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0000                                    FLO                                 1.  QADAAD ASSEMBLER PASS 1.
0001                                                                        TABLE OF CONTENTS
0002                                                                        X   C.  COPY ROUTINE
0003                                                                        X   G.  GET NEXT CARD IMAGE ROUTINE
0004                                                                        X   I.  INITIALIZE ROUTINE
0005                                                                        X   M.  MASTER CONTROL ROUTINE
0006                                                                        X   U.  CARD BUFFER UNLOAD CO-ROUTINE
0007                                                                        X   W.  TAPE WRITE ROUTINE
0008                                                                        X   THIS PASS READS CARDS ONTO TAPE, UPDATING
0009                                                                        X   A PREVIOUS TAPE.
0010                                                                        X   THE SHOW BEGINS AT ROUTINE I.
0011                                                                        X
0012                                                                        X   ERROR STOPS
0013                                                                        X   M  MEANING
0014                                                                        X   1  CARD READ COMPARISON ERROR
0015                                                                        X   2  HSR OFF NORMAL
0016                                                                        X   5  TAPE WRITE ERROR
0017                                                                        X   6  TAPE READ ERROR
0018                          B8AH      NEW1 00001      00000
0019                          INIT      EQU   8999                        G   START
0020                          R0000     BLR   4200       4419             G   TAPE INPUT AREA
0021                          D0000     BLR   4000       4199             G   CARD READ AREA
0022                          F0000     COR   0200                        G   FIRST STATION AREA
0023                          C0000     COR   0200                        G   2ND STATION AREA
0024                          B0000     COR   0201                        G   TAPE OUTPUT AREA
0025                          E0000     COR   0020                        G   CARD EDIT TARGET AREA
0026                          U0000     COR   0080                        G   CARD BUFFERS
0027                          V0000     COR   0040                        G   CARD BUFFERS
0028                          I0001     COR   0020                        G   1ST STATION UNLOAD TABLE
0029                          J0001     COR   0020                        G   2ND STATION UNLOAD TABLE
0030                          G0000     COR   0020                        G   CURRENT INPUT CARD
0031                                    HHH         C
0032  8622  888 0 00  8661  8642        U0000     JMP   U0039      U0020   G   CARD INPUT BUFFER LINKS
0033  8642  888 0 00  8681  8662        U0020     JMP   U0059      U0040
0034  8662  888 0 00  8701  8682        U0040     JMP   U0079      U0060
0035  8682  888 0 00  8721  8702        U0060     JMP   V0019      V0000
0036  8702  888 0 00  8741  8722        V0000     JMP   V0039      V0020
0037  8722  888 0 00  8641  8622        V0020     JMP   U0019      U0000
0038  8742  888 0 30  8014  8802        I0001     LDL   F0013      TB1R    G   1ST STATION UNLOAD CONTROL
0039  8743  888 0 30  8026  8802        I0002     LDL   F0025      TB1R
0040  8744  888 0 30  8038  8802        I0003     LDL   F0037      TB1R
0041  8745  888 0 30  8050  8802        I0004     LDL   F0049      TB1R
0042  8746  888 0 30  8062  8802        I0005     LDL   F0061      TB1R
0043  8747  888 0 30  8074  8802        I0006     LDL   F0073      TB1R
0044  8748  888 0 30  8086  8802        I0007     LDL   F0085      TB1R
0045  8749  888 0 30  8098  8802        I0008     LDL   F0097      TB1R
0046  8750  888 0 30  8019  8802        I0009     LDL   F0018      TB1R
0047  8751  888 0 30  8031  8802        I0010     LDL   F0030      TB1R
0048  8752  888 0 30  8043  8802        I0011     LDL   F0042      TB1R
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0049  8753  888 0 30  8055  8802      I0012   LDL  F0054   TB1R
0050  8754  888 0 30  8067  8802      I0013   LDL  F0066   TB1R
0051  8755  888 0 30  8079  8802      I0014   LDL  F0078   TB1R
0052  8756  888 0 30  8091  8802      I0015   LDL  F0090   TB1R
0053  8757  888 0 30  8112  8802      I0016   LDL  F0111   TB1R
0054  8762  888 0 25  8319  000C      J0001   LDA  C0118   RX        G   2ND STATION UNLOAD CONTROL
0055  8763  888 0 25  8331  000C      J0002   LDA  C0130   RX
0056  8764  888 0 25  8343  000C      J0003   LDA  C0142   RX
0057  8765  888 0 25  8355  000C      J0004   LDA  C0154   RX
0058  8766  888 0 25  8367  000C      J0005   LDA  C0166   RX
0059  8767  888 0 25  8379  000C      J0006   LDA  C0178   RX
0060  8768  888 0 25  8391  000C      J0007   LDA  C0190   RX
0061  8769  888 0 25  8207  000C      J0008   LDA  C0006   RX
0062  8770  888 0 25  8324  000C      J0009   LDA  C0123   RX
0063  8771  888 0 25  8336  000C      J0010   LDA  C0135   RX
0064  8772  888 0 25  8348  000C      J0011   LDA  C0147   RX
0065  8773  888 0 25  8360  000C      J0012   LDA  C0159   RX
0066  8774  888 0 25  8372  000C      J0013   LDA  C0171   RX
0067  8775  888 0 25  8384  000C      J0014   LDA  C0183   RX
0068  8776  888 0 25  8396  000C      J0015   LDA  C0195   RX
0069  8777  888 0 25  8212  000C      J0016   LDA  C0011   RX
