

IDENTIFICATION

PRODUCT CODE: MAINDEC 12-D688-D
PRODUCT NAME: VR12 DISPLAY TEST
DATE CREATED: 9-21-79
MAINTAINER: DIAGNOSTICS GROUP
AUTHOR: DAVE FERRARINI

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(8) TO 6000(8)

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=7300 AND SSW=0
- D. DEPRESS THE "DO" TOGGLE
- E. DEPRESS START 20.
- F. TO CALL THE PROGRAM FROM DIAL INDEX:
 - LO DISPTST 0 <CR>
- G. DIAL LOADER WILL SELF START PROGRAM.
- H. RESTART PROCEDURE: DEPRESS START 20.

4.

OPERATOR ACTION

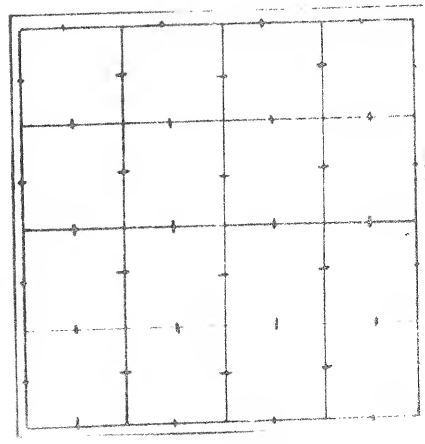
UPON STARTING, THE PROGRAM WILL ALTERNATELY DISPLAY THE THREE PATTERNS, EACH FOR APPROXIMATELY TEN SECONDS.

- 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 SW0=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 SCORE.

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
 HALF 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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/DIS TEST VERSION 1B
/PDP-12 DISPLAY CONTROL AND SCOPE TEST
/COPYRIGHT 1970 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
/FERRARINI D.
/POINT DISPLAY PATTERN [DISPAT
/CHARACTER DISPLAY PATTERN [DSCPAT
/DISPLAY X PATTERN [DISP
/6-7-69
/REVISED 8-20-69 RTB
/REVISED 8-29-69 HRL
/REVISED 9-01-70 RAS
SEGMENT 2
*10
04BETA, 0
03BETA, 0
02BETA, 0
01BETA, 0
*20
LDA I
1
STC FLAG
SET I 17
-300
JMP INCMB
JMP CLOCK
JMP DISPAT
JMP 400
DISPAT, JMP TST1
JMP TST2
JMP TTYOPT
JMP DISPAT-3
JMP DISPAT-1
INCMB, LDA
0000
STC EXMB
STC 0
DIS I
LDA
0000
SAE I
0001
HLT
0000
CLR
ESF
0001
STC

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/TEST INCREMENT THE M.B.
/CHECK CLOCK
/DO DSC TEST
/DO DIS PATTERN
/CHECK TTY OPTIONS
/BACK TO GO
/GET THE RETURN
/ ADDRESS
/SAVE IN EXIT
/CLEAR LOG. 0
/DISPLAY A POINT
/GET THE VALUE IN
/ LOC. 0000
/IS IT EQUAL TO
/ THE EXPECTED
/NO, INCREMENT THE
/MB FAILED AFTER
/A DIS INSTRUCTION
/CLEAR A.C.
/CLEAR S.F.R.
/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 1464 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 STC I /DISPLAY A CHARACTER
70 4067 1760 1760 /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 4076 6076 EXMB, JMP
79 4100 4100 *100

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/ THE SUBROUTINE BELOW WILL GENERATE 5
/ LINES ACROSS THE SCREEN, THE POINT
/ SPACING IS 4 UNITS
/ THE FIRST LEFT HAND POINT IS
/ 2000, THE LAST RIGHT HAND POINT IN
/ EACH LINE IS 0774.

