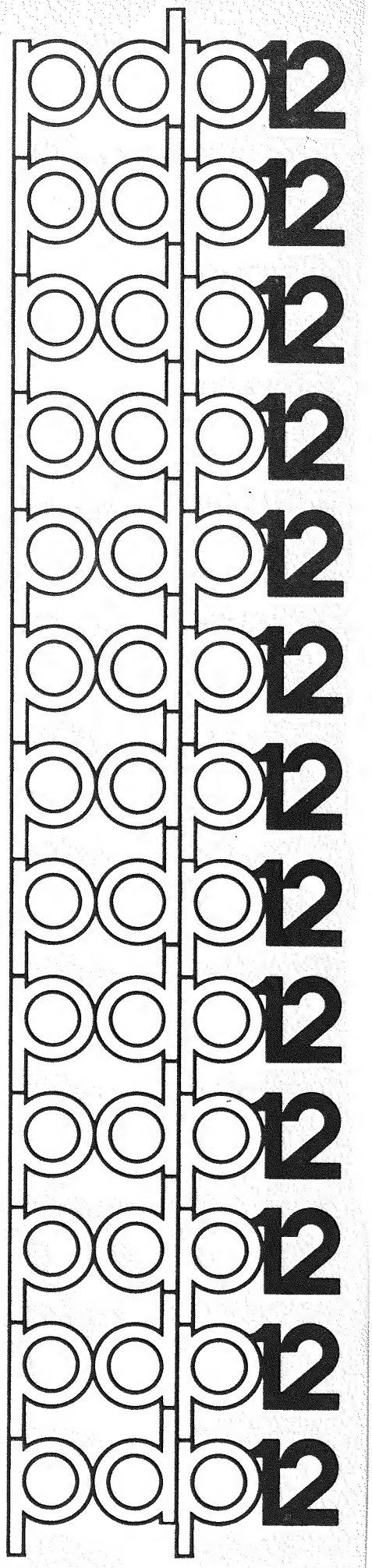
digital

SINPRE



DEC-12-UW4A-D
June, 1970

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1.0 GENERAL DESCRIPTION

The SINPRE program will convert a LINCtape based double precision file[1], such as that from the Signal Averager program (DEC-12-UZ1A-D), into a LINCtape based single precision file.

The user is asked for the first and last tape block number of the double precision file and the tape unit number. The single precision file is defined by the first tape block number and the tape unit number.

The values of the double precision file are scaled to $\pm$8 bits (scope limits) by first searching the double precision file for the maximum absolute value. This value is then shifted right until it is within the required limits and the number of shifts is recorded. It should be noted that if the maximum double precision value is initially within the required limits, no shifting is performed. Now each value of the double precision file is shifted the above number of times and written in the output file as single precision numbers.

When the conversion is completed, the unfilled locations of the last single precision data block are filled with zeros and written on tape. The user then has the option to convert another file.

2.0 MINIMUM REQUIREMENTS

A. PDP-12B with 4K of core.

B. LAP6-DIAL[2] tape containing the SINPRE program.

---

[1]The order of the double precision words is low/high.

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

3.0 STARTING PROCEDURE

1. Load the DIAL tape with the SINPRE program. (Refer to the LAP6-DIAL Programmer's Reference Manual, DEC-12-SE2B-D.)

2. Load SINPRE by typing

→LO SINPRE,Ø↵

4.0 SETUP MODE

The SINPRE program displays a series of scope messages which the user answers by typing the appropriate characters on the keyboard. All scope messages are presented using the QANDA subroutine (refer to DEC-12-FISA-D). It is assumed that the user is familiar with the conventions of QANDA.

Any of the following conditions initialize the setup mode:

1. Loading SINPRE from DIAL.

2. Depressing Sense Switch Ø during Setup Mode.

3. Responding with R to message 5 (refer to section 4.5).

4. Pressing STOP, I/O PRESET and then START 2Ø when the program has been loaded from DIAL.

In the following messages, unfilled QANDA blanks are interpreted as zeros. Also, all leading zeros and trailing blanks are ignored.

For example:

1 _ _	=	1
_ _ _	=	ØØØ
ØØ1	=	1

4.1 MESSAGE 1

When the setup mode of SINPRE is initialized, the following message is displayed:

```
                    SINPRE

          CONVERT A DOUBLE PRECISION FILE
          TO A SINGLE PRECISION FILE

          TYPE C TO CONTINUE _
```

Typing C causes message 2 to be displayed.

4.2 MESSAGE 2

```
          DOUBLE PRECISION FILE

              FIRST BLOCK_ _ _
              LAST BLOCK _ _ _
              UNIT _
```

The user is asked to define the double precision file that is to be converted.

FIRST BLOCK is the starting tape block of the double precision file; LAST BLOCK is the last tape block of the double precision file. Both must be octal and in the range Ø-777 and the value of LAST BLOCK must be greater than or equal to FIRST BLOCK.

UNIT is a single digit octal number in the range Ø-7 describing the tape unit on which the tape containing the double precision file is or will be mounted.

4.3 MESSAGE 3

```
          SNGL PRECISION FILE
            FIRST BLOCK_ _ _
              UNIT _
```

Here the user is asked to describe the single precision file that is to be created from the double precision file.

FIRST BLOCK is the starting tape block of the single precision file. It must be octal and in the range Ø-777.

UNIT is the single digit octal number in the range of Ø-7 which describes the tape unit on which the single precision file is to be created.

The SINPRE program will not allow the single precision file to write over the double precision file. Therefore, if the double precision unit is equal to the single precision unit, the single precision FIRST BLOCK cannot be in the range double precision FIRST BLOCK to double precision LAST BLOCK. Other checks are made while the files are being converted.

4.4 MESSAGE 4

```
   MOUNT TAPES
ON PROPER UNITS
TYPE C TO CONVERT _
```

At this time the user should check that the data tapes are mounted on the correct units and that the units are set to REMOTE and WRITE ENABLE. The requested conversion is performed after C and a terminator are typed.

CAUTION: DIAL is not protected if data is converted to that tape.

4.5 MESSAGE 5

After the specified double precision file has been converted, the following message is displayed:

```
REQUESTED DATA
HAS BEEN CONVERTED
TYPE R FOR ANOTHER JOB
REPLY _
```

Type R if another file is to be converted. Message 1 will be displayed. Typing any other character will cause the program to halt.

If the program detects an error in the user's response to any of the above messages, the message is re-displayed. It should be noted that the program does not interrogate any of the replies to the displayed message until the message has been terminated according to the QANDA conventions. Also, the user may initialize setup mode at any time (while he is in the setup mode) by depressing Sense Switch Ø.

5.0 ERROR CONDITIONS

There are three error messages that can be printed out on the Teletype while the file is being converted. They are:

a. NO DATA

The SINPRE program assumes that zeros are used to fill the last block of the double precision file once the last data point has been accumulated. A search for the last data point is performed and if no non-zero values are found, the NO DATA diagnostic is printed on the console printer and the setup mode is initialized.

b. OUTPUT OVERFLOW

This diagnostic is printed on the console Teletype if the single precision file has reached block 777 of the tape before all double precision values have been converted. After the message is printed, setup mode is initialized.

c. DATA OVERFLOW

If the single precision and double precision files are defined to be on the same tape unit and if converted data (single pre-

cision) is about to be written over the first block of the double precision file, the DATA OVERFLOW diagnostic is printed and setup mode is initialized.

APPENDIX A. MODIFYING SINPRE

It is possible to revise SINPRE to (1) accept double precision words as high/low rather than the low/high convention for which it is programmed, and,

(2) to scale to ±11 bits rather than ±8 bits.