0070  8999  888 0 25  8803  800A      INIT    LDA  WROF             I.  INITIALIZE.
0071                                                                I1. STOP.
0072  800A  888 0 67  8804  801A              HLT  PASS2            M:  HALT. IF M RESTART GO TO*PAS2 (#6).
0073  801A  888 0 60  8805  802A              STA  CKWR             C:
0074  802A  888 0 F2  0300  803A              TRW   0300            I2. SET STARTING VALUES
0075  803A  888 0 26  8806  8806              CLA                       SET LINE COUNT TO 0
0076  8806  888 0 60  8807  804A              STA  NUM                  SET STACKER SELECT COUNT TO 0
0077  804A  888 0 60  8808  805A              STA  SSCT                 SET STACKER SELECT TO POCKET 0
0078  805A  888 0 25  8809  8810              LDA                9F     RESET OUTPUT BUFFER
0079  8809  888 1 00  0050  0000              CON1 00005         00000
0080  8810  888 0 60  8811  806A      9       STA  SSW
0081  806A  888 0 25  8812  8813              LDA                2F
0082  8812  888 0 00  8420  8401              JMP  B0019         B0000
0083  8813  888 0 60  8814  807A      2       STA  WR2
0084  807A  888 0 25  8815  8816              LDA                9F
0085  8815  888 1 00  0000  0010              CON1 00000         00010      SET CURRENT TAPE INPUT LINE COUNT TO -10
0086  8816  888 0 60  4201  808A      9       STA  R0001                    CLEAR CARD INPUT BUFFERS
0087  808A  888 0 25  8622  809A              LDA  U0000            I3. THEN GO
0088  809A  888 0 60  8817  810A              STA  K0                   TO MASTER CONTROL*M1.
0089  810A  888 0 60  8818  8819              STA  K1            MASTR
0090  8820  888 0 60  8821  811A      U1      STA  UEX              U.  UNLOAD SECTION
0091  811A  888 0 96  4001  812A              HBU  D0001            U1. UNLOAD BUFFER
0092  812A  888 0 25  8822  8823              LDA                9F     FILL 2ND STATION AREA
0093  8822  888 0 00  8400  8201              JMP  C0199         C0000
0094  8823  888 0 B0  4000  8824      9       TDC  D0000         U2
0095  8824  888 0 30  8825  8826      U2      LDL                9F     U2. CHECK 2ND
0096  8825  888 0 HH  HHHH  HHHH              CON  HHHHH        HHHHH        STATION EMPTY.
0097  8826  888 0 25  8207  813A      9       LDA  C0006                EMPTIF EMPTY. GO TO*U5.
0098  813A  888 0 82  8827  8828              TEQ  U5            U3     FULL
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0099  8828  888 0 05  8829  814A  U3    LDX  8F                    U3. COMPARE 2ND STATION
0100  814A  888 1 08  0016  8830          LIR3  0016      9F            WITH PREVIOUS 1ST STATION FOR CHECK.
0101  8830  888 1 04  8741  8741  9     JMP3 I0000                  ERR:GO TOU6 IF COMPARISON FAILS.
0102  8802  888 1 04  8761  8761  TB1R  JMP3 J0000                  OK:
0103  8829  888 0 82  8831  8832  8     TEQ                  U6
0104  8831  888 1 0G  9999  815A          IIR3  9999
0105  815A  888 0 31  8833  8833          CLL
0106  8833  888 0 82  8834  8830          TEQ  U4              9B
0107  8834  888 0 07  0600  816A  U4      IIR   0600                U4. CHECK FOR 600 CARDS
0108  816A  888 0 77  816A  817A          ATL                           IF SO SWAP CARD POCKETS 0 AND 1
0109  817A  888 0 07  0001  818A          IIR   0001
0110  818A  888 0 70  8808  819A          ADD  SSCT
0111  819A  888 0 60  8808  820A          STA  SSCT
0112  820A  888 0 82  8835  8836          TEQ                  2F
0113  8835  888 0 26  8837  8837          CLA
0114  8837  888 0 60  8808  821A          STA  SSCT
0115  821A  888 0 75  8811  822A          SUB  SSW
0116  822A  888 0 60  8811  8838          STA  SSW             3F
0117  8836  888 0 25  8811  8838  2       LDA  SSW             3F
0118  8838  888 0 70  8839  000A  3       ADD                  RA
0119  8839  888 0 47  0050  4999          HSS   0050      4999      G   WATCH OUT FOR UNDIGIT GARBLE
0120  4999  888 0 25  8207  823A   4999   LDA  C0006               U5. FILL INTERNAL BUFFER
0121  823A  888 0 60  8621  824A          STA  E0019                   EDIT 2ND STATION TO E REGION
0122  824A  888 0 25  8212  825A          LDA  C0011                   SEE QADAAD PASS 2. SECTION E FOR OUTPUT
0123  825A  888 0 60  8620  826A          STA  E0018                   FORMAT
0124  826A  888 0 25  8391  827A          LDA  C0190
0125  827A  888 0 60  8619  828A          STA  E0017
0126  828A  888 0 25  8396  829A          LDA  C0195
0127  829A  888 0 60  8618  830A          STA  E0016
0128  830A  888 0 25  8379  831A          LDA  C0178
0129  831A  888 0 60  8617  832A          STA  E0015
0130  832A  888 0 25  8384  833A          LDA  C0183
0131  833A  888 0 60  8616  834A          STA  E0014
0132  834A  888 0 25  8367  835A          LDA  C0166
0133  835A  888 0 60  8615  836A          STA  E0013
0134  836A  888 0 25  8372  837A          LDA  C0171
0135  837A  888 0 60  8614  838A          STA  E0012
0136  836A  888 0 25  8355  839A          LDA  C0154
0137  839A  888 0 35  8840  8841          ERS  9F              8F
0138  8840  888 0 0H  HHHH  HHHH  9       CON  0HHHH           HHHHH
0139  8841  888 0 60  8613  840A  8       STA  E0011
0140  840A  888 0 25  8360  841A          LDA  C0159
0141  841A  888 0 35  8840  842A          ERS  9B
0142  842A  888 0 60  8612  843A          STA  E0010
0143  843A  888 0 05  8355  844A          LDX  C0154
0144  844A  888 0 25  8343  845A          LDA  C0142
0145  845A  888 0 32  0900  846A          SHR   0900
0146  846A  888 0 25  000C  847A          LDA  RX
0147  847A  888 0 37  0100  848A          SHL   0100
0148  848A  888 0 60  8609  849A          STA  E0007
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0149  849A  888 0 05  8360  850A          LDX  C0159
0150  850A  888 0 25  8348  851A          LDA  C0147
0151  851A  888 0 32  0900  852A          SHR   0900
0152  852A  888 0 25  000C  853A          LDA  RX