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/ A GLITCH IS PLACED AT THE HORIZONTAL
/ POINTS OF 100,300,500 AND 700 ON
/ EACH LINE

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92 4100 1000 LDA TST1,
93 4101 0000 0 STA I
94 4102 1060 0 /
95 4103 0000 LDA I
96 4104 1020 10
97 4105 0010 10 STC
98 4106 4134 4134 SET I 2
99 4107 0062 0 REL
100 4110 0000 0

```


101	4111	6135	TST1LP, JMP	LP1
102	4112	1000	LDA	
103	4113	0002	2	
104	4114	1661	BCC I	
105	4115	0100	100	
106	4116	1560	BCL I	
107	4117	7600	7600	
108	4118	0470	AZE I	
109	4119	0206	JMP	T1GL
110	4120	1000	LDA	
111	4121	0002	2	
112	4122	1120	ADA I	
113	4123	0004	4	
114	4124	1040	STA	
115	4125	0002	2	
116	4126	1460	SAFE I	
117	4127	1000	1000	
118	4128	6111	JMP	TST1LP
119	4129	6103	JMP	TST1+3
120	4130	0000	REL,	/VARIABLE
121	4131	0000		
122	4132	1060	STA I	
123	4133	0000	0	
124	4134	1020	LDA I	
125	4135	0370	370	
126	4136	2134	ADD	REL
127	4137	0142	DIS	2
128	4138	1000	LDA	
129	4139	0002	2	
130	4140	0017	COM	
131	4141	4002	STC	2
132	4142	1020	LDA I	
133	4143	0367	367	
134	4144	2134	ADD	REL
135	4145	0142	DIS	2
136	4146	1000	LDA	
137	4147	0002	2	
138	4148	0017	COM	
139	4149	4002	STC	2
140	4150	1020	LDA I	
141	4151	0367	367	
142	4152	2134	ADD	REL
143	4153	0142	DIS	2
144	4154	1000	LDA	
145	4155	0002	2	
146	4156	0017	COM	
147	4157	4002	STC	2
148	4158	1020	LDA I	
149	4159	0370	370	
150	4160	2134	ADD	REL
151	4161	0142	DIS	2
152	4162	1000	LDA	
153	4163	0002	2	
154	4164	0017	COM	
155	4165	4002	STC	2
156	4166	1020	LDA I	

/THIS IS THE ROUTINE THAT DISPLAYS
/FIVE POINTS, ONE ON EACH OF THE
/HORIZONTAL LINES
LP1,

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156	4172	0167	167	
157	4173	2134	ADD	REL
158	4174	0142	DIS	2
159	4175	1000	LDA	
160	4176	0002	2	
161	4177	0017	COM	
162	4200	4002	STC	2

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163 4201 1020 LDA I
164 4202 0767 767
165 4203 2134 ADD REL
166 4204 0142 2 DIS
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
176 4215 6135 JMP LPI
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
191
192
193
194 4232 1000
195 4233 0000
196 4234 1060 STA I
197 4235 0000 0
198
199 4236 0011 CLR
200 4237 4134 STC REL
201
202 4240 6262 JMP LP2A
203 4241 6301 JMP LP2B
204 4242 1000 LDA
205 4243 0134 REL
206 4244 1660 BCO I
207 4245 0100 100
208 4246 1060 BCL I
209 4247 7600 7600
210 4250 047 AZE I
211 4251 6325 JMP GL2
212 4252 102 LDA I
213 4253 0004 4
214 4254 114 ADM
215 4255 4134 REL
216 4256 1460 SAE I
217 4257 1000 1000

```

/THIS ROUTINE GENERATES 5 VERTICAL LINES
 /AT HORIZONTAL LOCATIONS 0,177,377,577,777,
 /GLITCHES ARE DISPLAYED AT VERTICAL LOCATIONS
 /177,377,500,700 ON THE LINES.
 TST2, LDA

