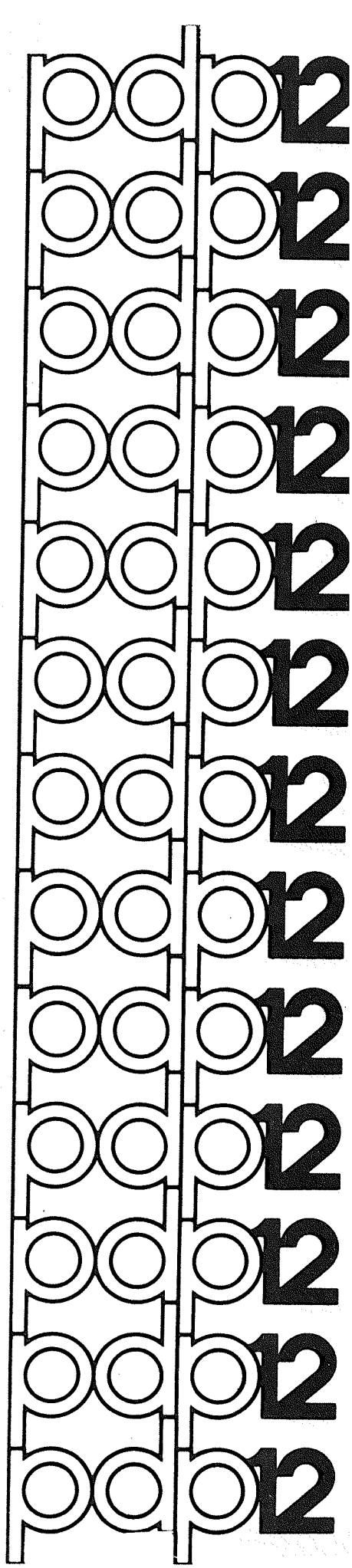
digital

PRTC12-F



DEC-12-YIYA-D

April, 1970

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1.0 PROGRAM DESCRIPTION

The PRTC12-F program operates the TC12-F tape option which is prewired in the PDP-12 computer and allows the user to read and write in the forward direction DECtapes that have been formatted on the PDP-8, PDP-9, PDP-10, or PDP-15 computers. The tape used on the PDP-12 is in LINC format and differs from other DECtapes in the following ways:

a. Tape direction over the tape head is reversed.

b. The polarity of the tape heads is reversed.

c. Channels one and three are reversed.

d. Data transfer has a different bit configuration. The following table is a 12-bit comparison of the two systems.

LINCtape Format	0	1	2	3	4	5	6	7	8	9	10	11
DECtape Format	2	5	8	11	1	4	7	10	0	3	6	9

e. The "mark track" on LINCtape is 4-bit oriented and on DECtape is 8-bit oriented. The TC12-F hardware has a special window register, but only the "block mark" (BM) is decoded. Data flags, bit shuffling, and the computation and verification of the checksum are all done with software.

The PRTC12-F program is written in LAP6-DIAL[1] language and is filed on the DIAL tape with the name PRTC12-F.

2.0 STARTING PROCEDURE

PRTC12-F is started by the following procedure.

a. Start the DIAL system (as described in the LAP6-DIAL Manual, DEC-12-SE2B-D). (Be sure to wind sufficient tape on the takeup reels so that they are positioned at least three blocks beyond the end zone.)

b. Call the PRTC12-F program by the command

LO PRTC12-F,n

where n is the tape unit number from which the program will be loaded. Units 0-7 can be used.

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[1] LAP6-DIAL is hereafter referred to as DIAL.

PRTC12-F occupies locations 3500 through 7712 and is nondestructive. The program restarts automatically after completing an operation and may be restarted manually at any time at its starting address (4020).

3.0 USING PRTC12-F

After it is loaded, the program displays an introduction followed by three sets of questions for the user to define the operation.

3.1 The first display is an introduction to the program as follows:

```
LINCTAPE/DECTAPE CONVERSION PROGRAM
THIS PROGRAM WILL RUN SUCCESSFULLY
ONLY ON A PDP-12 COMPUTER EQUIPPED WITH THE
TC12-F OPTION.  IT WILL READ AND WRITE
FROM TAPE UNITS 0-7 IN ANY TAPE
FORMAT;  YOU MUST SPECIFY THE CORRECT FORMAT.
TYPE LINE FEED TO CONTINUE.
```

Press the line feed or return key to display the second message.

3.2 The READ questionnaire is displayed next.

```
READ _____ BLOCKS
TAPE FORMAT_____UNIT_____
STARTING WITH BLOCK_____
FORMAT A -- PDP-8 201 WORDS/BLOCK
FORMAT B -- PDP-12 400 WORDS/BLOCK
FORMAT C -- OTHER (PDP-9, 10, 15, WITH 600 12-BIT
   WORDS/BLOCK)
```

Type in each value followed by a carriage return and then press line feed to advance to the next display.

3.3 The WRITE questionnaire must be answered.

```
WRITE THE RESULT
IN TAPE FORMAT_____ON UNIT_____
STARTING AT BLOCK_____
FORMAT A -- PDP-8 201 WORDS/BLOCK
FORMAT B -- PDP-12 400 WORDS/BLOCK
FORMAT C -- OTHER (PDP-9, 10, 15, WITH 600 12-BIT
   WORDS/BLOCK)
```

Again, type the correct values, each followed by a carriage return. Press line feed when completed to display the last message.

3.4 Respond to the PARITY questionnaire:

```
CHECK PARITY-
0 SPECIFIES NO
1 SPECIFIES YES
```

Type 0 or 1 and press line feed. The requested operation is performed. (Be sure sufficient tape has been wound on the take-up reels before pressing line feed.)

4.0 PROGRAM OPERATION

4.1 Transfers

There are nine possible combinations of data transfer referred to as MODOP 1 through 9, as defined in the TAPE FORMATS table below. The block packing column in the table describes all of the possible transfer configurations.

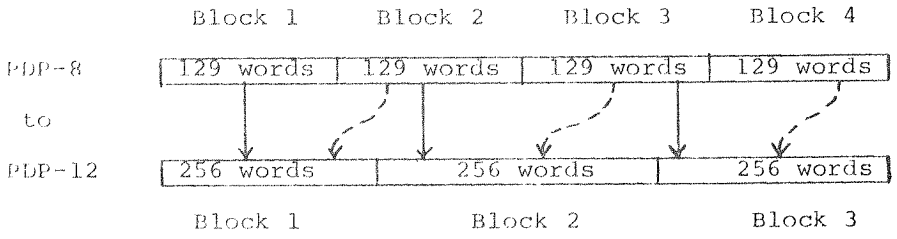
Table 1

TAPE FORMATS

MODOP	Transfer Direction	Number of 12 Bit Words/Block (Octal)		Block Packing Arrangement		Maximum Number of Octal Blocks Read
		READ	WRITE	READ	WRITE	
1	8 to 8	201	201	1	1	2,000
2	8 to 12	201	201	1	1	1,000
3	8 to N	200	600	3	1	2,000
4	12 to 8	400	200	1	2	1,000
5	12 to 12	400	400	1	1	1,000
6	12 to N	400	600	3	2	1,000
7	N to 8	600	200	1	3	750
8	N to 12	600	400	2	3	520
9	N to N	600	600	1	1	2,000

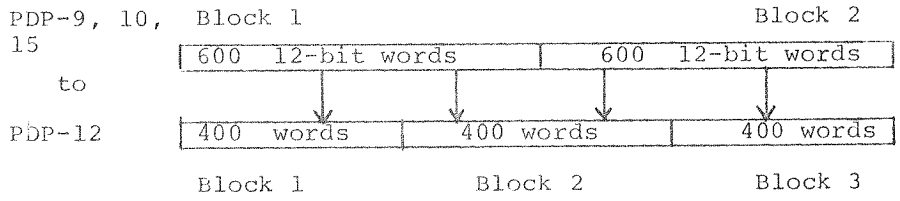
N = PDP-9, PDP-10, PDP-15.

A PDP-8 to PDP-12 transfer is a block to block transfer; a 129 word block of PDP-8 DECtape is written on a block of PDP-12 LINCtape. The PDP-12 LINCtape can have a 256 word block format or a 129 word block format. With the 256 word format, a block of PDP-8 DECtape is written in the first 129 locations of the LINCtape and the first 127 words of the next DECtape block are written on the same LINCtape block. This second DECtape block is written in its entirety again in the first 129 locations of the second LINCtape block to make a block to block transfer, as diagrammed.



For a PDP-12 to PDP-8 transfer, one 256 word LINCtape block is written on two PDP-8 128 word blocks. 7777 is written for the 129th (link) word in this case.

With PDP-9, 10, and 15 to PDP-12 transfers, data does not overlap, as illustrated.



Note that transferring an odd number of PDP-9, 10, and 15 blocks will use an extra half PDP-12 block. Similarly, PDP-12 and PDP-8 to PDP-9, 10, and 15 transfers may not completely fill the last block with information.

4.2 READ

When the desired block is found, the line counter is initialized. The control words that precede the data on tape are skipped. When a word from tape has been assembled in the tape AC register, the word flag is raised. The program checks the flag with the SWD instruction and the PC is incremented when it is set. Then the data is read into the AC with the TAC

instruction, parity is computed and the data is shuffled and stored in memory. When the WCOUNT is incremented to 7777, it signifies that the complete block of data has been read and that the parity word is now in the AC. This is computed in the parity register (LPB) and, if the transfer was executed correctly, the resulting checksum (CS) should be 7777. If the operator had requested a parity check and the CS was incorrect, the block will be read again until a correct CS is obtained or until the operator intervenes. For PDP-12 transfers, the data is checked after it has been read or written. If an error is detected, the program will halt at location 6766.

4.3 WRITE

The transport is set in motion and a check is made to assure that its status is OK. If it is not OK, i.e., more than one unit is selected or the WRITE LOCK switch is on, a wait loop is entered until the necessary corrections are made. When the desired block is found and the transport is going forward, the program is transferred to the write routine, DOUTIT. Two control words are skipped and then the writers are turned on with IOT 6152 and the appropriate AC bits. The reverse checksum is written as 7777 after the third control word. Then data is read from memory, the parity word is generated, and the data is shuffled and transferred from the AC to the Tape Buffer Register with IOT 6154. When the WCOUNT reaches 7777, the parity word is shuffled and written on tape.