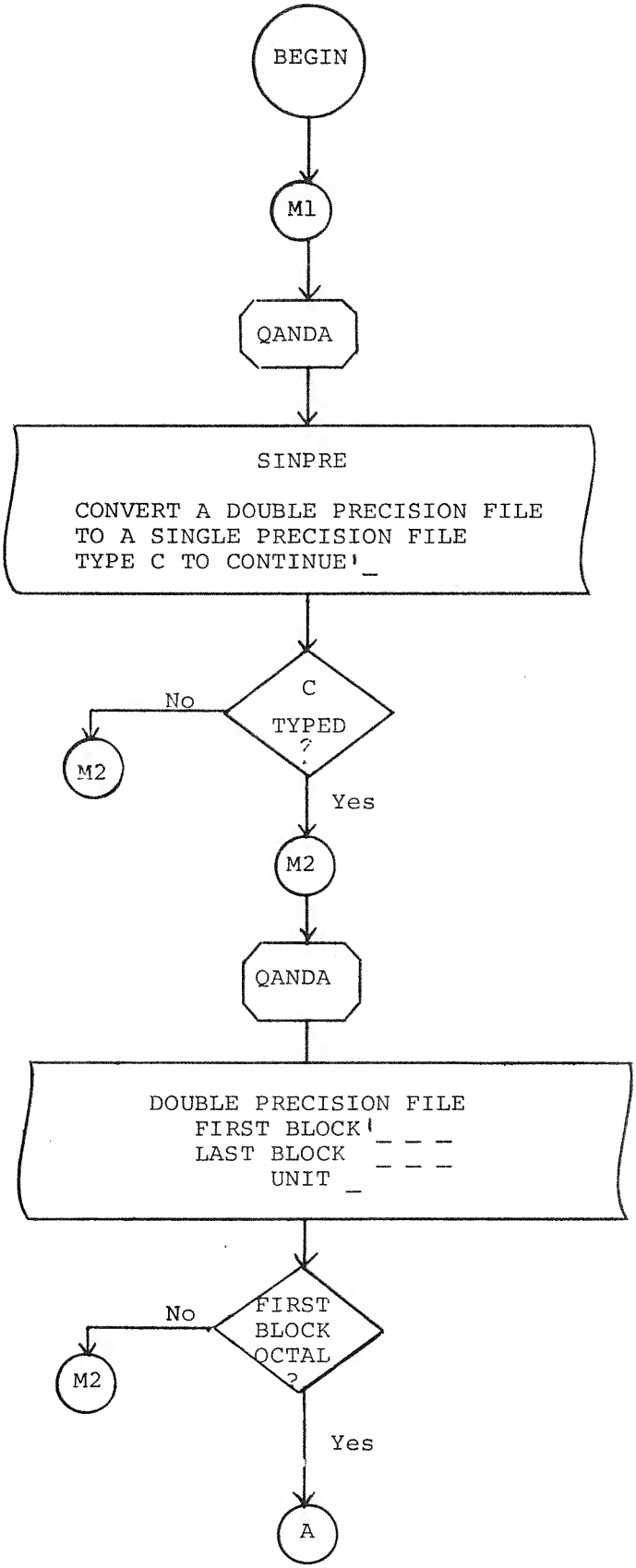
To implement these changes, the binary version of SINPRE must be revised using the PATCH program (DEC-12-YU2A). The revisions are as follows:

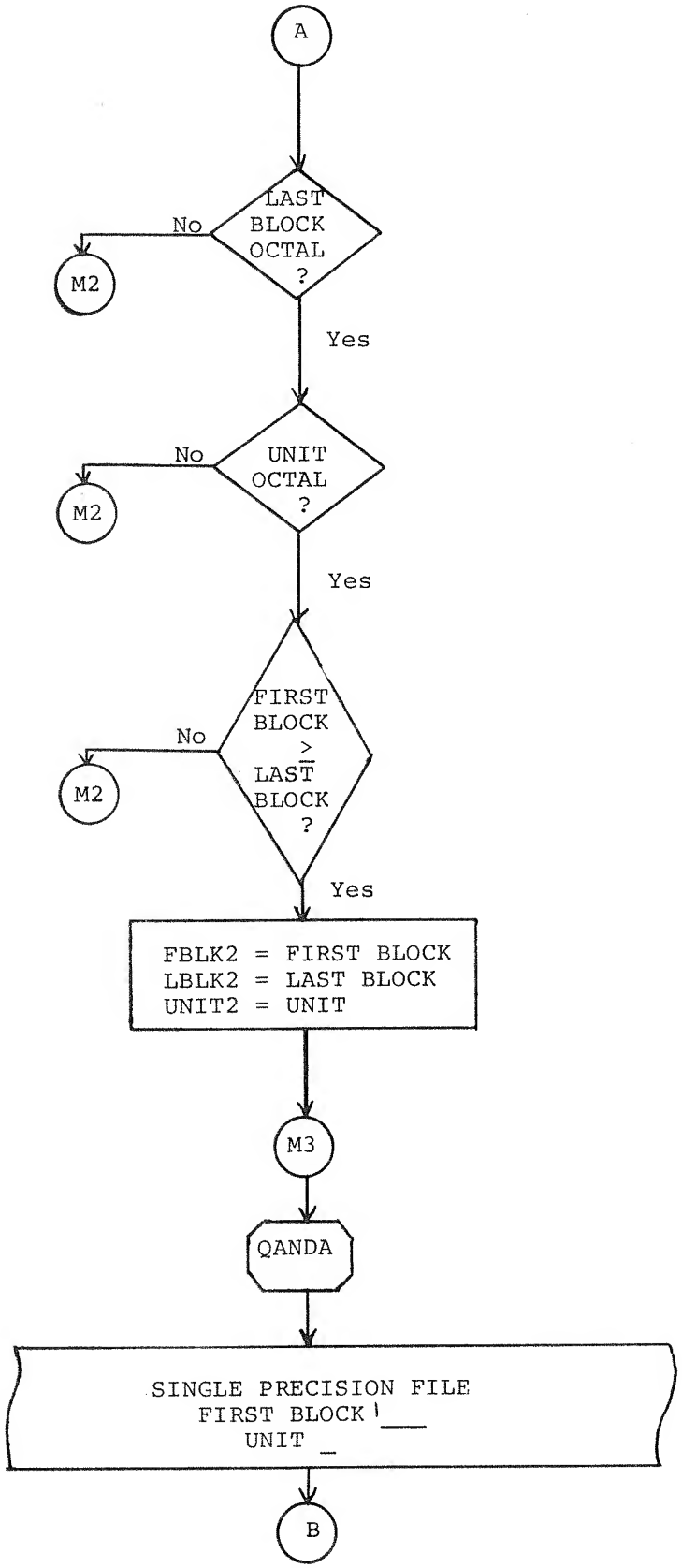
A. High/Low format

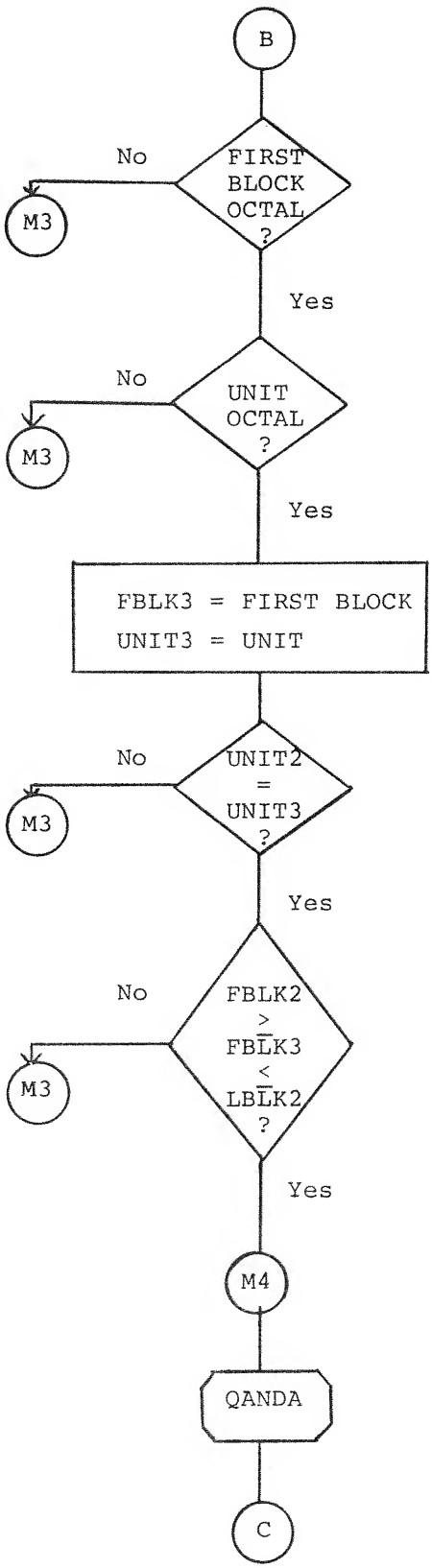
Change Location 53Ø to 31Ø1
Change Location 535 to 31ØØ
Change Location 614 to 31ØØ
Change Location 616 to 31Ø1

