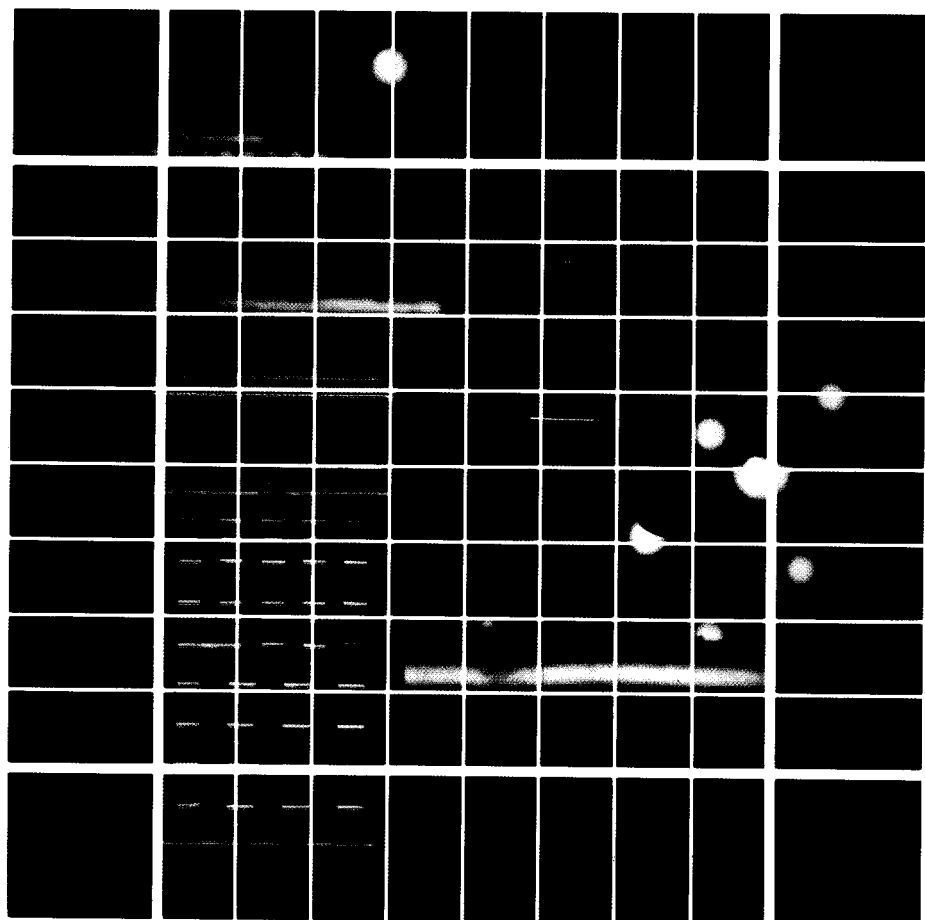# HEWLETT-PACKARD

HP·41C

GAMES PAC

NOTICE

Hewlett-Packard Company makes no express or implied warranty with regard to the keystroke procedures and program material offered or their merchantability or their fitness for any particular purpose. The keystroke procedures and program material are made available solely on an "as is" basis, and the entire risk as to their quality and performance is with the user. Should the keystroke procedures or program material prove defective, the user (and not Hewlett-Packard Company nor any other party) shall bear the entire cost of all necessary correction and all incidental or consequential damages. Hewlett-Packard Company shall not be liable for any incidental or consequential damages in connection with or arising out of the furnishing, use, or performance of the keystroke procedures or program material.

INTRODUCTION

The 7 games of Games Pac I are designed primarily to provide fun, but they are designed also to help teach principles of math and logic. Included are games of chance, skill and logic.

Each program in this Pac is represented by one program in the Application Module and a section in this manual. The manual provides a description of the program with a set of instructions for using the program and one or more example problems, each of which includes a list of the keystrokes required for its solution.

Before plugging in your Application Module, *turn your calculator off,* and be sure you understand the section Inserting and Removing Application Modules. Before using a particular program, take a few minutes to read Format of User Instructions and A Word About Program Usage.

You should first familiarize yourself with a program by running it once or twice while following the complete User Instructions in the manual. Thereafter, the program's prompting or the mnemonics on the overlays should provide the necessary instructions, including which variables are to be input, which keys are to be pressed, and which values will be output.

We hope the Games Pac will provide you with pleasure and education. If you have technical problems with this Pac, refer to your HP-41 owner's handbook for information on Hewlett-Packard Customer Support. To find this information, look in the index under "technical support" or "programming assistance."

> Note: Application modules are designed to be used in all HP-41 model calculators. The term "HP-41C" is used throughout the rest of this manual, unless otherwise specified, to refer to all HP-41 calculators.

CONTENTS

INSERTING AND REMOVING
APPLICATION MODULES

Before you insert an Application Module for the first time, familiarize yourself with the following information.

Up to four Application Modules can be plugged into the ports on the HP-41C. While plugged in, the names of all programs contained in the Module can be displayed by pressing ■ CATALOG 2.

CAUTION

Always turn the HP-41C off before inserting or removing any plug-in extension or accessories. Failure to turn the HP-41C off could damage both the calculator and the accessory.

To insert Application Modules:

1. Turn the HP-41C off! Failure to turn the calculator off could damage both the Module and the calculator.

2. Remove the port covers. Remember to save the port covers; they should be inserted into the empty ports when no extensions are inserted.

3. Insert the Application Module with the label facing downward as shown, into any port **after** the last Memory Module. For example, if you have a Memory Module inserted in port 1, you can insert an Application Module in any of ports 2, 3, or 4. (The port numbers are shown on the back of the calculator.) **Never insert an Application Module into a lower numbered port than a Memory Module.**

4. If you have additional Application Modules to insert, plug them into any port after the last Memory Module. Be sure to place port covers over unused ports.

5. Turn the calculator on and follow the instructions given in this book for the desired application functions.

To remove Application Modules:

1. Turn the HP-41C off! Failure to do so could damage both the calculator and the Module.

2. Grasp the desired Module handle and pull it out as shown.

3. Place a port cap into the empty ports.

Mixing Memory Modules and Application Modules

Any optional accessories (such as the HP 82104A Card Reader, or the HP 82143A Printer) should be treated in the same manner as Application Modules. That is, they can be plugged into any port after the last Memory Module. Also, the HP-41C should be turned off prior to insertion or removal of these extensions.

The HP-41C allows you to leave gaps in the port sequence when mixing Memory and Application Modules. For example, you can plug a Memory Module into port 1 and an Application Module into port 4, leaving ports 2 and 3 empty.

FORMAT OF USER INSTRUCTIONS

The User Instruction Form—which accompanies each program—is your guide to operating the programs in this Pac.

The form is composed of five labeled columns. Reading from left to right, the first column, labeled STEP, gives the instruction step number.

The INSTRUCTIONS column gives instructions and comments concerning the operations to be performed.

The INPUT column specifies the input data, the units of data if applicable, or the appropriate alpha response to a prompted question. Data Input keys consist of 0 to 9 and the decimal point (the numeric keys), [EEX] (enter exponent), and [CHS] (change sign).

The FUNCTION column specifies the keys to be pressed after keying in the corresponding input data.

The DISPLAY column specifies prompts and intermediate and final answers, and their units, where applicable.

Above the DISPLAY column is a box which specifies the minimum number of data storage registers necessary to execute the program. If an attempt is made to execute programs in this Pac with size set less than necessary, the message SIZE>= (n) will be displayed. Refer to pages 73 and 117 in the *Owner's Handbook*. Set size equal to or greater than the number indicated by n. After setting the size, press [R/S] to continue.

The following illustrates the User Instruction Form for Hangman.

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	Initialize the program.		CF *\'* XEQ HANG	WORD?
2	First player: Key in word or phrase containing 12 characters or less.	characters	R/S	7 LEFT (minus signs indicate letter positions)
3	Second player: guess a character Go to step 4 or 5.	any character	R/S	(past wrong guesses) (# of wrong guesses left) (word so far)
4	Repeat step 3 until word is correctly guessed or 2ⁿᵈ player is "hanged" and word or phrase is displayed. For new game press R/S and go to step 2.		R/S	(word) WORD?
5	While incomplete word is in display, press R/S to review incorrectly guessed characters.		R/S	(characters)
6	To make guess or view word guessed so far, press R/S and go to step 3.		R/S	(word so far)

Catalog

When an Application Module is plugged into a port of the HP-41C, the contents of the Module can be reviewed by pressing ▓ [CATALOG] 2 (the Extension Catalog). Executing the [CATALOG] function lists the name of each program or function in the Module, as well as functions of any other extensions which might be plugged in.

Overlays

Overlays have been included for some of the programs in this Pac. To run the program, choose the appropriate overlay, and place it on the calculator. The mnemonics on the overlay are provided to help you run the program. The program's name is given vertically on the left side. When the calculator is in USER mode, a blue mnemonic identifies the key directly above it.

