

IDENTIFICATION  
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PRODUCT CODE: MAINDEC 12-D688-D  
PRODUCT NAME: VR12 DISPLAY TEST  
DATE CREATED: 9-21-70  
MAINTAINER: DIAGNOSTICS GROUP  
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1. ABSTRACT

THIS PROGRAM TESTS THE PDP-12 DISPLAY SYSTEM BY GENERATING THREE DISTINCT PATTERNS ON THE SCOPE, TWO WITH THE DIS INSTRUCTION AND ONE WITH THE DSC INSTRUCTION.

2. REQUIREMENTS

2.1 EQUIPMENT

A. PDP-12A OR PDP-12B

2.2 STORAGE

MOST OF LOCATIONS 4000(B) TO 6000(B)

3. LOADING PROCEDURES

3.1 METHOD

- A. MOUNT A DIAL TAPE ON UNIT 0,
- B. SET MODE TO LINC AND DEPRESS I/O PRESET.
- C. SET LSW=701 RSW=7000 AND SSW=0
- D. DEPRESS THE "DO" TOGGLE
- E. DEPRESS START 20.
- F. TO CALL THE PROGRAM FROM DIAL INDEX:
- G. TYPE LINE FEED, LO DISPTST, COMMA, CARRIAGE RETURN,  
LO DISPTST 0 <CR>
- H. DIAL LOADER WILL SELF START PROGRAM,
- I. RESTART PROCEDURE: DEPRESS START 20.

4.

OPERATOR ACTION  
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UPON STARTING, THE PROGRAM WILL ALTERNATELY DISPLAY THE THREE PATTERNS, EACH FOR APPROXIMATELY TEN SECONDS.

A. FREEZE ON CURRENT PATTERN,

STRIKING THE KEY F WILL DIRECT THE PROGRAM TO LOCK INTO THE ROUTINES THAT ARE CONTROLLING DISPLAY OF THE CURRENT PATTERN.

B. ALTERNATE BETWEEN THREE PATTERNS.

STRIKING ANY KEY BUT F WILL DIRECT THE PROGRAM TO ALTERNATE THE DISPLAY BETWEEN THE THREE PATTERNS. IT SHOULD BE NOTED THAT REQUESTING THE ALTERNATE SEQUENCE WHILE IN ALTERNATE MODE OR THE FREEZE SEQUENCE WHILE IN FREEZE MODE HAS NO EFFECT.

C. RETURN TO DIAL.

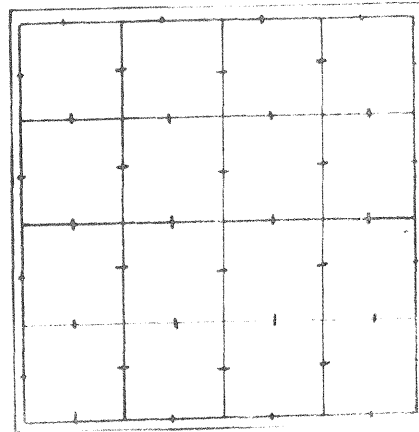
(O) SET SW<sub>0</sub>-1, PROGRAM WILL RETURN TO DIAL

5.

PROGRAM DESCRIPTION  
-----

A. PATTERN 1

THIS PATTERN GENERATED BY THE DIS INSTRUCTION TAKES THE FOLLOWING FORM.



THIS PERMITS CALIBRATION OF THE SCOPE.

B. PATTERN 2

THE PATTERN GENERATED BY THE DSC INSTRUCTION TAKES THE FOLLOWING FORM:

(QUADRANT 2)    CHAN 0            CHAN 1  
                 HALF SIZE    FULL SIZE (QUADRANT 1)

(QUADRANT 3)    CHAN 0            CHAN 1  
                 FULL SIZE    HALF SIZE (QUADRANT 4)

THE PATTERN DOES WHAT THE DISPLAY SAYS, ONE HALF OF ONE CHARACTER IS DISPLAYED IN ONE CORNER OF THE SCOPE THEN HALF OF ONE CHARACTER IS DISPLAYED IN THE OPPOSITE CORNER OF THE SCOPE, THE LEFT HALF OF THE CHARACTER IN QUADRANTS 2 AND 4 ARE DISPLAYED FIRST, THEN THE LEFT HALF OF THE CHARACTER IN QUADRANTS 1 AND 3 ARE DISPLAYED, WHEN THE LEFT HALF OF ALL CHARACTERS ON THE SCOPE HAVE BEEN DISPLAYED THE SEQUENCE IS REPEATED FOR THE RIGHT HALF OF THE CHARACTERS.

