

028646

## 4 PROGRAM SUBMITTAL

13

☒ New Program☐ Revision to Program

Model No.

☐ 67☐ 97☒ 41

Program Title

SUBMARINE HUNT

No. Lines

1282

Bytes

648

Category No.

F1102

(Primary)

Primary

Category Name

BOARD AND TABLE GAMES

Abstract-75 Word Maximum You are the captain of a destroyer with orders to seek out and destroy enemy submarines. The destroyer maneuvers on a 10 x 10 grid and searches for the submarine via sonar. The closer you are to the submarine when you drop your depth charge the greater the chance you have of sinking it. However, if you are inept, the submarine might torpedo you. Two levels of play are available.

Necessary Accessories: Memory module or HP-41CV

Name: Gary Goodman

Company

(If Applicable)

Address: Box 259N Route 4

City: Fredericksburg

State/Province: Virginia

Postal Code: 22405

Phone Number (703) 775-3260

Country: U.S.A.

Hewlett Packard Dealer: None

Acceptance Choice:

☐ FOUR \$6.00 PROGRAMS☐ ONE POINT CERTIFICATE

Please use the checklist below to insure submittal of all proper program documents

☒ SIGNED PROGRAM  
SUBMITTAL PAGE☒ Program Description II☒ Program Listing(s)☒ Registers, Status...☒ Program Description I☒ User Instructions☒ MASS STORAGE  
MEDIA☒ Keyboard, Card Labeling  
(optional)

## ACKNOWLEDGMENT AND AGREEMENT

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Signature

Gary Goodman

Date Feb. 6, 1984

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Pages:

Mag Cards  
Cassette:

Price:

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Signature

Mary Goodman

Date

Feb 6, 1984

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No.  
Pages:

Mag Cards  
Cassette:

Price:

# PROGRAM DESCRIPTION I

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**Program Title** Submarine Hunt  
**Contributor's Name** Gary Goodman  
**Address** Box 259N Route 4  
**City** Fredericksburg **State/Country** Virginia **Zip Code** 22405

**Program Description, Equations, Variables** You are the captain of a destroyer with orders to seek out and destroy enemy submarines. The destroyer maneuvers on a 10 x 10 grid and searches for the submarine via sonar. The closer you are to the submarine the higher will be the pitch of the sonar's echo and the greater chance you will have of sinking it when you drop your depth charge. However if you are inept, the submarine might torpedo you. Two levels of play are available.

The game is played on a 10 x 10 grid numbered as shown in the grid on the next page. The submarine is hiding somewhere within the grid's outer boundaries. The captain may maneuver his destroyer to the center of each box by inputting the grid number (0-99) when requested with ORDERS. Each time the destroyer moves, it sends out a sonar pulse with a range of  $2\frac{1}{2}$  units. If the sub is within range of the sonar an echo will be returned; the closer the sub, the higher pitched will be the

**Necessary Accessories** Memory Module or HP-41CV

**Operating Limits and Warnings**

**Reference(s)** This program is a further development of the HP Users' Library program 41-00539-4, Search & Destroy (W/Out Wand), by Richard Altman.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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# PROGRAM DESCRIPTION I

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

Sonar Grid

echo. The highest pitch (Tone 9) indicates that the sub is within  $\frac{1}{2}$  unit. The captain attacks by moving the destroyer as close over the sub as he can then dropping a depth charge. The probability of a kill decreases with the distance that the sub is from the destroyer, and is zero if the sub is more than 1 unit away (Tone 1, 3, or 5). A kill is indicated by BOOM appearing on the display. Otherwise MISSED will be displayed and the sub will move to a new location within a radius of 1 unit from its previous position.

Warning: As long as the destroyer is close enough to the sub to receive an echo, the sub also hears the sonar blips. The closer the destroyer comes to the sub and the longer it "hangs around", the more annoyed the sub captain becomes with the destroyer's presence until at last he counter attacks if he can do so without endangering his own ship. For the sub captain to be able to use his torpedoes he must be at least 1 unit away but closer than  $2\frac{1}{2}$  units. The torpedo's

# PROGRAM DESCRIPTION I

accuracy also decreases with distance. Torpedos are very powerful! If the torpedo misses, the sub again moves as described previously.

The object of the game is to kill each sub with as few scans and depth charges (cans) as possible. At any time the status of the game may be obtained and after each game the best, worst and average scores may be obtained.

The advanced level of play is the same except that the captain has only 1 second to decide each move after he is prompted with ORDERS, and the probability of a kill with the depth charges is reduced. The advanced play is activated by setting Flag 01 before starting the game.

