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PROGRAM LIBRARY

DECUS NO.	8-398a
TITLE	IMAGE
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SOURCE LANGUAGE	PAL-8

DECUS Program Library Write-up DECUS NO. 8-398a

IMAGE - A PROGRAM TO CONVERT PS-8 'SAVE'D FILES TO BINARY FORMAT.

BACKGROUND:
THERE IS NO CURRENTLY DEFINED WAY TO CREATE A BINARY FILE FORM A SAVED FILE, ALTHOUGH THE TRANSLATION OF BINARY TO SAVED IS WELL DEFINED (USING THE ABSLDR). THIS PROGRAM MAKES THE TRANSLATION, PRODUCING AN OUTPUT FILE, WHICH MAY BE RE-LOADED USING ANY OF THE BINARY LOADERS OF THE PDP-8 FAMILY. IT IS USEFUL WHEN THE ONLY COPY OF A WORKING PROGRAM IS ON A SAVED FILE, OR FOR ARCHIVAL STORAGE PURPOSES, OR FOR TRANSMISSION VIA PAPER TAPE TO OTHER INSTALLATIONS.

THE IDEA ORIGINATED (PROBABLY) AT THE OREGON MUSEUM OF SCIENCE AND INDUSTRY (OMSI), BUT THEIR PROGRAM WAS LIMITED TO PAPER TAPE PUNCH AS THE OUTPUT DEVICE. THE CODING OF THE PRESENT VERSION ALLOWS THE USE OF THE DEVICE INDEPENDENT PS-8 HANDLER FOR BOTH THE INPUT AND OUTPUT DEVICES.

IF THE USER SUPPLIES NO EXPLICIT OUTPUT EXTENSION, THEN .BN IS SUPPLIED BY THE PROGRAM.

IF THE USER SPECIFIES NO INPUT EXTENSION, THEN .SV WILL BE ASSUMED.

THE OPTION /L IS TO BE GIVEN BY THE USER IF THE 144(10) LEADER TRAILER CODES ARE TO BE SUPPLIED IN THE OUTPUT - INSTEAD OF THE 16(10) CODE. FOR EXAMPLE, ONE WOULD LIKE TO HAVE THE 144(10) LEADER TRAILER CODES IF 'PTP:' WERE THE OUTPUT DEVICE.

ALL ERRORS ARE SIGNALED BY A 'HLT', AND THERE IS NO RECOVERY POSSIBLE FROM THEM. A PERSISTENT ERROR MAY BE INVESTIGATED BY ASSEMBLING AND LISTING THE SOURCE FILE.

NOTE THAT ODT CANNOT BE USED TO DEBUG THIS PROGRAM, SINCE THE USR ROUTINES ARE ROLLED INTO 10000 - 11777, WHICH OVERWRITES THE THE ODT BREAKPOINT ENTRIES!

ABSLDR OPTIONS:

/8/9=2000$

ARE THE REQUIRED OPTIONS WHEN LOADING THE BINARY FILE.