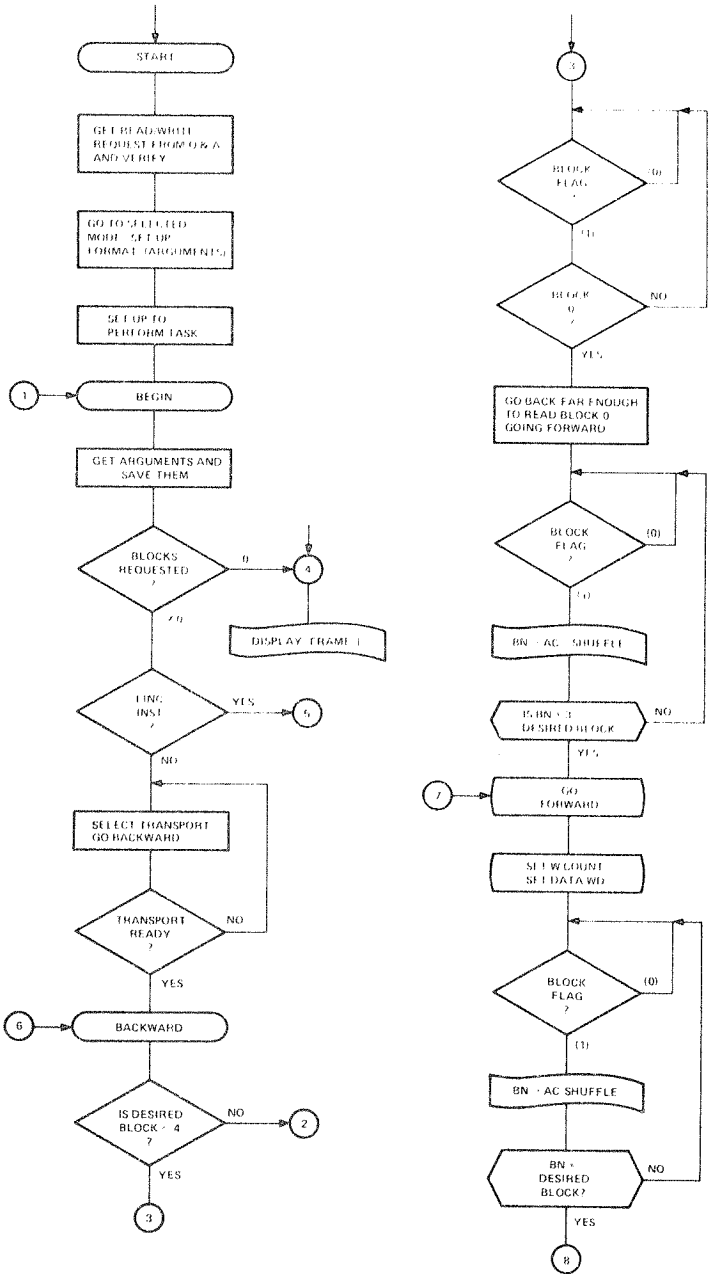
4.4 Restrictions

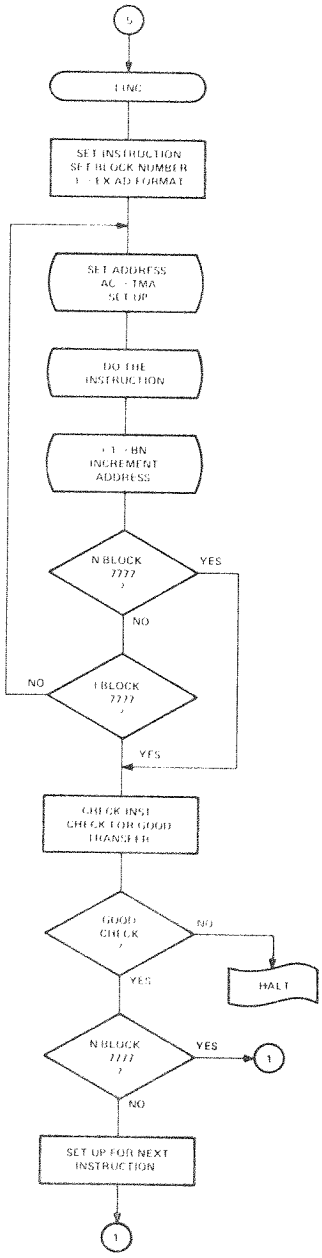
The PRTC12-F program has the following restrictions:

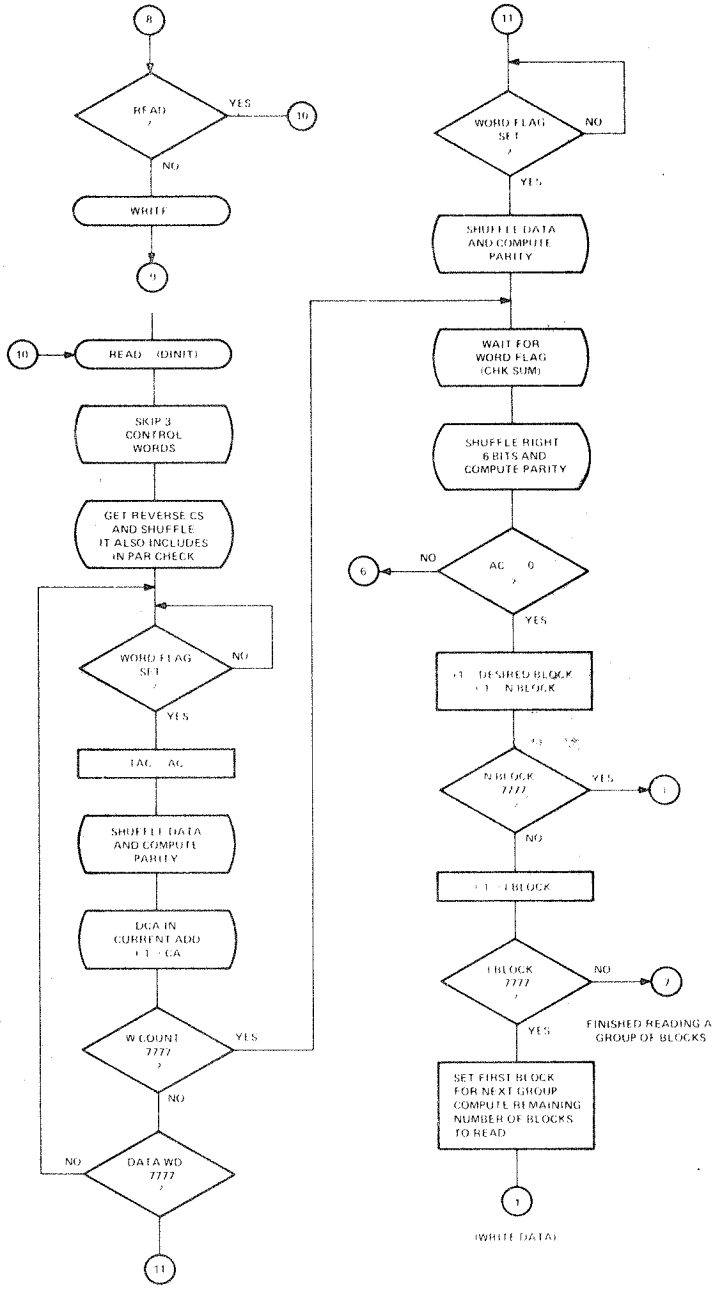
a. Data is read and written only in the "forward" direction.

b. Except for LINCtape transfers, data is not checked after being written on tape.

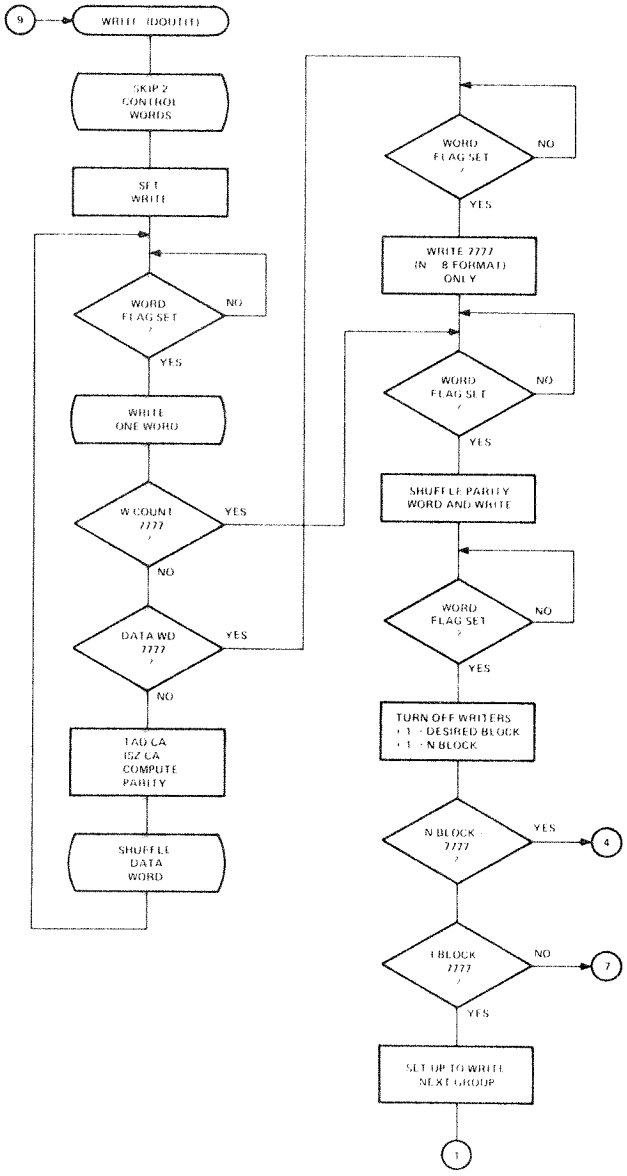
c. The maximum number of blocks in one transfer is 2000_8 blocks.


START
GET READ/WRITE REQUEST FROM O & A AND VERIFY
GO TO SELECTED MODE - SET UP FORMAT (ARGUMENTS)
SET UP TO PERFORM TASK
1
BEGIN
GET ARGUMENTS AND SAVE THEM
BLOCKS REQUESTED ?
0
4
DISPLAY FRAME 1
≠ 0
LINC INST ?
YES
5
NO
SELECT TRANSPORT GO BACKWARD
TRANSPORT READY ?
NO
YES
6
BACKWARD
IS DESIRED BLOCK = 4 ?
NO
2
YES
3
3
BLOCK FLAG ?
(0)
(1)
BLOCK 0 ?
NO
YES
GO BACK FAR ENOUGH TO READ BLOCK 0 GOING FORWARD
BLOCK FLAG ?
(0)
(1)
BN → AC SHUFFLE
IS BN = DESIRED BLOCK
NO
YES
7
GO FORWARD
SET W COUNT SET DATA WD
BLOCK FLAG ?
(0)
(1)
BN → AC SHUFFLE
BN = DESIRED BLOCK?
NO
YES
8


0
LINC
SET INSTRUCTION
SET BLOCK NUMBER
1 = EX AD FORMAT
SET ADDRESS
AC = TMA
SET UP
DO THE
INSTRUCTION
AC = BN
INCREMENT
ADDRESS
N BLOCK
7777
?
YES
NO
I BLOCK
7777
?
NO
YES
CHECK INST
CHECK FOR GOOD
TRANSFER
GOOD
CHECK
?
NO
HALT
YES
N BLOCK
7777
?
YES
1
NO
SET UP FOR NEXT
INSTRUCTION
1


8
READ
YES
10
NO
WRITE
9
10
READ (DINIT)
SKIP 3 CONTROL WORDS
GET REVERSE CS AND SHUFFLE IT ALSO INCLUDES IN PAR CHECK
WORD FLAG SET
NO
YES
AC AC
SHUFFLE DATA AND COMPUTE PARITY
DCA IN CURRENT ADD + 1 → CA
W COUNT 7777
YES
NO
DATA WD 7777
NO
11
11
WORD FLAG SET
NO
YES
SHUFFLE DATA AND COMPUTE PARITY
WAIT FOR WORD FLAG (CHK SUM)
SHUFFLE RIGHT 6 BITS AND COMPUTE PARITY
6
NO
AC 0
YES
+1 → DESIRED BLOCK
+1 → N BLOCK
N BLOCK 7777
YES
NO
+1 → I BLOCK
I BLOCK 7777
NO
YES
FINISHED READING A GROUP OF BLOCKS
SET FIRST BLOCK FOR NEXT GROUP COMPUTE REMAINING NUMBER OF BLOCKS TO READ
1
(WRITE DATA)