C. PATTERN 3

DISPLAY AN X PATTERN.

THIS PATTERN IS 2 DIAGONAL LINES FROM TOP LEFT CORNER TO BOTTOM RIGHT CORNER, AND FROM BOTTOM LEFT CORNER TO TOP, RIGHT CORNER, THIS PATTERN IS USED TO ADJUST DEFLECTION AMPLIFIERS OF THE VR12,



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1
2
3 /DIS TEST VERSION 18
4 /PDP-12 DISPLAY CONTROL AND SCOPE TEST
5
6 /COPYRIGHT 1970 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
7
8 /FERRARINI D.
9
10 /POINT DISPLAY PATTERN [DISPAT
11 /CHARACTER DISPLAY PATTERN [DSCPAT
12 /DISPLAY X PATTERN [DISP
13
14 /6-7-69
15 /REVISED 8-20-69 RTB
16 /REVISED 8-29-69 HRL
17 /REVISED 9-01-70 RAS
18
19 4000 SEGMENT 2
20 4010 *10
21 4010 0000 Q4BETA, 0
22 4011 0000 Q3BETA, 0
23 4012 0000 Q2BETA, 0
24 4013 0000 Q1BETA, 0
25
26 4020 4020 *20
27 4021 0001 LDA I
28 4022 4660 STC FLAG
29 4023 0077 SET I 17
30 4024 7477 -300
31 4025 6036 JMP INCB /TEST INCREMENT THE M.B.
32 4026 6621 JMP CLOCK /CHECK CLOCK
33 4027 6031 JMP DISPAT
34 4030 6400 JMP 400 /DO DSC TEST
35 4031 6100 DISPAT, JMP TST1 /DO DIS PATTERN
36 4032 6232 JMP TST2
37 4033 6641 JMP TTYOPT /CHECK TTY OPTIONS
38 4034 6026 JMP DISPAT=3
39 4035 6030 JMP DISPAT-1 /BACK TO GO
40
41 4036 1000 INCB, LDA /GET THE RETURN
42 4037 0000 0000 / ADDRESS
43 4040 4076 STC EXMB /SAVE IN EXIT
44 4041 4000 STC 0 /CLEAR LOG, 0
45 4042 0160 DIS I /DISPLAY A POINT
46 4043 1000 LDA /GET THE VALUE IN
47 4044 0000 0000 / LOC, 0000
48 4045 1460 SAE I /IS IT EQUAL TO
49 4046 0001 0001 / THE EXPECTED
50 4047 0000 HLT /NO, INCREMENT THE
51 /MB FAILED AFTER
52 /A DIS INSTRUCTION
53 4050 0011 CLR /CLEAR A,C.
54 4051 0004 ESF /CLEAR S,F,R.
55 4052 4001 STC 1 /CLEAR LOC, 0001

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56 4053 1762 DSC I /DISPLAY A CHARACTER
57 4054 4477 4477 /LOAD THE A.C. WITH
58 4055 1000 LDA /THE VALUE IN LOC, 0001
59 4056 0001 0001 /IS IT EQUAL TO
60 4057 1463 SAE I /THE EXPECTED VALUE?
61 4060 0004 0004 /INCREMENT THE M.B.
62 4061 0000 HLT /FAILED AFTER A
63 /DSC INSTRUCTION
64 /LOAD THE A.C.
65 4062 1020 LDA I /WITH 0200
66 4063 0200 0200 /LOAD S.F.R.
67 4064 0004 ESF /CLEAR A.C. AND
68 4065 0011 CLR /LOC, 0001
69 4066 0001 0001 /DISPLAY A CHARACTER
70 4067 1760 STC I /LOAD THE A.C. WITH
71 4070 7744 7744 /VALUE IN LOC 1
72 4071 1000 LDA /IS IT EQUAL TO
73 4072 0001 0001 /THE EXPECTED?
74 4073 1460 SAE I /NO, INCREMENT THE
75 4074 0010 0010 /MB FAILED AFTER
76 4075 0000 HLT /A DSC INSTRUCTION
77
78
79 4076 6076 EXMB, JMP
80 4100 4100 *100
81
82 /THE SUBROUTINE BELOW WILL GENERATE 5
83 /LINES ACROSS THE SCREEN, THE POINT
84 /SPACING IS 4 UNITS
85 /THE FIRST LEFT HAND POINT IS
86 /2000, THE LAST RIGHT HAND POINT IN
87 /EACH LINE IS 0774.
88
89 /A GLITCH IS PLACED AT THE HORIZONTAL
90 /POINTS OF 100,300,500 AND 700 ON
91 /EACH LINE
92 TST1, LDA
93 4100 1000 0
94 4101 0000 0
95 4102 1060 0
96 4103 0000 0
97 4104 1020 LDA I
98 4105 0010 10
99 4106 4134 STC I
100 4107 0062 SET I 2
101 4110 0000 0