/SET UP INDEX REG.
 /GO DISPLAY SOME POINTS

/DONE ALL POINTS YET

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DIAL10

/DIS TEST VERSION 18

TST2LP
TST2+3

JMP
JMP

218 4260 6241
219 4261 6235
220

/SET UP INDEX REGISTERS

```

221 4262 1000  LDA
222 4263 0000  STA I
223 4264 1060  STA I
224 4265 0000  SET I 2
225 4266 0062  SET I 3
226 4267 0060  SET I 4
227 4270 0063  SET I 5
228 4271 0177  SET I 6
229 4272 0064  SET I 7
230 4273 0377  SET I 8
231 4274 0065  SET I 9
232 4275 0577  SET I 10
233 4276 0066  SET I 11
234 4277 0777  SET I 12
235 4300 6265  JMP LP2A+3
236
237

```

/ACTUALLY DISPLAY THE 5 POINTS

```

238 LP2B, LDA
239 4301 1000  STA I
240 4302 0000  STA I
241 4303 1060  STA I
242 4304 0000  LDA
243 4305 1000  REL
244 4306 0134  DIS
245 4307 0142  COM
246 4310 0017  DIS
247 4311 0146  LDA
248 4312 1000  REL
249 4313 0134  ADA I
250 4314 1120  ADA I
251 4315 0200  DIS
252 4316 0143  DIS
253 4317 0017  COM
254 4320 0145  DIS
255 4321 1000  LDA
256 4322 0134  REL
257 4323 0144  DIS
258 4324 6304  JMP LP2B+3
259

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/DISPLAY THE GLITCHES ON THE VERTICAL LINES

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260 GL2, LDA
261 4325 1000  STA I
262 4326 0000  STA I
263 4327 1060  STA I
264 4330 0000  SET I 15
265 4331 0075  -5
266 4332 7772  LDA I
267 4333 1020  767
268 4334 0767  STC
269 4335 4343  SET I 7
270 4336 0067  -5
271 4337 7772  SET I 10
272 4340 0070  1
273 4341 0001  LDA I
274 4342 1020  767
275 4343 0767

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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

```

284
285 4353 0235 XSK I 15
286 4354 6336 JMP GL2V=5
287 4355 6262 JMP LP2A
288 4356 6330 JMP GL2+3
289
290 4400 *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
298 4406 0666 01GRID=1
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
308 /HAFFLG=0 WHEN DISPLAYING LEFT HALF OF PATTERN
309 /#4 WHEN DISPLAYING RIGHT HALF
310 STC HAFFLG
311 SET I 7
312 RCHNG=1
313 SET I 14
314 -4
315 /IN RIGHT HALF PASS NOP BELOW WILL BE REPLACED BY ADA I 7
316 /LEFT AND RIGHT HALF SEQUENCES ARE STAGGERED BY A CONSTANT
317 /20 FOR FULL SIZE CHARACTERS, 10 FOR HALF SIZE
318 RHL,
319 STA I 15
320 LDA I 15
321 STA I 15
322 XSK I 14
323 JMP RH1-1
324 STC LNFLG
325
326 4434 0075 SET I 15
327 4435 7771 -6
328
329 ESF
330 LOOP1, ADD Q2HOR
331 STC 1
332 ADD Q2VER
333 DSC I Q2BETA
334 LDA I
335
/RESET HORIZONTAL POSITION
/GO RACK
/PUT GRID PATTERN ADDR FOR
/EACH QUAD IN 4 RETAS
/INITIALIZE ARGUMENTS
/THERE ARE
/4 QUADRANTS
/IN RIGHT HALF PASS NOP BELOW WILL BE REPLACED BY ADA I 7
/LEFT AND RIGHT HALF SEQUENCES ARE STAGGERED BY A CONSTANT
/20 FOR FULL SIZE CHARACTERS, 10 FOR HALF SIZE
/PTR FOR HORIZ COORD
RH1,
/NO
/=#0 WHEN DOING LN 2 ;N
/E, 0 WHEN DOING LN 1
/THERE ARE 6 CHAR ON LN 1
/ENABLE HALF SIZE CHARS
/SELECT CHAN 0 AND
/SET HORIZ COORD
/VERT COORD TO AC
/DSC IN QUAD 2
/BUMP HORIZ COORD TO

