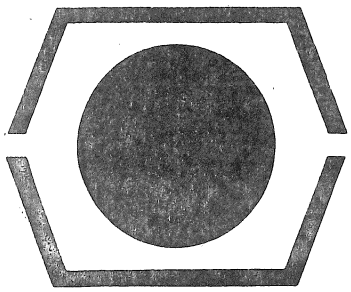

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TITLE RAW - A REVERSE ASSEMBLER OF WINDSOR

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```
                /**************************RAW1*******************
                / COMMONLY USED CHARACTERS

                A=301
                B=302
                C=303
                D=304
                E=305
                F=306
                G=307
                H=310
                II=311
                J=312
                K=313
                L=314
                M=315
                N=316
                O=317
                P=320
                Q=321
                R=322
                S=323
                T=324
                U=325
                V=326
                X=330
                Y=331
                ZZ=332
                CR=215
                LF=212
                SP=240
                TWO=262

                *10

                / TABLE POINTERS

0010  0000    BUFPT,0          / BUFFER
0011  0000    DIRT,0           / DIRECT ADDRESS
0012  0000    INDT,0           / INDIRECT ADDRESS POINTER
0013  0000    INDAT,0          / INDIRECT ADDRESS
0014  0000    VT,0             / VARIABLE TABLE
0015  0000    PRINPT,0         / PRINT OUTPUT

                / OTHER POINTERS

                *20

0020  0000    ENDPR,0          / STRING END POINTER
0021  0000    INSPT,0          / INSTRUCTION STRING POINTER
0022  0000    SYMST,0          / SYMBOL STRING POINTER
```

These are also the Index Registers

```
                / TEMPORARY STORAGE LOCATIONS

0023  0000  TEM1,0
0024  0000  TEM2,0
0025  0000  TEM3,0
0026  0000  ADDR,0
0027  0000  LOCN,0
0030  0000  BUFFPT,0
0031  0000  STORE,0
0032  0000  MVS,0              / - VARIABLE SEARCH CHARACTER
0033  0000  LS,0               / LIST START ADDRESS
0034  0000  MLS,0              / - LS
0035  0000  LST,0              / NEXT LIST START ADDRESS
0036  0000  BUFS,0             / BUFFER ACTUAL START
0037  0000  BUFE,0             / BUFFER ACTUAL END

                / COUNTERS

0040  0000  BUFC,0             / BUFFER COUNTER
0041  0000  VTC,0              / VARIABLE COUNT
0042  0000  MVTC,0             / - VTC
0043  0000  DIC,0              / DIRECT ADDRESS COUNTER
0044  0000  MDIC,0             / - DIC
0045  0000  INC,0              / INDIRECT POINTER COUNTER
0046  0000  MINC,0             / - INC
0047  0000  INDAC,0            / INDIRECT ADDRESS COUNTER
0050  0000  MINDAC,0           / - INDAC
0051  0000  BLC,0              / BLOCK COUNTER

                / FLAGS

0052  0000  ASTFL,0            / ASTERISK FLAG
0053  0000  LAI,0              / LABELLED INSTRUCTION FLAG
0054  0000  HLR,0              / HIGH/LOW SPEED READER FLAG
0055  0000  EAFL,0             / EAE FLAG
0056  0000  FLF,0              / FL. PT. FLAG
0057  0000  JF,0               / JMP/JMS FLAG
0060  0000  OUTFL,0           / OUTPUT FORMAT FLAG
0061  0000  SF,0               / SKIP FLAG
0062  0000  SKJMFL,0          / ISZ.JMP FLAG
0063  0000  MODE,0            / INSTR./DATA MODE FLAG
0064  3600  BUFST,3600         / BUFFER AREA START
0065  3777  INDTS,3777        / INDIRECT POINTER TABLE START
0066  4777  DIRTS,4777        / DIRECT ADDRESS TABLE START
0067  5777  INDATS,5777       / INDIRECT ADDRESS TABLE START
0070  6777  VTS,6777          / VARIABLE TABLE START

                / IA POINTERS

0071  3332  PRINTI,PRINTO
0072  3274  SYM3I,SYM3
0073  3265  SYM4I,SYM4
0074  3200  UNPCKI,UNPACK
0075  3000  VARBLI,VARBL
0076  1533  INSTSI,INSTS
0077  3313  ISPTI,ISPT
```

change to 6377 to allow use of ODT (high)

```
                / CONSTANTS

0100    0001    C1,1
0101    0002    C2,2
0102    0003    C3,3
0103    0004    C4,4
0104    0007    C7,7
0105    0011    C9,11
0106    0010    C10,10
0107    0012    C12,12
0110    0016    C16,16
0111    0020    C20,20
0112    0040    C40,40
0113    0100    C100,100
0114    0177    C177,177
0115    0200    C200,200
0116    0240    C240,240
0117    0254    C254,254
0120    0260    C260,260
0121    0314    C314,314
0122    0326    C326,326
0123    0377    C377,377
0124    0400    C400,400
0125    5206    C5206,5206
0126    7000    C7000,7000
0127    7600    C7600,7600
0130    7777    M1,-1
0131    7776    M2,-2
0132    7775    M3,-3
0133    7774    M4,-4
0134    7752    M22,-26
0135    7601    M177,-177
0136    7600    M200,-200
0137    7000    M1000,-1000
0140    4000    M4000,-4000
0141    3371    M4407,-4407
0142    6000    PASMSK,6000         / PASS MASK

                / SYMBOL DEFINITIONS

                ISPTJ=JMS I ISPTI
                SYM3J=JMS I SYM3I
                SYM4J=JMS I SYM4I
                UNPCKJ=JMS I UNPCKI
```

```
                / STRING PRINT ROUTINE
0143  0000  PRINT,0
0144  3156  DCA COUNT
0145  6046  TLS
0146  1415  NEXP, TAD I PRINPT
0147  6041  TSF
0150  5147  JMP .-1
0151  6046  TLS
0152  7200  CLA
0153  2156  ISZ COUNT
0154  5146  JMP NEXP
0155  5543  JMP I PRINT

0156  0000  COUNT,0

                / CHARACTER READ IN ROUTINE

0157  0000  READIN,0
0160  7200  CLA
0161  1054  TAD HLR
0162  7640  SZA CLA          / IS HS READER IN USE ?
0163  5172  JMP LOW          / NO - USE LS READER (ASR)
0164  6014  RFC
0165  6011  RSF
0166  5165  JMP .-1
0167  7200  CLA
0170  6012  RRB
0171  5557  JMP I READIN
0172  6031  LOW, KSF
0173  5172  JMP .-1
0174  6036  KRB
0175  5557  JMP I READIN


                *177

                / INITIALIZATION

0177  7300  INITAL, CLA CLL
0200  3052  DCA ASTFL
0201  3056  DCA FLF
0202  1065  TAD INDTS
0203  3012  DCA INDT
0204  1066  TAD DIRTS
0205  3011  DCA DIRT
0206  1067  TAD INDATS
0207  3013  DCA INDAT
0210  3023  DCA TEM1
```

```
0211  6014  RFC
0212  6011  RSF
0213  7410  SKP
0214  5236  JMP HREAD
0215  2023  ISZ TEM1          / TESTING FOR HSR
0216  5212  JMP .-4
0217  1100  TAD C1
0220  3054  DCA HLR
0221  6032  PASS, KCC
0222  6046  TLS
0223  7402  HLT
0224  7604  CLA OSR           / READ IN PASS #
0225  0142  AND PASMSK
0226  7450  SNA               / IS PASS # SET ?
0227  5221  JMP PASS          / NO - TRY AGAIN
0230  7104  RAL CLL
0231  7420  SNL               / IS IT PASS 1 ?
0232  5241  JMP PASS1
0233  7700  SMA CLA           / IS IT PASS 2 ?
0234  5253  JMP PASS2
0235  5264  JMP PASS3         / MUST BE PASS 3
0236  7200  HREAD, CLA
0237  3054  DCA HLR
0240  5221  JMP PASS

                / PASS 1 INITIALIZATION

0241  7300  PASS1,CLA CLL
0242  3043  DCA DIC
0243  3045  DCA INC
0244  3047  DCA INDAC
0245  3041  DCA VTC
0246  1366  TAD PROCI
0247  1100  TAD C1
0250  3365  DCA PROCJ
0251  3052  DCA ASTFL
0252  5304  JMP READ

                / PASS 2 INITIALIZATION

0253  7300  PASS2,CLA CLL
0254  1045  TAD INC
0255  7650  SNA CLA           / ARE THERE ANY INDIRECT ADDRESSES ?
0256  5663  JMP I NOPA2I      / NO - GO TO TYPE MESSAGE
0257  1366  TAD PROCI
0260  1101  TAD C2
0261  3365  DCA PROCJ
0262  5304  JMP READ


0263  3113  NOPA2I,NOPA2
```

```
                / PASS 3 INITIALIZATION

0264  7300  PASS3, CLA CLL
0265  1366  TAD PROCI
0266  1102  TAD C3
0267  3365  DCA PROCJ
0270  1100  TAD C1
0271  3063  DCA MODE
0272  3061  DCA SF
0273  7402  HLT
0274  7604  CLA OSR           / READ IN OUTPUT FORMAT
0275  7010  RAR
0276  7630  SZL CLA
0277  1100  TAD C1
0300  3060  DCA OUTFL         / AND SET FLAG
0301  4703  JMS I SALDI       / JUMP TO LOAD STARTING ADDRESSES
0302  5304  JMP READ

0303  2323  SALDI, SALD                Not a S/R Start !

                / BLOCK READ IN ROUTINE

0304  4157  READ, JMS READIN
0305  1136  TAD M200
0306  7450  SNA               / IS IT LEADER CODE ?
0307  5304  JMP .-3           / YES - TRY AGAIN
0310  1115  EXTR, TAD C200    / NO - LOAD INTO LEFT HALF OF STORE
0311  7106  RTL CLL           / AND SET LINK IF ADDRESS (*)
0312  7006  RTL
0313  7006  RTL
0314  3031  DCA STORE
0315  4157  JMS READIN
0316  1031  TAD STORE
0317  7420  SNL               / IS IT * ?
0320  5345  JMP CODE          / NO - LOAD CODE
0321  3031  DCA STORE         / YES - IT IS AN ADDRESS
0322  1052  TAD ASTFL
0323  7640  SZA CLA           / IS * FLAG SET ?
0324  5361  JMP SAST          / YES - GO TO STORE IN LST FOR NEXT BLOCK
0325  1031  TAD STORE         / NO - STORE IN LS, LIST START
0326  3033  LSS, DCA LS       / AND INITIALIZE FOR BUFFER READ IN
0327  1033  TAD LS  /LS=LIST START
0330  0114  AND C177
0331  1064  TAD BUFST
0332  3036  DCA BUFS
0333  1036  TAD BUFS
0334  1130  TAD M1
0335  3010  DCA BUFPT
0336  1100  TAD C1
0337  3052  DCA ASTFL
```

```
0340  4157  NEXT, JMS READIN
0341  1136  TAD M200
0342  7450  SNA                 / IS IT TRAILER CODE ?
0343  5357  JMP TRAIL           / YES - GO TO SET END CODE (7777)
0344  5310  JMP EXTR            / NO -CONTINUE READING
0345  3410  CODE, DCA I BUFPT
0346  1010  TAD BUFPT
0347  0114  AND C177
0350  1135  TAD M177
0351  7440  SZA                 / IS BUFFER FULL ?
0352  5340  JMP NEXT            / NO - GET MORE
0353  1033  TAD LS              / YES - SET NEXT LIST START (LST)
0354  1115  TAD C200
0355  0127  AND C7600
0356  5362  JMP .+4
0357  7240  TRAIL, CLA CMA
0360  3031  DCA STORE
0361  1031  SAST, TAD STORE
0362  3035  DCA LST
0363  1010  TAD BUFPT
0364  3037  DCA BUFE
0365  5400  PROCJ, JMP I 0    / GO TO PROCESS DATA

0366  5766  PROCI, .+5400
0367  0400  PROC1
0370  0516  PROC2
0371  0600  PROC3

            PAUSE
```

Switch to select Pass #

```
                /**************************RAW2**********************

                / PASS 1 DATA PROCESSING : SEARCHING FOR JMP AND JMS ADDRESS

                *400

0400   7300     PROC1, CLA CLL
0401   1036     TAD BUFS
0402   1130     TAD M1
0403   3010     DCA BUFPT
0404   1037     TAD BUFE
0405   1100     TAD C1
0406   7041     CIA
0407   1036     TAD BUFS
0410   7450     SNA                 / IS THER ANY DATA IN THIS BLOCK ?
0411   5366     JMP END             / NO - GO FOR NEXT BLOCK
0412   3040     DCA BUFC            / YES - PROCESS DATA
0413   7200     PROCR, CLA
0414   1410     TAD I BUFPT
0415   3031     DCA STORE
0416   1056     TAD FLF
0417   7650     SNA CLA             / IS IT A FLOATING POINT INSTRUCTION ?
0420   5225     JMP .+5             / NO - PROCEED WITH SEARCH
0421   1031     TAD STORE           / YES BUT -
0422   7650     SNA CLA             / - IS IT FEXT ?
0423   3056     DCA FLF             / YES - CLEAR FL. PT. FLAG (FLF)
0424   5311     JMP NEX             / AND GO TO GET NEXT ITEM
0425   1031     TAD STORE
0426   1141     TAD M4407
0427   7640     SZA CLA             / IS IT A 'JMS I 7' (ENTRY TO FL.PT. ?
0430   5233     JMP .+3             / NO - PROCEED WITH SEARCH
0431   1100     TAD C1              / YES - SET FLF
0432   3056     DCA FLF
0433   1031     TAD STORE
0434   0126     AND C7000
0435   1140     TAD M4000
0436   7450     SNA                 / IS IT A JMS ?
0437   5244     JMP JUMP            / YES - PROCEED TO STORE ADDRESS
0440   1137     TAD M1000
0441   7450     SNA                 / IS IT A JMP ?
0442   5244     JMP JUMP            / YES - PROCEED TO STORE ADDRESS
0443   5311     JMP NEX             / NO - GO TO GET NEXT ITEM
0444   1031     JUMP, TAD STORE
0445   0123     AND C377
0446   3023     DCA TEM1
0447   1023     TAD TEM1
0450   0115     AND C200
0451   7650     SNA CLA             / IS ADDRESS ON PAGE ZERO ?
0452   5263     JMP .+9             / YES - GO TO DEPOSIT ADDRESS IN ADDR
0453   1033     TAD LS              / NO - CREATE ABSOLUTE ADDRESS IN ADDR
0454   0127     AND C7600
0455   3026     DCA ADDR
0456   1031     TAD STORE
0457   0114     AND C177
0460   1026     TAD ADDR
0461   3026     DCA ADDR
```