0153  853A  888 0 37  0100  854A          SHL   0100
0154  854A  888 0 60  8608  855A          STA  E0006
0155  855A  888 0 05  8343  856A          LDX  C0142
0156  856A  888 0 25  8331  857A          LDA  C0130
0157  857A  888 0 32  0800  858A          SHR   0800
0158  858A  888 0 25  000C  859A          LDA  RX
0159  859A  888 0 37  0100  860A          SHL   0100
0160  860A  888 0 60  8607  861A          STA  E0005
0161  861A  888 0 05  8348  862A          LDX  C0147
0162  862A  888 0 25  8336  863A          LDA  C0135
0163  863A  888 0 32  0800  864A          SHR   0800
0164  864A  888 0 25  000C  865A          LDA  RX
0165  865A  888 0 37  0100  866A          SHL   0100
0166  866A  888 0 60  8606  867A          STA  E0004
0167  867A  888 0 25  8319  868A          LDA  C0118
0168  868A  888 0 35  8842  8843          ERS  9F          8F
0169  8842  888 0 HH  HHHH  HHH0    9     CON  HHHHH       HHHH0
0170  8843  888 0 60  8605  869A    8     STA  E0003
0171  869A  888 0 25  8324  870A          LDA  C0123
0172  870A  888 0 35  8842  871A          ERS  98
0173  871A  888 0 60  8604  872A          STA  E0002
0174  872A  888 0 06  8844  8844          CLX
0175  8844  888 0 60  8603  873A          STA  E0001
0176  873A  888 0 05  8331  874A          LDX  C0130
0177  874A  888 0 25  8319  875A          LDA  C0118
0178  875A  888 0 32  0700  876A          SHR   0700
0179  876A  888 0 25  000C  877A          LDA  RX
0180  877A  888 0 37  0600  878A          SHL   0600
0181  878A  888 0 60  8611  879A          STA  E0009
0182  879A  888 0 05  8336  880A          LDX  C0135
0183  880A  888 0 25  8324  881A          LDA  C0123
0184  881A  888 0 32  0700  882A          SHR   0700
0185  882A  888 0 25  000C  883A          LDA  RX
0186  883A  888 0 37  0600  884A          SHL   0600                  MOVE REGION E TO NEXT
0187  884A  888 0 60  8610  8845          STA  E0008       BLST       FREE CARD INPUT BUFFER
0188  8845  888 0 25  8846  8847  BLST    LDA              9F
0189  8846  888 0 00  8621  8602          JMP  E0019       E0000
0190  8847  888 0 88  4400  885A    9     TCD  R0200
0191  885A  888 0 25  8818  886A          LDA  K1
0192  886A  888 0 70  8848  8849          ADD              9F
0193  8848  888 0 00  0000  0001          CON  00000       00001
0194  8849  888 0 80  4401  887A    9     TDC  R0201
0195  887A  888 0 25  8818  888A          LDA  K1
0196  888A  888 0 35  8850  8851          ERS              9F
0197  8850  888 0 00  0000  HHHH          CON  00000       0HHHH
0198  8851  888 0 37  0400  889A    9     SHL   0400                  THEN CYCLE EMPTY BUFFER CONTROL LINK K1.
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0199  889A  888 0 20  8852  000A                 BUF          RA
0200  8852  898 0 25  0000  890A                 LDA   0000
0201  890A  888 0 60  8818  8827                 STA   K1      U5
0202  8827  888 0 25  8853  8854  U5             LDA           9F
0203  8853  888 0 00  8200  8001                 JMP   F0199   F0000
0204  8854  888 0 80  4000  8821  9              TDC   D0000   UEX
0205  8832  888 0 47  0200  891A  U6             HSS   0200
0206  891A  888 0 67  0001  8821                 HLT   0001    UEX
0207
0208  8855  888 0 42  8820  892A  G1             HBT   U1
0209  892A  888 0 26  8856  8856                 CLA
0210  8856  888 0 60  8857  8858                 STA   T       G2
0211  8858  888 0 72  8859  8860  G2             HCC           -G3
0212  8859  888 0 42  8820  8858                 HBT   U1      G2
0213  8860  888 0 25  8817  893A  -G3            LDA   K0
0214  893A  898 0 30  8818  894A                 LDL   K1
0215  894A  888 0 82  8862  8863                 TEQ           G4
0216  8862  888 0 42  8820  8858                 HBT   U1      G2
0217  8863  888 0 88  4400  895A  G4             TCD   R0200
0218  895A  888 0 35  8864  8865                 ERS           9F
0219  8864  888 0 00  0000  HHHH                 CON   00000   0HHHH
0220  8865  888 0 37  0400  896A  9              SHL   0400
0221  896A  888 0 20  8866  000A                 SUF           RA
0222  8866  888 0 25  0000  897A                 LDA   0000
0223  897A  888 0 60  8817  898A                 STA   K0
0224  898A  888 0 25  8867  8868                 LDA           9F
0225  8867  888 0 00  8801  8782                 JMP   G0019   G0000
0226  8868  888 0 80  4400  899A  9              TDC   R0200
0227  899A  888 0 42  8820  800F                 HBT   U1
0228  800F  888 0 04  0000  0000                 JMP1  0000
0229  8861  888 0 07  0150  801F  &G3            IIR   0150
0230  801F  888 0 77  801F  802F                 ATL
0231  802F  888 0 07  0001  803F                 IIR   0001
0232  803F  888 0 70  8857  804F                 ADD   T
0233  804F  888 0 60  8857  805F                 STA   T
0234  805F  888 0 05  0000  806F                 LDX   0000
0235  806F  888 0 82  8869  8860                 TEQ           -G3
0236  8869  888 0 67  0002  8855                 HLT   0002    G1
0237  8870  888 0 07  0150  807F  STOP           IIR   0150
0238  807F  888 0 77  807F  808F                 ATL
0239  808F  888 0 26  8871  8871                 CLA   2F
0240  8871  888 0 88  0000  809F  2              TEQ1  0000
0241  809F  888 0 42  8872  810F                 HBT   1F
0242  810F  888 0 05  0000  811F                 LDX   0000
0243  811F  888 0 70  8873  8871                 ADD           2B
0244  8873  888 0 00  0001  0000                 CON   00000   10000
0245  8872  888 0 42  8820  8870  1              HBT   U1      STOP
0246  8819  888 0 08  8874  8855  MASTR          LIR1  MAST1   G1
0247  8874  888 0 25  8790  812F  MAST1          LDA   G0008
0248  812F  888 0 30  8875  8876                 LDL           2F
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U6. MOVE STATION 1
    TO 1ST STATION AREA.  THEN#EXIT.