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334 4444 0010 BHQ2, 10
335 4445 2001 ADD 1
336 4446 4702 STC Q2HOR
337 4447 2710 ADD Q4HOR
338 4450 1620 BSE I
339 4451 4000 4000
340 4452 4001 STC 1
341 4453 2712 ADD Q4VER
342 4454 1770 DSC I Q4BETA
343 4455 1020 LDA I
344 4456 0010 10
345 4457 2001 ADD Q4HOR
346 4460 4710 STC 15
347 4461 0235 XSK I LOOP1
348 4462 6437 JMP LNFLG
349 4463 2662 ADD I
350 4464 0470 AZE I
351 4465 6511 JMP I
352 4466 0075 SET I
353 4467 7766 -11
354 4470 0011 CLR
355 4471 4662 STC LNFLG
356 4472 2677 ADD Q2HOR
357 4473 2661 HAFFLG
358 4474 4700 STC Q2HOR
359 4475 2701 ADD Q2VER
360 4476 1120 ADA I
361 4477 7737 -40
362 4500 4702 STC Q2VER
363 4501 2707 ADD Q4HOR
364 4502 2661 ADD HAFFLG
365 4503 4710 STC Q4HOR
366 4504 2711 ADD Q4VER
367 4505 1120 ADA I
368 4506 7737 -40
369 4507 4712 STC Q4VER
370 4510 6437 JMP LOOP1
371 4511 0075 SET I 15
372 4512 7771 -6
373 /DELAY, SIZE CHANGE NEXT
374 SET I 16
375 4513 0076 -40
376 4514 7737 XSK I 16
377 4515 0236 JMP I -1
378 4516 6515
379 4517 1020 LDA I
380 4520 0200 200
381 4521 0004 ESF
382 4522 4662 STC LNFLG
383 4523 2674 ADD Q1HOR
384 4524 1620 BSE I
385 4525 4000 4000
386 -26 4001 STC 1
387 27 2676 ADD Q1VER

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/SET HORIZ COORD

/DSC IN QUAD 4
/BUMP HORIZ COORD

/DONE A LN?
/NO

/DONE 2 LNS?
/YES GO TO FULL SIZE CHARS
/THERE ARE 11
/CHARS IN LN 2

/SET LNFLG
/TO EXIT ON NEXT CHK
/RESET HORIZ
/AND VERT
/COORD
/FOR LN 2

/DOO LN 2
/SET CTR
/FOR LN 1

/ENABLE
/FULL SIZE
/CHAR
/SET FLAG FOR LN 1
/HORIZ COORD

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389 4530 1773 DSC I Q1BETA /QUAD 1
390 4531 1020 LDA I
391 4532 0020 B401, 20 /BUMP HORIZ
392 4533 2001 ADD 1