```
0462  5266  JMP .+4
0463  1031  TAD STORE
0464  0114  AND C177
0465  3026  DCA ADDR
0466  1031  TAD STORE
0467  0124  AND C400
0470  7650  SNA CLA          / IS IT AN INDIRECT ADDRESS ?
0471  5302  JMP .+11         / NO - GO TO DEPOSIT ADDRESS IN DIRT
0472  1026  TAD ADDR         / YES - DEPOSIT ADDRESS IN INDT
0473  3412  DCA I INDT
0474  2045  ISZ INC
0475  1045  TAD INC
0476  1137  TAD M1000
0477  7650  SNA CLA          / IS TABLE FULL ?
0500  5715  JMP I TABFI      / YES - GO TO TYPE MESSAGE
0501  5311  JMP NEX          /NO -) GO TO GET NEXT ITEM
0502  1026  TAD ADDR
0503  3411  DCA I DIRT
0504  2043  ISZ DIC
0505  1043  TAD DIC
0506  1137  TAD M1000
0507  7650  SNA CLA          / IS TABLE FULL ?
0510  5715  JMP I TABFI      / YES - GO TO TYPE MESSAGE
0511  2033  NEX, ISZ LS
0512  2040  ISZ BUFC         / IS BLOCK COMPLETED ?
0513  5213  JMP PROCR        / NO -CONTINUE PROCESSING
0514  5366  JMP END          / YES - GO FOR NEXT BLOCK

0515  3067  TABFI,TABFUL

              / PASS 2 DATA PROCESSING : SEARCHING FOR JMP AND JMS INDIRE

0516  7300  PROC2, CLA CLL
0517  1065  TAD INDTS
0520  3012  DCA INDT
0521  1045  TAD INC
0522  7041  CIA
0523  3046  DCA MINC
0524  1033  TAD LS
0525  7041  CIA
0526  3034  DCA MLS
0527  1033  TAD LS
0530  0127  AND C7600
0531  3023  DCA TEM1
0532  1037  TAD BUFE
0533  0114  AND C177
0534  1023  TAD TEM1
0535  7041  CIA
0536  3376  DCA MLE
```

```
0537  1412  NEX2, TAD I INDT
0540  3023  DCA TEM1
0541  1023  TAD TEM1
0542  1034  TAD MLS
0543  7710  SPA CLA          / IS ENTRY IN INDT IN THIS BLOCK ?
0544  5364  JMP END2         / NO - ADDRESS TOO LOW; TRY NEXT ENTRY IN I
0545  1023  TAD TEM1         / MAYBE IT STILL IS POSSIBLE
0546  1376  TAD MLE
0547  7740  SMA SZA CLA      / LET US MAKE SURE
0550  5364  JMP END2         / NO - ADDRESS TOO HIGH : TRY NEXT ENTRY IN
0551  1023  TAD TEM1         / YES IT IS - LOAD IT IN INDAT
0552  0114  AND C177
0553  1064  TAD BUFST
0554  3030  DCA BUFFPT
0555  1430  TAD I BUFFPT
0556  3413  DCA I INDAT
0557  1013  TAD INDAT
0560  1137  TAD M1000
0561  7650  SNA CLA          / IS TABLE FULL ?
0562  5715  JMP I TABFI      / YES - GO TO TYPE MESSAGE
0563  2047  ISZ INDAC
0564  2046  END2, ISZ MINC   / ALL ENTRIES TRIED ?
0565  5337  JMP NEX2         / NO -TRY NEXT ENTRY
                             / YES - GO TO 'END' FOR NEXT BLOCK

      / COMMON 'END' ROUTINE

0566  7300  END, CLA CLL
0567  1035  TAD LST
0570  1100  TAD C1
0571  7650  SNA CLA          / IS THIS THE LAST BLOCK (LST=7777) ?
0572  5177  JMP INITAL       / YES - GO TO NEXT PASS
0573  1035  TAD LST          / NO - GO TO READ NEXT BLOCK
0574  5775  JMP I LSSI

0575  0326  LSSI,LSS
0576  0000  MLE,0
```

```
                *600

                / PASS 3 DATA PROCESSING : TRANSLATION AND OUTPUT GENERATION

0600  7300    PROC3, CLA CLL
0601  3041    DCA VTC
0602  1343    TAD OCTST
0603  1331    TAD C15
0604  3015    DCA PRINPT
0605  1131    TAD M2
0606  4143    JMS PRINT
0607  1036    TAD BUFS
0610  1130    TAD M1
0611  3010    DCA BUFPT
0612  1100    TAD C1
0613  1037    TAD BUFE
0614  7041    CIA
0615  1036    TAD BUFS
0616  7450    SNA                 / ANY ITEMS IN BLOCK ?
0617  5735    JMP I ENDI2         / NO - GO FOR NEXT BLOCK
0620  3040    DCA BUFC
0621  1033    TAD LS              / LS CONTAINS CURRENT LOCATION
0622  4732    JMS I ASTOI         / GO TO PRINT * LOCATION
0623  7200    NEX3, CLA
0624  1410    TAD I BUFPT         / EXTRACT ITEM GIVEN BY CURRENT LOCATION
0625  3024    DCA TEM2            / AND GENERATE OCTAL STRING
0626  1033    TAD LS
0627  3023    DCA TEM1
0630  1343    TAD OCTST
0631  1103    TAD C4
0632  4474    UNPCKJ
0633  1024    TAD TEM2
0634  3023    DCA TEM1
0635  1343    TAD OCTST
0636  1107    TAD C12
0637  4474    UNPCKJ
0640  1033    TAD LS
0641  7041    CIA
0642  3034    DCA MLS
0643  1055    TAD EAFL
0644  7640    SZA CLA             / IS THIS ITEM A VARIABLE FOLLOWING EAE INST
0645  5734    JMP I EAVARI        / YES - GO TO LOAD IN VARIABLE TABLE
0646  1065    TAD INDTS           / NO - INITIALIZE FOR ITEM TYPE SEARCH
0647  3012    DCA INDT
0650  1066    TAD DIRTS
0651  3011    DCA DIRT
```

```
0652  1067  TAD INDATS
0653  3013  DCA INDAT
0654  1045  TAD INC
0655  7041  CIA
0656  3046  DCA MINC
0657  1043  TAD DIC
0660  7041  CIA
0661  3044  DCA MDIC
0662  1047  TAD INDAC
0663  7041  CIA
0664  3050  DCA MINDAC
0665  3053  DCA LAI
0666  4741  JMS I SASCHI     / GO TO SEE IF CURRENT LOCATION IS A START
0667  1043  TAD DIC
0670  7650  SNA CLA          / ARE THERE ANY ITEMS IN DIRT ?
0671  5300  JMP .+7          / NO - TRY INDAT
0672  1411  TAD I DIRT       / YES - SEARCH DIRT FOR CURRENT LOCATION
0673  1034  TAD MLS
0674  7650  SNA CLA          / IS IT IN TABLE ?
0675  5737  JMP I LAINSI     / YES - IT IS A LABLED INSTRUCTION
0676  2044  ISZ MDIC         / ALL ENTRIES TRIED ?
0677  5272  JMP .-5          /NO - TRY AGAIN
0700  1047  TAD INDAC
0701  7650  SNA CLA          / ARE THERE ANY ITEMS IN INDAT ?
0702  5311  JMP .+7          / NO - TRY INDT
0703  1413  TAD I INDAT      / YES - SEARCH INDAT FOR CURRENT LOCATION
0704  1034  TAD MLS
0705  7650  SNA CLA          / IS IT IN TABLE ?
0706  5737  JMP I LAINSI     / YES - IT IS A LABLED INSTRUCTION
0707  2050  ISZ MINDAC       / ALL ENTRIES TRIED ?
0710  5303  JMP .-5          / NO - TRY AGAIN
0711  1045  TAD INC
0712  7650  SNA CLA          / ARE THERE ANY ITEMS IN INDT ?
0713  5322  JMP .+7          / NO - GO TO FIND MODE
0714  1412  TAD I INDT       / YES - SEARCH INDT FOR CURRENT LOCATION
0715  1034  TAD MLS
0716  7650  SNA CLA          / IS IT IN TABLE ?
0717  5740  JMP I LALABI     / YES - IT IS A LABLED LABLE
0720  2046  ISZ MINC         / ALL ENTRIES TRIED ?
0721  5314  JMP .-5          / NO - TRY AGAIN
0722  1062  TAD SKJMFL
0723  7650  SNA CLA          / IS ITEM PRECEEDED BY 'ISZ,JMP' ?
0724  4742  JMS I VARSCI     / YES - GO TO SEE IF IN VARIABLE TABLE
0725  1063  TAD MODE
0726  7640  SZA CLA          / WHAT IS MODE ?
0727  5733  JMP I DATAI      / DATA MODE
0730  5736  JMP I INSMOI     / INSTRUCTION MODE
```

```
0731  0015  CI5,15
0732  3226  ASTOI,ASTOUT
0733  2600  DATAI,DATA
0734  2577  EAVARI,EAEVAR
0735  0566  ENDI2,END
0736  1000  INSMOI,INSMOD
0737  2666  LAINSI,LAINST
0740  2700  LALABI,LALAB
0741  2342  SASCHI,SASCH
0742  3036  VARSCI,VARSCH

0743  0743  OCTST, .          / OCTAL CODE STRING
0744  0240  SP
0745  0240  SP
0746  0257  257
0747  0000  0
0750  0000  0
0751  0000  0
0752  0000  0
0753  0240  SP
0754  0240  SP
0755  0000  0
0756  0000  0
0757  0000  0
0760  0000  0
0761  0215  CR
0762  0212  LF

      PAUSE.
```

```
/**********KA8E**********

*1000

/ IDENTIFY INSTRUCTIONS CAUSING A CHANGE TO DATA MODE

1000  1356  INSMOD, TAD FLF
1001  7640  SZA CLA          / IN FLOATING OPERATION MODE ?
1002  5252  JMP TRANSL       / YES - GO TO  TRANSLATE OCTAL CODE
1003  1024  TAD TEMP   <-NO
1004  1247  TAD M7402
1005  7650  SNA CLA          / IS IT A 'HALT' ?
1006  5224  JMP SKPI         / YES - GO TO CHECK FOR PRECEEDING SKIP
1007  1024  TAD TEMP
1010  1251  TAD M7600
1011  7650  SNA CLA          / IS IT A OPR. GR.2 'CLA' ?
1012  5252  JMP TRANSL       / YES - GO TO  TRANSLATE OCTAL CODE
1013  1024  TAD TEMP
1014  1252  TAD M7404
1015  7650  SNA CLA          / IS IT AN 'OSR' ?
1016  5252  JMP TRANSL       / YES - GO TO  TRANSLATE OCTAL CODE
1017  1024  TAD TEMP
1020  0126  AND C7000
1021  1245  TAD M5000
1022  7640  SZA CLA    Yes   / IS IT A 'JMP' ?
1023  5235  JMP .+12   NO
1024  1061  SKPI, TAD SF     / YES - CHECK FOR PRECEEDING SKIP
1025  7640  SZA CLA          / IS SKIP FLAG SET ?
1026  5232  JMP .+4    NO
1027  1100  TAD C1           / NO - SET DATA MODE
1030  3063  DCA MODE
1031  5252  JMP TRANSL
1032  2062  ISZ SKJMFL      / INCREMENT 'ISZ,JMP' FLAG FOR DATA TEST
1033  7000  NOP
1034  5252  JMP TRANSL
1035  1024  TAD TEMP
1036  0244  AND C7401
1037  1246  TAD M7400
1040  7640  SZA CLA          / IS IT A SKIP INSTRUCTION CODE ?
1041  5252  JMP TRANSL  NO
1042  1100  TAD C1     Yes   / YES - PREPARE TO SET SKIP FLAG
1043  5252  JMP TRANSL

1044  7401  C7401, 7401
1045  5000  M5000, -5000
1046  7402  M7400, -7400
1047  7376  M7402, -7402
1050  7374  M7404, -7404
1051  7600  M7600, -7600
```

```
                / ROUTINE TO TRANSLATE OCTAL CODE

1052  3061  TRANSL, DCA SF   / INITIALIZATION
1053  2772  ISZ I ANDFLI
1054  7000  NOP
1055  2773  ISZ I JMSFLI
1056  7000  NOP
1057  1023  TAD TEM1
1060  3025  DCA TEM3
1061  1371  TAD M18
1062  3051  DCA BLC
1063  1476  TAD I INSTSI
1064  1102  TAD C3
1065  3027  DCA LOCN
1066  1116  TAD C240
1067  3427  DCA I LOCN
1070  2027  ISZ LOCN
1071  2051  ISZ BLC
1072  5266  JMP .-4
1073  1053  TAD LAI
1074  7650  SNA CLA              / IS INSTRUCTION LABLED ?
1075  5307  JMP ANALY            / NO - SKIP NEXT 9 INSTRUCTIONS
1076  1121  TAD C314             / YES - SET UP LABEL IN SYMBOLIC INST. STRIN
1077  3776  DCA I INST3
1100  1025  TAD TEM3
1101  3023  DCA TEM1
1102  1476  TAD I INSTSI
1103  1103  TAD C4
1104  4474  UNPCKJ
1105  1117  TAD C254
1106  3777  DCA I INST8
1107  3057  ANALY, DCA JF
1110  1056  TAD FLF
1111  7640  SZA CLA              / IN FLOATING POINT MODE ?
1112  5775  JMP I FLOPRT         / YES - GO TO FLOATING POINT DECODER
1113  1024  TAD TEM2             / NO - SET UP ENTRY TO JUMP TABLE FOR BASICS
1114  0126  AND C7000
1115  7106  RTL CLL
1116  7006  RTL
1117  1325  TAD JMPT
1120  0114  AND C177
1121  1370  TAD C5601
1122  3247  DCA .+2
1123  1105  TAD C9
1124  5400  JMP I 0              / JUMP TO SET UP MNEMONIC CODE IN INST. STRG
1125  1125  JMPT, .
1126  1200  ANDOP
1127  1136  TADOP
1130  1143  ISZOP
1131  1154  DCAOP
1132  1221  JMSOP
1133  1161  JMPOP
1134  1456  IOTOP
1135  1600  OPROP
```

