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DECUS NO.	8-535
TITLE	BINARY PUNCH FOR PDP-8/E WITH 2 TTY'S (OR WITH HIGH SPEED PUNCH)
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SOURCE LANGUAGE	PAL III

BINARY PUNCH FOR PDP-8/E WITH 2 TTY'S
(or with a high speed punch & a console keybd.)

Hardware: PDP-8/E with a console keyboard or TTY and a paper tape punch not part of the console printer. The routine is particularly useful for 8-K (or more) machines, but will work perfectly well in a 4-K installation.

Core: Locations 4000 to 4376 in any core field.

Function: Punches a binary tape of selected sections of core memory. Any number of blocks may be punched (the user need not count them in advance); a given block may be taken from any core field. Field pseudo-ops. (3n0) may be punched before all, some, or none of the blocks. Communication between the user and the punch is via the console keyboard and printer.

Choice of punches: As written, the program will punch its binary output on a TTY (low-speed) paper tape punch, output device code=41. If the user has some other punch (DEC PP8 or PC8, for example) he may change locations 4005, 4102 and 4104. The changes necessary for the DEC high-speed punch are shown in the program listing. The punch can then be used to output a copy of its revised self.

Use: Start the program at address *4000. The dialogue proceeds as follows:

FIELD?	User types field of data block: 0,1,etc.
PUNCH FIELD PS.-OP.(Y OR N)?	User types Y or N.
STARTING & ENDING ADDRESSES?	
#:	User types starting (lowest) address of his data block, normally a 4-digit octal number
#:	User types ending address.
(Tape is now punched)	
MORE (Y OR N)?	"N" causes punching of checksum and trailer. The punch halts, but can be restarted by "Continue" key on processor console. "Y" starts the dialogue all over again at FIELD?

Entering 4-digit addresses: Any code over 267 ASCII is interpreted as a rubout and erases the 1 to 3 digits already typed. The same address is asked for once more, on the same line.

Any code below 260 ASCII is a terminator: thus, 1 + a space is the equivalent of 0001.

Address overflow: If the internal address pointer counts up past 7777 to 0000, the routine halts. If this is not a mistake, press "Continue" to continue.

/BINARY CORE PUNCH FOR PDP-8/E WITH 2 TTY'S,
 /(OR WITH A HIGH SPEED PUNCH & A CONSOLE KEYBD.)

/USER COMMUNICATES WITH PROGRAM VIA CONSOLE TTY;
 /OUTPUT IS PUNCHED ON TTY2 PUNCH (DEV. CODE 41)
 / [FOR HIGH SPEED PUNCH, SEE NOTES IN LISTING.]

*4000

4000	6032		KCC	
4001	6214		RDF	
4002	1364		TAD KCDF	
4003	3257		DCA CURFLD	
4004	6040		SPF	
4005	6410		SPF2	/TAPE PUNCH=TTY2
				/[HI SPD. PUNCH: CHANGE TO 6026]
4006	3362		DCA CKSUM	/CLEAR
4007	4337		PUN200	/LEADER
4010	4761	WHERE,	PRINT	
4011	4171		TEXT1	/IN WHAT FIELD?
4012	6031		KSF	
4013	5212		JMP --1	
4014	6036		KRB	
4015	6046		TL S	/ECHO
4016	0335		AND K7	
4017	7106		CLL RTL	
4020	7004		RAL	
4021	7421		MQL	
4022	7501		MQA	
4023	1364		TAD KCDF	
4024	3255		DCA DATAF	
4025	7701	CT,	CLA MQA	
4026	1365		TAD K300	
4027	3366		DCA PSDOP	
4030	4761		PRINT	
4031	4175		TEXT2	/IS PS.-OP. TO BE PUNCHED?
4032	4347		YESNO	/"N" RETURNS AS 0, "Y" AS 1
4033	3367		DCA PUNOPF	
4034	4761		PRINT	
4035	4350		TEXT3	/STARTING & ENDING ADRS.?
4036	4760		READ4	
4037	3370		DCA STADR	
4040	4760		READ4	
4041	7040		CMA	
4042	1370		TAD STADR	
4043	3363		DCA COUNT	
4044	1367		TAD PUNOPF	/PUNCH PS.-OP. IF REQUIRED
4045	7650		SNA CLA	
4046	5251		JMP .+3	
4047	1366		TAD PSDOP	
4050	4301		PUNCH	