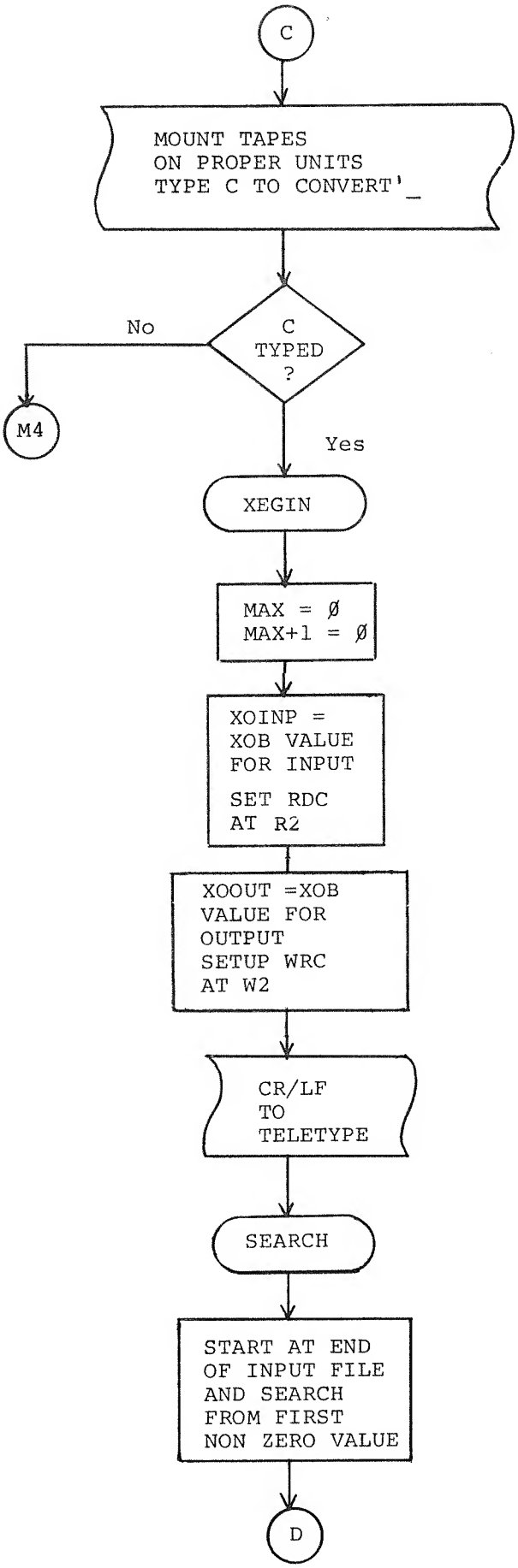
B. Scaling to ±11 Bits

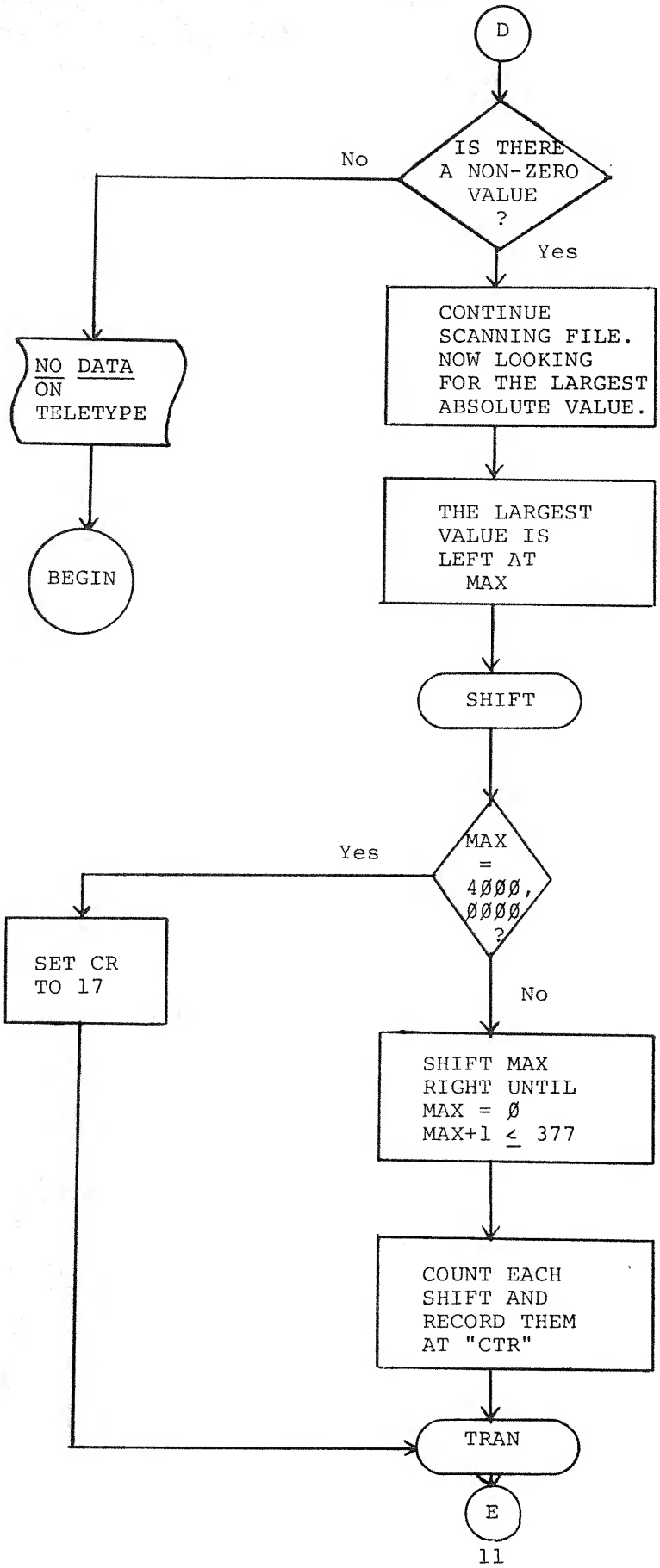
Change Location 1Ø5 to 4ØØØ
Change Location 264 to ØØ13