U7. SELECT STACKER 2
    BEGINNING WITH BAD COMPARISON CARD. HALT.
X   THEN#EXIT.
G.  FETCH NEXT CARD SECTION
G1. RESET TIMER
    FOR OFF NORMAL
G2. TRY TO FEED A CARD
OFF:IF OFF NORMAL GO TO#G5.
ON:
G3. CHECK BUFFERS.
EMP:IF BUFFERS ARE EMPTY GO TO#G2
    AND FEED ANOTHER CARD.
ONE:
G4. MOVE NEXT IMAGE
    TO AREA G.


    THEN CYCLE FULL BUFFER CONTROL LINK K0.
    AFTER THAT#EXIT.


G5. STEP TIMER
    STEP THE OFF NORMAL TIMER.
150:IF TOO LONG STOP.
    THEN TRY AGAIN BY GOING TO#G1.
OK: OTHERWISE GO TO#G3 AND EMPTY A BUFFER.
G   SYNCHRONIZE LOOP WITH DRUM


S.  STOP ROUTINE
S1. SHUT DOWN READER
    COUNT TO 150 TO MAKE SURE ALL COMMITTED
    CARDS HAVE BEEN READ.
    THEN#EXIT.
G   SYNCHRONIZE LOOP WITH DRUM


M.  MASTER PROCESS CONTROL
M1. FETCH A CARD
    BY GOING TO SECTION G.
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```
0249  8875  888 0 11  2000  0000          ZON  FIN 0     00000
0250  8876  888 0 82  8877  8878    2     TEQ               3F        M2. CHECK FOR FIN
0251  8877  888 0 25  8791  813F          LDA  G0009                  FIN:IF SO SET LINE NUMBER TO SENTINEL
0252  813F  888 0 30  8879  8880          LDL               2F            AND WRITE TAPE AT#W1.
0253  8879  888 0 69  5800  0000          NUM  FIN 0     00000        NO:
0254  8880  888 0 82  8881  8882    2     TEQ               4F
0255  8881  888 0 25  8883  8884          LDA               2F
0256  8883  888 0 99  9999  9999          CON  99999     99999
0257  8884  888 0 60  8807  8885    2     STA  NUM          WRITE
0258  8878  888 0 30  8886  8887    3     LDL               2F        M3. CHECK FOR CPY
0259  8886  888 0 12  3000  0000          ZON  CPY 0     00000        CPY:IF SO JUMP TO COPY ROUTINE#C1.
0260  8887  888 0 82  8888  8882    2     TEQ               4F        NO:
0261  8888  888 0 25  8791  814F          LDA  G0009
0262  814F  888 0 30  8889  8890          LDL               2F
0263  8889  888 0 37  8800  0000          NUM  CPY 0     00000
0264  8890  888 0 82  8891  8882    2     TEQ  COPY         4F
0265  8882  888 0 08  8819  8885    4     LIR1 MASTR        WRITE     M4. WRITE LINE
0266                                                                  X   THIS IS A CARD TO BE PROCESSED BY PASS 2 SO
0267                                                                  X   WE WRITE IT OUT, USING ROUTINE W, AND GO
0268                                                                  X   BACK TO#M1.
0269  8891  888 0 08  8892  8870    COPY  LIR1 5F           STOP      C.  COPY OLD TAPE
0270  8892  888 1 02  8893  8805    5     LIR2 6F           CK#R      C1. STOP THE READER
0271  8893  888 0 25  8787  815F    6     LDA  G0005                      ROUTINE S.
0272  815F  888 0 05  8789  816F          LDX  G0007                C2. CHECK PREV WRITE
0273  816F  888 0 32  0500  817F          SHR   0500                      AT W50.
0274  817F  888 0 60  8894  818F          STA  FRST                 C3. SET UP FIRST,LAST
0275  818F  888 0 65  8895  8896          STX  LST          -CP           LINE NUMBERS FOR OLD TAPE.
0276  8896  888 0 30  4201  819F    -CP   LDL  R0001                C4. FIRST:CURRENT
0277  819F  888 0 25  8894  820F          LDA  FRST                 LESSIF FIRST IS LESS THAN CURRENT GO TO#C6.
0278  820F  888 0 35  8898  8899          ERS               2F      EQL IF FIRST EQUALS CURRENT GO TO#C8.
0279  8898  888 0 00  0000  HHH0          CON  00000     0HHH0      GTR
0280  8899  888 0 82  8900  8901    2     TEQ  3F           8F
0281  8901  888 0 87  8902  8903    8     TGR  9F           4F
0282  8902  888 0 G2  0200  821F    9     TRD   0200                C5. READ TAPE FORWARD
0283  821F  888 0 C7  8902  822F          TBT  98                   OK: THEN GO BACK TO#C4.
0284  822F  888 0 C7  8904  822F          TBT               *       BAD:
0285  8904  888 0 26  8905  8905          CLA                           IF ERROR ON TAPE READ, HOWEVER, HALT AND
0286  8905  888 0 82  8906  8897          TEQ               &CP         REVERSE DIRECTION
0287  8906  888 0 F6  4200  8896          TBU  R0000        -CP
0288  8897  888 0 67  0006  8903    &CP   HLT   0006        4F
0289  8903  888 0 G2  0205  823F    4     TRD   0205                C6. READ TAPE BACKWARD
0290  823F  888 0 C7  8907  823F          TBT               *       BAD:IF ERROR REVERSE DIRECTION AT#C5.
0291  8907  888 0 26  8908  8908          CLA                       OK:
0292  8908  888 0 82  8909  8911          TEQ               &CPP
0293  8909  888 0 F6  4200  8910          TBU  R0000        -CPP
0294  8910  888 0 25  8894  824F    -CPP  LDA  FRST                 C7. RECOMPARE
0295  824F  888 0 35  8912  8913          ERS               2F      LESSIF FIRST IS STILL LESS THAN CURRENT, GO TO#C6
0296  8912  888 0 00  0000  HHH0          CON  00000     0HHH0      EQL IF THEY ARE EQUAL, REREAD FORWARD AT#C5.
0297  8913  888 0 30  4343  825F    2     LDL  R0143               GTR IF GREATER, WE ALSO GO TO#C5 (PROBABLY A BAD
0298                                                                  X   MACHINE ERROR)
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0299  825F  888 0 82  8902  8901          TEQ  9B        8B
0300  8911  888 0 67  0006  8902  &CPP    HLT   0006     9B
0301  8900  888 0 25  8894  826F  3       LDA  FRST                 C8. MOVE TO OUTPUT.
0302  826F  888 0 35  8914  8915          ERS               2F          MOVE A RECORD FROM THE OLD TAPE TO
0303  8914  888 0 00  0000  000H          CON  00000        0000H       WORKING STORAGE (REGION G).
0304  8915  888 0 37  0500  827F  2       SHL   0500
0305  827F  888 0 70  000A  828F          ADD  RA
0306  828F  888 0 70  8916  8917          ADD  MOV          1F
0307  8916  888 0 80  4200  8918  MOV     TDC  R0000        WRIT2
0308  8917  888 0 60  8919  829F  1       STA  WRIT1
0309  829F  888 0 25  8920  8919          LDA               WRIT1
0310  8920  888 0 00  8801  8782          JMP  G0019        G0000
0311  8918  888 0 08  8921  8885  WRIT2   LIR1 5F          WRITE       C9. THEN WRITE IT OUT
0312                                                                  X   THE OLD TAPE IS NOW POSITIONED TO WRITE
0313  8921  888 0 25  8894  830F  5       LDA  FRST                       PROPERLY. USE SECTION W TO WRITE OUT A LINE.
0314  830F  888 0 30  8895  831F          LDL  LST                        INCREMENT 'FRST' AND CHECK FOR END.
0315  831F  888 0 70  8922  832F          ADD  ONE                  DONEIF DONE WITH THIS COPY CARD,GO BACK TO MASTER
0316                                                                  X   CONTROL#M1
0317  832F  888 0 87  8819  833F          TGR  MASTR                MORE
0318  833F  888 0 60  8894  8923          STA  FRST         5F      C10.CHECK INPUT BUFFER
0319  8923  888 0 25  8919  834F  5       LDA  WRIT1                EMPTIF EXHAUSTED READ ANOTHER RECORD AT#C5.
0320  834F  888 0 70  8924  835F          ADD  M20                  OK  OTHERWISE GO BACK TO#C8.
0321  835F  888 0 30  8925  8926          LDL               2F
0322  8925  888 0 80  4400  8918          TDC  R0200        WRIT2
0323  8926  888 0 82  8902  8917  2       TEQ  9B           1B
0324  8924  888 0 00  0020  0000  M20     CON  00002        00000
0325  8922  888 0 00  0000  0001  ONE     CON  00000        00001
0326  8885  888 0 42  8820  836F  WRITE   HBT  U1                      W.  TAPE WRITE CONTROL SECTION.
0327  836F  888 0 25  8807  837F          LDA  NUM                    W1. SET LINE COUNT.
0328  837F  888 0 60  8783  838F          STA  G0001                      AND INCREMENT
0329  838F  888 0 31  8927  8927          CLL                       FIN:IF SENTINEL JUMP TO#W4.
0330  8927  888 0 50  8782  839F          STL  G0000                OK:
0331  839F  888 0 70  8922  8928          ADD  ONE          -WR     W2. PLACE IN BUFFER
0332  8928  888 0 60  8807  8930  -WR     STA  NUM          WR4         THEN CHECK FOR BUFFER FULL.