```
1136  4472  TADOP, SYM3J
1137  0324  T
1140  0301  A
1141  0304  D
1142  5774  JMP I TRADRI
1143  4472  ISZOP, SYM3J
1144  0311  I
1145  0323  S
1146  0332  Z
1147  1100  TAD C1
1150  3061  DCA SF
1151  1130  TAD M1
1152  3062  DCA SKJMFL
1153  5774  JMP I TRADRI
1154  4472  DCAOP, SYM3J
1155  0304  D
1156  0303  C
1157  0301  A
1160  5774  JMP I TRADRI
1161  4472  JMPOP, SYM3J
1162  0312  J
1163  0315  M
1164  0320  P
1165  1100  TAD C1
1166  3057  DCA JF
1167  5774  JMP I TRADRI

1170  5601  C5601, 5601
1171  7756  M18, -22
1172  1240  ANDFLI, ANDFL
1173  1241  JMSFLI, JMSFL
1174  1377  TRADRI, TRADR
1175  1250  FLOPRI, FLOPR
1176  1536  INST3, INSTS+3
1177  1543  INST8, INSTS+10

          *1200

1200  4472  ANDOP, SYM3J
1201  0301  A
1202  0316  N
1203  0304  D
1204  1240  TAD ANDFL
1205  7650  SNA CLA          / WAS PREVIOUS INSTRUCTION AN 'AND' ?
1206  5212  JMP .+4          / YES - GO TO CHECK IF A SK ARGUMENT
1207  1130  TAD M1           / NO - RESET 'AND' FLAG
1210  3240  DCA ANDFL
1211  5377  JMP TRADR
1212  1241  TAD JMSFL
1213  7710  SPA CLA          / STILL SK ARGUMENTS ?
1214  5377  JMP TRADR
1215  1100  TAD C1           / MUST BE - CHANGE TO DATA MODE
1216  3063  DCA MODE
1217  3241  DCA JMSFL
1220  5377  JMP TRADR
```

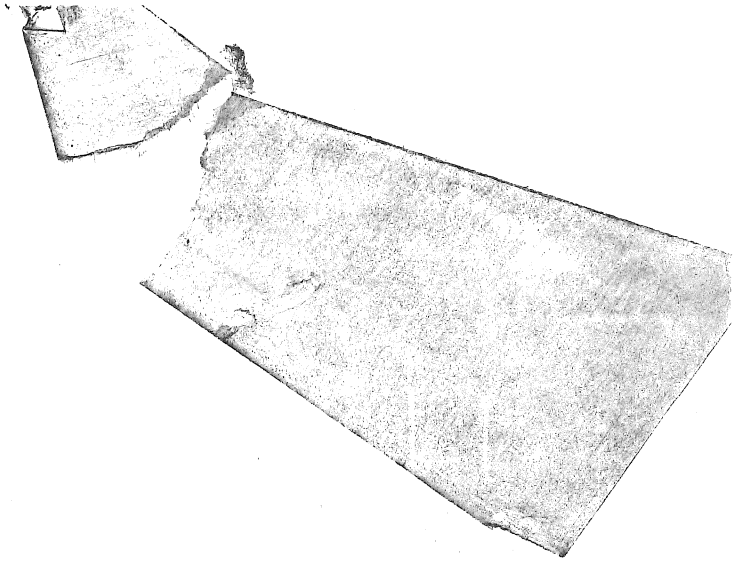
needed because TRADR is on next page

	+0	=
ANDFL	Prev Instr was AND	No Prev AND
JMSFL	Prev Instr was JMS	No Prev JMS

i.e. OK if ≠0

JMS I SYM3I ≡ JMS SYM3

Go to 19



```
1221   4472   JMSOP, SYM3J
1222   3312   J
1223   3315   M
1224   3323   S
1225   1100   TAD C1
1226   3057   DCA JF
1227   1133   TAD M4
1230   3241   DCA JMSFL
1231   1024   TAD TEM2
1232   1141   TAD M4407
1233   7640   SZA CLA          / IS IT A 'JMS I 7' ?
1234   5237   JMP .+3
1235   1100   TAD C1           / PROBABLY; SETTING FL.PT. MODE
1236   3056   DCA FLF
1237   5377   JMP TRADR

1240   0000   ANDFL,0
1241   0000   JMSFL,0

               *1250

               / MNEMONIC CODES FOR FLOATING POINT CODES

1250   1024   FLOPR, TAD TEM2
1251   0126   AND C7000
1252   7106   RTL CLL
1253   7006   RTL
1254   1262   TAD JMPT2
1255   0114   AND C177
1256   1345   TAD CC5601
1257   3261   DCA .+2
1260   1105   TAD C9
1261   5400   JMP I 0          / JUMP TO SET UP MNEMONIC CODE IN INST. STRG
1262   1262   JMPT2, .
1263   2377   SPECOP
1264   1273   FADDOP
1265   1301   FSUBOP
1266   1307   FMPYOP
1267   1315   FDIVOP
1270   1323   FGETOP
1271   1331   FPUTOP
1272   1337   FNOROP
```

```
1273   4473   FADDOP, SYM4J
1274   0306   F
1275   0301   A
1276   0304   D
1277   0304   D
1300   5377   JMP TRADR
1301   4473   FSUBOP, SYM4J
1302   0306   F
1303   0323   S
1304   0325   U
1305   0302   B
1306   5377   JMP TRADR
1307   4473   FMPYOP, SYM4J
1310   0306   F
1311   0315   M
1312   0320   P
1313   0331   Y
1314   5377   JMP TRADR
1315   4473   FDIVOP, SYM4J
1316   0306   F
1317   0304   D
1320   0311   I
1321   0326   V
1322   5377   JMP TRADR
1323   4473   FGETOP, SYM4J
1324   0306   F
1325   0307   G
1326   0305   E
1327   0324   T
1330   5377   JMP TRADR
1331   4473   FPUTOP, SYM4J
1332   0306   F
1333   0320   P
1334   0325   U
1335   0324   T
1336   5377   JMP TRADR
1337   4473   FNOROP, SYM4J
1340   0306   F
1341   0316   N
1342   0317   O
1343   0322   R
1344   5377   JMP TRADR

1345   5601   CC5601,5601

              PAUSE
```

SQF Patch at 1350

1355

```
                /**************************RAW4*****************************:

                *1377

                / GENERATION OF SYMBOLIC ADDRESSES

1377   1116   TRADR, TAD C240
1400   3353   DCA INSTS+15
1401   1024   TAD TEM2
1402   0124   AND C4000
1403   7450   SNA                  / IS INDIRECT BIT 1 ?
1404   5210   JMP .+4
1405   1331   TAD C311             / YES - INSERT'I' IN SYMBOLIC STRING, INSTS
1406   3351   DCA INSTS+16
1407   5212   JMP .+3
1410   1116   TAD C240             / NO - INSERT 'SPACE' IN SYMBOLIC STRING
1411   3351   DCA INSTS+16
1412   1116   TAD C240
1413   3352   DCA INSTS+17
1414   1024   TAD TEM2
1415   0114   AND C177
1416   3026   DCA ADDR
1417   1024   TAD TEM2
1420   0113   AND C200
1421   7650   SNA CLA              / IS ADDRESS ON PAGE ZERO ?
1422   5225   JMP .+3
1423   1033   TAD LS               / NO - ADD CURRENT ADDRESS TO FORM ABS. ADDR
1424   0127   AND C7600
1425   1026   TAD ADDR
1426   3026   DCA ADDR
1427   1026   TAD ADDR
1430   7041   CIA
1431   3032   DCA MVS
1432   1057   TAD JF
1433   7640   SZA CLA              / IS INSTRUCTION A 'JMP' OR 'JMS' ?
1434   5251   JMP JMI              / YES - GO TO LOOK FOR LABEL
1435   1122   TAD C326             / NO - SEARCH FOR VARIABLE NAME
1436   3353   DCA INSTS+20
1437   4475   JMS I VARBLI
1440   1116   TAD C240
1441   3352   DCA INSTS+17
1442   1333   TAD INSTS
1443   1327   TAD C21
1444   4474   UNPCKJ
1445   1333   TAD INSTS
1446   3022   DCA SYMSI
1447   1134   TAD M22
1450   5471   JMP I PRINTI         / GO TO PRINT OUT LINE OF CODE
1451   1121   JMI, TAD C314
1452   3353   DCA INSTS+20
1453   1026   TAD ADDR
1454   3023   DCA TEM1
1455   5240   JMP .-15
```

```
                / I/O INSTRUCTION ROUTINE

1456  4472  IOTOP, SYM3J
1457  0311  II
1460  0317  O
1461  0324  T
1462  7300  CLA CLL
1463  1024  TAD TEM2
1464  0100  AND C1
1465  7450  SNA                 / IS 'IOP 1' SET ? PROBABLY A TEST SKIP INSTR
1466  5270  JMP .+2
1467  3061  DCA SF              / YES - SET SKIP FLAG AND GENERATE SYMBOLIC
1470  1333  TAD INSTS                                              / \0
1471  1113  TAD C16
1472  3026  DCA ADDR
1473  1024  TAD TEM2
1474  0332  AND C770
1475  7010  RAR
1476  7012  RTR
1477  3023  DCA TEM1
1500  1023  TAD TEM1
1501  0330  AND C70
1502  7010  RAR
1503  7012  RTR
1504  1120  TAD C260
1505  3426  DCA I ADDR
1506  2026  ISZ ADDR
1507  1023  TAD TEM1
1510  0104  AND C7
1511  1120  TAD C260
1512  3426  DCA I ADDR
1513  1116  TAD C240
1514  3354  DCA INSTS+21
1515  1024  TAD TEM2
1516  2026  ISZ ADDR
1517  2026  ISZ ADDR
1520  0104  AND C7
1521  1120  TAD C260
1522  3426  DCA I ADDR
1523  1333  TAD INSTS
1524  3022  DCA SYMST
1525  1134  TAD M22
1526  5471  JMP I PRINTI      / GO TO PRINT OUT LINE OF CODE

1527  0021  C21,21
1530  0070  C70,70
1531  0311  C311,311
1532  0770  C770,770
```

```
1533  1533  INSTS, .          / SYMBOLIC STRING
1534  0240  SP
1535  0240  SP
1536  0314  L
1537  0000  0
1540  0000  0
1541  0000  0
1542  0000  0
1543  0254  254
1544  0000  0
1545  0000  0
1546  0000  0
1547  0000  0
1550  0000  0
1551  0000  0
1552  0000  0
1553  0326  V
1554  0000  0
1555  0000  0
1556  0000  0
1557  0000  0
1560  0215  CR
1561  0212  LF
1562  0240  SP
1563  0240  SP
1564  0257  257
1565  0240  SP
1566  0240  SP
1567  0306  F
1570  0325  U
1571  0314  L
1572  0314  L
1573  0215  CR
1574  0212  LF

      *1600

      / GENERATION OF OPERATE GROUP INSTRUCTIONS

1600  1133  OPROP, TAD M4
1601  3021  DCA INSPT
1602  1134  TAD M22
1603  3020  DCA ENDPR
1604  1024  TAD TEMP
1605  1364  TAD M7000
1606  7640  SZA CLA          / IS IT A 'NOP' INSTRUCTION ?
1607  5217  JMP .+10
1610  4477  ISPTJ            / YES - GENERATE SYMBOLIC STRING
1611  1021  TAD INSPT
1612  4472  SYM3J
1613  0316  N
1614  0317  O
1615  0320  P
1616  5360  JMP OPREND
1617  1024  TAD TEMP
1620  0124  AND C400
1621  7640  SZA CLA          / IS BIT 3 SET ?
1622  5377  JMP GR2          / YES - GO TO GROUP 2 INSTRUCTION TRANSLATIO
```

```
                / GROUP 1 INSTRUCTIONS  - INDIVIDUAL BITS ARE NOW CHECKED

1623  1024  GR1, TAD TEMP
1624  0115  AND C200
1625  7650  SNA CLA            / IS BIT 4 SET ?
1626  5235  JMP .+7
1627  4477  ISPTJ              / YES - GENERATE 'CLA'
1630  1021  TAD INSPT
1631  4472  SYM3J
1632  0303  C
1633  0314  L
1634  0301  A
1635  1024  TAD TEMP
1636  0113  AND C100
1637  7650  SNA CLA            / IS BIT 5 SET ?
1640  5247  JMP .+7
1641  4477  ISPTJ              / YES - GENERATE 'CLL'
1642  1021  TAD INSPT
1643  4472  SYM3J
1644  0303  C
1645  0314  L
1646  0314  L
1647  1024  TAD TEMP
1650  0112  AND C40
1651  7650  SNA CLA            / IS BIT 6 SET ?
1652  5261  JMP .+7
1653  4477  ISPTJ              / YES - GENERATE 'CMA'
1654  1021  TAD INSPT
1655  4472  SYM3J
1656  0303  C
1657  0315  M
1660  0301  A
1661  1024  TAD TEMP
1662  0111  AND C20
1663  7650  SNA CLA            / IS BIT 7 SET ?
1664  5273  JMP .+7
1665  4477  ISPTJ              / YES - GENERATE 'CML'
1666  1021  TAD INSPT
1667  4472  SYM3J
1670  0303  C
1671  0315  M
1672  0314  L
1673  1024  TAD TEMP
1674  0110  AND C10
1675  7650  SNA CLA            / IS BIT 8 SET ?
1676  5321  JMP LFTT
1677  1024  TAD TEMP           / YES - GENERATE RIGHT ROTATE
```