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```

101
102 4111 6135 TST1LP, JMP LP1
103 4112 1000 LDA
104 4113 0002 2
105 4114 1660 BCD I
106 4115 0100 100
107 4116 1560 BCL I
108 4117 7600 7600
109 4120 0470 ABE I
110 4121 6206 JMP T10L
111 4122 1000 LDA
112 4123 0002 2
113 4124 1120 ADA I
114 4125 0004 4
115 4126 1040 STA
116 4127 0002 2
117 4130 1460 SAE I
118 4131 1000 1000
119 4132 6111 JMP TST1LP
120 4133 6103 JMP TST1+3

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121
122 4134 0000 REL, 0000 /VARIABLE

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123
124 /THIS IS THE ROUTINE THAT DISPLAYS
125 /FIVE POINTS, ONE ON EACH OF THE
126 /HORIZONTAL LINES

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127 4135 1000 LP1, LDA
128 4136 0000 0
129 4137 1060 STA I
130 4140 0000 0
131 4141 1020 LDA I
132 4142 0370 370
133 4143 2134 ADD REL
134 4144 0142 DIS 2
135 4145 1000 LDA
136 4146 0002 2
137 4147 0017 COM
138 4150 4002 STC 2
139 4151 1020 LDA I
140 4152 0367 367
141 4153 2134 ADD REL
142 4154 0142 DIS 2
143 4155 1000 LDA
144 4156 0002 2
145 4157 0017 COM
146 4160 4002 STC 2
147 4161 1020 LDA I
148 4162 0570 570
149 4163 2134 ADD REL
150 4164 0142 DIS 2
151 4165 1000 LDA
152 4166 0002 2
153 4167 0017 COM
154 4170 4002 STC 2
155 4171 1020 LDA I

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156 4172 0167  
157 4173 2134  
158 4174 0142  
159 4175 1000  
160 4176 0002  
161 4177 0017  
162 4200 4002