18 MAR 71
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#

```
                        /IMAGE-TO-BINARY CONVERSION
                        /LOAD WITH OPTIONS /8/9:2000$
                 2000   *2000
02000  7300  IMAGE,  CLA CLL
02001  6212          CIF 10
02002  4777          JMS I (7700
02003  0010           10                  /USR IN
02004  6212          CIF 10
02005  4776          JMS I (200
02006  0005           5                   /COMMAND DECODER
02007  2326           2326                /.SV
02010  1375          TAD (INDEV+1         /ALLOW 2-PAGE HANDLER.
02011  3221          DCA INHNDL
02012  6211          CDF 10
02013  1774          TAD I (7617          /INPUT DEVICE.
02014  0377          AND (17
02015  6201          CDF
02016  6212          CIF 10
02017  4776          JMS I (200
02020  0001           1                   /FETCH HANDLER
02021  2401  INHNDL,  INDEV+1
02022  7402           HLT
02023  6211          CDF 10
02024  1772          TAD I (7604
02025  7450          SNA                  /SKIP IF EXTENSION SUPPLIED.
02026  1371          TAD (0216            /.BN
02027  3772          DCA I (7604
02030  1770          TAD I (7620          /INPUT BLOCK.
02031  6201          CDF
02032  3236          DCA INBLOK
02033  4621          JMS I INHNDL
02034  0200           200
02035  3400           HEADER
02036  0000  INBLOK,  0
02037  7402           HLT
02040  7001          IAC
02041  1236          TAD INBLOK
02042  3303          DCA INBLK1
02043  1767          TAD I (HEADER
02044  3344          DCA SEGCNTR          /COUNTS SEGMENTS
02045  1366          TAD (HEADER+3
02046  3345          DCA SEGPNTR          /SETUP POINTER TO 1ST PAIR OF WORDS.
02047  4765'         JMS LEADER
02050  1376          TAD (200             /SEND DUMMY ORIGIN (200) 1ST
02051  7120          STL                  /SO 'PIP' CAN READ BINARY FILES
02052  4764'         JMS SEND             /PRODUCED BY 'IMAGE'.
02053  2345  SEGLOOP, ISZ SEGPNT
02054  1745          TAD I SEGPNT         /ADDRESS
02055  3236          DCA INBLOK           /SAVE TEMPORARILY.
02056  2345          ISZ SEGPNT
02057  1745          TAD I SEGPNT         /FIELDS AND PAGES.
```

```
   56  02060  0363          AND (70          /NOW JUST FIELDS.
   57  02061  1362          TAD (300
   58  02062  6212          CIF 10
   59  02063  4761          JMS I (OPUTC     /FIELD CHANGE IS NOT CHECKSUMMED.
   60  02064  1236          TAD INBLOK       /ADDRESS AGAIN.
   61  02065  7120          STL              /LINK(1)=SET-ORIGIN.
   62  02066  4764'         JMS SEND
   63  02067  1745          TAD I SEGPNT
   64  02070  0360          AND (3700        /PAGES.
   65  02071  7104          RAL CLL
   66  02072  7041          CIA
   67  02073  3342          DCA WC
   68  02074  1361  NXTBLK,  TAD (-400
   69  02075  3343          DCA BLWC
   70  02076  1357          TAD (INBUFF
   71  02077  3341          DCA CA
   72  02100  4621          JMS I INHNDL
   73  02101  0200           200
   74  02102  4000           INBUFF
   75  02103  0000  INBLK1,  0
   76  02104  7402           HLT
   77  02105  2303          ISZ INBLK1
   78  02106  1741  NXTWRD,  TAD I CA
   79  02107  2341          ISZ CA
   80  02110  7100          CLL
   81  02111  4764'         JMS SEND         /LINK MUST BE CLEAR HERE
   82  02112  2342          ISZ WC           /SKIP WHEN LOCATIONS ALL SENT
   83  02113  7410          SKP
   84  02114  5320          JMP SEGDONE
   85  02115  2343          ISZ BLWC         /SKIP WHEN BLOCK EXHAUSTED.
   86  02116  5306          JMP NXTWRD
   87  02117  5274          JMP NXTBLK
   88  02120  2344  SEGDONE, ISZ SEGCNT      /SKIP WHEN SEGMENTS COMPLETE
   89  02121  5253          JMP SEGLOOP
   90  02122  1756'         TAD CHKSUM
   91  02123  4764'         JMS SEND
   92  02124  4765'         JMS LEADER
   93  02125  1355          TAD (232
   94  02126  6212          CIF 10
   95  02127  4761          JMS I (OPUTC     /^Z CLOSES FILE.
   96  02130  6212          CIF 10
   97  02131  4776          JMS I (200
   98  02132  0011           11              /USR OUT
   99  02133  6211          CDF 10
  100  02134  1754          TAD I (7642
  101  02135  6201          CDF
  102  02136  7700          SMA CLA          /SKIP IF ALTMODE TERMINATOR.
  103  02137  5200          JMP IMAGE
  104  02140  5746          JMP I K7600      /BACK TO KEYMON.
  105
  106
  107
  108                 /VARIABLES
  109
  110  02141  0000  CA,     0        /CURRENT-ADDRESS POINTER
```

```
111   02142  0000  WC,      0        /WORD-COUNTER