```
1700  0101  AND C2
1701  7650  SNA CLA            / IS BIT 10 SET ?
1702  5312  JMP .+8
1703  4477  ISPTJ              / YES - GENERATE 'RTR'
1704  1021  TAD INSPT
1705  4472  SYM3J
1706  0322  R
1707  0324  T
1710  0322  R
1711  5346  JMP IACT
1712  4477  ISPTJ              / NO - GENERATE 'RAR'
1713  1021  TAD INSPT
1714  4472  SYM3J
1715  0322  R
1716  0301  A
1717  0322  R
1720  5346  JMP IACT
1721  1024  LFTT, TAD TEMP
1722  0103  AND C4
1723  7650  SNA CLA            / IS BIT 9 SET ?
1724  5346  JMP IACT
1725  1024  TAD TEMP           / YES - GENERATE LEFT ROTATE
1726  0101  AND C2
1727  7650  SNA CLA            / IS BIT 10 SET ?
1730  5334  JMP .+2
1731  4477  ISPTJ              / YES - GENERATE 'RTL'
1732  1021  TAD INSPT
1733  4472  SYM3J
1734  0322  R
1735  0324  T
1736  0314  L
1737  5346  JMP IACT
1740  4477  ISPTJ              / NO - GENERATE 'RAL'
1741  1021  TAD INSPT
1742  4472  SYM3J
1743  0322  R
1744  0301  A
1745  0314  L
1746  1024  IACT, TAD TEMP
1747  0100  AND C1
1750  7650  SNA CLA            / IS BIT 11 SET ?
1751  5357  JMP .+6
1752  4477  ISPTJ              / YES - GENERATE 'IAC'
1753  1021  TAD INSPT
1754  4472  SYM3J
1755  0311  I
1756  0301  A
1757  0303  C
1760  1476  OPEND, TAD I INSTST
1761  3022  DCA SYMST
1762  1020  TAD ENDPS
1763  5471  JMP I PRINTI      / GO TO PRINT OUT A LINE OF CODE

1764  1500  $7000$, -7000
```

```
                *1777

                / GROUP 2 INSTRUCTIONS - INDIVIDUAL BITS ARE NOT CHECKED

 1777   7410   GRP2, SKP
 2000   0000   RF,0
 2001   3200   DCA RF
 2002   1024   TAD TEMP
 2003   0100   AND C1
 2004   7640   SZA CLA              / IS BIT 11 SET ?
 2005   5365   JMP EAE              / YES - THIS IS AN EAE INSTRUCTION AND
 2006   1024   TAD TEMP             /       \ IS PROCESSED ELSEWHERE
 2007   1357   TAD M7410
 2010   7640   SZA CLA              / IS THIS A 'SKP' ?
 2011   5221   JMP .+8
 2012   4477   ISPTJ                / YES - GENERATE 'SKP'
 2013   1021   TAD INSPT
 2014   4472   SYM3J
 2015   0323   S
 2016   0313   K
 2017   0320   P
 2020   5344   JMP CLAEND           / GO TO SEE IF 'CLA' IS ALSO REQUIRED
 2021   1024   TAD TEMP
 2022   0106   AND C10
 2023   7658   SNA CLA              / IS BIT 8 SET ?
 2024   5227   JMP .+3
 2025   1100   TAD C1               / YES - SET 'REVERSE SKIP' FLAG, RF
 2026   3200   DCA RF
 2027   1024   TAD TEMP
 2030   0113   AND C100
 2031   7650   SNA CLA              / IS BIT 5 SET ?
 2032   5252   JMP .+20
 2033   4477   ISPTJ                / YES
 2034   1200   TAD RF
 2035   7640   SZA CLA              / IS RF SET ?
 2036   5245   JMP .+7
 2037   1021   TAD INSPT            / NO - GENERATE 'SMA'
 2040   4472   SYM3J
 2041   0323   S
 2042   0315   M
 2043   0301   A
 2044   5252   JMP .+6
 2045   1021   TAD INSPT            / YES - GENERATE 'SPA'
 2046   4472   SYM3J
 2047   0323   S
 2050   0320   P
 2051   0301   A
 2052   1024   TAD TEMP
 2053   0112   AND C40
 2054   7650   SNA CLA              / IS BIT 6 SET ?
 2055   5275   JMP .+20
 2056   4477   ISPTJ                / YES
 2057   1200   TAD RF
 2060   7640   SZA CLA              / IS RF SET ?
 2061   5270   JMP .+7
 2062   1021   TAD INSPT            / NO - GENERATE 'SZA'
 2063   4472   SYM3J
 2064   0323   S
 2065   0332   Z
 2066   0301   A
```

```
2067  5275  JMP .+6
2070  1021  TAD INSPT          / YES - GENERATE 'SNA'
2071  4472  SYM3J
2072  0323  S
2073  0316  N
2074  0301  A
2075  1024  TAD TEM2
2076  0111  AND C20
2077  7650  SNA CLA            / IS BIT 7 SET ?
2100  5320  JMP .+20
2101  4477  ISPTJ              / YES
2102  1200  TAD RF
2103  7640  SZA CLA            / IS RF SET ?
2104  5313  JMP .+7
2105  1021  TAD INSPT          / NO - GENERATE 'SNL'
2106  4472  SYM3J
2107  0323  S
2110  0316  N
2111  0314  L
2112  5320  JMP .+6
2113  1021  TAD INSPT          / YES - GENERATE 'SZL'
2114  4472  SYM3J
2115  0323  S
2116  0332  Z
2117  0314  L
2120  1024  TAD TEM2
2121  0103  AND C4
2122  7650  SNA CLA            / IS BIT 9 SET ?
2123  5332  JMP .+7
2124  4477  ISPTJ              / YES - GENERATE 'OSR'
2125  1021  TAD INSPT
2126  4472  SYM3J
2127  0317  O
2130  0323  S
2131  0322  R
2132  1024  TAD TEM2
2133  0101  AND C2
2134  7650  SNA CLA            / IS BIT 10 SET ?
2135  5344  JMP .+7
2136  4477  ISPTJ              / YES - GENERATE 'HLT'
2137  1021  TAD INSPT
2140  4472  SYM3J
2141  0310  H
2142  0314  L
2143  0324  T
2144  1024  CLAEND, TAD TEM2
2145  0115  AND C200
2146  7650  SNA CLA            / IS BIT 4 SET ?
2147  5356  JMP .+7
2150  4477  ISPTJ              / YES - GENERATE 'CLA'
2151  1021  TAD INSPT
2152  4472  SYM3J
2153  0303  C
2154  0314  L
2155  0301  A
2156  5760  JMP I OPREN2       / GO TO PRINT OUT A LINE OF CODE

2157  7410  M7410,7410
2160  1760  OPREN2, OPREND

      PAUSE
```

```
                /**************************RAW5**************************

                / GENERATE EAE MNEMONICS

                *2165

2165  1024  EAE, TAD TEMP
2166  0113  AND C100
2167  7650  SNA CLA              / IS BIT 5 SET ?
2170  5377  JMP .+7
2171  4477  ISPTJ               / YES - GENERATE 'MQA'
2172  1021  TAD INSPT
2173  4472  SYM3J
2174  0315  M
2175  0321  Q
2176  0301  A
2177  1024  TAD TEMP
2200  0112  AND C40
2201  7650  SNA CLA              / IS BIT 6 SET ?
2202  5211  JMP .+7
2203  4477  ISPTJ               / YES - GENERATE 'SCA'
2204  1021  TAD INSPT
2205  4472  SYM3J
2206  0323  S
2207  0303  C
2210  0301  A
2211  1024  TAD TEMP
2212  0111  AND C20
2213  7652  SNA CLA              / IS BIT 7 SET ?
2214  5223  JMP .+7
2215  4477  ISPTJ               / YES - GENERATE 'MQL'
2216  1021  TAD INSPT
2217  4472  SYM3J
2220  0315  M
2221  0321  Q
2222  0314  L
2223  7100  CLL
2224  1024  TAD TEMP
2225  0110  AND C16
2226  7454  SNA                 / ARE ANY OF BITS 8-10 SET ?
2227  5722  JMP I CLAFNI        / NO - GO TO CHECK FOR 'CLA'
2230  7010  RAR                 / YES - GENERATE ENTRY TO JUMP TABLE
2231  1231  TAD .
2232  1102  TAD C3
2233  0114  AND C177
2234  1125  TAD C5006
2235  3241  DCA .+4
2236  7000  NOP
2237  4477  ISPTJ
2240  1021  TAD INSPT
2241  5001  JMP 0               / JUMP TO GENERATE OTHER EAE OPERATIONS
```

```
2242  5722  JMP I CLAENI
2243  5722  JMP I CLAENI
2244  5252  JMP MUYOP
2245  5261  JMP DVIOP
2246  5270  JMP NMIOP
2247  5275  JMP SHLOP
2250  5304  JMP ASROP
2251  5313  JMP LSROP
2252  4472  MUYOP, SYM3J
2253  0315  M
2254  0325  U
2255  0331  Y
2256  1100  TAD C1
2257  3055  DCA EAFL
2260  5722  JMP I CLAENI
2261  4472  DVIOP, SYM3J
2262  0304  D
2263  0326  V
2264  0311  I I
2265  1100  TAD C1
2266  3055  DCA EAFL
2267  5722  JMP I CLAENI
2270  4472  NMIOP, SYM3J
2271  0316  N
2272  0315  M
2273  0311  I I
2274  5722  JMP I CLAENI
2275  4472  SHLOP, SYM3J
2276  0323  S
2277  0310  H
2300  0314  L
2301  1100  TAD C1
2302  3055  DCA EAFL
2303  5722  JMP I CLAENI
2304  4472  ASROP, SYM3J
2305  0301  A
2306  0323  S
2307  0322  R
2310  1100  TAD C1
2311  3055  DCA EAFL
2312  5722  JMP I CLAENI
2313  4472  LSROP, SYM3J
2314  0314  L
2315  0323  S
2316  0322  R
2317  1100  TAD C1
2320  3055  DCA EAFL
2321  5722  JMP I CLAENI

2322  2144  CLAENI,CLAEND
```

```
                / STARTING ADDRESS TABLE LOAD ROUTINE

2323  0000  SALD,0
2324  1365  TAD SAS
2325  3362  DCA SAP
2326  3363  DCA SAC
2327  7402  HLT
2330  6046  TLS
2331  7604  CLA OSR
2332  7000  NOP               / 'TAD C1' IF TERMINATOR IS TO BE 7777
2333  7450  SNA               / IS 'ADDRESS' LOADED = ZERO ?
2334  5723  JMP I SALD        / YES - RETURN TO MAINLINE
2335  7000  NOP               / 'TAD M1' IF TERMINATOR IS TO BE 7777
2336  2362  ISZ SAP           / NO
2337  3762  DCA I SAP         / LOAD ADDRESS INTO TABLE, SAP
2340  2363  ISZ SAC
2341  5327  JMP SALD+4        / AND REPEAT

                / STARTING ADDRESS TABLE SEARCH ROUTINE

2342  0000  SASCH,0
2343  1363  TAD SAC
2344  7041  CIA
2345  3364  DCA MSAC
2346  1365  TAD SAS
2347  3362  DCA SAP
2350  2362  ISZ SAP
2351  1034  TAD MLS
2352  1762  TAD I SAP
2353  7650  SNA CLA           / IS ADDRESS A STARTING ADDRESS ?
2354  5360  JMP .+4
2355  2364  ISZ MSAC          / NO - TRY AGAIN IF ALL ENTRIES NOT TRIED
2356  5350  JMP .-6
2357  5742  JMP I SASCH       / NOT A STARTING ADDRESS - RETURN TO MAIN LI
2360  3063  DCA MODE          / IT IS A STARTING ADDRESS - SET INSTRUCTION
2361  5742  JMP I SASCH       / MODE AND RETURN TO MAIN LINE

2362  0000  SAP,0
2363  0000  SAC,0
2364  0000  MSAC,0
2365  2365  SAS, .            / STARTING ADDRESS TABLE
2366  0000  0
2367  0000  0
2370  0000  0
2371  0000  0
2372  0000  0
2373  0000  0
2374  0000  0
2375  0000  0
```

```
                / GENERATE FLOATING POINT SPECIAL OPERATION MNEMONICS

                *2377

2377  3021  SPECOP, DCA INSPT
2400  1134  TAD M22
2401  3020  DCA ENDPR
2402  1024  TAD TEM2
2403  0353  AND C17
2404  3023  DCA TEM1
2405  1023  TAD TEM1
2406  0352  AND C14
2407  1354  TAD M14
2410  7640  SZA CLA           / IS NUMBER LESS THAN 14(OCTAL) ?
2411  5214  JMP .+3
2412  1351  TAD C13           / NO - SET ENTRY = 13(OCTAL)
2413  3023  DCA TEM1
2414  1023  TAD TEM1
2415  1215  TAD .             / GENERATE ENTRY TO JUMP TABLE
2416  0114  AND C177
2417  1125  TAD C5206
2420  3222  DCA .+2
2421  1021  TAD INSPT
2422  5000  JMP 0             / JUMP TO GENERATE FL. PT. MNEMONIC
2423  5237  JMP FEXT
2424  5246  JMP SQRE
2425  5254  JMP SQRT
2426  5262  JMP FSIN
2427  5270  JMP FCOS
2430  5276  JMP FATN
2431  5304  JMP FEXP
2432  5312  JMP FLOG
2433  5320  JMP FNEG
2434  5326  JMP FINP
2435  5334  JMP FOUT
2436  5342  JMP FUND           / FL. PT. SYSTEM UNDEFINED OPERATION

2437  4473  FEXT, SYM4J
2440  0306  F
2441  0305  E
2442  0330  X
2443  0324  T
2444  3056  DCA FLF
2445  5756  JMP I OPREN3      / GO TO PRINT OUT A LINE OF CODE
2446  4473  SQRE, SYM4J
2447  0323  S
2450  0321  Q
2451  0322  R
2452  0305  E
2453  5756  JMP I OPREN3
2454  4473  SQRT, SYM4J
2455  0323  S
2456  0321  Q
2457  0322  R
2460  0324  T
2461  5756  JMP I OPREN3
```

set up Switch

```
2462   4473   FSIN,  SY44J
2463   0306   F
2464   0323   S
2465   0311   I
2466   0316   N
2467   5750   JMP  I  OPRND3
2470   4473   FCOS,  SY44J
2471   0306   F
2472   0303   C
2473   0317   O
2474   0323   S
2475   5750   JMP  I  OPRND3
2476   4473   FATN,  SY44J
2477   0306   F
2500   0301   A
2501   0324   T
2502   0316   N
2503   5750   JMP  I  OPRND3
2504   4473   FEXP,  SY44J
2505   0306   F
2506   0305   E
2507   0330   X
2510   0320   P
2511   5750   JMP  I  OPRND3
2512   4473   FLOG,  SY44J
2513   0306   F
2514   0314   L
2515   0317   O
2516   0307   G
2517   5750   JMP  I  OPRND3
2520   4473   FXPG,  SY44J
2521   0316   N
2522   0305   E
2523   0307   G
2524   0240   SP
2525   5750   JMP  I  OPRND3
2526   4473   FINP,  SY44J
2527   0306   F
2530   0311   I
2531   0316   N
2532   0320   P
2533   5750   JMP  I  OPRND3
2534   4473   FOUT,  SY44J
2535   0306   F
2536   0317   O
2537   0325   U
2540   0324   T
2541   5750   JMP  I  OPRND3
2542   4473   FIND,  SY44J
2543   0306   F
2544   0314   L
2545   0317   O
2546   0320   P
2547   5750   JMP  I  OPRND3

