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GRAPHICS 8: SYSTEM MAINTENANCE (SOFTWARE)*

by

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PREFACE

The purpose of this file is to collect and document program preparation facilities developed during implementation of the Graphical Remote Access Support System [3]. These facilities are essentially modifications and extensions of an existing disk monitor system [1]. The availability of a more powerful hardware configuration than that normally used to support the standard monitor system provided much of the impetus for our efforts. In particular, 16K words of memory were used instead of the usual 4K, an Inktronic printer was available for program listings, and a high speed, high density disk replaced the usual model.

1. PDP-8 Disk Monitor System

The Disk Monitor System (DMS) currently in use on the PDP-8 was developed from a similar system available from Digital Equipment Corporation. A description of the details of this system and of the operation of the basic system programs (EDIT, PALD, LOAD, and PIP) is contained in Digital Equipment Corporation's Disk Monitor System--Programmer's Reference Manual [1] and will not be dealt with here. What follows is a discussion of how to create and maintain a program library on DEctape, and how to use the locally written system utility programs.

1.1 Creation of a Swaptape

All programs being developed by a user must be saved on a specially formatted DEctape (called a Swaptape) while he is not using the machine. The Swaptape contains a complete dump of the disk and several programs which enable the user to load the disk from his tape, duplicate the tape, etc. To create a Swaptape, the program SYSGEN must be run. The following procedure should be followed:

1. IPL the DEctape system. This is done by setting 7577 into the Switch Register (SR), pressing the Load Address (LA) key, setting 0000 into the SR, and raising the IPL key. When the lights stop flashing, the Memory Buffer lights should be displaying 0220. At this point, lower the IPL key. The DEctape system is now loaded.
2. Mount the Swaptape from which the new tape is to be generated on a DEctape drive, and select it as unit 8. Set the rocker switches to WRITE ENABLED and REMOTE.
3. Mount a formatted DEctape onto which the system is to be generated on the other drive, and select it as unit 4. Set the switches as above.

4. Start up the DECTape system by turning the teletype to LINE, setting 7600 into the SR, then pressing LA and Start. When the teletype types a carriage-return line feed, the system is ready.
5. Type SYSGEN, followed by a carriage-return. The Swaptape on unit 8 will be copied onto the tape on unit 4*, and both will be rewound. The new tape will be an exact duplicate of the old one.

1.2 Loading the Disk from a Swaptape

Before using the Disk Monitor System, it must be loaded onto the disk from a Swaptape. To do this, the program SWAP is used as follows:

1. IPL the DECTape system, mount a Swaptape on unit 8, and start the DECTape system as described in 1.1 (1, 2, and 4).
2. Type SWAP followed by a carriage-return. The disk will be loaded from the Swaptape, the DMS will be started, and the tape rewound. The DMS is now ready for use.

1.3 Verifying the Validity of the Disk Contents

To guard against undetected disk and tape errors, the program VRFY is used. VRFY checks that the linked file structure and disk storage allocation map (SAM blocks) are valid. It should be run immediately after swapping onto the disk, and immediately before exiting. VRFY is run from the DMS, and if an error is detected, the program will halt with the offending file's SAM number displayed in the AC. Pressing Continue repeatedly will display the following:

* CAUTION--it is not good practice to have the WRITE ENABLED switch on unless actually writing onto the tape. Therefore, about 5 seconds after SYSGEN is started, WRITE ENABLED may be turned off on unit 8. Following this practice with SWAP and other programs will avoid much unnecessary grief in the event of program or machine errors.

1. The disk block # whose link word was found to be in error.
2. The correct link, determined from a scan of the SAM blocks to find the next block allocated to this file.*
3. The actual link word in the block.
4. Resumption of testing. Testing is resumed with the next file, so multiple errors in one file will not be detected.

1.4 Saving the Disk Contents on a Swaptape

After the user is finished using the PDP-8 he must save the contents of the disk on a Swaptape if he wishes to preserve the work just completed. To save the contents of the disk, the DMS program EXIT is run. The following procedure is followed:

1. Mount a Swaptape on unit 4 with WRITE ENABLED (as in 1.1 (3)).
2. Run VRFY to ensure the validity of the disk.
3. Run EXIT. The disk will be dumped onto the Swaptape, the tape will be rewound, and control will be returned to the DMS.

The next time the user wishes to use the machine, swapping on with this tape will restore the system to its state at the time of the EXIT.

1.5 Other DMS Utility Programs

1. PALD Listing Options and Increased Speed

PALD has been modified to provide formatted listing on the Inktronic printer during Pass 3. This listing may be requested by typing R in response to the "*OPT-" typed by PALD during the initial dialogue. In the case that the user wishes to list only parts of an

* This is a valid criteria for determining the correct link. The blocks in a file are always allocated in ascending order unless the dynamic deletion option is used with EDIT. This is, however, a dangerous option and should never be used.

assembly, the listing may be turned on and off with bit 11 of the SR (SR11=0-listing on).

A modification was also made to speed-up assembly time. The overflow symbol table is kept in a bank of core rather than on disk. Fast access to 1000 symbols is thus provided.

2. COPY

A generalized file copying and merging program, COPY, is available. This program will copy and merge files on disk, Swaptape, or DECTape (old DECTape system). The file specified in response to "*IN-" is copied into the file specified in response to "*OUT-". The options available are:

A - Copies and merges up to 15 ASCII files on the disk system (disk or Swaptape), or copies single ASCII files between the disk and DECTape systems.

S - Copies single system files to or from disk or Swaptape.

U - Identical to S except user files are copied.

B - Identical to S except binary files are copied.

SPECIAL NOTE ON COPYING ASCII FILES ON DECTAPE--

To specify that input or output is a DECTape file, type a carriage return in response to the "*IN-" or "*OUT-" request. When "OUTPUT:" or "INPUT:" is typed, answer by typing the name of the desired DECTape file. The DECTape should be on unit 8. Multiple files may be copied from the disk system to the DECTape system, but not the reverse.

3. LIST

A program called LIST is available to provide formatted, paginated listings of either DMS ASCII files or paper tapes. To use it, respond to "*IN-" with either a "T: " to list a paper tape (the tape should be in the reader at this point), or the name of the disk or Swaptape file to be listed. Respond to "*OPT-" with either a "T" for a listing on the teletype, or anything else for a listing on the Inktronic printer.

4. SWCH

After editing from a source file into a temporary file, SWCH is used to get the temporary file back into the proper source file. This is done by changing each occurrence in the SAM blocks of each file's SAM number to that of the other. When done, the contents of the input and output files will have been exchanged.

OPTIONS

A - ASCII

B - Binary

ERRORS

Any detected error condition will cause a "?" to be typed and control to be returned to the system. There are no software conditions which can cause destruction of the SAM blocks.

1.6 PDP-8/I Channel and Monitor Support

There are currently several programs available utilizing the channel between the PDP-8 and the PDP-8/I [2]. These programs enable utilization of the PDP-8 DMS to develop programs for the PDP-8/I and use of the PDP-8/I high speed paper tape reader as an input device for the PDP-8. The programs available are:

1. MON8I

This program is the resident "monitor" in the PDP-8/I. It is resident on the 7600 page in bank 1 of the 8/I, and must be running to allow any of the programs described below to be loaded. MON8I is loaded into the 8/I from paper tape with the binary loader.

MON8I communicates with a program running in the PDP-8 via three software flag locations in bank 0 of the PDP-8's memory. They direct MON8I to perform its functions of loading data from PDP-8 core to 8/I core, and starting a program in the 8/I. These locations and their meanings are:

7765 - 0 = idle

→ 0 = PDP-8 program has data ready for MON8I to load into the 8/I. In this case, 7765 should contain a CDF to the destination bank in the 8/I. Reset to 0 when data has been loaded.

7766 - Contains either

1. Load address for data in PDP-8/I, or
2. 7777, indicating that location 7767 contains the starting address for execution in the 8/I.

7767 - Contains either

1. PDP-8 address of data to be loaded, or
2. starting address in PDP-8/I (for (2) above).

Obviously, the contents of these locations has meaning only if the channel is enabled by the PDP-8. These locations may be used freely by programs running with the channel disabled.

2. LD8I

This program runs in the PDP-8, and will load user saved files from disk or Swaptape into the PDP-8/I (via MON8I), and begin their execution. To use:

1. Prepare and assemble the 8/I program using the DMS.
2. Save the program as a user file.
3. Run LD8I, responding to the "*IN-" request by typing the name of the user file (on disk or Swaptape) to be loaded and run in the 8/I. The program will be loaded and started, and the PDP-8 will return to the monitor.

3. PTAP

Transfers ASCII and binary paper tapes from the PDP-8/I high speed reader to the PDP-8. To use, make sure MON8I is running, then run PTAP in the PDP-8. PTAP will load a segment of itself into the 8/I, and start it up. It will then ask for an option on the PDP-8 TTY. The options are:

- A - read in an ASCII paper tape
- B - read in a binary paper tape

Then, "*OUT-" will be typed. Reply with the name of the output file on disk or Swaptape. When "*IN-" is typed, load the tape into the reader. Hitting carriage-return will start the reading. The tape will then be read into the PDP-8 and stored in proper format in the specified file. If an error occurs, a "?" will be typed. In either case, both machines will be returned to their monitors.

4. XRAY

This program is run from the PDP-8 DMS and loads itself with MON8I into the PDP-8/I. The PDP-8 portion then returns to the DMS. As long as the channel is enabled, it allows the user to perform most of the functions of XOD or ODT (see appropriate DEC program documentation) in the memory of the PDP-8 from the 8/I teletype. Core searches and modification may be done while a program is in operation in the PDP-8.

2. PERTINENT MODIFICATIONS AND PROGRAM LISTINGS

The following material describes the major modifications needed to enable the DMS to run on the fast disk. Listings of new utilities and of the major modified portions of standard programs are also presented. Note that many standard programs such as EDIT, LOAD, and HELP do not appear here. Since these programs call SYSIO for disk blocks, merely changing the disk routine in the header allows all these programs to run on the altered system without being modified.

2.1 Monitor Head and Command Decoder

The monitor head contains a new block-number-to-disk-address mapping routine and a new SYSIO disk routine. The altered command decoder takes advantage of the new block map routine.

(listings follow)

PAGE

/SYSTEM MONITOR HEAD FOR DISK MONITOR SYSTEM

/LIVES AT 07600

/H. J. LEVIN

/MARCH, 1970

HEAD.

0600	0037	SS0037,	37	
0601	7200		7200	/LIST OF ADDRESSES
0602	7400	SSMONI,	7400	
0603	7200		7200	
0604	7400		7400	
0605	1330	TAD	SSADHD	
0606	3227	DCA	SSADRX	
0607	1331	TAD	SS0005	/WRITE
0610	3233	DCA	SSFUN	
0611	1241	TAD	SSWAP	/SWAP BLOCK
0612	4225	JMS	SSGO	/WRITE PAGE LAST-2
0613	1241	TAD	SSWAP	
0614	7001	IAC		
0615	4225	JMS	SSGO	/WRITE PAGE LAST-1
0616	1332	TAD	SS0003	/READ
0617	3233	DCA	SSFUN	
0620	7001	IAC		
0621	4225	JMS	SSGO	/READ MON PAGE 1
0622	7326	CLA	STL RTL	/BLOCK 2
0623	4225	JMS	SSGO	/READ MON PAGE 2
0624	5602	JMP	I SSMONI	/START MONITOR
0625	0000	SSGO,	0	
0626	3234	DCA	SSBLOK	/BLOCK NO.
0627	1201	SSADRX,	TAD SSMONI-1	/RESET AND BUMPED
0630	2227		ISZ SSADRX	
0631	3235	DCA	SSMAR	/MEM ADD
0632	4242	JMS	SYS IO	
0633	0000	SSFUN,	0	
0634	0000	SSBLOK,	0	
0635	0000	SSMAR,	0	
0636	0000	SSLINK,	0	
0637	7402	HLT		
0640	5625	JMP	I SSGO	
0641	0373	SSWAP,	373	/FIRST SWAP BLOCK

/SYSTEM I/O ROUTINE

```

0642 0000  SYSIO, 0
0643 7200  CLA
0644 6214  RDF /CALLER'S FIELD
0645 1320  TAD SSCTF
0646 3335  DCA SSCNG
0647 7126  STL RTL /2
0650 1335  TAD SSCNG /CIF CDF CALLER
0651 3347  DCA SSFXT
0652 1642  TAD I SYSIO /FUNCTION
0653 2242  ISZ SYSIO
0654 3326  DCA SSFUNG
0655 1326  TAD SSFUNG /CHECK FOR INDIRECT
0656 7006  RTL
0657 7710  SPA CLA
0660 7040  CMA /-1 FOR INDIRECT
0661 3351  DCA SSIND /0 FOR DIRECT

```

/GET BLOCK NUMBER AND MULTIPLY BY 202(8)

```

0662 1642  TAD I SYSIO
0 3 7510  SPA /<4000?
0664 7402  HLT /NO, ERROR
0665 0333  AND SS3740 /HIGH BITS
0666 7112  CLL RTR /RIGHT 5
0667 7012  RTR
0670 7010  RAR
0671 1334  TAD SS603 /BANK 3 AND BYPASS IPL(TRACKS 0-1)
0672 3325  DCA SSFXT
0673 1642  TAD I SYSIO
0674 0200  SS0200, AND SS0037 /LOW ORDER BITS
0675 7112  CLL RTR /MULT. BY 200
0676 7012  RTR
0677 7012  RTR
0700 1642  TAD I SYSIO /ADD TWICE MORE
0701 1642  TAD I SYSIO
0702 2242  ISZ SYSIO
0703 3324  DCA SS0KAD /LOW ORDER DISK ADDRESS
0704 7430  SZL /OVERFLOW?
0705 2325  ISZ SSFXT /YES, FIX IT

0706 1642  TAD I SYSIO /MEMORY ADDRESS
0707 2242  ISZ SYSIO
0710 3323  DCA SSMPM
0711 1242  TAD SYSIO
0712 2242  ISZ SYSIO /LINK ADDRESS
0713 3327  DCA SSLNK1
0 4 1642  TAD I SYSIO
0715 3352  DCA SS1AD /POSSIBLE INDIRECT RETURN ADDRESS
0716 2242  ISZ SYSIO /MOVE TO ERROR RETURN
0717 1727  TAD I SSLNK1

```



```

/
SSCDF,
0720 6201 SSAGN, CDF 0 /REPEAT FROM HERE IF ERROR
0721 6232 CIF 30
0722 4202 JMS BNK 3-200 /GO TO BANK 3 ROUTINES
0723 0000 SSMEH, 0
0724 0000 SSDKAD, 0
0725 0000 SSEXT, 0
0726 0000 SSEUNC, 0
0727 0000 SSLNK1, 0 /A(LINK)
/
/
0730 1201 SSADHD, TAD SS4ONI-1
0731 0005 SS0005, 5
0732 0003 SS0003, 3
0733 3740 SS3740, 3740
0734 0603 SS603, 603
```

```

/
/RETURN HERE AFTER SUCCESSFUL TRANSFER
/AC CONTAINS LINK IF READ
/LINK CONTAINS DIRECTION
/
SSOUT.
0735 0000 SSCNG. 0 /BUMPED TO A CDF CALLER
0736 2351 ISZ SSIND /INDIRECT RETURN?
0737 5344 JMP SSDIR /NO
0740 7201 CLA IAC /GET ADDRESS+1
0741 1352 TAD SSIND /INDIRECT ADDRESS
0742 3242 DCA SYSIO
0743 5346 JMP SEXIT-1 /RETURN
/
0744 7430 SSDIR, SZL /READ OR WRITE ON DIRECT RETURN?
0745 3727 DCA I SSINK1 /READ, DELIVER LINK
0746 7300 CLA CL
0747 0000 SEXIT, 0 /A CIF CDF CALLER
0750 5642 JMP I SYSIO /RETURN WITH AC=0
SSIND=.
SSIAD=+.1

```

```

      / IPL SEQUENCE IS LOCATED HERE
      /
      / THE 2 PAGE MONITOR HEAD IS LOCATED AT WORD 0
      / OF THE DISK.
      /
      / IT CAN BE BROUGHT IN TO CORE BY THE FOLLOWING:
      /
      /      *7776
      /      DKIPL  /START IPL
      /      JMP .  /THIS LOC OVERLAYED
      /
0751  6623  SS1PL,  DKEF!DKRS      /ANY ERRORS?
0752  5361      JMP SS1PL1        /NO, GET NEXT PAGE
0753  7402      HLT                /HALT AND SHOW STATUS BITS
0754  7200      CLA
0755  1360      TAD SS5177        /REPLACE JMP SS1PL
0756  3377      DCA SS1PL2        /WITH A JMP .
0757  6577      DKIPL            /START IPL
0760  5377  SS5377, JMP SS1PL2    /WAIT FOR IT
      /
0761  6573  SS1PL1, DKIPL-4      /START IPL AGAIN
0762  1274      TAD SS0200        /CHANGE DISK ADD TO 200
0763  6602      DKTA
0764  1375      TAD SS4600        /AND BANK BITS TO 3
0765  6604      DKEX
0766  6574      DKIPL-3
0767  6611      DKSF              /WAIT FOR IT
0770  5367      JMP .-1
0771  6623      DKEF!DKRS        /ERRORS?
0772  5200      JMP HEAD         /NO, START MONITOR
0773  7402      HLT              /YES, SHOW THEM
0774  5354      JMP SS1PL+3      /START ALL OVER
      /
      /
0775  4600  SS4600, 4600
      /
      / OVERLAY TO CONTINUE IPL SEQUENCE
      /
      / *HEAD+177
0777  5351  SS1PL2, JMP SS1PL
      /
      /
      /

```

```

PAGE
/
/ROUTINES IN TOP PAGE OF BANK 3
/
/
0400 0000 LINK1. 0
0401 0000 SUM. 0
/
0402 0000 BNK3. 0 /ENTRY POINT
0403 3355 DCA LINK
0404 1602 TAD I BNK3 /MEM ADD
0405 2202 ISZ BNK3
0406 3356 DCA MEMADD
0407 1602 TAD I BNK3 /DISK ADD (LOW)
0410 2202 ISZ BNK3
0411 3357 DCA DSKADD
0412 1602 TAD I BNK3 /EXTENSION
0413 2202 ISZ BNK3
0414 3360 DCA EXT
0415 1602 TAD I BNK3 /FUNCTION
0416 0377 AND C70 /FIELD FOR DATA
0417 1376 TAD CDF
0 0 3240 DCA CNG1
0421 1240 TAD CNG1
0422 3261 DCA CNG2
0423 1602 TAD I BNK3 /FUNCTION
0424 6231 CDF 30
0425 0375 AND C7 /DIRECTION
0426 1374 TAD C-5
0427 7650 SNA CLA
0430 5253 JMP WRITE /5=WRITE

```

```

0431 4344 / READ. JMS READ1 /READ A BLOCK
0432 1373 TAD (-200 /MOVE 200 WORDS
0433 3361 DCA TEMP
0434 1372 TAD (-7400 /FROM 37400
0435 3364 DCA ADPNT /TO MEMADD
0436 1764 RDLOOP, TAD I ADPNT
0437 2364 ISZ ADPNT
0440 0000 CNG1, 0 /CDF FIELD
0441 3756 DCA I MEMADD
0442 2356 ISZ MEMADD
0443 7000 NOP /NO OVERFLOW
0444 6231 CDF 30
0445 2361 ISZ TEMP
0446 5236 JMP RDLOOP
0447 1200 TAD LINK1 /GET LINK WORD
0450 7120 STL /L=1 MEANS READ
0451 6203 TRNSOK, CIF CDF 0
0452 5335 JMP SSOUT+200 /GO BACK TO CLEANUP

```

0453	1355	WRITE.	TAD LINK	/MOVE LINK
0454	3200		DCA LINK1	
0455	1373		TAD (-200	/MOVE IN DATA
0456	3361		DCA TEMP	
0457	1372		TAD (7400	
0460	3364		DCA ADPNT	
0461	0000	CNG2:	D	/A CDF
0462	1756		TAD I MEMADD	
0463	2356		TSZ MEMADD	
0464	7000		NOP	/NO OVERFLOW
0465	6231		CDF 30	
0466	3764		DCA I ADPNT	
0467	2364		TSZ ADPNT	
0470	2361		TSZ TEMP	
0471	5261		JMP CNG2	
0472	4330		JMS CHKSUM	/COMPUTE CHECKSUM
0473	3201		DCA SUM	
0474	4300		JMS TRANS	/DO THE TRANSFER
0475	4344		JMS READ1	/REREAD TO CHECK IT
0476	7100		CIL	/L=0 FOR WRITE
0477	5251		JMP TRNSOK	

