

Program Description I

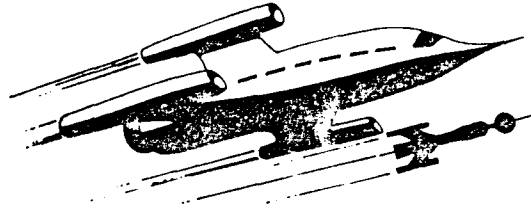
Program Title **Space War**

Contributor's Name **HEWLETT-PACKARD COMPANY**
Corvallis Division
 Address **1000 N.E. Circle Boulevard**
 City **Corvallis, OR 97330**

State

Zip Code

Program Description, Equations, Variables



You are the commander of the Nuclear Powered Reconnoiterer (NPR) Kittyhawk. The NPR Kittyhawk 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 three agents of evil: the vile Alglogs, known throughout space as interstellar thieves and creators of cosmic mischief. Your mission as commander of the NPR Kittyhawk is to search out and destroy the fearsome Alglogs within 18 stardays.

Also within the galaxy somewhere is a Base, a haven to which your ship may return in order to resupply itself. The weapons carried by the Kittyhawk are torpedos, which are fired in a straight line, and phasers, which send out an omnidirectional burst of energy. In addition, your starship is equipped with short- and long-range sensors which can detect the presence of Alglogs or the Base in nearby space. One starday is used whenever the Kittyhawk changes its position, i.e., when a move is made. Details of the operation of the NPR Kittyhawk are given below.

POWER ON (Card 1)

The Kittyhawk is started by supplying a seed s ($0 \leq s \leq 1$) to the routine START (Card 1). This routine positions the three Alglogs, the Base, and the Kittyhawk randomly in the galaxy. For best results, the seed s should contain all the digits but 0 and end in a 1, 3, 7, or 9. Remember that 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. The position of an object, then, may be specified by giving its quadrant and sector (QQ.SS). Examples of allowable positions are 23.68, 10.99, 7.01, and 85.00. No two objects may occupy the same position. At the end of the routine START, the calculator displays the starting position of the NPR Kittyhawk.

Operating Limits at

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Program Description, Equations, Variables

LONG-RANGE SCAN (Card 1)

The long-range scan covers all quadrants adjacent to and including that of the Kittyhawk itself. This scan will detect and report the presence of Alglogs or the Base in those quadrants. Suppose objects are located in the quadrants as below.

62	63	64	65
		B	A
52	53	54	55
A	KH		
42	43	44	45

The long-range scan would include the quadrants adjacent to quadrant 53 (Q53). The output of the scan would be three lines as follows:

```
63.00400401
53.10400400
43.00400400
```

The first line shows the contents of quadrants 62, 63, and 64. Two digits are allocated to each quadrant, with the "4's" merely indicating separation of the quadrants. The Base would appear in the right-hand of the two digits, an Alglog in the left-hand digit. Notice that the Base appears in the top line (Q64) and an Alglog in the second line (Q52). The Alglog in quadrant 65 is beyond the range of the sensors and does not show up. The numbers 63, 53, and 43 refer to the middle quadrant of each line.

Operating Limits and

The contents of nine squares are displayed with each long-range scan. If the Kittyhawk is at or near the edge of the galaxy, some of this information may be meaningless.

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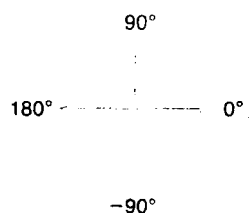
State

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Program Description, Equations, Variables

MOVE (Card 1)

If the Kittyhawk were in the position shown in the long-range scan above, 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's width, specify an r of 1. To move from Q53 to Q52, then, select $\theta = 180^\circ$ and $r = 1$. Suppose one wished to move from Q53 to Q64. This would require an angle of 45° and a distance of $\sqrt{2}$. The output at the end of the move routine is the Kittyhawk's new position.

Each move uses 1 starday. If a move is taken when no stardays remain, the display will flash zeros to indicate that the mission has failed.

Caution must be observed near the edges of the galaxy. Moving beyond an edge can result in the Kittyhawk's being lost in space.

Operating Limits and Warnings

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Program Descripti

SHORT-RANGE SCAN (Card 2)

The short-range scan gives a detailed picture of the quadrant the Kittyhawk is presently in. The output is 10 lines of information output by PRINTx commands, each line representing a row of the quadrant. The rows are output in the order 9, 8, 7, ..., 0. Each line consists of 10 digits that represent the ten sectors in the row. A "0" in a line means that that sector is unoccupied; a "3" marks the location of the Kittyhawk, a "4" an Alglog, and a "7" the Base. Suppose the output of a short-range scan were as shown below:

Row 9	0.000000000
Row 8	0.040000000
Row 7	0.000000000
Row 6	0.000000000
Row 5	0.000000003
Row 4	0.000000000
Row 3	0.000000000
Row 2	7.000000000
Row 1	0.000000000
Row 0	0.000400000

This scan indicates the presence of Alglogs in sectors 04 and 82, the Kittyhawk in sector 59, and the Base in sector 20.