393	4534	4674	STC	Q1HOR	/HORIZ COORD
394	4535	2704	ADD	Q3HOR	/CHAN 0
395	4536	4001	STC	1	
396	4537	2706	ADD	Q3VER	/SQUAD 3
397	4540	1771	DSC I	Q3BETA	
398	4541	1020	LDA I		
399	4542	0020	20		
400	4543	2001	ADD	1	
401	4544	4704	STC	Q3HOR	/DONE A LN?
402	4545	0235	XSK I	15	/NO
403	4546	6523	JMP	LOOP2	
404	4547	2662	ADD	LNFLG	
405	4550	0470	AZE I		
406	4551	6577	JMP	HAFCHK	/DONE 2 LNS?
407	4552	0075	SET I	15	/YES CHK FOR 2ND HALF OF PATTERN
408	4553	7766	-11		/NO SET FOR LN 2
409	4554	0011	CLR		
410	4555	4662	STC	LNFLG	/SET LNFLG FOR
411	4556	2673	ADD	Q1HOR	/EXIT TO HAFCHK
412	4557	2661	ADD	HAFFLG	/RESET COORDINATES
413	4560	2661	ADD	HAFFLG	
414	4561	4674	STC	Q1HOR	
415	4562	2675	ADD	Q1VER	
416	4563	1120	ADA I		
417	4564	7737	-40		
418	4565	4676	STC	Q1VER	
419	4566	2703	ADD	Q3HOR	
420	4567	2661	ADD	HAFFLG	
421	4570	2661	ADD	HAFFLG	
422	4571	4704	STC	Q3HOR	
423	4572	2705	ADD	Q3VER	
424	4573	1120	ADA I		
425	4574	7737	-40		
426	4575	4706	STC	Q3VER	
427	4576	6523	JMP	LOOP2	/DO LN 2
428	4577	1000	LDA		/DONE BOTH
429	4600	0661	HAFFLG		/LEFT AND RIGHT
430	4601	0450	AZE		/SEQUENCES?
431	4602	6614	JMP	DSCEND	/YES EXIT
432	4603	1020	LDA I		/NO SET FOR
433	4604	0004	4		/DSC RIGHT SEQ.
434	4605	4661	LDA I	HAFFLG	/SET HAFFLG FOR EXIT
435	4607	1127	ADA I	7	/ENABLE INST TO ADD A
436	4610	4425	STC	R41	/CONSTANT FOR
437	4611	0075	SET I	15	/RIGHT HALF SEQ.
438	4612	0672	KQ1HOR-1		
439	4613	6420	JMP	R41-5	/CO RIGHT HALF SEQ.

442	4614	1020	DSCEND,	LDA I				/RESTORE NOP
443	4615	0016		NOP				/FOR NEXT LEFT HALF SEQ.
444	4616	4425		STC				/CHK OPTIONS
445	4617	6641		JMP		RH1		
446	4617	6641		JMP		TTYOPT		
447	4620	6402		JMP		DSPAT-3		
448	4621	1000	CLOCK,	LDA				
449	4622	0000		0				
450	4623	4640		STC		RTNJMP		/CHK FOR ALTERNATING SEQ.
451	4624	7140		JMP		SNSOPT		
452	4625	1000		LDA				
453	4626	0660		FLAG				
454	4627	0470		AZE I				/WHICH SEQ.?
455	4630	6640		JMP		RTNJMP		/FREEZE SEQ IGNORE CLOCK
456	4631	0237		XSK I		17		/TICK CLOCK AND
457	4632	6640		JMP		RTNJMP		/REFRESH SCOPE
458								
459	4633	1000		LDA				
460	4634	0640		RTNJMP				/SAVE RTN JMP
461	4635	1120		ADA I				
462	4636	0001		1				
463	4637	4640		STC		RTNJMP		
464	4640	0000		0				
465	4641	1000		LDA				
466	4642	0000		0				
467	4643	4657		STC		EXIT		
468	4644	0415		KST		0		/HAVE TTY OPTIONS BEEN REQUESTED?
469	4645	6000		JMP				/NO RTN
470	4646	0500		IOB				/YES GET CHAR
471				PMODE				/F FREEZES THE
472	4647	6036		KRB				/CURRENT PATTERN
473				LMODE				/ANY OTHER KEY ALTERNATES
474	4650	1460		SAE I				/FREEZE ON CURRENT PATTERN
475	4651	0306		306		EXIT=1		/RY SETTING FLAG TO 0
476	4652	6656		JMP				/SET FLAG ,NE. TO 0
477	4653	0011		CLR				
478	4654	4660		STC		FLAG		
479	4655	6657		JMP		EXIT		
480	4656	4660		STC		FLAG		
481	4657	0000		0				
482	4660	0000		0				
483	4661	0000		HAFFLG,				
484	4662	0000		LNFLG,				
485	4663	0010		RHCHNG,				
486	4664	0004		4				
487	4665	0010		10				
488	4666	0004		4				
489	4667	2712		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		Q1HOR,		450		
494	4674	0000		Q1HOR,		0		
495	4675	0340		Q1VER,		340		
496	4676	0000		Q1VER,		0		