/ROUTINE TO DO A TRANSFER

```

0500 0000  TRANS.  0
0501 3361          DCA TEMP          /SAVE FUNCTION
0502 6571          DKCF              /CLEAR FLAGS
0503 1372          TAD C7400         /BUFFER ADDRESS
0504 6601          DKMA
0505 1357          TAD DSKADD        /LOW DISK ADDRESS
0506 6602          DKTA
0507 1360          TAD EXT           /EXTENSION BITS
0510 1361          TAD TEMP         /FUNCTION
0511 6604          DKEX
0512 1371          TAD C201         /202 WORDS
0513 6614          DKWC            /START TRANSFER
0514 1360          TAD EXT           /SHOW EXTENSION
0515 6611          DKSF            /WAIT FOR COMPLETION
0516 5315          JMP .-1
0517 7200          CIA
0520 6623          DKEF!DKRS        /ERRORS?
0521 5700          JMP I TRANS      /NO, RETURN
0522 3363  ERR,    DCA ERRLOC       /SAVE STATUS
0523 1355          TAD LINK         /GET LINK WORD
0524 0 4 6202      CIF 0
0525 2362          ISZ ERRCNT       /BUMP COUNTER
0526 5320          JMP SSAGN+200    /TRY AGAIN
0527 5326          JMP .-1         /PATCH FOR SPECIAL ACTION

```

```

/COMPUTE CHECKSUM
/
0530 0000 CHKSUM, 0 /SUM WORDS 7400-7600
0531 1372 TAD C7400
0532 3364 DCA ADPNT
0533 1370 TAD C-201
0534 3361 DCA TEMP
0535 1764 TAD I ADPNT
0536 2364 ISZ ADPNT
0537 2361 ISZ TEMP
0540 5335 JMP .-3
0541 1360 TAD EXT /THROW IN EXTENSION WORD
0542 1357 TAD DSKADD /AND DISK ADDRESS
0543 5730 JMP I CHKSUM /RETURN
```


/READ 1 BLOCK

/

0544	0000	READ1 . 0	
0545	1367	TAD C4000	/READ BIT
0546	4300	JMS TRANS	/DO THE TRANSFER
0547	4330	JMS CHKSUM	/COMPUTE CHECKSUM
0550	7041	CIA	
0551	1201	TAD SUM	/OLD CHECKSUM
0552	7650	SNA CLA	/=0?
0553	5744	JMP I READ1	/YES, RETURN
0554	5323	JMP ERR+1	/NO, ERROR

/VARIABLES AND DEFINITIONS

0555 0000 LINK, 0
0556 0000 MEMAD, 0
0557 0000 DSKAD, 0
0560 0000 EXT, 0
0561 0000 TEMP, 0
0562 0000 ERRON7, 0
0563 0000 ERRLOC, 0
0564 0000 ADPNT, 0
DKCF=6571
DKMA=6601
DKTA=6602
DKEX=6604
DKSF=6611
DKWC=6614
DKEF=6621
DKRS=6622
DKIP=6577

0567	4000
0570	7577
0571	0201
0572	7400
0573	7600
0574	7773
0575	0007
0576	6201
0577	0070

```

/ Command Decoder (.CD.)
/ Modifications
/
/ Disk location (old contents)/New Contents
/
15.101(5371)/5702 /same as BUILDER, removes code
                    to read blk 3 (old Swaptape
                    blkmap routine) into bank 1.
20.21(377)/402     /faster to add to logical blk no.
                    to get Swaptape physical blk no.
20.55(6212)/2203   /same as BUILDER
20.56(4605)/5375   /go to new mapping routine
20.175(7662)/1221  /new Swaptape mapping routine: adds 402
20.176(0)/3353     /to blk no. passed in call to CDIC
                    and puts it in DXBLO
20.177(6757)/5257 /jump back to the next instruction
/
/

```

2.2 SYSGEN, SWAP, and VRFY

The three new programs created to load and unload the disk system are SYSGEN, SWAP (which also contains EXIT), and VRFY, as described in sections 1.1, 1.2, and 1.3.

(listings follow)

/PROGRAM TO COPY A TAPE TO UNIT #4.

*200

0200	6032	SYSGEN.	KCC	
0201	1377		TAD (-57	/57 PASSES OF 37 BLOCKS;
0202	3234		DCA CNT	/=2622 BLOCKS
0203	3210		DCA TBLK1	/START AT BEGINNING OF TAPE
0204	3215		DCA TBLK2	
/				
0205	1376	LOOP,	TAD (20	/BANK 2
0206	4775		JMS RWTAPE	/READ 37 BLOCKS
0207	0237		0237	/FROM UNIT 8
0210	0000	TBLK1,	0	
0211	0000		0	
0212	1376		TAD (20	
0213	4775		JMS RWTAPE	/WRITE ONTO UNIT 4
0214	4437		4437	
0215	0000	TBLK2,	0	
0216	0000		0	
0217	1210		TAD TBLK1	/BUMP BLOCK NUMBER
0220	1374		TAD (37	
0221	3210		DCA TBLK1	
0222	1210		TAD TBLK1	
0223	3215		DCA TBLK2	
0224	2234		ISZ CNT	/DONE?
0225	5205		JMP LOOP	/NO
/				
0226	1373		TAD (4600	/REWIND UNIT 4
0227	6766		DCA DTXA	
0230	7200		CLA	
0231	2234		ISZ CNT	/A SHORT DELAY
0232	5231		JMP -1	
0233	5772		JMP 7600	/RETURN TO DECTAPE
/				
0234	0000	CNT,	0	

0372	7600
0373	4600
0374	0037
0375	0400
0376	0020
0377	7721

PAGE

/RWTAPE

/

/THIS VERSION USES 201(8) AS A BLOCKSIZE

/

XLIST

/END OF RWTAPE

/PROGRAM TO GO FROM TAPE TO DISK AND DISK TO TAPE

/TAPE FORMAT IS AS FOLLOWS:

/BLOCKS 0-377: DECTAPE REGION
/BLOCKS 400-401: MONITOR HEAD
/BLOCKS 402-2601: SWAP REGION

/SWAP REGION BLOCKS ARE CONSECUTIVE ON TAPE

/START HERE TO SWAP

*200

0200	6032	SWAP.	KCC	
0201	4777		JMS RWTAPE	/BLOCK 1 OF HEAD
0202	0201		0201	
0203	0400		400	
0204	7400		7400	/INTO 7400
0205	1376		TAD (7377	/MOVE IT UP
0206	3010		DCA 10	
0207	1375		TAD (-200	/ONE PAGE
0210	3347		DCA CNT	
0 1	1410		TAD I 10	
0212	3747		DCA I CNT	
0213	2347		ISZ CNT	
0214	5211		JMP .-3	
/				
0215	1374		TAD (30	/BANK 3
0216	4777		JMS RWTAPE	/BLOCK 2 OF HEAD
0217	0201		0201	
0220	0401		401	
0221	7600		7600	/INTO 37600
/				
0222	1373		TAD (-46	/46(8) PASSES
0223	3351		DCA PASSES	
0224	1372		TAD (402	/START AT BLOCK 402
0225	3232		DCA TBLK1	
0226	3250		DCA DBLK1	/BLOCK 0 ON DISK
/				
0227	1371	PASS1.	TAD (20	/BANK 2
0230	4777		JMS RWTAPE	/READ 37 BLOCKS
0231	0237		0237	
0232	0000	TBLK1.	0	
0233	0000		0	/INTO LOC 0
0234	3251		DCA ADR1	
0235	1370		TAD (-37	
0236	3347		DCA CNT	
/				
0 7	1251	LOOP1.	TAD ADR1	
0240	1367		TAD (200	/POINT TO LINK
0241	3350		DCA HOLD	

0242	6221	CDF 20	
0243	1750	TAD I HOLD	/PICK UP LINK
0244	6201	CDF 0	
0245	3252	DCA LLINK1	
0246	4766	JMS 764?	/WRITE IT OUT
0247	0025	25	/OF BANK 2
0250	0000	DBLK1, 0	
0251	0000	ADR1, 0	
0252	0000	LLINK1, 0	
0253	7402	HLT	
0254	2250	ISZ DBLK1	/BUMP DISK BLOCK
0255	1350	TAD HOLD	
0256	7001	IAC	
0257	3251	DCA ADR1	/BUMP ADDRESS
0260	2347	ISZ CNT	/ENOUGH?
0261	5237	JMP LOOP1	/NO
/			
0262	1232	TAD TBLK1	/BUMP TAPE BLOCK
0263	1365	TAD C37	
0264	3232	DCA TBLK1	
0265	2351	ISZ PASSES	/DONE?
0266	5227	JMP PASS1	/NO
0267	1364	TAD C600	/REWIND UNIT 8
0270	6766	DTCA DTXA	
0271	5775	JMP 7600	/START MONITOR

```

/START HERE TO EXIT
/
*300
0300 6032 EXIT. KCC
0301 1373 TAD (-46 /46 PASSES
0302 3351 DCA PASSES
0303 1372 TAD (402 /TAPE BLOCK 402
0304 3335 DCA TBLK2
0305 3313 DCA DBLK2 /DISK BLOCK 0
/
0306 1370 PASS2. TAD (-37 /37 BLOCKS
0307 3347 DCA CNT
0310 3314 DCA ADR2
/
0311 4766 LOOP2. JMS 7642 /READ
0312 0023 23 /BANK 2
0313 0000 DBLK2. 0
0314 0000 ADR2. 0
0315 0000 LLINK2. 0
0316 7402 HLT
0317 1314 TAD ADR2 /MOVE OUT LINK
0320 1367 TAD (200
C 1 3314 DCA ADR2
0322 1315 TAD LLINK2
0323 6221 CDF 20
0324 3714 DCA I ADR2
0325 6201 CDF 0
0326 2314 ISZ ADR2 /BUMP FOR NEXT BLOCK
0327 2313 ISZ DBLK2 /BUMP DISK BLOCK
0330 2347 ISZ CNT /DONE?
0331 5311 JMP LOOP2 /NO
/
0332 1371 TAD (20 /BANK 2
0333 4777 JMS RWTAPE /WRITE 37 BLOCKS
0334 4437 4437 /ON UNIT 4
0335 0000 TBLK2. 0
0336 0000 0
0337 1335 TAD TBLK2 /BUMP TAPE BLOCK
0340 1365 TAD (37
0341 3335 DCA TBLK2
0342 2351 ISZ PASSES /ALL DONE?
0343 5306 JMP PASS2 /NO
0344 1363 TAD (4600 /REWIND UNIT 4
0345 6766 DTCA DTXA
0346 5775 JMP 7600 /RETURN TO SYSTEM
/
/
0347 0000 CNT. 0
0350 0000 HOLD. 0
0351 0000 PASSES. 0

```

0363	4600
0364	0600
0365	0037
0366	7642
0367	0200
0370	7741
0371	0020
0372	0402
0373	7732
0374	0030
0375	7600
0376	7377
0377	0400

PAGE

/RTAPE

/

/THIS VERSION USES 201(8) AS A BLOCKSIZE

/

XLIST

/END OF RTAPE

/VERIFY ALL FILES ON DISK BY
/CHECKING ALL THEIR LINKS.

/

*200

/READ ALL THE SAM BLOCKS

0200	6032	VRFY.	KCC	
0201	1377		TAD (200	/FIRST SAM #
0202	3215		DCA SLINK	
0203	1376		TAD (SAMBUF	
0204	3214		DCA SMEM	
0205	1215	SLOOP,	TAD SLINK	
0206	7450		SNA	
0207	5223		JMP SDONE	
0210	3213		DCA SBLOCK	/READ NEXT
0211	4775		JMS 7642	
0212	0003		3	
0213	0000	SBLOCK,	0	
0214	0000	SMEM,	0	
0215	0000	SLINK,	0	
0216	7402		HLT	
0217	1214		TAD SMEM	/BUMP MEM ADD
0220	1377		TAD (200	
0221	3214		DCA SMEM	
0222	5205		JMP SLOOP	
0223	1374	SDONE,	TAD (2	/START AT FILE 2
0224	3230		DCA FILE	
0225	1373		TAD (-76	/76(8) FILES
0226	3231		DCA FCNT	
0227	5232		JMP VNXT	
0230	0000	FILE,	0	
0231	0000	FCNT,	0	

```

/BUILD A LIST OF BLOCK NUMBERS,
/THEN VERIFY THEM
/
0232 1372 VNXT, TAD (BUF-1 /BLOCK LIST
0233 3010 DCA 10
0234 1371 TAD (SAMBUF-1
0235 3011 DCA 11
0236 1370 TAD (77 /LEFT HALF FIRST
0237 3305 DCA MASK
0240 1367 TAD (-5 /5 SAM BLOCKS
0241 3306 DCA SCNT
0242 3310 DCA BLOCK /BLOCK 0
/
0243 1230 BNXTL, TAD FILE
0244 7041 CIA
0245 3311 DCA MFILE /SFARCH PARAMETER
0246 1366 BNXT, TAD (-200 /200 WORDS PER BLOCK
0247 3307 DCA BCNT
0250 1411 TAD I 11
0251 0305 AND MASK /EXTRACT HALF
0252 1311 TAD MFILE /MATCH?
0253 7640 SZA CLA
0254 5257 JMP .+3 /NO
0255 1310 TAD BLOCK /YES, PUT INTO LIST
0256 3410 DCA I 10
0257 2310 ISZ BLOCK /NEXT BLOCK
0260 2307 ISZ BCNT /MORE WORDS?
0261 5250 JMP BNXT+2 /YES
0262 1305 TAD MASK /SWITCH MASK
0263 7040 CMA
0264 3305 DCA MASK
0265 1305 TAD MASK /BACK TO LEFT HALF?
0266 7710 SPA CLA
0267 5273 JMP .+4 /NO, RIGHT HALF
0270 2306 ISZ SCNT /ALL BLOCKS SEARCHED?
0271 5243 JMP BNXTL /NO, DO NEXT
0272 5312 JMP BDONE /YES, START VERIFICATION
0273 1230 TAD FILE /SFARCH RIGHT HALF
0274 7106 CLL RTL
0275 7006 RTL
0276 7006 RTL
0277 7041 CIA
0300 3311 DCA MFILE
0301 1011 TAD 11 /RESTORE 11
0302 1366 TAD (-200
0303 3011 DCA 11
0304 5246 JMP BNXT
/
0305 0000 MASK, 0
0306 0000 SCNT, 0
0307 0000 BCNT, 0
0310 0000 BLOCK, 0

```

0311 0000 MFILE, 0
SAMBUF=400
BUF=SAMBUF+1200

/DO THE VERIFICATION NOW

0312	3410	BDONE.	DCA I 10	/PUT IN A 0
0313	4040		JMS RCHECK	/CHECK THE FILE
0314	5020		JMP ERR	/AN ERROR
0315	2230	BDONE2.	ISZ FILE	/NEXT FILE
0316	2231		ISZ FCNT	/ANY MORE FILES
0317	5232		JMP VNXT	/YES
0320	5766		JMP 7600	/NO. RETURN TO MONITOR

0366 7600
0367 7773
0370 0077
0371 0377
0372 1577
0373 7702
0374 0002
0375 7642
0376 0400
0377 0200

*20

0020	1177	ERR,	TAD (207	/RING BELL
0021	6046		TLS	
0022	7200		CLA	
0023	1776		TAD FILE	
0024	7402		HLT	
0025	7200		CLA	
0026	1054		TAD RBLOCK	
0027	7402		HLT	
0030	7200		CLA	
0031	1472		TAD I RPTR	
0032	7402		HLT	
0033	7200		CLA	
0034	1056		TAD RLINK	
0035	7402		HLT	
0036	7200		CLA	
0037	5775		JMP BDONE2	

```

/READ AND CHECK THE FILE
/
0040 0000 RCHECK, 0
0041 1174 TAD (BUF /BLOCK LIST
0042 3072 DCA RPTR
0043 1472 TAD I RPTR
0044 7450 SNA /NULL FILE?
0045 5070 JMP ROK /YES
0046 7410 SKP
0047 1472 RLOOP, TAD I RPTR /SET UP BLOCK
0050 2072 ISZ RPTR
0051 3054 DCA RBLOCK
0052 4773 JMS 7642 /READ A BLOCK
0053 0013 13 /INTO BANK 1
0054 0000 RBLOCK, 0
0055 7600 7600 /AT 7600
0056 0000 RLINK, 0
0057 7402 HLT
0060 1056 TAD RLINK /COMPARE LINKS
0061 7041 CIA
0062 1472 TAD I RPTR
0063 7640 SZA CLA
0064 5440 JMP I RCHECK /ERROR, RETURN TO CALL+1
0065 1056 TAD RLINK /WAS IT LAST BLOCK?
0066 7640 SZA CLA
0067 5047 JMP RLOOP /NO, DO MORE
0070 2040 ROK, ISZ RCHECK /ALL OK, RETURN TO CALL +2
0071 5440 JMP I RCHECK
/
0072 0000 RPTR, 0
0173 7642
0174 1600
0175 0315
0176 0230
0177 0207

```

2.3 PALD, PIP, COPY, LIST, and SWCH

The assembler (PALD) and the peripheral interchange program (PIP) were modified to improve their performance on the new system. The patches to PALD demonstrate use of the Inktronic printer.

Easier handling of files and symbolics is provided by the three new programs COPY, LIST, and SWCH. The listing of COPY is very important for three reasons. First, it demonstrates the manner in which files on the DMS, the DEctape, and the Swaptape are related (e.g., control and directory block usage). Second, it contains a listing of the subroutine RWTAPE which is used by many other programs for accessing the magnetic tape units. Third, it contains the routines for reading and writing DMS files and for manipulation of the SAM blocks. These routines are both flexible and general, and may be used in other programs which manipulate DMS files.