TORPEDO (Card 2)

The Kittyhawk begins its mission with 3 torpedos. A torpedo may be fired at an Alglog within the same quadrant. If the torpedo passes within 1° of the Alglog, the Alglog is destroyed and the torpedo is spent. To fire a torpedo, simply specify the angle of fire in degrees.

If no torpedos remain and you attempt to fire a torpedo, the display will show "Error."

Operating Limits ar

PHASERS (Card 2)

At the start of the mission, 1000 units of energy are available for firing phasers. Unlike torpedos, phasers fire equally in all directions and can destroy as many Alglogs as are within range. Only Alglogs within the same quadrant as the Kittyhawk may be fired on. The closer the Alglog, the less energy is required to destroy it. A minimum of 105 units and a maximum of 275 units may be needed to destroy an Alglog. To fire phasers, simply specify the amount of energy to be used.

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Program Description, Equations, Variables

Whenever an Alglog is fired on with phasers, there is a danger that the fire will be returned. Accordingly, the Kittyhawk uses another 100 units of energy to maintain shields against each Alglog within the quadrant.

If more energy is needed than is available, flashing zeros will be displayed to indicate that the mission has failed.

DOCK (Card 2)

The Kittyhawk may dock at the Base by moving into a sector adjacent to that of the base and executing the routine DOCK. If the docking is successful, the Kittyhawk's supply of torpedos and energy are replenished to their initial level: 3 torpedos, 1000 units of energy. The display at the end of this routine shows the current supply of energy and torpedos.

STATUS

Two routines are available for providing information on the status of the mission. Either of these routines may be executed at any time.

The first, on card 1, shows the number of days remaining in the mission. Simply press **A** and the number of days will be displayed.

The second, on card 2, shows the remaining energy and torpedos. Both values are output in a single display as Energy.Torpedos. For example, a supply of 500 energy units and 2 torpedos would be displayed as 500.2. This information is available by pressing **A** on card 2.

Operating Limits and

MAP OF GALAXY

A map of the galaxy (playing board) is located on page 04-03 in the game of Submarine Hunt.

Reference:

This program is based on an HP-65 Users' Library program written by Lee Gregory, Jr.

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Sketch(es)

Sample Problem(s)

	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	
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

Solution(s)

	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

Reference(s)

	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

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

Sketch(es)

Example:

From the log of the NPR Kittyhawk:

Load side 1 and side 2 of Space War 1.

Keystrokes:

.63154897 **A** →

C →

Outputs:

50.53 (KH position)

60.00400400 ***

50.00400400 *** (Long scan)

40.00400400 ***

Sample Problem(s)

Current map of galaxy:

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	KH	•								5			3						5
4	•	•								4									4
3										3									3
2										2									2
1										1									1
0										0									0

Quadrants

Sectors

Dots indicate quadrants known to contain neither Alglogs nor Base.

Move in direction -45° .

Solution(s)

45 **CHS** **ENTER** 5.5 **E** →

C →

14.62 (New position)

24.00400400 ***

14.00400401 *** (Long scan)

4.00400410 ***

Current map of galaxy:

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			3						6
5	•	•								5									5
4	•	•								4									4
3										3									3
2				•	•	•				2									2
1				•	KH	B				1									1
0				•	•	A				0									0

Quadrants

Sectors

Reference(s)

Sketch(es)

Sample Problem(s)

Move to Q05 to attack.

45 **CHS** **ENTER** 2 **↵** **E** →

5.62 (Now in Q05)

Load side 1 and side 2 of Space War 2.

A →

0.000000000 *** (Short scan)
 0.000000000 ***
 0.000000000 ***
 0.030000000 *** (KH in S62)
 0.000000000 ***
 0.000000000 ***
 0.000000000 ***
 0.000000000 ***
 0.000000000 ***
 0.004000000 *** (Alglog in S03)

Current map of galaxy:

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

Quadrants

Sectors

Fire a torpedo in direction -80°.

80 **CHS** **C** →

2.000000000 (2 Alglogs left)

Return to Base and dock.

Load side 1 and side 2 of SW1.

90 **ENTER** 1 **E** →

15.62 (New position)

Solution(s)

Reference(s)

Sketch(es)

Sample Problem(s)

Load side 1 and side 2 of SW2.

A

0.000000000 ***
 0.000000000 ***
 0.000000000 ***
 0.030000007 *** (KH in S62, Base
 in S69)
 0.000000000 ***
 0.000000000 ***
 0.000000000 ***
 0.000000000 ***
 0.000000000 ***
 0.000000000 ***

Current map of galaxy:

	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		3						7		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

Quadrants

Sectors

Move to S68.