112   02143  0000  BLWC,    0        /BLOCK WORD-COUNTER
113
114
115
116   02144  0000  SEGCNT,  0        /COUNTS SEGMENTS OF      SAVED FILE.
117   02145  0000  SEGPNT,  0        /POINTS TO SEGMENT TABLE IN DIRECTORY.
118
119   02146  7600  K7600,   -200     /ALSO 7600.
120   02154  7642
121   02155  0232
122   02156  2236
123   02157  4000
124   02160  3700
125   02161  7400
126   02162  0300
127   02163  0070
128   02164  2220
129   02165  2200
130   02166  3403
131   02167  3400
132   02170  7620
133   02171  0216
134   02172  7604
135   02173  0017
136   02174  7617
137   02175  2401
138   02176  0200
139   02177  7700
140          2200  PAGE
```

```
                                EJECT
                        /LEADER SUBROUTINE PUTS OUT 200 CODES.

02200  0000  LEADER,  0
02201  6211          CDF 10
02202  7201          CLA IAC
02203  0777          AND I (7643       /IS /L OPTION SET?
02204  7640          SZA CLA           /NO - SKIP NEXT LINE.
02205  1376          TAD (7600         /YES - PUT OUT 200 CODES.
02206  1375          TAD (-20
02207  6201          CDF
02210  3234          DCA LCNTR
02211  1374          TAD (200
02212  6212          CIF 10
02213  4773          JMS I (OPUTC
02214  2234          ISZ LCNTR
02215  5211          JMP .-4
02216  3236          DCA CHKSUM
02217  5600          JMP I LEADER
                        /SEND ROUTINE TRANSMITTS A 12-BIT WORD IN 'BINARY' FORMAT.
                        /IF LINK(1), THEN BIT 5 IS SENT ON 1ST FRAME.

02220  0000  SEND,    0
02221  3234          DCA STMP
02222  1234          TAD STMP
02223  7012          RTR;RTR;RTR
02224  7012
02225  7012
02226  0372          AND (177
02227  4237          JMS STUFF
02230  1234          TAD STMP
02231  0371          AND (77
02232  4237          JMS STUFF
02233  5620          JMP I SEND

                LCNTR,
02234  0000  STMP,    0
02235  0000  STMP1,   0
02236  0000  CHKSUM,  0         /CHECKSUM, MODULO 4096.

02237  0000  STUFF,   0
02240  3235          DCA STMP1
02241  1235          TAD STMP1
02242  6212          CIF 10
02243  4773          JMS I (OPUTC
02244  1235          TAD STMP1
02245  1236          TAD CHKSUM
02246  3236          DCA CHKSUM
02247  5637          JMP I STUFF
02371  0077
02372  0177
02373  7400
02374  0200
02375  7760
02376  7600
```

```
196   02377   7643
197           2400   PAGE
```

```
                        /ASCII I/O FOR PS-8

                        /DEFINITIONS REQUIRED FOR CHARACTER I/O ROUTINES.

                4000    INBUFF=. +1400
                6600    OUTBUFF=6600    /IN FIELD 1.
                2400    INDEV=.
                3000    OUTDEV=. +400
                3400    HEADER=. +1000
                7402    ERROR1=HLT
                7200    IOAREA=7200
                0001    O/PAGE=1

                0001    FIELD 1
                7200    *IOAREA
                        /USED BY OUTPUT ROUTINES.
                        /COME HERE IN CASE OUTPUT CANNOT BE OPENED ON FIRST TRY.
17200   1610    OFAIL,  TAD I I7600
17201   0376            AND (7760
17202   7650            SNA CLA         /SKIP IF NOT INDEFINITE REQUEST.
17203   7402            ERROR1          /OUTPUT FILE PROBABLY TOO LARGE.
17204   1610            TAD I I7600
17205   0376            AND (17
17206   3610            DCA I I7600
17207   5775            JMP I (QUENTR   /TRY INDEFINITE.
17210   7600    I7600,  7600
17375   7534
17376   0017
17377   7760
                7400    PAGE
```

```
                        /DELIVERS A CHARACTER TO THE OUTPUT FILE.  OUTPUT FILE NAME
                        /MUST HAVE BEEN DEFINED PREVIOUSLY!'
                        /^Z WILL CLOSE OUTPUT FILE.
                        /CALLED BY:
                        /       TAD CHAR
                        /       IOF                     /SEE NOTE AT IGETC ABOVE.
                        /       CDF
                        /       CIF 10
                        /       JMS I (OPUTC
                        /       RETURN (ACC=0)

17400  0000  OPUTC,    0
17401  3366            DCA LAST
17402  6214            RDF
17403  1307            TAD CDFCIF
17404  3311            DCA ODONE
17405  6213            CDF CIF 10
17406  1366            TAD LAST
17407  3761  OL02,     DCA I OPNTR
17410  1372            TAD OUTINH
17411  7650            SNA CLA                 /SKIP IF OUTPUT ENTERED.
17412  5313            JMP OOPEN
17413  2361  OL01,     ISZ OPNTR
17414  1761            TAD I OPNTR
17415  7500            SMA                     /SKIP WHEN 3 CHARACTERS SAVED.