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/DIS TEST VERSION 1B

497	4677	0010	K02HOR, 10
498	4700	0000	02HOR, 0
499	4701	0340	K02VER, 340

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4702 0000
4703 0010
4704 0000
4705 7477
4706 0000
4707 0600
4710 0000
4711 7477
4712 0000

4713 4136
4714 1077
4715 4477
4716 3077
4717 0000
4720 2101
4721 4477
4722 0177
4723 0177
4724 0177
4725 0000
4726 5121
4727 7741
4730 4543
4731 4577

4732 2241
4733 7710
4734 7744
4735 7706
4736 0000
4737 0177
4740 4044
4741 7701
4742 0301
4743 0301
4744 0000
4745 4651
4746 0041
4747 6151
4750 4145

4751 4136
4752 1077
4753 4477
4754 3077
4755 0000
4756 4136
4757 1077
4760 4477
4761 0177
4762 4477
4763 0000

Q2VER, 0
Q3HOR, 10
Q3HOR, 0
Q3VER, -300
Q3VER, 0
Q4HOR, 600
Q4HOR, 0
Q4VER, -300
Q4VER, 0
/GRID PATTERNS
/QUAD 1 LEFT HALF
4136
1077
4477
3077
0
2101
4477
0177
0177
0177
0
5121
7741
4543
4577
/RIGHT HALF
2241
7710
7744
7706
0
0177
4044
7701
0301
0301
0
4651
0041
6151
4145
/QUAD 2 LEFT HALF
4136
1077
4477
3077
0
4136
1077
4477
0177
4477
0

/C
/H
/A
/N
/SPACE
/I
/F
/U
/L
/L
/L
/SPACE
/S
/I
/E
/E

/C
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/SPACE
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/L
/SPACE
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/I
/E
/E

3-SEP-70

DIAL10 V003

/DIS TEST VERSION 18

555	4764	5121
556	7741	7741
557	4765	4543
558	4766	4577
559	4767	4577
560		/RIGHT HALF
561	4770	2241
562	4771	7710
563	4772	7744
564	4773	7706
565	4774	0
566	4775	3641
567	4776	7710
568	4777	7744
569	5000	0301
570	5001	4044
571	5002	0
572	5003	4651
573	5004	0041
574	5005	6151
575	5006	4145
576		/QUAD 3 LEFT HALF
577	5007	4136
578	5010	1077
579	5011	4477
580	5012	3077
581	5013	0
582	5014	4136
583	5015	4477
584	5016	0177
585	5017	0177
586	5020	0177
587	5021	0000
588	5022	5121
589	5023	7741
590	5024	4543
591	5025	4577
592		/RIGHT HALF
593	5026	2241
594	5027	7710
595	5030	7744
596	5031	7706
597	5032	0000
598	5033	3641
599	5034	4044
600	5035	7701
601	5036	0301
602	5037	0301
603	5040	0000
604	5041	4651
605	5042	0041
606	5043	6151
607	5044	4145
608		/QUAD 4 LEFT HALF
609	345	4136

/S
/I
/Z
/E
/V
/H
/A
/N
/SPACE
/0
/H
/A
/L
/F
/SPACE
/S
/I
/Z
/E
/C
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/SPACE
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/SPACE
/S
/I
/Z
/E
/C
/H
/A
/N
/SPACE

/QUAD 3 LEFT HALF

/RIGHT HALF

/QUAD 4 LEFT HALF

610	5046	1077	1077
611	5047	4477	4477
612	5050	3077	3077
613	5051	000A	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				
626	5064	2241	/RIGHT HALF	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

/A
/L
/F
/SPACE
/S
/1
/2

04ER:

641
642
643
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680
681

```

5103 0077
5104 6377
5105 6621
5106 7110
5107 6023
5110 0073
5111 0377
5112 0074
5113 7400
5114 0075
5115 7000
5116 0061
5117 0000
5120 1020
5121 7776
5122 1140
5123 0013
5124 0161
5125 1020
5126 0001
5127 1020
5130 0001
5131 1140
5132 0014
5133 0141
5134 0235
5135 7120
5136 6641
5137 7105
5140 0440
5141 6000
5142 0075
5143 0701
5144 0076
5145 7300
5146 0643
5147 6015