Load side 1 and side 2 of SW1.

0 ENTER .6 E

15.68

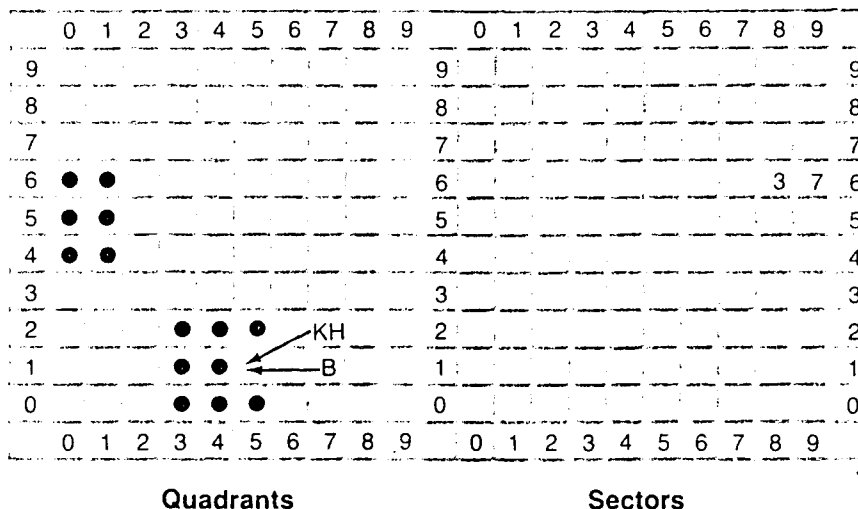
Solution(s)

Reference(s)

Sketch(es)

Sample Problem(s)

Current map of galaxy:



Dock.

Load side 1 and side 2 of SW2.

E →

1000.3

(Energy, torpedos
replenished)

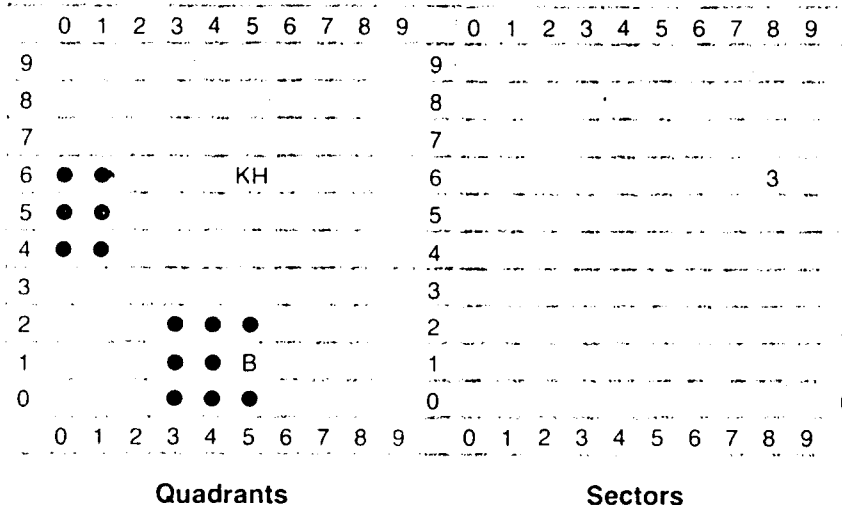
Load side 1 and side 2 of SW1.

90 **ENTER** 5 **E** →

65.68

(New position)

Current map of galaxy:

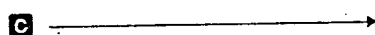


Solution(s)

Reference(s)

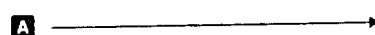
Sketch(es)

Sample Problem(s)

C

75.00400400 ***
 65.00410400 *** (Note Alglog in Q65)
 55.00400400 ***

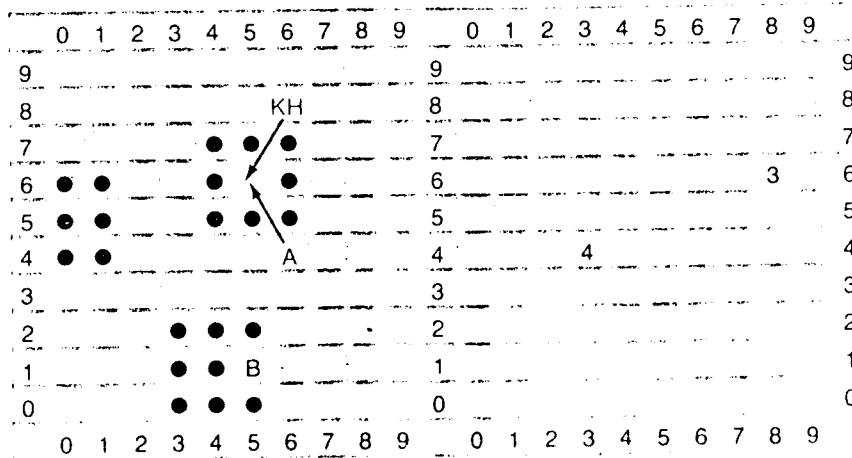
Load side 1 and side 2 of SW2.