167  
ADD  
DIS  
LDA  
2  
COM  
STC

REL  
2

2

```

163 4201 1020 LDA I
164 4202 0767 767
165 4203 2134 ADD REL
166 4204 0142 DIS 2
167 4205 6140 JMP LP1+3
168
169 4206 1000 T1GL, LDA /GLITCH GENERATOR
170 4207 0000 0
171 4210 1060 STA I
172 4211 0000 0
173 4212 1020 LDA I
174 4213 0020 20
175 4214 4134 STC REL
176 4215 6135 JMP LP1
177 4216 0011 CLR
178 4217 1020 LDA I
179 4220 7774 7774
180 4221 1200 LAM
181 4222 0134 REL
182 4223 1460 SAE I
183 4224 7774 7774
184 4225 6215 JMP T1GL+7
185 4226 1020 LDA I
186 4227 0010 10
187 4230 4134 STC REL
188 4231 6211 JMP T1GL+3
189
190 /THIS ROUTINE GENERATES 5 VERTICAL LINES
191 /AT HORIZONTAL LOCATIONS 0,177,377,577,777.
192 /GLITCHES ARE DISPLAYED AT VERTICAL LOCATIONS
193 /177,377,500,700 ON THE LINES.
194 4232 1000 TST2, LDA
195 4233 0000 0
196 4234 1060 STA I
197 4235 0000 0
198
199 4236 0011 CLR
200 4237 4134 STC REL
201
202 4240 6262 TST2LP, JMP LP2A /SET UP INDEX REG.
203 4241 6301 JMP LP2B /GO DISPLAY SOME POINTS
204 4242 1000 LDA
205 4243 0134 REL
206 4244 1660 BCO I
207 4245 0100 100
208 4246 1560 BCL I
209 4247 7600 7600
210 4250 0470 AZE I
211 4251 6325 JMP GL2
212 4252 1020 LDA I
213 4253 0004 4
214 4254 1140 ADM
215 4255 0134 REL
216 4256 1460 SAE I
217 4257 1000 1000 /DONE ALL POINTS YET

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218 4260 6241  
219 4261 6235  
220

JMP  
JMP  
TST2LP  
TST2+3

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221
222 4262 1000 LP2A, LDA /SET UP INDEX REGISTERS
223 4263 0000 0
224 4264 1060 STA I
225 4265 0000 0000
226 4266 0062 SET I 2
227 4267 0000 0
228 4270 0063 SET I 3
229 4271 0177 177
230 4272 0064 SET I 4
231 4273 0377 377
232 4274 0065 SET I 5
233 4275 0577 577
234 4276 0066 SET I 6
235 4277 0777 777
236 4300 6265 JMP LP2A+3
237
238 /ACTUALLY DISPLAY THE 5 POINTS
239 4301 1000 LP2B, LDA
240 4302 0000 0
241 4303 1060 STA I
242 4304 0000 0
243 4305 1000 LDA
244 4306 0134 REL
245 4307 0142 DIS 2
246 4310 0017 COM
247 4311 0146 DIS 6
248 4312 1000 LDA
249 4313 0134 REL
250 4314 1120 ADA I
251 4315 0200 200
252 4316 0143 DIS 3
253 4317 0017 COM
254 4320 0145 DIS 5
255 4321 1000 LDA
256 4322 0134 REL
257 4323 0144 DIS 4
258 4324 6304 JMP LP2B+3
259
260 /DISPLAY THE GLITCHES ON THE VERTICAL LINES
261 4325 1000 GL2, LDA
262 4326 0000 0
263 4327 1060 STA I
264 4330 0000 0
265 4331 0075 SET I 15
266 4332 7772 -5
267 4333 1020 LDA I
268 4334 0767 767
269 4335 4343 STC GL2V
270 4336 0067 SET I 7
271 4337 7772 -5
272 4340 0075 SET I 10
273 4341 0001 1
274 4342 1020 LDA I
275 4343 0767 GL2V, 767

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276	4344	1170	ADM I	10
277	4345	0227	XSK I	7
278	4346	6342	JMP	,-4
279				
280	4347	6501	JMP	LP2B
281	4350	1020	LDA I	
282	4351	0004	4	
283	4352	4343	STC	GL2V

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284
285 4353 4235      XSK I  15
286 4354 6336      JMP    GL2V=5
287 4355 6262      JMP    LP2A      /RESET HORIZONTAL POSITION
288 4356 6330      JMP    GL2+3     /GO BACK
289
290                *400
291 4400 0077      SET I  17
292 4401 0000      0
293 4402 6621      JMP    CLOCK
294 4403 6405      JMP    DSCPAT
295 4404 7103      JMP    DISPX
296
297 4405 0075      DSCPAT, SET I  15      /PUT GRID PATTERN ADDR FOR