2550   1760   OPRND3, OPREND
2551   0013   C13,13
2552   0014   C14,14
2553   0017   C17,17
2554   7764   M14,-14
```

```
/*****************************RA86*****************************

*2577

/ EAE DATA MODE ENTRY

2577  3055  EAEVAR, DCA EAFL    / RESET INSTRUCTION MODE

/ DATA MODE TRANSLATION

2600  1122  DATA, TAD C326
2601  3242  DCA VARS+3
2602  1117  TAD C254
2603  3247  DCA VARS+10
2604  1034  TAD MLS
2605  3032  DCA MVS
2606  1033  TAD LS
2607  3026  DCA ADDR
2610  4475  JMS I VARBLI        / GO TO GET SYMBOLIC VARIABLE
2611  1237  TAD VARS
2612  1103  TAD C4
2613  4474  UNPCKJ
2614  1024  VARABL, TAD TEMP
2615  7500  SMA                 / IS VALUE OF VARIABLE GREATER THAN 3777 ?
2616  5224  JMP POS
2617  7041  CIA                 / YES - VALUE ASSUMED TO BE NEGATIVE
2620  3023  DCA TEM1
2621  1236  TAD C255            / PUT '-' IN VARIABLE STRING, VARS
2622  3250  DCA VARS+11
2623  5227  JMP .+4
2624  3023  POS, DCA TEM1
2625  1116  TAD C240
2626  3250  DCA VARS+11
2627  1237  TAD VARS
2630  1107  TAD C12
2631  4474  UNPCKJ
2632  1237  TAD VARS
2633  3022  DCA SYMST
2634  1134  TAD M22
2635  5471  JMP I PRINTI        / GO TO PRINT OUT A LINE OF CODE
```

```
2636  0???  C255,255
2637  ????  VARS, .          / VARIABLE STRING
2640  0240  SP
2641  0240  SP
2642  1B26  V
2643  0030  0
2644  0031  1
2645  0030  0
2646  0032  2
2647  0254  254
2650  0030  0
2651  0030  0
2652  0030  0
2653  0030  0
2654  0030  0
2655  0240  SP
2656  0240  SP
2657  0240  SP
2660  0240  SP
2661  0240  SP
2662  0240  SP
2663  0240  SP
2664  0215  CR
2665  0212  LF
```

```
                / LABELLED INSTRUCTION GENERATION

2666  1033  LAINST, TAD LS
2667  3023  DCA TEM1
2670  3063  DCA MODE
2671  1024  TAD TEM2
2672  7650  SNA CLA              / IS CONTENT OF ITEM = ZERO ?
2673  5327  JMP ZLAB             / YES - GO TO INSERT ZEROS
2674  1100  TAD C1               / NO - SET LABELLED INSTRUCTION FLAG, LAI
2675  3053  DCA LAI
2676  5677  JMP I .+1            / GO TO INSTRUCTION MODE
2677  1063  INSMOD+3

                / LABELLED LABEL GENERATION

2700  1033  LALAB, TAD LS
2701  3023  DCA TEM1
2702  1024  TAD TEM2
2703  7650  SNA CLA              / IS CONTENT OF ITEM = ZERO ?
2704  5327  JMP ZLAB             / YES - GO TO INSERT ZEROS
2705  1023  TAD TEM1
2706  3025  DCA TEM3
2707  1024  TAD TEM2
2710  3023  DCA TEM1
2711  1121  TAD C314
2712  3356  DCA LALAS+11
2713  1345  TAD LALAS
2714  1107  TAD C12
2715  4474  UNPCKJ
2716  1025  TAD TEM3
2717  3023  DCA TEM1
2720  1345  N1, TAD LALAS
2721  1103  TAD C4
2722  4474  UNPCKJ
2723  1345  TAD LALAS
2724  3022  DCA SYMST
2725  1134  TAD M22
2726  5471  JMP I PRINTI         / GO TO PRINT OUT A LINE OF CODE
```

```
                / ZERO ITEM ROUTINE

2727  1133  ZLAB, TAD M4
2730  3051  DCA BLC
2731  1345  TAD LALAS
2732  1105  TAD C9
2733  3027  DCA LOCN
2734  1116  TAD C240
2735  3427  DCA I LOCN
2736  2027  ISZ LOCN
2737  1120  TAD C260
2740  3427  DCA I LOCN
2741  2027  ISZ LOCN
2742  2051  ISZ BLC
2743  5337  JMP .-4
2744  5320  JMP N1

2745  2745  LALAS, .          / LABELLED LABEL STRING
2746  0240  SP
2747  0240  SP
2750  0314  L
2751  0000  0
2752  0000  0
2753  0000  0
2754  0000  0
2755  0254  254
2756  0314  L
2757  0000  0
2760  0000  0
2761  0000  0
2762  0000  0
2763  0240  SP
2764  0240  SP
2765  0240  SP
2766  0240  SP
2767  0240  SP
2770  0240  SP
2771  0240  SP
2772  0215  CR
2773  0212  LF
```

```
                *3000

                / ROUTINE TO GET SYMBOLIC VARIABLE

3000  0000  VARBL, 0
3001  7300  CLA CLL
3002  3235  DCA VC
3003  1070  TAD VTS
3004  3014  DCA VT
3005  1041  TAD VTC
3006  7450  SNA                 / ARE THERE ANY ENTRIES IN TABLE ?
3007  5221  JMP ASSV            / NO - GO TO ASSIGN A SYMBOLIC VARIABLE NUMB
3010  7041  CIA                 / YES - PREPARE TO SEARCH TABLE
3011  3042  DCA MVTC
3012  2235  ISZ VC
3013  1414  TAD I VT
3014  1032  TAD MVS
3015  7650  SNA CLA             / IS VARIABLE MATCHED ?
3016  5232  JMP INVT            / YES - GO TO LOAD VARIABLE ADDRESS
3017  2042  ISZ MVTC            / NO - ALL ENTRIES TRIED ?
3020  5212  JMP .-6             / NO - TRY AGAIN
3021  1026  ASSV, TAD ADDR      / YES - PLACE VARIABLE ADDRESS IN TABLE
3022  3414  DCA I VT
3023  2041  ISZ VTC
3024  1041  TAD VTC
3025  1136  TAD M200
3026  7650  SNA CLA
3027  5267  JMP TABFUL
3030  1041  TAD VTC
3031  3235  DCA VC
3032  1026  INVT, TAD ADDR
3033  3023  DCA TEM1
3034  5600  JMP I VARBL
3035  0000  VC, 0

                / ROUTINE TO SEARCH FOR A SYMBOLIC VARIABLE

3036  0000  VARSCH, 0
3037  7300  CLA CLL
3040  1100  TAD C1
3041  3062  DCA SKJMFL
3042  3235  DCA VC
3043  1070  TAD VTS
3044  3014  DCA VT
3045  1041  TAD VTC
3046  7450  SNA                 / ARE THERE ANY ENTRIES IN TABLE
3047  5636  JMP I VARSCH        / NO - RETURN FROM ROUTINE
3050  7041  CIA                 / YES - PREPARE TO SEARCH TABLE
3051  3042  DCA MVTC
3052  2235  ISZ VC
3053  1414  TAD I VT
3054  1034  TAD ML5
3055  7650  SNA CLA             / IS VARIABLE MATCHED ?
3056  5262  JMP INVAR           / YES - GO TO LOAD VARIABLE ADDRESS
3057  2042  ISZ MVTC            / NO - ALL ENTRIES TRIED ?
3060  5252  JMP .-6             / NO - TRY AGAIN
3061  5636  JMP I VARSCH        / YES - RETURN FROM ROUTINE
3062  1033  INVAR, TAD L5
3063  3023  DCA TEM1
3064  1100  TAD C1
3065  3063  DCA MODE
3066  5636  JMP I VARSCH
```

```
                / ROUTINE TO PRINT OUT 'TABLE FULL' MESSAGE

3067  1274  TABFUL, TAD FULSTR
3070  3015  DCA PRINPT
3071  1312  TAD M15
3072  4143  JMS PRINT
3073  5177  JMP INITAL
3074  3074  FULSTR, .
3075  0257  257
3076  0324  T
3077  0301  A
3100  0302  B
3101  0314  L
3102  0305  E
3103  0240  SP
3104  0306  F
3105  0325  U
3106  0314  L
3107  0314  L
3110  0215  CR
3111  0212  LF

3112  7763  M15,-15

                / ROUTINE TO PRINT OUT 'NO PASS 2' MESSAGE

3113  1320  NOPAS, TAD NOPAST
3114  3015  DCA PRINPT
3115  1312  TAD M15
3116  4143  JMS PRINT
3117  5177  JMP INITAL
3120  3120  NOPAST, .
3121  0257  257
3122  0316  N
3123  0317  O
3124  0240  SP
3125  0320  P
3126  0301  A
3127  0323  S
3130  0323  S
3131  0240  SP
3132  0262  TWO
3133  0240  SP
3134  0215  CR
3135  0212  LF
```

```
                *3200

                / ROUTINE TO UNPACK A 4-DIGIT OCTAL NUMBER AND PLACE IN A C

3200  0000  UNPACK, 0
3201  3224  DCA ADDRS          / OUTPUT LOCATION IN STRING
3202  3031  DCA STORE
3203  1133  TAD M4
3204  3225  DCA DIGCO
3205  1023  TAD TEMI           / 'TEMI' CONTAINS THE OCTAL NUMBER
3206  7004  RAL
3207  1031  UNPCK, TAD STORE
3210  7004  RAL
3211  7006  RTL
3212  3031  DCA STORE
3213  1031  TAD STORE
3214  0104  AND C7
3215  1120  TAD C260
3216  3624  DCA I ADDRS
3217  2224  ISZ ADDRS
3220  2225  ISZ DIGCO
3221  5207  JMP UNPCK
3222  7300  CLA CLL
3223  5600  JMP I UNPACK
3224  0000  ADDRS, 0
3225  0000  DIGCO, 0

                / PAGE STARTING ADDRESS (*) PRINT OUT ROUTINE

3226  0000  ASTOUT, 0
3227  3023  DCA TEMI
3230  1240  TAD ASTS
3231  1110  TAD C16
3232  4474  UNPCKJ
3233  1240  TAD ASTS
3234  3015  DCA PRINPT
3235  1264  TAD M19
3236  4143  JMS PRINT
3237  5626  JMP I ASTOUT

3240  3240  ASTS, .
3241  0240  SP
3242  0240  SP
3243  0240  SP
3244  0240  SP
3245  0240  SP
3246  0240  SP
3247  0240  SP
3250  0240  SP
3251  0240  SP
3252  0240  SP
3253  0240  SP
3254  0240  SP
3255  0252  252
3256  0000  0
3257  0004  4
3260  0001  1
3261  0003  3
3262  0215  CR
3263  0212  LF

3264  7755  M19, -23
```

```
                / ROUTINE TO PLACE A 4-CHARACTER STRING IN AN OUTPUT CODE S
3265  0000      SYM4, 0
3266  1476      TAD I INSTSI
3267  3027      DCA LOCN
3270  1265      TAD SYM4
3271  3274      DCA SY43
3272  1130      TAD M1
3273  5277      JMP .+4

                / ROUTINE TO PLACE A 3-CHARACTER STRING IN AN OUTPUT CODE S

3274  0000      SYM3, 0
3275  1476      TAD I INSTSI
3276  3027      DCA LOCN

3277  1132      TAD M3          / THIS PART IS COMMON TO BOTH ROUTINES
3300  3312      DCA SYMCO
3301  1674      TAD I SY43
3302  3427      DCA I LOCN
3303  2274      ISZ SYM3
3304  2027      ISZ LOCN
3305  2312      ISZ SYMCO
3306  5301      JMP .-5
3307  1116      TAD C240
3310  3427      DCA I LOCN
3311  5674      JMP I SYM3

3312  0000      SYMCO, 0

                / ROUTINE TO INCREMENT POINTER IN STRING AND CHECK FOR OVER

3313  0000      ISPT, 0
3314  1321      TAD INSPT
3315  1330      TAD M21
3316  7450      SNA                 / IS STRING FULL ?
3317  5323      JMP FULL            / YES - GO TO PRINT OUT LINE OF CODE WITH
3320  1327      TAD C25             / NO - RESET POINTER        \ 'FULL' APPENDED
3321  3021      DCA INSPT
3322  5713      JMP I ISPT
3323  1331      FULL, TAD M33
3324  3023      DCA ENDPR
3325  5726      JMP I OPENF

3326  1764      OPENF, OPEND

3327  0025      C25, 25
3330  7757      M21, -21
3331  7737      M33, -41
```

```
/ CODE OUTPUT FORMAT ROUTINE

3332  3365  PRINTO, DCA STLN
3333  1960  TAD OUTFL
3334  7640  SZA CLA                / OUTPUT FORMAT TYPE ?
3335  5350  JMP .+13               / 'ASSEMBLY INPUT' FORMAT
3336  1770  TAD I OCTSTI           / 'ASSEMBLY OUTPUT' FORMAT
3337  1102  TAD C3
3340  3015  DCA PRINPT
3341  1366  TAD M10
3342  4143  JMS PRINT
3343  1422  TAD I SYMST
3344  3015  DCA PRINPT
3345  1365  TAD STLN
3346  4143  JMS PRINT
3347  5361  JMP ENDO

3350  1422  TAD I SYMST
3351  3015  DCA PRINPT
3352  1365  TAD STLN
3353  1101  TAD C2
3354  4143  JMS PRINT
3355  1770  TAD I OCTSTI
3356  3015  DCA PRINPT
3357  1367  TAD M17
3360  4143  JMS PRINT
3361  2033  ENDO, ISZ LS
3362  2040  ISZ BUFC
3363  5771  JMP I NEXI
3364  5772  JMP I ENDII