A

0.000000000 ***
 0.000000000 ***
 0.000000000 ***
 0.000000030 *** (KH in S68)
 0.000000000 ***
 0.004000000 *** (Alglog in S43)
 0.000000000 ***
 0.000000000 ***
 0.000000000 ***

Current map of galaxy:

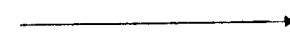
Solution(s)



Quadrants

Sectors

Use phasers. Try 200 energy units.

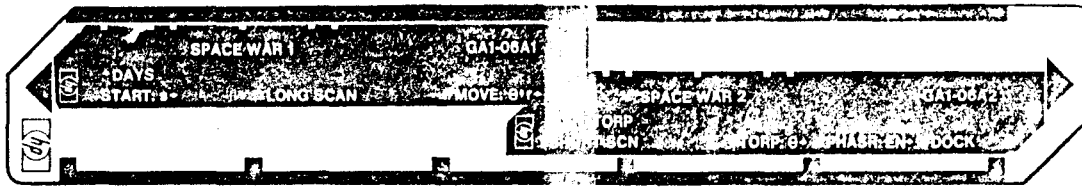
200 **D**

1.000000000 (1 Alglog left)

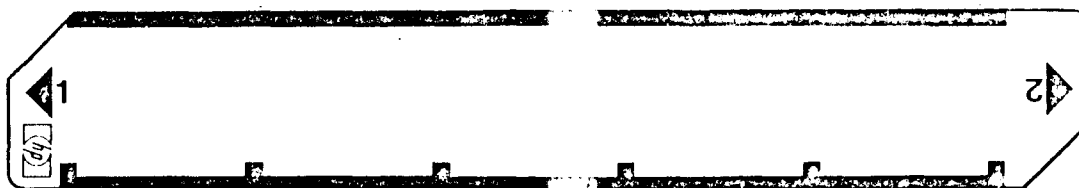
The rest of the mission will be left as an exercise for the cadet.

Reference(s)

***Shown by PRINT on HP-97 and by PAUSE on HP-67.



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Load side 1 and side 2 of <i>Space War 1</i> .			
2	To initialize, key in a seed s ($0 \leq s \leq 1$). Output is the starting position of Kittyhawk.	s	A	QQ.SS
3	You have 18 stardays. Your options are outlined below. Be sure the appropriate card is loaded for each option.			
	LONG RANGE SCAN (Card 1)			
4	Output 3 lines of scan. KH is in center. QQ refers to middle quadrant of each line. Digits AB refer to Alglogs and Base.		C	QQ.AB4AB4AB
	MOVE (Card 1)			
5	Key in direction and distance (in quadrants) of desired move; output new position of Kittyhawk. (Flashing zeros means all stardays used; mission failed.)	. 0 r	ENTER E	QQ.SS
	SHORT RANGE SCAN (Card 2)			
6	Output 10 rows of present quadrant in order 9, 8, ..., 0. Kittyhawk = 3, Alglog = 4, Base = 7.		A	X.XXXXXXXX
	TORPEDO (Card 2)			



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
7	To fire a torpedo, key in angle or fire; output number of Alglogs remaining. ("Error " means no torpedos remain; use phasers.)	0	C	# Alglogs
	PHASER (Card 2)			
8	To fire phasers, key in units of energy expended in fire; output number of Alglogs remaining. (Flashing zeros mean all energy used; mission failed.)	Energy	D	# Alglogs
	DOCK (Card 2)			
9	You may dock from any square adjacent to Base. Output is present Energy.Torpedos.		E	En.Torp
	STATUS			
10	With Card 1, display number of days remaining.	(Card 1)	A	Days
11	With card 2, display present Energy. Torpedos.	(Card 2)	A	En.Torp