WRITE


9
WRITE (DOUBLE)
SKIP 2 CONTROL WORDS
SET WRITE
WORD FLAG SET
NO
YES
WRITE ONE WORD
W COUNT 7777
YES
NO
DATA WD 7777
YES
NO
TAD CA
ISZ CA
COMPUTE PARITY
SHUFFLE DATA WORD
WORD FLAG SET
NO
YES
WRITE 7777 (N - 8 FORMAT) ONLY
WORD FLAG SET
NO
YES
SHUFFLE PARITY WORD AND WRITE
WORD FLAG SET
NO
YES
TURN OFF WRITERS
+1 - DESIRED BLOCK
+1 - N BLOCK
N BLOCK - 7777
YES
4
I BLOCK 7777
NO
7
YES
SET UP TO WRITE NEXT GROUP
1

```
0000                    *20
0001                    /
0002                    /Q AND A HANDLER FOR TC12-F
0003                    /TAPE CONVERTER PROGRAM
0004                    /
0005                    /
0006                    *15
0007                    /
0010                    /
0011    0015  0000  DIVCNT, 0
0012    0016  0000          0
0013    0017  0000          0
0014    0020  0641          LDF 1
0015    0021  7113          JMP QAINIT
0016    0022  3500          TXTINTRO&3777   /10 BIT ADDRESS PLUS DATA FIELD BIT;
0017    0023  3777          3777            /JUST A SAFE ADDRESS;
0020    0024  7166          JMP QARFSH
0021                                        /LINE-FEED DURING INTRO
0022                                        /RETURNS PROGRAM TO HERE
0023                    /
0024                    /
0025                    /
0026                    /
0027    0025  0643          LDF 3
0030    0026  7113  QAREAD, JMP QAINIT
0031    0027  3274          TXTRDE&3777     /10 BIT ADDRESS PLUS DATA FIELD BIT;
0032    0030  3674          ANSWR1&3777
0033    0031  7166          JMP QARFSH
0034                    /
0035                    /
0036                    /
0037                    /
0040                    /
0041                    /
0042                    /
0043    0032  0077  UNREAD, SET I 17        /ROUTINE TO GET NUMBER
0044    0033  3674          ANSWR1&3777     /OF BLOCKS TO BE TRANSFERRED
0045    0034  0076          SET I 16
0046    0035  7773  M4,      -4             /4 NUM ANS
0047    0036  0075          SET I 15
0050    0037  0110          NUMBRS-1        /ANS ADD -1
0051    0040  0073          SET I 13
0052    0041  6026          JMP QAREAD      /RETURN JMP
0053    0042  6222          JMP GET         /GET ANSWER;
0054    0043  0470          AZE I           /IS RDENUM=0?
0055    0044  6026          JMP QAREAD      /YES;
0056    0045  0451          APO             /NOT ZERO;NEGATIVE?
0057    0046  6026          JMP QAREAD      /YES; TRY AGAIN
0060    0047  1134          ADA I 14        /ADD -2000
0061    0050  0471          APO I           /TOO MANY?
0062    0051  6026          JMP QAREAD      /YES TRY AGAIN
0063    0052  1134          ADA I 14        /ADD +2000
0064    0053  4626          STC RDENUM      /NUM OF BLOCKS
0065                    /
0066                    /
0067    0054  0077          SET I 17        /ROUTINE TO GET TAPE UNIT NO.
0070    0055  7677          ANSWR1&3777+4003
0071    0056  0076          SET I 16
0072    0057  7776          -1              /1 NUM ANS
0073    0060  0075          SET I 15
0074    0061  0110          NUMBRS-1        /ANS ADD -1
```

```
0077                    /
0100                    /
0101    0064    0077            SET I 17        /ROUTINE TO GET STARTING BLOCK
0102    0065    7700            ANSWR1&3777+4004
0103    0066    0076            SET I 16
0104    0067    7773            -4              /4 WORD ANS
0105    0070    0075            SET I 15
0106    0071    0110            NUMBRS-1        /ANS ADD-1
0107    0072    6222            JMP GET         /GET ANS
0110    0073    4625            STC RDEBN       /BLOCK NUM
0111                    /
0112                    /
0113    0074    0077            SET I 17        /GET READ FORMAT
0114    0075    7676            3777&ANSWR1+4002
0115    0076    0076            SET I 16
0116    0077    7776            -1              /1 NUM ANS
0117    0100    0075            SET I 15
0120    0101    0116            CHARS-1         /ANS ADD-1
0121    0102    6222            JMP GET         /GET ANS
0122    0103    1260            MUL I           /CONVERT TO MODOP ADDRESS
0123    0104    0003            3
0124    0105    1120            ADA I           /CHANGE RANGE
0125    0106    7774    M3,     -3              /FROM 3,6,9 TO
0126    0107    4161            STC MODOP       /0,3,6
0127    0110    6123            JMP QAWRIT      /GET NEXT FRAME
0130                    /
0131                    /
0132    0111    7720    NUMBRS, -57             /NUMBER  LIMITS
0133    0112    0057            +57
0134    0113    7710            -67
0135    0114    0067            +67
0136    0115    5777            -2000
0137    0116    2000            +2000
0140    0117    0000    CHARS,  0               /CHAR LIMITS
0141    0120    0000            0
0142    0121    7774            -3
0143    0122    0003            +3
0144                    /
0145                    /
0146    0123    7113    QAWRIT, JMP QAINIT      /WRITE FRAME
0147    0124    3474            TXTWRI&3777     /10 BIT ADDRESS PLUS DATA FIELD BIT
0150    0125    3704            ANSWR2&3777
0151    0126    7166            JMP QARFSH
0152                    /
0153                    /
0154    0127    0077    UNWRIT, SET I 17        /GET UNIT TO WRITE ON;
0155    0130    3705            ANSWR2&3777+1
0156    0131    0076            SET I 16        /1 NUM ANS
0157    0132    7776            -1
0160    0133    0075            SET I 15
0161    0134    0110            NUMBRS-1
0162    0135    0073            SET I 13
0163    0136    6123            JMP QAWRIT      /RETURN ADD
0164    0137    6222            JMP GET         /GET ANS
0165    0140    4630            STC WRIFU       /UNIT
0166                    /
0167                    /
0170    0141    0077            SET I 17        /GET STARTING BLOCK FOR WRITE;
0171    0142    3706            ANSWR2&3777+2
0172     143    0076            SET I 16
0173     144    7773            -4              /4 NUM ANS
0174    0145    0075            SET I 15
```

```
0175    0146  0110          NUMBRS-1          /ADDRESS-1
0176    0147  6222          JMP GET           /GET ANS
0177    0150  4633          STC WRIBN         /BLOCK
0200                  /
0201                  /
0202    0151  0077          SET I 17
0203    0152  3704          ANSWR2&3777       /ANS ADD
0204    0153  0076          SET I 16
0205    0154  7776          -1                /1 NUM ANS
0206    0155  0075          SET I 15
0207    0156  0116          CHARS-1           /CHECK ADD
0210    0157  6222          JMP GET           /GET ANS
0211    0160  1160          ADM I
0212    0161  0000  MODOP,   0                 /FORMAT
0213    0162  1120          ADA I             /GENERATE JMP STA
0214    0163  6210          JMP 0+SETUP
0215    0164  4210          STC SETUP
0216    0165  0011          CLR               /CLEAR THE LINK BIT
0217    0166  0643          LDF 3
0220    0167  7113  QPAR,    JMP QAINIT        /PARITY FRAME
0221    0170  3220          TXTPAR&3777
0222    0171  3711          ANSWR3&3777
0223    0172  7166          JMP QARFSH
0224    0173  1000  UNPAR,   LDA               /CHECK PAR ANSWER
0225    0174  3711          ANSWR3&3777
0226    0175  0301          ROR 1
0227    0176  0451          APO               /NO CHECK
0230    0177  6203          JMP .+4           /YES
0231    0200  1020          LDA I
0232    0201  0016          NOP               /REPLACE JMPRDEAGN WITH NOP
0233    0202  6205          JMP .+3
0234    0203  1020          LDA I
0235    0204  6460          JMP RDEAGN
0236    0205  1040          STA
0237    0206  2430          PARERR!2000
0240    0207  0011          CLR
0241                  /
0242                  /
0243                  /
0244    0210  6000  SETUP,    JMP               /MODES OF OPERATION
0245    0211  6260          JMP MODOP1
0246    0212  6304          JMP MODOP2
0247    0213  6331          JMP MODOP3
0250    0214  6365          JMP MODOP4
0251    0215  6417          JMP MODOP5
0252    0216  6441          JMP MODOP6
0253    0217  6510          JMP MODOP7
0254    0220  6540          JMP MODOP8
0255    0221  6575          JMP MODOP9
0256                  /
0257                  /
0260                  /
0261                  /
0262    0222  0041  GET,     SET 1             /SAVE RETURN JMP
0263    0223  0000          0
0264    0224  0011          CLR
0265    0225  4256          STC HOLD
0266    0226  1337  NEXT,    LDH I 17          /THIS ROUTINE GETS THE ANSWERS
0267    0227  1460          SAE I
0270    0230  0000          00
0271    0231  0467          SKP
```

```
0275    0235  1134          ADA I 14          /SUBTRACT LOWER LIMIT
0276    0236  0451          APO               /
0277    0237  6013          JMP 13
0300    0240  1134          ADA I 14          /ADD LOWER LIMIT BACK
0301    0241  1134          ADA I 14          /SUBTRACT UPPER LIMIT
0302    0242  0471          APO I             /
0303    0243  6013          JMP 13
0304    0244  1134          ADA I 14          /ADD UPPER LIMIT BACK
0305    0245  1560          BCL I             /JUST TO BE SURE
0306    0246  7770          7770
0307    0247  0303          ROR 3
0310    0250  2256          ADD HOLD
0311    0251  0243          ROL 3
0312    0252  4256          STC HOLD
0313    0253  0236          XSK I 16
0314    0254  6226          JMP NEXT
0315    0255  1020          LDA I
0316    0256  0000  HOLD,    0
0317    0257  6001          JMP 1
0320                  /
0321                  /
0322                  /
0323                  /
0324    0260  2654  MODOP1,   ADD P8FMT1        /PDP-8 TO PDP-8
0325    0261  4624           STC RDELNG
0326    0262  2655           ADD P8FMT2        /129 WORD TRANSFER
0327    0263  4632           STC WRILNG
0330    0264  2626           ADD RDENUM        /NUM OF BLOCKS TO READ
0331    0265  4634           STC WRINUM        /AND WRITE
0332    0266  2313           ADD M16           /DO 16 AT A TIME
0333    0267  1040           STA
0334    0270  2066           RDLTAN!2000
0335    0271  1040           STA
0336    0272  2037           WDLTAN!2000
0337    0273  1020           LDA I             /TOTAL WORDS PER BLOCK
0340    0274  7576           -201
0341    0275  1040           STA
0342    0276  2070           RDEKEY!2000
0343    0277  1020           LDA I
0344    0300  7575           -202
0345    0301  1040           STA
0346    0302  2041           WRIKEY!2000
0347    0303  6620           JMP GO            /DO THE JOB !
0350                  /
0351                  /
0352                  /
0353                  /
0354    0304  2654  MODOP2,   ADD P8FMT1        /PDP-8 TO PDP-12
0355    0305  1040           STA               /WRITE 129 WORDS
0356    0306  2747           ADDINC!2000       /IN A 400 WORD BLOCK
0357    0307  4624           STC RDELNG        /READ 129 WORDS
0360    0310  2626           ADD RDENUM
0361    0311  4634           STC WRINUM        /1:1 BLOCK TRANSFER
0362    0312  1220           LDA I
0363    0313  7761  M16,      -16
0364    0314  1040           STA
0365    0315  2066           RDLTAN!2000
0366    0316  1040           STA
0367    0317  2037           WDLTAN!2000
0370    0320  1020           LDA I
0371    0321  7576           -201
0372    0322  1040           STA
```

```
0373    0323  2070          RDEKEY!2000
0374    0324  0011          CLR
0375    0325  0017          COM
0376    0326  1040          STA
0377    0327  2041          WRIKEY!2000
0400    0330  6620          JMP GO
0421                  /
0422                  /
0423                  /
0424                  /
0425    0331  2653  MODOP3,  ADD P8FMT0       /PDP-8 TO PDP-N
0426    0332  4624          STC RDELNG
0427    0333  2657          ADD P10FM1
0430    0334  4632          STC WRILNG
0431    0335  1020          LDA I
0432    0336  7774          -3
0433    0337  4667          STC DIVISR
0434    0340  6660          JMP DIVIDE
0435    0341  0011          CLR
0436    0342  2015          ADD DIVCNT
0437    0343  4634          STC WRINUM
0440    0344  1020          LDA I
0441    0345  7763  M14,     -14