```

/THIS ROUTINE DISPLAYS X PATTERN

DISPX, SET I 17

LNTIME, -1400

CLOCK

GO

JMP

SET I 13

377

SET I 14

-377

SET I 15

-777

SET I 1

0

XPATRN, LDA I

-1

ADM

13

DIS I 1

LDA I

1

LDA I

1

ADM

14

DIS I

XSK I

JMP

JMP

SNS

JMP

JMP

JMP

SET I 15

RCG

SET I 16

7300

LDF

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

JMP

/BACK TO DIAL?
/NO, RETURN
/YES, SET UP SEQUENCE

/BACK TO DIAL
/BACK TO DIAL

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

G4ER 5102
 Q4GRID 4672
 Q4HOR 4710
 Q4VER 4712
 REL 4134
 RH1 4425
 RHCHNG 4663
 RTNJMP 4640
 SNSOPT 5140
 T1GL 4206
 TST1 4100
 TST1LP 4111
 TST2 4232
 TST2LP 4241
 TTYOPT 4641
 XPATRN 5120

4532
 4444
 4542
 4456
 4564
 4477
 4574
 4506
 4621
 4031
 5103
 4614
 4405
 4657
 4076
 4660
 4511
 4325
 4343
 5110
 4577
 4661
 4036
 4673
 4675
 4677
 4701
 4703
 4705
 4707
 4711
 4662
 5104
 4437
 4523
 4135
 4262
 4301
 4013
 4667
 4674
 4676
 4012
 4670
 4700
 4702
 4011
 4671
 4704
 4706
 4010
 5263
 BH01
 BH02
 BH03
 BH04
 BV01
 BV02
 BV03
 BV04
 CLOCK
 DISPAT
 DISPX
 DSCEND
 DSCPAT
 EXIT
 EXMB
 FLAG
 FULSIZ
 GL2
 GL2V
 GO
 HAFCHK
 HAFFLG
 INOMB
 K01HOR
 K01VER
 K02HOR
 K02VER
 K03HOR
 K03VER
 K04HOR
 K04VER
 LNFLG
 LNTIME
 LOOP1
 LOOP2
 LP1
 LP2A
 LP2B
 Q1BETA
 Q1GRID
 Q1HOR
 Q1VER
 Q2BETA
 Q2GRID
 Q2HOR
 Q2VER
 Q3BETA
 Q3GRID
 Q3HOR
 Q3VER
 Q4BETA
 Q4EL

ERRORS DETECTED: 0

LINKS GENERATED: 2

RUN-TIME: 5 SECONDS

3K CORE USED

BHQ1
 BHQ2
 BHQ3
 BHQ4
 BVQ1
 BVQ2
 BVQ3
 BVQ4
 CLOCK
 DISPAT
 DISPX
 DSCEND
 DSCPAT
 EXIT
 EXMB
 FLAG
 FULSIZ
 GL2
 GL2V
 GO
 HAFCHK
 HAFFLG
 INCMB
 KQ1HOR
 KQ1VER
 KQ2HOR
 KQ2VER
 KQ3HOR
 KQ3VER
 KQ4HOR
 KQ4VER
 LNFLG
 LNTIME
 LOOP1
 LOOP2
 LP1
 LP2A
 LP2B
 Q1BETA
 Q1GRID
 Q1HOR
 Q1VER
 Q2BETA
 Q2GRID
 Q2HOR
 Q2VER
 Q3BETA
 Q3GRID
 Q3HOR
 Q3VER
 Q4BETA
 Q4EL
 Q4ER

293
 35#
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 443#
 297#
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 448#
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 283
 671
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 371
 428
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 647
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 421
 435
 430
 411
 405
 404#
 483#