Space War

STEP		KEY ENTRY		COMMENTS		STEP		KEY ENTRY		COMMENTS	
001		+LSL8		Initialize.		057	SF2				
002		CLR0		If seed = 0, use π.		058	CLX				
003		X=0?				059	RCL0				
004		P1				060	X=Y?				
005		ST09				061	SF2				
006		1				062	CLX				
007		0				063	RCL0				
008		ST04		Point to R _A and prepare to compute random starting positions.		064	X=Y?			Set flag 2 if position occupied.	
009		2				065	SF2				
010		0				066	P1				
011		ST01				067	PTN				
012		*LBL9		Compute a position. Check not occupied.		068	*LBL0			Long Scan.	
013		GSP1				069	4				
014		GSE0				070	FIX				
015		F2?				071	9				
016		GT09				072	9				
017		ST01		Store position.		073	9			Store constant 0.00400400.	
018		ISZ1				074	+				
019		RCL1				075	ST02				
020		2				076	GSP9				
021		5		Exit loop after filling R _E .		077	SFC				
022		X=Y?				078	RCL0				
023		GT09				079	INT				
024		EEX				080	ST00				
025		3		Energy = 1000.		081	RCL4			Scan line above KH.	
026		ST06				082	+				
027		3		Torpedoes = 3.		083	GSP3				
028		ST07				084	RCL0			Scan line with KH.	
029		ST09				085	GSP3				
030		1				086	RCL0				
031		0		Days = 18		087	RCL4			Scan line below KH.	
032		ST08		Display position of Kittyhawk.		088	-				
033		RCL0				089	GSP3				
034		PTN				090	RTN				
035		*LBL1		Generate one starting position of the form QQ SS,		091	*LEL3			Routine scans one line, i.e., 3 quadrants.	
036		RCL9		where QQ is quadrant, SS is sector.		092	RCL2				
037		9				093	ST01				
038		9				094	P1				
039		7				095	ST03				
040		x				096	ST+1			R ₁ = QQ.00400400,	
041		FRC				097	1			where QQ refers to middle quadrant	
042		ST09				098	-				
043		EEX				099	GSE0				
044		4				100	GSR5				
045		x				101	GSE5			First quadrant.	
046		INT				102	ST+1				
047		GSE5				103	RCL3				
048		GSR5				104	GSR0				
049		PTN				105	EEX				
050		*LBL8				106	5			Middle quadrant.	
051		RCLA		Routine tests to see if position in X-register is already occupied.		107	+				
052		X=Y?				108	ST+1				
053		SF2				109	RCL3				
054		CLX				110	1				
055		RCLB				111	+				

STEP	KEY ENTRY	COMMENTS	STEP	KEY ENTRY	COMMENTS
113	EcX		165	INT	
114	S	Last quadrant.	170	GSE5	
115	+		171	FRC	
116	ST+1		172	+	Q_y, S_y
117	RCL1		173	+	$(Q_y + \Delta Q_y), (S_y + \Delta S_y)$
118	RTX	Print line.	174	FRC	
119	RTN		175	LSTX	
120	*LBL0		176	INT	
121	0		177	GSR4	
122	ST05	Routine checks one quadrant for presence of Alglog or Base.	178	+	Q_y, O, S_y (new Y-position)
123	R1		179	RCL2	
124	RCL4		180	FRC	
125	INT		181	RCL3	
126	X=Y?	Forms a two-digit number AB, where A is no. of	182	FRC	
127	GSR1	Alglogs, B no. of Bases in	183	GSR4	
128	CLX	quadrant.	184	INT	
129	RCL6		185	+	O_x, S_x
130	INT		186	RCL0	
131	X=Y?		187	+	$(O_x + \Delta O_x), (S_x + \Delta S_x)$
132	GSR1		188	INT	
133	CLX		189	LSTX	
134	RCL0		190	FRC	
135	INT		191	GSR5	
136	X=Y?		192	+	Q_y, OS_x
137	GSR1		193	*LBL7	
138	CLX		194	+	Q_y, O_x, S_y, S_x (QQSS)
139	RCL0		195	GSR6	Test not occupied.
140	INT		196	F2?	
141	X=Y?		197	GT06	
142	GSR2		198	ST06	
143	RCL5		199	1	
144	RTN		200	ST-8	Decrement no. days remaining.
145	*LBL1		201	RCL6	
146	RCL4	Alglog detected - add 10 to R_5 .	202	X10?	If negative, game over.
147	ST+5		203	GT06	Otherwise display new position
148	RTN		204	RCL0	
149	*LBL2		205	RTN	
150	1	Base found - add 1 to R_5 .	206	*LBL6	
151	ST+5		207	CLX	Ran out of days - flash zeros.
152	RTN		208	PSE	
153	*LBL5		209	GT06	
154	+R	Move	210	*LBL4	
155	FIX	Convert (r, θ) to ($\Delta x, \Delta y$).	211	RCL4	Multiply by 10.
156	DSP1		212	+	
157	RND		213	RTN	
158	ST08	$\Delta O_x, \Delta S_x$	214	*LBL5	
159	X=Y		215	RCL4	
160	RND	$\Delta Q_y, \Delta S_y$	216	+	Divide by 10
161	DSP2		217	RTN	
162	RCL0		218	*LBL8	
163	GSR5		219	+	Position occupied - add 0.1 and try again.
164	ST03		220	1	
165	INT		221	GT07	
166	RCL0		222	*LBL9	
167	GSR4		223	RCL8	Display remaining days
168	ST02		224	RTN	