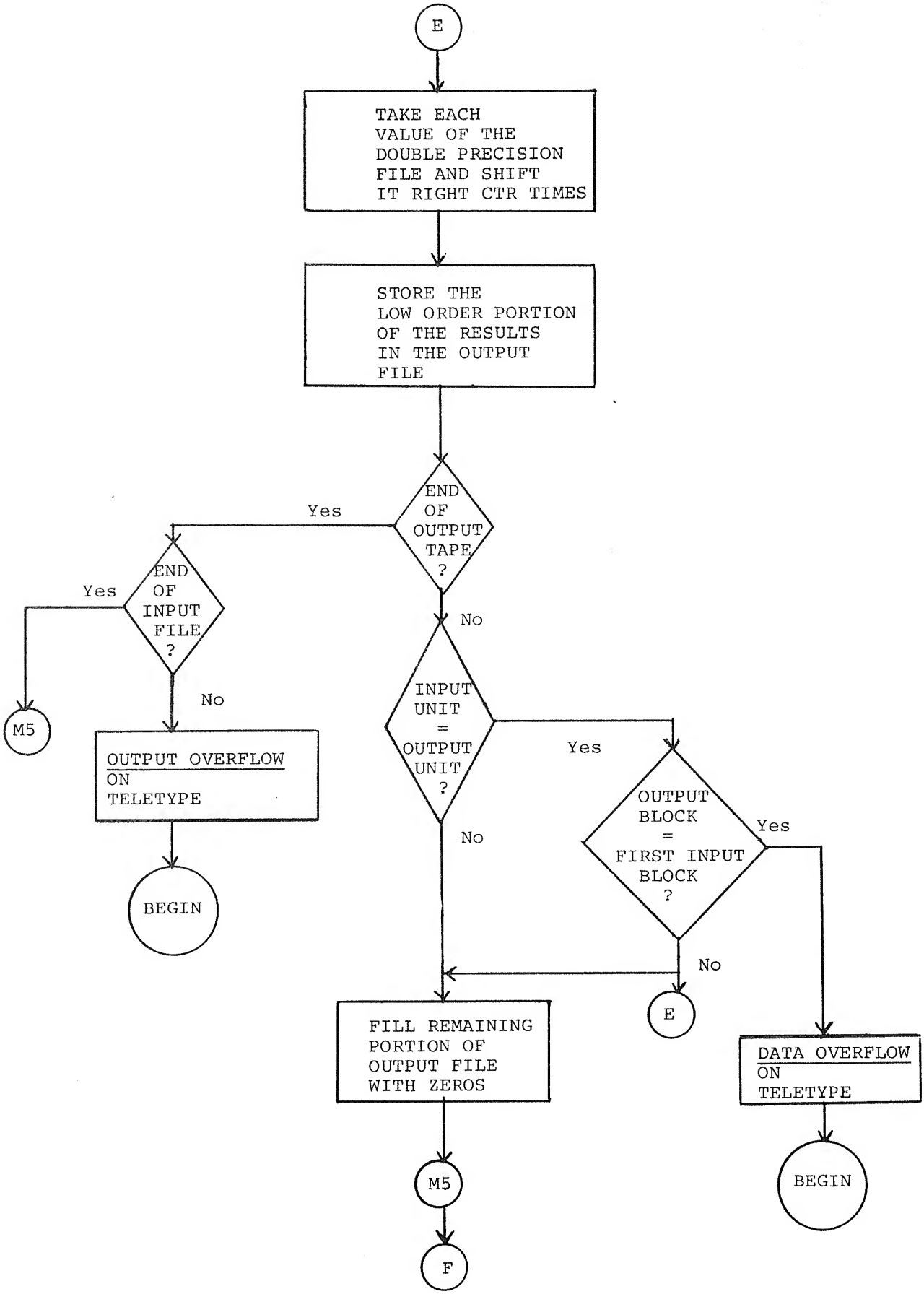

BEGIN
M1
QANDA
SINPRE
CONVERT A DOUBLE PRECISION FILE
TO A SINGLE PRECISION FILE
TYPE C TO CONTINUE!_
C
TYPED
?
No
M2
Yes
M2
QANDA
DOUBLE PRECISION FILE
FIRST BLOCK!_ _ _
LAST BLOCK _ _ _
UNIT _
FIRST
BLOCK
OCTAL
?
No
M2
Yes
A

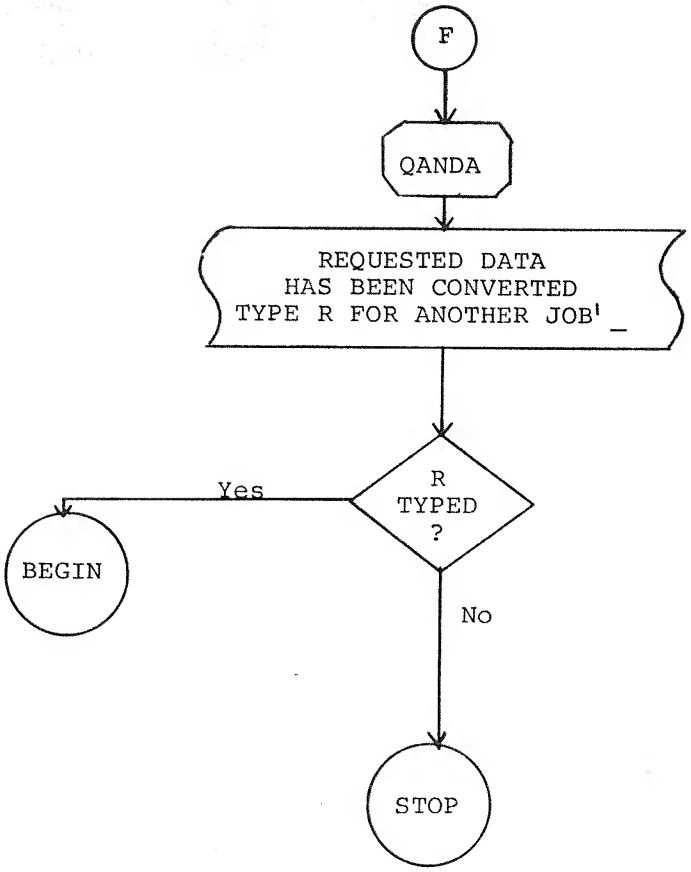

A
LAST BLOCK OCTAL ?
No
M2
Yes
UNIT OCTAL ?
No
M2
Yes
FIRST BLOCK > LAST BLOCK ?
No
M2
Yes
FBLK2 = FIRST BLOCK
LBLK2 = LAST BLOCK
UNIT2 = UNIT
M3
QANDA
SINGLE PRECISION FILE
FIRST BLOCK
UNIT
B


B
FIRST BLOCK OCTAL ?
No
M3
Yes
UNIT OCTAL ?
No
M3
Yes
FBLK3 = FIRST BLOCK
UNIT3 = UNIT
UNIT2 = UNIT3 ?
No
M3
Yes
FBLK2 > FBLK3 < LBLK2 ?
No
M3
Yes
M4
QANDA
C


C
MOUNT TAPES
ON PROPER UNITS
TYPE C TO CONVERT'_
C
TYPED
?
No
M4
Yes
XEGIN
MAX = Ø
MAX+1 = Ø
XOINP =
XOB VALUE
FOR INPUT
SET RDC
AT R2
XOOUT =XOB
VALUE FOR
OUTPUT
SETUP WRC
AT W2
CR/LF
TO
TELETYPE
SEARCH
START AT END
OF INPUT FILE
AND SEARCH
FROM FIRST
NON ZERO VALUE
D


D
IS THERE A NON-ZERO VALUE ?
No
Yes
NO DATA ON TELETYPE
CONTINUE SCANNING FILE. NOW LOOKING FOR THE LARGEST ABSOLUTE VALUE.
BEGIN
THE LARGEST VALUE IS LEFT AT MAX
SHIFT
MAX = 4ØØØ,ØØØØ ?
Yes
No
SET CR TO 17
SHIFT MAX RIGHT UNTIL MAX = Ø MAX+1 ≤ 377
COUNT EACH SHIFT AND RECORD THEM AT "CTR"
TRAN
E


E
TAKE EACH VALUE OF THE DOUBLE PRECISION FILE AND SHIFT IT RIGHT CTR TIMES
STORE THE LOW ORDER PORTION OF THE RESULTS IN THE OUTPUT FILE
END OF OUTPUT TAPE ?
Yes
No
END OF INPUT FILE ?
Yes
No
M5
OUTPUT OVERFLOW ON TELETYPE
BEGIN
INPUT UNIT = OUTPUT UNIT ?
Yes
No
OUTPUT BLOCK = FIRST INPUT BLOCK ?
Yes
No
E
DATA OVERFLOW ON TELETYPE
BEGIN
FILL REMAINING PORTION OF OUTPUT FILE WITH ZEROS
M5
F