298 4406 0666      Q1GRID-1      /EACH QUAD IN 4 RETAS
299 4407 1035      LDA I  15
300 4410 4013      STC    Q1BETA
301 4411 1035      LDA I  15
302 4412 4012      STC    Q2BETA
303 4413 1035      LDA I  15
304 4414 4011      STC    Q3BETA
305 4415 1035      LDA I  15
306 4416 4010      STC    Q4BETA
307              /HAFFLG=0 WHEN DISPLAYING LEFT HALF OF PATTERN
308              /=4 WHEN DISPLAYING RIGHT HALF
309 4417 4661      STC    HAFFLG
310 4420 0067      SET I  7      /INITIALIZE ARGUMENTS
311 4421 0662      RHCHNG-1
312 4422 0074      SET I  14      /THERE ARE
313 4423 7773      -4      /4 QUADRANTS
314              /IN RIGHT HALF PASS NOP BELOW WILL BE REPLACED BY ADA I 7
315              /LEFT AND RIGHT HALF SEQUENCES ARE STAGGERED BY A CONSTANT
316              /20 FOR FULL SIZE CHARACTERS, 10 FOR HALF SIZE
317 4424 1035      LDA I  15      /PTR FOR HORIZ COORD
318 4425 0016      RH1,  NOP
319 4426 1075      STA I  15      /HORIZ ARGUMENT
320 4427 1035      LDA I  15      /PTR FOR VERT COORD
321 4430 1075      STA I  15      /VERT ARGUMENT
322 4431 0234      XSK I  14      /DONE ALL QUADRANTS
323 4432 6424      JMP    RH1-1     /NO
324 4433 4662      STC    LNFLG    /=0 WHEN DOING LN 2 ,N
325              /E, 0 WHEN DOING LN 1
326 4434 0075      SET I  15      /THERE ARE 6 CHAR ON LN 1
327 4435 7771      -6
328 4436 0004      ESF                /ENABLE HALF SIZE CHARS
329 4437 2700      LOOP1, ADD    Q2HOR    /SELECT CHAN 0 AND
330 4440 4001      STC    1      /SET HORIZ COORD
331 4441 2702      ADD    Q2VER    /VERT COORD TO AC
332 4442 1772      DSC I  Q2BETA    /DSC IN QUAD 2
333 4443 1021      LDA I                /BUMP HORIZ COORD TO

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334
335 4444 0017 BHQ2, 10
336 4445 2001 ADD 1
337 4446 4702 STC Q2HOR
338 4447 2710 ADD Q4HOR /SET HORIZ COORD
339 4450 1620 BSE I
340 4451 4000 4000
341 4452 4001 STC 1
342 4453 2712 ADD Q4VER
343 4454 1770 DSC I Q4BETA /DSC IN QUAD 4
344 4455 1020 LDA I /BUMP HORIZ COORD
345 4456 0010 BHQ4, 10
346 4457 2001 ADD 1
347 4460 4710 STC Q4HOR
348 4461 0235 XSK I 15 /DONE A LN?
349 4462 6437 JMP LOOP1 /NO
350 4463 2662 ADD LNFLG
351 4464 0470 AZE I /DONE 2 LNS?
352 4465 6511 JMP FULSIZE /YES GO TO FULL SIZE CHARS
353 4466 0075 SET I 15 /THERE ARE 11
354 4467 7766 -11 /CHARS IN LN 2
355 4470 0011 CLR /SET LNFLG
356 4471 4662 STC LNFLG /TO EXIT ON NEXT CHK
357 4472 2677 ADD KQ2HOR /RESET HORIZ
358 4473 2661 ADD HAFFLG /AND VERT
359 4474 4700 STC Q2HOR /COORD
360 4475 2701 ADD KQ2VER /FOR LN 2
361 4476 1120 ADA I
362 4477 7737 BVQ2, -40
363 4500 4702 STC Q2VER
364 4501 2707 ADD KQ4HOR
365 4502 2661 ADD HAFFLG
366 4503 4710 STC Q4HOR
367 4504 2711 ADD KQ4VER
368 4505 1120 ADA I
369 4506 7737 BVQ4, -40
370 4507 4712 STC Q4VER
371 4510 6437 JMP LOOP1 /DOO LN 2
372 4511 0075 FULSIZE, SET I 15 /SET CTR
373 4512 7771 -6 /FOR LN 1
374 /DELAY, SIZE CHANGE NEXT
375 4513 0076 SET I 16
376 4514 7737 -40
377 4515 0236 XSK I 16
378 4516 6515 JMP , -1
379
380 4517 1020 LDA I /ENABLE
381 4520 0200 200 /FULL SIZE
382 4521 0004 ESF /CHAR
383 4522 4662 STC LNFLG /SET FLAG FOR LN 1
384 4523 2674 LOOP2, ADD Q1HOR /HORIZ COORD
385 4524 1620 BSE I
386 4525 4000 4000
387 4526 4001 STC 1
388 4527 2676 ADD Q1VER