An auxiliary program, GRID, is included which will print practice grids as shown below.

```
0==0-1-2-3-4-5-6-7-8-9
10==0-1-2-3-4-5-6-7-8-9
20==0-1-2-3-4-5-6-7-8-9
30==0-1-2-3-4-5-6-7-8-9
40==0-1-2-3-4-5-6-7-8-9
50==0-1-2-3-4-5-6-7-8-9
60==0-1-2-3-4-5-6-7-8-9
70==0-1-2-3-4-5-6-7-8-9
80==0-1-2-3-4-5-6-7-8-9
90==0-1-2-3-4-5-6-7-8-9
```

# PROGRAM DESCRIPTION II

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**Sample Problem** (Sketch if Desired) Clear area represents possible location of submarine.

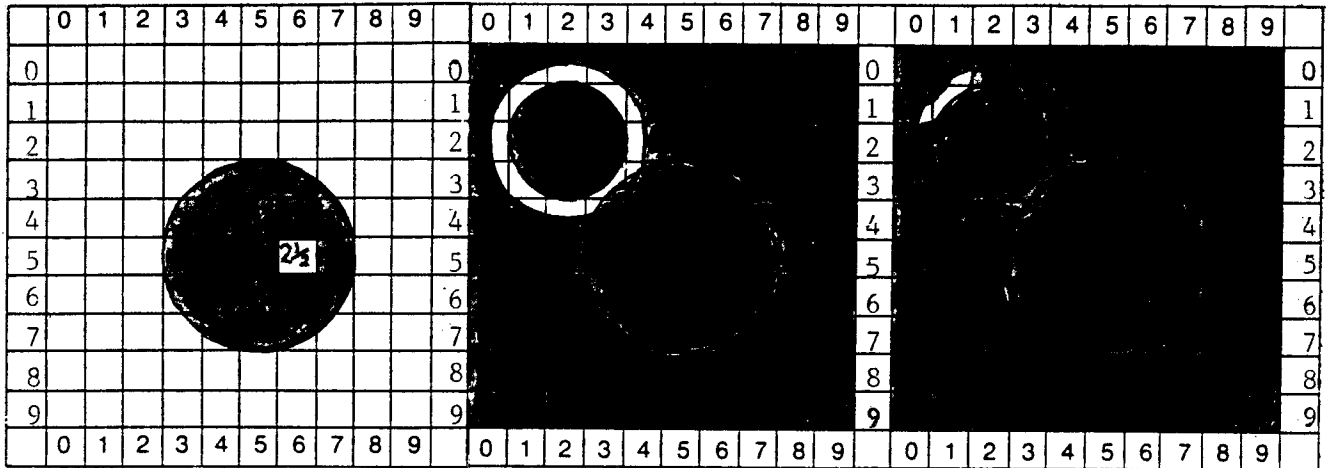


Figure 1

Figure 2

Figure 3

## SOLUTION:

Input	Function	Display	Comments
		CF 01	Choose beginning level of play.
SEED?	73	[XEQ] SCAN	
ORDERS 0		[R/S]	Seed for random number generator.
--SCANNING--	(1st move) 55	[R/S]	Destroyer starts at location 00.
ORDERS 55			Since there was no echo, the sub is not within the sonar's range (figure 1).
--SCANNING--	(2nd move) 22	[R/S]	
--CONTACT--			A TONE 3 echo indicates that the sub's range is 1½-2 units away.
low pitch echo (Tone 3)			Areas closer to or further from the destroyer can be eliminated (figure 2).
ORDERS 22			
--SCANNING--	(3rd move) 0	[R/S]	
--CONTACT--			A TONE 5 echo indicates that the sub is closer, 1-1½ units away.
middle pitch echo (Tone 5)			Eliminating the areas closer and further away leaves only a small area (figure 3).
ORDERS 0			
--SCANNING--	(4th move) 10	[R/S]	
--CONTACT--			A TONE 7 indicates that the sub is between ½-1 unit away, close enough to use depth charges.
high pitch echo (Tone 7)			
ORDERS 10			
(depth charge dropping)		[A]	Drop a depth charge.
BOOM			
1 CAN			
4 SCANS			
GOOD JOB			
NEW GAME? <E>			