0333  8930  888 0 25  8931  8932  WR4     LDA               1F      OK: IF NOT,#EXIT.
0334  8931  888 0 00  8801  8782          JMP  G0019        G0000   FULL
0335  8932  888 0 88  4000  840F  1       TCD  D0000
0336  840F  888 0 25  8814  841F          LDA  WR2
0337  841F  888 0 30  8933  8934          LDL  9F           1F
0338  8933  888 0 00  8600  8581  9       JMP  B0199        B0180
0339  8934  888 0 80  4000  842F  1       TDC  D0000
0340  842F  888 0 82  8935  843F          TEQ  1F
0341  843F  888 0 70  8936  844F          ADD  TWTW
0342  844F  888 0 60  8814  845F          STA  WR2
0343  845F  888 0 42  8820  846F          HBT  U1
0344  846F  888 0 04  0000  0000          JMP1  0000
0345  8935  888 0 25  8937  8938  1       LDA  8F           1F
0346  8937  888 0 00  8420  8401  8       JMP  B0019        B0000
0347  8938  888 0 60  8814  847F  1       STA  WR2
0348  847F  888 0 42  8820  848F          HBT  U1
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0349    848F  888 0 25  8401  849F            LDA  80000
0350    849F  888 0 60  8601  850F            STA  80200
0351    850F  888 1 02  8939  8805            LIR2 5F        CKWR    W3. CHECK PREV WRITE
0352    8936  888 0 00  0020  0020  TWTW      CON  00002     00020       AT W50.
0353    8939  888 0 C6  8402  8940  5         TBL  80001     1F          LOAD THE BUFFER, WRITE, AND SET THE
0354    8940  888 0 H2  0300  851F  1         TWR   0300                 CHECKING SWITCH ON.
0355    851F  888 0 C2  8941  8942            TST            7F          THEN#EXIT.
0356    8941  888 0 42  8820  8940            HBT  U1        1B
0357    8942  888 0 25  8943  852F  7         LDA  WRON
0358    852F  888 0 60  8805  853F            STA  CKWR
0359    853F  888 0 04  0000  0000            JMP1  0000
0360    8929  888 0 08  8944  8930  &WR       LIR1           WR4         W4. WRITE SENTINEL.
0361    8944  888 0 25  8814  854F            LDA  WR2                       CHECK FOR END OF TAPE RECORD.
0362    854F  888 0 30  8937  855F            LDL  88                    NO: IF NOT,RETURN TO#W4,WRITING SENTINELS UNTIL
0363                                                                     X   A TAPE RECORD IS DUMPED OUT.
0364    855F  888 0 82  8945  8929            TEQ            &WR         YES:
0365    8945  888 1 02  8946  8805            LIR2 5F        CKWR        W5. CLEAN UP.
0366    8946  888 0 08  8947  8870  5         LIR1 5F        STOP            CHECK THE WRITE.  USE W50.
0367    8947  888 0 C6  8402  8948  5         TBL  80001     5F
0368    8948  888 0 H2  0300  856F  5         TWR   0300                     WRITE ANOTHER SENTINEL BLOCK.
0369    856F  888 0 C2  8948  857F            TST  5B
0370    857F  888 0 F2  0200  8804            TRW   0200     PASS2
0371    8804  888 0 F2  0300  858F  PASS2     TRW   0300                 W6. END.
0372    858F  888 0 G2  0400  859F            TRD   0400                     REWIND TAPES, READ#PASS2 AND EXECUTE IT.
0373    859F  888 0 F6  8000  8000            TBU   8000      8000
0374    8803  888 1 00  0000  0000  WROF      JMP2  0000                 W50. PREVIOUS WRITE...
0375    8943  888 0 C7  8949  860F  WRON      TBT  1F                        SWITCH TESTS EXISTENCE OF PREVIOUS WRITE.
0376    860F  888 0 42  8820  8943            HBT  U1        WRON        NONEIF NONE#EXIT.
0377    8949  888 0 26  8950  8950  1         CLA                        WRIT
0378    8950  888 0 82  8951  861F            TEQ  3F                    W51.WAIT READY.
0379    861F  888 0 0G  0000  862F            IIR1  0000                     WHEN TAPE IS FINISHED CHECK FOR ERRORS.
0380    862F  888 0 20  8952  8953            BUF                2F      NONEIF OK SET SWITCH OFF AND#EXIT.
0381    8952  888 0 08  0000  8954            LIR1  0000         CKW1    ERR IF ERROR STOP THE READER (SECTION S),
0382    8953  888 0 60  8955  863F  2         STA  CKW2                      HALT, AND THEN#EXIT.
0383    863F  888 0 08  8955  8870            LIR1 CKW2          STOP
0384    8954  888 0 67  0005  8803  CKW1      HLT   0005         WROF
0385    8951  888 0 25  8803  864F  3         LDA  WROF
0386    864F  888 0 60  8805  8803            STA  CKWR          WROF
- 0387                                        END  INIT
```

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0000                                        FLO                                 1.  QADAAD ASSEMBLER PASS 1.
0001
0018                                 B8AH   NEW1 00001      00000
0019                                 INIT   EQU   8999                           START
0020                                 R0000  BLR   4200       4419                TAPE INPUT AREA
0021                                 D0000  BLR   4000       4199                CARD READ AREA
0022                                 F0000  COR   0200                           FIRST STATION AREA
0023                                 C0000  COR   0200                           2ND STATION AREA
0024                                 B0000  COR   0201                           TAPE OUTPUT AREA
0025                                 E0000  COR   0020                           CARD EDIT TARGET AREA
0026                                 U0000  COR   0080                           CARD BUFFERS
0027                                 V0000  COR   0040                           CARD BUFFERS
0028                                 I0001  COR   0020                           1ST STATION UNLOAD TABLE
0029                                 J0001  COR   0020                           2ND STATION UNLOAD TABLE
0030                                 G0000  COR   0020                           CURRENT INPUT CARD
0031                                        HHH          C
0032  8622  888 0 00  8661  8642   U0000  JMP   U0039      U0020                CARD INPUT BUFFER LINKS
0033  8642  888 0 00  8681  8662   U0020  JMP   U0059      U0040
0034  8662  888 0 00  8701  8682   U0040  JMP   U0079      U0060
0035  8682  888 0 00  8721  8702   U0060  JMP   V0019      V0000
0036  8702  888 0 00  8741  8722   V0000  JMP   V0039      V0020
0037  8722  888 0 00  8641  8622   V0020  JMP   U0019      U0000
0038  8742  888 0 30  8014  8802   I0001  LDL   F0013      TB1R                 1ST STATION UNLOAD CONTROL
0039  8743  888 0 30  8026  8802   I0002  LDL   F0025      TB1R
0040  8744  888 0 30  8038  8802   I0003  LDL   F0037      TB1R
0041  8745  888 0 30  8050  8802   I0004  LDL   F0049      TB1R
0042  8746  888 0 30  8062  8802   I0005  LDL   F0061      TB1R
0043  8747  888 0 30  8074  8802   I0006  LDL   F0073      TB1R
0044  8748  888 0 30  8086  8802   I0007  LDL   F0085      TB1R
0045  8749  888 0 30  8098  8802   I0008  LDL   F0097      TB1R
0046  8750  888 0 30  8019  8802   I0009  LDL   F0018      TB1R
0047  8751  888 0 30  8031  8802   I0010  LDL   F0030      TB1R
0048  8752  888 0 30  8043  8802   I0011  LDL   F0042      TB1R
0049  8753  888 0 30  8055  8802   I0012  LDL   F0054      TB1R
0050  8754  888 0 30  8067  8802   I0013  LDL   F0066      TB1R
0051  8755  888 0 30  8079  8802   I0014  LDL   F0078      TB1R
0052  8756  888 0 30  8091  8802   I0015  LDL   F0090      TB1R
0053  8757  888 0 30  8112  8802   I0016  LDL   F0111      TB1R
0054  8762  888 0 25  8319  000C   J0001  LDA   C0118      RX                   2ND STATION UNLOAD CONTROL
0055  8763  888 0 25  8331  000C   J0002  LDA   C0130      RX
0056  8764  888 0 25  8343  000C   J0003  LDA   C0142      RX
0057  8765  888 0 25  8355  000C   J0004  LDA   C0154      RX
0058  8766  888 0 25  8367  000C   J0005  LDA   C0166      RX
0059  8767  888 0 25  8379  000C   J0006  LDA   C0178      RX
0060  8768  888 0 25  8391  000C   J0007  LDA   C0190      RX
0061  8769  888 0 25  8207  000C   J0008  LDA   C0006      RX
0062  8770  888 0 25  8324  000C   J0009  LDA   C0123      RX
0063  8771  888 0 25  8336  000C   J0010  LDA   C0135      RX
0064  8772  888 0 25  8348  000C   J0011  LDA   C0147      RX
```