F
QANDA
REQUESTED DATA
HAS BEEN CONVERTED
TYPE R FOR ANOTHER JOB!
R
TYPED
?
Yes
No
BEGIN
STOP

INDEX

```
0000                    *20
0001                    /SINPRE
0002                    /PAGE 0
0003                            PMODE
0004                            *10
0005        0010  0000  XR0,    0
0006        0011  0001  XR1,    1
0007        0012  0002  XR2,    2
0010                            *20
0011        0020  6141          LINC
0012                            LMODE
0013        0021  0602          LIF 2
0014        0022  6020          JMP BEGIN
0015                            PMODE
0016                            *50
0017        0050  0000  FTB,    0
0020        0051  0000  LTB,    0
0021        0052  0000  ITU,    0
0022        0053  0000  OFTB,   0
0023        0054  0000  OTU,    0
0024                            *70
0025        0070  0700  C700,   700
0026        0071  0704  C704,   704
0027        0072  0000  RTBLK,  0
0030        0073  0000  STSW,   0
0031        0074  2377  BBUFA,  TBUF+377
0032        0075  2000  TBUFA,  TBUF
0033        0076  0265  READA,  READ
0034        0077  0304  WRITEA, WRITE
0035        0100  0000  INWORD, 0
0036        0101  0000          0
0037        0102  0000  MAX,    0
0040        0103  0000          0
0041        0104  0000  PTR,    0
0042        0105  7400  C7400,  7400
0043        0106  0000  CTR,    0
0044        0107  0000  OTBLK,  0
0045        0110  2377  OBUFA,  OBUF-1
0046        0111  2777  OEND,   OBUF+377
0047        0112  0000  TCTR,   0
0050        0113  0777  C777,   777
0051        0114  1000  TTYOA,  TTYO
0052        0115  0010  C1X,    10
0053        0116  1015  CRLFA,  CRLF
0054        0117  0736  ALDONE, DONEAL
0055        0120  0000  XOINP,  0
0056        0121  0000  XOOUT,  0
0057        0122  4000  C4X,    4000
0060        0123  5000  C5X,    5000
0061        0124  0323  RSTRTA, RSTRT
0062        0125  7400  M4X,    -400
0063                            *200
0064        0200  7300  XEGIN,  CLA CLL
0065        0201  3102          DCA MAX
0066        0202  3103          DCA MAX+1
0067        0203  1052          TAD ITU
0070        0204  7110          CLL RAR
0071        0205  3120          DCA XOINP
0072        0206  1070          TAD C700
0073        0207  7430          SZL
0074        0210  1115          TAD C1X
0075        0211  3277          DCA R2
=
```

```
0076    0212  1054          TAD OTU
0077    0213  7110          CLL RAR
0100    0214  3121          DCA XOOUT
0101    0215  1071          TAD C704
0102    0216  7430          SZL
0103    0217  1115          TAD C1X
0104    0220  3316          DCA W2
0105    0221  3106          DCA CTR
0106    0222  6046          TLS
0107    0223  4516          JMS I CRLFA
0110    0224  5625          JMP I .+1
0111    0225  0400          SRCH
0112                  /
0113                  /
0114                  /THIS ROUTINE WILL SHIFT THE
0115                  /MAX DP VALUE TO 8 BITS
0116                  /THE NUMBER OF SHIFTS IS IN CTR
0117                  /
0120                  /
0121    0226  7300    SHIFT,  CLA CLL
0122    0227  1102            TAD MAX
0123    0230  7004            RAL
0124    0231  7660            SZA SNL CLA
0125    0232  5241            JMP S3
0126    0233  1103            TAD MAX+1
0127    0234  7440            SZA
0130    0235  5241            JMP S3
0131    0236  1264            TAD C17X
0132    0237  3106            DCA CTR
0133    0240  5663            JMP I S4
0134    0241  7200    S3,     CLA
0135    0242  1102            TAD MAX
0136    0243  7740            SZA CLA CLL
0137    0244  5253            JMP S1
0140    0245  1103            TAD MAX+1
0141    0246  0105            AND C7400
0142    0247  7650            SNA CLA
0143    0250  5663            JMP I S4
0144    0251  7100            CLL
0145    0252  5256            JMP S2
0146    0253  1102    S1,     TAD MAX
0147    0254  7010            RAR
0150    0255  3102            DCA MAX
0151    0256  1103    S2,     TAD MAX+1
0152    0257  7010            RAR
0153    0260  3103            DCA MAX+1
0154    0261  2106            ISZ CTR
0155    0262  5226            JMP SHIFT
0156    0263  0600    S4,     TRAN
0157    0264  0017    C17X,   17
0160                  /
0161                  /
0162                  /READ OR WRITE 1 BLOCK TO
0163                  /THE SPECIFIED UNITS
0164                  /
0165                  /
0166    0265  0000    READ,   0
0167    0266  1072            TAD RTBLK
0170    0267  0113            AND C777
0171    0270  1122            TAD C4X
0172    0271  3300            DCA R1
0173    0272  6141            LINC
0174                          LMODE
=
```

```
0175    0273  2120          ADD XOINP
0176    0274  0001          AXO
0177    0275  0011          CLR
0200    0276  0641          LDF 1
0201    0277  0000  R2,     0
0202    0300  0000  R1,     0
0203    0301  0011          CLR
0204    0302  0002          PDP
0205                        PMODE
0206    0303  5665          JMP I READ
0207    0304  0000  WRITE,  0
0210    0305  1107          TAD OTBLK
0211    0306  0113          AND C777
0212    0307  1123          TAD C5X
0213    0310  3317          DCA W1
0214    0311  6141          LINC
0215                        LMODE
0216    0312  2121          ADD XOOUT
0217    0313  0001          AXO
0220    0314  0011          CLR
0221    0315  0641          LDF 1
0222    0316  0000  W2,     0
0223    0317  0000  W1,     0
0224    0320  0011          CLR
0225    0321  0002          PDP
0226                        PMODE
0227    0322  5704          JMP I WRITE
0230                  /
0231                  /ALL ERROR CONDITIONS END UP HERE
0232                  /RETURN TO MSG 1 OF SET UP
0233                  /
0234    0323  6141  RSTRT,  LINC
0235                        LMODE
0236    0324  0602          LIF 2
0237    0325  6020          JMP BEGIN
0240                        PMODE
0241                  /
0242                  /
0243                  /
0244                  /SEARCH THE INPUT FILE FOR THE
0245                  /THE MAX VALUE (ABSOLUTE)
0246                  /IF A VALUE IS NEG. MAKE IT POS
0247                  /SEARCHES FROM THE END OF THE
0250                  /INPUT FILE AND SKIPS THE
0251                  /ENDING ZEROS
0252                  /THE MAX VALUE IS LEFT IN MAX
0253                        *400
0254    0400  7200  SRCH,   CLA
0255    0401  1051          TAD LTB
0256    0402  3072          DCA RTBLK
0257    0403  7001          IAC
0260    0404  3073          DCA STSW
0261    0405  7001  TAG1,   IAC
0262    0406  1074          TAD BBUFA
0263    0407  3104          DCA PTR
0264    0410  4476          JMS I READA
0265    0411  1073          TAD STSW
0266    0412  7650          SNA CLA
0267    0413  5244          JMP TAG2
0270    0414  4323  TAG4,   JMS GETWRD
0271    0415  1100          TAD INWORD
0272    0416  7640          SZA CLA
0273    0417  5241          JMP TAG3
```

```
0274    0420  1101          TAD INWORD+1
0275    0421  7640          SZA CLA
0276    0422  5241          JMP TAG3
0277                  /
0300                  /CHECK FOR TOP OF BUFFER
0301                  /
0302    0423  1104          TAD PTR
0303    0424  7041          CIA
0304    0425  1075          TAD TBUFA
0305    0426  7710          SPA CLA
0306    0427  5214          JMP TAG4
0307                  /
0310                  /CHECK FOR START OF FILE
0311                  /
0312    0430  1072          TAD RTBLK
0313    0431  7041          CIA
0314    0432  1050          TAD FTB
0315    0433  7650          SNA CLA
0316    0434  5317          JMP TAGA
0317    0435  7040          CMA
0320    0436  1072          TAD RTBLK
0321    0437  3072          DCA RTBLK
0322    0440  5205          JMP TAG1
0323                  /
0324                  /HERE AFTER FIRST NON ZERO VALUE
0325                  /
0326    0441  2104  TAG3,    ISZ PTR
0327    0442  2104          ISZ PTR
0330    0443  3073          DCA STSW
0331                  /
0332                  /NON ZERO VALUES
0333                  /
0334    0444  4323  TAG2,    JMS GETWRD
0335    0445  1100          TAD INWORD
0336    0446  7700          SMA CLA
0337    0447  5260          JMP TAG5
0340                  /
0341                  /IF NEG  MAKE POS
0342                  /
0343    0450  1100          TAD INWORD
0344    0451  7040          CMA
0345    0452  3100          DCA INWORD
0346    0453  1101          TAD INWORD+1
0347    0454  7041          CIA
0350    0455  7450          SNA
0351    0456  2100          ISZ INWORD