ALPHA and USER Mode Notation

This manual uses a special notation to signify ALPHA mode. Whenever a statement on the User Instruction Form is printed in gold, the [ALPHA] key must be pressed before the statement can be keyed in. After the statement is input, press [ALPHA] again to return the calculator to its normal operating mode, or to begin program execution. For example, [XEQ] HANG means press the following keys: [XEQ] [ALPHA] HANG [ALPHA] .

When the calculator is in USER mode, this manual will use the symbols [A] – [J] and ▓ [A] – ▓ [E] to refer to the reassigned keys in the top two rows. These key designations will appear on the User Instruction Form and in the keystroke solutions to sample problems.

Optional HP 82143A Printer

When the optional printer is plugged into the HP-41C along with the Games Application Module, all results will be printed automatically. You may also want to keep a permanent record of the values input to a certain program. A convenient way to do this is to set the Print Mode switch to NORMAL before running the program. In this mode, all input values and the corresponding keystrokes will be listed on the printer, thus providing a record of the entire operation of the program.

Using Programs as Subroutines

Some programs in this Pac may be called as subroutines for user programs in the HP-41C's program memory. Refer to Appendix A for information on special subroutine calling points.

7

Downloading Module Programs

If you wish to trace execution, to modify, or to record on magnetic cards a program in this Application Module, it must first be copied into the HP-41C's program memory. For information concerning the HP-41C's COPY function, see the Owner's Handbook. It is not necessary to copy a program in order to run it.

Program Interruption

These programs have been designed to operate properly when run from beginning to end, without turning the calculator off (remember, the calculator may turn itself off). If the HP-41C is turned off, it may be necessary to set flag 21 (SF 21) to continue proper execution.

Use of Labels

You should generally avoid writing programs into the calculator memory that use program labels identical to those in your Application Module. In case of a label conflict, the label within program memory has priority over the label within the Application Pac program.

Several labels used in the Games I Application Module are also used in other modules. If you have this module and another plugged into your calculator, you should make sure that the module containing the programs you want to use is in the lower numbered port.

You will find a list of all the global labels used in this application module at the back of the manual in appendix B, Program Labels. The names of modules or accessories where duplicate labels occur are also listed. Before plugging in two or more modules, check that listing for duplicate label conflicts.

Assigning Program Names

Key assignments to keys [A] – [J] and ▓[A] – ▓[E] take priority over the automatic assignments of local labels in the Application Module. Be sure to clear previously assigned functions before executing a Module program.

SUBMARINE HUNT

DROP   STATUS   SCAN

SUBHUNT
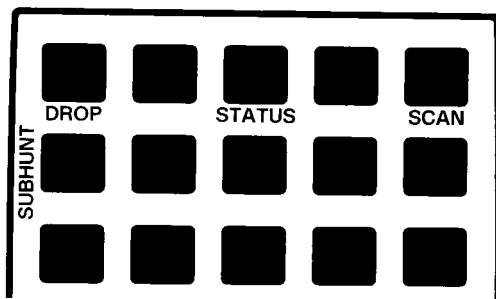
You are the commander of a destroyer with orders to search out and destroy an enemy submarine. The submarine is trapped somewhere in a bay having dimensions of 10 by 10 leagues. Your destroyer is equipped with sonar having a range of 2.5 leagues. Since your destroyer has been recently restocked, you have a seemingly unlimited supply of depth charges. To find the submarine, input the position (row and column) of your destroyer. Then send out a sonar signal (a beep) by pressing $\boxed{R/S}$ or $\boxed{E}$. If the signal is reflected back (indicated by a second beep), the submarine is within 2.5 leagues of your destroyer. The tone of the beep is related to the distance to the submarine. The higher the tone, the closer the submarine is. If the reflected tone is the same as the initial signal, the submarine is within 0.25 leagues of the destroyer.

When you think that you have located the submarine, attempt to move your destroyer directly over it for an attack by inputting the new coordinates. Then drop a depth charge by pressing $\boxed{A}$. The closer you are to the submarine, the greater your chances for a hit. If you are more than 1.5 leagues from the submarine, there is no chance for a hit. A successful attack is indicated by BOOM appearing in the display. Otherwise, MISSED will be displayed and the submarine will have moved. Its new location will be within a radius of one league from its last position.

When you have begun the game, you will be prompted with HARD? Y/N. If you select Y (yes) the game is more challenging because the submarine is allowed to move after each sonar scan as well as after each depth charge miss. (All of these movements are restricted to within a radius of 1 league.)

Playing the easier game, try to destroy the submarine using no more than ten sonar readings and one depth charge.

Anytime the prompt ORDERS appears in the display you can check your present score by pressing [C] . The display will show the number of depth charges (CANS) dropped, followed by the number of sonar readings (SCANS) taken.

				SIZE: 009
STEP	**INSTRUCTIONS**	**INPUT**	**FUNCTION**	**DISPLAY**
1	Initialize the program and place overlay on calculator.		[XEQ] SUBHUNT	SEED ?
2	Input any number.	seed	[R/S]	HARD? Y/N
3	To select difficult game (submarine always moving) otherwise		Y [R/S] N [R/S]	ORDERS
4	Select from the following orders (steps 5 thru 7) until sub is destroyed.			
5	To operate sonar, input row, then column. 1 beep means no echo. 2 beeps means echo received.	row col	[ENTER↑] [R/S] or [E]	(1 beep or 2 beeps)
6	To drop charge input row then column.* If sub is missed: If sub is hit: Go to step 3 for new game:	row col	[ENTER↑] [A]	MISSED ORDERS BOOM ( ) CANS ( ) SCANS HARD? Y/N
7	To review status *To drop a charge on location just scanned, you may skip entering the coordinates. Just press [A] .		[C]	( ) CANS ( ) SCANS ORDERS

Example:

Play an "easy" game.

Keystrokes (SIZE ≥ 009)	**Display**
[XEQ] [ALPHA] SUBHUNT [ALPHA]	*SEED ?*
45.6 [R/S]	*HARD? Y/N*
N [R/S]	*ORDERS*

First move:

5 [ENTER◆] [R/S]   ***ORDERS***   (no echo)

The shaded locations below can be eliminated.
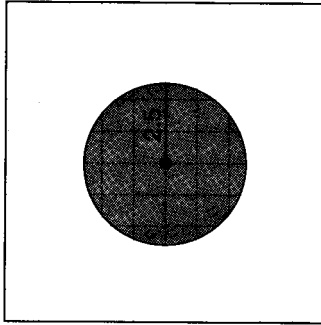
Second move:

Look for the sub in the upper left hand corner.

2 [ENTER◆] 8 [R/S]   ***ORDERS***   (hear a low tone
                                                                echo)

Since it was a low tone, the area very close to the destroyer can be eliminated. Also eliminated is the area outside a 2.5 league radius from 2,8.
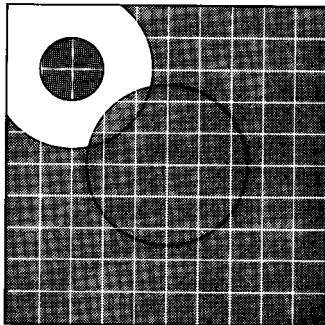
Third move: continue the search.

0 [ENTER♦] 10 [R/S]   **ORDERS**   (hear a low tone
                                                               echo)

The area close to 0, 10 can be eliminated because it was a low tone. Also
eliminated is the area outside of a 2.5 radius from 0, 10.
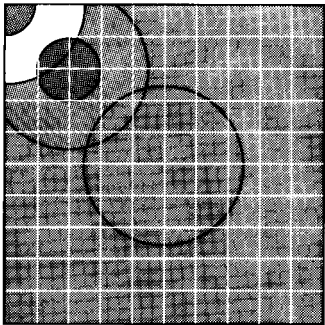
Try location 3, 10 to eliminate more area.

3 [ENTER♦] 10 [R/S]   **ORDERS**   (no echo)
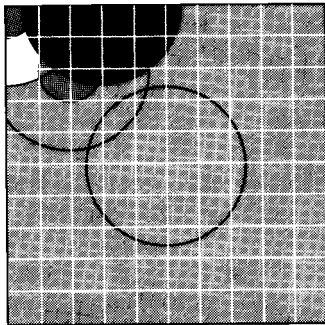
Since the area has been narrowed down quite a bit, a depth charge is now
dropped in the center of that area.

Keystrokes   **Display**

.5 [ENTER♦] 8.25 [A]   *

                                 BOOM
                                 1.CAN
                                 4.SCANS
                                 HARD? Y/N

Playing boards for Submarine Hunt and Space War.
You might wish to use copies of this page for your games.

	0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9	
9											9											9
8											8											8
7											7											7
6											6											6
5											5											5
4											4											4
3											3											3
2											2											2
1											1											1
0											0											0
	0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9	

	0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9	
9											9											9
8											8											8
7											7											7
6											6											6
5											5											5
4											4											4
3											3											3
2											2											2
1											1											1
0											0											0
	0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9	

	0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9	
9											9											9
8											8											8
7											7											7
6											6											6
5											5											5
4											4											4
3											3											3
2											2											2
1											1											1
0											0											0
	0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9	

Playing boards for Submarine Hunt and Space War.
You might wish to use copies of this page for your games.