17416  5255            JMP OEXIT
17417  3361            DCA OPNTR               /RESTORE POINTER.
17420  1364            TAD OCHAR3
17421  7106            CLL RTL;RTL
17422  7006
17423  0237            AND O7400
17424  1362            TAD OCHAR1
17425  3770            DCA I OCA
17426  2370            ISZ OCA
17427  1364            TAD OCHAR3
17430  7112            CLL RTR;RTR;RAR         /LEFT-SHIFT 8.
17431  7012
17432  7010
17433  0237            AND O7400
17434  1363            TAD OCHAR2
17435  3770            DCA I OCA
17436  2370            ISZ OCA
17437  7400  O7400,    7400                    /IN CASE OCA PASSES THRU 0.
17440  2367            ISZ OWC                 /SKIP IF BUFFER FULL
17441  5255            JMP OEXIT

17442  2304            ISZ OBLWC               /SKIP IF OUTPUT FILE TOO LARGE!
17443  7410            SKP
17444  7402            ERROR1
17445  6202            CIF
17446  4727            JMS I OUHAND
17447  4210             4210
17450  6600  OUTP,      OUTBUFF
17451  0000  OUTBLK,    0                       /MUST BE FILLED BY 'OOPEN'.
```

```
283   17452  7402          ERROR1
284   17453  2251          ISZ OUTBLK
285   17454  4351          JMS ORESET
286                 07600,
287   17455  7600  OEXIT,  7600
288   17456  1366          TAD LAST
289   17457  1377          TAD (-232
290   17460  7640          SZA CLA           /SKIP IF ^Z RECIEVED.
291   17461  5311          JMP ODONE
292
293                 /CLOSE THE OUTPUT FILE.
294
295   17462  1200  CLOSE,  TAD OPUTC
296   17463  3371          DCA RETURN
297   17464  1251          TAD OUTBLK
298   17465  7041          CIA
299   17466  3337          DCA OUBLK         /SAVE -BLOCK.
300   17467  4200          JMS OPUTC         /PACK WITH 0'S.
301   17470  1251          TAD OUTBLK
302   17471  1337          TAD OUBLK
303   17472  7650          SNA CLA           /SKIP WHEN LAST ONE WRITTEN.
304   17473  5267          JMP .-4
305   17474  1340          TAD OULENGTH
306   17475  7041          CIA               /NOW HAVE +LENGTH.
307   17476  1304          TAD OBLWC         /GET -LENGTH+N
308   17477  3304          DCA OBLWC
309   17500  1655          TAD I 07600
310   17501  4776          JMS I (200
311   17502  0004           4                /CLOSE
312   17503  7601  OU7601,  7601
313   17504  0000  OBLWC,    0               /COUNTS BLOCKS AVAILABLE.
314   17505  7402          ERROR1
315   17506  3372          DCA OUTINH        /MARK OUTPUT FILE CLOSED.
316   17507  6203  CDFCIF, CDF CIF
317   17510  5771          JMP I RETURN      /TO CALL+1.
318   17511  6203  ODONE,  CIF CDF
319   17512  5600          JMP I OPUTC
320
321                       IFNDEF O2PAGE <O2PAGE=0>
322   17513  1303  OOPEN,  TAD OU7601
323   17514  3337          DCA OUBLK
324   17515  1375          TAD (11
325   17516  7001  OL03,   IAC
326   17517  3326          DCA OUHAND-1
327   17520  1374          TAD (OUTDEV+O2PAGE
328   17521  3327          DCA OUHAND
329   17522  1655          TAD I 07600
330   17523  7450          SNA               /SKIP IF OUTPUT POSSIBLE.
331   17524  7402          ERROR1
332   17525  4776          JMS I (200
333   17526  0012           12               /CHECK HANDLER, OR FETCH IT.
334   17527  3001  OUHAND,  OUTDEV+O2PAGE
335   17530  7402          ERROR1            /HUH?
336   17531  1327          TAD .-2
337   17532  7650          SNA CLA           /SKIP IF NOW IN CORE.
```

```
                JMP OL03        /TRY TO LOAD IT.
17534 1655 OUENTR, TAD I 07600
17535 4776      JMS I (200
17536 0003      3               /ENTER OUTPUT FILE.
17537 7601 OUBLK, 7601
17540 0000 OULENG, 0
17541 5773      JMP I (OFAIL    /CAN'T ENTER IT.
17542 1337      TAD OUBLK
17543 3251      DCA OUTBLK
17544 1340      TAD OULENGTH
17545 3304      DCA OBLWC
17546 4351      JMS ORESET
17547 2372      ISZ OUTINH
17550 5213      JMP OL01

                /RESET POINTERS.

17551 0000 ORESET, 0
17552 1365      TAD OCHAR
17553 3361      DCA OPNTR
17554 1255      TAD 07600
17555 3367      DCA OWC
17556 1250      TAD OUTP
17557 3370      DCA OCA
17560 5751      JMP I ORESET

17561 7562 OPNTR, .+1
17562 0000 OCHAR1, 0            /SIMILAR TO ICHAR1 ETC.
17563 0000 OCHAR2, 0
17564 0000 OCHAR3, 0
17565 7562 OCHAR, OCHAR1        /SEE ICHAR3+1 FOR WARNING!

17566 0000 LAST, 0              /CONTAINS LAST CHAR RECIEVED.
17567 7600 OWC, -200            /"
17570 6600 OCA, OUTBUFF         /"
17571 0000 RETURN, 0            /RETURN ADDRESS FOR RECURSIVE OPUTC.
17572 0000 OUTINH, 0            /0 WHEN NO OUTPUT FILE IN PROGRESS.
```