0352    0457  3101          DCA INWORD+1
0353                  /
0354                  /COMPARE TO MAX
0355                  /
0356    0460  1102  TAG5,    TAD MAX
0357    0461  7161          CLL CML CIA
0360    0462  1100          TAD INWORD
0361    0463  7530          SZL SPA
0362    0464  5300          JMP TAG6
0363    0465  7640          SZA CLA
0364    0466  5274          JMP FMAX
0365    0467  1103          TAD MAX+1
0366    0470  7141          CIA CLL
0367    0471  1101          TAD INWORD+1
0370    0472  7620          SNL CLA
0371    0473  5300          JMP TAG6
0372                  /
```

```
0373                    /REPLACE MAX IF INWORD
0374                    /IS LARGER (OR EQUAL)
0375                    /
0376    0474  1100  FMAX,   TAD INWORD
0377    0475  3102          DCA MAX
0400    0476  1101          TAD INWORD+1
0401    0477  3103          DCA MAX+1
0402                    /
0403                    /TOP OF BUFFER CHECK
0404                    /
0405    0500  1104  TAG6,   TAD PTR
0406    0501  7041          CIA
0407    0502  1075          TAD TBUFA
0410    0503  7710          SPA CLA
0411    0504  5244          JMP TAG2
0412                    /
0413                    /END OF TAPE CHECK
0414                    /
0415    0505  1072          TAD RTBLK
0416    0506  7041          CIA
0417    0507  1050          TAD FTB
0420    0510  7650          SNA CLA
0421                    /
0422                    /DONE IF END OF FILE
0423                    /
0424    0511  5716          JMP I TAG7
0425    0512  7040          CMA
0426    0513  1072          TAD RTBLK
0427    0514  3072          DCA RTBLK
0430    0515  5205          JMP TAG1
0431    0516  0226  TAG7,   SHIFT
0432    0517  1322  TAGA,   TAD NDAT
0433    0520  4514          JMS I TTYOA
0434    0521  5524          JMP I RSTRTA
0435    0522  1032  NDAT,   NODAT-1
0436                    /
0437                    /DECREMENTS PTR AND LEAVES DP WORD
0440                    /AT INWORD
0441                    /
0442    0523  0000  GETWRD, 0
0443    0524  7040          CMA
0444    0525  1104          TAD PTR
0445    0526  3104          DCA PTR
0446    0527  1504          TAD I PTR
0447    0530  3100          DCA INWORD
0450    0531  7040          CMA
0451    0532  1104          TAD PTR
0452    0533  3104          DCA PTR
0453    0534  1504          TAD I PTR
0454    0535  3101          DCA INWORD+1
0455    0536  5723          JMP I GETWRD
0456                    /
0457                    /
0460                    /TRANSLATES EACH VALUE OF THE
0461                    /INPUT FILE TO A SINGLE PRECISION
0462                    /NUMBER
0463                    /IT CONSTRUCTS THE OUTPUT FILE
0464                    /STARTING AT OFTB
0465                    /DOES NOT LET THE OUTPUT FILE
0466                    /OVERLAP THE INPUT FILE IF THE UNITS
0467                    /ARE COMMON
0470                        *600
0471    0600  7200  TRAN,   CLA
=
```

```
0472    0601  1050          TAD FTB
0473    0602  3072          DCA RTBLK
0474    0603  1053          TAD OFTB
0475    0604  3107          DCA OTBLK
0476    0605  1110          TAD OBUFA
0477    0606  3012          DCA XR2
0500    0607  4476  TR1,     JMS I READA
0501    0610  7040          CMA
0502    0611  1075          TAD TBUFA
0503    0612  3011          DCA XR1
0504    0613  1411  TR2,     TAD I XR1
0505    0614  3101          DCA INWORD+1
0506    0615  1411          TAD I XR1
0507    0616  3100          DCA INWORD
0510                        /
0511                        /NO SHIFT IF CTR IS 0
0512                        /
0513    0617  1106          TAD CTR
0514    0620  7450          SNA
0515    0621  5237          JMP TR6
0516    0622  7041          CIA
0517    0623  3112          DCA TCTR
0520                        /
0521                        /SHIFT RIGHT TCTR TIMES
0522                        /
0523    0624  7100  TR3,     CLL
0524    0625  1100          TAD INWORD
0525    0626  7510          SPA
0526    0627  7120          STL
0527    0630  7010          RAR
0530    0631  3100          DCA INWORD
0531    0632  1101          TAD INWORD+1
0532    0633  7010          RAR
0533    0634  3101          DCA INWORD+1
0534    0635  2112          ISZ TCTR
0535    0636  5224          JMP TR3
0536                        /
0537                        /LSB TO OUTPUT BUFFER
0540                        /
0541    0637  1101  TR6,     TAD INWORD+1
0542    0640  3412          DCA I XR2
0543                        /
0544                        /CHECK OUTPUT BUFFER FULL
0545                        /
0546    0641  1012          TAD XR2
0547    0642  7041          CIA
0550    0643  1111          TAD OEND
0551    0644  7640          SZA CLA
0552    0645  5310          JMP TR5
0553    0646  4477          JMS I WRITEA
0554    0647  2107          ISZ OTBLK
0555    0650  1110          TAD OBUFA
0556    0651  3012          DCA XR2
0557                        /
0560                        /CHECK TAPE LIMIT
0561                        /
0562    0652  1107          TAD OTBLK
0563    0653  7041          CIA
0564    0654  1113          TAD C777
0565    0655  7700          SMA CLA
0566    0656  5273          JMP TR4
0567                        /
0570                        /NO MORE INPUT IF AT LIMIT
```

```
0571                        /
0572        0657  4320              JMS CIBF
0573        0660  7650              SNA CLA
0574        0661  5266              JMP ERROR
0575        0662  4327              JMS CIPT
0576        0663  7650              SNA CLA
0577        0664  5266              JMP ERROR
0600        0665  5517              JMP I ALDONE
0601        0666  1271  ERROR,      TAD OUTOVA
0602        0667  4514              JMS I TTYOA
0603        0670  5524              JMP I RSTRTA
0604        0671  1043  OUTOVA,     OUTOV=1
0605        0672  1064  DATOVA,     DATOV=1
0606                        /
0607                        /CHECK FOR OVERFLOW IF UNITS
0610                        /ARE EQUAL
0611                        /
0612        0673  1052  TR4,        TAD ITU
0613        0674  7041              CIA
0614        0675  1054              TAD OTU
0615        0676  7640              SZA CLA
0616        0677  5310              JMP TR5
0617        0700  1107              TAD OTBLK
0620        0701  7041              CIA
0621        0702  1050              TAD FTB
0622        0703  7640              SZA CLA
0623        0704  5310              JMP TR5
0624        0705  1272              TAD DATOVA
0625        0706  4514              JMS I TTYOA
0626        0707  5524              JMP I RSTRTA
0627                        /
0630                        /CHECK FOR END OF INPUT
0631                        /
0632        0710  4320  TR5,        JMS CIBF
0633        0711  7650              SNA CLA
0634        0712  5213              JMP TR2
0635        0713  4327              JMS CIPT
0636        0714  7640              SZA CLA
0637        0715  5517              JMP I ALDONE
0640        0716  2072              ISZ RTBLK
0641        0717  5207              JMP TR1
0642                        /
0643                        /
0644                        /CHECK STATUS OF INPUT BUFFER
0645                        /
0646        0720  0000  CIBF,       0
0647        0721  1011              TAD XR1
0650        0722  7041              CIA
0651        0723  1074              TAD BBUFA
0652        0724  7650              SNA CLA
0653        0725  7001              IAC
0654        0726  5720              JMP I CIBF
0655                        /
0656                        /
0657                        /CHECK STATUS OF INPUT FILE
0660                        /
0661        0727  0000  CIPT,       0
0662        0730  1072              TAD RTBLK
0663        0731  7041              CIA
0664        0732  1051              TAD LTB
0665        0733  7650              SNA CLA
0666        0734  7001              IAC
0667        0735  5727              JMP I CIPT
```

```
0670                    /
0671                    /
0672                    /FILL REMAINING PORTION OF THE
0673                    /OUTPUT BUFFER WITH ZEROS
0674                    /THEN WRITE IT ON TAPE
0675    0736  1012  DONEAL, TAD XR2
0676    0737  7041          CIA
0677    0740  1111          TAD OEND
0700    0741  1125          TAD M4X
0701    0742  7650          SNA CLA
0702    0743  5353          JMP DONE1
0703    0744  3412  DONE2,  DCA I XR2
0704    0745  1012          TAD XR2
0705    0746  7041          CIA
0706    0747  1111          TAD OEND
0707    0750  7640          SZA CLA