0442    0346  1040          STA
0443    0347  2066          RDLTAN!2000
0444    0350  1020          LDA I
0445    0351  7773          -4
0446    0352  1040          STA
0447    0353  2037          WDLTAN!2000
0450    0354  1020          LDA I
0451    0355  7576          -201
0452    0356  1040          STA
0453    0357  2070          RDEKEY!2000
0454    0360  1020          LDA I
0455    0361  7176  M601,    -601
0456    0362  1040          STA
0457    0363  2041          WRIKEY!2000
0460    0364  6620          JMP GO
0441                  /
0442                  /
0443                  /
0444                  /
0445    0365  2654  MODOP4,  ADD P8FMT1       /PDP-12 TO PDP-8
0446    0366  4632          STC WRILNG       /READ 400 WORDS
0447    0367  2626          ADD RDENUM       /WRITE 200 WORDS
0450    0370  0241          ROL 1            /1:2 BLOCK TRANSFER
0451    0371  4634          STC WRINUM
0452    0372  1020          LDA I
0453    0373  0400  K400,    400
0454    0374  1040          STA
0455    0375  2747          ADDINC!2000
0456    0376  1020          LDA I
0457    0377  7770  M7,      -7
0460    0400  1040          STA
0461    0401  2066          RDLTAN!2000
0462    0402  1020          LDA I
0463    0403  7761          -16
0464    0404  1040          STA
0465    0405  2037          WDLTAN!2000
0466    0406  0011          CLR
0467    0407  0017          COM
```

```
0473    0413  7575          -202
0474    0414  1040          STA
0475    0415  2041          WRIKEY!2000
0476    0416  6620          JMP GO
0477                  /
0500                  /
0501                  /
0502                  /
0503    0417  2626  MODOP5,  ADD RDENUM       /PDP-12 TO PDP-12
0504    0420  4634          STC WRINUM
0505    0421  2377          ADD M7
0506    0422  1040          STA
0507    0423  2066          RDLTAN!2000
0510    0424  1040          STA
0511    0425  2037          WDLTAN!2000
0512    0426  0011          CLR
0513    0427  2373          ADD K400
0514    0430  1040          STA
0515    0431  2747          ADDINC!2000
0516    0432  0011          CLR
0517    0433  0017          COM
0520    0434  1040          STA
0521    0435  2070          RDEKEY!2000
0522    0436  1040          STA
0523    0437  2041          WRIKEY!2000
0524    0440  6620          JMP GO
0525                  /
0526                  /
0527                  /
0530                  /
0531    0441  2657  MODOP6,  ADD P10FM1    /PDP12 TO PDP-N
0532    0442  4632          STC WRILNG
0533    0443  2106          ADD M3
0534    0444  4667          STC DIVISR
0535    0445  6660          JMP DIVIDE
0536    0446  1120          ADA I               /ACC =-2 INDICATES REMAINDER WAS 1; I.E., RDENUM =1,4,7, ETC.;
0537    0447  0001  K1,     1
0540    0450  1460          SAE I               /ADDING 1 WOULD MAKE ACC=7776=-1;
0541    0451  7776          7776
0542    0452  6455          JMP .+3             /NO;ACC NOT = -1
0543    0453  4462          STC EXTRA           /YES; NOW PUT IN EXTRA TO SUBTRACT 1
0544    0454  6457          JMP MULT2           /AFTER MULTIPLYING DIVCNT BY 2;
0545    0455  0011          CLR                 /ACC NOT = -1;
0546    0456  4462          STC EXTRA           /CLEAR EXTRA;
0547    0457  2015  MULT2,   ADD DIVCNT         /GET RESULTS OF DIVISION;
0550    0460  0241          ROL 1               /MULTIPLY BY 2;
0551    0461  1120          ADA I
0552    0462  0000  EXTRA,   0                  /ADD EXTRA;
0553    0463  4634          STC WRINUM
0554    0464  2373          ADD K400
0555    0465  1040          STA
0556    0466  2747          ADDINC!2000
0557    0467  1020          LDA I
0560    0470  7771  M6,      -6
0561    0471  1042          STA
0562    0472  2066          RDLTAN!2000
0563    0473  1020          LDA I
0564    0474  7773          -4
0565    0475  1040          STA
0566    0476  2037          WDLTAN!2000
0567    0477  0011          CLR
0570    0500  0017          COM
```

```
0571    0501  1040          STA
0572    0502  2070          RDEKEY!2000
0573    0503  1020          LDA I
0574    0504  7176          -601
0575    0505  1040          STA
0576    0506  2041          WRIKEY!2000
0577    0507  6620          JMP GO
0600                  /
0601                  /
0602                  /
0603                  /
0604    0510  2656    MODOP7, ADD P10FMT      /PDP-N TO PDP-8
0605    0511  4624          STC RDELNG
0606    0512  2654          ADD P8FMT1
0607    0513  4632          STC WRILNG
0610    0514  2626          ADD RDENUM
0611    0515  1260          MUL I
0612    0516  0003          3
0613    0517  4634          STC WRINUM
0614    0520  2035          ADD M4
0615    0521  1040          STA
0616    0522  2066          RDLTAN!2000
0617    0523  1020          LDA I
0620    0524  7763          -14
0621    0525  1040          STA
0622    0526  2037          WDLTAN!2000
0623    0527  1020          LDA I
0624    0530  7177    M600,  -600
0625    0531  1040          STA
0626    0532  2070          RDEKEY!2000
0627    0533  1020          LDA I
0630    0534  7575          -202
0631    0535  1040          STA
0632    0536  2041          WRIKEY!2000
0633    0537  6620          JMP GO
0634                  /
0635                  /
0636                  /
0637                  /
0640    0540  2656    MODOP8, ADD P10FMT      /PDP-N TO PDP-12
0641    0541  4624          STC RDELNG        /WRIFMT IS OK FOR 12 TAPE
0642    0542  2626          ADD RDENUM
0643    0543  1040          STA
0644    0544  0634          WRINUM
0645    0545  0321          ROR I 1
0646    0546  1200          LAM               /ADD AGAIN TO MAKE 1.5 X RDENUM;
0647    0547  0634          WRINUM            /LINK BIT GIVES US EXTRA BLK IF RDENUM WAS AN ODD NUMBER
0650    0550  4634          STC WRINUM
0651    0551  2035          ADD M4
0652    0552  1040          STA
0653    0553  2066          RDLTAN!2000
0654    0554  0011          CLR
0655    0555  2470          ADD M6
0656    0556  1040          STA
0657    0557  2037          WDLTAN!2000
0660    0560  1020          LDA I
0661    0561  0400          400
0662    0562  1040          STA
0663    0563  2747          ADDINC!2000
0664    0564  0011          CLR
0665    0565  0017          COM
```

```
0672    0572  1040          STA
0673    0573  2070          RDEKEY!2000
0674    0574  6620          JMP GO
0675                  /
0676                  /
0677                  /
0700                  /
0701    0575  2656  MODOP9,  ADD P10FMT       /PDP-N TO PDP-N
0702    0576  4624          STC RDELNG
0703    0577  2657          ADD P10FM1
0704    0600  4632          STC WRILNG
0705    0601  2626          ADD RDENUM
0706    0602  4634          STC WRINUM
0707    0603  2035          ADD M4
0710    0604  1040          STA
0711    0605  2066          RDLTAN!2000
0712    0606  1040          STA
0713    0607  2037          WDLTAN!2000
0714    0610  0011          CLR
0715    0611  2361          ADD M601
0716    0612  1040          STA
0717    0613  2041          WRIKEY!2000
0720    0614  0011          CLR
0721    0615  2530          ADD M600
0722    0616  1040          STA
0723    0617  2072          RDEKEY!2000
0724                  /
0725                  /
0726                  /
0727                  /
0730    0620  0022  GO,       PDP
0731                PMODE
0732    4621  4651  JOB1,     JMS I READPT
0733                LMODE
0734    0622  0000  RDEFU,    0000
0735    0623  0000  RDELOC,   0000          /ALWAYS LEFT AS 0000
0736    0624  0000  RDELNG,   0000
0737    0625  0000  RDEBN,    0000
0740    0626  0000  RDENUM,   0000
0741                /
0742                PMODE
0743    4627  4652  JOB2,     JMS I WRITPT
0744                LMODE
0745    0630  0000  WRIFU,    0000
0746    0631  0000  WRILOC,   0000
0747    0632  0000  WRILNG,   0000
0750    0633  0000  WRIBN,    0000
0751    0634  0000  WRINUM,   0000
0752                PMODE
0753    4635  6141  WRIEXIT,LINC
0754                LMODE
0755    0636  0643          LDF 3
0756    0637  1007          LDA
0757    0640  2012          NBLOCK!2000     /GET REMAINING BLOCKS
0760    0641  1620          BSE I
0761    0642  6000          6000
0762    0643  0470          AZE I           /ARE WE FINISHED?
0763    0644  6673          JMP DONE        /YES
0764    0645  0002          PDP             /HELL NO
0765                        PMODE
0766    4646  5221          JMP JOB1        /OK; GO READ MORE
```

```
0767    4647  7402          HLT
0770    4650  7402          HLT                 /TRY AGAIN;
0771                  /
0772    4651  6057   READPT, READ!6000
0773    4652  6025   WRITPT, WRITE!6000
0774                  LMODE
0775    0653  0200   P8FMT0, 0200     /WORDS PER BLOCK
0776    0654  0201   P8FMT1, 0201
0777    0655  0202   P8FMT2, 0202
1000    0656  0600   P10FMT, 0600
1001    0657  0601   P10FM1, 0601
1002                  /
1003                  /
1004                  /
1005                  /
1006    0660  0041   DIVIDE, SET 1            /SET UP RETURN JUMP;
1007    0661  0000           0
1010    0662  0011           CLR              /CLEAR DIVIDEND
1011    0663  4015           STC DIVCNT
1012    0664  2626           ADD RDENUM
1013    0665  0235           XSK I DIVCNT     /INCREMENT DIVIDEND;
1014    0666  1120           ADA I
1015    0667  0000   DIVISR, 0                /SUBTRACT DIVISOR;
1016    0670  0471           APO I            /HAS ACC GONE NEGATIVE YET?
1017    0671  6665           JMP,-4           /NO;
1020    0672  6001           JMP 1            /YES; RETURN;
1021                  /
1022                  /
1023    0673  6020   DONE,   JMP 20           /DISPLAY FRAME 1
1024                  /
1025                  ////
1026                          LMODE
1027                          SEGMNT 2
1030                  /QANDA SUBROUTINE FOR THE
1031                  /PDP-12
1032                  /REMOVE *1000 BELOW IF
1033                  /INSERTING SOURCE DIRECTLY
1034                  /INTO YOUR PROGRAM SOURCE
1035                  *1113 /REMOVE,IF DESIRED
1036                  /
1037                  /TO HERE TO INITIALIZE THE ROUTINE
1040                  /
1041                          NOLIST
2013                  /
2014                  /
2015                  /                       DECTAPE ROUTINE FOR THE PDP - 12
2016                  /
2017                  /
2020                  /
2021                  /
2022                  /
2023                  /
2024                  /
2025                  /
2026                  /
2027                  /
2030                  /
2031                  /
2032                  LMODE
2033                  /
2034                          SEGMNT  3
```

```
2040                    /
2041                    /
2042                    /
2043                    /
2044                    /
2045                    /
2046                    /
2047                    /
2050                    /
2051                    /
2052                    /
2053                    /
2054                            SBM=414                 /SKIP ON BLOCK MARK FLAG
2055                            SWD=457                 /SKIP ON WORD IN TAC.
2056                    /
2057                    /
2060                    /
2061                    /
2062                    /
2063                    /
2064                    /
2065                            *1
2066                    /
2067                    /
2070                    /
2071    0001    0000    TASK,   HLT
2072    0002    0000    BEST,   0
2073    0003    0000    WCOUNT, 0
2074    0004    0000    BETAR,  0
2075    0005    0000    SKIP,   0
2076    0006    0000    SKIP2,  0
2077    0007    0000    DATAWD, 0
2100    0010    0000    COUNT2, 0
2101    0011    0000    COUNT1, 0
2102    0012    0000    NBLOCK, 0
2103    0013    0000    POINT1, 0
2104    0014    0000    POINT2, 0
2105    0015    0000    IBLOCK, 0
2106    0016    0000    SWITCH, 0
2107                    /
2110                    /
2111                    /
