



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

1. 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 261.

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		

tw mode

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	

Setup line ctr

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

Stop delay 250 ms

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	

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	

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

org 500

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	

check data , lt bin

0505	762200	bf	lat	
0506	020531		and bk	,770000
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

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		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