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389	4530	1773	DSC I	QIBETA	/OUAD 1
390	4531	1020	LDA I		
391	4532	0020	BH01,	20	/BUMP HORIZ
392	4533	2001	ADD 1		

393					
394	4534	4674	STC	Q1HOR	
395	4535	2704	ADD	Q3HOR	/HORIZ COORD
396	4536	4001	STC	1	/CHAN 0
397	4537	2706	ADD	Q3VER	
398	4540	1771	DSC I	Q3BETA	/QUAD 3
399	4541	1020	LDA I		
400	4542	0020	BHQ3,	20	
401	4543	2001	ADD	1	
402	4544	4704	STC	Q3HOR	
403	4545	0235	XSK I	15	/DONE A LN?
404	4546	6523	JMP	LOOP2	/NO
405	4547	2662	ADD	LNFLG	
406	4550	0470	AZE I		/DONE 2 LNS?
407	4551	6577	JMP	HAFCHK	/YES CHK FOR 2ND HALF OF PATTERN
408	4552	0075	SET I	15	/NO SET FOR LN 2
409	4553	7766	-11		
410	4554	0011	CLR		/SET LNFLG FOR
411	4555	4662	STC	LNFLG	/EXIT TO HAFCHK
412	4556	2673	ADD	KQ1HOR	/RESET COORDINATES
413	4557	2661	ADD	HAFFLG	
414	4560	2661	ADD	HAFFLG	
415	4561	4674	STC	Q1HOR	
416	4562	2675	ADD	KQ1VER	
417	4563	1120	ADA I		
418	4564	7737	BVQ1,	-40	
419	4565	4676	STC	Q1VER	
420	4566	2703	ADD	KQ3HOR	
421	4567	2661	ADD	HAFFLG	
422	4570	2661	ADD	HAFFLG	
423	4571	4704	STC	Q3HOR	
424	4572	2705	ADD	KQ3VER	
425	4573	1120	ADA I		
426	4574	7737	BVQ3,	-40	
427	4575	4706	STC	Q3VER	
428	4576	6523	JMP	LOOP2	/DO LN 2
429	4577	1000	HAFCHK,	LDA	/DONE BOTH
430	4600	0661	HAFFLG		/LEFT AND RIGHT
431	4601	0450	AZE		/SEQUENCES?
432	4602	6614	JMP	DSCEND	/YES EXIT
433	4603	1020	LDA I		/NO SET FOR
434	4604	0004	4		/DSC RIGHT SEQ,
435	4605	4661	STC	HAFFLG	/SET HAFFLG FOR EXIT
436	4606	1020	LDA I		/ENABLE INST TO ADD A
437	4607	1127	ADA I	7	/CONSTANT FOR
438	4610	4425	STC	RH1	/RIGHT HALF SEQ.
439	4611	0075	SET I	15	
440	4612	0672	KQ1HOR-1		
441	4613	6420	JMP	RH1-5	/DO RIGHT HALF SEQ,

442					
443	4614	1020	DSCEND,	LDA I	/RESTORE NOP
444	4615	0016		NOP	/FOR NEXT LEFT HALF SEQ.
445	4616	4425		STC	RH1
446	4617	6641		JMP	TTYOPT
447	4620	6402		JMP	DSCPAT-3
448	4621	1000	CLOCK,	LDA	
449	4622	0000		0	
450	4623	4640		STC	RTNJMP
451	4624	7140		JMP	SNSOPT
452	4625	1000		LDA	/CHK FOR ALTERNATING SEQ.
453	4626	0660		FLAG	
454	4627	0470		AZE I	/WHICH SEQ.?
455	4630	6640		JMP	RTNJMP
456	4631	0237		XSK I	17
457	4632	6640		JMP	RTNJMP
458					/REFRESH SCOPE
459	4633	1000		LDA	
460	4634	0640		RTNJMP	
461	4635	1120		ADA I	
462	4636	0001		1	
463	4637	4640		STC	RTNJMP
464	4640	0000	RTNJMP,	0	
465	4641	1000	TTYOPT,	LDA	/SAVE RTN JMP
466	4642	0000		0	
467	4643	4657		STC	EXIT
468	4644	0415		KST	/HAVE TTY OPTIONS BEEN REQUESTED?
469	4645	6000		JMP	0
470	4646	0500		IOB	/NO RTN
471				Pmode	/YES GET CHAR
472	4647	6036		KRB	/F FREEZES THE
473				Lmode	
474	4650	1460		SAE I	/CURRENT PATTERN
475	4651	0306		306	/ANY OTHER KEY ALTERNATES
476	4652	6656		JMP	EXIT-1
477	4653	0011		CLR	/FREEZE ON CURRENT PATTERN
478	4654	4660		STC	FLAG
479	4655	6657		JMP	EXIT
480	4656	4660		STC	FLAG
481	4657	0000	EXIT,	0	/SET FLAG ,NE. TO 0
482	4660	0000	FLAG,	0	
483	4661	0000	HAFFLG,	0	
484	4662	0000	LNFLG,	0	
485	4663	0010	RHCHNG,	10	
486	4664	0004		4	
487	4665	0010		10	
488	4666	0004		4	
489	4667	0712	Q1GRID,	Q4VER	/ADDR -1 OF GRID PATTERNS
490	4670	0750	Q2GRID,	Q4VER+36	
491	4671	1006	Q3GRID,	Q4VER+74	
492	4672	1044	Q4GRID,	Q4VER+132	
493	4673	0450	KQ1HOR,	450	
494	4674	0000	Q1HOR,	0	
495	4675	0340	KQ1VER,	340	
496	4676	0000	Q1VER,	0	

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/DIS TEST VERSION 1B

497	4677	0013	DIAL10	K02HOR, 10
