



INTEROFFICE MEMORANDUM

M-1100

SUBJECT Punch Test Program, DEC TP-1,
Operating Instructions

DATE April 26, 1961

TO PDP-1 Distribution List B

FROM A. N. Blumenthal

I. General Test

a. To punch test tape

1. Sense switch #1 down
2. Start at:
100 for punch #0
112 for punch #1
3. Will punch following pattern:
Alphanumeric mode
10 lines all ones
10 lines all zeros
10 lines all ones
10 lines all zeros
0,0; 0,1; etc. thru 0,376
377,0; 377,1, etc. thru 377,376
Binary mode
0 thru 77

b. To check test tape

1. Load test tape in reader, reader on 200 c.p.s.
2. Put sense switch #1 up, reading and checking line by line will begin.
3. If no error, program halts with PC holding 412. (Routine checks for single line of feed after test punching.)
4. If error:
AC = Incorrect bit(s) on one. Bits 10 thru 17 = holes 8 thru 1.
IO = Number from erroneous line.
PC = 537
Press continue to check rest of tape.

5. If desired to recheck tape, start at 26 i.

II. Test Word Mode

a. To punch test tape, alphanumeric mode.

1. Alternately punches right half (bits 10 thru 17), then left half (bits 2 thru 9) of test word.
2. Punches 19 pairs of above lines followed by 250 ms delay, repeated indefinitely. Must be stopped manually.
3. Start at:
220 for punch #0
224 for punch #1

b. To punch test tape, binary mode.

1. Alternately punches left half (bits 0 thru 5), then right half (bits 9 thru 14) of test word.
2. Same as II a. 2.
3. Start at:
222 for punch #0
226 for punch #1

c. To check test tape

1. Load tape into reader, reader on 200 c.p.s.
2. Test word switches must remain undisturbed since punching of tape.
3. Start at:
450 if alphanumeric punching
500 if binary punching
4. If no error, program stops in halt upon finding tape feed with PC = 537,
IO = 200.
5. If error:
Same as I b. 4.
6. If desired to recheck tape, repeat II c. 3.

Setup punch 0, general test

0100 200250	org 100	lac k	,ppa *
0101 240131	m	dac a + 1	
0102 240135		dac a + 5	
0103 240146		dac c + 1	
0104 240150		dac c + 3	
0105 240154		dac c + 7	
0106 240156		dac c + 11	
0107 200251		lac k + 1	,ppb *
0110 240166		dac e + 1	
0111 600123		jmp b	

Setup punch 1

0112 200252	n	lac k + 2	,ppa * c1
0113 240131		dac a + 1	
0114 240135		dac a + 5	
0115 240146		dac c + 1	
0116 240150		dac c + 3	
0117 240154		dac c + 7	
0120 240156		dac c + 11	
0121 200253		lac k + 3	,ppb * c1
0122 240166		dac e + 1	
0123 200214	b	lac j + 1	, -2 reset a ctrs
0124 240203		dac h + 4	
0125 200213		lac j	, -12
0126 240200		dac h + 1	
0127 240202		dac h + 3	

10 lines all holes

0130 220177	a	lio h	,377
0131 000000		0	
0132 460200		isp h + 1	, -12
0133 600130		jmp a	

10 lines no holes

0134 220201		lio h + 2	,777400
0135 000000		0	
0136 460202		isp h + 3	, -12
0137 600134		jmp a + 4	
0140 460203		isp h + 4	, -2
0141 600125		jmp b + 2	

reset c ctrs

0142 200201	d	lac h + 2	,777400
0143 240205		dac h + 6	
0144 240206		dac h + 7	

o,n; on+ 1; etc.

0145 220204	c	lio h + 5	,0
0146 000000		0	
0147 220205		lio h + 6	,777400
0150 000000		0	
0151 460205		isp h + 6	
0152 600145		jmp c	

377, n., 377, n + 1, etc.