2112                    /
2113                    /
2114                    /
2115                    /
2116                    /
2117                    /
2120                    /
2121                    /
2122                            *20
2123                    /
2124                    /
2125                    /
2126                    /
2127                    /
2130                    /
2131                    /
2132                    /
2133                    /
2134                    /
2135                    /
```

```
2136                    /
2137                    /
2140                    /
2141                    /
2142    0020  0002  EXIT,   PDP             /COMES HERE AFTER READS & WRITES
2143                        PMODE
2144    6021  7330          CLA CLL CML RAR
2145    6022  6152          6152
2146    6023  7200          CLA
2147    6024  5657          JMP I   READ
2150                    /
2151                    /
2152                    /
2153                    /
2154                    /
2155                    /
2156                    /
2157                    /
2160                    /
2161                    /
2162                    LMODE
2163                    /
2164                    /
2165                    /
2166                    /
2167                    /
2170                    /ITS IMPORTANT THAT "WRITE" LOCATION HAVE A 10 BIT ADDRESS;
2171                    /
2172                    /
2173                    /
2174    0025  0000  WRITE,  0                       /GENERALWRITE ROUTINE
2175                        PMODE
2176                                                /CALLED IN 8 MODE
2177    6026  6141          LINC                    /GET INTO LINC MODE
2200                        LMODE
2201    0027  1000          LDA
2202    0030  0025          WRITE                   /GET THE CALLING ADDRESS
2203    0031  4057          STC     READ            /AND PLACE IN THE READ ADDRESS
2204    0032  0061          SET I   TASK            /SET THE OPERATION TO DO A WRITE
2205    0033  6476          JMP     DOUTIT          /JMP TO WRITE ROUTINE
2206    0034  0062          SET I   BEST            /SET THE BEST CASE TO SKIP
2207    0035  7774          -3                      /3 WORDS, THE WRITTERS NEED SOME ROOM
2210    0036  0075          SET I IBLOCK
2211    0037  0000  WDLTAN, 0                       /NUMBER OF BLOCKS WRITTEN AT A TIME
2212    0040  0076          SET I SWITCH
2213    0041  0000  WRIKEY, 0                       /TOTAL NUM WORDS WRITTEN
2214    0042  1020          LDA I
2215    0043  0706          0706            /LINC WRITE
2216    0044  4744          STC INST
2217    0045  1020          LDA I
2220    0046  2633          WRIBN!2000              /SET-UP WRITE
2221    0047  5003          STC BNSET
2222    0050  1020          LDA I
2223    0051  2634          WRINUM!2000             /DITTO
2224    0052  5010          STC NUMSET
2225    0053  1020          LDA I
2226    0054  0451          APO
2227    0055  4225          STC WRIOK               /CHECK THE WRITE SWITCH
2230    0056  6105          JMP COMMON              /GO TO THE COMMON READ-WRITE
2231                    /
2232                    /
2233                    /
```

```
0060  0141          LINC                    /SET THE TASK TO READ
                    LMODE
0061  0061          SET I   TASK                    /SET THE TASK TO READ
0062  6350          JMP     DINIT
0063  0062          SET I   BEST            /SET THE BEST CASE TO SKIP
0064  7773          -4                      / 5 WORDS
0065  0075          SET I IBLOCK
0066  0000  RDLTAN, 0                       /NUM BLKS READ AT A TIME
0067  0076          SET I SWITCH
0070  0000  RDEKEY, 0                       /TOTAL WORDS PER BLK
0071  1020          LDA I
0072  0702          0702                    /LINC READ
0073  4744          STC INST
0074  1020          LDA I
0075  2625          RDEBN!2000
0076  5003          STC BNSET               /SET-UP FOR READ
0077  1020          LDA I
0100  2626          RDENUM!2000             /NUM BLKS
0101  5010          STC NUMSET
0102  1020          LDA I
0103  0016          NOP
0104  4225          STC WRIOK               /DONT CHECK WRITE SW
            /
            /
0105  0002  COMMON, PDP                     /GET OVER INTO 8 MODE TO GET THE ARGUMENYTS
                    PMODE
6106  4321          JMS     AGET            /GET THE ARGUMENTS
6107  3325          DCA     ARG1
6110  4321          JMS     AGET
6111  3326          DCA     ARG2
6112  4321          JMS     AGET
6113  3327          DCA     ARG3
6114  4321          JMS     AGET
6115  3330          DCA     ARG4
6116  4321          JMS     AGET
6117  3331          DCA     ARG5
6120  5334          JMP     PASTS           /SKIP PAST SUBROUTINE
            /
            /
6121  0000  AGET,   0
6122  1657          TAD I   READ
6123  2257          ISZ     READ
6124  5721          JMP I   AGET
            /
            /
            /
            /
            /
            /
                    LMODE
            /
            /
            /
            /
            /
            /
0125  0000  ARG1,   0               /READ & WRITE ARGS
0126  0000  ARG2,   0
0127  0000  ARG3,   0
0130  0000  ARG4,   0
0131  0000  ARG5,   0
0132  0000  SIZE,   0
```

```
2334
2335                    FBLOCK=ARG4
2336                    /
2337                    /
2340                    /
2341                    /
2342                    /
2343                    /
2344                    /
2345                    /
2346                    /
2347                    /
2350                    /
2351                            PMODE
2352                    /
2353                    /
2354    6134    6141    PASTS,  LINC                    /GET INTO LINC MODE
2355                            LMODE
2356    0135    2125            ADD     ARG1            /GET THE FIRST ARGUMENT
2357    0136    0245            ROL     5               /ROTATE TO GOOD IOB PLACE
2360    0137    1560            BCL I                   /JUST GET BIT 6
2361    0140    7737            -40
2362    0141    4252            STC UNITL1              /SAVE UNITS 0 & 1;
2363    0142    2125            ADD     ARG1            /GET IT AGAIN
2364    0143    0301            ROR     1               /SHIFT OVER
2365    0144    1560            BCL I
2366    0145    7774            -3
2367    0146    4240            STC     LAXO            /AND STASH AWAY
2370    0147    2125            ADD     ARG1            /GET THECRAP AGAIN
2371    0150    0301            ROR     1
2372    0151    1560            BCL I
2373    0152    7743            -34
2374    0153    1620            BSE I
2375    0154    0640            LDF     0
2376    0155    4635            STC SDATAF
2377    0156    2126            ADD     ARG2            /GET THE ADDRESS
2400    0157    1040            STA
2401    0160    0347            COREL1                  /STORE IN FIRST CORE LOC
2402    0161    4552            STC COREL2
2403                            /ALSO IN SECOND LOC,
2404    0162    2127            ADD     ARG3            /GET THE NUMBER OF WORDS TO TDUE
2405    0163    0017            COM                     /NEGATE IT
2406    0164    4132            STC     SIZE            /AND STASH AWAY
2407    0165    2131            ADD     ARG5            /GET THE NUMBER OF BLOCKS
2410    0166    0470            AZE I
2411    0167    6020            JMP     EXIT            /NO BLOCKS TO DO,
2412    0170    0017            COM
2413    0171    4012            STC     NBLOCK          /AND STASH AWAY,
2414    0172    0216    XSK SWITCH
2415    0173    0467            SKP
2416    0174    6711    JMP LINC                        /IF SWITCH=7777
2417                    /
2420                    /
2421                    /
2422                    /
2423                    /
2424                    /
2425                    /
2426    0175    1020    WAITL,  LDA I                   /THIS WAITS TILL DRIVE IS READY,
2427    0176    5000            5000
2430    0177    0500            IOB
2431    0200    6151            6151                    /GET INTO MAINTENANCE MODE
```

```
2434    0203  2240          ADD     LAXO            /ADD ON CORRECT UNITS
2435    0204  0001          AXO
2436    0205  1000          LDA
2437    0206  0252          UNITL1
2440    0207  1120          ADA I
2441    0210  0206          206
2442    0211  0500          IOB
2443    0212  6152          6152            /SELECT,SET MTN
2444    0213  1020          LDA I
2445    0214  0100          100
2446    0215  0500          IOB
2447    0216  6152          6152            /SET BACKWARD
2450    0217  0011          CLR
2451    0220  0500          IOB
2452    0221  6154          6154            /READ TRANSPORT STATUS
2453    0222  0322          ROR I   2
2454    0223  0472          LZE I
2455    0224  6175          JMP     WAITL           /UNIT NOT READY YET.
2456    0225  0016  WRIOK,  NOP             /THIS INST. IS REPLACED DURING THE READ/WRITE SUBROUTINE
2457                                        /READ=NOP WRITE=APO
2460    0226  6234          JMP    .+6
2461    0227  1020          LDA I           /WRITE SWITCH NOT ON;
2462    0230  4000          4000            /STOP TAPE
2463    0231  0500          IOB
2464    0232  6152          6152            /LTM PRESET
2465    0233  6175          JMP  WAITL
2466                /
2467                /
2470                /
2471    0234  0011          CLR             /CLEAR OUT THE MAINTENANCE MODE
2472    0235  0500          IOB
2473    0236  6151          6151
2474    0237  1020          LDA I
2475    0240  0000  LAXO,    0
2476    0241  0001          AXO
2477    0242  6300          JMP BACKWARD
2500                /
2501                /
2502    0243  0047  FORWARD,SET DATAWD      /DATA WORDS PER BLOCK
2503    0244  0132          SIZE
2504    0245  0043          SET WCOUNT      /TOTAL WORDS PER BLOCK
2505    0246  0016          SWITCH
2506    0247  1020          LDA I
2507    0250  0226          226
2510    0251  1120          ADA I
2511    0252  0000  UNITL1, 0
2512    0253  0500          IOB
2513    0254  6152          6152            /SEL,SET FWD
2514    0255  0045          SET SKIP
2515    0256  0002          BEST            /NUM CONTROL WORDS
2516    0257  0414          SBM             /WAIT FOR BM
2517    0260  6257          JMP .-1
2520    0261  0003          TAC             /BN TO AC
2521    0262  0016          NOP
2522    0263  0457          SWD             /SKIP FIRST SHORT WORD
2523    0264  6263          JMP .-1
2524    0265  6637          JMP INIT        /SHUFFLE
2525    0266  0451          APO             /ARE WE OUT OF END ZONE?
2526    0267  6243          JMP FORWARD     /NO
2527    0270  1440          SAE             /YES
2530    0271  0130          FBLOCK          /RIGHT BLOCK?
2531    0272  0467          SKP             /NO
```

```
                                  P                  /YES; NOW DO IT!
0274  0017                        COM
0275  2130                        ADD FBLOCK
0276  0471                        APO I              /GOING RIGHT  .RECTION??
0277  6243                        JMP FORWARD        /YES, KEEP GOIN
                /
                /
                /
                /
                /
                /
                /
                /
                /
0300  1020      BACKWARD,LDA I
0301  0306                        306
0302  1100                        ADA
0303  0252                        UNITL1
0304  0500                        IOB
0305  6152                        6152               /GO BACKWARD
0306  1000                        LDA
0307  0130                        FBLOCK
0310  1120                        ADA I
0311  7774                        7774
0312  0451                        APO                /IS BLOCK <4?
0313  6331                        JMP DEEP           /YES
0314  0414                        SBM                /WAIT FOR BM
0315  6314                        JMP .-1