498	4700	0000		G2HOR, 0
499	4701	0340		K02VER, 340

500  
501 4702 0000 Q2VER, 0  
502 4703 0010 KQ3HOR, 10  
503 4704 0000 Q3HOR, 0  
504 4705 7477 KQ3VER, -300  
505 4706 0000 Q3VER, 0  
506 4707 0600 KQ4HOR, 600  
507 4710 0000 Q4HOR, 0  
508 4711 7477 KQ4VER, -300  
509 4712 0000 Q4VER, 0

/GRID PATTERNS  
/QUAD 1 LEFT HALF

510  
511  
512 4713 4136 4136 /C  
513 4714 1077 1077 /H  
514 4715 4477 4477 /A  
515 4716 3077 3077 /N  
516 4717 0000 0 /SPACE  
517 4720 2101 2101 /I  
518 4721 4477 4477 /F  
519 4722 0177 0177 /U  
520 4723 0177 0177 /L  
521 4724 0177 0177 /L  
522 4725 0000 0 /SPACE  
523 4726 5121 5121 /S  
524 4727 7741 7741 /I  
525 4730 4543 4543 /Z  
526 4731 4577 4577 /E

/RIGHT HALF

527  
528 4732 2241 2241 /C  
529 4733 7710 7710 /H  
530 4734 7744 7744 /A  
531 4735 7706 7706 /N  
532 4736 0000 0 /SPACE  
533 4737 0177 0177 /I  
534 4740 4044 4044 /F  
535 4741 7701 7701 /U  
536 4742 0301 0301 /L  
537 4743 0301 0301 /L  
538 4744 0000 0 /SPACE  
539 4745 4651 4651 /S  
540 4746 0041 0041 /I  
541 4747 6151 6151 /Z  
542 4750 4145 4145 /E

/QUAD 2 LEFT HALF

543  
544 4751 4136 4136 /C  
545 4752 1077 1077 /H  
546 4753 4477 4477 /A  
547 4754 3077 3077 /N  
548 4755 0000 0 /SPACE  
549 4756 4136 4136 /0  
550 4757 1077 1077 /H  
551 4760 4477 4477 /A  
552 4761 0177 0177 /L  
553 4762 4477 4477 /F  
554 4763 0000 0 /SPACE

555					
556	4764	5121	5121	/S	
557	4765	7741	7741	/I	
558	4766	4543	4543	/Z	
559	4767	4577	4577	/E	
560					
561	4770	2241	2241	/C	
562	4771	7710	7710	/H	
563	4772	7744	7744	/A	
564	4773	7706	7706	/N	
565	4774	0000	0	/SPACE	
566	4775	3641	3641	/0	
567	4776	7710	7710	/H	
568	4777	7744	7744	/A	
569	5000	0301	0301	/L	
570	5001	4044	4044	/F	
571	5002	0000	0	/SPACE	
572	5003	4651	4651	/S	
573	5004	0041	0041	/I	
574	5005	6151	6151	/Z	
575	5006	4145	4145	/E	
576					
577	5007	4136	4136	/C	
578	5010	1077	1077	/H	
579	5011	4477	4477	/A	
580	5012	3077	3077	/N	
581	5013	0000	0	/SPACE	
582	5014	4136	4136	/0	
583	5015	4477	4477	/F	
584	5016	0177	0177	/U	
585	5017	0177	0177	/L	
586	5020	0177	0177	/L	
587	5021	0000	0	/SPACE	
588	5022	5121	5121	/S	
589	5023	7741	7741	/I	
590	5024	4543	4543	/Z	
591	5025	4577	4577	/E	
592					
593	5026	2241	2241	/C	
594	5027	7710	7710	/H	
595	5030	7744	7744	/A	
596	5031	7706	7706	/N	
597	5032	0000	0	/SPACE	
598	5033	3641	3641		
599	5034	4044	4044		
600	5035	7701	7701		
601	5036	0301	0301		
602	5037	0301	0301		
603	5040	0000	0		
604	5041	4651	4651		
605	5042	0041	0041		
606	5043	6151	6151		
607	5044	4145	4145		
608					
609	045	4136	4136		

/RIGHT HALF

/QUAD 3 LEFT HALF

/RIGHT HALF

/QUAD 4 LEFT HALF

610	5046	1077	1077
611	5047	4477	4477
612	5050	3077	3077
613	5051	0000	0
614	5052	2101	2101
615	5053	1077	1077
616	5054	4477	4477
617	5055	0177	0177
618	5056	4477	4477
619	5057	0000	0
620	5060	5121	5121
621	5061	7741	7741
622	5062	4543	4543
623	5063	4577	4577

04EL,

624			
625			/RIGHT HALF
626	5064	2241	2241
627	5065	7710	7710
628	5066	7744	7744
629	5067	7706	7706
630	5070	0000	0
631	5071	0177	0177
632	5072	7710	7710
633	5073	7744	7744
634	5074	0301	0301
635	5075	4044	4044
636	5076	0000	0
637	5077	4651	4651
638	5100	0041	0041
639	5101	6151	6151
640	5102	4145	4145

Q4ER,

/A  
 /L  
 /F  
 /SPACE  
 /S  
 /I  
 /Z