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```
0065  8773  888 0 25  8360  000C                    J0012  LDA
0066  8774  888 0 25  8372  000C                    J0013  LDA
0067  8775  888 0 25  8384  000C                    J0014  LDA
0068  8776  888 0 25  8396  000C                    J0015  LDA
0069  8777  888 0 25  8212  000C                    J0016  LDA

                                    C0159    RX     LDA
                                    C0171    RX     LDA
                                    C0183    RX     LDA
                                    C0195    RX     LDA
                                    C0011    RX     LDA
```

```
0070  8999  888 0 25  8803  800A      INIT   LDA  #ROF                  I.  INITIALIZE.
0071                                                                    II. STOP.
0072  800A  888 0 67  8804  801A             HLT  PASS2
0073  801A  888 0 60  8805  802A             STA  CK#R
0074  802A  888 0 F2  0300  803A             TR#   0300                 I2. SET STARTING VALUES
0075  803A  888 0 26  8806  8806             CLA
0076  8806  888 0 60  8807  804A             STA  NUM
0077  804A  888 0 60  8808  805A             STA  SSCT
0078  805A  888 0 25  8809  8810             LDA            9F
0079  8809  888 1 00  0050  0000             CON1 00005     00000
0080  8810  888 0 60  8811  806A      9      STA  SS#
0081  806A  888 0 25  8812  8813             LDA            2F
0082  8812  888 0 00  8420  8401             JMP  80019     80000
0083  8813  888 0 60  8814  807A      2      STA  #R2
0084  807A  888 0 25  8815  8816             LDA            9F
0085  8815  888 1 00  0000  0010             CON1 00000     00010
0086  8816  888 0 60  4201  808A      9      STA  R0001
0087  808A  888 0 25  8622  809A             LDA  U0000                 I3. THEN GO
0088  809A  888 0 60  8817  810A             STA  K0
0089  810A  888 0 60  8818  8819             STA  K1        MASTR
```