BLNK	2143	SEGPNT	2145
CR	2141	SEND	2220
CDFLIF	7507	STMP	2234
CHKSUM	2236	STMP1	2235
CLOSE	7462	STUFF	2237
ERROR1	7402	WC	2142
HEADER	3400		
IMAGE	2000		
INBLK1	2103		
INBLOK	2036		
INBUFF	4000		
INDEV	2400		
INHNDL	2021		
IOAREA	7200		
L7600	7210		
L600	2146		
LAST	7566		
LCNTR	2234		
LEADER	2200		
NXTBLK	2074		
NXTWRD	2106		
OBUWC	7504		
OCA	7570		
OCHAR	7565		
OCHAR1	7562		
OCHAR2	7563		
OCHAR3	7564		
ODONE	7511		
OEXIT	7455		
OFAIL	7200		
OL01	7413		
OL02	7407		
OL03	7516		
OOPEN	7513		
ONTR	7561		
OPUTC	7400		
ORESET	7551		
OUBLK	7537		
OUENTR	7534		
OUHAND	7527		
OULENG	7540		
OUTBLK	7451		
OUTBUF	6600		
OUTDEV	3000		
OUTINH	7572		
OUTP	7450		
OU7601	7503		
OWC	7567		
O2PAGE	0001		
O7400	7437		
O7600	7455		
RETURN	7571		
SEGCNT	2144		
SEGDON	2120		
SEGLOO	2053		

SEGPNT	45	51	52	54	55	63	117#
SEND	49	62	81	91	163#	174	
STMP	164	165	171	177#			
STMP1	178#	182	183	186			
STUFF	170	173	181#	189			
WC	67	82	111#				
_L2154	100						
_L2155	93						
_L2157	70						
_L2160	64						
_L2161	59	68	95				
_L2162	57						
_L2163	56						
_L2166	44						
_L2167	42						
_L2170	31						
_L2171	29						
_L2172	27	30					
_L2173	18						
_L2174	17						
_L2175	14						
_L2176	11	21	47	97			
L2177	8						
_L2371	172						
_L2372	169						
_L2373	155	185					
_L2374	153						
_L2375	150						
_L2376	149						
_L2377	147						
_L7375	222						
_L7376	220						
_L7377	216						
_L7573	344						
_L7574	327						
_L7575	324						
_L7576	310	332	340				
_L7577	289						