0153 220177		lio h	,377
0154 000000		0	
0155 220206		lio h + 7	,777400
0156 000000		0	
0157 460206		isp h + 7	
0160 600153		jmp c + 6	

reset e ctrs

0161 200210	f	lac h + 11	,-100
0162 240207		dac h + 10	
0163 200204		lac h + 5	,0
0164 240211		dac h + 12	

bin 0-77

0165 220211	e	lio h + 12	,0 init
0166 000000		0	
0167 200211		lac h + 12	
0170 400212		add h + 13	,10000
0171 240211		dac h + 12	
0172 460207		isp h + 10	
0173 600165		jmp e	
0174 640010		szs 10	
0175 600261		jmp aa	
0176 600174		jmp e + 7	

constants

```

0177 000377      h      377
0200 000000      0
0201 777400      777400
0202 000000      0
0203 000000      0
0204 000000      0
0205 000000      0
0206 000000      0
0207 000000      0
0210 777677      - 100
0211 000000      0
0212 010000      10000
0213 777765      i      - 12
0214 777775      - 2

org 220

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tw mode

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0220 200250      g      lac k      ,0a
0221 600227      jmp g + 7
0222 200251      lac k + 1      ,0b
0223 600227      jmp g + 7
0224 200252      lac k + 2      ,1a
0225 600227      jmp g + 7
0226 200253      lac k + 3      ,1b
0227 240240      dac r

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Setup line ctr

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0231 200254      lac k + 4      ,-23
0232 240255      dac k + 5

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Stop delay 250 ms

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0233 200256      lac k + 6      ,-60k
0234 240257      dac k + 7
0235 762200      lat
0236 240260      dac k + 10
0237 220260      lio k + 10
0240 000000      r      0      ,punch rt half if a, lt half if b
0241 672777      rir s9
0242 000000      0      ,punch lt half if a, rt half if b
0243 460255      isp k + 5      ,-23 line count
0244 600237      jmp p + 7

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0245 460257		isp k + 7	, -60k stop delay
0246 600245		jmp r + 5	
0247 600231		jmp p + 1	

Constants

0250 730005	k	ppa *	
0251 730006		ppb *	
0252 730105		ppa * c1	
0253 730106		ppb * c1	
0254 777754		- 23	
0255 000000		0	
0256 717777		- 60000	
0257 000000		0	
0260 000000		0	

locate data, general test read check

0261 200413	aa	lac ah	, 100
0262 730001		rpa *	
0263 320414		dio ah + 1	
0264 500414		sad ah + 1	
0265 600262		jmp aa + 1	

reset ab and ad

0266 200214	ac	lac j + 1	, -2
0267 240422		dac ah + 7	
0270 200417		lac ah + 4	, -12
0271 240416		dac ah + 3	
0272 240421		dac ah + 6	

check 10 lines all holes

0273 200415	ab	lac ah + 2	, 377
0274 060414		xor ah + 1	
0275 640100		sza	
0276 170533		jda bd	, error
0277 460416		isp ah + 3	, -12
0300 600302		jmp ab + 7	

check next 10

0301 600305		jmp ad	
0302 730001		rpa *	
0303 320414		dio ah + 1	
0304 600273		jmp ab	

check 10 lines no holes

0305 730001	ad	rpa *	
0306 320414		dio ah + 1	
0307 200420		lac ah + 5	,0
0310 040414		ior ah + 1	
0311 640100		sza	
0312 170533		jda bd	,error
0313 460421		isp ah + 6	, -12
0314 600305		jmp ad	
0315 460422		isp ah + 7	, -2

check next 10

0316 600320		jmp ad + 13	,377
0317 600323		jmp an	
0320 730001		rpa *	
0321 320414		dio ah + 1	
0322 600270		jmp ac + 2	
0323 200420	an	lac ah + 5	,0 reset for 0,n
0324 240423		dac aj	
0325 240421		dac ah + 6	
0326 200424		lac aj + 1	, -377
0327 240416		dac ah + 3	,pr ctr
0330 200214		lac j + 1	, -2
0331 240422		dac ah + 7	

check 0,n

0332 600333		jmp ae	
0333 730001	ae	rpa *	
0334 320414		dio ah + 1	
0335 200423		lac aj	,0
0336 060414		xor ah + 1	
0337 640100		sza	
0340 170533		jda bd	
0341 730001		rpa *	
0342 320414		dio ah + 1	
0343 200421		lac ah + 6	,0 init
0344 060414		xor ah + 1	
0345 640100		sza	
0346 170533		jda bd	,error
0347 460416		isp ah + 3	, -377

0350	600352		jmp ae + 17	
0351	600354		jmp af	
0352	440421		idx ah + 6	, compare word
0353	600333		jmp ae	
0354	460422	af	isp ah + 7	, -2
0355	600357		jmp af + 3	
0356	600366		jmp af + 12	

reset for 377, n

0357	200415		lac ah + 2	, 377
0360	240423		dac aj	
0361	200420		lac ah + 5	, 0
0362	240421		dac ah + 6	
0363	200424		lac aj + 1	, -377
0364	240416		dac ah + 3	, pr ctr
0365	600333		jmp ae	, check 377, n

reset for binary

0366	200425		lac aj + 2	, -100
0367	240426		dac aj + 3	
0370	200427		lac aj + 4	, 200 compare word
0371	240430		dac aj + 5	
0372	730001	ag	rpa *	, check binary
0373	320414		dio ah + 1	
0374	200430		lac aj + 5	, 200 init
0375	060414		xor ah + 1	
0376	640100		sza	
0377	170533		jda bd	, error
0400	460426		isp aj + 3	, -100
0401	600403		jmp ag + 11	
0402	600405		jmp ag + 13	
0403	440430		idx aj + 5	
0404	600372		jmp ag	

check feed

0405	200413		lac ah	, 100
0406	730001		rpa *	
0407	320414		dio ah + 1	
0410	500414		sad ah + 1	
0411	760400		hlt	, test complete
0412	170533		jda bd	, error

constants

0413	000100	ah	100
0414	000000		0
0415	000377		377
0416	000000		0
0417	777765		- 12
0420	000000		0
0421	000000		0
0422	000000		0
0423	000000	aj	0
0424	777400		- 377
0425	777677		- 100
0426	000000		0
0427	000200		200
0430	000000		0

org 450

locate data

0450	200413	ba	lac ah	,100
0451	730001		rpa *	
0452	320414		dio ah + 1	
0453	500414		sad ah + 1	
0454	600451		jmp ba + 1	

check data, rt alpha

0455	762200	bb	lat	
0456	020415		and ah + 2	,377
0457	060414		xor ah + 1	
0460	640100		sza	
0461	170533		jda bd	,error
0462	730001		rpa *	
0463	320414		dio ah + 1	

check data lt

0464	762200	bc	lat	
0465	675777		sar s9	
0466	020415		and ah + 2	,377
0467	060414		xor ah + 1	
0470	640100		sza	

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0471 170533          jda bd          ,error
0472 730001          rpa *
0473 320414          dio ah + 1
0474 600455          jmp bb

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org 500

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locate data