LABELS					SET STATUS			
A Start	B	C Long Scan	D	E Move	0	FLAGS		
F Days	G	H	I	J	K	ON	OFF	
L Used	M Used	N Used	O Scan line	P 10x	Q Occupied	1	2	3
R 10	S Flash zeros	T Exit move	U Occupied?	V Start loop	W			

DEG	GRAD	RAD	FIX	SCI	ENG	2
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[illegible]

PROGRAM LISTING

117	FSB	169	FCL	170	INT	If Base and KH not in same quadrant, display same in Torp.
118	INT	171	FCL	172	INT	
119	FCL	173	X*Y	174	GTG	
120	FRC	175	RCL	176	FRC	
121	FSB	177	GSB	178	STG	
122	FSB	179	INT	180	RCL	
123	AF	181	FRC	182	GSB	
124	FTN	183	STG	184	INT	
125	-	185	-	186	ABS	
126	GSB	187	-	188	X*Y	
127	AF	189	GTG	190	RCL	KH must be within 1 sector of Base in Y-direction
128	FTN	191	FRC	192	GSB	
129	ALBL	193	RCL	194	FRC	
130	STG	195	GSB	196	-	
131	ST-G	197	ABS	198	2	
132	1	199	X*Y	200	GTG	
133	9	201	EEN	202	3	
134	STG	203	STG	204	3	
135	FSB	205	STG	206	GTG	
136	GSB	207	ALBL	208	RCL	
137	GSB	209	RCL	210	ALBL	Also must be within 1 sector of Base in X-direction
138	GSB	211	1	212	0	
139	GSB	213	+	214	X*Y	
140	GSB	215	INT	216	+	
141	GSB	217	FIX	218	[SP]	
142	GSB	219	PTN	220	ALBL	
143	GSB	221	1	222	0	
144	GSB	223	x	224	FTN	
145	GSB	225	-			
146	GSB					
147	GSB					
148	GSB					
149	GSB					
150	GSB					
151	GSB					
152	GSB					
153	GSB					
154	GSB					
155	GSB					
156	GSB					
157	GSB					
158	GSB					
159	GSB					
160	GSB					
161	GSB					
162	GSB					
163	GSB					
164	GSB					
165	GSB					
166	GSB					
167	GSB					
168	GSB					

Return r in X, θ in Y.					
Phaser.					
Save energy and subtract from total.					
Check if Aligogs 1, 2, and 3 are in range.					
Display no. Aligogs left.					
Test if Aligog hit by phaser.					
If energy < 0, exit.					
If Aligog not in KH's quadrant, return.					
Deduct 100 for shields.					
Find distance r to Aligog.					
Energy input must be greater than r ² + 100.					
If hit, store -1 as Aligog's position.					
Decrement no. Aligogs.					
Out of energy - flash zeros.					
Dock					

Form display Energy Torpedoes.					
If failed, display old energy and torpedoes.					
Multiply by 10					

LABELS					FLAGS		SET STATUS		
1	2	3	4	5	6	7	8	9	10
Short scan		Torpedo	Phaser	Dock	Torpedo	ON OFF			
En torp									
Used	Torp hit?		Phaser hit?						
10x	Flash zeros	KH to Aligog	Print req	Clear req					