MISSION STATUS JUMP LONG TORP

SWAR

POSITION DOCK SHORT PHASORS

You are the commander of the Nuclear Powered Reconnoiterer (NPR) Sapphire. The NPR Sapphire is the sole guardian of justice in a vast galaxy that measures 10 quadrants by 10 quadrants. Within the galaxy somewhere, anchored among the blazing stars, lie groups of sinister, vile Alglogs, known throughout space as interstellar thieves and creators of cosmic mischief. Your mission, as commander of the NPR Sapphire, is to search out and destroy the fearsome Alglogs in as few stardays as possible.

Within the galaxy somewhere is a Base, a haven to which your ship may return in order to repair damage and resupply. The weapons carried by the Sapphire are torpedos, which are fired in a straight line and phasors, which send out computer-selected directional bursts of energy. In addition, your starship is equipped with short- and long-range scanners which can detect the presence of Alglogs or the Base in nearby space. One starday is used for each quadrant traversed during a hyperspace jump. Details of the orders available to you as commander are given below.

Mission

This command begins with a mission briefing. Here you are prompted with **SEED?** Input any number to randomly place the Base, the Sapphire and the enemy. It also determines the Alglog's strategy. You are then prompted **GROUPS?**. The Alglogs fight in groups, each group in a different quadrant. Here you select the number of groups you wish to fight. The next prompt is **ALGLOGS PER?** Here you select the number of Alglog ships in each group. All Alglogs of a group are in one quadrant. The briefing ends with your position in the galaxy displayed by your on-board computer.

The galaxy is a 10 × 10 grid of quadrants; within each quadrant is a 10 × 10 grid of smaller areas called sectors. The quadrants are numbered 00 through 99, as are the sectors. A display of **QD55 SC17** means that the Sapphire is in quadrant 55, sector 17.

Long-Range Scan

The long-range scan covers all quadrants adjacent to and including that of the Sapphire. This scan will detect and report the presence of Alglogs or the Base in those quadrants. If neither are present, **CLEAR** will be displayed. Suppose objects are located in the quadrants as shown below.

	61	62	63	64	65
6				Base	Alglog
	51	52	53	54	55
5		Alglog	Sapphire		
	41	42	43	44	45
4				Alglog	

The long-range scan would include quadrants adjacent to quadrant 53 (QD53). The output would be as follows:

ENEMY QD 52

ENEMY QD 44

BASE QD 64

Short-Range Scan

The short-range scan gives a detailed picture of the quadrant in which the Sapphire is located. The output from the scan will tell you which sectors, if any, the Alglogs and the Base reside. If neither the Base nor Alglogs are in the quadrant, **CLEAR** will be displayed.

Suppose a quadrant looks as follows:

	0	1	2	3	4	5	6	7	8	9
9										
8										
7		A						B		
6				A						
5										
4										
3				S						
2										
1									A	
0										

A Quadrant

The display after short-range scan would look as follows:

CONTACT MADE

ALGLOG SC 71

ALGLOG SC 18

ALGLOG SC 63

BASE SC 77

Also, flag 0, meaning contact was made, will be set on your instrument panel. Since the Alglogs can sense your short-range scan, they will know where you are. Thus, after a short-range scan an Alglog in the quadrant may open fire or move anywhere within the quadrant. The display may continue as follows:

ALGLOG FIRES

**HIT**

MINOR DAMAGE

ORDERS

In this example, an Alglog opened fire on the Sapphire which sustained minor damage. If the Sapphire is hit a second time without having been repaired, the display will show **SHEILDS GONE***. A third hit results in **MAJOR DAMAGE**; then, if hit a fourth time, the display shows **DESTROYED**, in which case the game is over, and you have definitely lost. Also note that Alglogs are not perfect marksmen; they often miss. Sometimes they are not alert and do not detect your presence after a short-range scan. In this case, they do nothing.

Since the Sapphire's weapons are directly tied into the firing computer, they will be effective only after the short-range scanner has made contact. When flag 0 is set, the Sapphire weapons are effective. You also are susceptible to being fired upon by the Alglogs.

Jump

A jump through hyperspace to any other part of the galaxy takes one starday per quadrant traversed. Of course, it seems to be instantaneous while aboard the Sapphire.

If the Sapphire were in the position shown in the long-range scan example, a logical move would be to go to quadrant 52 to attack the Alglog. To make a move, one specifies the angle θ and distance r to be covered. Orientation of angles is shown in the diagram below.
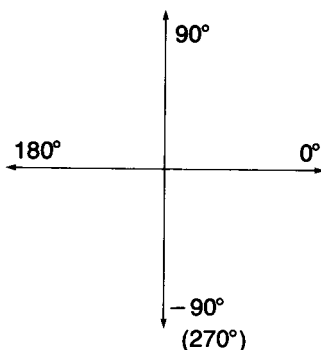
Angles must be input in degrees. The distance is specified in terms of quadrants. To move exactly one quadrant width, specify an r of 1. To move from QD 53 to QD 52, select $\theta = 180°$ and r = 1. Suppose one wished to move from QD 53 to QD 64. This would require an angle of 45° and a distance of $\sqrt{2}$. The output at the end of the jump routine is the Sapphire's new position.

When a jump is made, even if the Sapphire remains in the same quadrant, contact with Alglogs is broken since they cannot track the Sapphire through hyperspace. Flag 0 will no longer be lit on your instrument panel.

---

*"Sheilds" is the common name for the "Laser Deflection System" which was named after its inventor, Dr. Chris B. Sheilds (1982-2087). Any resemblance to the word "shield" is entirely coincidental. (It is not misspelled.)

Torpedo

The Sapphire begins each mission with 6 torpedos. These torpedos are effective only within a quadrant and must pass within 5° of an Alglog ship to destroy it. Only one Alglog can be destroyed per torpedo. To fire a torpedo simply specify the angle of fire then press ⒠ . Remember, unless contact has been made (flag 0 set) you are wasting torpedos.

Phasers

Before each mission, the Sapphire is supplied with 500 units of energy available for firing phasers. Unlike torpedos, phaser direction is computer controlled. Distance is operator controlled. Ten units of energy per sector are required to reach and destroy an Alglog ship. The computer arbitrarily selects which Alglog ship within range is to be destroyed. If no ship is within range, or if contact has not been made with the short-range scanner, the energy will be wasted. If more phaser energy is specified than is available, the amount available is used. Thus, it is possible to specify enough energy to destroy an Alglog yet miss him.

Dock

The Sapphire may dock at the Base by moving into a sector adjacent to that of the base and then pressing ⒣ . Torpedos and energy will be replenished and damage will be repaired.

Status

Mission status may be obtained at any time. It is ordered as follows:

Stardays from mission briefing to date;

Damage report;

Number of torpedos left;

Amount of energy left;

Number of Alglog ships left;

Sapphire's position.

If the Sapphire has been destroyed, mission status ends after the damage report.

Position

The position of the Sapphire may be obtained at any time. The output from this routine is **QD** ( ) **SC** ( ) where the number following **QD** is the quadrant, and the number following **SC** is the sector.

On Board Computer

The Sapphire contains a very powerful computer which can be used at any time to calculate inputs needed to jump or fire weapons. Use the 41C whenever desired but do not disturb the storage registers. All calculations must be done in the stack.

Note: The 41C may need to be taken out of user mode to use the top two rows.

Map of Galaxy

A map of the galaxy (playing board) is located on page 14.

Remarks:

1. When an order is selected when the printer is attached, it will print the results of that order and end with a prompt for new orders (**ORDERS**). When not using the printer, just continue pressing [R/S] and watching the results of your last order until you see the prompt **ORDERS**. This prompt is the Sapphire's way of requesting a new command.

2. After steps 1 and 3 in the user instructions, it is possible to get the following prompt in the display: **SIZE** >= (nn). This prompt indicates that the size is not set large enough to execute the program. (Refer to pages 73 and 117 in the *Owner's Handbook*.) Reset the size to a number greater than or equal to the number in the display. Then, press [R/S] to continue.

				SIZE: >14†
STEP	**INSTRUCTIONS**	**INPUT**	**FUNCTION**	**DISPLAY**
1	Get a mission and place overlay on calculator.		[XEQ] SWAR	SEED ?
2	Key in any number.	SEED	[R/S]	GROUPS?
3	Key in number of groups.	# groups	[R/S]	ALGLOGS PER?
4	Key in number of Alglogs per group. Display shows Sapphire's position.	# alglogs per	[R/S] [R/S] *	QD( ) SC( ) ORDERS
	Select from the following orders (steps 5 through 12) until enemy or Sapphire is destroyed.			
5	For long-range scan		[D]	
	If enemy is found, lists enemy positions.			ENEMY QD( )
			[R/S] *	
	If base is found			BASE QD( )
			[R/S] *	ORDERS
	otherwise			CLEAR
	†SIZE=14 + (no. of groups) + ((no. of groups) × (no. of ALGLOGS per group))		[R/S] *	ORDERS
	*Press [R/S] if the printer is not attached.			