0710    0751  5344          JMP DONE2
0711    0752  4477          JMS I WRITEA
0712    0753  6141  DONE1,  LINC
0713                        LMODE
0714    0754  0602          LIF 2
0715    0755  6216          JMP M5
0716                    /
0717                    /
0720                    /
0721                        PMODE
0722                        *1000
0723    1000  0000  TTYO,    0
0724    1001  3010          DCA XR0
0725    1002  4215          JMS CRLF
0726    1003  6041  TT1,     TSF
0727    1004  5203          JMP .-1
0730    1005  1410          TAD I XR0
0731    1006  7450          SNA
0732    1007  5213          JMP TT2
0733    1010  6046          TLS
0734    1011  7200          CLA
0735    1012  5203          JMP TT1
0736    1013  4215  TT2,     JMS CRLF
0737    1014  5600          JMP I TTYO
0740    1015  0000  CRLF,    0
0741    1016  1231          TAD CC
0742    1017  6041          TSF
0743    1020  5217          JMP .-1
0744    1021  6046          TLS
0745    1022  7200          CLA
0746    1023  1232          TAD LF
0747    1024  6041          TSF
0750    1025  5224          JMP .-1
0751    1026  6046          TLS
0752    1027  7200          CLA
0753    1030  5615          JMP I CRLF
0754    1031  0215  CC,      215
0755    1032  0212  LF,      212
0756                    /
0757                    /
0760    1033  0316  NODAT,   316
0761    1034  0317          317
0762    1035  0240          240
0763    1036  0304          304
0764    1037  0301          301
0765    1040  0324          324
0766    1041  0301          301
```

```
0767      1042  0207           207
0770      1043  0000           0
0771      1044  0317  OUTOV,   317
0772      1045  0325           325
0773      1046  0324           324
0774      1047  0320           320
0775      1050  0325           325
0776      1051  0324           324
0777      1052  0240           240
1000      1053  0317           317
1001      1054  0326           326
1002      1055  0305           305
1003      1056  0322           322
1004      1057  0306           306
1005      1060  0314           314
1006      1061  0317           317
1007      1062  0327           327
1010      1063  0207           207
1011      1064  0000           0
1012      1065  0304  DATOV,   304
1013      1066  0301           301
1014      1067  0324           324
1015      1070  0301           301
1016      1071  0240           240
1017      1072  0317           317
1020      1073  0326           326
1021      1074  0305           305
1022      1075  0322           322
1023      1076  0306           306
1024      1077  0314           314
1025      1100  0317           317
1026      1101  0327           327
1027      1102  0207           207
1030      1103  0000           0
1031                  /
1032                  /
1033                  /INPUT FILE BUFFER
1034                           *2000
1035      2000  0000  TBUF,    0
1036                  /
1037                  /
1040                  /OUTPUT FILE BUFFER
1041                           *2400
1042      2400  0000  OBUF,    0
1043                           LMODE
1044                           SEGMNT 2
1045                           *20
1046      0020  1020  BEGIN,   LDA I
1047      0021  0020           20
1050      0022  0004           ESF                 /SET IO PRESET
1051      0023  6033  START,   JMP M1
1052      0024  6050           JMP M2
1053      0025  6124           JMP M3
1054      0026  6201           JMP M4
1055      0027  0002           PDP
1056                           PMODE
1057      4030  5631           JMP I ,+1
1060      4031  0200           200
1061                           LMODE
1062      0032  6216           JMP M5
1063      0033  0057  M1,      SET 17
1064      0034  0000           0
1065      0035  6666  M1A,     JMP QAINIT
```

```
1066    0036  0342          MESS1
1067    0037  0656          ANSWER
1070    0040  6322          JMP CHKSNS
1071    0041  0070          SET I 10
1072    0042  0656          ANSWER
1073    0043  1330          LDH I 10
1074    0044  1420          SHD I
1075    0045  0300          0300              /A  C?
1076    0046  6017          JMP 17
1077    0047  6035          JMP M1A
1100    0050  0057  M2,     SET 17
1101    0051  0000          0
1102    0052  6666  M2A,    JMP QAINIT
1103    0053  0434          MESS2
1104    0054  0656          ANSWER
1105    0055  6322          JMP CHKSNS
1106    0056  0070          SET I 10
1107    0057  0656          ANSWER
1110    0060  1020          LDA I             /SET UP FOR
1111    0061  0010          10                /OCTAL INPUT
1112    0062  1040          STA               /TO OCTAL
1113    0063  0266          MULWD             /CONVERSION
1114    0064  0017          COM
1115    0065  4260          STC UPLIM
1116    0066  6231          JMP CHAR
1117    0067  0467          SKP
1120    0070  6052          JMP M2A
1121    0071  1000          LDA
1122    0072  0332          OCTAC
1123    0073  6325          JMP ZERO
1124    0074  4334          STC FBLK2         /FIRST BLK NO
1125    0075  6231          JMP CHAR
1126    0076  0467          SKP
1127    0077  6052          JMP M2A
1130    0100  1000          LDA
1131    0101  0332          OCTAC
1132    0102  6325          JMP ZERO
1133    0103  4335          STC LBLK2         /LAST BLK NO
1134    0104  1000          LDA
1135    0105  0334          FBLK2
1136    0106  1120          ADA I
1137    0107  7776          -1
1140    0110  0017          COM
1141    0111  2335          ADD LBLK2
1142    0112  0451          APO               /LSTBLK>FSTBLK?
1143    0113  6052          JMP M2A           /NO
1144    0114  6231          JMP CHAR          /YES
1145    0115  0467          SKP
1146    0116  6052          JMP M2A
1147    0117  1000          LDA
1150    0120  0332          OCTAC
1151    0121  6325          JMP ZERO
1152    0122  4336          STC UNIT2         /UNIT NO
1153    0123  6017          JMP 17
1154    0124  0057  M3,     SET 17
1155    0125  0000          0
1156    0126  6666  M3A,    JMP QAINIT
1157    0127  0503          MESS3
1160    0130  0656          ANSWER
1161    0131  6322          JMP CHKSNS
1162    0132  0070          SET I 10
1163    0133  0656          ANSWER
1164    0134  6231          JMP CHAR
```

```
1165    0135  0467          SKP
1166    0136  6126          JMP M3A
1167    0137  1000          LDA
1170    0140  0332          OCTAC
1171    0141  6325          JMP ZERO
1172    0142  4337          STC FBLK3       /FIRST BLK TEMP
1173    0143  6231          JMP CHAR
1174    0144  0467          SKP
1175    0145  6126          JMP M3A
1176    0146  1000          LDA
1177    0147  0332          OCTAC
1200    0150  6325          JMP ZERO
1201    0151  1040          STA
1202    0152  0340          UNIT3           /UNIT3 TEMP
1203    0153  1440          SAE
1204    0154  0336          UNIT2           /UNIT3 = UNIT2?
1205    0155  6177          JMP OK
1206    0156  1000          LDA             /YES
1207    0157  0334          FBLK2
1210    0160  0017          COM
1211    0161  2337          ADD FBLK3
1212    0162  0470          AZE I
1213    0163  6126          JMP M3A
1214    0164  0451          APO
1215    0165  6177          JMP OK
1216    0166  1000          LDA
1217    0167  0337          FBLK3
1220    0170  0017          COM
1221    0171  2335          ADD LBLK2
1222    0172  0470          AZE I
1223    0173  6126          JMP M3A
1224    0174  0451          APO
1225    0175  0467          SKP             /NO
1226    0176  6126          JMP M3A         /YES
1227    0177  6272  OK,     JMP CHARLY
1230    0200  6017          JMP 17
1231    0201  0057  M4,     SET 17
1232    0202  0000          0
1233    0203  6666  M4A,    JMP QAINIT
1234    0204  0541          MESS4
1235    0205  0656          ANSWER
1236    0206  6322          JMP CHKSNS
1237    0207  0070          SET I 10
1240    0210  0656          ANSWER
1241    0211  1330          LDH I 10
1242    0212  1420          SHD I
1243    0213  0300          0300            /A  C?
1244    0214  6017          JMP 17
1245    0215  6203          JMP M4A         /NO
1246    0216  6666  M5,     JMP QAINIT
1247    0217  0577          MESS5
1250    0220  0656          ANSWER
1251    0221  6741          JMP QARFSH
1252    0222  0070          SET I 10
1253    0223  0656          ANSWER
1254    0224  1330          LDH I 10
1255    0225  1420          SHD I
1256    0226  2200          2200            /AN R?
1257    0227  6020          JMP BEGIN
1260    0230  0000          HLT             /STOP
1261    0231  0056  CHAR,    SET 16