3365  0000  STLN, 0
3366  7766  M10, -12
3367  7761  M17, -17
3370  0743  OCTSTI, OCTST
3371  0623  NEXI, NEX3
3372  0566  ENDII, END
```

A	0341
ADDR	0026
ADDRS	3224
ANALY	1107
ANDFL	1240
ANDFLI	1179
ANDOP	1250
ASKOP	2304
ASSV	3421
ASTFL	0659
ASTOI	0732
ASTOUT	3226
ASIS	3240
B	0342
BLC	0051
BUFC	0040
BUFE	0037
BUFFFI	0038
BUFPT	0010
BUFS	0036
BUFST	0164
C	0303
CC5601	1345
CLAEND	2144
CLAENI	2322
CODE	0345
COUNT	0156
C0	0215
C1	0109
C10	0126
C100	0113
C12	0107
C13	2551
C14	2552
C15	0731
C16	0119
C17	2553
C177	0114
C2	0101
C20	0111
C200	0115
C21	1527
C240	0116
C25	3327
C254	0117
C255	2636
C260	0120
C3	0102
C311	1531
C314	0121
C326	0122
C377	0123

C4	0123
C40	0112
C400	0124
C5206	0125
C5601	1170
C7	0104
C70	1530
C7000	0126
C7401	1044
C7600	0127
C770	1532
C9	0135
D	0304
DATA	2600
DATAI	0733
DCAOP	1154
DIC	0043
DIGCO	3225
DIRT	0011
DIRTS	0066
DVIOP	2261
E	0305
EAE	2165
EAEVAR	2577
EAFL	0055
EAVARI	0734
END	0566
ENDI1	3372
ENDI2	0735
ENDO	3361
ENDPR	0020
END2	0564
EXTR	0312
F	0306
FADDOP	1273
FAIN	2476
FCOS	2470
FDIVOP	1315
FEXP	2504
FEXT	2437
FGETOP	1323
FINP	2526
FLF	0056
FLOG	2512
FLOPR	1250
FLOPRI	1175
FMPYOP	1317
FNEG	2522
FNOROP	1337
FOUT	2534
FPUTOP	1331
FSIN	2462
FSUBOP	1301
FULL	3323
FULSTR	3074
FUND	2542