(listings follow)

/ PATCHES TO **PALD** TO GET PASS 3 LISTINGS THRU
/ THE LIST PROGRAM

FIELD 1

0010	0000	*10	/COMPENSATE FOR LOADER ERROR
			0
0601	6213	*601	CIF CDF 10 /PATCH TO HIGH SPEED PUNCH I/O ROUTINE
0602	5605		JMP I .+3
0603	7200		CLA
0604	5600		JMP I 600
0605	5454		LIST
		*1632	/LINK TO ROUTINE TO HANDLE FORM-FEEDS
1632	5633		JMP I .+1
1633	4335		FFCHK
		*2150	JMP END /DONE WITH PASS 3
2150	5777		
		*2163	INIT /GO TO INIT BEFORE OUTPUTTING SYMBOLS
2163	4350		
2177	4345		
		*4600	/MOVE LIST ROUTINE TO BANK 1
4600	5601		JMP I .+1
4601	5730		MOVLST
		*4664	/ENABLE LIST ROUTINE
4664	5777		JMP ENABL
4777	4357		
		*4335	
4335	7450	FFCHK,	SNA /CHECK FOR FORM FEED, TAKE PROPER ACTION
4336	5341		JMP .+3 /FORM FEED?
4337	5740		JMP I .+1 /NO, RETURN TO BIT6
4340	1634		1634
4341	1377		TAD (214 /YES, OUTPUT IT
4342	4776		JMS 600
4343	5744		JMP I .+1 /RETURN TO IDX
4344	2027		2027
4345	1377	END,	TAD (214 /SEND FF TO FINISH PAGE
4346	4776		JMS 600
4347	5775		JMP 7600
4350	0000	INIT,	0 /INITIALISE LIST ROUTINE
4351	1374		TAD (INIT+5 /RETURN ADDR FROM TYO2
4352	3776		DCA 600
4353	6213		CIF CDF 10
4354	5773		JMP GINIT
4355	4772		JMS 2411 /LIST SYMBOL TABLE
4356	5750		JMP I INIT
4357	1371	ENABL,	TAD (NOP /ENABLE INITIALIZATION ROUTINE
4360	6211		CDF 10
4361	3773		DCA GINIT
4362	6201		CDF 0
4363	1376		TAD (600 /ENABLE PALD I/O ROUTINE
4364	5770		JMP 4665

4370 4665
4371 7000
4372 2411
4373 5400
4374 4355
4375 7600
4376 0600
4377 0214

*5400

	/	LIST ROUTINE	
5400	5251	GINI,, JMP CHAC	/ASSUME NO OUTPUT UNTIL CHANGED BY MOVIST
5401	1377	TAD (NOP	
5402	3254	DCA LIST	/SET LIST TO ACCEPT CHARACTER
5403	6456	6456	/INITIALIZE PRINTER
5404	7240	STA	
5405	3335	DCA LINCNT	
5406	3331	DCA PAGNUM	/SET PAGE # TO 0
5407	3334	PAG, DCA ENDMK	/CLEAR CHARACTER FLAG
5410	3332	DCA SHTNUM	/CLEAR SHEET #
5411	2331	ISZ PAGNUM	/BUMP PAGE #
5412	2335	7000 ISZ LINCNT	/GET TO THE TOP OF A PAGE
5413	7410	7000 SKP	
5414	5220	4776 JMP SHEET	
5415	4776	5716 JMS XTYPE	
5416	5716	2335 MCRLF	
5417	5212	5214 JMP .-5	
5420	1375	SHEET, TAD (215	/TYPE A C.R.
5421	4774	JMS TYPE	
5422	4776	JMS XTYPE	/AND 4 LINEFEEDS
5423	5722	M4LF	
5424	2332	ISZ SHTNUM	/BUMP SHEET #
5425	4776	JMS XTYPE	
5426	5677	HEAD	
5427	1331	TAD PAGNUM	/TYPE PAGE AND SHEET #'S
5430	4773	JMS DECTYP	
5431	1372	TAD (*- /TYPE A DASH	
5432	4774	JMS TYPE	
5433	1332	TAD SHTNUM	
5434	4773	JMS DECTYP	
5435	1375	TAD (215	
5436	4774	JMS TYPE	
5437	4776	JMS XTYPE	
5440	5721	M5LF	
5441	1371	TAD (-64	/COUNT 65 LINES
5442	3335	DCA LINCNT	
5443	1370	LINE, TAD (212	/GET ON A NEW LINE
5444	4774	JMS TYPE	
5445	4325	JMS TABSET	/SET TAB COUNTER
5446	2335	ISZ LINCNT	/BUMP LINE CNTR
5447	7410	SKP	/ARE WE THROUGH WITH THE SHEET?
5450	5220	JMP SHEET	/YES
5451	7200	CHAC, CLA	
5452	6203	CDF CIF 0	
5453	5767	JMP 603	
5454	5251	LIST, JMP CHAC	
5455	0366	AND (377	/MASK OFF FOR 8 BIT ASCII
5456	1365	TAD (-200	/IGNORE LEADER-TRAILER
5457	7450	SNA	
5460	5251	JMP CHAC	
5461	1364	TAD (-4	

JMS XTYPE
MCRLF
ISZ LINCNT
JMP .-3


```

5462 7450      SNA      /HANDLE EOF AS FORM FEED
5463 1363      TAD C 10
5464 1362      TAD C -5 /TAB?
5465 7440      SZA
5466 5275      JMP NOTAB      /NO
5467 1361      TABLP, TAD C 240      /YES, TYPE A SPACE
5470 4774      JMS TYPE
5471 2333      ISZ TABCNT      /ENOUGH SPACES?
5472 5267      JMP TABLP
5473 4325      JMS TABSET      /YES, RESET TAB COUNTER
5474 5251      JMP CHAC
5475 1360      NOTAB, TAD C -1 /LINEFEED?
5476 7450      SNA
5477 5243      JMP LINE      /YES, START A NEW LINE
5500 1357      TAD C -2 /FORM FEED?
5501 7440      SZA
5502 5307      JMP .+5
5503 1334      TAD ENDMK      /HAS A CHAR BEEN PRINTED ON THIS PAGE?
5504 7640      SZA CLA
5505 5207      JMP PAG      /YES, FINISH THE PAGE
5506 5251      JMP CHAC      /NO, IGNORE THE FF
5507 1356      TAD C -25
5510 3325      DCA TABSET
5511 1325      TAD TABSET
5512 7710      SPA CLA
5513 5316      JMP .+3
5514 7001      IAC      /PRINTING CHAR, SO SET FLAG
5515 3334      DCA ENDMK
5516 1325      TAD TABSET
5517 1355      TAD C 241      /GET BACK ASCII CHAR
5520 4774      JMS TYPE
5521 2333      ISZ TABCNT
5522 7410      SKP
5523 4325      JMS TABSET      /RESET TAB COUNTER
5524 5251      JMP CHAC
5525 0000      TABSET, 0      /SET TAB COUNTER
5526 1354      TAD C -10
5527 3333      DCA TABCNT
5530 5725      JMP I TABSET
5531 0000      PAGNO, 0
5532 0000      SHTNO, 0
5533 0000      TABCNT, 0
5534 0000      ENDM, 0
5535 0000      LINCNT, 0

```

5554	7770
5555	0241
5556	7753
5557	7776
5560	7777
5561	0240
5562	7773
5563	0010
5564	7774
5565	7600
5566	0377
5567	0603
5570	0212
5571	7714
5572	0255
5573	5600
5574	5663
5575	0215
5576	5651
5577	7000

#5600

OCTAL-DECIMAL OUTPUT ROUTINE

```

5600 0000 DECTYP, 0
5601 3236 DCA DT OCT /STORE OCTAL NUMBER
5602 3237 DCA DT QUO
5603 3240 DCA DT SUP /SET UP ZERO SUPPRESSION
5604 1241 TAD DT DIV1 /POINTER TO LIST OF DIVISORS
5605 3242 DCA DT BASE /POINTER TO CURRENT DIVISOR
5606 7100 DTLOOP, CLL
5607 1236 TAD DT OCT
5610 1642 TAD I DT BASE /SUBTRACT DIVISOR
5611 7420 SNL /UNDERFLOW?
5612 5216 JMP DT DONE /YES
5613 2237 ISZ DT QUO /NO, BUMP QUOTIENT
5614 3236 DCA DT OCT /STORE REMAINDER
5615 5206 JMP DT LOOP
5616 7300 DT DONE, CLA CLL
5617 1237 TAD DT QUO /RESET SUPPRESSION CONSTANT
5620 1240 TAD DT SUP
5621 3240 DCA DT SUP
5622 1240 TAD DT SUP /STILL ALL LEADING 0'S?
5623 7650 SNA CLA
5624 5230 JMP DT ND /YES, DON'T TYPE ANYTHING
5625 1243 TAD DT N260 /NO, FORM ASCII DIGIT
5626 1237 TAD DT QUO
5627 4263 JMS TYPE /AND TYPE IT
5630 3237 DT ND, DCA DT QUO /CLEAR QUOTIENT
5631 2242 ISZ DT BASE /SET POINTER FOR NEXT DIVISOR
5632 1642 TAD I DT BASE /THROUGH?
5633 7640 SZA CLA
5634 5206 JMP DT LOOP /NO
5635 5600 JMP I DECTYP
5636 0000 DT OCT, 0
5637 0000 DT QUO, 0
5640 0000 DT SUP, 0
5641 5644 DT DIV1, DT DIV
5642 0000 DT BASE, 0
5643 0260 DT N260, 260
5644 6030 DT DIV, -1750
5645 7634 -144
5646 7766 -12
5647 7777 -1
5650 0000 0

```

```

/
/
/
PRINTER I/O ROUTINES AND MESSAGES

```

```

5651 0000 XTYPL, 0
5652 7240 STA
5653 1651 TAD I XTYPE
5654 3011 DCA 11
5655 2251 ISZ XTYPE
5656 1411 TAD I 11
5657 7450 SNA
5660 5651 JMP I XTYPE
5661 4263 JMS TYPE
5662 5256 JMP .-4
5663 0000 TYPE, 0
5664 3347 DCA MOCNT /SAVE CHR
5665 7604 LAS
5666 7010 RAR /LOW BIT ON?
5667 7630 SZL CLA
5670 5663 JMP I TYPE /YES, TURN OFF LISTING
5671 1347 TAD MOCNT /NO, PRINT THE CHARACTER
5672 6451 6451
5673 5272 JMP .-1
5674 6456 6456
5675 7200 CLA
5676 5663 JMP I TYPE

```

```

/ TELETYPE MESSAGES

```

```

5677 0255 HEAD, "
5700 0255 "
5701 0255 "
5702 0255 "
5703 0255 "
5704 0215 215
5705 0212 212
5706 0212 212
5707 0212 212
5710 0320 "P
5711 0301 "A
5712 0307 "G
5713 0305 "E
5714 0240 240
5715 0000 0
5716 0215 MCRLI, 215
5717 0212 212
5720 0000 0
5721 0212 M5LF, 212
5722 0212 M4LF, 212
5723 0212 212
5724 0212 212
5725 0212 212
5726 0000 0
5727 7402 HLT /TO TRAP THE MYSTERIOUS CPU - EMLIN

```

//
// MOVE ROUTINE--GETS LIST ROUTINE INTO BANK 1
//

5730	6041	MOVLSI, TSF	/MOVE LIST ROUTINE TO BANK 1
5731	5330	JMP	-1
5732	7200	CLA	
5733	1377	TAD C-MOVLST+GINIT	/MOVE ONLY WHAT IS REQUIRED
5734	3347	DCA MOCNT	
5735	1376	TAD CGINIT	
5736	3350	DCA MOPNT	
5737	1750	LMO, TAD I MOPNT	
5740	6211	CDF 10	
5741	3750	DCA I MOPNT	
5742	6201	CDF 0	
5743	2350	ISZ MOPNT	
5744	2347	ISZ MOCNT	
5745	5337	JMP LMO	
5746	5775	JMP 4602	
5747	0000	MOCNT, 0	
5750	0000	MOPNT, 0	
5775	4602		
5776	5400		
5777	7450		

CHAC 5451
DECTYP 5600
DTBASE 5642
DTDIV 5644
DTDIV1 5641
DTDONE 5616
DTLOOP 5606
DTND 5630
DTN260 5643
DTOCT 5636
DTQUO 5637
DTSUP 5640
ENABL 4357
END 4345
ENDMK 5534
FFCHK 4335
GINIT 5400
HEAD 5677
INIT 4350
LINCNT 5535
LINE 5443
LIST 5454
L 5737
MCR LF 5716
MOCNT 5747
MOPNT 5750
MOVLST 5730
M4LF 5722
M5LF 5721
NOTAB 5475
PAG 5407
PAGNUM 5531
SHEET 5420
SHTNUM 5532
TABCNT 5533
TABLP 5467
TABSET 5525
TYPE 5663
XTYPE. 5651

/

/

/

/PALD PATCHES FOR 8-K SYM

/

/

/WRITTEN BY C. YDE

/

/

1775	0000	SYMD,	*1775 0	/BANK 0 ENTRY TO BANK 3 ROUTINE
1776	6232		CIF 30	
1777	5020		JMP SYMINT-SYM	/PROPER OFFSET(SHOULD BE 20)
/				
/				
3320	1334	SYMIN,	*3320 TAD SYM:OC	/MOVE THE SYMBOL TABLE ROUTINE(NEW)
3321	3016		DCA 16	/TO BANK 3
3322	7240		STA	
3323	3017		DCA 17	/TO PAGE 0 IN BANK 3
3324	1416	SYMLP,	TAD I 16	
3325	6231		CDF 30	
3326	3417		DCA I 17	
3327	6201		CDF 0	
3330	2333		ISZ SMCNT	
3331	5324		JMP SYMLP	/MOVE IN A COMPLETE PAGE
3332	5777		JMP CDSRV+2	/RETURN TO MAINLINE CODE
3333	7600	SMCNI,	-200	
3334	5777	SYMLUL,	SYM-1	
/				
/				
3377	6202			
/				
5276	4777		*5276 JMS SYM	/PATCH SDECODE CALL TO SYSIO
/				
5377	1775			
/				
6000	0000	SYM,	*6000 0	/MOVED FROM HERE BEFORE AREA IS NEEDED
6001	0000	SHOLD,	0	/POINTER TO CALLER
6002	0000	BLK,	0	/BLOCK NUMBER, LINK POINTER
6003	0000	SDIR,	0	/TRANSFER DIRECTION BIT
6004	6112	STAB,	STABLE	/LINK TABLE ADDRESS
/				
6020	1777	SYMENT,	*6020 TAD SYM	/PICK UP CALLERS ADDRESS
6021	3201		DCA SHOLD	
6022	1601		TAD I SHOLD	/COMMAND
6023	7012		RTR	
6024	0376		AND (1	/GET THE DIRECTION BIT (3=READ,5=WRITE)
6025	3203		DCA SDIR	

6026	2201	ISZ SHOLD	
6027	1601	TAD I SHOLD	/BLOCK NUMBER
6030	1375	TAD C-21	
6031	7700	SMA CLA	/SKIP IF IN RANGE
6032	5310	JMP SERR	/JUMP IF NOT
6033	1601	TAD I SHOLD	/GET IT AGAIN
6034	3202	DCA SBK	/KEEP IT AROUND
6035	1202	TAD SBK	
6036	7106	CLL RTL	
6037	7006	RTL	
6040	7006	RTL	
6041	7004	RAL	
6042	1374	TAD C-1	/BLOCK*128-1
6043	3016	DCA 16	/GET READY FOR THE MOVE
6044	2201	ISZ SHOLD	
6045	7240	STA	
6046	1601	TAD I SHOLD	/GET CALLERS BUFFER ADDRESS
6047	3017	DCA 17	
6050	1373	TAD C-200	
6051	3200	DCA SW	/128 WORDS IN A BUFFER
6052	2201	ISZ SHOLD	
6053	1203	TAD SDK	
6054	7110	CLL RAR	/DIRECTION BIT TO THE LINK
6055	7430	SZL	
6056	5301	JMP SWL COP	/IS A WRITE
6057	6231	CDF 30	
6060	1202	TAD SBK	
6061	1204	TAD STAR	/GET THE PROPER LINK
6062	3202	DCA SBK	
6063	1602	TAD I SHLK	
6064	6201	CDF 0	
6065	3601	DCA I SHOLD	/AND DEPOSIT IT IN THE CALLING SEQUENCE
6066	6231	CDF 30	
6067	1416	SRL OUP, TAD I A 6	
6070	6201	CDF 0	
6071	3417	DCA I A 7	
6072	6231	CDF 30	
6073	2200	ISZ SW	/MOVE INTO CALLERS BANK
6074	5267	JMP SRL COP	
6075	2201	SBACK, ISZ SHOLD	
6076	2201	ISZ SHOLD	/SKIP TO PROPER RETURN ADDRESS
6077	6203	CDF ICF 0	
6100	5601	JMP I SHOLD	
6101	6201	SRL OUP, CDF 0	
6102	1417	TAD I A 7	
6103	6231	CDF 30	
6104	3416	DCA I A 6	
6105	2200	ISZ SW	/MOVE FROM CALLERS BANK
6107	5301	JMP SWL COP	
6107	5275	JMP SBACK	/IGNORE THE LINK ON A WRITE
6110	2201	SERR, ISZ SHOLD	
6111	5275	JMP SBACK	

6112	0002	STABL R. 2;	
6113	0003	3;	
6114	0004	4;	
6115	0005	5;	
6116	0006	6;	
6117	0007	7;	
6120	0010	10;	
6121	0012	12;	
6122	0013	13;	
6123	0014	14;	
6124	0015	15;	
6125	0016	16;	
6126	0017	17	
6127	0020	20;	
6130	0021	21;	
6131	0022	22;	
6132	0023	23;	
6133	0024	24;	
6134	0025	25;	
6135	0026	26;	
6136	0026	26;	
6137	0030	30	
		/	
		/	
6173	7600		
6174	7777		
6175	7747		
6176	0001		
6177	1775		
6200	5601	CDSVRV. JMP I -. :1	
6201	3320	SYMIN	/INITIALIZE FIRST THING
6202	7201	CLA IAC	
		/	
		/	
		*6400	
6400	4636	JMS I XSYM	/PATCH TO .SYM INITIALIZER
		/	
		*6436	
6436	1775	XSYM, SYMD	
		/	

/

/

/PATCHES TO PALD

/

/

/ THESE PATCHES ARE TO TRY TO KEEP PALD FROM

/ BLOWING UP IN PASS 1

/

/

/ TO GET THEM, DO THE FOLLOWING

/

/

/ .HELP

/

/ *IN-

/

/ *SYSLUK

/

/ 105.4/ 3331 6456

/

/ 106.64/ 6456 6451

/

/ 106.65/ 6451 5264

/

/ 106.66/ 5265 6456

/

/ 106.120/ 7200 5340

/

/ 106.140/ 2227 7200

/

/ 106.141/ 0000 6224

/

/ 106.142/ 0000 7440

/

/ 106.143/ 7465 7402

/

/ 106.144/ 0703 5322

/

/

/ IF ANY OF THE LOCATIONS BEFORE PATCHING ARE DIFFERENT

/ FROM ABOVE (IE 106.120 WAS A 5771 INSTEAD OF 7200),

/ SEE ROGER HASKIN BEFORE ATTEMPTING TO PATCH.

/

/

/

/ Peripheral Interchange Program (PIP)
/ Modifications
/

- / 1. Save program with starting address 1000.
/
- / 2. Alter location 206 to improve tape control:
/ previous contents = 6766 (clear tape flags)
/ new contents = 6771 (clear tape control unit)
/

COPY

COPIES AND MERGES FILES ON THE DISK AND DECTAPE SYSTEMS
OPTIONS:

- A- COPIES AND MERGES UP TO 15 ASCII FILES ON THE DISK SYSTEM OR COPIES SINGLE ASCII FILES BETWEEN THE DISK AND DECTAPE SYSTEMS.
- S- COPIES SINGLE SYSTEM FILES TO OR FROM DISK OR SWAPTAPE.
- U- IDENTICAL TO S EXCEPT USER FILES ARE COPIED.
- B- IDENTICAL TO S EXCEPT BINARY FILES ARE COPIED.

SPECIAL NOTE ON COPYING ASCII FILES:

IF A CARRIAGE RETURN IS TYPED IN RESPONSE TO EITHER "*IN-" OR "*OUT-", THE DECTAPES WILL BE USED. WHEN "OUTPUT:" OR "INPUT:" IS TYPED, ANSWER BY TYPING THE NAME OF THE DESIRED DECTAPE FILE.