```

0500 200413          be          lac ah          ,100
0501 730001          rpa *
0502 320414          dio ah + 1
0503 500414          sad ah + 1
0504 600501          jmp be + 1

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check data , lt bin

```

0505 762200          bf          lat          ,770000
0506 020531          and bk
0507 671077          rar s6
0510 671077          rar s6
0511 400427          add aj + 4          ,200
0512 060414          xor ah + 1
0513 640100          sza
0514 170533          jda bd          ,error
0515 730001          rpa *
0516 320414          dio ah + 1

```

check data, rt bin

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0517 762200          bg          lat
0520 020532          and bk + 1          ,770
0521 671007          rar s3
0522 400427          add aj + 4          ,200
0523 060414          xor ah + 1
0524 640100          sza
0525 170533          jda bd          ,error
0526 730001          rpa *
0527 320414          dio ah + 1
0530 600505          jmp bf
0531 770000          bk          770000
0532 000770          bd          770
0533 000000          bd          0

```

error routine

0534 26 0537		dap bd + 4
0535 200533		lac bd
0536 760400		hlt
0537 600000		jmp

0000 000000	org 0	0
	bj	jmp end

m	000100
k	000250
a	000130
c	000145
e	000165
b	000123
n	000112
i	000213
h	000177
d	000142
f	000161
aa	000261
g	000220
r	000240
p	000230
ah	000413
ac	000266
ab	000273
bd	000533
ad	000305
an	000323
aj	000423
ae	000333
af	000354
ag	000372
ba	000450
bb	000455
bc	000464
be	000500
bf	000505
bk	000531
bg	000517
bj	000000