```
G         0307
GR1       1623
GR2       1777
H         0314
HLP       0054
HREAD     0236
IACT      1746
II        0311
INC       0045
INDAC     0047
INDAT     0013
INDATS    0067
INDT      0012
INDTS     0065
INITAL    0177
INSMOD    1000
INSMOI    0736
INSPI     0021
INSTS     1533
INSTSI    0076
INST3     1176
INST8     1177
INVAR     3062
INVI      3032
IOTOP     1456
ISPT      3313
ISPTI     0077
ISPTJ     4477
ISZOP     1143
J         0312
JF        0057
JMI       1451
JMPOP     1161
JMPT      1125
JMPT2     1262
JMSFL     1241
JMSFLI    1173
JMSOP     1221
JUMP      0444
K         0313
L         0314
LAI       0053
LAINSI    0737
LAINST    2666
LALAR     2700
LALARI    2746
LALAS     2745
LF        0012
LFIT      1721
LOCN      0007
LOG       0172
LS        0033
LSHOP     2313
LSS       0326
LSSI      0575
LST       0035
```

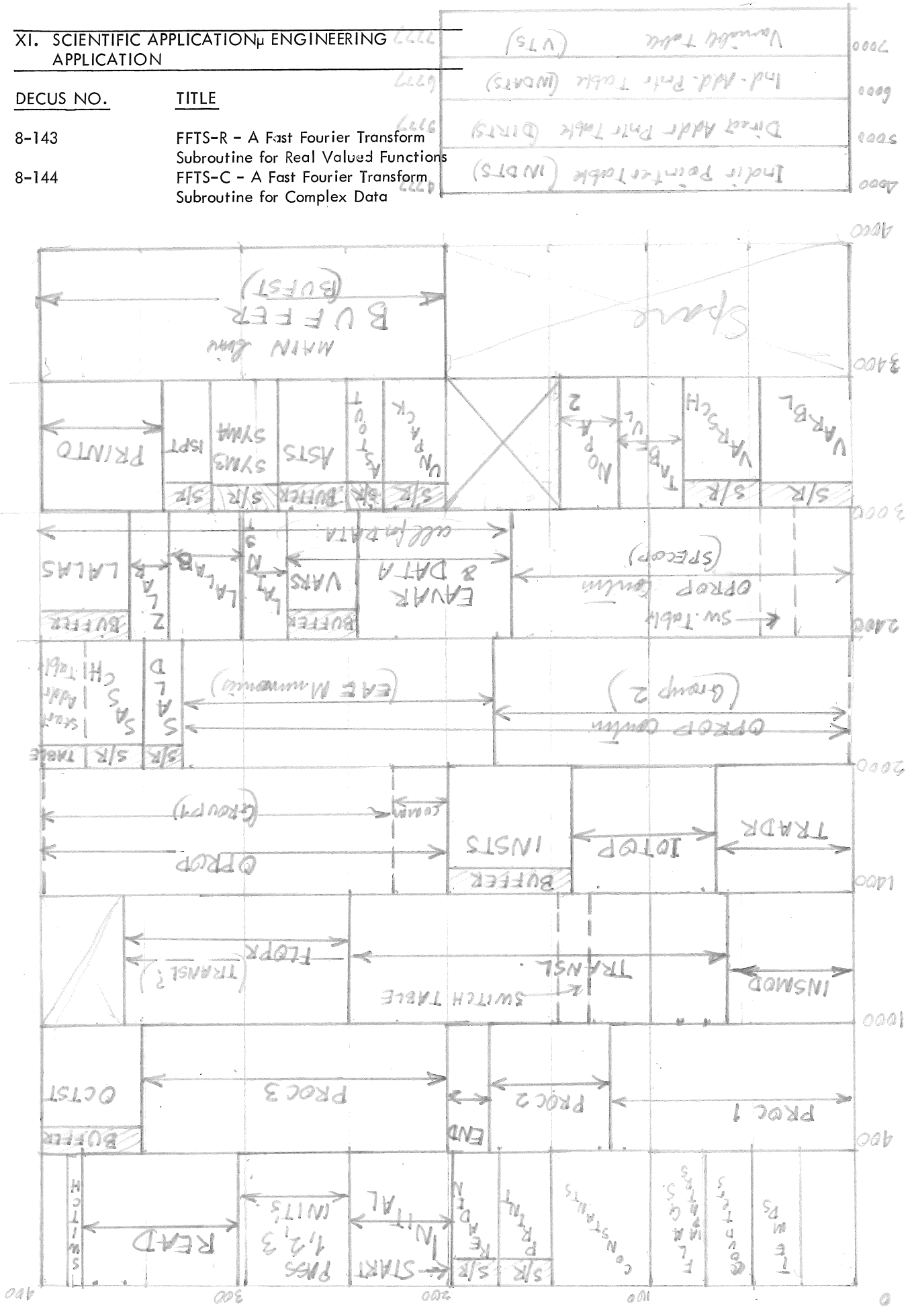
```
M         0315
MDIC      0044
MINC      0046
MINDAC    0050
MLE       0576
MLS       0034
MODE      0063
MSAC      2364
MUTOP     2252
MVS       0032
MVTC      0042
M1        0130
M10       3366
M1000     0137
M14       2554
M15       3112
M17       3367
M177      0135
M18       1171
M19       3264
M2        0131
M200      0136
M21       3330
M22       0134
M3        0132
M33       3331
M4        0133
M4000     0140
M4407     0141
M5000     1045
M7400     1046
M7402     1047
M7404     1050
M7410     2157
M7600     1051
N         0316
NEX       0511
NEXI      3371
NEXP      0146
NEXT      0340
NEX2      0537
NEX3      0623
NMIOP     2270
NOPAST    3120
NOPA2     3113
NOPA2I    3263
N1        2792
O         0317
OCTST     0743
OCTSTI    3370
OPREND    1765
OPRENF    3326
OPREN2    2160
OPREN3    2553
OPROP     1655
OUTFL     0060
```

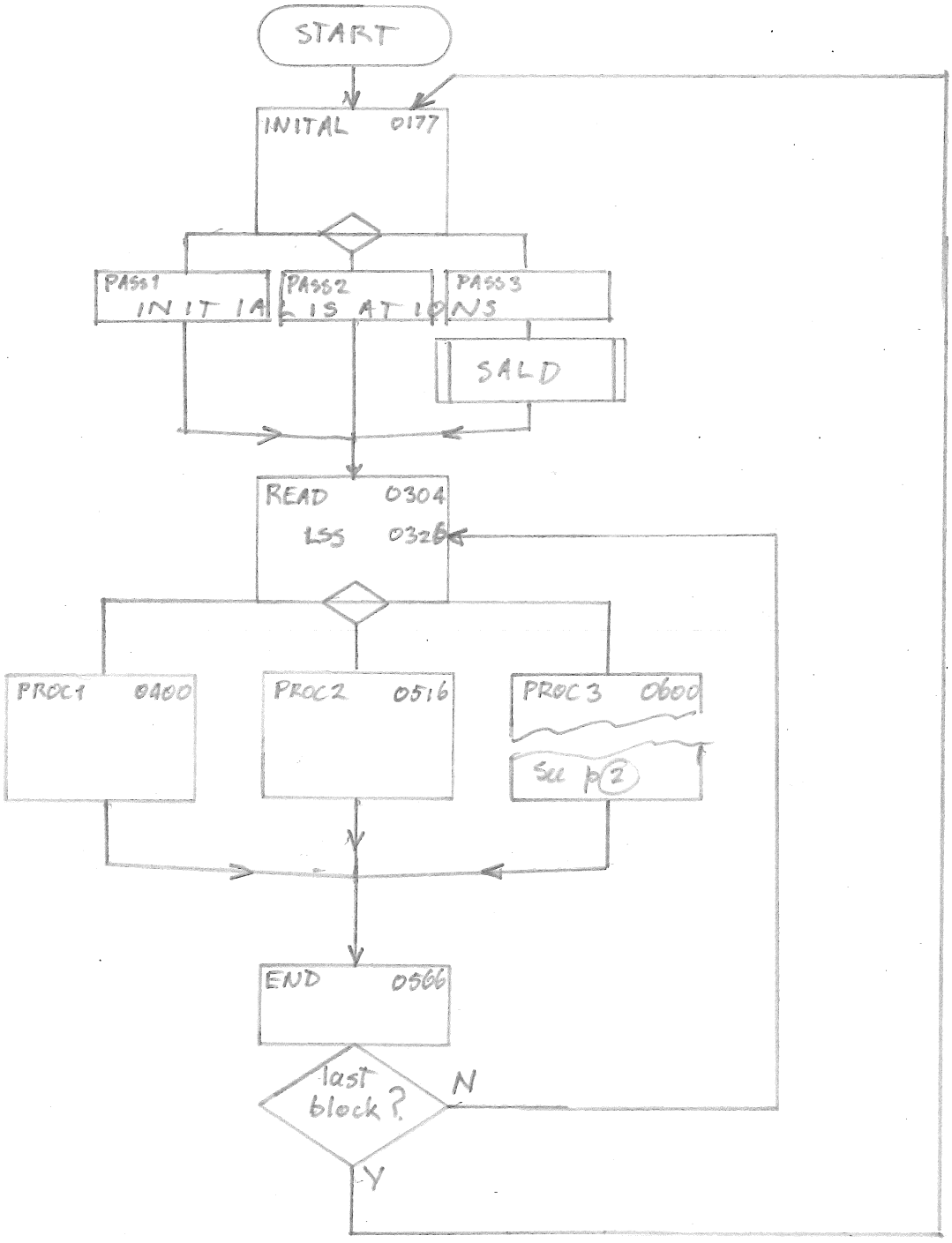
```
P         0320
PASMSK    0149
PASS      0221
PASS1     0241
PASS2     0253
PASS3     0264
POS       2624
PRINPT    0015
PRINT     0143
PRINTI    0071
PRINTO    3332
PROCI     0366
PROCJ     0365
PROCK     0413
PROC1     0400
PROC2     0516
PROC3     0600
Q         0321
R         0322
READ      0304
READIN    0157
RF        2000
S         0323
SAC       2363
SALD      2323
SALDI     0303
SAP       2362
SAS       2365
SASCH     2342
SASCHI    0741
SAST      0361
SF        2061
SHLOP     2275
SKJMFL    0062
SKPT      1024
SP        0240
SPECOP    2377
SQRE      2446
SQRT      2454
STLN      3365
STORE     0031
SYMCO     3312
SYMST     0022
SYM3      3274
SYM3I     0072
SYM3J     4472
SYM4      3265
SYM4I     0073
SYM4J     4473
```

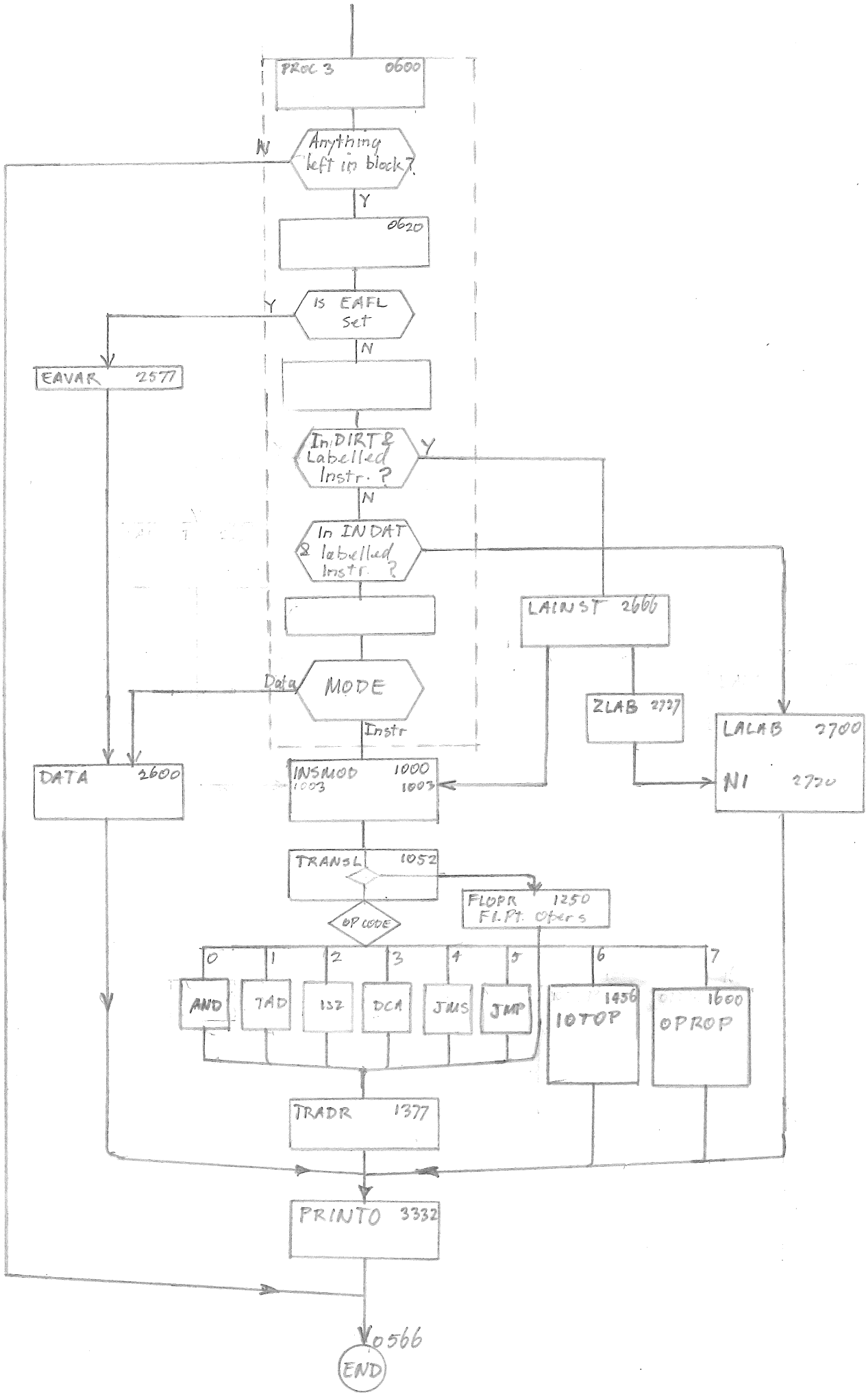
```
T          0324
TABFI      0515
TABFUL     3067
TADDR      1136
TEM1       0023
TEM2       0024
TEM3       0025
TRADR      1377
TRADRI     1174
TRAIL      0357
TRANSL     1452
TWO        0262
U          0325
UNPACK     3240
UNPCK      3207
UNPCKI     0074
UNPCKJ     4474
V          0326
VARABL     2614
VARBL      3000
VARBLI     0075
VARS       2637
VARSCH     3036
VARSCI     0742
VC         3035
VT         0014
VTC        0041
VTS        0070
X          0330
Y          0331
ZLAB       2727
ZZ         0332
```

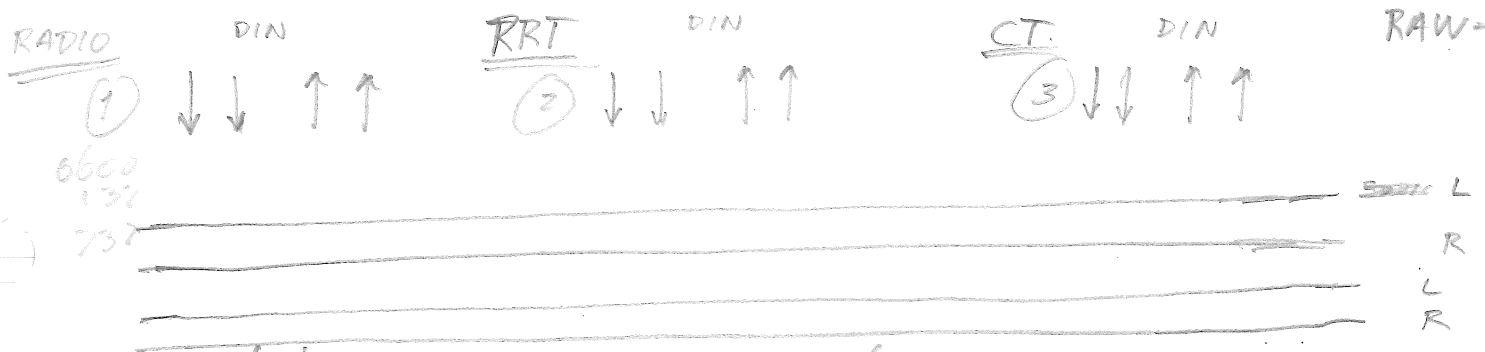
XI. SCIENTIFIC APPLICATION& ENGINEERING APPLICATION

DECUS NO.	TITLE
8-143	FFTS-R - A Fast Fourier Transform Subroutine for Real Valued Functions