4051	1370		TAD STADR	
4052	7120		CLL CML	/SET LINK; WILL BECOME 100
4053	4317		PUNCH2	
4054	7100	DATA,	CLL	
4055	0000	DATAF,	0	
4056	1770		TAD I STADR	
4057	0000	CURFLD,	0	/CDF BACK TO INSTR. FLD.
4060	4317		PUNCH2	
4061	2370		ISZ STADR	
4062	7410		SKP	
4063	7402		HLT	/ADDRS. OVERFLOW; AN ERROR? / (IF NOT, PRESS "CONTINUE")
4064	2363		ISZ COUNT	
4065	5254		JMP DATA	/LOOP UNTIL ALL LOCNS. PUNCHED
4066	4761		PRINT	
4067	4367		TEXT4	/MORE?
4070	4347		YESNO	
4071	7640		SZA CLA	
4072	5210		JMP WHERE	/MORE TO COME; ASK WHERE
4073	1362		TAD CKSUM	
4074	7100		CLL	
4075	4317		PUNCH2	
4076	4337		PUN200	/TRAILER
4077	7402		HLT	
4100	5206		JMP WHERE-2	/RESTART; NO BLANK TAPE / FRAME IS PUNCHED

/-----
/SUBROUTINES:

			PUNCH=JMS .	
4101	0000		0	
4102	6411		6411	/[H. S. P. : 6021]
4103	5302		JMP .-1	
4104	6416		6416	/[H. S. P. : 6026]
4105	7600	M200,	7600	
4106	5701		JMP I .-5	
4107	0000	PUNCHK,	0	
4110	3347		DCA TEMP	
4111	1347		TAD TEMP	
4112	1362		TAD CKSUM	
4113	3362		DCA CKSUM	
4114	1347		TAD TEMP	
4115	4301		PUNCH	
4116	5707		JMP I PUNCHK	
			PUNCH2=JMS .	
4117	0000		0	
4120	7421		MQL	
4121	7501		MQA	
4122	7012		RTR	
4123	7012		RTR	
4124	7012		RTR	
4125	0333		AND K177	/LINK, IF 1, BECOMES 100
4126	4307		JMS PUNCHK	

4127	7501		MQA
4130	0334		AND K77
4131	4307		JMS PUNCHK
4132	5717		JMP I .-13
4133	0177	K177,	177
4134	0077	K77,	77
4135	0007	K7,	7
4136	0770	K770,	770

PUN200=JMS .

4137	0000		0
4140	1225		TAD CT
4141	3363		DCA COUNT
4142	1305		TAD M200
4143	4301		PUNCH
4144	2363		ISZ COUNT
4145	5342		JMP .-3
4146	5737		JMP I .-7

/PUNCH SEES 7600 AS 200

YESNO=JMS .

4147	0000	TEMP,	0
4150	6031	KSF	
4151	5350	JMP .-1	
4152	6036	KRB	
4153	6046	TL5	
4154	7110	CLL RAR	
4155	7630	SZL CLA	
4156	7001	IAC	
4157	5747	JMP I .-10	

/(ALSO USED FOR TEMP. STOR.)

/"Y" ENDS IN 1

READ4= JMS I .
OCDR

4160 4215

PRINT= JMS I .
TEXTYP

4161 4311

4162	0000	CKSUM,	0
4163	0000	COUNT,	0
4164	6201	KCDF,	CDF
4165	0300	K300,	300
4166	0000	PSDOP,	0
4167	0000	PUNOPF,	0
4170	0000	STADR,	0
		SPF2=	6410

4171	0611	TEXT1,	0611
4172	0514	0514	
4173	0477	0477	
4174	0000	0	

4175	2025	TEXT2,	2025
4176	1603	1603	
4177	1040	1040	
4200	0611	0611	
4201	0514	0514	
4202	0440	0440	

4203	2023	2023
4204	0525	0525
4205	0417	0417
4206	5517	5517
4207	2040	2040
4210	5031	5031
4211	4017	4017
4212	2240	2240
4213	1651	1651
4214	7700	7700