```
0090  8820  888 0 60  8821  811A      U1        STA  UEX                    U.  UNLOAD SECTION
0091  811A  888 0 96  4001  812A                HBU  D0001                  U1. UNLOAD BUFFER
0092  812A  888 0 25  8822  8823              LDA                9F
0093  8822  888 0 00  8400  8201              JMP  C0199         C0000
0094  8823  888 0 80  4000  8824      9       TDC  D0000         U2
0095  8824  888 0 30  8825  8826      U2      LDL                9F          U2. CHECK 2ND
0096  8825  888 0 HH  HHHH  HHHH              CON  HHHHH        HHHHH
0097  8826  888 0 25  8207  813A      9       LDA  C0006
0098  813A  888 0 82  8827  8828              TEQ  U5            U3
0099  8828  888 0 05  8829  814A      U3      LDX  8F                        U3. COMPARE 2ND STATION
0100  814A  888 1 08  0016  8830              LIR3  0016         9F
0101  8830  888 1 04  8741  8741      9       JMP3 I0000
0102  8802  888 1 04  8761  8761      TB1R    JMP3 J0000
0103  8829  888 0 82  8831  8832      8       TEQ                U6
0104  8831  888 1 0G  9999  815A              IIR3  9999
0105  815A  888 0 31  8833  8833              CLL
0106  8833  888 0 82  8834  8830              TEQ  U4            9B
0107  8834  888 0 07  0600  816A      U4      IIR   0600                     U4. CHECK FOR 600 CARDS
0108  816A  888 0 77  816A  817A              ATL
0109  817A  888 0 07  0001  818A              IIR   0001
0110  818A  888 0 70  8808  819A              ADD  SSCT
0111  819A  888 0 60  8808  820A              STA  SSCT
0112  820A  888 0 82  8835  8836              TEQ                2F
0113  8835  888 0 26  8837  8837              CLA
0114  8837  888 0 60  8808  821A              STA  SSCT
0115  821A  888 0 75  8811  822A              SUB  SSW
0116  822A  888 0 60  8811  8838              STA  SSW           3F
0117  8836  888 0 25  8811  8838      2       LDA  SSW           3F
0118  8838  888 0 70  8839  000A      3       ADD                RA
0119  8839  888 0 47  0050  4999              HSS   0050         4999          WATCH OUT FOR UNDIGIT GARBLE
0120  4999  888 0 25  8207  823A      4999    LDA  C0006                    U5. FILL INTERNAL BUFFER
0121  823A  888 0 60  8621  824A              STA  E0019
0122  824A  888 0 25  8212  825A              LDA  C0011
0123  825A  888 0 60  8620  826A              STA  E0018
0124  826A  888 0 25  8391  827A              LDA  C0190
0125  827A  888 0 60  8619  828A              STA  E0017
0126  828A  888 0 25  8396  829A              LDA  C0195
0127  829A  888 0 60  8618  830A              STA  E0016
0128  830A  888 0 25  8379  831A              LDA  C0178
0129  831A  888 0 60  8617  832A              STA  E0015
0130  832A  888 0 25  8384  833A              LDA  C0183
0131  833A  888 0 60  8616  834A              STA  E0014
0132  834A  888 0 25  8367  835A              LDA  C0166
0133  835A  888 0 60  8615  836A              STA  E0013
0134  836A  888 0 25  8372  837A              LDA  C0171
0135  837A  888 0 60  8614  838A              STA  E0012
0136  838A  888 0 25  8355  839A              LDA  C0154
0137  839A  888 0 35  8840  8841              ERS  9F            8F
0138  8840  888 0 0H  HHHH  HHHH      9       CON  0HHHH        HHHHH
```

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```
0139  8841  888  0 60  8613  840A  STA  E0011
0140  840A  888  0 25  8360  841A  LDA  C0159
0141  841A  888  0 35  8840  842A  A    98
0142  842A  888  0 60  8612  843A  ERS  E0010
0143  843A  888  0 05  8355  844A  STA  C0154
0144  844A  888  0 25  8343  845A  LDX  C0142
0145  845A  888  0 32  0900  846A  A    0900
0146  846A  888  0 25  000C  847A  SHR  RX
0147  847A  888  0 37  0100  848A  LDA  0100
0148  848A  888  0 60  8609  849A  SHL  E0007
0149  849A  888  0 05  8360  850A  STA  C0159
0150  850A  888  0 25  8348  851A  LDX  C0147
0151  851A  888  0 32  0900  852A  A    0900
0152  852A  888  0 25  000C  853A  SHR  RX
0153  853A  888  0 37  0100  854A  LDA  0100
0154  854A  888  0 60  8608  855A  SHL  E0006
0155  855A  888  0 05  8343  856A  STA  C0142
0156  856A  888  0 25  8331  857A  LDX  C0135
0157  857A  888  0 32  0800  858A  A    0800
0158  858A  888  0 25  000C  859A  SHR  RX
0159  859A  888  0 37  0100  860A  LDA  0100
0160  860A  888  0 60  8607  861A  SHL  E0005
0161  861A  888  0 05  8348  862A  STA  C0147
0162  862A  888  0 25  8336  863A  LDX  C0135
0163  863A  888  0 32  0800  864A  A    0800
0164  864A  888  0 25  000C  865A  SHR  RX
0165  865A  888  0 37  0100  866A  LDA  0100
0166  866A  888  0 60  8606  867A  SHL  E0004
0167  867A  888  0 25  8319  868A  STA  C0118
0168  868A  888  0 35  8842  8843  LDA  9F
0169  8842  888  0 HH  HHHH  HHHO  ERS  HHHHO
0170  8843  888  0 60  8605  869A  STA  E0003
01 71  869A  888  0 25  8324  870A  LDA  C0123
0172  870A  888  0 35  8842  871A  ERS  98
0173  871A  888  0 60  8604  872A  STA  E0002
0174  872A  888  0 06  8844  8844  CON  8
0175  8844  888  0 60  8603  873A  LDA  E0001
0176  873A  888  0 05  8331  874A  STA  C0130
0177  874A  888  0 25  8319  875A  LDX  C0118
0178  875A  888  0 32  0700  876A  A    0700
0179  876A  888  0 25  000C  877A  SHR  RX
0180  877A  888  0 37  0600  878A  LDA  0600
0181  878A  888  0 60  8611  879A  SHL  E0009
0182  879A  888  0 05  8336  880A  STA  C0135
0183  880A  888  0 25  8324  881A  LDX  C0123
0184  881A  888  0 32  0700  882A  A    0700
0185  882A  888  0 25  000C  883A  SHR  RX
0186  883A  888  0 37  0600  884A  LDA  0600
0187  884A  888  0 60  8610  8845  SHL  E0008
0188  8845  888  0 25  8846  8847  STA  BLST
```

```
0189  8846  888 0 00  8621  8602        JMP  E0000
0190  8847  888 0 88  4400  885A  9     TCD  R0200
0191  885A  888 0 25  8818  886A        LDA  K1
0192  886A  888 0 70  8848  8849        ADD  00000
0193  8848  888 0 00  0000  0001        CON  00001
0194  8849  888 0 80  4401  887A        TDC  R0201
0195  887A  888 0 25  8818  888A        LDA  K1
0196  888A  888 0 35  8850  8851        ERS  9F
0197  8850  888 0 00  0000  HHHH        CON  OHHHH
0198  8851  888 0 37  0400  869A        SHL  00000
0199  869A  888 0 20  8852  000A        BUF  0400
0200  8852  888 0 25  0000  890A  9     LDA  RA
0201  890A  888 0 60  8818  8827        STA  0000
0202  8827  888 0 25  8853  8854  U5    LDA  K1
0203  8853  888 0 00  8200  8001        JMP  U5
0204  8854  888 0 80  4000  8821        TDC  9F
0205  8832  888 0 47  0200  891A  9     TDC  F0000
0206  891A  888 0 67  0001  8821  U6    HSS  UEX
                                        HLT
```

```
E0019  E0000
R0200
K1
00000  9F
00001
R0201
K1
00000  9F
0400   OHHHH
0000   RA
K1     U5
F0199  9F
00000  F0000
0200   UEX
0001   UEX
```

U6. MOVE STATION 1

U7. SELECT STACKER 2

```
0208  8855  888 0 42  8820  892A  G1     HBT  U1                  G.  FETCH NEXT CARD SECTION
0209  892A  888 0 26  8856  8856         CLA                      G1. RESET TIMER
0210  8856  888 0 60  8857  8858         STA  T         G2
0211  8858  888 0 72  8859  8860  G2     HCC            -G3       G2. TRY TO FEED A CARD
0212  8859  888 0 42  8820  8858         HBT  U1        G2
0213  8860  888 0 25  8817  893A  -G3    LDA  K0
0214  893A  888 0 30  8818  894A         LDL  K1                  G3. CHECK BUFFERS.
0215  894A  888 0 82  8862  8863         TEQ            G4
0216  8862  888 0 42  8820  8858         HBT  U1        G2
0217  8863  888 0 88  4400  895A  G4     TCD  R0200
0218  895A  888 0 35  8864  8865         ERS            9F        G4. MOVE NEXT IMAGE
0219  8864  888 0 00  0000  HHHH         CON  00000     0HHHH
0220  8865  888 0 37  0400  896A  9      SHL   0400
0221  896A  888 0 20  8866  000A         BUF            RA
0222  8866  888 0 25  0000  897A         LDA   0000
0223  897A  888 0 60  8817  898A         STA  K0
0224  898A  888 0 25  8867  8868         LDA            9F
0225  8867  888 0 00  8801  8782         JMP  G0019     G0000
0226  8868  888 0 80  4400  899A  9      TDC  R0200
0227  899A  888 0 42  8820  800F         HBT  U1
0228  800F  888 0 04  0000  0000         JMP1  0000
0229  8861  888 0 07  0150  801F  &G3    IIR   0150                G5. STEP TIMER
0230  801F  888 0 77  801F  802F         ATL
0231  802F  888 0 07  0001  803F         IIR   0001
0232  803F  888 0 70  8857  804F         ADD  T
0233  804F  888 0 60  8857  805F         STA  T
0234  805F  888 0 05  0000  806F         LDX   0000                    SYNCHRONIZE LOOP WITH DRUM
0235  806F  888 0 82  8869  8860         TEQ            -G3
0236  8869  888 0 67  0002  8855         HLT   0002     G1
```

```
0237  8870  888 0 07  0150  807F        11R   0150
0238  807F  888 0 77  807F  308F        ATL   2F 0000
0239  808F  888 0 26  8871  8871        CLA   1 0000
0240  8871  888 0 88  0000  809F  2     TEQ   1F 0000
0241  809F  888 0 42  8872  810F        HBT   0000
0242  810F  888 0 05  0000  811F        LDX   00000 U1
0243  811F  888 0 70  8873  8871        ADD   20 10000
0244  8873  888 0 00  0001  0000        CON   STOP
0245  8872  888 0 42  8820  8870  1     HBT
```