# USER INSTRUCTIONS

				SIZE: (HP-41C) 011
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	Load program SCAN			
2a	For beginner's level game		CF 01	
2b	For advanced level game		SF 01	
3	Start game		[XEQ] SCAN	SEED?
4	Key in any number (0-100)	SEED	[R/S]	ORDERS 0
5	Enter a grid number  If sub is within $2\frac{1}{2}$ units an echo (Tone) will be heard and --CONTACT-- will flash on the display	n	[R/S]*	--SCANNING--  --CONTACT-- ORDERS n
6	Repeat step 5 until you are close to the sub (high pitched echo)			
7	Then drop a depth charge		[A]	depth charge BOOM or MISSED
8a	If BOOM then sub is sunk			x CANS y SCANS NEW GAME?<E>
8b	If MISSED then sub moves up to 1 unit from previous position. Go to step 5			ORDERS n

# USER INSTRUCTIONS

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
9	Optional: Display Status		[C]	x CANS y SCANS ORDERS n
10	Optional: Display Totals (after the completion of a game)		[D]	NO./GAMES=n WORST GAME= x CANS, y SCANS BEST GAME= x CANS, y SCANS AVERAGE= x.x CANS, y.y SCANS NEW GAME? <E>
11	For a new game keeping old scores intact, go to step 5		[E]	ORDERS 0
	<p>* When the advanced level of play is selected, the player has only 1 second to respond after ORDERS is displayed. Otherwise, the previous orders will be re-executed. The player does NOT press [R/S] after giving his orders.</p>			



## USER INSTRUCTIONS

[illegible]

# PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	*LBL	"SCA N"	Program Submarine Hunt	46	XEQ 02		- Calc. sub's dist.
02	*LBL	15		47	ST+ X		
03	SF	27		48	INT		
04	CF	29		49	ST+ X		Put sub's dist.
05	CLX		Initialization	50	9		into odd-number-
06	STO	00		51	X<>Y		ed bins
07	STO	01		52	-		
08	STO	08		53	X<=0?		If sub undetected
09	1	E9		54	GTO 16		- Go to Orders
10	STO	09		55	"--CONTA		
11	DEG			CT--"			
12	"SEED?"		} Prompt & store random number seed	56	TONE IND		- Tone indicates sub's range
13	PROMPT			57	AVIEW		
14	SIN			58	ST+ 10		- Increase sub
15	ABS			59	RCL 10		capt. annoyance
16	STO	04		60	XEQ 01		
17	*LBL	E	Start New Game	61	15		Sub captain may
18	SF	08		62	X>Y?		launch torpedo if
19	CF	21		63	GTO 16		his annoyance is
20	CLX		Zero statuses, destroyer's pos.	64	3		≥ 15 and TONE
21	STO	05	} Calc. sub's starting pos.	65	R↑		is 1 or 3
22	STO	06		66	X>Y?		If no attack
23	STO	07		67	GTO 16		- Go to Orders
24	STO	10		68	" ALER		
25	FIX	0		T"			Torpedo Attack
26	10			69	AVIEW		
27	XEQ	01		70	TONE 8		
28	STO	02		71	TONE 8		
29	10			72	TONE 8		
30	XEQ	01		73	TONE 8		
31	STO	03		74	TONE 8		
32	*LBL	16	Orders	75	"TORPEDO		
33	"ORDERS			ATTACK"			
	"			76	AVIEW		
34	RCL	07		77	9		} Calc. chance
35	ARCL	X		78	XEQ 01		} factor for hit
36	AVIEW		Prompt for ORDERS	79	PSE		
37	FS?	01	for destroyer's	80	X>Y?		If torpedo misses
38	PSE		position	81	GTO 18		- Go to Sub Moves
39	FC?	01		82	" * KABL		
40	STOP			AM *"			Torpedo hits
41	"--SCANN			83	AVIEW		destroyer
ING--"				84	PSE		
42	AVIEW			85	" GLUB		Destroyer sinks
43	STO	07		GLUB"			
44	ISG	06	- Incr. no. scans	86	AVIEW		
45	CLX						

# PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
87	TONE	8		133	XEQ 04	-	Display status
88	TONE	6		134	12		
89	TONE	4		135	RCL 06		
90	TONE	2		136	X>Y?		If > 12 scans
91	TONE	0		137	GTO 17		-Exit
92	CF	08		138	"GOOD JO		
93	SF	11	Captain goes down	B"			Display GOOD JOB
94	PSE		with ship. All	139	AVIEW		
95	OFF		scores are clear-	140	BEEP		
96	GTO	15	ed on restart.	141	PSE		
97	LBL	A	Drop Depth Charge	142	LBL 17		End-of-Game Exit
98	FC?	08	If between games	143	"NEW GAM		
99	GTO	17	- Exit	E?<E>"			
100	"		} Depth charge display	144	AVIEW		
101	"			145	TONE 8		
102	AVIEW			146	TONE 5		
103	ISG	05	- Incr. no. cans	147	CF 08		
104	CLX			148	STOP		
105	XEQ	02	- Calc. sub's dist.	149	GTO E		-Go to New Game
106	FC?	01	If easy game	150	LBL 18		Sub Moves Routine
107	X↑2		- increase hit prob.	151	"MISSED"		
108	1			152	AVIEW		
109	XEQ	01		153	TONE 0		
110	X<=Y?		If can misses	154	TONE 0		
111	GTO	18	- Go to Sub Moves	155	360		Calc. movement
112	"BOOM"			156	XEQ 01		
113	AVIEW			157	ENTER↑		-Direction of move
114	TONE	5		158	FRC		-Distance moved
115	TONE	5	Depth charge	159	P-R		
116	TONE	5	sinks sub	160	ST+ 02		Update sub's
117	TONE	4		161	X<>Y		position
118	ISG	00		162	RCL 03		
119	CLX		- Incr. game count	163	+		
120	RCL	08		164	XEQ 03		Insure that row
121	RCL	06	} Encode scans & cans into scans.cans for R01	165	STO 03		& col. position
122	RCL	05		166	RCL 02		of sub is with-
123	1 E5			167	XEQ 03		in bounds
124	/			168	STO 02		
125	+			169	GTO 16		-Go to Orders
126	ST+ 01		- Add to total	170	LBL 01		Subroutine
127	X>Y?			171	RCL 04		Random Number
128	STO 08		- Update worst game	172	9821		returns random
129	RCL 09			173	*		number between
130	X<>Y			174	.211327		0 and R <sub>x</sub>
131	X<=Y?			175	+		
132	STO 09		- Update best game	176	FRC		
				177	STO 04		
				178	*		
				179	RTN		

# PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
180	LBL	02	-----	229	LBL	D	Summary Routine
181	RCL	07	Subroutine	230	FS?	08	If during game
182	10		Distance to Sub	231	GTO	16	- Exit
183	/			232	FIX	0	
184	INT			233	"NO./GAM		
185	RCL	03		ES="			
186	-			234	ARCL	00	
187	RCL	07		235	XEQ	08	- NO./GAMES #
188	10			236	"WOR"		
189	MOD			237	RCL	08	
190	RCL	02		238	XEQ	06	- WORST GAME #
191	-			239	" BE"		
192	.5			240	RCL	09	
193	ST+ Z			241	XEQ	06	- BEST GAME #
194	+			242	" AVERAG		
195	R-P			E="			
196	RTN			243	AVIEW		
197	LBL	03	-----	244	FIX	1	
198	10		Subroutine	245	RCL	01	
199	X>Y?		Insure x is with-	246	INT		
200	X<>Y		in plot boundar-	247	LASTX		
201	X<0?		ies 0 ≤ x ≤ 10	248	FRC		
202	CLX			249	RCL	00	
203	RTN		-----	250	ST/ Z		- Average scans
204	LBL	C	Status Routine	251	/		- .00001*avg. cans
205	FIX	0		252	XEQ	07	- Display averages
206	XEQ	04		253	GTO	17	- Exit
207	FS?	08	If during game				
208	GTO	16	- Go to Orders				
209	GTO	17	- Otherwise Exit				
210	LBL	04	Subroutine				
211	SF	07	CANS/SCANS				
212	RCL	05					
213	XEQ	05	- Display CANS #				
214	RCL	06					
215	LBL	05	-----				
216	CLA		Routine to				
217	ARCL	X	format & display				
218	"F "		CANS # or SCANS #				
219	FC?C	07					
220	"FS"						
221	"FCAN"						
222	1						
223	X≠Y?						
224	"FS"						
225	AVIEW						
226	PSE						
227	PSE						
228	RTN						