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
6	For short-range scan		[I]	
	If enemy is found,			CONTACT MADE
	lists enemy locations:		[R/S] *	ALGLOG SC( )
			:	:
	If base is found			BASE SC( )
	If contact was made			
	with enemy		[R/S] *	(Possible Alglog
				retaliation)
				ORDERS
	otherwise			CLEAR
			[R/S] *	ORDERS
7	To jump, key in angle	θ(DEG)	[ENTER♦]	
	and distance. See			
	Sapphire's new position.	r	[C]	QD( ) SC( )
			[R/S] *	ORDERS
8	To fire a torpedo, key in			
	angle	θ (DEG)	[E]	
	If Alglog is hit			HIT
			[R/S] *	(damage report)
				(possible Alglog
				retaliation)
				ORDERS
	otherwise			MISS
			[R/S] *	(possible Alglog
				retailiation)
			:	ORDERS
9	To fire phasers, key in energy	ENERGY	[J]	(same as step 8)
10	To dock		[H]	
	If close enough to dock			DONE
			[R/S] *	ORDERS
	otherwise			NOT DONE
			[R/S] *	ORDERS
11	For mission status:		[B]	
	days on mission			( ) DAYS OUT
	amount of damage		[R/S] *	( ) DAMAGE
	no. of torpedos left		[R/S] *	TORPS ( )
	units of energy left		[R/S] *	ENERGY ( )
	no. of Alglogs left		[R/S] *	ALGLOGS ( )
	Sapphire's position		[R/S] *	QD ( ) SC( )
			[R/S] *	ORDERS
12	For Sapphire's position		[G]	QD ( ) SC( )
			[R/S] *	ORDERS
13	For new mission		[A]	GROUPS?
	go to step 3.			
	*Press [R/S] if the printer is not attached.			

Example:

The Sapphire's mission is to seek out and destroy 2 groups of Alglogs, each group consisting of 4 Alglogs.

Keystrokes	Display
(Size depends on number of alglogs, but must be> 14.)	
[XEQ] [ALPHA] SWAR [ALPHA]	**SEED ?**
.23 [R/S]	**GROUPS ?**
2 [R/S]	**ALGLOGS PER?**
4 [R/S]	**SIZE>=24**

[XEQ] [ALPHA] SIZE [ALPHA] 024

From the log of NPR Sapphire:

[R/S]	**0 DAYS OUT**	
[R/S] *	**NO DAMAGE**	
[R/S] *	**TORPS 6**	
[R/S] *	**ENERGY 500**	
[R/S] *	**ALGLOGS 8**	
[R/S] *	**QD 51 SC 0**	(note SC 0 refers
[R/S] *	**ORDERS**	to sector 0, 0)

Start search for the Alglogs.
Look in the immediate area.

[D]	**CLEAR**	(long scan)
[R/S] *	**ORDERS**	

Current map of galaxy.
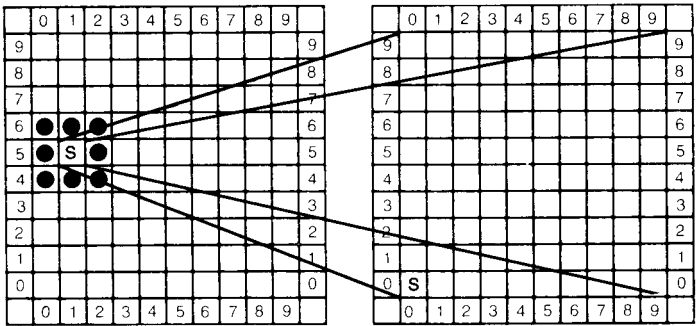
Quadrants   **Sectors of QD 51**

Dots indicate quadrants known to contain neither Alglogs nor base.

Move in direction 0°, 2 quadrants then use long range scan.

0 [ENTER↕] 2 [C]	*QD 53 SC 0*	(new position)
[R/S] *	*ORDERS*	
[D]	*ENEMY QD 63*	(long scan)
[R/S] *	*ORDERS*	

Current map of galaxy.
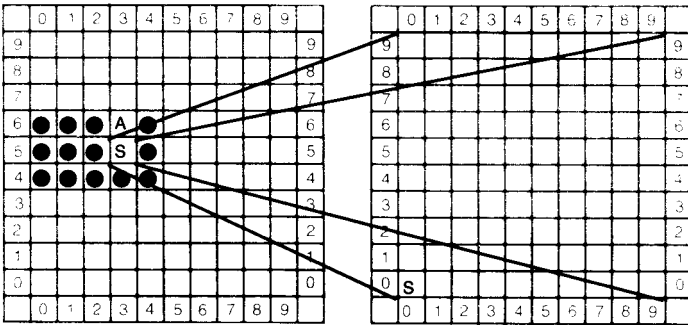
Quadrants   **Sectors of QD 53**

Move to QD 63 to attack.

90 [ENTER↕] 1 [C]	*QD 63 SC 0*	(jump)
[R/S] *	*ORDERS*	
[I]	*CONTACT MADE*	(short scan)
[R/S] *	*ALGLOG SC 16*	
[R/S] *	*ALGLOG SC 55*	
[R/S] *	*ALGLOG SC 20*	
[R/S] *	*ALGLOG SC 19*	
[R/S] *	*ORDERS*	

Current map of galaxy.

Quadrants   **Sectors of QD 63**
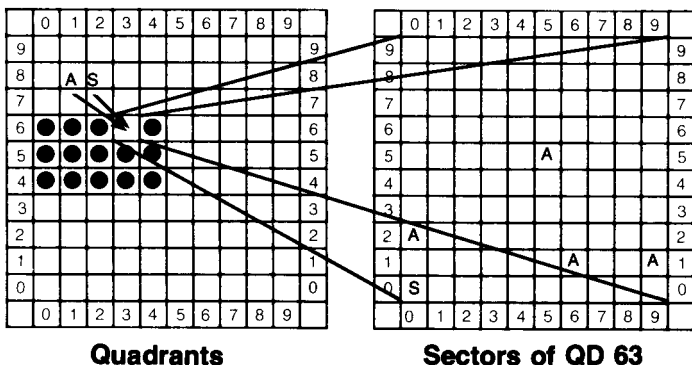
Use 20 units of energy to destroy Alglog in sector 20.

20[J]	*HIT*	(phasors)
[R/S] *	*7 LEFT*	
[R/S] *	*ALGLOG FIRES*	
[R/S] *	*HIT*	
[R/S] *	*MINOR DAMAGE*	
[R/S] *	*ORDERS*	

Fire a torpedo in direction 45° to destroy Alglog in sector 55.

45[E]	*HIT*	(torpedo)
[R/S] *	*6 LEFT*	
[R/S] *	*ALGLOG FIRES*	
[R/S] *	*HIT*	
[R/S] *	*SHEILDS GONE*	
[R/S] *	*ORDERS*	

Fire a torpedo in direction 10° to destroy Alglog in sector 16.

10[E]	*HIT*	(torpedo)
[R/S] *	*5 LEFT*	
[R/S] *	*ORDERS*	

Destroy the last Alglog in the Quadrant with the phasor.

100[J]	*HIT*	(phasors)
[R/S] *	*4 LEFT*	
[R/S] *	*ORDERS*	

Get a status report.

B	**3 DAYS OUT**	(status)
R/S *	**SHEILDS GONE**	
R/S *	**TORPS 4**	
R/S *	**ENERGY 380**	
R/S *	**ALGLOGS 4**	
R/S *	**QD 63 SC 0**	
R/S *	**ORDERS** /	

Continue search for the 4 remaining Alglogs.

D	**CLEAR**	(long scan)
R/S *	**ORDERS**	

Move 90°, 3 quadrants and scan for enemy.

90 **ENTER↑** 3 **C**	**QD 93 SC 0**	(jump)
R/S *	**ORDERS**	
D	**ENEMY QD 92**	(long scan)
R/S *	**BASE QD 92**	
R/S *	**ORDERS**	

Move 180° and 5 sectors to get in range to use short scan.

180 **ENTER↑** .5 **C**	**QD 92 SC 5**	(jump)
R/S *	**ORDERS**	
I	**CONTACT MADE**	(short scan)
R/S *	**ALGLOG SC 99**	
R/S *	**ALGLOG SC 68**	
R/S *	**ALGLOG SC 12**	
R/S *	**ALGLOG SC 43**	
R/S *	**BASE SC 57**	
R/S *	**ORDERS**	

Current map of galaxy.

Quadrants   **Sectors of QD 92**

Use phasors with 40 units of energy to destroy Alglog in sector 12.