*20

/

/

/MESSAGES AND TABLES

/

0020	0215	OPTMS,	215
0021	0212		212
0022	0252	"*	
0023	0317	"0	
0024	0320	"P	
0025	0324	"T	
0026	0255	"-	
0027	0000	0	

0030	7477	OPLIST,	-301
0031	0217		217
0032	0242		ASCII

/ASCII FILES
/CD OPTION BITS

0033	7455		-323
0034	7720		7720
0035	0400		SAVED

/SYSTEM

0036	7453		-325
0037	7600		7600
0040	0400		SAVED

/USER

0041	7476		-302
0042	2600		2600
0043	0400		SAVED

/BINARY

0044	0000		0
------	------	--	---

/

/ASSORTED GARBAGE

/

0045	7600	ERR,	7600	/CLA
0046	1057		TAD 0277	/TYPE '7'
0047	4051		JMS TYPE	
0050	5445		JMP 1 ERR	

/

0051	0000	TYPE,	0
0052	6046		TLS
0053	6041		TSF
0054	5053		JMP -1
0055	7200		CLA
0056	5451		JMP 1 TYPE

/

0057	0277	P 277,	277
0060	0000	TEM,	0

/

/

```

/
/
*167 /PARAMETERS FOR THE COMMAND DECODER
0167 7777 7777
0170 0000 0
0171 0000 0
0172 0015 15 /1ST BLOCK OF THE COMMAND DECODER ON THE DISK
0173 0000 0
0174 0100 CDLIST /ADDRESS OF COMMAND DECODER OUTPUT LIST
0175 0000 0 /OPTION BITS
0176 0000 0
0177 0000 0 /ADDRESS FOR RETURN FROM THE COMMAND DECODER
/
/
BDORG=1000 /START OF DISK IO ROUTINES
BTORG=1600 /START OF DECTAPE IO ROUTINES
RBUF=2400 /INPUT BUFFER
WBUF=2600 /OUTPUT BUFFER
SAMBUF=3000 /BUFFER FOR SAM BLOCKS
CDBUF=3200 /COMMAND DECODER GOES HERE
CDIO=CDBUF+603 /ADDRESS OF GENERALIZED DISK-SWAPTAPE IO ROUTINE
CDLIST=100

```

```

*200
/
/GET OPTION-(A, R, S, U) AND CALL COMMAND DECODER
/
0200 1377      TAD (OPTMS-1      /TYPE *OPT-
0201 3011      DCA 11
0202 1411      TAD I 11
0203 7450      SNA
0204 5207      JMP GETOPT
0205 4051      JMS TYPEF
0206 5202      JMP .-4
/
/
0207 6031      GETOPT, KSF      /GET RESPONSE
0210 5207      JMP .-1
0211 6036      KRB
0212 3060      DCA TEM      /SAVE IT
0213 1060      TAD TEM      /ECHO IT
0214 4051      JMS TYPEF
/
/
0215 1376      TAD (OPTIST-1    /DECODE OPTION
0216 3011      DCA 11
0217 1411      OPTCK, TAD I 11    /GET CHAR FROM OPTION TABLE
0220 7450      SNA      /END OF TABLE?
0221 5045      JMP ERR      /YES, BAD OPTION RESPONSE
0222 1060      TAD TEM      /MATCH?
0223 7650      SNA CLA
0224 5230      JMP FNDOP      /YES
0225 2011      ISZ 11
0226 2011      ISZ 11
0227 5217      JMP OPTCK      /NO, CHECK NEXT OPTION
/
/
0230 1411      FNDOP, TAD I 11    /SET OPTION BITS IN CD PARAMS
0231 3175      DCA 175
0232 1411      TAD I 11      /SET RETURN ADDR
0233 3177      DCA 177
/
/
0234 4775      JMS 7647      /CALL COMMAND DECODER
0235 1003      1003
0236 0015      15
0237 3400      CDBUFF+100
0240 0000      0
0241 3400      CDBUFF+100

```


/
 /ROUTINE TO COPY ASCII FILES
 /

0242	1100	ASCII,	TAD CDLIST	/WORD A OF OUTPUT FILE
0243	7450		SNA	
0244	5774		JMP DTOT	/NULL OUTPUT FILE, SO DO DTOT
0245	7700		SMA CLA	/FILE STRUCTURED OUTPUT?
0246	5045		JMP ERR	/NO, ERROR
0247	1102		TAD CDLIST+2	/WORD A OF INPUT FILE
0250	7450		SNA	
0251	5255		JMP ITOT	/NULL INPUT FILE, SO DO ITOT
0252	7700		SMA CLA	/FILE STRUCTURED INPUT?
0253	5045		JMP ERR	/NO, ERROR
0254	5773		JMP DTOT	/YES, DO DTOT

 /
 / DECTAPE TO DISK ROUTINE
 /

0255	1100	TTOD,	TAD CDLIST	/WORD A OF OUTPUT FILE
0256	7700		SMA CLA	/FILE STRUCTURED?
0257	5045		JMP ERR	/NO, ERROR
0260	4772		JMS BTRNIT	/INITIALIZE DECTAPE READ
0261	1371		TAD CDLIST	
0262	4770		JMS BDANIT	/INITIALIZE DISK WRITE ROUTINES

0263	7200	DLCHK,	CLA	
0264	4767		JMS BTRN	/GET ASCII CHAR FROM DECTAPE
0265	1366		TAD (-244	/5 IN COLUMN 1?
0266	7440		SZA	
0267	5273		JMP NODOL	/NO
0270	1365		TAD (-244	/YES, OUTPUT IT
0271	4764		JMS BDANIT	
0272	5322		JMP DLEND	/EXIT, WE'RE DONE
0273	1365	NODOL,	TAD (-244	/GET BACK ASCII CODE
0274	5277		JMP TLP1	

0275	7200	TLOOP,	CLA	
0276	4767		JMS BTRN	/GET ASCII CHAR
0277	1363	TLP1,	TAD (-204	/EOF?
0300	7450		SNA	
0301	5326		JMP ENDD	/YES, WE'RE DONE
0302	1362		TAD (-7 /EOT?	
0303	7440		SZA	
0304	5307		JMP .+3	
0305	4761		JMS BTRN LK	/YES, GET A NEW BLOCK OF TAPE
0306	5263		JMP DLCHK	
0307	1360		TAD (-2 /C.R.?	
0310	7440		SZA	
0311	5317		JMP REG	
0312	1357		TAD (-214	/YES, OUTPUT CR
0313	4764		JMS BDANIT	
0314	1356		TAD (-214	/AND LINEFEED

0315	4764		JMS BDANT	
0316	5263		JMP DLEND	/LOOK FOR \$ IN COL 1 OF NEXT LINE
0317	1357	REG,	TAD (214)	/GET BACK ASCII CODE
0320	4764		JMS BDANT	
0321	5275		JMP TLOCP	
/				
0322	1357	DLEND,	TAD (214)	/OUTPUT CR,LF
0323	4764		JMS BDANT	
0324	1356		TAD (214)	
0325	4764		JMS BDANT	
0326	1355	ENDTD,	TAD (214)	/END OF FILE, OUTPUT DBL FORM FEED
0327	4764		JMS BDANT	
0330	1355		TAD (214)	
0331	4764		JMS BDANT	
0332	4754		JMS BDEND	/CLOSE OUTPUT FILE
0333	4753	EXIT,	JMS RWTAPE	/REWIND DECTAPE
0334	0201		0201	
0335	0011		11	
0336	6000		6000	
0337	5752		JMP 7600	/RETURN TO MONITOR

0352	7600
0353	2200
0354	1336
0355	0214
0356	0212
0357	0215
0360	7776
0361	1644
0362	7771
0363	7574
0364	1200
0365	0244
0366	7534
0367	1600
0370	1276
0371	0100
0372	1667
0373	0642
0374	0600
0375	7642
0376	0027
0377	0017

PAGE

/ROUTINE TO COPY SAVED AND BINARY FILES

```

0400 1377  SAVE).  TAD (CDLIST+2  /SAVED (SYSTEM OR USER) FILES
0401 4250          JMS DNGIT  /GET POINTER TO DN ENTRY WORD 2
0402 2400  PRBUFF, RBUFF      /USE RBUFF TO READ DN BLK
0403 3011          DCA 11      /SAVE POINTER TO INPUT FILE DN ENTRY
0404 1376          TAD (CDLIST  /SAME FOR OUTPUT FILE
0405 4250          JMS DNGIT
0406 2600          WBUFF      /BUT READ INTO WBUFF
0407 3012          DCA 12
0410 1411          TAD I 11    /MOVE LOAD ADDRESS
0411 3412          DCA I 12
0412 1411          TAD I 11    /MOVE ENTRY ADDRESS
0413 3412          DCA I 12
0414 2012          ISZ 12
0415 1012          TAD 12
0416 3060          DCA TEM      /SAVE LAST DN ENTRY WORD ADDR
0417 1460          TAD I TEM    /SAVE DN NUMBER OF OUTPUT FILE
0420 0375          AND (7
0421 1 3460        DCA I TEM
0422 1411          TAD I 11    /GET BANK BITS AND FILE TYPE FO INPUT FILE
0423 0374          AND (7100
0424 1460          TAD I TEM    /PUT INTO OUTPUT FILE LAST WORD
0425 3460          DCA I TEM
0426 1376          TAD (CDLIST  /WRITE OUT MODIFIED DN BLOCK
0427 3171          DCA 17A     /FOR CDIO
0430 1373          TAD (5
0431 4307          JMS DNGIT

/
/
0432 1202          TAD PRBUFF  /SET BDWBLK TO USE RBUFF
0433 3772          DCA BDWBUF
0434 1377          TAD (CDLIST+2 /INITIALIZE INPUT FILE
0435 4771          JMS BDRNIT
0436 1376          TAD (CDLIST
0437 4770          JMS BDRNIT

/
0440 1767  SAVLP.  TAD BDRNKL  /LAST BLOCK?
0441 7650          SNA CLA
0442 5246          JMP SAVEND
0443 4766          JMS BDWBLK  /WRITE BLOCK
0444 4765          JMS BDRNKL
0445 5240          JMP SAVLP

/
0446 4764  SAVEND. JMS BDWEND
0447 5763          JMP 7650

```

```

/
/ DN SEARCH ROUTINES
/
0450 0000 DNGET. 0 /FIND DN ENTRY & RETURN POINTER
0451 3171 DCA 171 /STORE WORD A ADDR
0452 3330 DCA DNBLKS /CLEAR QUO
0453 1571 TAD I X71 /GET WORD A
0454 7500 SMA
0455 5045 JMP ERR /INVALID FILE (NOT TAPE OR DISK)
0456 0375 AND (7 /GET SAM #
0457 1362 TAD (-1 /DON'T ARGUE, IT WORKS!
0460 7100 CLL
0461 1361 TAD (-31
0462 2330 ISZ DNBLKS /DIVIDE. QUO=SAM#/25+1
0463 7430 SZL
0464 5260 JMP .-4
0465 1360 TAD (32 /QUO=DN BLK #
0466 3334 DCA DNLOC /REMAINDER+1
0467 1357 TAD (TAD DNBLKS /FIGURE THIS ONE OUT!
0470 1330 TAD DNBLKS
0471 3272 DCA .+Y
0472 0000 0
0473 3323 DCA DNBLK
0474 1650 TAD I DNGET /GET DN BUFFER ADDR
0475 3324 DCA DNBUF
0476 1356 TAD (3
0477 4307 JMS DNLOC /READ IN DN BLK
0500 1334 TAD DNLOC /GET REMAINDER
0501 7106 CLL RTL
0502 1334 TAD DNLOC
0503 1362 TAD (-1
0504 1650 TAD I DNGET /REM*5-1+DNBUF=ADDR OF DN WORD 2
0505 2250 ISZ DNGET
0506 5650 JMP I DNGET

/
/
0507 0000 DNIO. 0 /READ OR WRITE DN BLK
0510 3322 DCA DNLOC /CALLED WITH FUNCTION IN AC
0511 1571 TAD I X71
0512 0355 AND (XIO /DECTAPE OR DISK?
0513 7640 SZA CLA
0514 5321 JMP DNRW /DISK
0515 1571 TAD I X71 /TAPE. GET UNIT #
0516 0354 AND (XIO
0517 1322 TAD DNLOC
0520 3322 DCA DNLOC /PUT INTO FUNCTION WORD
0521 7000 NOP

*.-111
0521 4753 DNRW. JMS CDIO
0522 0000 DNLOC. 0
0523 0000 DNBLK. 0

```

0524	0000	DNBU-	0	
0525	0000		0	
0526	7402		HLT	
0527	5707		JMP I DNIO	
/				
0530	0000	DNBLK S,	0	/POINTER TO DN BLK #
0531	0177		177	/LIST OF DN BLK #'S
0532	0201		201	
0533	0202		202	
0534	0000	DNLOC,	0	/REMAINDER FOR DIVIDE

0553	4003
0554	0700
0555	2000
0556	0003
0557	1330
0560	0032
0561	7747
0562	7777
0563	7600
0564	1336
0565	1052
0566	1246
0567	1065
0570	1276
0571	1102
0572	1260
0573	0005
0574	7700
0575	0077
0576	0100
0577	0102

PAGE

/DISK TO DECTAPE ROUTINE

```

0600 1377 DTOT, TAD (CDLIST+2) /GET ADDR OF CD LIST OF INPUT FILES
0601 3324 DCA LISTPT /SET INPUT LIST POINTER
0602 4277 JMS NXTFIL /INITIALIZE FIRST DISK FILE
0603 5045 JMP ERR /BAD INPUT, ERROR RETURN
0604 4776 JMS BTWRT /INITIALIZE DECTAPE WRITE
0605 7410 SKP /SKIP STA FIRST TIME THRU

```

```

0606 7240 STA /SET FF FLAG TO INDICATE A FF RECIEVED
0607 3241 DLOOP, DCA FF FLAG
0610 4775 JMS BDRD /GET A CHAR FROM THE DISK
0611 1374 TAD (-214) /FORM FEED?
0612 7450 SNA
0613 5217 JMP FF /YES
0614 1373 TAD (214)
0615 4772 JMS BTWRT /NO, OUTPUT IT
0616 5207 JMP DLOOP

```

```

0617 1373 FF, TAD (214) /OUTPUT FF & EOF
0618 4772 JMS BTWRT
0619 1371 TAD (217)
0622 4772 JMS BTWRT
0623 4770 JMS BTWRLK /WRITE PARTIAL BUFFER
0624 2241 ISZ FF FLAG /2ND CONSECUTIVE FORM FEED?
0625 5206 JMP DLOOP-1 /NO, SET FLAG AND DO NEXT CHAR

```

```

0626 4277 JMS NXTFIL /THIS FILE DONE, GET NEXT ONE
0627 7410 SKP /RETURNS HERE IF THERE ISN'T ONE
0630 5207 JMP DLOOP /IF THERE IS, PROCESS IT

```

```

0631 1367 TAD (204) /YES, END FILE
0632 4772 JMS BTWRT
0633 1373 TAD (214)
0634 4772 JMS BTWRT
0635 1371 TAD (217)
0636 4772 JMS BTWRT
0637 4770 JMS BTWRLK /WRITE OUT LAST PARTIAL BUFFER
0640 5766 JMP EXIT /EXIT

```

```

0641 0000 FFLAG, 0

```

/DISK TO DISK ROUTINE

```

0642 1365 DTOD, TAD (CDLIST) /GET ADDR OF WORD A FOR OUTPUT FILE
0643 4764 JMS BDRD /INITIALIZE DISC WRITE
0644 1377 TAD (CDLIST+2)
0645 3324 DCA LISTPT /SET INPUT LIST POINTER
0646 4277 JMS NXTFIL /INITIALIZE INPUT FILE
0647 5045 JMP ERR /IF FIRST FILE IS BAD

```



```

0650 7410      SKP      /DON'T SET FFLAG 1ST TIME THRU
/
0651 7240      STA      /INDICATE ONE FF RECEIVED
0652 3241 DDLODF, DCA FFLAG /SET FF FLAG
0653 4775      JMS BDR0  /GET A CHAR FROM INPUT BUFFER
0654 1374      TAD (-214 /FF?
0655 7450      SNA
0656 5262      JMP DDFF  /YES
0657 1373      TAD (214
0660 4763      JMS BDR0
0661 5252      JMP DDLODF /DO NEXT CHAR
/
0662 2241 DDFF, ISZ FFLAG /2 CONSECUTIVE FF'S?
0663 7410      SKP      /NO
0664 5270      JMP DD2FF /YES, THIS INPUT FILE DONE
0665 1373      TAD (214 /JUST A PAGE, WRITE FF
0666 4763      JMS BDR0
0667 5251      JMP DDLODF-1 /SET FF FLAG
/
0670 4277 DD2FF, JMS NXFIL /INITIALIZE NEXT INPUT FILE
0671 7410      SKP      /THERE ISN'T ONE, STOP
0672 5252      JMP DDLODF /THERE IS, CONTINUE
0673 1373      TAD (214 /WRITE DOUBLE FF(1ST ONE ALREADY WRITTEN)
0674 4763      JMS BDR0
0675 4762      JMS BDR0
0676 5761      JMP 7600 /CLOSE OUTPUT FILE
/
/
0677 0000 NXTFIL, 0 /INITIALIZE AN INPUT FILE
0700 1724      TAD I LISTPT /IS THERE AN INPUT FILE?
0701 7001      IAC      /SEARCH FOR 7777 (END OF CD LIST)
0702 7450      SNA
0703 5677      JMP I NXTFIL /FOUND 7777, TAKE ERROR RETURN
0704 7700      SMA CLA /IS INPUT FILE STRUCTURED?
0705 5313      JMP NXCHK /NO, CHECK NEXT ONE
0706 1724      TAD I LISTPT /ARE INPUT & OUTPUT FILENAMES DIFFERENT?
0707 7041      CIA
0710 1100      TAD CD 1ST
0711 7640      SZA CLA
0712 5316      JMP NXDIF /YES
0713 2324 NXCHK, ISZ LISTPT /NO, CHECK NEXT INPUT FILE
0714 2324      ISZ LISTPT
0715 5300      JMP NXFIL+1
0716 1324 NXDIF, TAD LISTPT /EVERYTHING OK, INITIALIZE THE FILE
0717 4760      JMS BDR0
0720 2277      ISZ NXFIL /TAKE NORMAL RETURN
0721 2324      ISZ LISTPT /FOR NEXT TIME
0722 2324      ISZ LISTPT
0723 5677      JMP I NXTFIL
/
0724 0000 LISTPT, 0

```

0760	1102
0761	7600
0762	1336
0763	1200
0764	1276
0765	0100
0766	0333
0767	0204
0770	2060
0771	0213
0772	2000
0773	0214
0774	7564
0775	1000
0776	2104
0777	0102

*BDORG

```

/ROUTINES TO READ AND WRITE FILES ON DISK OR SWAPTAPE
/INITIALIZATION ROUTINES MUST BE ENTERED WITH THE AC POINTING TO
/WORD A OF THE COMMAND DECODER OUTPUT LIST FOR THAT FILE
BDRD, 0 /BUFFERED DISK READ
1000 0000
1001 4225 JMS BDGET
1002 1377 TAD (-77
1003 7450 SNA /NON-PRINTING CHAR?
1004 5212 JMP BD1 /YES
1005 1376 TAD (37
1006 7510 SPA
1007 1375 TAD (100 /0-37 ADD 300
1010 1374 TAD (240 /40-76 ADD 200
1011 5600 JMP I BDRD
1012 4225 BD1, JMS BDGET
1013 1377 TAD (-77 /IS IT A '?'
1014 7440 SZA
1015 5220 JMP .+3
1016 1376 TAD (37 /YES, ADD 200
1017 5223 JMP BD2
1020 1376 TAD (37 /NO
1021 7500 SMA
1022 1375 TAD (100 /40-76 ADD 300
1023 1374 BD2, TAD (240 /77,0-37 ADD 200
1024 5600 JMP I BDRD
1025 0000 BDGET, 0 /GET A CHAR FROM DBUFF
1026 7000 BDG0, NOP /PACKING SWITCH
1027 1373 TAD (CMP BDG2 /RESET PACKING SWITCH FOR RIGHT HALF OF WORD
1030 3226 DCA BDG0
1031 1700 TAD I BDRADR /GET PACKED WORD
1032 2300 ISZ BDRADR
1033 3301 DCA BDTFMP
1034 1301 TAD BDTFMP
1035 7012 RTR
1036 7012 RTR
1037 7012 RTR /OUTPUT LEFT HALF
1040 0372 BDG1, AND (77
1041 7100 CLL
1042 5625 JMP I BDGET
1043 1371 BDG2, TAD (NDF /SET SWITCH FOR LEFT HALF
1044 3226 DCA BDG0
1045 2276 ISZ BDRCNT /NEW BUFFER NEEDED?
1046 7410 SKP
1047 4252 JMS BDRBLK /YES, READ A BLOCK
1050 1301 TAD BDTFMP /OUTPUT RIGHT HALF
1051 5240 JMP BDG1
1052 0000 BDRBLK, 0 /GET A BLOCK OFF THE DISK
1 1277 TAD BDRFIL /LOAD 171 FOR CDIO
1 3171 DCA 171
105 1265 TAD BDRINK
1056 7450 SNA /DONE?
1057 5770 JMP 7600 /YES, BUT SHOULDN'T REACH HERE

```

```

1060 3263      DCA BDRBK
1061 7000      NOP
      *.-111 /GET ONTO AN ODD LOCATION
1061 4767      JMS CD10
1062 0003      BDRFNC, 3 /FUNCTION WORD
1063 0000      BDRBK, 0
1064 2400      BDRBUF, RBUF /READ INTO RBUF
1065 0000      BDRLNK, 0
1066 7402      HLT /ERROR RETURN
1067 1264      TAD .-3
1070 3300      DCA BDRADR /INITIALIZE READ ADDR
1071 1370      TAD C-200 /INITIALIZE BUFFER COUNTER
1072 3276      DCA BDRCNT
1073 1371      TAD C00P /RESET PACKING SWITCH
1074 3226      DCA BDGO
1075 5652      JMP I BDRBLK
1076 0000      BDRCNT, 0
1077 0000      BDRFIL, 0
1100 0000      BDRADR, 0
1101 0000      BDTEMP, 0
1102 0000      BDRNIT, 0 /INITIALIZE READ ROUTINE
1103 3277      DCA BDRFIL /STORE POINTER TO .CD. ENTRY FOR FILE
1104 1677      TAD I BDRFIL /GET WORD A FOR THIS FILE
1105 0366      AND C200 /INPUT ON SYSTEM DEVICE OR DECTAPE?
1106 7640      SZA CLA
1107 5314      JMP BDRNIT
1110 1677      TAD I BDRFIL /DECTAPE, GET UNIT #
1111 0365      AND C700 /MASK IT
1112 1262      TAD BDRFNC
1113 3262      DCA BDRFNC /PUT UNIT # INTO FUNCTION WORD
1114 1277      BDRNIT, TAD BDRFIL
1115 7001      IAC
1116 3301      DCA BDTEMP
1117 1701      TAD I BDTEMP /GET WORD B FOR THIS FILE
1120 3265      DCA BDRLNK /WHICH IS THE 1ST READ BLK #
1121 4252      JMS BDRBLK /GET FIRST INPUT BLOCK
1122 5702      JMP I BDRNIT