8-144	FFTS-C - A Fast Fourier Transform Subroutine for Complex Data




START
INITAL 0177
PASS1
INIT IA
PASS2
LIS AT IO
PASS3
NS
SALD
READ 0304
LSS 0326
PROC1 0400
PROC2 0516
PROC3 0600
Su p 2
END 0566
last block?
N
Y


PROC 3 0600
Anything left in block?
N
Y
0620
IS EAFL Set
Y
N
EAVAR 2577
In DIRT & Labelled Instr. ?
Y
N
In INDAT & labelled Instr. ?
LAINST 2666
Data
MODE
Instr
ZLAB 2727
LALAB 2700
NI 2720
DATA 2600
INSMOD 1000
1003
1003
TRANSL 1052
FLOPR 1250
Fl.Pt. Oprs
OP CODE
0
1
2
3
4
5
6
7
AND
TAD
ISZ
DCA
JMS
JMP
IOTOP 1436
OPROP 1600
TRADR 1377
PRINTO 3332
0566
END



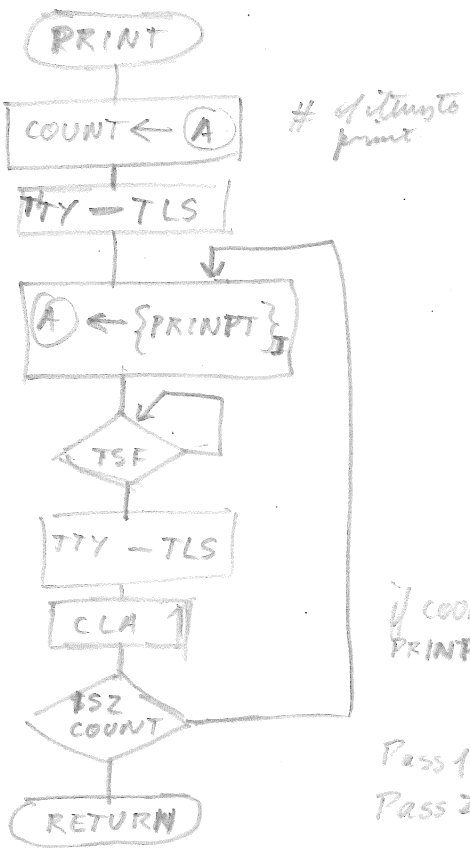
S/R's

0193 PRINT
0157 READIN

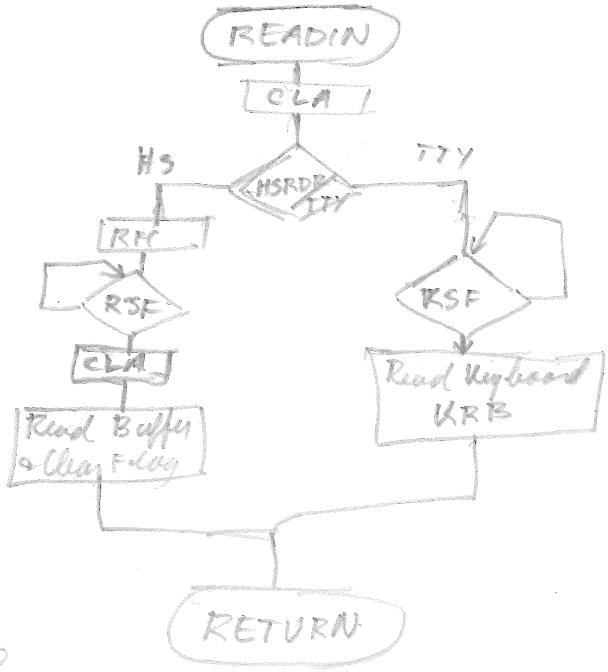
2323 SALD
2342 SASCH
3000 VARBL
3036 VARSCH
3200 UNPACK
3226 ASTOUT
3265 SYM4
3274 SYM3
3313 ISPT

~~3226 ASTOUT~~
3332 PRINTD Routine
~~3274 SYM3~~
~~3265 SYM4~~
~~3200 UNPACK~~
~~3000 VARBL~~
~~1533 INSTS~~ Table
~~3313 ISPT~~
~~2323 SALD~~
~~2342 SASCH~~
~~3036 VARSCH~~

Var String 2636-2665
VARS
Prog 2620-2635
Labelled Instrs
2666-2744
& label String
2745-2773

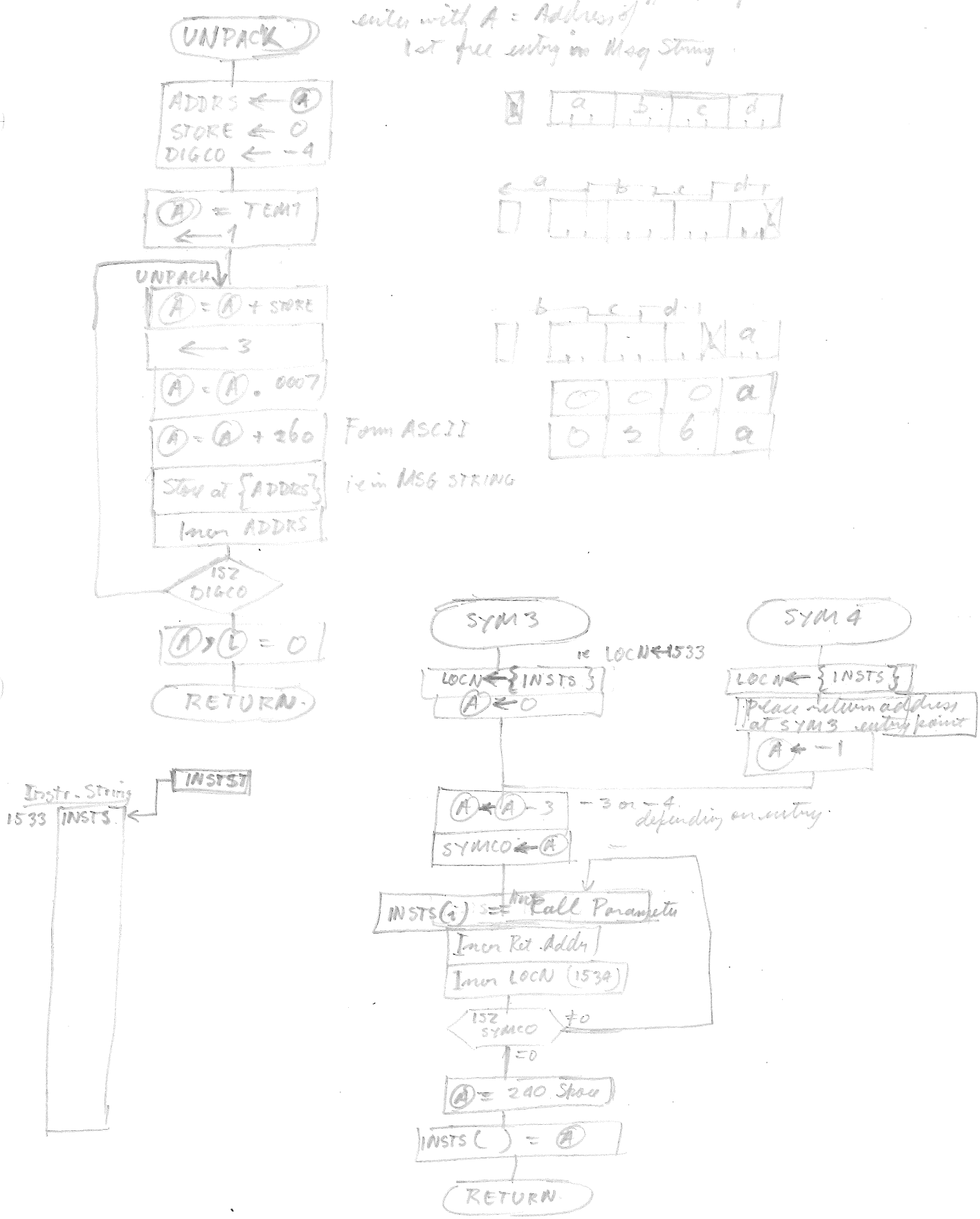


0 0000
-1 7777
→ 7776
-12 7766

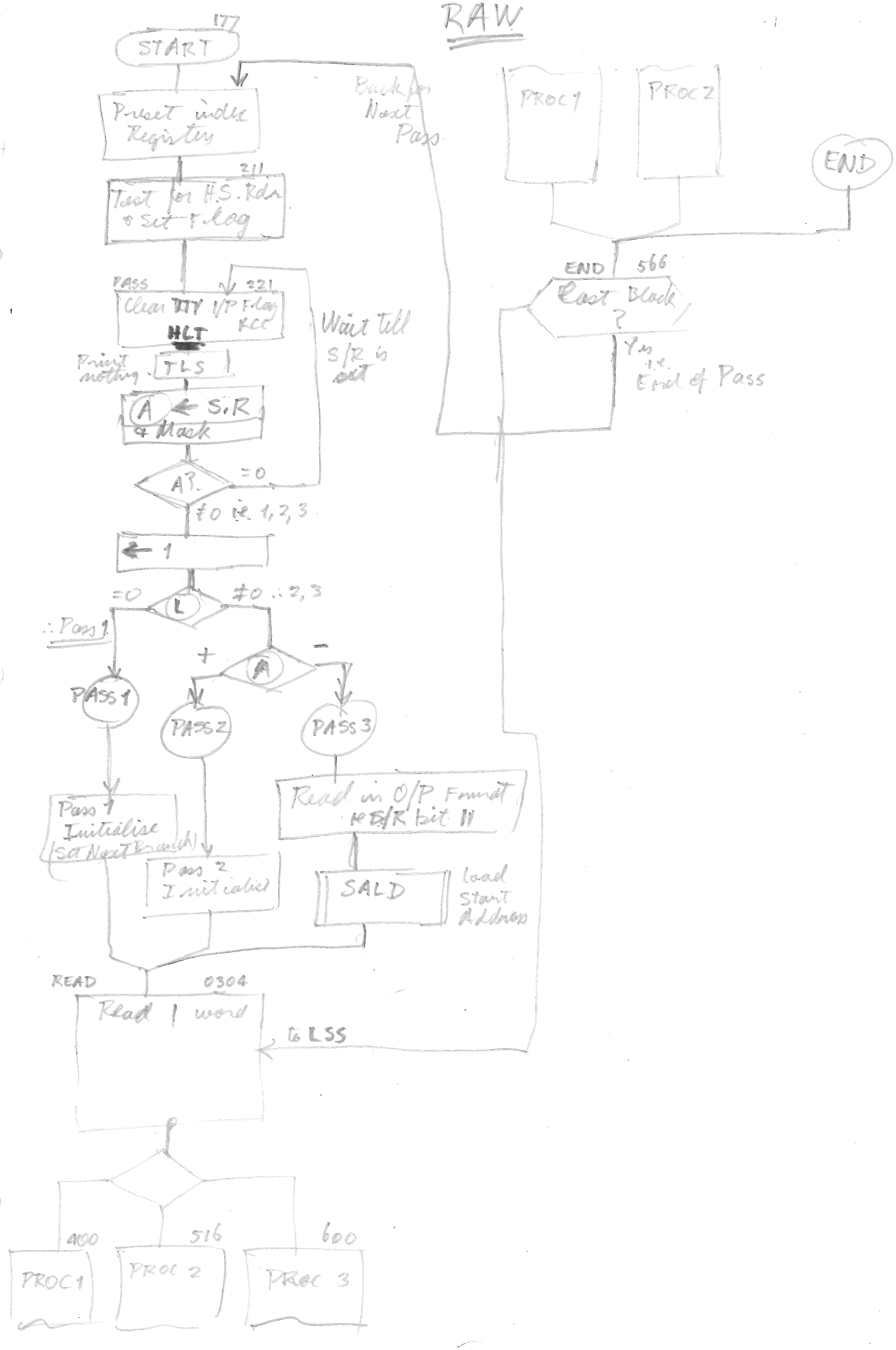


If COUNT = 2
PRINPT = 100

	COUNT	PRINPT	COUNT after ISZ
Pass 1	-2	101	-1
Pass 2	-1	102	0 ∴ SKIP out


enter with TEMP = Octal # to be printed
enter with A = Address of
1st free entry in Msg String
UNPACK
ADDRS ← (A)
STORE ← 0
DIGCO ← -4
(A) = TEMP
← 1
UNPACK
(A) = (A) + STORE
← 3
(A) ← (A) . 0007
(A) = (A) + 260
Form ASCII
Store at [ADDRS]
ie in MSG STRING
Incr ADDRS
ISZ DIGCO
(A) ; (L) = 0
RETURN
a b c d
c a b c d
b c d 1 a
c c 0 a
0 3 6 a
SYM 3
ie LOCN ← 1533
LOCN ← [INSTS]
(A) ← 0
SYM 4
LOCN ← [INSTS]
Place return address at SYM3 entry point
(A) ← -1
(A) ← (A) - 3
- 3 or - 4 depending on entry
SYMCO ← (A)
INSTS(i) ≠ Null Parameter
Incr Ret. Addr
Incr LOCN (1534)
ISZ SYMCO
≠0
=0
(A) = 240 Space
INSTS( ) = (A)
RETURN
Instr. String
1533
INSTS
INSTST

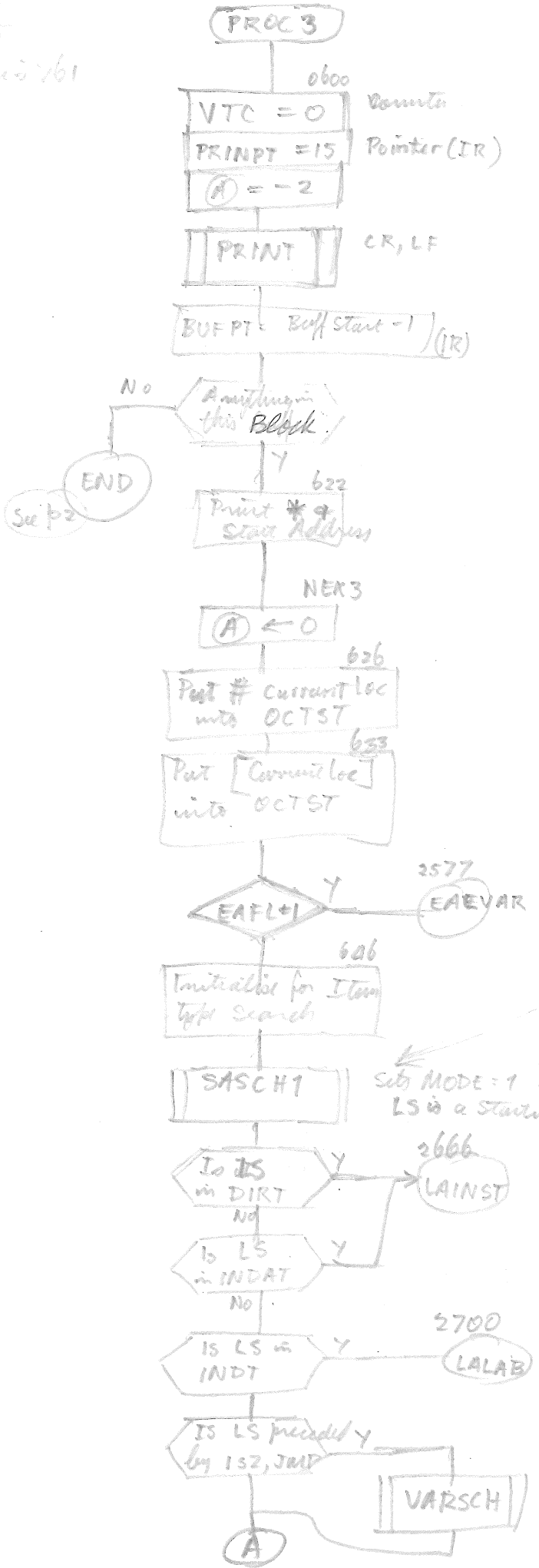
RAW

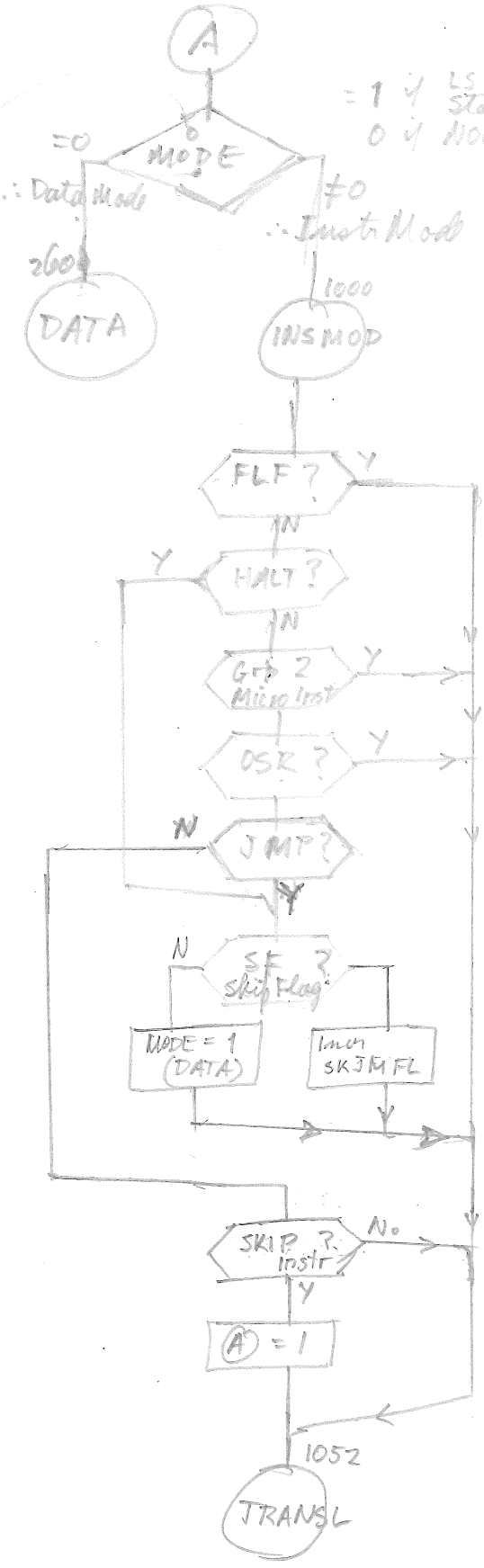

177
START
Preset index Registry
Back for Next Pass
211
Test for H.S. Rdr & Set F.flag
01
10
11
PASS
221
Clear TTY I/P F.flag KCC
HLT
Wait till S/R is set
Print nothing
TLS
A ← S.R & Mask
A?
=0
≠0 ie. 1, 2, 3
← 1
L
=0
≠0 : 2, 3
: Pass 1
A
+
−
PASS 1
PASS 2
PASS 3
Pass 1 Initialise (Set Next Branch)
Pass 2 Initialise
Read in O/P Format KB/R bit 11
SALD
Load Start Address
READ
0304
Read 1 word
to LSS
400
516
600
PROC 1
PROC 2
PROC 3
PROC 1
PROC 2
END
END
566
Last Block ?
Yes ie. End of Pass

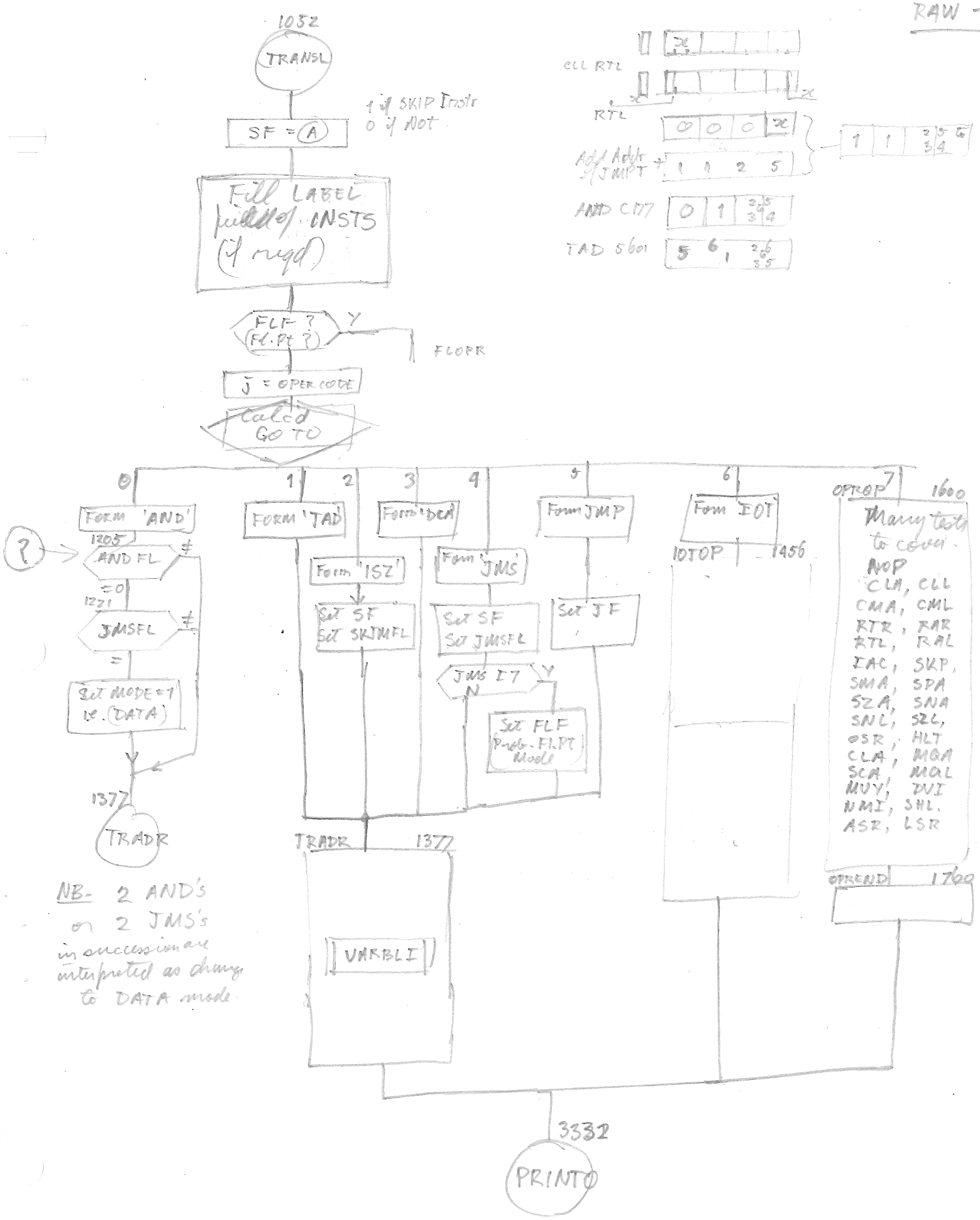
RAW - 2

MODE = 0 ↔ INSTR's
= 1 ↔ DATA

0743
15
0760






1052
TRANSL
1 if SKIP Instr
0 if Not
SF = A
Fill LABEL
CNSTS
(if reqd)
FLF ?
(FL.Pt ?)
Y
FLOPR
J = OPER CODE
Calcd GO TO
0
1
2
3
4
5
6
7
OPTOP 1600
Form 'AND'
1205
AND FL
≠
=0
1271
JMSFL
≠
=
Set MODE = 1
i.e. (DATA)
Y
1377
TRADR
NB- 2 AND's
or 2 JMS's
in succession are
interpreted as change
to DATA mode
Form 'TAD'
Form 'ISZ'
Set SF
Set SKIPFL
Form 'DCA'
Form 'JMS'
Set SF
Set JMSFL
JMS I ?
Y
N
Set FLF
(Prohib. FL.PT
Mode)
Form JMP
Set JF
Form IOT
IOTOP 1456
Many tests
to cover
NOP
CLA, CLL
CMA, CML
RTR, RAR
RTL, RAL
IAC, SKP,
SMA, SPA
SZA, SNA
SNL, SZL,
OSR, HLT
CLA, MQA
SCA, MQL
MUY, DVI
NMI, SHL,
ASR, LSR
OPREND 1700
TRADR 1377
VARBLI
3332
PRINTO
CLL RTL
RTL
Add Addr of JMPT
AND C177
TAD 5601