0	DEG	FIX
1	GRAD	SCI
2	RAD	ENG
3		2

Program Listing

DUPLICATE LISTING

001	*LELA	21 11	057	SF2	16 21 02	113	EEX	-23	169	INT	16 34
002	CLRG	16-53	058	CLX	-51	114	8	08	170	GSB5	23 05
003	X=0?	16-43	059	RCLC	36 13	115	=	-24	171	FRC	16 44
004	Pi	16-24	060	X=Y?	16-33	116	ST+1	35-55 01	172	+	-55
005	ST09	35 09	061	SF2	16 21 02	117	RCL1	36 01	173	+	-55
006	1	01	062	CLX	-51	118	PRTX	-14	174	FRC	16 44
007	0	00	063	RCLD	36 14	119	RTN	24	175	LSTX	16-63
008	ST04	35 04	064	X=Y?	16-33	120	*LBL0	21 00	176	INT	16 34
009	2	02	065	SF2	16 21 02	121	0	00	177	GSB4	23 04
010	0	00	066	R4	-31	122	ST05	35 05	178	+	-55
011	ST01	35 46	067	RTN	24	123	R4	-31	179	RCL2	36 02
012	*LEL9	21 09	068	*LELC	21 13	124	RCLA	36 11	180	FRC	16 44
013	GSB1	23 01	069	4	04	125	INT	16 34	181	RCL3	36 03
014	GSB8	23 08	070	FIX	-11	126	X=Y?	16-33	182	FRC	16 44
015	F2?	16 23 02	071	9	09	127	GSB1	23 01	183	GSB4	23 04
016	ST09	22 09	072	9	09	128	CLX	-51	184	INT	16 34
017	ST01	35 45	073	9	09	129	RCLB	36 12	185	+	-55
018	ISZI	16 26 46	074	=	-24	130	INT	16 34	186	RCL0	36 00
019	RCL1	36 46	075	ST02	35 02	131	X=Y?	16-33	187	+	-55
020	2	02	076	DSP8	-63 08	132	GSB1	23 01	188	INT	16 34
021	5	05	077	SFC	16-11	133	CLX	-51	189	LSTX	16-63
022	X=Y?	16-32	078	RCLC	36 15	134	RCLC	36 13	190	FRC	16 44
023	ST09	22 09	079	INT	16 34	135	INT	16 34	191	GSB5	23 05
024	EEX	-23	080	ST00	35 00	136	X=Y?	16-33	192	+	-55
025	3	03	081	RCL4	36 04	137	GSB1	23 01	193	*LBL7	21 07
026	ST06	35 06	082	+	-55	138	CLX	-51	194	+	-55
027	3	03	083	GSB3	23 03	139	RCLD	36 14	195	GSB8	23 08
028	ST07	35 07	084	RCL0	36 00	140	INT	16 34	196	F2?	16 23 02
029	ST09	35 09	085	GSB3	23 03	141	X=Y?	16-33	197	ST00	22 00
030	1	01	086	RCL0	36 00	142	GSB2	23 02	198	ST0E	35 15
031	8	08	087	RCL4	36 04	143	RCL5	36 05	199	1	01
032	ST08	35 08	088	-	-45	144	RTN	24	200	ST-8	35-45 08
033	RCLC	36 15	089	GSB3	23 03	145	*LBL1	21 01	201	RCL8	36 08
034	RTN	24	090	RTN	24	146	RCL4	36 04	202	X=0?	16-45
035	*LBL1	21 01	091	*LBL3	21 03	147	ST+5	35-55 05	203	ST06	22 06
036	RCL9	36 09	092	RCL2	36 02	148	RTN	24	204	RCLC	36 15
037	9	09	093	ST01	35 01	149	*LBL2	21 02	205	RTN	24
038	9	09	094	R4	-31	150	1	01	206	*LBL6	21 06
039	7	07	095	ST03	35 03	151	ST+5	35-55 05	207	CLX	-51
040	X	-35	096	ST+1	35-55 01	152	RTN	24	208	PSE	16 51
041	FRC	16 44	097	1	01	153	*LBL5	21 15	209	ST06	22 06
042	ST09	35 09	098	-	-45	154	*R	44	210	*LBL4	21 04
043	EEX	-23	099	GSB0	23 00	155	FIX	-11	211	RCL4	36 04
044	4	04	100	GSB5	23 05	156	DSP1	-63 01	212	X	-35
045	X	-35	101	GSB5	23 05	157	RND	16 24	213	RTN	24
046	INT	16 34	102	ST+1	35-55 01	158	ST00	35 00	214	*LBL5	21 05
047	GSB5	23 05	103	RCL3	36 03	159	X2Y	-41	215	RCL4	36 04
048	GSB5	23 05	104	GSB0	23 00	160	RND	16 24	216	=	-24
049	RTN	24	105	EEX	-23	161	DSP2	-63 02	217	PTN	24
050	*LBL8	21 08	106	5	05	162	RCLC	36 15	218	*LBL0	21 00
051	RCLA	36 11	107	=	-24	163	GSB5	23 05	219	.	-62
052	X=Y?	16-33	108	ST+1	35-55 01	164	ST03	35 03	220	1	01
053	SF2	16 21 02	109	RCL3	36 03	165	INT	16 34	221	ST07	22 07
054	CLX	-51	110	1	01	166	RCLC	36 15	222	*LBL6	21 16 11
055	RCLB	36 12	111	+	-55	167	GSB4	23 04	223	RCL8	36 08
056	X=Y?	16-33	112	GSB0	23 00	168	ST02	35 02	224	RTN	24