40 [J]	*HIT*	(phasors)
[R/S] *	*3 LEFT*	
[R/S] *	*ALGLOG MOVES*	
[R/S] *	*ORDERS*	

An Alglog moved. Assume it was not the one that was in sector 43. Use a phasor with 50 units of energy to destroy it.

50 [J]	*HIT*	(phasors)
[R/S] *	*2 LEFT*	
[R/S] *	*ALGLOG FIRES*	
[R/S] *	*HIT*	
[R/S] *	*MAJOR DAMAGE*	
[R/S] *	*ORDERS*	

Dock to repair damage. Jump 90°, 5 sectors, then 0°, 1 sector.

90 [ENTER♦] .5 [C]	*QD 92 SC 55*	(jump)
[R/S] *	*ORDERS*	
0 [ENTER♦] .1 [C]	*QD 92 SC 56*	(jump)
[R/S] *	*ORDERS*	
[H]	*DONE*	(dock)
[R/S] *	*ORDERS*	
[B]	*6 DAYS OUT*	(status)
[R/S] *	*NO DAMAGE*	
[R/S] *	*TORPS 6*	
[R/S] *	*ENERGY 500*	
[R/S] *	*ALGLOGS 2*	
[R/S] *	*QD 92 SC 56*	
[R/S] *	*ORDERS*	

Do a short range scan to find which Alglog moved and to find his new position.

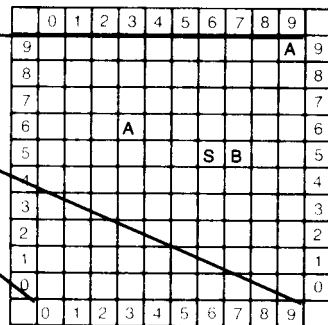|		
☐ **I**	*CONTACT MADE*	(short scan)
R/S *	*ALGLOG SC 99*	
R/S *	*ALGLOG SC 63*	
R/S *	*BASE SC 57*	
R/S *	*ORDERS*	

Current map of galaxy.
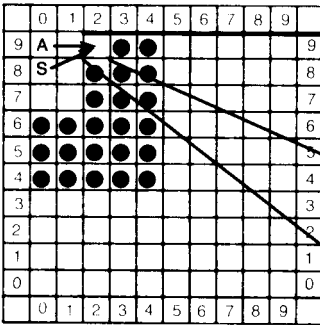
Quadrants   **Sectors of QD 92**

The Alglog that was at sector 68 has moved to sector 63.

The command of the Sapphire has now been relinquished to you.
Try to destroy the last 2 Alglogs.

SUPER BAGELS

$$27\ 77\ 415\ 7\ 389$$

The object of the game of Super Bagels is for the player to guess a number which the calculator has chosen. Clues are given after each guess to tell the player how close his guess is to the hidden number. To make the game more interesting, the hidden number can be specified by the player to be from 1 to 8 digits in length. The maximum digit value is also specified by the player. When the hidden number is finally entered, the number of guesses required to discover the hidden number is displayed.

A game where the number of digits is 4 and the maximum digit value is 5, is of moderate difficulty. In this game the player tries to guess a 4 digit number with each digit having any value from 0 to 5. Thus the minimum possible number is 0 (0000) and the maximum is 5555.

After each guess is entered and R/S is pressed, a clue is displayed indicating how well that number matched the hidden number. The guess appears in the left side of the display and the clue in the right side. The clue has the form PLC-XVAL where PLC is the number of digits of the guess that exactly match digits in the hidden number both in value and the *plac*ement. XVAL (extra values) is the number of digits which match in *val*ue but not in location. Digits are not counted twice; that is, digits counted in PLC are not counted again in XVAL digits.

For example, if the hidden number is 00251, a guess of 01234 would yield 01234 2-1. This display means that two numbers (the 0 and the 2) match the hidden number exactly, but that one number (the 1) is out of place.

When the guess finally matches the hidden number, the hidden number and the number of guesses is displayed.

Next the calculator prompts with **SAME? Y/N** . Pressing the letter Y followed by R/S enables the user to continue playing with his previous limits. N R/S should be pressed to play a game with new limits.

If the user forgets the limits and the calculator expects a guess as the next input the user can get a review of the limits by entering a negative number as a guess.

The first time through the game there will be three reminder messages. The first message is **DIGS CAN DUP**. This message serves as a reminder that there can be duplicate digits. The second message immediately follows: **0 LEGAL** appears in the display to remind the user that 0 is a legal digit. The third reminder message is displayed just before the first clue. **PLC**=m **XVAL**= n (where m and n are numbers) serves as a reminder that the first digit of the clue is the number of digits of the guess which are correct in value and *plac*ement. **XVAL**= stands for *ex*tra *val*ues. These are numbers which are correct in value only.

For those who want to discover the hidden number in some manner other than by using the clues given, you are invited to try. Super Bagels has been written to hide the number as well as possible. Good luck.

Reference:

This game was inspired by the popular game MASTERMIND.

				SIZE: 028
STEP	**INSTRUCTIONS**	**INPUT**	**FUNCTION**	**DISPLAY**
1	Begin Super Bagels.		(XEQ) BAGELS	SEED ?
2	Input seed (any positive or negative number).	SEED	(R/S)	LENGTH?
3	Input number of digits in hidden number††, 1 to 8.	N	(R/S)	MAX DIG?
4	Input maximum value of digit found in number, 1 to 9.	M	(R/S)	DIGS CAN DUP** 0 LEGAL GUESS?
5	Input guess. (To get a review of the rules input a negative number as the guess.) To input new guess press (R/S) .	GUESS	(R/S)	PLC=XVAL=** (GUESS: CLUE)†
6	Repeat step 5 until hidden number is guessed. When number is finally guessed, the display will show:			YOU GOT IT
			(R/S) *	(hidden number)
			(R/S) *	(no. of guesses.)
			(R/S) *	SAME? Y/N
7	Select option for next game: Game using same rules: Go to step 5.	Y	(R/S)	GUESS?
	Game using new rules. Go to step 3.	N	(R/S)	LENGTH ?
	†Your guess appears in the left side of the display. The clue is in the right side.			
	*Press (R/S) if printer is not attached.			
	**Displayed at start of first game.			
	††If display shows ILLEGAL NO. press (R/S) to reenter data.			

Example 1:

Play a game with 4 digits, each in the range 0 through 5.

Keystrokes (SIZE ⩾ 028)	Display	
[XEQ] [ALPHA] BAGELS [ALPHA]	*SEED?*	
75192.23[CHS] [R/S]	*LENGTH?*	
4 [R/S]	*MAX DIG?*	
5 [R/S]	*DIGS CAN DUP*	
[R/S] *	*0 LEGAL*	
[R/S] *	*GUESS?*	
3214 [R/S]	*PLC=0 XVAL=2*	
[R/S] *	*3214: 0-2*	(0 in the right places, 2 right)
0514 [R/S]	*0514: 1-3*	(1 in the right place, 3 right)
0145 [R/S]	*0145: 1-3*	
0451 [R/S]	*0451: 0-4*	(4 right)
1540 [R/S]	*YOU GOT IT.*	
[R/S] *	*1540*	
[R/S] *	*5 GUESSES*	
[R/S] *	*SAME? Y/N*	

* Press [R/S] if printer is not attached.

Example 2:

The original game of Bagels uses a hidden number of 3 digits each in the
range 0 through 9. Continuing from the last example, play a game of Bagels.

Keystrokes	Display	
	SAME? Y/N	
N [R/S]	**LENGTH?**	
3 [R/S]	**MAX DIG?**	
9 [R/S]	**GUESS?**	
012 [R/S]	**012:** **1-1**	
345 [R/S]	**345:** **0-0**	
567 [R/S]	**567:** **0-0**	
1 [CHS] [R/S]	**LEN=3, MAX=9**	(check limits)
[R/S] *	**567:** **0-0**	
892 [R/S]	**892:** **1-0**	
081 [R/S]	**081:** **0-3**	
810 [R/S]	**YOU GOT IT.**	
[R/S] *	**810**	
[R/S] *	**6 GUESSES**	
[R/S] *	**SAME? Y/N**	

*Press [R/S] if printer is not attached.
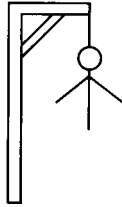
HANGMAN

This game is a version of the popular word game "hangman". The first player selects a word or phrase with as many as 12 characters in length and keys it into the calculator. The second player guesses various characters until he completes the word or gets hanged. The second player gets 7 wrong guesses before he is hanged. After each guess the display shows the previous wrong guesses, next the number of wrong guesses left, then the correctly guessed characters in their appropriate places. If the player is "hanged" before the word is guessed, the word is displayed.