```

1165	0700
1166	2000
1167	4003
1170	7600
1171	7000
1172	0077
1173	5243
1174	0240
1175	0100
1176	0037
1177	7701

```

AGE
200 0000 BDWRT, 0 /BUFFERED DISK WRITE
201 1377 TAD (-2 17 /IS CHAR. <= 237?
202 7550 SPA SNA
203 5215 JMP BDW1 /YES, PACK AS 77&LAST 6 BITS
204 1376 TAD (-1 00 /NO, CHAR <= 337?
205 7540 SMA SZA
206 5215 JMP BDW1
207 1375 TAD (40 /YES, CHAR = 277?
210 7450 SNA
211 5214 JMP BDW1
212 1375 TAD (40 /NO, PACK AS TRIMMED 6 BITS
213 5221 JMP BDW1
214 1375 BDW1, TAD (40 /YES, GET BACK CODE
215 3275 BDW2, DCA BDWTEM
216 1374 TAD (77
217 4225 JMS BDPUT
220 1275 TAD BDWTEM
221 1373 BDW3, TAD (137 /GET BACK LAST 6 BITS OF ASCII CODE
222 0374 AND (77 /MASK THEM
223 4225 JMS BDPUT /PUT THEM INTO THE BUFFER
224 5600 JMP I BDWRT
225 0000 BDPUT, 0 /PUT CHARACTER INTO WRITE BUFFER
226 7000 BDPO, NOP /PACKING SWITCH
227 7106 CLL RTL
230 7006 RTL
231 7006 RTL
232 3673 DCA I BDWADR /PUT IN LEFT HALF OF PACKED WORD
233 1372 TAD (JMP BDP2 /SET SWITCH FOR RIGHT HALF
234 3226 BDP1, DCA BDPG
235 5625 JMP I BDPUT
236 1673 BDP2, TAD I BDWADR /PUT IN RIGHT HALF
237 3673 DCA I BDWADR
240 2273 ISZ BDWADR
241 2272 ISZ BDWCNT /BUFFER FULL?
242 7410 SKP
243 4246 JMS BDWBLK /YES, WRITE IT
244 1371 TAD (NOP
245 5234 JMP BDP1
246 0000 BDWBLK, 0 /PUT WRITE BUFFER ON THE DISK
247 1274 TAD BDWFIL /LOAD 171 FOR CDIO
250 3171 DCA 171
251 1261 TAD BDWLNK
252 3257 DCA BDWBLK
253 4770 BDWLO, JMS ALLOCAT /ALLOCATE NEXT BLOCK, RETURN
254 3261 DCA BDWLNK /WITH LINK TO IT IN AC
255 7000 NOP
256 4767 *-1:1 /GET ONTO AN ODD LOCATION
257 0005 JMS CDIO /WRITE BUFFER
258 0005 BDWFNC, 5
259 0000 BDWBK, 0
260 2600 BDWBUF, WBUF /WRITE FROM WBUF

```

```

1261 0000 BDWLNK, 0
1262 7402 HLT /ERROR RETURN
1263 1260 TAD .-3
1264 3273 DCA BDWADR /INITIALIZE WBUFF POINTER
1265 1366 TAD (-200
1266 3272 DCA BDWCNT /INITIALIZE WBUFF COUNTER
1267 1371 TAD (NOF /RESET SWITCH
1270 3226 DCA BDPC
1271 5646 JMP I BDWBLK
1272 0000 BDWCNT, 0
1273 0000 BDWADR, 0
1274 0000 BDWFIL, 0
1275 0000 BDWTEM, 0

1276 0000 BDWNIT, 0 /INITIALIZE WRITE ROUTINE
1277 3274 DCA BDWFIL
1300 1274 TAD BDWFIL
1301 3765 DCA SAMFIL
1302 1674 TAD I BDWFIL
1303 0364 AND (2000 /DECTAPE OR SYSTEM DEVICE?
1304 7640 SZA CLA
1305 5322 JMP BDWNIT1
1306 1674 TAD I BDWFIL
1307 0363 AND (700
1310 3275 DCA BDWTEM /GET AND STORE DECTAPE UNIT #
1311 1275 TAD BDWTEM /PUT IT IN ALL FUNCTION WORDS
1312 1256 TAD BDWFNC
1313 3256 DCA BDWFNC
1314 1275 TAD BDWTEM
1315 1762 TAD SWFNC
1316 3762 DCA SWFNC
1317 1275 TAD BDWTEM
1320 1761 TAD SWFNC
1321 3761 DCA SWFNC
1322 4760 BDWNIT1, JMS SAMZAP /CLEAN UP SAM BLOCKS
1323 1357 TAD (JMS ALOCAT
1324 3253 DCA BDWIO
1325 4770 JMS ALOCAT /ALLOCATE FIRST BLOCK
1326 3261 DCA BDWINK
1327 1260 TAD BDWBUF /INITIALIZE BUFFER POINTER
1330 3273 DCA BDWADR
1331 1366 TAD (-200
1332 3272 DCA BDWCNT /INITIALIZE COUNTER
1333 1371 TAD (NOF
1334 3226 DCA BDPC /INITIALIZE POINTER
1335 5676 JMP I BDWNIT
1336 0000 BDWEND, 0 /CLOSE UP FILE
1337 1371 TAD (NOF /SET TO WRITE LINK OF 0
1338 3253 DCA BDWIO
1341 4246 JMS BDWHLK /WRITE LAST PARTIAL BUFFER
1342 4756 JMS GETSAM /WRITE OUT MODIFIED SAM BLOCK
1343 5736 JMP I BDWEND

```

356	1477
357	4770
360	1421
361	1520
362	1506
363	0700
364	2000
365	1536
366	7600
367	4003
370	1400
371	7000
372	5236
373	0137
374	0077
375	0040
376	7700
377	7541

571	0200
572	4003
573	3000
574	7700
575	5776
576	7600
577	5244

*BTRCG

```

/ROUTINES TO READ AND WRITE ASCII FILES ON DECTAPE
1600 0000 BTRD, 0 /BUFFERED TAPE READ
1601 4220 BTR0, JMS BTGET
1602 1377 TAD (-77
1603 7450 SNA /IS IT A 77?
1604 5212 JMP BTR1 /YES
1605 1376 TAD (-72
1606 7450 SNA /IS IT A 5?
1607 1375 TAD (-30 /YES, IT IS A C.R.
1610 1374 TAD (-245 /GETS ASCII CHARACTER
1611 5600 JMP I BTRD
1612 4220 BTR1, JMS BTGET
1613 1377 TAD (-77
1614 7450 SNA
1615 1373 TAD (-40 /CHAR WAS LEFT ARROW(7777)
1616 1372 TAD (-27 /OTHERWISE CHAR=CHAR+200
1617 5600 JMP I BTRD
1620 0000 BTGET, 0 /GET A CHARACTER FROM READ BUFFER
1621 7000 BTG0, NOP /PACKING SWITCH
1622 1371 TAD (JMP BTG2 /RESET SWITCH FOR RIGHT HALF OF WORD
1623 3221 DCA BTG0
1624 1664 TAD I BTRADR /PROCESS A PACKED WORD
1625 2264 ISZ BTRADR /BUMP RBUF POINTER
1626 3265 DCA BTRTEM
1627 1265 TAD BTRTEM
1630 7012 RTR
1631 7012 RTR
1632 7012 RTR
1633 0370 BTG1, AND (-77
1634 5620 JMP I BTGET
1635 1367 BTG2, TAD (NOF /SET SWITCH FOR LEFT HALF
1636 3221 DCA BTG0
1637 2266 ISZ BTRCNT /NEW BUFFER NEEDED?
1640 7410 SKP
1641 4244 JMS BTRBLK /YES, READ A BLOCK
1642 1265 TAD BTRTEM /OUTPUT RIGHT HALF
1643 5233 JMP BTG1
1644 0000 BTRBLK, 0 /READ A BLOCK OF TAPE
1645 2306 ISZ BTRMBK /TAPE FILE EXCEEDED?
1646 7410 SKP
1647 5766 JMP 7600 /YES
1650 4765 JMS RWTAPE /NO, READ A BLOCK
1651 0201 0201
1652 0000 BTRBK, 0
1653 2400 RBUF
1654 1253 TAD .-1
1655 3264 DCA BTRADR /INITIALIZE READ ADDRESS
1656 2252 ISZ BTRBK /BUMP READ BLKN
1657 1366 TAD (-200
1660 3266 DCA BTRCNT /INITIALIZE BUFFER COUNTER
1661 1367 TAD (NOF /RESET PACKING SWITCH

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```

1662 3221          DCA BTGG
1663 5644          JMP I BTRBLK
1664 0000 BTRADR, 0
1665 0000 BTRTEN, 0
1666 0000 BTRCNT, 0
1667 0000 BTRNIT, 0          /SET UP TO READ A FILE FROM DECTAPE
1670 7340          CLA CU, CMA
1671 3266          DCA BTRCNT          /INITIALIZE BUFFER COUNTER
1672 1367          TAD CNDP
1673 3221          DCA BTGG          /INITIALIZE PACKING SWITCH
1674 4765          JMS RWTAPE          /GET DECTAPE DIRECTORY
1675 0203          0203
1676 0011          11
1677 6000          6000
1700 4765          JMS RWTAPE          /GET XRDCT
1701 0202          0202
1702 0041          41
1703 6600          6600
1704 4703          JMS I, -1          /GO TO XRDCT
1705 0000 BTRBK1, 0          /1ST BLOCK OF INPUT FILE
1706 0000 BTRMBK, 0          /-(# BLKS + 1)
1707 1305          TAD BTRBK1
171 3252          DCA BTRBK
1711 4244          JMS BTRBLK          /GET FIRST INPUT BLOCK
1712 5667          JMP I BTRNIT

```

1765	2200
1766	7600
1767	7000
1770	0077
1771	5235
1772	0277
1773	0040
1774	0245
1775	7750
1776	0072
1777	7701

PAGE			
2000	0000	BTWRT, 0	/BUFFERED TAPE WRITE
2001	1377	TAD (-212	
2002	7450	SNA	/LINEFEED?
2003	5600	JMP I BTWRT	/YES, IGNORE
2004	1376	TAD (-26	
2005	7510	SPA	/IS CHAR > 237?
2006	5223	JMP BTW3	
2007	1375	TAD (-5	/YES
2010	7450	SNA	/CHAR = 245?
2011	5217	JMP BTW1	/YES
2012	1374	TAD (-7	
2013	7450	SNA	/CHAR = 337 (LEFT ARROW)?
2014	5221	JMP BTW2	
2015	1373	TAD (77	
2016	5233	JMP BTW4	/OUTPUT CHAR = CHAR-240
2017	1372	BTW1, TAD (45	/CODE FOR 'Z'
2020	5227	JMP BTW4	
2021	1373	BTW2, TAD (77	/CODE FOR LEFT ARROW
2022	5227	JMP BTW4	
2023	1371	BTW3, TAD (23	/CHR < 23?
2024	7450	SNA	
2025	5235	JMP BTW6	
2026	1370	TAD (15	
2027	3301	BTW4, DCA BTW1EM	/USE CODE 77XX, XX=CHAR-200
2030	1373	TAD (77	
2031	4237	JMS BTPUT	
2032	1301	TAD BTW1EM	
2033	4237	BTW5, JMS BTPUT	/OUTPUT CHAR
2034	5600	JMP I BTWRT	
2035	1367	BTW6, TAD (5	/5=CODE FOR C.R.
2036	5233	JMP BTW4	
2037	0000	BTPUT, 0	/PUT A CHARACTER INTO WRITE BUFFER
2040	7000	BTP0, NOP	/SWITCH TO HALF OF PACKED WORD
2041	7106	CLL RTL	
2042	7006	RTL	
2043	7006	RTL	
2044	3702	DCA I BTWADR	/PUT IN LEFT HALF OF PACKED WORD
2045	1366	TAD (JMP BTP2	/SET SWITCH FOR RIGHT HALF
2046	3240	BTP1, DCA BTP0	
2047	5637	JMP I BTPUT	
2050	1702	BTP2, TAD I BTWADR	
2051	3702	DCA I BTWADR	/PUT IN RIGHT HALF WORD
2052	2302	ISZ BTWADR	
2053	2303	ISZ BTWONT	/BUFFER FULL?
2054	7410	SKP	
2055	4260	JMS BTWALK	/YES, PUT IT ON TAPE
2056	1365	TAD (NOP	
2057	5246	JMP BTP1	
2060	0000	BTWBLK, 0	
2061	2325	ISZ BTWMBK	/TAPE FILE EXCEEDED?
2062	7410	SKP	

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2063 5764      JMP 7600      /YES
2064 4763      JMS RWTAPE    /NO, PUT THE BUFFER ON TAPE
2065 0401      0401
2066 0000      BTWBK, 0
2067 2600      WBUFF
2070 7200      CLA
2071 1267      TAD -2
2072 3302      DCA BTWADR     /INITIALIZE BUFFER POINTER
2073 2266      ISZ BTWBK     /BUMP BLOCK #
2074 1364      TAD (-200
2075 3303      DCA BTWCNT     /INITIALIZE BUFFER COUNTER
2076 1365      TAD (NDF      /RESET PACKING SWITCH
2077 3240      DCA BTPO
2100 5660      JMP I BTWBLK
2101 0000      BTWTEM, 0
2102 0000      BTWADR, 0
2103 0000      BTWCNT, 0
2104 0000      BTWNIT, 0     /SET UP TO WRITE A FILE ON DECTAPE
2105 1364      TAD (-200
2106 3303      DCA BTWCNT     /INITIALIZE BUFFER COUNTER
2107 1365      TAD (NDF
2108 3240      DCA BTPO
2109 1362      TAD (WBUFF
2112 3302      DCA BTWADR     /INITIALIZE WRITE BUFFER ADDRESS
2113 4763      JMS RWTAPE    /GET DIRECTORY
2114 0203      0203
2115 0011      11
2116 6000      6000
2117 4763      JMS RWTAPE    /GET XWDCT
2120 0204      0204
2121 0043      43
2122 6600      6600
2123 4722      JMS I -1
2124 0000      BTWBK1, 0     /1ST BLOCK OF OUTPUT FILE
2125 0000      BTWMBK, 0     /-(# BLKS+1)
2126 1324      TAD BTWBK1
2127 3266      DCA BTWBK
2130 4763      JMS RWTAPE    /STORE DIRECTORY
2131 0403      0403
2132 0011      11
2133 6000      6000
2134 5704      JMP I BTWNIT

```

2162	2600
2163	2200
2164	7600
2165	7000
2166	5250
2167	0005
2170	0015
2171	0023
2172	0045
2173	0077
2174	7706
2175	7773
2176	7752
2177	7566

PAGE			
2200	0000	RWTAPE.	0 /READ OR WRITE STANDARD TAPE BLOCKS
2201	3360	DCA RWTFD	/SAVE FIELD FOR TRANSFER
2202	6214	6214	/RDF TO GET CALLING FIELD
2203	1361	TAD RWB03	/MAKE INTO A CDF/CIF
2204	3303	DCA RWOUT	
2205	6224	6224	/RIF TO GET CURRENT FIELD
2206	3357	DCA RWUFD	/AND SAVE
2207	1600	TAD I RWTAPE	
2210	2200	ISZ RWTAPE	
2211	3340	DCA RWFGA	/A-REGISTER
2212	1600	TAD I RWTAPE	
2213	2200	ISZ RWTAPE	
2214	3342	DCA RWBK	/OBJECT BLOCK
2215	7040	CMA	
2216	1600	TAD I RWTAPE	
2217	2200	ISZ RWTAPE	
2220	3341	DCA RWLOC	/CORE LOCATION
2221	1336	TAD RW12	
2222	3335	DCA RWCNT	/CUMULATIVE ERROR COUNTER
2223	6201	RWBGN, 6201	/CDF 0
2224	1357	TAD RWUFD	
2225	6774	DTLB	/SET DECTAPE FIELD
2226	1346	TAD RWBN	
2227	3744	DCA I RWADCA	/INITIALIZE CURRENT ADDRESS
2230	1340	TAD RWFGA	
2231	0354	AND RW077	
2232	7040	CMA	
2233	3343	DCA RWBNT	/-(# OF BLOCKS TO BE TRANSFERRED+1)
		/BEGIN SEARCHING REVERSE	
2234	1340	TAD RWFGA	/INITIALIZE FOR SEARCHING
2235	0347	AND RW000	
2236	1350	TAD RW010	/SEARCH REV, CLEAR FLAGS, NORMAL
2237	6766	DTCA DTXA	
2240	4313	RWREV, JMS RWAIT	/WAIT FOR A BLOCK #
2241	5247	JMP RWWD-4	/ERROR RETURN, ASSUME IN FRONT ENDZONE
2242	1337	TAD RWBN	
2243	7040	CMA	
2244	1342	TAD RWBK	
2245	7710	SPA CLA	
2246	5240	JMP RWRFV	/CONTINUE REVERSE SEARCH
		/START SEARCHING FORWARD	
2247	1340	TAD RWFGA	
2250	0347	AND RW000	
2251	1351	TAD RW010	
2252	6766	DTCA DTXA	
2253	4313	RWFWD, JMS RWAIT	/SEARCH FORWARD, FOR OBJECT BLOCK
2254	5223	JMP RWBGN	/ERROR RETURN, ASSUME IN BACK ENDZONE
2255	1337	TAD RWBN	/CHECK FOR BLOCK
2256	7041	CIA	
2257	1342	TAD RWBK	
2260	7450	SNA	/AT OBJECT BLOCK?


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2261 5265      JMP .+4 /YES
2262 7710      SPA CLA /PAST OBJECT BLOCK?
2263 5223      JMP RWBGN /YES, START OVER
2264 5253      JMP RWFWD /NO, CONTINUE FORWARD SEARCHING
/START FUNCTION FORWARD
2265 1340      TAD RWREGA
2266 7112      CLL RTR
2267 7010      RAR /GET FUNCTION IN BIT 6-8
2270 0355      AND RWDG70
2271 1352      TAD RWD110
2272 6764      DTXA /XOR IN FUNCTION, XOR OUT SEARCH BIT
2273 1360      TAD RWFWD
2274 6774      DTLB /SET DECTAPE FIELD
2275 1341      TAD RWD10C
2276 3744      DCA I RWADCA /INITIALIZE CURRENT ADDRESS FOR ACTUAL TRANS
R
2277 2343      RWAGN, ISZ RWBNT /DONE?
2300 5306      JMP .+6
2301 1353      TAD RWD200 /YES, STOP TAPES
2302 6764      DTXA
2303 7000      RWOUT, NOP /A CIF/CDF TO CALLING FIELD
2304 6774      DTLB /RESTORE TO FIELD 0
2305 5600      JMP I RWTAPE /RETURN WITH IF AND DF RESTORED
2306 1356      TAD RWD200 /PROCESS A BLOCK
2307 3745      DCA I RWADWC
2310 4313      JMS RWAIT
2311 5223      JMP RWBGN /ERROR RETURN, START OVER
2312 5277      JMP RWAGN
/WAIT LOOP FOR FLAG, EXIT TO CALL+1 IN EVENT OF AN
/ERROR, TO CALL+2 IF NO ERROR
2313 0000      RWAIT, 0 /WAIT FOR DTF, THEN CHECK FOR ERRORS
2314 6764      DTXA
2315 6771      DTSE
2316 5315      JMP .-1
2317 6772      DTRB /GET STATUS REGISTER B
2320 7700      SMA CLA /ANY ERRORS?
2321 5333      JMP RWOUT /NO ERRORS
2322 2335      ISZ RWTNT /ERROR, TRIED IT 10(10) TIMES
2323 5713      JMP I RWAIT /NO
2324 6761      DTRA /STOP THE TAPES
2325 0353      AND RWD200
2326 7440      SZA
2327 6764      DTXA
2330 6772      DTRB /GET STATUS B REGISTER
2331 7402      HLT /ERROR HALT
2332 5331      JMP .-1 /NO RECOVERY
2333 2313      RWOUT, ISZ RWAIT
2334 5713      JMP I RWAIT
/CONSTANTS AND VARIABLES
2335 0000      RWTNT, 0
2336 7766      RWM12, -12
2337 0000      RWBN, 0
2340 0000      RWREGA, 0

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2341 0000 RWCLOC, 0
2342 0000 RWBLK, 0
2343 0000 RWBCNT, 0
2344 7755 RWADCA, 7755
2345 7754 RWADMC, 7754
2346 2337 RWADBN, RWBN
2347 7000 RW7000, 7000
2350 0610 RW0610, 0610
2351 0210 RW0210, 0210
2352 0110 RW0110, 0110
2353 0200 RW0200, 0200
2354 0077 RW0077, 0077
2355 0070 RW0070, 0070
2356 7600 RWM200, -200
2357 0000 RWCUPD, 0
2360 0000 RWTRFD, 0
2361 6203 RW6203, 6203

DTRA=6761

DTCA=6762

DTXA=6764

DTSF=6771

DTRB=6772

DTLB=6774

LIST

MAIN PROGRAM

*200

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0200 4777 GETCD, JMS 7642 /GET COMMAND DECODER
0201 1003 1003 /READ INDIRECT RETURN
0202 0015 CDBLK, 15
0203 2200 CDBUFF+200
0204 0000 0
0205 2200 CDBUFF+200
0206 1174 CDRTRN, TAD 174 /POINTER TO CDLIST
0207 1376 TAD (3
0210 3171 DCA 171 /POINTS TO OPTION
0211 1571 TAD I 171 /GET OPT
0212 1375 TAD (-324 /-T
0213 7650 SNA CLA /IS IT A T?
0214 5223 JMP TELOUT /YES, CONTINUE ALONG
0215 1374 TAD (6456 /MODIFY TTY IOT'S
0216 3773 DCA TYPE+1
0217 1372 TAD (6451
0220 3771 DCA TYPE+2
0221 1370 TAD (M4LF /CHANGE LINES
0222 3302 DCA COUNT
0223 1174 TELOUT, TAD 174 /174 CONTAINS CDLIST
0224 3171 DCA 171
0225 1574 TAD I 174 /GET WORD A FROM .CD. OUTPUT LIST
0226 0367 AND (7000 /MASK DEVICE CODE
0227 7650 SNA CLA /FILE STRUCTURED OR TELETYPE?
0230 5242 JMP TELE /TELETYPE
0231 1574 TAD I 174 /NO, GET WORD A AGAIN
0232 0366 AND (700 /MASK DECCTAPE UNIT # BITS
0233 1376 TAD (3 /READ FUNCTION
0234 3765 DCA BDRFNC
0235 1101 TAD CDLIST+1 /GET 1ST READ BLKN
0236 3240 DCA .+2
0237 4764 JMS BDRNIT /INITIALIZE READ ROUTINE
0240 0000 0 /READ BLOCK NUMBER
0241 5257 JMP GINIT
0242 1574 TELE, TAD I 174
0243 1363 TAD (-1 /TELETYPE?
0244 7640 SZA CLA
0245 5200 JMP GETCD /NO, DEVICE INVALID
0246 1362 TAD (READ1&177!JMS!600 /CHANGE INPUT FROM DISK TO READER
0247 3761 DCA CHAC+1
0250 1362 TAD (READ1&177!JMS!600
0251 3760 DCA NXTPG
0252 1367 TAD (NOP /DON'T CHECK FOR TT INPUT IN TYPE ROUTINE
0253 3757 DCA TKSF
0254 6032 KCC
0255 6031 KSF
0256 5255 JMP .-1
0257 6032 GINIT, KCC