Duplicate Listing

001	*LELA	21 11	057	CHS	-22	113	GSB5	23 05	159	PCLD	36 14
002	FIN	-11	058	10*	16 33	114	INT	16 34	170	INT	16 34
003	28FS	-63 09	059	X	-35	115	-	-45	171	RCLE	36 15
004	SPC	16-11	060	ST-1	35-55 45	116	RCL1	36 01	172	INT	16 34
005	PFS	16-51	061	RTN	24	117	FRC	16 44	173	X*Y?	16-32
006	9	09	062	*LBLC	21 13	118	RCLE	36 15	174	GT0a	22 16 11
007	STOI	35 46	063	CF0	16 22 00	119	GSB5	23 05	175	PCLD	36 14
008	0	00	064	ST00	35 00	120	FRC	16 44	176	FRC	16 44
009	*LELS	21 09	065	RCL7	36 07	121	-	-45	177	GSB5	23 05
010	STOI	35 45	066	1	01	122	GSB5	23 05	178	ST00	35 00
011	DSZI	16 25 46	067	X*Y?	16-34	123	*P	34	179	INT	16 34
012	GT09	22 09	068	GT0B	22 12	124	RTN	24	180	RCLE	36 15
013	ST00	35 00	069	-	-45	125	*LELD	21 14	181	FRC	16 44
014	3	03	070	ST07	35 07	126	ST00	35 00	182	GSB5	23 05
015	RCLE	36 15	071	1	01	127	ST-6	35-45 06	183	STOI	35 01
016	GSB0	23 00	072	9	09	128	1	01	184	INT	16 34
017	4	04	073	STOI	35 46	129	9	09	185	-	-45
018	RCLE	36 11	074	GSB1	23 01	130	STOI	35 46	186	ABS	16 31
019	GSB0	23 00	075	GSB1	23 01	131	GSB4	23 04	187	2	02
020	4	04	076	GSB1	23 01	132	GSB4	23 04	188	X*Y?	16-35
021	RCLB	36 12	077	RCL9	36 09	133	GSB4	23 04	189	GT0a	22 16 11
022	GSB0	23 00	078	CF0	16 22 00	134	RCL9	36 09	190	RCL0	36 00
023	4	04	079	RTN	24	135	RTN	24	191	FRC	16 44
024	PCLD	36 13	080	*LBL1	21 01	136	*LBL4	21 04	192	GSB5	23 05
025	GSB0	23 00	081	ISZI	16 26 46	137	RCL6	36 06	193	RCL1	36 01
026	7	07	082	F0?	16 23 00	138	X*0?	16-45	194	FRC	16 44
027	PCLD	36 14	083	RTN	24	139	GT06	22 06	195	GSB5	23 05
028	GSB0	23 00	084	RCL1	36 45	140	ISZI	16 26 46	196	-	-45
029	9	09	085	INT	16 34	141	RCL1	36 45	197	ABS	16 31
030	STOI	35 46	086	RCLE	36 15	142	INT	16 34	198	2	02
031	*LBL0	21 00	087	INT	16 34	143	RCLE	36 15	199	X*Y?	16-35
032	RCL1	36 45	088	X*Y?	16-32	144	INT	16 34	200	GT0a	22 16 11
033	PRTX	-14	089	RTN	24	145	X*Y?	16-32	201	EEX	-23
034	DSZI	16 25 46	090	GSB7	23 07	146	RTN	24	202	3	03
035	GT08	22 08	091	CLX	-51	147	EEX	-23	203	ST06	35 06
036	RCL0	36 00	092	RCL0	36 00	148	2	02	204	3	03
037	PRTX	-14	093	-	-45	149	ST-6	35-45 06	205	ST07	35 07
038	PFS	16-51	094	ABS	16 31	150	GSB7	23 07	206	GT00	22 00
039	RTN	24	095	1	01	151	X*	53	207	*LBLa	21 16 11
040	*LBL0	21 00	096	X*Y?	16-35	152	EEX	-23	208	RCL6	36 06
041	ENT1	-21	097	RTN	24	153	2	02	209	RCL7	36 07
042	INT	16 34	098	1	01	154	+	-55	210	*LBL0	21 00
043	RCLE	36 15	099	CHS	-22	155	RCL0	36 00	211	1	01
044	INT	16 34	100	STOI	35 45	156	X*Y?	16-35	212	0	00
045	X*Y?	16-32	101	SF0	16 21 00	157	RTN	24	213	+	-24
046	RTN	24	102	1	01	158	1	01	214	XZY	-41
047	F4	-31	103	ST-9	35-45 09	159	CHS	-22	215	INT	16 34
048	F4	-31	104	RTN	24	160	STOI	35 45	216	+	-55
049	FRC	16 44	105	*LBL7	21 07	161	1	01	217	FIX	-11
050	GSB5	23 05	106	RCL1	36 45	162	ST-9	35-45 09	218	DSP1	-63 01
051	INT	16 34	107	FRC	16 44	163	RTN	24	219	RTN	24
052	STOI	35 46	108	GSB5	23 05	164	*LBL6	21 06	220	*LBL5	21 05
053	CLX	-51	109	STOI	35 01	165	CLX	-51	221	1	01
054	LSTX	16-63	110	INT	16 34	166	FSE	16 51	222	0	00
055	FRC	16 44	111	RCLE	36 15	167	GT06	22 06	223	X	-35
056	GSB5	23 05	112	FRC	16 44	168	*LBL5	21 15	224	RTN	24