				SIZE: 018
STEP	**INSTRUCTIONS**	**INPUT**	**FUNCTION**	**DISPLAY**
1	Initialize the program.		CF 21	
			XEQ HANG	WORD?
2	First player: Key in word or phrase containing 12 characters or less.	characters	R/S	7 LEFT (minus signs indicate letter positions)
3	Second player: guess a character	any character	R/S	(past wrong guesses) (# of wrong guesses left) (word so far)
	Go to step 4 or 5.			
4	Repeat step 3 until word is correctly guessed or 2nd player is "hanged" and word or phrase is displayed. For new game press R/S and go to step 2.		R/S	(word) WORD?
5.	While incomplete word is in display, press R/S to review incorrectly guessed characters.		R/S	(characters)
6	To make guess or view word guessed so far, press R/S and go to step 3.		R/S	(word so far)

Example:

Hide "I AM THE 41C" and then guess it.

Keystrokes (SIZE ≥ 018)	Display	
■ CF 21		
XEQ ALPHA HANG ALPHA	**WORD?**	
I AM THE■ 4■ 1C R/S	**7 LEFT**	
	- --- --- ---	
A R/S	**7 LEFT**	
	- A- --- ---	
E R/S	**7 LEFT**	
	- A- --E ---	
B R/S	**6 LEFT**	
	- A- --E ---	
T R/S	**B**	(previous
	6 LEFT	wrong guess)
	- A- T-E ---	
H R/S	**B**	
	6 LEFT	
	- A- THE ---	
■ 7 R/S	**B**	
	5 LEFT	
	- A- THE ---	
I R/S	**B7**	
	5 LEFT	
	I A- THE ---	
M R/S	**B7**	
	5 LEFT	
	I AM THE ---	
■ 4 R/S	**B7**	
	5 LEFT	
	I AM THE 4--	
■ 1 R/S	**B7**	
	5 LEFT	
	I AM THE 41-	
C R/S	**B7**	
	5 LEFT	
	I AM THE 41C	

To play a new game
press R/S

PINBALL
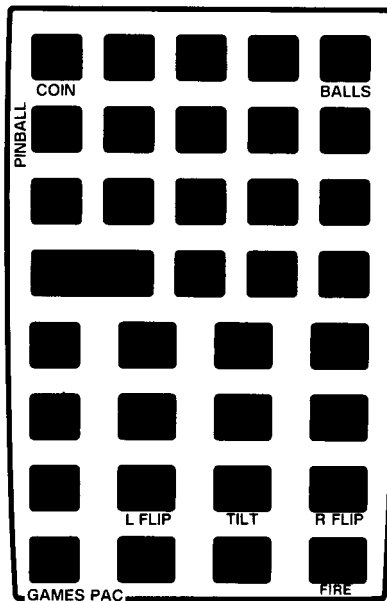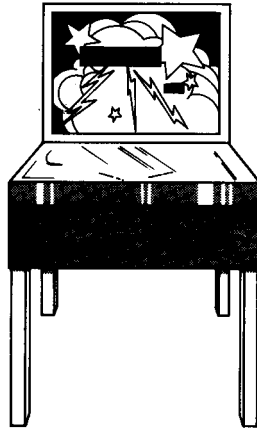
This game simulates a pinball machine. Twenty-five cents buys three games, with three balls per game. There are eight types of scoring devices, seven of which, along with appropriate sound effects, advance points immediately upon contact. Standard pinball game features such as specials, extra balls, bonus points, and the possibility of a tilt are included. If you are both skilled and lucky enough to get 50,000 points, you win a free game. So drop in a quarter, start the game and fire a ball, then watch for your chances to flip the flippers.
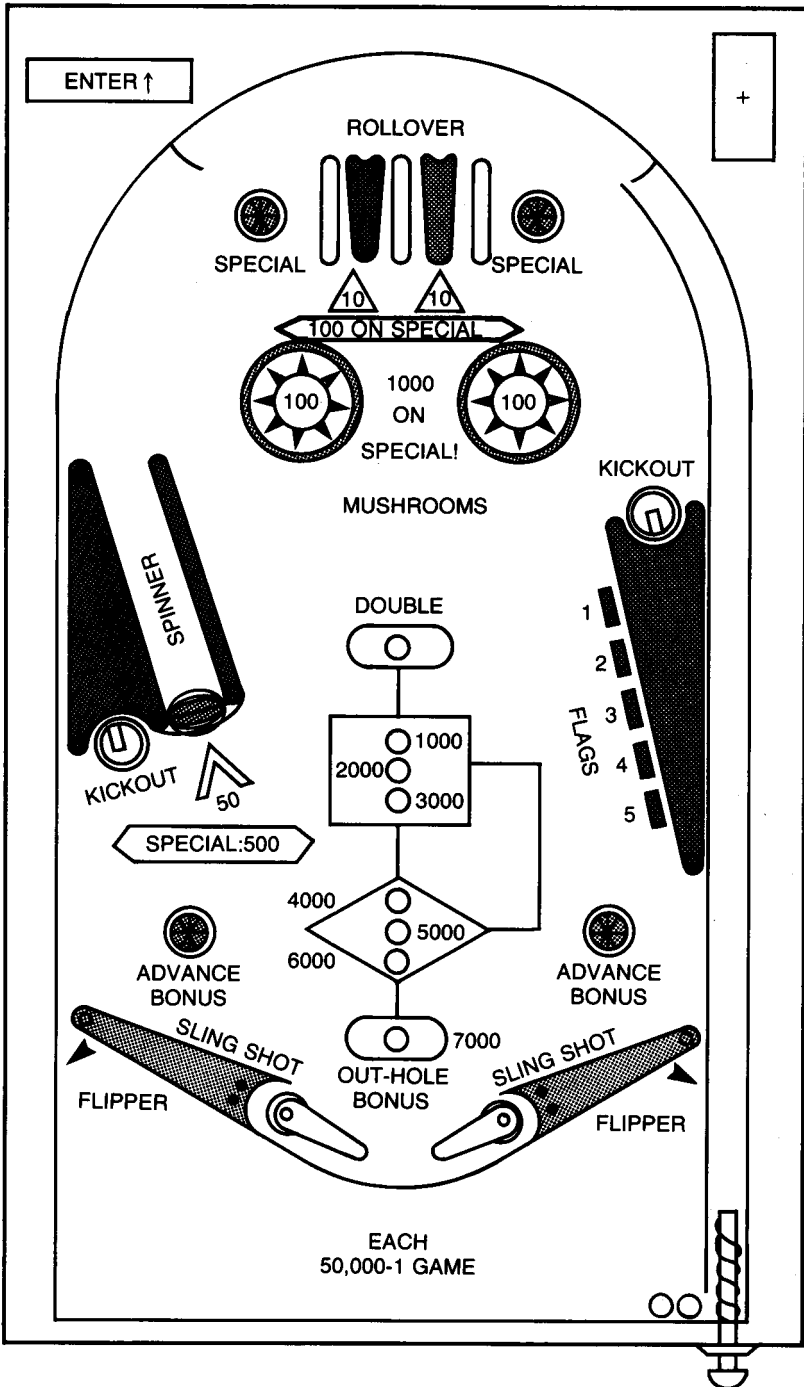
Pinball Playing Field

Scoring Devices

Special

Two roll-over stars are shown at the top of the playing board, either of which scores 10 points. The stars alternate each time one is hit between an ON and OFF state shown by display annunciator flag 0. When the special is on (flag 0 lit in the display) all devices will score 10 times their usual amounts. If the ball goes out of play while the special is lit, outhole bonus scoring is doubled. Flag 0 is reset when a ball goes out of play.

Rollover

The two top roll-overs score 10 points.

Mushrooms

Mushrooms score 100 points each time one is hit. The ball can bounce between them up to ten times, beeping each time.

Kickout

Kickout holes score 50 points.

Spinner

When the spinner gate is hit, it scores 50 points for each spin. Twenty-five spins are possible with a beep sounding with each spin.

Bonus

Bonus advance roll-overs score 10 points when struck and add 1000 points to the out-hole bonus. Each ball starts with 1000 out-hole bonus points already accumulated.

Flags

There are five flags (numbered 1 through 5) to knock down. Flags score 10 points, plus an extra ball for the fifth flag. They are reset each time they are all knocked down and before each ball is fired.

Sling Shot

Sling shot bumpers score 10 points.

L Flipper

When "L FLIPPER" appears in the display there is approximately 1 second to hit the left flipper (the 1 key) to get the ball back into play, otherwise the ball is lost out the out-hole.

R Flipper

When "R FLIPPER" appears in the display there is approximately 1 second to hit the right flipper (the 3 key) to get the ball back into play, otherwise the ball is lost out the out-hole.

Out

When OUT appears in the display the ball is just about to go out of play. If the 2 key is pressed within approximately 1 second there is a 50 percent possibility of the ball going back into play. However, the other 50 percent of the time "tilt" will appear in the display; the ball will be lost and so will the bonus points for that ball. Bonus points, if any, will be added to your score when the ball is lost through the out-hole.