```

0260	7240	STA	
0261	3756	DCA LINCNT	
0262	3755	DCA PAGNUM	/SET PAGE # TO 0
0263	7240	PAG, STA	
0264	3754	DCA ENDMK	/SET FF COUNTER
0265	3753	DCA SHTNUM	/CLEAR SHEET #
0266	2755	ISZ PAGNUM	/BUMP PAGE #
0267	2756	ISZ LINCNT	/GET TO THE TOP OF A PAGE
0270	7410	SKP	
0271	5277	JMP SHEET	
0272	1352	TAD (215	
0273	4751	JMS TYPE	
0274	1350	TAD (212	
0275	4751	JMS TYPE	
0276	5267	JMP .-7	
277	1352	SHEET, TAD (215	/TYPE A C.R.
0300	4751	JMS TYPE	
0301	4747	JMS XTYPE	/AND 6 LINEFEEDS
0302	0730	COUNT, M6LF	
0303	2753	ISZ SHTNUM	/BUMP SHEET #
0304	4747	JMS XTYPE	
0305	0711	HEAD	
0306	1755	TAD PAGNUM	/TYPE PAGE AND SHEET #'S
0307	4746	JMS DECTYP	
0310	1345	TAD (*- /TYPE A DASH	
0311	4751	JMS TYPE	
0312	1753	TAD SHTNUM	
0313	4746	JMS DECTYP	
0314	1352	TAD (215	
0315	4751	JMS TYPE	
0316	4747	JMS XTYPE	
0317	0731	M5LF	
0320	1344	TAD (-65	/COUNT 65 LINES
0321	3756	DCA LINCNT	
0322	1350	LINE, TAD (212	/GET ON A NEW LINE
0323	4751	JMS TYPE	
0324	4743	JMS TABSET	/SET TAB COUNTER
0325	2756	ISZ LINCNT	/BUMP LINE CNTR
0326	7410	SKP	/ARE WE THROUGH WITH THE SHEET?
0327	5277	JMP SHEET	/YES
0330	5742	JMP CHAC	
0342	0400		
0343	0435		
0344	7713		
0345	0255		
0346	0600		
0347	0651		
0350	0212		
0351	0663		
0352	0215		
0353	0451		
0354	0453		

0355 0450
 0356 0454
 0357 0670
 0360 0441
 0361 0401
 0362 4655
 0363 7777
 0364 1075
 0365 1060
 0366 0700
 0367 7000
 0370 0732
 0371 0665
 0372 6451
 0373 0664
 0374 6456
 0375 7454
 0376 0003
 0377 7642

0400	7200	PAGE	CLA	
0401	4777	CHAC,	JMS BDRD	/GET A CHARACTER OFF THE DISK
0402	1376		TAD (-211	/IS IT A TAB?
0403	7440		SZA	
0404	5213		JMP NOTAB	/NO
0405	1375	TABLP,	TAD (-240	/YES, TYPE A SPACE
0406	4774		JMS TYPE	
0407	2252		ISZ TABCNT	/ENOUGH SPACES?
0410	5205		JMP TABLP	
0411	4235		JMS TABSET	/YES, RESET TAB COUNTER
0412	5200		JMP CHAC	
0413	1373	NOTAB,	TAD (-1	/LINEFEED?
0414	7450		SNA	
0415	5772		JMP LINE	/YES, START A NEW LINE
0416	1371		TAD (-2	/FORM FEED?
0417	7440		SZA	
0420	5225		JMP .+5	
0421	2253		ISZ ENDMK	/YES, 2ND CONSECUTIVE ONE?
0422	7410		SKP	
0423	5770		JMP 7600	/YES, WE'RE ALL DONE
0424	5767		JMP PAG	/NO, JUST A NEW PAGE
0425	1366		TAD (-214	/NOT A SPECIAL CHARACTER, JUST TYPE IT
0426	4774		JMS TYPE	
0427	2252		ISZ TABCNT	
0430	7410		SKP	
0431	4235		JMS TABSET	/RESET TAB COUNTER
0432	7001		IAC	/SET FF COUNTER NOT TO SKIP
0433	3253		DCA ENDMK	
0434	5200		JMP CHAC	
0435	0000	TABSET,	0	/SET TAB COUNTER
0436	1365		TAD (-10	
0437	3252		DCA TABCNT	

```

0440 5635      JMP I TABSET
0441 4777  NXTPG,  JMS BDRD      /GET NEXT CHAR OFF THE DISK
0442 1364      TAD (-214        / FF (END OF PAGE) ?
0443 7640      SZA CLA
0444 5241      JMP NXTPG      /NO,CHECK NEXT CHAR
0445 7240      STA
0446 3254      DCA LINCNT      /RESET LINE COUNTER
0447 5767      JMP PAG

```

```

0450 0000  PAGNUM,0
0451 0000  SHTNUM,0
0452 0000  TABCNT,0
0453 0000  ENDMK,0
0454 0000  LINCNT,0
0455 0675  READ1,READ
          CDLIST=100
          RBUFF=1200
          CDBUFF=2000
          CDIO=2603

```

```

0564 7564
0565 7770
0566 0214
0567 0263
0568 7600
0571 7776
0572 0322
0573 7777
0574 0663
0575 0240
0576 7567
0577 1000

```

*167 /COMMAND DECODER LIST

```

0167 0000      0
0170 0000      0
0171 0100      CDLIST
0172 0015      15      /FIRST BLOCK OF THE COMMAND DECOOER ON THE DIS
0173 0000      0
0174 0100      CDLIST /ADDR OF START OF OUTPUT LIST
0175 0040      40      /OPTIONS
0176 0000      0
0177 0206      CDRTRN /ADDR OF RETURN FROM COMMAND DECODER

```

SWCH

SWITCHES FILES ON SYSTEM DEVICE ONLY

OPERATION: ALL OCCURANCES IN THE SAMBLOCKS
OF EACH FILENAME IS CHANGED TO THE OTHER FILENAME

USE: AFTER AN EDIT, GETS EDITED FILE OUT OF A
TEMPORARY FILE INTO THE PROPER SOURCE FILE.

OPTIONS:

A- ASCII
B- BINARY
S- SYSTEM
U- USER

ERRORS: ANY DETECTED ERROR CONDITION WILL CAUSE A ?
TO BE TYPED AND CONTROL TO BE RETURNED TO THE
SYSTEM. THERE ARE NO SOFTWARE CONDITIONS WHICH CAN
CAUSE DESTRUCTION OF THE SAM BLOCKS.

*20

/

/

/MESSAGES AND TABLES

/

0020	0215	OPTMS.	215
0021	0212		212
0022	0252	"*	
0023	0317	"0	
0024	0320	"P	
0025	0324	"T	
0026	0255	"-	
0027	0000		0

/

0030	7477	OPLIST.	-301
0031	0200		200

/ASCII FILES

/CD OPTION BITS

/

0032	7476		-302
0033	2600		2600

/BINARY

/

0034	0000		0
------	------	--	---


```

/
/ASSORTED GARBAGE
/
0035 7600 ERR, 7600 /CLA
0036 1047 TAD P277 /TYPE '2'
0037 4041 JMS TYPE
0040 5435 JMP I ERR
/
0041 0000 TYPE, 0
0042 6046 TIS
0043 6041 TSF
0044 5043 JMP .-1
0045 7200 CLA
0046 5441 JMP I TYPE
/
0047 0277 P277, 277
0050 0000 TEM, 0
/
/
0051 0000 FILCK, 0 /CHECK A FILE'S VALIDITY & RETURN SAM #
0052 7100 CLL
0053 1064 TAD P2000 /ADD TO CD WORD A (ENTERED IN AC)
0054 7420 SNL
0055 5035 JMP ERR /NOT SYSTEM DEVICE, ERROR
0056 0063 AND K77 /ISOLATE SAM #
0057 5451 JMP I FILCK
/
0060 0000 XMASK, 0
0061 0000 PNT, 0
0062 0000 CNT, 0
0063 0077 K77, 77
0064 2000 P2000, 2000
/

```

```

/
/
*167 /PARAMETERS FOR THE COMMAND DECODER
0167 7777 7777
0170 0000 0
0171 0000 0
0172 0015 15 /1ST BLOCK OF THE COMMAND DECODER ON THE DISK
0173 0000 0
0174 0120 CDLIST /ADDRESS OF COMMAND DECODER OUTPUT LIST
0175 0000 0 /OPTION BITS
0176 0000 0
0177 0240 SWITCH /ADDRESS FOR RETURN FORM THE COMMAND DECODE
/
/
SAMBUF=600 /BUFFER FOR SAM BLOCKS
CDBUFF=600 /COMMAND DECODER GOES HERE
CDLIST=120

```

*200

/GET OPTION-(A,B,S,U) AND CALL COMMAND DECODER

```

0200 1377      TAD (OPTMS-1      /TYPE '**OPT-'
0201 3011      DCA 11
0202 1411      TAD I 11
0203 7450      SNA
0204 5207      JMP GETOPT
0205 4041      JMS TYPE
0206 5202      JMP .-4
/
/
0207 6031      GETOPT, KSF      /GET RESPONSE
0210 5207      JMP .-1
0211 6036      KRB
0212 3050      DCA TEM      /SAVE IT
0213 1050      TAD TEM      /ECHO IT
0214 4041      JMS TYPE
/
0215 1376      TAD (OPLIST-1    /DECODE OPTION
0216 3011      DCA 11
0217 1411      OPTCK, TAD I 11    /GET CHAR FROM OPTION TAB
0220 7450      SNA      /END OF TABLE?
0221 5035      JMP ERR      /YES, BAD OPTION RESPONSE
0222 1050      TAD TEM      /MATCH?
0223 7650      SNA CLA
0224 5230      JMP FNDOP      /YES
0225 2011      ISZ 11
0226 2011      ISZ 11
0227 5217      JMP OPTCK      /NO, CHECK NEXT OPTION
/
/
0230 1411      FNDOP, TAD I 11    /SET OPTION BITS IN CD PA
0231 3175      DCA 175
/
0232 4775      JMS 7642      /CALL COMMAND DECODER
0233 1003      1003
0234 0015      15
0235 1000      CDBUFF+200
0236 0000      0
0237 1000      CDBUFF+200

```

```

/
/ SWITCH THE SAM ENTRIES
/
0240 1120 SWITCH. TAD CDLIST /CHECK FILE VALIDITY
0241 4051 JMS FILCK
0242 3277 DCA SAM1R /OUTPUT SAM #
0243 1122 TAD CDLIST+2
0244 4051 JMS FILCK
0245 3300 DCA SAM2R
/
0246 1277 TAD SAM1R /GET CHECKS
0247 3305 DCA SAM1RB
0250 1277 TAD SAM1R
0251 7106 CIL RTL
0252 7006 RTL
0253 7006 RTL
0254 3311 DCA SAM1L
0255 1311 TAD SAM1L
0256 3317 DCA SAM1LB
0257 1300 TAD SAM2R
0260 3304 DCA SAM2RB
0261 1300 TAD SAM2R
0262 7106 CIL RTL
0263 7006 RTL
0264 7006 RTL
0265 3312 DCA SAM2L
0266 1312 TAD SAM2L
0267 3316 DCA SAM2LB
/
0270 4774 SLOOP. JMS GETSAM /DO THE SWITCH; GET A SAM BLOCK
0271 1773 TAD SWBLK+1 /SAM BUFFER ADDRESS
0272 3061 DCA PNT
0273 1372 TAD C-200
0274 3062 DCA CNT
/
0275 4325 BLOOP. JMS XCH /VARIOUS POSSIBLE EXCHANGES
0276 0077 77 /RIGHT HALF
0277 0000 SAM1R. 0
0300 0000 SAM2R. 0
0301 5307 JMP .+6 /IF FOUND, DON'T SWITCH IT BACK
0302 4325 JMS XCH
0303 0077 77
0304 0000 SAM2R R. 0
0305 0000 SAM1R R. 0
0306 7000 NOP
0307 4325 JMS XCH
0310 7700 7700
0311 0000 SAM1. 0
0312 0000 SAM2. 0
0313 5321 JMP .+6 /DON'T SWITCH THIS BACK EITHER
0314 4325 JMS XCH

```

0315	7700		7700	
0316	0000	SAM2 R.	0	
0317	0000	SAM1 R.	0	
0320	7000		NOP	
/				
0321	2061		ISZ PNT	
0322	2062		ISZ CNT	
0323	5275		JMP BLOOP	
0324	5270		JMP SLOOP	
/				
0325	0000	XCH,	0	/EXCHANGE SAM NUMBERS IF THEY MATCH
0326	1725		TAD I XCH	/GET MASK
0327	2325		ISZ XCH	
0330	3060		DCA XMASK	
0331	1461		TAD I PNT	/GET SAM ENTRY
0332	0060		AND XMASK	
0333	7041		CIA	
0334	1725		TAD I XCH	/AND COMPARE
0335	2325		ISZ XCH	
0336	7640		SZA CLA	
0337	5346		JMP XBMP	
0340	1060		TAD XMASK	/THEY MATCHED, EXCHANGE THEM
0341	7040		CMA	
0342	0461		AND I PNT	
0343	1725		TAD I XCH	
0344	3461		DCA I PNT	/AND RESTORE
0345	7410		SKP	/SO WE DON'T SWITCH BACK
0346	2325	XBMP.	ISZ XCH	/GET RETURN ADDR
0347	2325		ISZ XCH	
0350	5725		JMP I XCH	
/				
/				
/				

C

0372	7600
0373	0407
0374	0400
0375	7642
0376	0027
0377	0017

PAGE

```

/
/ ROUTINE TO READ AND WRITE SAM BLOCKS
/
0400 0000 GETSAM, 0 /WRITE MODIFIED SAM BLK, GET NEXT ONE
0401 1206 TAD SWBLK /IS THERE A BLOCK TO WRITE?
0402 7450 SNA
0403 5212 JMP RSAM /NO, FIRST (OR LAST) TIME THRU
0404 4777 JMS 7642
0405 0005 SWFUNC, 5
0406 0000 SWBLK, 0
0407 0600 SAMBUF
0410 0000 SWLNK, 0
0411 7402 HLT
0412 1222 RSAM, TAD SRLNK /END OF SAM CHAIN?
0413 7450 SNA
0414 5776 RSAM1, JMP 7600 /YES, EXIT
0415 3220 DCA SRBLK /NO, STORE NEXT SAM BLOCK #
0416 4777 JMS 7642
0417 0003 SWFUNC, 3
0420 0000 SRBLK, 0
0421 0600 SAMBUF
0422 0200 SRLNK, 200 /INITIALIZE FOR 1ST SAM BLOCK
0423 7402 HLT
0424 1220 TAD SRBLK /SET BLOCK, LINK FOR NEXT TIME
0425 3206 DCA SWBLK
0426 1222 TAD SRLNK
0427 3210 DCA SWLNK
0430 5600 JMP I GETSAM

0576 7600
0577 7642

```

2.4 MØN8I, LD8I, and PTAP

New programs were added to utilize the availability of an attached PDP-8/I.