0316  0003                        TAC                /BN TO AC
0317  6637                        JMP INIT           /SHUFFLE
0320  1120                        ADA I              /GO 3 BLOCKS PAST DESIRED BLK
0321  0003                        3
0322  0017                        COM
0323  2130                        ADD FBLOCK
0324  0470                        AZE I              /RIGHT BLOCK?
0325  6243                        JMP FORWARD        /YES
0326  0451                        APO                /NO.
0327  6300                        JMP BACKWARD
0330  6243                        JMP FORWARD
                /
                /
                /
                /
                /
                /
                /
                /
                /
0331  0414      DEEP,             SBM                /COMES HERE IF BLOCK < 4
0332  6331                        JMP .-1
0333  0003                        TAC                /BN TO AC
0334  6637                        JMP INIT           /SHUFFLE IT
0335  0450                        AZE                /BLOCK 0?
0336  6300                        JMP BACKWARD       /NOT YET!
0337  0071                        SET I COUNT1       /THIS DELAY ALLOWS US TO FIND THE BLK GOING FWD
0340  7767                        -10
0341  4010                        STC COUNT0
0342  0230                        XSK I COUNT0
0343  6342                        JMP .-1
0344  0231                        XSK I COUNT1
```

```
2632                    /
2633                    /
2634                    /
2635                    /
2636    0347    0000    COREL1,0
2637                    /
2640                    /
2641                    /
2642                    /
2643                    /
2644    0350    0046    DINIT,  SET SKIP2        /READ ROUTINE
2645    0351    0005            SKIP
2646    0352    0011            CLR
2647    0353    4641            STC LPB
2650    0354    6635            JMP SDATAF       /JUST SET DF
2651    0355    0226            XSK I SKIP2      /SKIP 3 CONTROL WORDS
2652    0356    0467            SKP
2653    0357    6365            JMP IGETCK       /GET REV CS
2654    0360    0457            SWD              /SKIP ON WD FLAG
2655
2656    0361    6360            JMP .-1
2657    0362    0457            SWD
2660    0363    6352            JMP DINIT+2      /REPEAT
2661    0364    6362            JMP .-2
2662                    /
2663                    /
2664    0365    0457    IGETCK, SWD              /WAIT FOR REV CS
2665    0366    6365            JMP .-1
2666    0367    0003            TAC              /GET IT
2667    0370    6637            JMP INIT         /PUT IN LPB & SHUFFLE
2670                    /
2671                    /
2672                    /
2673                    /
2674    0371    0457    IGETIT, SWD              /WAIT FOR WORD
2675    0372    6371            JMP .-1
2676    0373    0003            TAC              /TAPE AC TO AC
2677    0374    6637            JMP INIT         /COMP PARITY &SHUFFLE
2700    0375    0002            PDP
2701                            PMODE
2702    6376    3747            DCA I COREL1     /STORE DATA
2703    6377    2347            ISZ  COREL1      /INCR ADD
2704    6400    7000            NOP
2705    6401    6141            LINC
2706                            LMODE
2707    0402    0223            XSK I WCOUNT     /FINISHED?
2710    0403    0467            SKP              /NO
2711    0404    6410            JMP IGETLP       /YES,GET CS
2712    0405    0227            XSK I DATAWD     /GOT ALL DATA?
2713    0406    6371            JMP IGETIT       /NO,GO TO IT
2714    0407    6453            JMP LASTWD       /GET LAST WORD
2715    0410    0457    IGETLP, SWD               /WAIT FOR LPB
2716    0411    6410            JMP  .-1
2717    0412    0003            TAC               /LPB TO AC
2720    0413    1560            BCL I            /CS IS ONLY 6 BITS
2721    0414    1463            1463             /CLEAR LEFT HALF
2722    0415    6637            JMP INIT         /COMP PARITY
2723    0416    0011            CLR
2724    0417    2641            ADD LPB          /GET PARITY BUF
2725    0420    6646            JMP LPB+5        /SHUFFLE IT
2726    0421    1040            STA
2727    0422    0641            LPB
```

```
2731                                    CLC
2732    0425    0641                    LPB
2733    0426    0306                    ROR 6
2734    0427    0450                    SZE                     /GOOD CHK SUM?
2735    0430    6460    PARERR, JMP RDEAGN      /NO!TRY AGAIN
2736                    /
2737                    /
2740                    /
2741                    /
2742                    /
2743    0431    1020    RDEDUN, LDA I
2744    0432    0001            1
2745    0433    1140            ADM
2746    0434    0130            FBLOCK          /INCR BLOCK
2747    0435    0232            XSK I NBLOCK    /ALL DONE?
2750    0436    0467            SKP             /NOT DONE YET
2751    0437    6020            JMP EXIT        /YES DONE
2752    0440    0235            XSK I IBLOCK    /FINISHED DBN?
2753    0441    6243            JMP FORWARD      /NO
2754    0442    0642            LDF 2
2755    0443    1040            STA             /SET UP FOR NEXT READ
2756    0444    2625            RDEBN!2000
2757    0445    0011            CLR
2760    0446    2012            ADD NBLOCK
2761    0447    0017            COM
2762    0450    1040            STA
2763    0451    2626            RDENUM!2000
2764    0452    6020            JMP EXIT
2765                    /
2766                    /
2767    0453    0457    LASTWD, SWD             /THIS WORD IS INCLUDED IN THE CS
2770    0454    6453            JMP .-1
2771    0455    0003            TAC
2772    0456    6637            JMP INIT        /PUT IN LPB
2773    0457    6410            JMP IGETLP      /GET THE CS
2774                    /
2775                    /
2776    0460    0011    RDEAGN, CLR             /PARITY ERROR
2777    0461    2132            ADD SIZE        /DECR  ADDRESS
3000    0462    1120            ADA I           /BY 1 BLOCK
3001    0463    0001            1
3002    0464    1200            LAM
3003    0465    0347            COREL1
3004    0466    0011            CLR             /CLR LINK
3005    0467    1000            LDA
3006    0470    0130            FBLOCK
3007    0471    1120            ADA I
3010    0472    7774            -3
3011    0473    0471            APO I
3012    0474    6300            JMP BACKWARD
3013    0475    6243            JMP FORWARD
3014                    /
3015                    /
3016    0476    0011    DOUTIT, CLR             /WRITE ROUTINE
3017    0477    4641            STC LPB
3020    0500    0046            SET SKIP2
3021    0501    0005            SKIP
3022    0502    6635            JMP SDATAF      /SET DF
3023    0503    1020            LDA I
3024    0504    0027            27
3025    0505    0226            XSK I SKIP2     /SKIP 2 CONTROL WORDS
3026    0506    0467            SKP
```

```
0507  6515          JMP OGETIT      /PREPARE TO WRITE
0510  0457          SWD             /SKIP ON WORD FLAG
0511  6510          JMP .-1
0512  0457          SWD             /WAIT FOR FLAG TO GO DOWN
0513  6505          JMP DOUTIT+7    /DO IT AGAIN
0514  6512          JMP     .-2
                /
                /
                /
                /
                /
                /
                /
                /
0515  0500  OGETIT, IOB
0516  6152          6152              /SET WRITE
0517  1020          LDA I             /SET RTN  JMP
0520  6522          JMP GOWRI
0521  4710          STC OUTRTN
0522  0457  GOWRI,  SWD             /WAIT FOR WORD FLAG
0523  6522          JMP     .-1
0524  0500          IOB
0525  6154          6154            /AC TO TB
0526  0223          XSK I WCOUNT    /FINISHED?
0527  0467          SKP             /NOT YET
0530  6560          JMP OGETLP      /GET CS
0531  0227          XSK I DATAWD    /WRITTEN ALL DATA?
0532  0467          SKP             /NOO
0533  6553          JMP WRILAST     /WRITE 7777
0534  0002          PDP
                    PMODE
6535  7300          CLA CLL
6536  1752          TAD I COREL2    /GET DATA
6537  2352          ISZ   COREL2    /INCR ADDRESS
6540  6141          LINC
                    LMODE
0541  0017          COM             /COMPUTE PARITY
0542  4545          STC TEMP0
0543  2641          ADD LPB
0544  1660          BCO I
0545  0000  TEMP0,  0
0546  4641          STC LPB
0547  2545          ADD TEMP0
0550  0017          COM
0551  6670          JMP OUTIT       / SHUFFLE DATA &WRITE IT
0552  0000  COREL2, 0
0553  0011  WRILAST,CLR             /WRITE 7777 WHEN THE LAST WORD IS JUNK
0554  0457          SWD             /WAIT FOR FLAG TO GO DOWN JUST IN CASE
0555  0467          SKP
0556  6554          JMP  .-2
0557  6522          JMP  GOWRI      /WRITE 7777
0560  1020  OGETLP, LDA I           /SET RTN JMP TO
0561  6571          JMP WRILPB      /WRITE PARITY
0562  4710          STC OUTRTN
0563  1000          LDA             /GET PARITY WOR
0564  0641          LPB
0565  0306          ROR 6           /ITS 6 BITS
0566  1640          BCO             /XOR IT
0567  0641          LPB
0570  6670          JMP OUTIT       /SHUFFLE IT GOOD
0571  0457  WRILPB, SWD             /WRITE CS
0572  6571          JMP .-1
0573  0500          IOB
```

```
3126
3127  0575  0457  WRIOFF, SWD                    /NOW WAIT TILL LAS IS OPT AND WELL
3130  0576  0467         SKP
3131  0577  6575         JMP     .-2
3132  0600  0457         SWD                    /NEXT WORD ALL SET???
3133  0601  6600         JMP     .-1            /NOPE. WAIT
3134  0602  0457         SWD                    /NEXT WORD THERE. WAIT TILL IT PASSES.
3135  0603  0467         SKP
3136  0604  6602         JMP     .-2            /ITS PAST. LAST WORD IS NOW OUT COMPLETEL
3137  0605  1020         LDA I                  /YEP. TURN OFF THE WRITTERS.
3140  0606  0226         226
3141  0607  0500         IOB
3142  0610  6152         6152
3143  0611  1020  WRIDUN, LDA I           /PREPARE TO WRITE NEXT BLK
3144  0612  0001         0001
3145  0613  1140         AOM
3146  0614  0130         FBLOCK
3147  0615  0232         XSK I NBLOCK     /ALL DONE?
3150  0616  0467         SKP              /NOT YET
3151  0617  6020         JMP EXIT         /THATS IT!
3152  0620  0043         SET WCOUNT       /INIT WCOUNT
3153  0621  0041         WRIKEY
3154  0622  0235         XSK I IBLOCK     /FINISHED GROUP?
3155  0623  6243         JMP FORWARD      /GO DO IT!
3156  0624  0642         LOF 2
3157  0625  1040         STA
3160  0626  2633         WRIBN!2000       /NEXT BLOCK
3161  0627  0011         CLR
3162  0630  2012         ADD NBLOCK
3163  0631  0017         COM
3164  0632  1040         STA
3165  0633  2634         WRINUM!2000      /REMAINING BLKS
3166  0634  6020         JMP EXIT         /READ SOME MORE
3167                /
3170                /
3171                /
3172                /
3173                /
3174                /
3175                /
3176                /
3177                /
3200                /
3201                SDATAF=.
3202  0635  0000  DATAF, HLT              /OPTION FOR EXT MEM
3203  0636  6000         JMP     0
3204                /
3205                /
3206                /
3207                /
3210  0637  4643  INIT,  STC TEMP1        /COMPUTE PARITY
3211  0640  1120         ADA I
3212  0641  0000  LPB,    0
3213  0642  1660         BCO I
3214  0643  0000  TEMP1,  0
3215  0644  4641         STC LPB
3216  0645  2643         ADD TEMP1        /READ SHUFFLE
3217  0646  0017         COM
3220  0647  1040         STA
3221  0650  0643         TEMP1
3222  0651  1560         BCL I
3223  0652  7700         -77
```

```
0654  3012          ADD TABLE1
0655  4666          STC ADDIN1
0656  1300          LDH              /GET LEFT HALF
0657  0643          TEMP1&3777       /OF TEMP1
0660  1120          ADA I
0661  3012          ADD TABLE1
0662  4664          STC ADDIN2