1262    0232  0000          0
1263    0233  0011          CLR
=
```

```
1264    0234  4332          STC OCTAC
1265    0235  1330  LOOP1,  LDH I 10
1266    0236  1420          SHD I
1267    0237  7400          7400            /E O ANS,F,
1270    0240  6016          JMP 16
1271    0241  1420          SHD I
1272    0242  3400          3400            /E O M?
1273    0243  6016          JMP 16
1274    0244  1420          SHD I
1275    0245  0000          0               /A BLANK?
1276    0246  6235          JMP LOOP1
1277    0247  1120          ADA I
1300    0250  7717          -60             /A DIGIT?
1301    0251  1040          STA
1302    0252  0333          NUM
1303    0253  1120          ADA I
1304    0254  0001          1
1305    0255  0451          APO             /NUM IS NONNEG?
1306    0256  6320          JMP XIT         /SHOULD BE
1307    0257  1120          ADA I
1310    0260  0000  UPLIM,  0               /IS NUM LESS
1311    0261  0471          APO I           /THAN 10?
1312    0262  6320          JMP XIT         /SHOULD BE
1313    0263  1000          LDA
1314    0264  0332          OCTAC
1315    0265  1260          MUL I
1316    0266  0000  MULWD,  0
1317    0267  2333          ADD NUM
1320    0270  4332          STC OCTAC
1321    0271  6235          JMP LOOP1
1322    0272  1000  CHARLY, LDA
1323    0273  0000          0
1324    0274  4317          STC RTN1
1325    0275  0055          SET 15
1326    0276  0341          INPTR
1327    0277  0640          LDF 0
1330    0300  1000          LDA
1331    0301  0334          FBLK2
1332    0302  1075          STA I 15
1333    0303  1000          LDA
1334    0304  0335          LBLK2
1335    0305  1075          STA I 15
1336    0306  1000          LDA
1337    0307  0336          UNIT2
1340    0310  1075          STA I 15
1341    0311  1000          LDA
1342    0312  0337          FBLK3
1343    0313  1075          STA I 15
1344    0314  1000          LDA
1345    0315  0340          UNIT3
1346    0316  1075          STA I 15
1347    0317  0000  RTN1,   0
1350    0320  0236  XIT,    XSK I 16
1351    0321  6016          JMP 16
1352    0322  0440  CHKSNS, SNS 0
1353    0323  6741          JMP QARFSH
1354    0324  6023          JMP START
1355    0325  1460  ZERO,   SAE I
1356    0326  7777          7777
1357    0327  0467          SKP
1360    0330  0011          CLR
1361    0331  6000          JMP 0
1362    0332  0000  OCTAC,  0
```

```
1363      0333  0000  NUM,    0
1364      0334  0000  FBLK2,  0
1365      0335  0000  LBLK2,  0
1366      0336  0000  UNIT2,  0
1367      0337  0000  FBLK3,  0
1370      0340  0000  UNIT3,  0
1371      0341  2047  INPTR,  2047
1372      0342  0640
1372      0343  4040
1372      0344  4040
1372      0345  4040
1372      0346  2311
1372      0347  1620
1372                  MESS1,  TEXT ǂF       SINPRE
1373      0350  2205
1373
1374      0351  4347
1374
1375      0352  4347
1375      0353  4310
1375      0354  4040
1375      0355  4040
1375      0356  0317
1375      0357  1626
1375      0360  0522
1375      0361  2440
1375      0362  0140
1375      0363  0417
1375      0364  2502
1375      0365  1405
1375      0366  4020
1375      0367  2205
1375      0370  0311
1375      0371  2311
1375      0372  1716
1375      0373  4006
1375      0374  1114
1375                  H     CONVERT A DOUBLE PRECISION FILE
1376      0375  0543
1376      0376  1040
1376      0377  4040
1376      0400  4040
1376      0401  4040
1376      0402  2417
1376      0403  4001
1376      0404  4023
1376      0405  1116
1376      0406  0714
1376      0407  0540
1376      0410  2022
1376      0411  0503
1376      0412  1123
1376      0413  1117
1376      0414  1640
1376      0415  0611
1376                  H         TO A SINGLE PRECISION FILE
1377      0416  1405
1377
1400      0417  4347
1400      0420  4306
1400      0421  2431
1400      0422  2005
1400      0423  4003
```

```
1400        0424   4024
1400        0425   1740
1400        0426   0317
1400        0427   1624
1400        0430   1116
1400        0431   2505
1400        0432   4074
1400        0433   6134
1400                      FTYPE C TO CONTINUE <1\Ƶ
1401        0434   0604
1401        0435   0214
1401        0436   0540
1401        0437   2022
1401        0440   0503
1401        0441   1123
1401        0442   1117
1401        0443   1640
1401        0444   0611
1401                      MESS2,  TEXT ƵFDBLE PRECISION FILE
1402        0445   1405
1402
1403        0446   4347
1403        0447   4306
1403        0450   4040
1403        0451   0611
1403        0452   2223
1403        0453   2440
1403        0454   0214
1403        0455   1703
1403        0456   1340
1403                      F  FIRST BLOCK <3
1404        0457   7463
1404        0460   4306
1404        0461   4040
1404        0462   4014
1404        0463   0123
1404        0464   2440
1404        0465   0214
1404        0466   1703
1404        0467   1340
1404                      F   LAST BLOCK <3
1405        0470   7463
1405        0471   4306
1405        0472   4040
1405        0473   4040
1405        0474   4040
1405        0475   4040
1405        0476   4025
1405        0477   1611
1405        0500   2440
1405        0501   7461
1405        0502   3400
1405                      F          UNIT <1\Ƶ
1406        0503   0623
1406        0504   1607
1406        0505   1440
1406        0506   2022
1406        0507   0503
1406        0510   1123
1406        0511   1117
1406        0512   1640
1406        0513   0611
1406                      MESS3,  TEXT ƵFSNGL PRECISION FILE
```

```
1407        0514   1405
1407
1410        0515   4347
1410        0516   4306
1410        0517   4040
1410        0520   0611
1410        0521   2223
1410        0522   2440
1410        0523   0214
1410        0524   1703
1410        0525   1340
1410                      F  FIRST BLOCK <3
1411        0526   7463
1411        0527   4306
1411        0530   4040
1411        0531   4040
1411        0532   4040
1411        0533   4040
1411        0534   4025
1411        0535   1611
1411        0536   2440
1411        0537   7461
1411        0540   3400
1411                      F          UNIT <1\Ż
1412        0541   0640
1412        0542   4040
1412        0543   4015
1412        0544   1725
1412        0545   1624
1412        0546   4024
1412        0547   0120
1412                      MESS4,  TEXT ŻF    MOUNT TAPES
1413        0550   0523
1413        0551   4306
1413        0552   4040
1413        0553   1716
1413        0554   4020
1413        0555   2217
1413        0556   2005
1413        0557   2240
1413        0560   2516
1413        0561   1124
1413                      F  ON PROPER UNITS
1414        0562   2343
1414
1415        0563   4743
1415        0564   0624
1415        0565   3120
1415        0566   0540
1415        0567   0340
1415        0570   2417
1415        0571   4003
1415        0572   1716
1415        0573   2605
1415        0574   2224
1415        0575   4074
1415        0576   6134
1415                      FTYPE C TO CONVERT <1\Ż
1416        0577   0640
1416        0600   4040
1416        0601   2205
1416        0602   2125
1416        0603   0523
-
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```
1416      0604  2405
1416      0605  0440
1416      0606  0401
1416                    MESS5,  TEXT ≠F   REQUESTED DATA
1417      0607  2401
1417      0610  4306
1417      0611  4010
1417      0612  0123
1417      0613  4002
1417      0614  0505
1417      0615  1640
1417      0616  0317
1417      0617  1626
1417      0620  0522
1417      0621  2405
1417                    F HAS BEEN CONVERTED
1420      0622  0443
1420
1421      0623  4743
1421      0624  1040
1421      0625  4040
1421      0626  4040
1421      0627  4040
1421      0630  4040
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1421      0634  4006
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1421      0641  0522
1421      0642  4012
1421                    H          TYPE R FOR ANOTHER JOB
1422      0643  1702
1422
1423      0644  4347
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1423      0646  4040
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1423      0650  4040
1423      0651  2205
1423      0652  2014
1423      0653  3140
1423      0654  7461
1423      0655  3400
1423                    F       REPLY <1\≠
1424      0656  0000  ANSWER,  0
1425                            *.+7
1426                            NOLIST
2402      1554  0000  AAAEND,  0
```

0000 ERRORS

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