(listings follow)

MON8-I

/MONITOR FOR PDP-8/I COMPUTER

/

/IS PERMANENTLY RESIDENT IN FIELD 1 AT 7600

/

/LOCATIONS 7765-7767 IN THE PDP-8 ARE USED FOR COMMUNICATIONS
/AS FOLLOWS:

/

/ 7765: CONTAINS 0 WHEN IDLE,
/ CONTAINS CDE BANK8I WHEN DATA READY,
/ IS RESET TO 0 WHEN DATA IS ACCEPTED

/

/ 7766: CONTAINS EITHER
/ 1) LOAD ADDRESS IN PDP-8/I OR
/ 2) 7777 INDICATING THAT LOCATION
/ 7767 CONTAINS THE STARTING ADDRESS
/ FOR EXECUTION

/

/ 7767: BUFFER ADDRESS IN PDP-8 OR STARTING
/ ADDRESS IN PDP-8/I

/

FIELD 1				
*7600				
7600	7600	MON8I.	7600	/C'4 AND -200
7601	1252		TAD N7765	
7602	6145		6145	/SET FLAG LOCATION
7603	7130		STL RAR	/4000=READ
7604	6146		6146	/BANK 0
7605	4254		JMS CHAN	/READ FLAG
7606	7440		SZA	/ANYTHING?
7607	5212		JMP .+3	/YES, IS A CDF
7610	4260		JMS STOP	/NO. STOP
7611	5200		JMP MON8I	/TRY AGAIN
/				
7612	3213		DCA CNGFLD	/SAVE CDF
7613	0000	CNGFLD.	0	/EXECUTE IT
7614	4254		JMS CHAN	/GET LOC 7766
7615	7040		CMA	/IS IT 7777?
7616	7450		SNA	
7617	5242		JMP STARTP	/YES, START EXECUTION
7620	7040		CMA	/NO. IS LOAD POINT ADDRESS
7621	3253		DCA POINT	/RESTORE AND SAVE
7622	4254		JMS CHAN	/GET LOC 7767
7623	4260		JMS STOP	/AND STOP
7624	6145		6145	/AC CONTAINS BUFFER ADDRESS
7625	7130		STL RAR	/READ
7626	6146		6146	/FROM BANK 0
7627	1200		TAD MON8I	/-200
7630	3250		DCA COUNT	
/				
7631	6157	READ.	6157	/GET WORD
7632	5231		JMP .-1	
7633	3653		DCA I POINT	/PUT IT AWAY
7634	2253		ISZ POINT	/BUMP ADDRESS
7635	7000		NOP	/NO OVERFLOW ALLOWED.
7636	2250		ISZ COUNT	/DONE?
7637	5231		JMP READ	/NO
7640	4264		JMS END	/YES, SIGNAL END OF DATA
7641	5200		JMP MON8I	/GO FOR MORE
/				
/START EXECUTION				
/				
7642	4254	STARTP.	JMS CHAN	/GET START ADDRESS IN LOC 7766
7643	3253		DCA POINT	
7644	4264		JMS END	/SHOW COMPLETION
7645	7126		STL RTL	/2
7646	1213		TAD CNGFLD	/MAKE INTO CDF: CDF
7647	3250		DCA .+1	
7650	0000	COUNT.	0	/EXECUTE IT
7651	5653		JMP I POINT	/START WITH AC=0
/				
7652	7765	N7765.	7765	
7653	0000	POINT.	0	

/SUBROUTINES

7654 0000 CHAN, 0
7655 6157 6157
7656 5255 JMP .-1
7657 5654 JMP I CHAN

/DO A TRANSFER

7660 0000 STOP, 0 7611
7661 6155 6155
7662 5261 JMP .-1
7663 5660 JMP I STOP

/TIME-OUT ON READ

7664 0000 END, 0
7665 4260 JMS STOP
7666 1252 TAD N7765
7667 6145 6145
7670 6146 6146
7671 4254 JMS CHAN
7672 5664 JMP I END

/RESET LOC 7765 TO 0
/COMPLETE PREVIOUS READ

/WRITE, BANK 0
/WRITE A 0

LD8-I

/ THIS PROGRAM RUNS IN THE PDP-8 AND WILL LOAD USER SAVED FILES
/ ON THE DISK INTO THE PDP-8 AND BEGIN THEIR EXECUTION.

/

/

/ TO USE:

- /
1. PREPARE AND ASSEMBLE THE PROGRAM FOR THE 8/I
 2. LOAD IT INTO THE 8 AND SAVE IT AS A USER FILE
 3. CALL LD8I, AND WHEN IT TYPES '*IN-', RESPOND BY
/ TYPING THE NAME OF THE USER FILE TO BE LOADED AND
/ RUN IN THE 8/I. THE PROGRAM WILL BE LOADED AND
/ STARTED, AND THE PDP-8 WILL RETURN TO THE MONITOR.
- /

/

*20 /CONSTANTS AND VARIABLES

0020	0000	DNBLK,	0	/POINTER TO THE DN BLOCK #
0021	0177		177	/TABLE OF DN BLOCK #'S
0022	0201		201	
0023	0202		202	
0	4	0000	DNLOC,	0 /POINTER TO WORD 3 IN DN ENTRY
0025	0000	TCNT,	0	
0026	0000	START,	0	/STARTING ADDRESS OF THE 8/I PROGRAM
0027	6201	PCDF,	CDF	/BECOMES CDF TO BANK IN 8/I

/

/

*167

/OPTIONS FOR THE COMMAND DECODER

0167	7777		7777	
0170	0000		0	
0171	0000		0	
0172	0015		15	/FIRST BLOCK OF .CD.
0173	0000		0	
0174	0100		CDLIST	/POINTER TO .CD. OUTPUT LIST
0175	6000		6000	/OPTIONS=USER INPUT FILE
0176	0000		0	
0177	0206		CDRTN	/ADDRESS OF RETURN FROM .CD.

/

/ EQUIVALENCES

/

BDORG=400

CDBUFF=600

CDIO=CDBUFF+603

RBUFF=1600

DNBUFF=2000

BLKBUFF=2200

CDLIST=100

```

*200
/      MAIN PROGRAM
/

0200  4777      JMS 7642      /READ IN .CD.
0201  1003      1003
0202  0015      15
0203  1000      CDBUFF+200
0204  0000      0
0205  1000      CDBUFF+200      /BRANCH TO .CD.

/
0206  1100  CDRTRN, TAD CDLIST      /VALID INPUT?
0207  7500      SMA
0210  5325      JMP ERR      /NO ERROR
0211  0376      AND (77      /GET SAM #
0212  1375      TAD (-1      /SUBTRACT 1
0213  7100      CLL
0214  1374      TAD (-31
0215  2020      ISZ DNBLK      /DIVIDE TO GET QUO(SAM# / 25)+1
0216  7430      SZL
0217  5213      JMP .-4
0220  1373      TAD (32      /QUO+1=DN BLK #
0221  3024      DCA DNLOC      /REFM+1
0222  1024      TAD DNLOC
0223  7106      CLL RTL
0224  1024      TAD DNLOC
0225  1372      TAD (DNBUFF      /((REFM+1)*5+DNBUFF=ADDR OF DN WORD.3
0226  3024      DCA DNLOC
0227  1371      TAD (TAD DNBLK
0230  1020      TAD DNBLK
0231  3232      DCA .+1
0232  0000      0      /GET DN BLOCK #
0233  3770      DCA DNBK1      /PUT INTO DN GET ROUTINE
0234  1367      TAD (CDLIST
0235  4766      JMS BDRNIT      /INITIALIZE DISK READ ROUTINES
0236  4765      JMS GETDN      /READ PROPER DN BLOCK INTO DNBUFF
0237  1364      TAD (BLKBUFF-1
0240  3011      DCA 11
0241  1011      TAD 11
0242  3012      DCA 12      /SET LOAD ADDRESS TABLE POINTERS
0243  1424      TAD I DNLOC      /SA=77777
0244  7040      CMA
0245  7640      SZA CLA
0246  5255      JMP TABLE
0247  1363      TAD (BLKBUFF      /YES, 1ST BLOCK IN FILE IS TABLE
0250  3762      DCA BDRBUF      /READ TABLE BLK INTO BLKBUFF
0251  4761      JMS BDRBLK
0252  1360      TAD (RBUF      /RESET BUFFER FOR READS
0253  3762      DCA BDRBUF      /START TRANSFER OF THE FILE
0   4  5266      JMP TRAN

/
0255  1357  TABLE, TAD (-40      /SA .NE. 7777
0256  3025      DCA TCNT      /MAKE TABLE OF LOAD ADDRESSES

```

0257	1424	TABLP.	TAD I DNLOC	/GET 1ST LOAD ADDRESS
0260	3411		DCA I 11	/PUT IT INTO TABLE
0261	1424		TAD I DNLOC	
0262	1356		TAD (200	
0263	3424		DCA I DNLOC	/BUMP ADDRESS
0264	2025		ISZ TCNT	/DONE WITH TABLE?
0265	5257		JMP TABLP	/NO. DO NEXT ENTRY
/				
0266	2024	TRAN.	ISZ DNLOC	/GET ENTRY ADDRESS
0267	1424		TAD I DNLOC	
0270	3026		DCA START	
0271	2024		ISZ DNLOC	
0272	1424		TAD I DNLOC	/GET BANK OF 8/I PROGRAM
0273	7012		RTR	
0274	7010		RTR	
0275	0355		AND (10	/MAKE SURE IT IS 0 OR 1
0276	1027		TAD PCDF	/CONSTRUCT CDF BANK
0277	3027		DCA PCDF	
/				
0300	4761	LOADLP.	JMS BDRBLK	/READ A BLOCK
0301	1412		TAD I 12	/SET LOAD ADDRESS
0302	3754		DCA 7766	
0303	1360		TAD (RBUFF	/SET BUFFER ADDRESS
0304	3753	STR8I.	DCA 7767	
0305	1027		TAD PCDF	/SET FLAG
0306	3752		DCA 7765	
0307	6471		6471	/ENABLE CHANNEL
0310	1752		TAD 7765	
0311	7640		SZA CLA	/CHANNEL DONE?
0312	5310		JMP .-2	
0313	6472		6472	/YES. DISABLE IT
0314	1751	ENDALL.	TAD BDRBLK	/CHANGES TO JMP 7600
0315	7640		SZA CLA	/LAST BLOCK OF INPUT FILE?
0316	5300		JMP LOADLP	
0317	1330		TAD ENDJMP	/GET (JMP 7600
0320	3314		DCA ENDALL	
0321	7240		STA	/INDICATE THAT 7767 IS STARTING ADDR
0322	3754		DCA 7766	
0323	1026		TAD START	
0324	5304		JMP STR8I	/START EXECUTION OF 8/I PROGRAM
/				
0325	7200	ERR.	CLA	/ERROR ROUTINE
0326	1350		TAD (277	/TYPE A 1?
0327	6046		TLS	
0330	5747	ENDJMP.	JMP 7600	

0347	7600
0350	0277
0351	0465
0352	7765
0353	7767
0354	7766
0355	0010
0356	0200
0357	7740
0360	1600
0361	0452
0362	0464
0363	2200
0364	2177
0365	0524
0366	0502
0367	0100
0370	0531
0371	1020
0372	2000
0373	0032
0374	7747
0375	7777
0376	0077
0377	7642

*BDORG

```

/ROUTINES TO READ AND WRITE FILES ON DISK OR SMAPTape
/INITIALIZATION ROUTINES MUST BE ENTERED WITH THE AC POINTING TO
/WORD A OF THE COMMAND DECODER OUTPUT LIST FOR THAT FILE
BDRD,  O      /BUFFERED DISK READ
0400  0000      JMS BDGET
0401  4225      TAD (-77
0402  1377      SNA      /NON-PRINTING CHAR?
0403  7450      JMP BD1 /YES
0404  5212      TAD (37
0405  1376      SPA
0406  7510      TAD (100      /0-37 ADD 300
0407  1375      TAD (240      /40-76 ADD 200
0410  1374      JMP I BDRD
0411  5600      BD1,  JMS BDGET
0412  4225      TAD (-77      /IS IT A '?'
0413  1377      SZA
0414  7440      JMP .+3
0415  5220      TAD (37 /YES, ADD 200
0416  1376      JMP BD2
0417  5223      TAD (37 /NO
0420  1376      SMA
0421  7500      TAD (100      /40-76 ADD 300
0422  1375      TAD (240      /77-0-37 ADD 200
0  3  1374      BD2,  JMP I BDRD
0424  5600      BDGET, O      /GET A CHAR FROM DBUFF
0425  0000      BDG0,  NOP      /PACKING SWITCH
0426  7000      TAD (JMP BDG2 /RESET PACKING SWITCH FOR RIGHT HALF OF WORD
0427  1373      DCA BDG0
0430  3226      TAD I BDRADR /GET PACKED WORD
0431  1700      ISZ BDRADR
0432  2300      DCA BDTEMP
0433  3301      TAD BDTEMP
0434  1301      RTR
0435  7012      RTR
0436  7012      RTR      /OUTPUT LEFT HALF
0437  7012      BDG1,  AND (77
0440  0372      CLL
0441  7100      JMP I BDGET
0442  5625      BDG2,  TAD (NOP      /SET SWITCH FOR LEFT HALF
0443  1371      DCA BDG0
0444  3226      ISZ BDRCNT      /NEW BUFFER NEEDED?
0445  2276      SKP
0446  7410      JMS BDRBLK      /YES, READ A BLOCK
0447  4252      TAD BDTEMP      /OUTPUT RIGHT HALF
0450  1301      JMP BDG1
0451  5240      BDRBLK, O      /GET A BLOCK OFF THE DISK
0452  0000      TAD BDRFIL      /LOAD 171 FOR CDIO
0453  1277      DCA 171
0454  3171      TAD BDRLINK
0455  1265      SNA      /DONE?
0456  7450      JMP 7600      /YES, BUT SHOULDN'T REACH HERE
0457  5770

```



```

0460 3263      DCA BDRBK
0461 7000      NOP
          *.-111 /GET ONTO AN ODD LOCATION
0461 4767      JMS CDIO
0462 0003      BDRFNC, 3      /FUNCTION WORD
0463 0000      BDRBK, 0
0464 1600      BDRBUF, RBUF   /READ INTO RBUF
0465 0000      BDRLNK, 0
0466 7402      HLT           /ERROR RETURN
0467 1264      TAD .-3
0470 3300      DCA BDRADR      /INITIALIZE READ ADDR
0471 1370      TAD (-200      /INITIALIZE BUFFER COUNTER
0472 3276      DCA BDRCNT
0473 1371      TAD (NOP       /RESET PACKING SWITCH
0474 3226      DCA BDGO
0475 5652      JMP I BDRBLK
0476 0000      BDRCNT, 0
0477 0000      BDRFIL, 0
0500 0000      BDRADR, 0
0501 0000      BDTEMP, 0
0502 0000      BDRNIT, 0      /INITIALIZE READ ROUTINE
0503 3277      DCA BDRFIL      /STORE POINTER TO .CD. ENTRY FOR FILE
0504 1677      TAD I BDRFIL    /GET WORD A FOR THIS FILE
0 5 0366      AND (2000       /INPUT ON SYSTEM DEVICE OR DECTAPE?
0506 7640      SZA CLA
0507 5316      JMP BDRNI1
0510 1677      TAD I BDRFIL    /DECTAPE, GET UNIT #
0511 0365      AND (700       /MASK IT
0512 1262      TAD BDRFNC
0513 3262      DCA BDRFNC      /PUT UNIT # INTO FUNCTION WORD
0514 1262      TAD BDRFNC
0515 3330      DCA DNFNC
0516 1277      BDRNI1, TAD BDRFIL
0517 7001      IAC
0520 3301      DCA BDTEMP
0521 1701      TAD I BDTEMP    /GET WORD B FOR THIS FILE
0522 3265      DCA BDRINK      /WHICH IS THE 1ST READ BLK #
0523 5702      JMP I BDRNIT
/
0524 0000      GETDN, 0      /GET THE DN BLOCK
0525 1277      TAD BDRFIL
0526 3171      DCA 171
0527 7000      NOP
          *.-111 /GET ONTO AN ODD LOCATION
0527 4767      JMS CDIO
0530 0003      DNFNC, 3
0531 0000      DNBK1, 0
0532 2000      DNBUF
0533 0000      0
0 4 7402      HLT
0535 5724      JMP I GETDN
0565 0700

```

0566	2000
0567	1403
0570	7600
0571	7000
0572	0077
0573	5243
0574	0240
0575	0100
0576	0037
0577	7701

PTAP

PAPER TAPE INPUT FROM PDP-8/I

INPUTS ASCII AND BINARY PAPER TAPES FROM THE PDP-8/I
HIGH SPEED READER ONTO THE PDP-8 DISK.

OPTIONS:

- A- PAPER TAPE IS ASCII
- B- PAPER TAPE IS BINARY

FIRST, "*OUT-" WILL BE TYPED. REPLY WITH THE NAME OF THE
FILE INTO WHICH THE PAPER TAPE IS TO BE STORED.
WHEN "*IN-" IS TYPED, IGNORE BY TYPING CARRIAGE RETURN
IF AN ERROR OCCURS, A "?" WILL BE TYPED. BOTH MACHINES
WILL BE RETURNED TO THEIR MONITORS.

*20

/

/

/MESSAGES AND TABLES

/

0020	0215	OPTMS.	215
0021	0212		212
0022	0252		"*
0023	0317		"0
0024	0320		"P
0025	0324		"T
0026	0255		"-
0027	0000		0

/

0030	7477	OPLIST.	- 301
0031	0200		200
0032	0242		ASCII

/ASCII FILES

/CD OPTION BITS

/

0033	7476		- 302
0034	2200		2200
0035	0265		BINARY

/BINARY

/

0036	0000		0
------	------	--	---

/ ASSORTED GARBAGE

0037	7600	ERR,	7600	/CLA
0040	1051		TAD P277	/TYPE '2'
0041	4043		JMS TYPE	
0042	5452		JMP I EEND	
/				
0043	0000	TYPE,	0	
0044	6046		TLS	
0045	6041		TSF	
0046	5045		JMP .-1	
0047	7200		CLA	
0050	5443		JMP I TYPE	
/				
0051	0277	P277,	277	
0052	0261	EEND,	END+1	
0053	0000	TEM,	0	

/
/

```

/
/
*167 /PARAMETERS FOR THE COMMAND DECODER
0167 7777 7777
0170 0000 0
0171 0000 0
0172 0015 15 /1ST BLOCK OF THE COMMAND DECODER ON THE DISK
0173 0000 0
0174 0100 CDLIST /ADDRESS OF COMMAND DECODER OUTPUT LIST
0175 0000 0 /OPTION BITS
0176 0000 0
0177 0000 0 /ADDRESS FOR RETURN FROM THE COMMAND DECODER

```

```

/
/
WBUF=1200 /OUTPUT BUFFER
SAMBUF=1400 /BUFFER FOR SAM BLOCKS
CDBUF=WBUF /COMMAND DECODER GOES HERE
CDIO=CDBUF+603 /ADDRESS OF GENERALIZED DISK-WAPTAPE IO ROUTINE
CDLIST=100

```

*200

/GET OPTION-(A,B,S,U) AND CALL COMMAND DECODE

```

0200 1377      TAD (OPTMS-1      /TYPE '*OPT-
0201 3011      DCA 11
0202 1411      TAD I 11
0203 7450      SNA
0204 5207      JMP GETOPT
0205 4043      JMS TYPE
0206 5202      JMP .-4

/
/
0207 6031      GETOPT, KSF      /GET RESPONSE
0210 5207      JMP .-1
0211 6036      KRB
0212 3053      DCA TEM      /SAVE IT
0213 1053      TAD TEM      /ECHO IT
0214 4043      JMS TYPE

/
0215 1376      TAD (OPLIST-1    /DECODE OPTION
0216 3011      DCA 11
0217 1411      OPTOK, TAD I 11  /GET CHAR FROM OPTION TABLE
0218 7450      SNA            /END OF TABLE?
0221 5037      JMP ERR        /YES, BAD OPTION RESPONSE
0222 1053      TAD TEM        /MATCH?
0223 7650      SNA CLA
0224 5230      JMP FNDOP      /YES
0225 2011      ISZ 11
0226 2011      ISZ 11
0227 5217      JMP OPTOK      /NO, CHECK NEXT OPTION

/
/
0230 1411      FNDOP, TAD I 11  /SET OPTION BITS IN C PARAMS
0231 3175      DCA 175
0232 1411      TAD I 11      /SET RETURN ADDR
0233 3177      DCA 177

/
0234 4775      JMS 7642      /CALL COMMAND DECODER
0235 1003      1003
0236 0015      15
0237 1400      CDBUFF+200
0240 0000      0
0241 1400      CDBUFF+200

```

```

/ROUTINE TO INPUT ASCII PAPER TAPES
/
0242 4774 ASCII, JMS VALID      /CHECK IF INPUT FILE OK
0243 4773      JMS LOAD      /IF OK, LOAD 8/I SEGMENT
/
0244 4772 CHA, JMS CREAD      /GET A FRAME
0245 5254      JMP AEND      /IF DONE WITH TAPE
0246 0371      AND C177      /TEST FOR LEADER TRAILER
0247 7450      SNA
0250 5244      JMP CHA      /AND IGNORE IT....
0251 1370      TAD C200      /GET BACK ASCII
0252 4767      JMS BDWRT
0253 5244      JMP CHA
/
/
0254 1366 AEND, TAD C214      /OUTPUT DOUBLE FORM-FEED
0255 4767      JMS BDWRT
0256 1366      TAD C214
0257 4767      JMS BDWRT
0260 4765 END, JMS BDWEND    /CLOSE UP SHOP
0261 6472      CHD
0262 7240      STA      /AND TELL OUR BUDDY
0263 3764      DCA CCHR
0264 5763      JMP 7600
/
/