# PROGRAM LISTING

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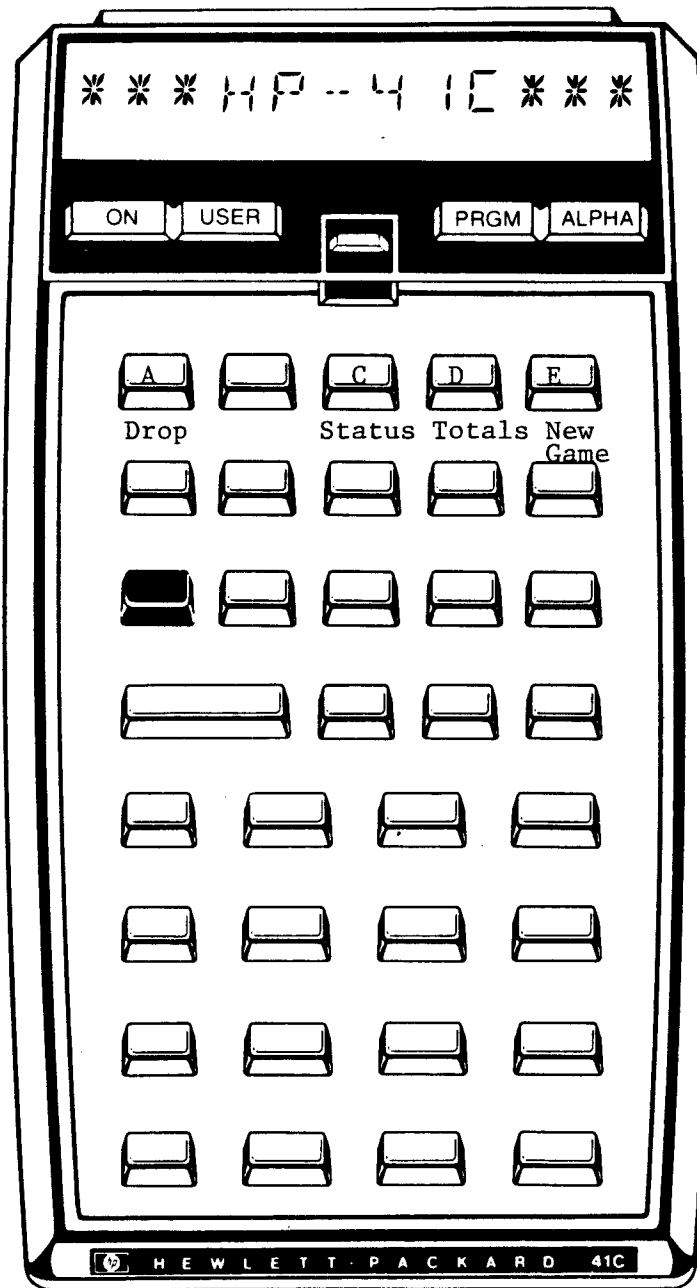
☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
254	LBL 06		Subroutine	01	LBL "GRI		Program
255	"FST GAM		Format & Display	D"			Print Practice
E="				02	CF 12		Grid
256	AVIEW			03	SF 21		
257	INT			04	CF 29		
258	LASTX			05	FIX 0		
259	FRC			06	.0901		
260	LBL 07			07	LBL 01		
261	1 E5			08	" "		
262	*			09	INT		
263	" "			10	X=0?		
264	ARCL X			11	"F "		
265	"F CAN"			12	ARCL X		
266	1			13	LASTX		
267	X=Y?			14	"F==0-1-		
268	"FS"			2-3-4-5"			
269	"F, "			15	"F-6-7-8		
270	RCL Z			-9"			
271	ARCL X			16	PRA		
272	"F SCAN"			17	ISG X		
273	X=Y?			18	GTO 01		
274	"FS"			19	ADV		
275	"F "			20	ADV		
276	PSE			21	ADV		
277	LBL 08		- Entry Point for	22	ADV		
278	AVIEW		Display	23	ADV		
279	TONE 8			24	END		
280	TONE 6						
281	PSE						
282	END						

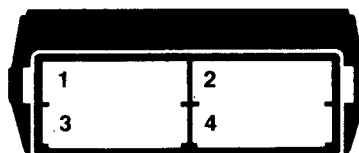
FUNCTION	KEY	FUNCTION	KEY
1. <u>START</u>	1	1. <u>START</u>	1
2. <u>STOP</u>	2	2. <u>STOP</u>	2
3. <u>RESET</u>	3	3. <u>RESET</u>	3
4. <u>PAUSE</u>	4	4. <u>PAUSE</u>	4
5. <u>RECALL</u>	5	5. <u>RECALL</u>	5
6. <u>DELETE</u>	6	6. <u>DELETE</u>	6
7. <u>EDIT</u>	7	7. <u>EDIT</u>	7
8. <u>SAVE</u>	8	8. <u>SAVE</u>	8
9. <u>LOAD</u>	9	9. <u>LOAD</u>	9
10. <u>EXECUTE</u>	10	10. <u>EXECUTE</u>	10
11. <u>TEST</u>	11	11. <u>TEST</u>	11
12. <u>DEBUG</u>	12	12. <u>DEBUG</u>	12
13. <u>HELP</u>	13	13. <u>HELP</u>	13
14. <u>QUIT</u>	14	14. <u>QUIT</u>	14
15. <u>END</u>	15	15. <u>END</u>	15

# KEYBOARD CARD LABELING

KEYBOARD



SYSTEM  
CONFIGURATION



CARD

