class of elementary students is invited in for a performance of Hero's talents. Welcoming them is a black-and-white sign that reads "The robots are coming," and filling cabinets stuffed with literature about the machines.

During a recent visit by the 26 students in Darlene Poormon's 2nd-grade class, Crosby demonstrated the robot's ability to count, sing songs, hold various items, and move along the floor measuring distance.

"I am surprised Hero can do so many things," said Missy Chambers of MacDougall, as she watched the robot pick up a pencil with its claw-like hand. "It's really neat."

As the grey-colored robot moved around the room on its three wheels with the help of a battery-powered control unit held by Crosby, several of the 6- and 7-year-old students took the opportunity to inspect it.

Stephanie Moss of Seneca Army Depot laughed after she pushed a computer button on Hero's head and the robot started singing "Old MacDonald."

"I've never seen one of these up close," said Stephanie. "It's not scary at all. It's almost human. It's

cute and I really love it." Jason Prince, of Romulus, was more interested in the robot's ability to direct light using a sensor unit that looks like an eye on the front of Hero's head.

"It's really smart," said Prince. "I'd like to have it teach some of my classes or help me with my homework."

Crosby, a former radar location and electronics specialist in the U.S. Army, assembled the 20-inch-tall robot from a kit last summer. He added other equipment and the project cost him a total of about \$2,500. He decided to bring the 25-pound Hero to school after reading numerous articles about the use of robots in industry.

"Those articles projected that by 1990 there will be 5 million jobs in robotics available in industry and that no one will be trained to do them," said Crosby, who has taught in the district for 12 years. "I believe that it's my job to expose our students to the world of robots so they can be prepared for that future."

Later this year, Crosby will begin programming Hero to play words, logic and math games with students.

"I believe that robots can be integrated into a classroom as another teaching tool for many subjects and that's what I hope to do," he said.

Several middle and high school students have already begun programming the robot to play simple games and do more difficult tasks, such as picking up a small ball and placing it in a container.

"Hero is simple to use, easy to



Meet 'Hero' JANUARY 1985-FINGER LAKES TIMES-GENEVA, N.Y.

Romulus Elementary School teacher Frank Crosby (left to right) with his teaching colleague quanta students Amy Kuryla, Kiersten Dunbar and Lisa "Hero," a robot. (Times photo by Sonnd Sampson)

manipulate and fun to program," to work on the robot. "I could said freshman Tom Waldron of never get enough of this, I come Fayette, who comes in after school every chance I get to work with it."

Hero that they lose track of time he said, "and sometimes I have force them out the door."



Good afternoon

COMPUTER technologist Larry MacNaughton proprietor of MNTL Logic on Route 6 in Hampton has introduced a new assistant in the form of Hero robot. The robot stands just inside the door and greets incoming customers, welcoming them and giving them information about the different areas of the establishment and just where MacNaughton can be found. MacNaughton says the robot can be programmed to give an statements or information desired. He will be participating in the American Business Equipment and Computer Show at the Hartford Civic Center next week he said, and he is contemplating including the Hero as an assistant. MacNaughton said he plans to put the robot to some good use in the way of routine chores. In above photo MacNaughton is handed a copy of the Chronicle by his Hero robot at the entrance to his computer technology business, MNTL Logic.

<<< SCRAPBOOK >>>

It's always a pleasure to receive photos and newspaper clippings from members. Unfortunately it's difficult to get a good copy to share with you in the newsletter. Please keep them coming. Here are a few:

Clockwise from upper left is Frank Crosby, 74 Bridge St., Seneca Falls, NY 13148 / L. MacNaughton, Box 124, Hampton, CT 06247 / Community School Cheer by HERO from Ron Campbell, PO Box 284, Arlington, SD 57212.



Oct 2, 1985
JAL News

Jan Nelson holds microphone so HERO (robot) can give a pep talk.