```



```

/ROUTINE TO INPUT BINARY PAPER TAPES
/
0265 4774 BINARY, JMS VALID /CHECK INPUT FILE VALIDITY
0266 4773 JMS LOAD /AND LOAD 8/I IF OK
/
0267 4315 BWORD, JMS BFRAME /INPUT A BINARY FRAME
0270 3313 DCA WORD1
0271 4315 JMS BFRAME /AND ANOTHER
0272 3314 DCA WORD2
0273 4315 JMS BFRAME /AND YET ANOTHER....
0274 3315 DCA BFRAME /AND SAVE
/
0275 1315 BLEAVE, TAD BFRAME
0276 7010 RAR
0277 7012 RTR
0300 7012 RTR
0301 0362 AND (7400 /GET LO 4 BITS
0302 1313 TAD WORD1 /PACK
0303 4761 JMS BDWWD /AND PUT ON DISK
0304 1315 TAD BFRAME
0305 7006 RTL
0306 7006 RTL /GET HI 4 BITS
0307 0362 AND (7400 /AND DO LIKEWISE
0310 1314 TAD WORD2
0311 4761 JMS BDWWD
0312 5267 BEXIT, JMP BWORD
/
/
0313 0000 WORD1, 0
0314 0000 WORD2, 0
/
/
0315 0000 BFRAME, 0 /INPUT A BINARY PAPER TAPE FRAME
0316 4772 JMS CREAD
0317 5037 JMP ERR /THIS IS TRULY UNEXPECTED!!
0320 1363 TAD (-200 /CHECK FOR LEADER-TRAILER
0321 7440 SZA
0322 5331 JMP BRGLR
0323 2343 ISZ LTFLG /OVERFLOW?
0324 5327 JMP .+3
0325 1360 TAD (JMP BEND /YES, SET UP TO DIE
0326 3312 DCA BEXIT
0327 1370 BBACK, TAD (-200 /A LITTLE TRAILER
0330 5715 JMP I BFRAME
/
0331 3342 BRGLR, DCA BTEM
0332 7240 STA
0333 3343 DCA LTFLG /INDICATE REGULAR CHAR
0334 1342 TAD BTEM
0335 5327 JMP BBACK

```

0336	4772	/ BEND.	JMS CREAD	/RUN TAPE OFF
0337	5260		JMP END	
0340	7200		CLA	
0341	5336		JMP .-3	
0342	0000	/ BTEM.	0	
0343	0000	LTFLG.	0	

0360 5336
0361 0600
0362 7400
0363 7600
0364 0447
0365 0746
0366 0214
0367 0607
0370 0200
0371 0177
0372 0431
0373 0407
0374 0400
0375 7642
0376 0027
0377 0017

*400

/GARBAGE ROUTINES

0400	0000	VALID.	0	/CHECK VALIDITY OF INPUT FILE
0401	1100		TAD CDLIST	
0402	7700		SMA CLA	
0403	5037		JMP ERR	/NOT FILE-STRUCTURED DEVICE
0404	1377		TAD (CDLIST	
0405	4776		JMS BDWNIT	/FILE OK, INITIALIZE IT
0406	5600		JMP I VALID	

0407	0000	LOAD.	0	/LOAD A PAGE INTO THE 8/I
0410	6471		CHE	/ENABLE 8/I CHANNEL
0411	1375		TAD (400	/NEXT PAGE
0412	3774		DCA 7766	
0413	1375		TAD (400	
0414	3773		DCA 7767	
0415	1372		TAD (CDF	
0416	3771		DCA 7765	
0417	1771		TAD 7765	/WAIT TILL MON8I IS DONE
0420	7640		SZA CLA	
0422	5217		JMP .-2	
0422	1370		TAD (START	
0423	3773		DCA 7767	/SET STARTING ADDR
0424	7240		STA	/START HIM UP
0425	3774		DCA 7766	
0426	1372		TAD (CDF	
0427	3771		DCA 7765	
0430	5607		JMP I LOAD	

0431	0000	CREAD.	0	/READ A WORD FROM THE 8/I
0432	1247		TAD CCHR	
0433	7450		SNA	
0434	5232		JMP .-2	/WAIT FOR SOME INPUT
0435	7500		SMA	/END OF TAPE?
0436	5241		JMP .+3	
0437	7200		CLA	/YES
0440	5631		JMP I CREAD	/TAKE ERROR RETURN

0441	2231		ISZ CREAD	
0442	0367		AND (377	/TRIM OFF UGLY FAT....
0443	3250		DCA CTEM	
0444	3247		DCA CCHR	/AND SEND 8/I ON HIS LAY
0445	1250		TAD CTEM	
0446	5631		JMP I CREAD	

0447	0000	CCHR.	0
0448	0000	CTEM.	0

```

/ THIS IS THE 8/I'S END OF THE BARGAIN
/
0451 6014 START. RFC /START UP THE READER
0452 6145 CHSA
0453 7130 STL RAR /READ, REST EXPECTS I RUNNING
0454 6146 CHSE

/
0455 1366 LOOP. TAD C-20 /TIMEOUT COUNTER
0456 3336 DCA CNT1
0457 6011 TIME. RSF /WAIT FOR CHAR
0460 7410 SKP
0461 5273 JMP READ
0462 2317 ISZ IO /INTERMEDIATE COUNTER
0463 5257 JMP TIME
0464 2336 ISZ CNT1
0465 5257 JMP TIME
0466 4317 JMS IO /TELL 8 WE'RE OUT OF TAPE
0467 0447 CCHR
0470 0000 0
0471 4000 4000
0472 5306 JMP IEND /AND GO AWAY

/
0473 6016 READ. RFC!RRB
0474 3315 DCA PCHR /SAVE IT

/
0475 4317 CHECK. JMS IO
0476 0447 CCHR
0477 4000 4000
0500 0000 0
0501 7450 SNA
0502 5312 JMP CLEAR /WE'RE DONE!!
0503 7040 CMA /CHECK FOR ERROR IN THE 8
0504 7640 SZA CLA /WHICH IS INDICATED BY A -1
0505 5275 JMP CHECK
0506 6155 IEND. CHSD
0507 5306 JMP .-1
0510 6213 CIF CDF 10
0511 5765 JMP 7600

/
0512 4317 CLEAR. JMS IO /SEND TAPE CHAR TO 8
0513 0447 CCHR
0514 0000 0
0515 0000 PCHR. 0
0516 5255 JMP LOOP

/
0517 0000 IO. 0 /CHANNEL I/O ROUTINE
0520 6155 CHSD /TIME OUT LAST CHANNEL OP
0521 5320 JMP .-1
0522 1717 TAD I IO /WORD ADDRESS
0523 2317 ISZ IO

```

0524	6145	CHSA	
0525	1717	TAD I 10	/EXTENSION
0526	2317	ISZ 10	
0527	6146	CHSE	
0530	1717	TAD I 10	
0531	2317	ISZ 10	
0532	1364	TAD (2000	/SO'S WE GET NO AMBIGUITY FOR 0
0533	6157	CHTS	
0534	5333	JMP .-1	
0535	5717	JMP I 10	/EXIT
0536	0000	CNT1.	0

0564 2000
0565 7600
0566 7760
0567 0377
0570 0451
0571 7765
0572 6201
0573 7767
0574 7766
0575 0400
0576 0706
0577 0100

PAGE

```

/
/
0600 0000 BDWAD. 0 /PUT A WORD INTO THE BUFFER
0601 3703 DCA I BDWADR
0602 2303 ISZ BDWADR
0603 2302 ISZ BDWCNT
0604 5600 JMP I BDWWD
0605 4255 JMS BDWBLK /WRITE THE BLOCK IF FULL
0606 5600 JMP I BDWWD

/
0607 0000 BDWRT. 0 /BUFFERED DISK WRITE
0610 1377 TAD (-237 /IS CHAR. <= 237?
0611 7550 SPA SNA
0612 5224 JMP BDW2 /YES, PACK AS 77&LAST 6 BITS
0613 1376 TAD (-100 /NO, CHAR. <= 337?
0614 7540 SMA SZA
0615 5224 JMP BDW2
0616 1375 TAD (40 /YES, CHAR = 277?
0617 7450 SNA
0620 5223 JMP BDW1
0621 1375 TAD (40 /NO, PACK AS TRIMMED 6 BITS
0622 5230 JMP BDW3
0623 1375 BDW1. TAD (40 /YES, GET BACK CODE
0624 3305 BDW2. DCA BDWTEM
0625 1374 TAD (77
0626 4234 JMS BDPUT
0627 1305 TAD BDWTEM
0630 1373 BDW3. TAD (137 /GET BACK LAST 6 BITS OF ASCII CODE
0631 0374 AND (77 /MASK THEM
0632 4234 JMS BDPUT /PUT THEM INTO THE BUFFER
0633 5607 JMP I BDWRT
0634 0000 BDPUT. 0 /PUT CHARACTER INTO WRITE BUFFER
0635 7000 BDPO. NOP /PACKING SWITCH
0636 7106 CLL RTL
0637 7006 RTL
0640 7006 RTL
0641 3703 DCA I BDWADR /PUT IN LEFT HALF OF PACKED WORD
0642 1372 TAD (JMP BDP2 /SET SWITCH FOR RIGHT HALF
0643 3235 BDP1. DCA BDPO
0644 5634 JMP I BDPUT
0645 1703 BDP2. TAD I BDWADR /PUT IN RIGHT HALF
0646 3703 DCA I BDWADR
0647 2303 ISZ BDWADR
0650 2302 ISZ BDWCNT /BUFFER FULL?
0651 7410 SKP
0652 4255 JMS BDWBLK /YES, WRITE IT
0653 1371 TAD (NOP
0654 5243 JMP BDP1
0655 0000 BDWB K. 0 /PUT WRITE BUFFER ON THE DISK
0656 1304 TAD BDWFIL /LOAD 171 FOR CDIO
0657 3171 DCA 171

```



```

0660 1271      TAD BDWLNK
0661 3267      DCA BDWBK
0662 4770      BDWLD. JMS ALOCAT      /ALLOCATE NEXT BLOCK RETURN
0663 3271      DCA BDWLNK      /WITH LINK TO IT IN
0664 7000      NOP
                *.-111 /GET ONTO AN ODD LOCATION
0665 4767      JMS CDIO      /WRITE BUFFER
0666 0005      BDWFNC. 5
0667 0000      BDWBK. 0
0670 1200      BDWBUF. WBUF      /WRITE FROM WBUF
0671 0000      BDWLNK. 0
0672 7402      HLT      /ERROR RETURN
0673 1270      TAD .-3
0674 3303      DCA BDWADR      /INITIALIZE WBUF POINTER
0675 1366      TAD (-200
0676 3302      DCA BDWNT      /INITIALIZE WBUF COUNTER
0677 1371      TAD (NOP      /RESET SWITCH
0700 3235      DCA BDPO
0701 5655      JMP I BDWBLK
0702 0000      BDWNT. 0
0703 0000      BDWADR. 0
0704 0000      BDWFI. 0
0705 0000      BDWTFM. 0

0706 0000      BDWNT. 0      /INITIALIZE WRITE ROUTINE
0707 3304      DCA BDWFIL
0710 1304      TAD BDWFIL
0711 3765      DCA SAMFIL
0712 1704      TAD I BDWFIL
0713 0364      AND (-2000      /DECTAPE OR SYSTEM DRIVE?
0714 7640      SZA CLA
0715 5332      JMP BDWNI1
0716 1704      TAD I BDWFIL
0717 0363      AND (-700
0720 3305      DCA BDWTEM      /GET AND STORE DECTAPE UNIT #
0721 1305      TAD BDWTEM      /PUT IT IN ALL FUNCTION WORDS
0722 1266      TAD BDWFNC
0723 3266      DCA BDWFNC
0724 1305      TAD BDWTEM
0725 1762      TAD SWFUNC
0726 3762      DCA SWFUNC
0727 1305      TAD BDWTEM
0730 1761      TAD SRFUNC
0731 3761      DCA SRFUNC
0732 4760      BDWNT. 1, JMS SAMZAP      /CLEAN UP SAM BLOCKS
0733 1357      TAD (JMS ALOCAT
0734 3262      DCA BDWLO
0735 4770      JMS ALOCAT      /ALLOCATE FIRST BLOCK
0736 3271      DCA BDWLNK
0737 1270      TAD BDWBUF      /INITIALIZE BUFFER POINTER
0740 3303      DCA BDWADR
0741 1366      TAD (-200

```

0742	3302	DCA BDWCNT	/INITIALIZE COUNTER
0743	1371	TAD C NOP	
0744	3235	DCA BDPO	/INITIALIZE POINTER
0745	5706	JMP I BDWNIT	
0746	0000	BDWEND, 0	/CLOSE UP FILE
0747	1371	TAD C NOP	/SET TO WRITE LINK 0 0
0750	3262	DCA BDWLO	
0751	4255	JMS BDWBLK	/WRITE LAST PARTIAL FFER
0752	4756	JMS GETSAM	/WRITE OUT MODIFIED M BLOCK
0753	5746	JMP I BDWEND	

0756	1077
0757	4770
0760	1021
0761	1120
0762	1106
0763	0700
0764	2000
0765	1136
0766	7600
0767	2003
0770	1000
0771	7000
0772	5245
0773	0137
0774	0077
0775	0040
0776	7700
0777	7541

0756	1077
0757	4770
0760	1021
0761	1120
0762	1106
0763	0700
0764	2000
0765	1136
0766	7600
0767	2003
0770	1000
0771	7000
0772	5244
0773	0137
0774	0077
0775	0040
0776	7700
0777	7541

PAGE

/ROUTINES TO CLEAR OUT THE OLD SAM ENTRIES FOR A FILE. ALLOCATE
/NEW BLOCKS TO AN OUTPUT FILE AS THEY ARE NEEDED, AND RETURN
/WITH THE BLOCK NUMBER IN THE AC.

1000	0000	ALOCAT, 0	
1001	7200	GET1, CLA	
1002	2332	ISZ SAMPNT	/BUMP POINTER
1003	2333	ISZ SAMCNT	/THRU WITH THIS HALF OF SAM BLOCK
1004	7410	SKP	
1005	4250	JMS PASDUN	/YES
1006	2334	ISZ BLKCNT	/BUMP BLOCK #
1007	7000	NOP	
1010	1732	TAD I SAMPNT	/GET ENTRY
1011	0335	AND SAMMSK	
1012	7640	SZA CLA /IS BLOCK UNUSED?	
1013	5201	JMP GET1	/NO, TRY NEXT ONE
1014	1337	TAD SAMNUM	
1015	1732	TAD I SAMPNT	
1016	3732	DCA I SAMPNT	/MAKE SAM ENTRY
1017	1334	TAD BLKCNT	
1020	5600	JMP I ALOCAT	
1021	0000	SAMZAP, 0	/CLEAN SAM BLKS OF THE OLD ENTRIES
1022	4340	JMS SAMNIT	
1023	1377	TAD (JMP ZAPFIN	
1024	3315	DCA RSAM1	
1025	2332	ZAP1, ISZ SAMPNT	/BUMP POINTER
1026	2333	ISZ SAMCNT	/THRU WITH THIS HALF OF SAM BLK?
1027	7410	SKP	
1030	4250	JMS PASDUN	/YES
1031	1732	TAD I SAMPNT	/NO, GET ENTRY
1032	0335	AND SAMMSK	
1033	7041	CIA	
1034	1337	TAD SAMNUM	/ENTRY SAME AS SAM #
1035	7640	SZA CLA	
1036	5225	JMP ZAP1	/NO, GET NEXT ENTRY
1037	1335	TAD SAMMSK	/YES, INVERT MASK
1040	7040	CMA	
1041	0732	AND I SAMPNT	/ZERO PROPER HALF OF WORD
1042	3732	DCA I SAMPNT	
1043	5225	JMP ZAP1	/GET NEXT ENTRY
1044	4340	ZAPFIN, JMS SAMNIT	/REINITIALIZE SAM ROUTINES
1045	1375	TAD (JMP 7600	
1046	3315	DCA RSAM1	
1047	5621	JMP I SAMZAP	
1050	0000	PASFIN, 0	
1051	1335	TAD SAMMSK	
1052	0374	AND (7700	/ARE WE ON LEFT HALF WORD?
1053	7650	SNA CLA	
1054	5661	JMP PAS1	
1055	4277	JMS GETSAM	/YES, WRITE OUT MODIFIED SAM BLK, GET NEXT ON
1056	1337	TAD SAMNUM	/SWITCH SAM # TO RIGHT HALF WORD

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1057 7104      CLL RAL
1060 5263      JMP PAS2
1061 1337 PAS1. TAD SAMNUM      /SWITCH SAM # TO LEFT HALF
1062 7100      CLL
1063 7006 PAS2. RTL
1064 7006      RTL
1065 7006      RTL
1066 3337      DCA SAMNUM
1067 1335      TAD SAMMSK      /SWITCH MASK OVER
1070 7040      CMA
1071 3335      DCA SAMMSK
1072 1376      TAD (-200
1073 3333      DCA SAMCNT      /INITIALIZE SAMBUFF COUNTER
1074 1373      TAD (SAMBUE
1075 3332      DCA SAMPNT      /INITIALIZE SAMBUFF COUNTER
1076 5650      JMP I PASDUN
1077 0000 GETSAM. 0      /WRITE MODIFIED SAM BLK, GET NEXT ONE
1100 1336      TAD SAMFIL      /LOAD 171 FOR CDIO
1101 3171      DCA 171
1102 1307      TAD SWBLK      /IS THERE A BLOCK TO WRITE?
1103 7450      SNA
1104 5313      JMP RSAM      /NO, FIRST (OR LAST) TIME THRU
1105 7000      NOP
          *.-111 /GET ONTO AN ODD LOCATION
1106 4772      JMS CDIO
1106 0005 SWFUNC. 5
1107 0000 SWBLK. 0
1110 1400      SAMBUF
1111 0000 SWLNK. 0
1112 7402      HLT
1113 1323 RSAM. TAD SRLNK      /END OF SAM CHAIN?
1114 7450      SNA
1115 5776 RSAM. JMP 7600      /YES, EXIT
1116 3321      DCA SRBLK      /NO, STORE NEXT SAM BLOCK #
1117 7000      NOP
          *.-111
1117 4772      JMS CDIO
1120 0003 SRFUNC. 3
1121 0000 SRBLK. 0
1122 1400      SAMBUF
1123 0200 SRLNK. 200      /INITIALIZE FOR 1ST SAM BLOCK
1124 7402      HLT
1125 1321      TAD SRBLK      /SET BLOCK, LINK FOR NEXT TIME
1126 3307      DCA SWBLK
1127 1323      TAD SRLNK
1130 3311      DCA SWLNK
1131 5677      JMP I GETSAM
1132 0000 SAMPNT. 0
1133 0000 SAMCNT. 0
1134 0000 BLKCNT. 0
1135 0000 SAMMSK. 0
1136 0000 SAMFIL. 0

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1137 0000 SAMNUM, 0
1140 0000 SAMNIT, 0 /INITIALIZE SAM ROUTINES
1141 1374 TAD (7700 /SET SAM CNTR & MASK
1142 3335 DCA SAMMSK
1143 7240 STA
1144 3333 DCA SAMCNT
1145 7240 STA
1146 3334 DCA BLKCNT /SET BLKN TO 0
1147 1371 TAD (200
1150 3323 DCA SRLNK
1151 3307 DCA SWBLK
1152 1736 TAD I SAMFIL /GET SAM NUMBER
1153 7006 RTL
1154 7006 RTL
1155 7006 RTL
1156 0374 AND (7700 /STORE ON LEFT HALF WORD
1157 3337 DCA SAMNUM
1160 5740 JMP I SAMNIT

1171 0200
1172 2003
1173 1400
1174 7700
1175 5776
1176 7600
1177 5244

PAPER TAPE INPUT FROM PDP-8/I

INPUTS ASCII AND BINARY PAPER TAPES FROM THE PDP-8/I
HIGH SPEED READER ONTO THE PDP-8 DISK.

OPTIONS:

- A- PAPER TAPE IS ASCII
- B- PAPER TAPE IS BINARY

FIRST, "OUT-" WILL BE TYPED, REPLY WITH THE NAME OF THE
FILE INTO WHICH THE PAPER TAPE IS TO BE STORED.
WHEN "IN-" IS TYPED, IGNORE BY TYPING CARRIAGE RETURN
IF AN ERROR OCCURS, A "?" WILL BE TYPED. BOTH MACHINES
WILL BE RETURNED TO THEIR MONITORS.

LIST OF REFERENCES

- [1] Disk Monitor System-Programmer's Reference Manual, Digital Equipment Corporation DEC-D8-SDAB-D,
- [2] Levin, H. and Lopeman, H. PDP-8/I to PDP-8 Interface, Department of Computer Science File No. 843, University of Illinois, Urbana-Champaign, Illinois 61801, June 1970.
- [3] Michel, M. GRASS: System Overview, Department of Computer Science Report No. 465, University of Illinois, Urbana-Champaign, Illinois 61801, July 1971.