```

641
642
643      5103 0077      /THIS ROUTINE DISPLAYS X PATTERN
644      5104 6377      DISPX, SET I 17
645      5105 6621      LNTIME, -1400
646      5106 7110      JMP      CLOCK
647      5107 6023      JMP      GO
648      5110 0073      GO,      SET I 13
649      5111 0377      JMP      377
650      5112 0074      SET I 14
651      5113 7400      -377
652      5114 0075      SET I 15
653      5115 7000      -777
654      5116 0061      SET I 1
655      5117 0000      0
656      5120 1020      XPATRN, LDA I
657      5121 7776      -1
658      5122 1140      ADM
659      5123 0013      13
660      5124 0161      DIS I 1
661      5125 1020      LDA I
662      5126 0001      1
663      5127 1020      LDA I
664      5130 0001      1
665      5131 1140      ADM
666      5132 0014      14
667      5133 0141      DIS 1
668      5134 0235      XSK I 15
669      5135 7120      JMP      XPATRN
670      5136 6641      JMP      TTYOPT
671      5137 7105      JMP      GO-3
672      5140 0440      SNSOPT, SNS 0      /BACK TO DIAL?
673      5141 6007      JMP      0      /NO, RETURN
674      5142 0075      SET I 15      /YES, SET UP SEQUENCE
675      5143 0701      RCG
676      5144 0076      SET I 16
677      5145 7300      7300
678      5146 0643      LDF 3
679      5147 6015      JMP      15      /BACK TO DIAL
680
681      /END
      @

```

0000  
0100

0200  
0300

0400  
0500

0600  
0700

1000  
1100

1200  
1300

1400  
1500

1600  
1700

2000  
2100

2200  
2300

2400  
2500

2600  
2700

3000  
3100

3200  
3300

3400  
3500

3600  
3700



BHQ1	4532	Q4ER	5102
BHQ2	4444	Q4GRID	4672
BHQ3	4542	Q4HOR	4710
BHQ4	4456	Q4VER	4712
BVQ1	4564	REL	4134
BVQ2	4477	RH1	4425
BVQ3	4574	RHCHNG	4663
BVQ4	4506	RTNJMP	4640
CLOCK	4621	SNSOPT	5140
DISPAT	4031	T1GL	4206
DISPX	5103	TST1	4100
DSCEND	4614	TST1LP	4111
DSCPAT	4405	TST2	4232
EXIT	4657	TST2LP	4241
EXMB	4076	TTYOPT	4641
FLAG	4660	XPATRN	5120
FULSIZ	4511		
GL2	4325		
GL2V	4343		
GO	5110		
HAFCHK	4577		
HAFFLG	4661		
INCMB	4036		
KQ1HOR	4673		
KQ1VER	4675		
KQ2HOR	4677		
KQ2VER	4701		
KQ3HOR	4703		
KQ3VER	4705		
KQ4HOR	4707		
KQ4VER	4711		
LNFLG	4662		
LNTIME	5104		
LOOP1	4437		
LOOP2	4523		
LP1	4135		
LP2A	4262		
LP2B	4301		
Q1BETA	4013		
Q1GRID	4667		
Q1HOR	4674		
Q1VER	4676		
Q2BETA	4012		
Q2GRID	4670		
Q2HOR	4700		
Q2VER	4702		
Q3BETA	4011		
Q3GRID	4671		
Q3HOR	4704		
Q3VER	4706		
Q4BETA	4010		
Q4EL	5263		

ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 5 SECONDS

3K CORE USED