			SIZE: 007
STEP	**INSTRUCTIONS**	**INPUT**	**FUNCTION**	**DISPLAY**
1	Initialize the program.		[XEQ] PINBALL	SEED ?
2	Key in a seed (any number).	seed	[R/S]	$.25=3 GAMES
3	Insert a quarter Display shows: Amount of money deposited number of games left to play		[A]	 $( ) SPENT GAMES:( )
4	Start game		[E]	FIRE
5	FIRE a ball If display shows: L Flipper press R Flipper press OUT (optional)	 1 3 2	[R/S]	 (devices and scores) (final score)
6	Repeat step 5 for all balls.			
7	To start new game go to step 4.			
8	For 3 more games go to step 3.			

Example:

Keystrokes (SIZE ≥ 007)	Display	
[XEQ] [ALPHA] PINBALL [ALPHA]	**SEED ?**	
.555555 [R/S]	**$.25=3 GAMES**	
[A]	**$0.25 SPENT**	(drop in quarter)
	GAMES: 3	
[E]	**FIRE**	(push button to get balls; flag 3 lit shows 3 balls)
[R/S]	**SPINNER**	(fire ball)
	600	
	L FLIPPER	
1	**KICKOUT**	
	50	
	ROLLOVER	
	10	
	BONUS	
	10	
	L FLIPPER	
1	**R FLIPPER**	
3	**FLAG 1**	
	10	
	SPINNER	
	450	
	L FLIPPER	
1	**BONUS**	
	10	
	R FLIPPER	
3	**SPECIAL**	
	100	
	OUT	
	1240	
	2240	
	3240	
	4240	
	5240	
	6240	
	7240	
	FIRE	(flag 2 lit to show 2 balls left)

Keystrokes	Display
[R/S]	*FLAG 1*
	10
	R FLIPPER
3	*FLAG 2*
	10
	SLING SHOT
	10
	BONUS
	10
	L FLIPPER
1	*SPECIAL*
	100
	L FLIPPER
1	*R FLIPPER*
3	*FLAG 3*
	100
	SPECIAL
	10
	BONUS
	10
	ROLLOVER
	10
	MUSHROOMS
	1000
	OUT
2	*TILT*
	8510
	FIRE

Continue playing. Maybe you can get the 41,490 points necessary to win a free game.

CRAPS

The calculator plays the part of a casino operator in the game of craps. The rules for craps are as follows:

1. Place a bet.

2. Roll 2 die; if they total 7 or 11 on the first roll, you win. If they total 2, 3 or 12 on the first roll, you lose. Any other total on the first roll becomes your "point."

3. Continue rolling the die until you either roll your "point," (you win) or you roll a 7, (you lose).

				SIZE: 006
STEP	**INSTRUCTIONS**	**INPUT**	**FUNCTION**	**DISPLAY**
1	Initialize program and place overlay on calculator.		[XEQ] CRAPS	SEED ?
2	Input a seed (any number).	seed	[R/S]	PLACE BET
3	Input a bet for the round.	bet	[R/S]	ROLL
4	Optional: to check winnings		[C]	$( )
5	Roll the dice.		[A]	ROLLING (D₁ D₂)
	If dice total = 7 or 11 go to step 3.			YOU WIN PLACE BET
	Or if dice total = 2,3 or 12 go to step 3.			YOU LOSE PLACE BET
	Otherwise point = dice total.			POINT = (n) ROLL

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
6	Optional: to view current point.		Ⓑ	POINT = (n) ROLL
7	Roll the dice.		Ⓐ	ROLLING (D_1 D_2)
	If dice total = 7 go to step 3			YOU LOSE PLACE BET
	If dice total = point go to step 3. Otherwise go to step 6.			YOU WIN PLACE BET ROLL

Example:

Keystrokes (SIZE ≥ 006)   **Display**

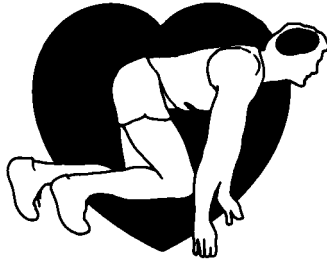|	
ⓍEQ ⓐLPHA CRAPS ⓐLPHA	**SEED ?**
23 ⓒHS Ⓡ/S	**PLACE BET**
10 Ⓡ/S	**ROLL** (bet $10)
Ⓐ	**ROLLING** (roll die)
	4 3
	YOU WIN
	PLACE BET
Ⓒ	**$10.00** (view winnings)
	PLACE BET
5 Ⓡ/S	**ROLL**
Ⓐ	**ROLLING**
	6 2
	POINT=8
	ROLL
Ⓐ	**ROLLING**
	4 3
	YOU LOSE
	PLACE BET
	⋮
	etc.

BIORHYTHMS

From ancient times, philosophers and sages have taught that human happiness lies in the harmonious integration of body, heart and mind. Now a twentieth-century theory claims to be able to quantitatively gauge the functioning of these three aspects of ourselves: the physical, sensitive, and cognitive.

The biorhythm theory is based on the assumption that the human body has inner clocks or metabolic rhythms with constant cycle times. Currently, three cycles starting at birth in a positive direction are postulated. The 23-day or physical cycle relates to physical vitality, endurance and energy. The 28-day or sensitivity cycle relates to sensitivity, intuition and cheerfulness. The 33-day or cognitive cycle relates to mental alertness and judgment.

For each cycle, a day is considered either high, low, or critical. The high (values greater than zero) times are regarded as energetic times, you are your most dynamic in the cycle. The low (values less than zero) times are regarded as the recuperative periods. The critical days (values equal to zero) are regarded as your accident prone days especially for the physical and sensitivity cycles.
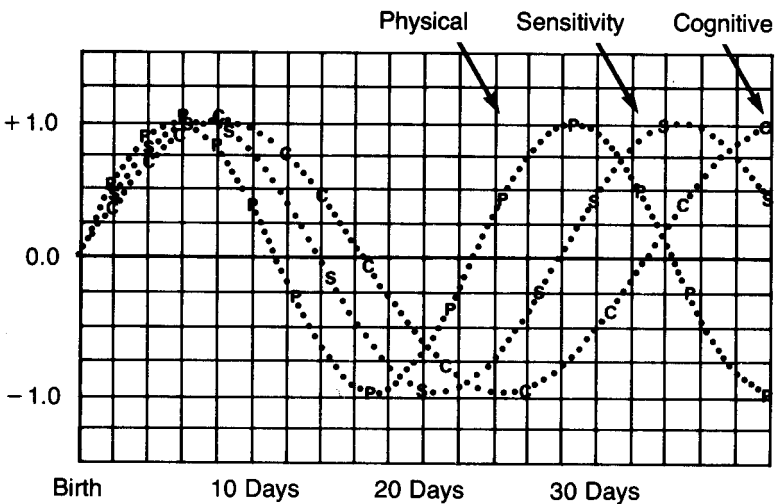
Remarks:

The date format for input is MM.DDYYYY (December 5, 1951 is keyed in as 12.051951).

The birthdate must occur after February 29, 1600. All biodates must occur on or after the birth date. The error message "ILLEGAL DATE" will be shown followed by the illegal date when these requirements are not met.

				SIZE: 026
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	Initialize the program.		[XEQ] BIOR	BIR=M.DDYYYY?
2	Input birthdate** in form mm.ddyyyy	bir	[R/S]	BIODATE?
3	Input starting date** in form mm.ddyyyy	biodate	[R/S]	NO. OF DAYS?
4	Input number of days n**. If the printer is not attached the display will show B:IO/C:RT/X:TR? For biovalues go to step 6a. For critical values go to step 6b. For extreme values go to step 6c. If the printer is attached the display will show PLOT? Y/N	n	[R/S]	B:IO/C:RT/X:TR?
		n	[R/S]	PLOT? Y/N
5	If you wish a plot, press "Y". Then after the plot of cognitive values, go to step 2.	Y	[R/S]	BIOPLOT FROM (date) BIRTHDATE: (PHY PLOT) (SEN PLOT) (COG PLOT)
	Otherwise press "N".	N	[R/S]	B:IO/C:RT/X:TR?
6a	To compute the physical, sensitive, and cognitive values for n consecutive days starting with biodate	B	[R/S]	BIRTHDATE: ( )
			[R/S] *	(date)
			[R/S] *	PHY = ( )
			[R/S] *	SEN = ( )
			[R/S] *	COG = ( )
	Biorhythm output continues for n days.		[R/S] *	(date)
			:	:
			etc.	
			[R/S] *	BIR=M.DDYYYY
	go to step 2 for new case.			