0663  0011          CLR
0664  2000  ADDIN2, ADD 0
0665  0265          ROL I   5
0666  2000  ADDIN1, ADD 0
0667  6000          JMP 0
            /
            /
            /
            /
            /
            /
            /
            /
            /
            /
0670  1060  OUTIT,  STA I            /WRITE SHUFFLE
0671  0000  TEMP2,  0
0672  1560          BCL I            /LOOK AT RIGHT HALF
0673  7700          -77
0674  1120          ADA I
0675  3112          ADD TABLE2
0676  4706          STC ADOUT1
0677  1300          LDH              /GET LEFT HALF
0700  0671          TEMP2&3777
0701  1120          ADA I
0702  3112          ADD  TABLE2
0703  4704          STC  .+1
0704  0000  ADOUT2, 0
0705  0242          ROL     2
0706  0000  ADOUT1, 0
0707  0017          COM
0710  0000  OUTRTN, 0                /WRITE IT
            /
            /
            /
            /
0711  1000  LINC,   LDA              /LINC TAPE HANDLER
0712  0125          ARG1             /GET UNIT
0713  0321          ROR I 1
0714  1560          BCL I
0715  7774          7774
0716  4730          STC EXUN
0717  0264          ROL I 4          /GET LINK BIT BACK
0720  1140          ADM
0721  0744          INST             /ADD UNIT ONE BIT IF ITS THERE
0722  1620          BSE I
0723  0007          0007
0724  4763          STC CHECK
0725  1020          LDA I
0726  0020          0020             /EXTENDED ADDRESS FORMAT, BANK 0
0727  1120          ADA I
0730  0000  EXUN,   0
0731  0001          AXO              /SET EX UNIT
0732  1000          LDA
0733  0130          ARG4             /GET BLOCK NUMBER
0734  1040          STA
```

```
3324
3325    0736  4764          STC CHECK+1
3326    0737  4742          STC ADDR
3327    0740  0640          LDF 0               /CLR DF
3330    0741  1020          LDA I
3331    0742  0000  ADDR,    0
3332    0743  0023          TMA                 /AC>TMA SETUP
3333    0744  0000  INST,    0
3334    0745  0000  BN,      0
3335    0746  1020          LDA I
3336    0747  0000  ADDINC,  0000              /WORDS PER BLOCK
3337    0750  1140          ADM
3340    0751  0742          ADDR
3341    0752  1020          LDA I
3342    0753  0001          1
3343    0754  1140          ADM
3344    0755  0745          BN                  /INCR BLOCK NUM
3345    0756  0232          XSK I NBLOCK
3346    0757  0467          SKP
3347    0760  6763          JMP CHECK           /TRANSFER COMPLETE
3350    0761  0235          XSK I IBLOCK
3351    0762  6740          JMP ADDR-2          /DO NEXT BLOCK
3352                  /
3353                  /
3354                  /
3355                  /
3356    0763  0707  CHECK,   CHK
3357    0764  0000          0000                /BLOCK NUMBER
3360    0765  0450          AZE
3361    0766  0000          HLT
3362    0767  1020          LDA I
3363    0770  0001          1
3364    0771  1140          ADM
3365    0772  0764          CHECK+1
3366    0773  1440          SAE                 /FINISHED?
3367    0774  0745          BN
3370    0775  6763          JMP CHECK           /NO
3371    0776  0212          XSK NBLOCK          /ALL DONE?
3372    0777  0467          SKP
3373    1000  6020          JMP EXIT            /ALL DONE
3374                  /
3375                  /
3376    1001  0642          LDF 2
3377    1002  1040          STA
3400    1003  2625  BNSET,  RDEBN!2000         /OR WRIBN!2000
3401    1004  0011          CLR
3402    1005  2012          ADD NBLOCK
3403    1006  0017          COM
3404    1007  1040          STA
3405    1010  2626  NUMSET, RDENUM!2000        /OR WRINUM!2000
3406    1011  6020          JMP EXIT
3407                  /
3410                  /
3411                  /
3412                  /
3413                  /                       INPUT CONVERSION TABLES.
3414                  /
3415                  LMODE
3416                  /
3417    1012  0000  TABLE1,   0
3420    1013  0004            4
3421    1014  0040            40
```

```
3423      1016  0400          400
3424      1017  0404          404
3425      1020  0440          440
3426      1021  0444          444
3427      1022  4000          4000
3430      1023  4004          4004
3431      1024  4040          4040
3432      1025  4044          4044
3433      1026  4400          4400
3434      1027  4404          4404
3435      1030  4440          4440
3436      1031  4444          4444
3437      1032  0002          2
3440      1033  0006          6
3441      1034  0042          42
3442      1035  0046          46
3443      1036  0402          402
3444      1037  0406          406
3445      1040  0442          442
3446      1041  0446          446
3447      1042  4002          4002
3450      1043  4006          4006
3451      1044  4042          4042
3452      1045  4046          4046
3453      1046  4402          4402
3454      1047  4406          4406
3455      1050  4442          4442
3456      1051  4446          4446
3457      1052  0020          20
3460      1053  0024          24
3461      1054  0060          60
3462      1055  0064          64
3463      1056  0420          420
3464      1057  0424          424
3465      1060  0460          460
3466      1061  0464          464
3467      1062  4020          4020
3470      1063  4024          4024
3471      1064  4060          4060
3472      1065  4064          4064
3473      1066  4420          4420
3474      1067  4424          4424
3475      1070  4460          4460
3476      1071  4464          4464
3477      1072  0022          22
3500      1073  0026          26
3501      1074  0062          62
3502      1075  0066          66
3503      1076  0422          422
3504      1077  0426          426
3505      1100  0462          462
3506      1101  0466          466
3507      1102  4022          4022
3510      1103  4026          4026
3511      1104  4062          4062
3512      1105  4066          4066
3513      1106  4422          4422
3514      1107  4426          4426
3515      1110  4462          4462
3516       111  4466          4466
3517                /
3520                /
```

```
3522
3523                    /
3524                    /
3525                    /
3526                    /
3527
3530
3531
3532                                EJECT
```

```
                    /                OUTPUT CONVERSION TABLE

1112  0000  TABLE2,  0
1113  0400            400
1114  0020            20
1115  0420            420
1116  0001            1
1117  0401            401
1120  0021            21
1121  0421            421
1122  1000            1000
1123  1400            1400
1124  1020            1020
1125  1420            1420
1126  1001            1001
1127  1401            1401
1130  1021            1021
1131  1421            1421
1132  0040            40
1133  0440            440
1134  0060            60
1135  0460            460
1136  0041            41
1137  0441            441
1140  0061            61
1141  0461            461
1142  1040            1040
1143  1440            1440
1144  1060            1060
1145  1460            1460
1146  1041            1041
1147  1441            1441
1150  1061            1061
1151  1461            1461
1152  0002            2
1153  0402            402
1154  0022            22
1155  0422            422
1156  0003            3
1157  0403            403
1160  0023            23
1161  0423            423
1162  1002            1002
1163  1402            1402
1164  1022            1022
1165  1422            1422
1166  1003            1003
1167  1403            1403
1170  1023            1023
1171  1423            1423
[illegible]72  0042            42
[illegible]173  0442            442
1174  0062            62
```

```
3632
3633      1177  0443            443
3634      1200  0063            63
3635      1201  0463            463
3636      1202  1042            1042
3637      1203  1442            1442
3640      1204  1062            1062
3641      1205  1462            1462
3642      1206  1043            1043
3643      1207  1443            1443
3644      1210  1063            1063
3645      1211  1463            1463
3646                  ////
3647                  /
3650                  /
3651                  ////
3652                          PMODE
3653                  /
3654                          *3500
3655      3500  0640
3655      3501  4040
3655      3502  4040
3655      3503  4224
3655      3504  0361
3655      3505  6255
3655                  TXTINTRO,TEXT ^F      "TC12-F"
3656      3506  0642
3656                  H
3657      3507  4310
3657      3510  4310
3657      3511  4040
3657      3512  4014
3657      3513  1116
3657      3514  0324
3657      3515  0120
3657      3516  0557
3657      3517  0405
3657      3520  0324
3657      3521  0120
3657      3522  0540
3657      3523  0317
3657      3524  1626
3657      3525  0522
3657      3526  2311
3657      3527  1716
3657      3530  4020
3657      3531  2217
3657      3532  0722
3657                  H    LINCTAPE/DECTAPE CONVERSION PROGRAM
3660      3533  0115
3660                  F
3661      3534  4306
3661      3535  4310
3661      3536  4040
3661      3537  4024
3661      3540  1011
3661      3541  2340
3661      3542  2022
3661      3543  1707
3661      3544  2201
3661      3545  1540
3661      3546  2711
```

```
3661       3551  2516
3661       3552  4023
3661       3553  2503
3661       3554  0305
3661       3555  2323
3661       3556  0625
3661       3557  1414
3661                   H   THIS PROGRAM WILL RUN SUCCESSFULLY
3662       3560  3143
3662       3561  4017
3662       3562  1614
3662       3563  3140
3662       3564  1716
3662       3565  4001
3662       3566  4020
3662       3567  0420
3662       3570  5561
3662       3571  6240
3662       3572  0317
3662       3573  1520
3662       3574  2524
3662       3575  0522
3662       3576  4005
3662       3577  2125
3662       3600  1120
3662       3601  2005
3662       3602  0440
3662       3603  2711
3662       3604  2410
3662       3605  4024
3662                   ONLY ON A PDP-12 COMPUTER EQUIPPED WITH THE
3663       3606  1005
3663       3607  4340
3663       3610  2403
3663       3611  6162
3663       3612  5506
3663       3613  4010
3663       3614  0122
3663       3615  0427
3663       3616  0122
3663       3617  0540
3663       3620  1720
3663       3621  2411
3663       3622  1716
3663       3623  5640
3663       3624  4011
3663       3625  2440
3663       3626  2711
3663       3627  1414
3663       3630  4022
3663       3631  0501
3663       3632  0440
3663       3633  0116
3663                   TC12-F HARDWARE OPTION.  IT WILL READ AND
3664       3634  0443
3664       3635  4027
3664       3636  2211
3664       3637  2405
3664       3640  4006
3664       3641  2217
3664       3642  1540
3664       3643  2401
```

```
3664
3664        3645   4025
3664        3646   1611
3664        3647   2423
3664        3650   4060
3664        3651   5567
3664        3652   4011
3664        3653   1640
3664        3654   0116
3664        3655   3140
3664        3656   2401
3664                       WRITE FROM TAPE UNITS 0-7 IN ANY TAPE
3665        3657   2005
3665        3660   4340
3665        3661   0617
3665        3662   2215
3665        3663   0124
3665        3664   7340
3665        3665   3117
3665        3666   2540
3665        3667   1525
3665        3670   2324
3665        3671   4023
3665        3672   2005
3665        3673   0311
3665        3674   0631
3665        3675   4024
3665        3676   1005
3665        3677   4003
3665        3700   1722
3665        3701   2205
3665        3702   0324
3665        3703   4006
3665        3704   1722
3665        3705   1501
3665                       FORMAT: YOU MUST SPECIFY THE CORRECT FORMAT.
3666        3706   2456
3666                       F
3667        3707   4306
3667                       F
3670        3710   4306
3670        3711   4310
3670        3712   2431
3670        3713   2005
3670        3714   4014
3670        3715   1116
3670        3716   0506
3670        3717   0505