4215	0000	OCRD,	0	
4216	4303		JMS CRLF	
4217	1263		TAD NUMSIN	
4220	4275		TYPE	
4221	1264		TAD COLON	
4222	4275		TYPE	
4223	1265		TAD MIN4	
4224	3266		DCA COUNT2	
4225	3267		DCA STORE2	
4226	6031	DIGIT,	KSF	
4227	5226		JMP --1	
4230	6034		KRS	
4231	4275		TYPE	
4232	6036		KRB	/ECHO, W. TIMING LOOP
4233	7421		MQL	
4234	7501		MQA	
4235	1270		TAD MIN260	/LEAVES DIGIT
4236	7710		SPA CLA	
4237	5256		JMP EXIT	/CODE<260 TERMINATES NO.
4240	7501		MQA	
4241	1332		TAD MIN270	
4242	7700		SMA CLA	/RUBOUT?
4243	5260		JMP RBT	/YES (ANY CODE>267)
4244	7501		MQA	/NO, RETRIEVE NUMBER
4245	0272		AND POS7	/READ LAST OCTAL DIGIT
4246	7421		MQL	
4247	1267		TAD STORE2	/DIGITS PREVIOUSLY READ
4250	7104		CLL RAL	/ROTATE 3 PLACES LEFT
4251	7006		RTL	
4252	7501		MQA	/NOW ADD NEW DIGIT
4253	3267		DCA STORE2	
4254	2266		ISZ COUNT2	/DONE 4 YET?
4255	5226		JMP DIGIT	/NO
4256	1267	EXIT,	TAD STORE2	/YES
4257	5615		JMP I OCRD	
4260	1271	RBT,	TAD LARROW	/"-": NUMBER IS DELETED
4261	4275		TYPE	
4262	5217		JMP OCRD+2	/ASK AGAIN FOR SAME NO.
4263	0243	NUMSIN,	243	
4264	0272	COLON,	272	
4265	7774	MIN4,	-4	
4266	0000	COUNT2,	0	
4267	0000	STORE2,	0	

4270 7520 MIN260, -260
 4271 0337 LARROW, 337
 4272 0007 POS7, 7
 4273 0215 POS215, 215
 4274 0212 POS212, 212

TYPE=JMS .

4275 0000 0
 4276 6041 TSF
 4277 5276 JMP .-1
 4300 6046 TLS
 4301 7200 CLA
 4302 5675 JMP I .-5

4303 0000 CRLF, 0
 4304 1273 TAD POS215
 4305 4275 TYPE
 4306 1274 TAD POS212
 4307 4275 TYPE
 4310 5703 JMP I CRLF

4311 0000 TEXTYP, 0
 4312 4303 JMS CRLF
 4313 1711 TAD I TEXTYP /ADDRESS OF TEXT, IN CALL+1
 4314 3267 DCA ADRES
 4315 2311 ISZ TEXTYP /RETURN TO CALL+2
 4316 1667 GO, TAD I ADRES
 4317 7450 SNA
 4320 5711 JMP I TEXTYP
 4321 3266 DCA WORD
 4322 7344 CLL CLA CMA RAL /-2
 4323 3215 DCA CYCLE
 4324 1266 TAD WORD
 4325 7002 BSW
 4326 0344 LOOP, AND POS77
 4327 7450 SNA
 4330 5711 JMP I TEXTYP /EXIT ON 6 OR 12-BIT 0
 4331 1345 TAD MIN40
 4332 7510 MIN270, SPA
 4333 1346 TAD POS100
 4334 1347 TAD POS240 /CODES<40: ADD 300
 4335 4275 TYPE
 4336 1266 TAD WORD
 4337 2215 ISZ CYCLE
 4340 5326 JMP LOOP
 4341 7200 CLA
 4342 2267 ISZ ADRES
 4343 5316 JMP GO

ADRES= STORE2
 CYCLE= 0CRD
 WORD= COUNT2

4344 0077 POS77, 77
 4345 7740 MIN40, -40
 4346 0100 POS100, 100

4347 0240 POS240, 240

4350 2324 TEXT3, 2324

4351 0122 0122

4352 2411 2411

4353 1607 1607

4354 4046 4046

4355 4005 4005

4356 1604 1604

4357 1116 1116

4360 0740 0740

4361 0104 0104

4362 0422 0422

4363 0523 0523

4364 2305 2305

4365 2377 2377

4366 0000 0

4367 1517 TEXT4, 1517

4370 2205 2205

4371 4050 4050

4372 3140 3140

4373 1722 1722

4374 4016 4016

4375 5177 5177

4376 0000 0

ADRES	4267
OKSUM	4162
COLON	4264
COUNT	4163
COUNT2	4266
CRLF	4303
CT	4025
CURFLD	4057
CYCLE	4215
DATA	4054
DATAF	4055
DIGIT	4226
EXIT	4256
@	4316
KCDF	4164
K177	4133
K300	4165
K7	4135
K77	4134
K770	4136
LARROW	4271
LOOP	4326
MIN260	4270
MIN270	4332
MIN4	4265
MIN40	4345
M200	4105
NUMSIN	4263
OCRD	4215
FOS100	4346
FOS212	4274
FOS215	4273
FOS240	4347
FOS7	4272
FOS77	4344
PRINT	4761
PSDOP	4166
FUNCH	4301
FUNCHK	4107
FUNCH2	4317
FUNOPF	4167
FUN200	4337
FBT	4260
READ4	4760
SPF2	6410
STADR	4170
STORE2	4267
TEMP	4147
TEXTYP	4311
TEXT1	4171
TEXT2	4175
TEXT3	4350
TEXT4	4367
TYPE	4275
WHERE	4010
WORD	4266
YESNO	4347