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
6b	To compute a list of the critical days occuring within n days from the biodate	C	R/S	BIRTHDATE: ( )
			R/S *	PHY = 0 ON:
			R/S *	(dates if any)
				:
			R/S *	SEN = 0 ON:
		~	R/S *	(dates if any)
				:
			R/S *	COG = 0 ON:
			R/S *	(dates if any)
				:
			R/S *	BIR=M.DDYYYY?
	Go to step 2 for new case.			
6c	To compute a list of the dates (within n days from the biodate) when any of the three biocurves equals −1, 1 or 0.	X	R/S	BIRTHDATE: ( )
			R/S *	PHY = −1 ON:
			R/S *	(dates if any)
				:
			R/S *	SEN = −1 ON:
			R/S *	(dates if any)
				:
			R/S *	COG = −1 ON:
				:
			R/S *	PHY = 1 on:
			R/S *	(dates if any)
				:
			R/S *	PHY = 0 ON:
			R/S *	(dates if any)
				:
			R/S *	SEN = 0 ON:
			R/S *	(dates if any)
				:
			R/S *	COG = 0 ON:
			R/S *	(dates if any)
				:
			R/S *	BIR=M.DDYYYY?
	Go to step 2 for new case. *Press R/S if you are not using printer. **If executing BIOR more than once, these values need to be input only if they are different from the previous values. Just press R/S and continue. Optional: to view previous value press ⊟ .			

Example 1:

Napoleon Bonaparte was born on August 15, 1769. The Battle of Waterloo, Napoleon's great defeat, occurred on June 18, 1815. Find Napoleon's bio-values for that day. (This example assumes that the printer is not attached).

Keystrokes (SIZE ≥ 026)	Display
[XEQ] [ALPHA] BIOR [ALPHA]	*BIR=M.DDYYYY?*
8.151769 [R/S]	*BIODATE?*
6.181815 [R/S]	*NO. OF DAYS?*
1 [R/S]	*B:IO/C:RT/X:TR?*
[B] [R/S]	*BIRTHDATE:*
	8/15/1769
[R/S]	*6/18/1815*
[R/S]	*PHY = -0.52*
[R/S]	*SEN = -0.43*
[R/S]	*COG = 0.87*
[R/S]	*BIR=M.DDYYYY?*

Example 2:

Robert Noel was born on July 21, 1950. What are the critical values of the three curves for the month of Robert's 30th birthday?

Keystrokes	Display	
	BIR=M.DDYYYY?	
7.211950 [R/S]	*BIODATE?*	
7.011980 [R/S]	*NO. OF DAYS?*	
31 [R/S]	*PLOT? Y/N*	(appears only if printer is attached)
N [R/S]	*B:IO/C:RT/X:RT?*	(skip if printer is not attached)
C [R/S]	*BIRTHDATE:*	
	7/21/1950	
[R/S] *	*PHY = 0 ON:*	
[R/S] *	*7/11/1980*	
[R/S] *	*7/22/1980*	
[R/S] *	*SEN = 0 ON:*	
[R/S] *	*7/11/1980*	
[R/S] *	*7/25/1980*	
[R/S] *	*COG = 0 ON:*	
[R/S] *	*7/2/1980*	
[R/S] *	*7/19/1980*	
[R/S] *	*BIR=M.DDYYYY?*	

*Press [R/S] if printer is not attached.

Example 3:

For the same inputs as example 2, plot the three biorhythm curves. (This example uses the peripheral printer.)

Keystrokes	Display
Turn the calculator off and plug in the printer. Turn on the printer and calculator. Switch the printer mode to manual (MAN).	
[XEQ] [ALPHA] BIOR [ALPHA]	*BIR=M.DDYYYY?*
[←]	*7.211950*
[R/S]	*BIODATE?*
[R/S]	*NO. OF DAYS?*
[R/S]	*PLOT? Y/N*
Y [R/S]	*BIOPLOT FROM*
	7/1/1980
	BIRTHDATE:
	7/21/1950
	BIR=M.DDYYYY?

Here is the printer output

```
BIOPLOT FROM 7/1/1980
BIRTHDATE:   7/21/1950


              PHY

          PLOT OF BIOF
        X (UNITS= 1.) ↓
        Y (UNITS= 1.) →
          -1.10          1.10
                 0.00
          |---------|---------|
      1.         x   |
      2.       x     |
      3.     x       |
      4.   x         |
      5.  x          |
      6.  x          |
      7.   x         |
      8.    x        |
      9.      x      |
     10.        x  |
     11.            x
     12.            |  x
     13.            |    x
     14.            |      x
     15.            |        x
     16.            |         x
     17.            |         x
     18.            |         x
     19.            |       x
     20.            |     x
     21.            |   x
     22.           | x
     23.         x |
     24.      x    |
     25.    x      |
     26.   ::      |
     27. x         |
     28. x         |
     29. x         |
     30.  x        |
     31.    x      |
```
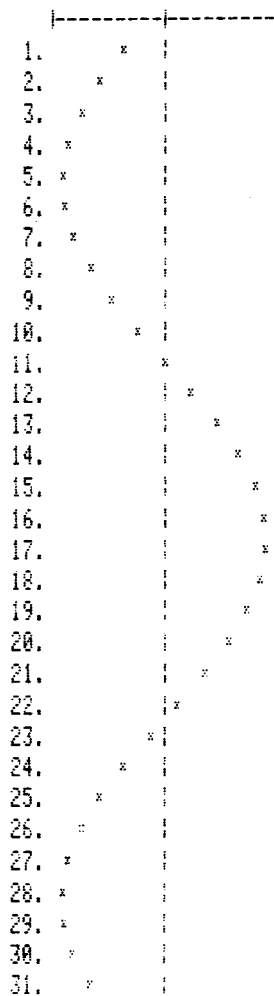
```
        SEN                            COG

    PLOT OF BIOF                   PLOT OF BIOF
   X (UNITS= 1.) ↓                X (UNITS= 1.) ↓
   Y (UNITS= 1.) →                Y (UNITS= 1.) →
      -1.10        1.10              -1.10        1.10
            0.00                           0.00
      |---------|---------|           |---------|---------|
  1.    x        |                1.             |  x
  2.   x         |                2.             |x
  3.   x         |                3.           x |
  4.   x         |                4.          x  |
  5.   x         |                5.         x   |
  6.   x         |                6.       x     |
  7.    x        |                7.      x      |
  8.     x       |                8.     x       |
  9.       x     |                9.   x         |
 10.        x   |                10.  x          |
 11.          x                 11.  x           |
 12.          |  x              12.  x           |
 13.          |    x            13.  x           |
 14.          |      x          14.   x          |
 15.          |        x        15.     x        |
 16.          |         x       16.      x       |
 17.          |          x      17.       x      |
 18.          |          x      18.        x     |
 19.          |           x     19.         x    |
 20.          |           x     20.          | x
 21.          |          x      21.          |  x
 22.          |         x       22.          |   x
 23.          |        x        23.          |    x
 24.          | x              24.          |     x
 25.          x                 25.          |     x
 26.        x |                 26.          |      x
 27.       x  |                 27.          |      x
 28.     x    |                 28.          |      x
 29.    x     |                 29.          |     x
 30.   x      |                 30.          |    x
 31.  x       |                 31.          |     x
```

SIZE CHECK SUBROUTINE (SIZE?)

Description:

It can be very annoying to be on the last input of a long input sequence and get a NONEXISTANT error message. This message is usually the result of an incorrect SIZE. By executing this subroutine at the beginning of a program, this problem is eliminated. It prompts the user for the correct SIZE if SIZE is set too small.

To Use:

To call this routine, the necessary SIZE must be placed in X prior to the call. The calling sequence must never be in a subroutine! Executing SIZE destroys the calculator's subroutine return stack. The calling sequence for a SIZE of 54 is:

54
[XEQ] SIZE?
FC?C 25   (SIZE? clears flag 25 if size is not set large enough.)
PROMPT

Side Effects:

● Flag 25 may be set or cleared on return.
● SIZE $>=$ (n) is in alpha register.

GENERATING RANDOM NUMBERS BETWEEN 0 AND 1 (RNDM)

To Use:

Subroutine RNDM assumes a seed (a number between zero and one) is in register 00. It generates a random number r, where $0 \leqslant r < 1$. Then it stores this number in register 00 to use as the seed to generate the next random number. The random number is returned in X.

Side Effects:

● The random number is left in X.
● The new seed is stored in register 00.
● The contents of Z and T are destroyed. The contents of X and Y are stored in Y and Z respectively.

GENERATING RANDOM INTEGERS BETWEEN 0 AND n. (RNDMW)

To Use:

Subroutine RNDMW assumes a number n is in X and a seed, (a number between zero and one) is in register 00. It generates a random number r, where $0 \leqslant r < n$. Then it stores a number in register 00 to use as the seed to generate the next random number. The random number is returned in X.

Side Effects:

- The random number is left in X.
- The new seed is stored in register 00.
- The contents of X, Z and T are destroyed. The contents of Y are reproduced in Y, Z and T.

PROGRAM LABELS

Label	Duplicate Label In
INI	Machine Design Pac
P	Petroleum Fluids Pac, Navigation Pac, Standard Pac
RNDM	Standard Pac
SIZE?	Extended Function Module, Structural Analysis Pac, Real Estate Pac, Stress Analysis Pac
BAGELS CRAPS SWAR BIOF HANG SUBHUNT BIOR PINBALL BOOM RNDMW	(no Label Conflicts)

The labels in this list are not in the same order as they appear in the catalog listing for the module.

HEWLETT PACKARD