3670        3720   0440
3670        3721   2417
3670        3722   4003
3670        3723   1716
3670        3724   2411
3670        3725   1625
3670        3726   0534
3670                       HTYPE LINEFEED TO CONTINUE\Z
3671                       /
3672                       /
3673                              *7220
3674        7220   0640
3674        7221   0310
3674        7222   0503
```

```
3674       7225  2211
3674       7226  2431
3674                   TXTPAR, TEXT ZF CHECK PARITY<1
3674       7227  7461
3675
3675
3676       7230  4347
3676       7231  4306
3676       7232  4760
3676       7233  4023
3676       7234  2005
3676       7235  0311
3676       7236  0611
3676       7237  0523
3676       7240  4016
3676                   F       0 SPECIFIES NO
3677       7241  1743
3677
3700       7242  4740
3700       7243  4306
3700       7244  4761
3700       7245  4023
3700       7246  2005
3700       7247  0311
3700       7250  0611
3700       7251  0523
3700       7252  4031
3700                   F       1 SPECIFIES YES
3701       7253  0523
3701       7254  4347
3701
3702       7255  4043
3702       7256  4724
3702       7257  3120
3702       7260  0540
3702       7261  1411
3702       7262  1605
3702       7263  4006
3702       7264  0505
3702       7265  0440
3702       7266  2417
3702       7267  4003
3702       7270  1716
3702       7271  2411
3702       7272  1625
3702       7273  0534
3702                           TYPE LINE FEED TO CONTINUE\Z
3703                   /
3704       7274  0640
3704       7275  4022
3704       7276  0501
3704       7277  0474
3704       7300  6440
3704       7301  0214
3704       7302  1703
3704                   TXTRDE, TEXT ZF  READ<4 BLOCKS
3705       7303  1323
3705                   F
3706       7304  4306
3706       7305  4340
3706       7306  4040
3706       7307  4040
```

```
3706
3706      7312  0120
3706      7313  0540
3706      7314  0617
3706      7315  2215
3706      7316  0124
3706      7317  7461
3706      7320  4006
3706      7321  2217
3706      7322  1540
3706      7323  2516
3706      7324  1124
3706                    TAPE FORMAT<1 FROM UNIT<1
3707      7325  7461
3707                F
3710      7326  4306
3710      7327  4340
3710      7330  4040
3710      7331  4040
3710      7332  4040
3710      7333  4040
3710      7334  4023
3710      7335  2401
3710      7336  2224
3710      7337  1116
3710      7340  0740
3710      7341  2711
3710      7342  2410
3710      7343  4002
3710      7344  1417
3710      7345  0313
3710                  STARTING WITH BLOCK<4
3711      7346  7464
3711                F
3712      7347  4306
3712      7350  4310
3712      7351  0617
3712      7352  2215
3712      7353  0124
3712      7354  4001
3712      7355  5656
3712      7356  5656
3712      7357  5620
3712      7360  0420
3712      7361  5570
3712      7362  4040
3712      7363  5062
3712      7364  6061
3712      7365  4027
3712      7366  1722
3712      7367  0423
3712      7370  5702
3712      7371  1417
3712      7372  0313
3712                HFORMAT A.....PDP-8  (201 WORDS/BLOCK)
3713      7373  5143
3713                H
3714      7374  1043
3714      7375  1040
3714      7376  4040
3714      7377  4040
3714      7400  4040
```

```
3714       7402  5656
3714       7403  5656
3714       7404  2004
3714       7405  2055
3714       7406  6162
3714       7407  4050
3714       7410  6460
3714       7411  6040
3714       7412  2717
3714       7413  2204
3714       7414  2357
3714       7415  0214
3714       7416  1703
3714                     H        B.....PDP-12 (400 WORDS/BLOCK)
3715       7417  1351
3715                     H
3716       7420  4310
3716       7421  4310
3716       7422  4040
3716       7423  4040
3716       7424  4040
3716       7425  4003
3716       7426  5656
3716       7427  5656
3716       7430  5617
3716       7431  2410
3716       7432  0522
3716       7433  4040
3716       7434  5020
3716       7435  0420
3716       7436  5571
3716       7437  5461
3716       7440  6054
3716       7441  6165
3716       7442  4027
3716       7443  1124
3716                     H        C.....OTHER  (PDP-9,10,15 WITH
3717       7444  1043
3717       7445  1040
3717       7446  4040
3717       7447  4040
3717       7450  4040
3717       7451  4040
3717       7452  4040
3717       7453  4040
3717       7454  4040
3717       7455  4040
3717       7456  4040
3717       7457  4040
3717       7460  6660
3717       7461  6040
3717       7462  6162
3717       7463  5502
3717       7464  1124
3717       7465  4027
3717       7466  1722
3717       7467  3423
3717       7470  5702
3717       7471  1413
3717                     H                        600 12-BIT WORDS/P K)
3720        472  5143
3720       7473  4034
3720                     \2
```

```
3721                    ,
3722                    /
3723                    /
3724                    /
3725      7474  0640
3725      7475  4027
3725      7476  2211
3725      7477  2405
3725      7500  4024
3725      7501  1005
3725      7502  4022
3725      7503  0523
3725      7504  2514
3725                    TXTWRI, TEXT ZF  WRITE THE RESULT
3726      7505  2443
3726                    F
3727      7506  0643
3727      7507  4040
3727      7510  4040
3727      7511  4040
3727      7512  4040
3727      7513  4011
3727      7514  1640
3727      7515  2401
3727      7516  2005
3727      7517  4006
3727      7520  1722
3727      7521  1501
3727      7522  2474
3727      7523  6140
3727      7524  1716
3727      7525  4025
3727      7526  1611
3727      7527  2474
3727                            IN TAPE FORMAT<1 ON UNIT<1
3732      7530  6143
3730
3731      7531  4743
3731      7532  4040
3731      7533  4040
3731      7534  4040
3731      7535  4040
3731      7536  4040
3731      7537  4023
3731      7540  2401
3731      7541  2224
3731      7542  1116
3731      7543  0740
3731      7544  0124
3731      7545  4002
3731      7546  1417
3731      7547  0313
3731                              STARTING AT BLOCK<4
3732      7550  7464
3732                    F
3733      7551  4306
3733      7552  4310
3733      7553  0617
3733      7554  2215
3733      7555  0124
3733      7556  4001
3733      7557  5656
```

```
3733        7562   0420
3733        7563   5570
3733        7564   4040
3733        7565   5062
3733        7566   6061
3733        7567   4027
3733        7570   1722
3733        7571   0423
3733        7572   5702
3733        7573   1417
3733        7574   0313
3733                       HFORMAT A.....PDP-8  (201 WORDS/BLOCK)
3734        7575   5143
3734                       H
3735        7576   1043
3735        7577   1040
3735        7600   4040
3735        7601   4040
3735        7602   4040
3735        7603   0256
3735        7604   5656
3735        7605   5656
3735        7606   2004
3735        7607   2055
3735        7610   6162
3735        7611   4050
3735        7612   6460
3735        7613   6040
3735        7614   2717
3735        7615   2204
3735        7616   2357
3735        7617   0214
3735        7620   1703
3735                       H        B.....PDP-12 (400 WORDS/BLOCK)
3736        7621   1351
3736                       H
3737        7622   4310
3737        7623   4310
3737        7624   4040
3737        7625   4040
3737        7626   4040
3737        7627   4003
3737        7630   5656
3737        7631   5656
3737        7632   5617
3737        7633   2410
3737        7634   0522
3737        7635   4040
3737        7636   5020
3737        7637   0420
3737        7640   5571
3737        7641   5461
3737        7642   6054
3737        7643   6105
3737        7644   4027
3737        7645   1124
3737                       H        C.....OTHER  (PDP-9,10,15 WITH
3740        7646   1043
3740          47   1040
3740          50   4040
3740        7651   4040
3740        7652   4040
```

```
3740
3740        7654   4040
3740        7655   4040
3740        7656   4040
3740        7657   4040
3740        7660   4040
3740        7661   4040
3740        7662   6660
3740        7663   6040
3740        7664   2717
3740        7665   2204
3740        7666   2357
3740        7667   0214
3740        7670   1703
3740                       H                        600 WORDS/BLOCK)
3741        7671   1351
3741        7672   4340
3741        7673   3400
3741                        \Z
3742                       /
3743                       /
3744        7674   7400    ANSWR1, 7400              /NUMBER OF BLOCKS
3745        7675   0000            0000              /TO BE READ IN
3746        7676   0074            0074              /4 OCTAL DIGITS
3747        7677   0074            0074              /FORMAT CHAR;
3750        7700   0074            0074              /UNIT NUMBER;
3751        7701   0000            0000              /STARTING BLOCK
3752        7702   0000            0000              /NUMBER;
3753        7703   3400            3400              /THATS ALL!!
3754        7704   7400    ANSWR2, 7400              /WRITE FORMAT;
3755        7705   7400            7400              /UNIT NUMBER;
3756        7706   7400            7400              /STARTING BLOCK
3757        7707   0000            0000              /NUMBER;
3760        7710   0034            0034              /THATS ALL!!
3761        7711   7400    ANSWR3, 7400              /PARITY
3762        7712   0034            34                /THATS IT!!
3763                       /                                      /
3764                       /                                      /
3765                       /
3766                       /        18 MARCH 1970
```

```
ADD.
ADDIN1  6660
ADDIN2   564
ADDR     742
ADOUT1  6706
ADOUT2  6704
AGET    6121
ANSWR1  7674
ANSWR2  7704
ANSWR3  7711
ARG1    6125
ARG2    6126
ARG3    6127
ARG4    6130
ARG5    6131
BACKWA  6300
BEST    6002
BETAR   6004
BN      6745
BNSET   7003
-
```

```
CHARS   ????
CHECK   6763
COMMON  6105
COREL1  6347
COREL2  6552
COUNT2  6010
COUNT1  6011
DATAF   6635
DATAWD  6007
DEEP    6331
DINIT   6350
DIVCNT  4015
DIVIDE  4660
DIVISR  4667
DONE    4673
DOUTIT  6476
EXIT    6020
EXTRA   4462
EXUN    6730
FBLOCK  0130
FORWAR  6243
GET     4222
GETKBD  5634
GO      4620
GOWRI   6522
HOLD    4256
IBLOCK  6015
IGETCK  6365
IGETIT  6371
IGETLP  6410
INIT    6637
INST    6744
JOB1    4621
JOB2    4627
K1      4447
K400    4373
LASTWD  6453
LAXO    6240
LINC    6711
LPB     6641
MODOP   4161
MODOP1  4260
MODOP2  4304
MODOP3  4331
MODOP4  4365
MODOP5  4417
MODOP6  4441
MODOP7  4510
MODOP8  4540
MODOP9  4575
MULT2   4457
M14     4345
M16     4313
M3      4106
M4      4235
M6      4470
M600    4530
M601    4361
M7      4377
NBLOCK  ?12
NEXT      26
NUMBRS  4111
NUMSET  7010
```

```
OGE
OGETLP 6560
OUTIT  670
OUTRT  710
PARERR 6430
PASTS  6134
POINT1 6013
POINT2 6014
P10FMT 4656
P10FM1 4657
P8FMT0 4653
P8FMT1 4654
P8FMT2 4655
QAB    5117
QACA   5130
QACHAR 5770
QACKLF 5734
QACNTR 5717
QAD    5141
QAE    5163
QAEXIT 5750
QAF    5631
QAG    5175
QAH    5227
QAI    5244
QAINIT 5113
QAJ    5251
QAK    5420
QAKRB  6236
QAL    5312
QALEGL 5710
QAM    5214
QAN    5336
QAO    5344
QAP    5355
QAQ    5376
QAREAD 4026
QARFSH 5166
QAT    5403
QATLS  6046
QATPE  5757
QATSF  6041
QATY   5651
QAU    5621
QAV    5431
QAW    5625
QAWRIT 4123
QAX    5537
QAY    5525
QAZ    5414
QPAR   4167
RDEAGN 6460
RDEBN  4625
RDEDUN 6431
RDEFU  4622
RDEKEY 6270
RDELNG 4624
RDELOC 4623
RDENUM 4626
RDLTAN 6066
READ   6057
READPT 4651
```

```
SETUP   4210
SIZE    6132
SKIP    6005
SKIP2   6006
SWD     0457
SWITCH  6016
TABLE1  7012
TABLE2  7112
TASK    6001
TEMP    6133
TEMP0   6545
TEMP1   6643
TEMP2   6671
TXTINT  3500
TXTPAR  7220
TXTRDE  7274
TXTWRI  7474
UNITL1  6252
UNPAR   4173
UNREAD  4032
UNWRIT  4127
WAITL   6175
WCOUNT  6003
WDLTAN  6037
WRIBN   4633
WRIDUN  6611
WRIEXI  4635
WRIFU   4630
WRIKEY  6041
WRILAS  6553
WRILNG  4632
WRILOC  4631
WRILPB  6571
WRINUM  4634
WRIOFF  6575
WRIOK   6225
WRITE   6025
WRITPT  4652
-
```

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