S. STOP ROUTINE
S1. SHUT DOWN READER

SYNCHRONIZE LOOP WITH DRUM

```
0246  8819  888 0 08  8874  8855      MASTR  LIR1  MAST1   G1          M.  MASTER PROCESS CONTROL
0247  8874  888 0 25  8790  812F      MAST1  LDA   G0008               M1. FETCH A CARD
0248  812F  888 0 30  8875  8876             LDL                2F
0249  8875  888 0 11  2000  0000             ZON   FIN 0       00000
0250  8876  888 0 82  8877  8878      2      TEQ               3F       M2. CHECK FOR FIN
0251  8877  888 0 25  8791  813F             LDA   G0009
0252  813F  888 0 30  8879  8880             LDL                2F
0253  8879  888 0 69  5800  0000             NUM   FIN 0       00000
0254  8880  888 0 82  8881  8882      2      TEQ                4F
0255  8881  888 0 25  8883  8884             LDA                2F
0256  8883  888 0 99  9999  9999             CON   99999       99999
0257  8884  888 0 60  8807  8885      2      STA   NUM          WRITE
0258  8878  888 0 30  8886  8887      3      LDL                2F       M3. CHECK FOR CPY
0259  8886  888 0 12  3000  0000             ZON   CPY 0       00000
0260  8887  888 0 82  8888  8882      2      TEQ                4F
0261  8888  888 0 25  8791  814F             LDA   G0009
0262  814F  888 0 30  8889  8890             LDL                2F
0263  8889  888 0 37  8800  0000             NUM   CPY 0       00000
0264  8890  888 0 82  8891  8882      2      TEQ   COPY         4F
0265  8882  888 0 08  8819  8885      4      LIR1  MASTR        WRITE    M4. WRITE LINE
```

```
0269  8891  888 0 08  8892  8870      COPY    LIR1 5F          STOP        C.  COPY OLD TAPE
0270  8892  888 1 02  8893  8805      5       LIR2 6F          CK#R        C1. STOP THE READER
0271  8893  888 0 25  8787  815F      6       LDA  G0005
0272  815F  888 0 05  8789  816F               LDX  G0007                   C2. CHECK PREV WRITE
0273  816F  888 0 32  0500  817F               SHR   0500
0274  817F  888 0 60  8894  818F               STA  FRST                    C3. SET UP FIRST,LAST
0275  816F  888 0 65  8895  8896               STX  LST         -CP
0276  8896  888 0 30  4201  819F      -CP      LDL  R0001                   C4. FIRST=CURRENT
0277  819F  888 0 25  8894  820F               LDA  FRST
0278  820F  888 0 35  8898  8899               ERS              2F
0279  8898  888 0 00  0000  HHH0               CON  00000       0HHH0
0280  8899  888 0 82  8900  8901      2       TEQ  3F          8F
0281  8901  888 0 87  8902  8903      8       TGR  9F          4F
0282  8902  888 0 G2  0200  821F      9       TRD   0200                   C5. READ TAPE FORWARD
0283  821F  888 0 C7  8902  822F               TBT  98
0284  822F  888 0 C7  8904  822F               TBT              *
0285  8904  888 0 26  8905  8905               CLA
0286  8905  888 0 82  8906  8897               TEQ              &CP
0287  8906  888 0 F6  4200  8896               TBU  R0000       -CP
0288  8897  888 0 67  0006  8903      &CP      HLT   0006       4F
- 0289  8903  888 0 G2  0205  823F      4       TRD   0205                   C6. READ TAPE BACKWARD
0290  823F  888 0 C7  8907  823F               TBT              *
0291  8907  888 0 26  8908  8908               CLA
0292  8908  888 0 82  8909  8911               TEQ              &CPP
0293  8909  888 0 F6  4200  8910               TBU  R0000       -CPP
0294  8910  888 0 25  8894  824F      -CPP     LDA  FRST                    C7. RECOMPARE
0295  824F  888 0 35  8912  8913               ERS              2F
0296  8912  888 0 00  0000  HHH0               CON  00000       0HHH0
0297  8913  888 0 30  4343  825F      2       LDL  R0143
0299  825F  888 0 82  8902  8901               TEQ  9B          8B
0300  8911  888 0 67  0006  8902      &CPP     HLT   0006       9B
0301  8900  888 0 25  8894  826F      3       LDA  FRST                    C8. MOVE TO OUTPUT.
0302  826F  888 0 35  8914  8915               ERS              2F
0303  8914  888 0 00  0000  000H               CON  00000       0000H
0304  8915  888 0 37  0500  827F      2       SHL   0500
0305  827F  888 0 70  000A  828F               ADD  RA
0306  828F  888 0 70  8916  8917               ADD  MOV         1F
0307  8916  888 0 80  4200  8918      MOV      TDC  R0000       WRIT2
0308  8917  888 0 60  8919  829F      1        STA  WRIT1
0309  829F  888 0 25  8920  8919               LDA              WRIT1
0310  8920  888 0 00  8801  8782               JMP  G0019       G0000
0311  8918  888 0 08  8921  8885      WRIT2    LIR1 5F          WRITE       C9. THEN WRITE IT OUT
0313  8921  888 0 25  8894  830F      5        LDA  FRST
0314  830F  888 0 30  8895  831F               LDL  LST
0315  831F  888 0 70  8922  832F               ADD  ONE
0317  832F  888 0 87  8819  833F               TGR  MASTR
0318  833F  888 0 60  8894  8923               STA  FRST        5F          C10.CHECK INPUT BUFFER
0319  8923  888 0 25  8919  834F      5        LDA  WRIT1
0320  834F  888 0 70  8924  835F               ADD  M20
```

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```
0321    B35F    888 0 30    8925    8926    LDL
0322    8925    888 0 80    4400    8918    TDC
0323    8926    888 0 82    8902    8917    TEO
0324    8924    888 0 00    0020    0000    CON
0325    8922    888 0 00    0000    0001    CON

                                    2
                                    M20
                                    ONE

R0200   2F
98      WRIT2
00002   1B
00000   00000
        00001
```

```
0326  8885  888 0 42  8820  836F  WRITE  HBT  U1                    W.  TAPE WRITE CONTROL SECTION.
0327  836F  888 0 25  8807  837F         LDA  NUM                   W1. SET LINE COUNT.
0328  837F  888 0 60  8783  838F         STA  G0001
0329  838F  888 0 31  8927  8927         CLL
0330  8927  888 0 50  8762  839F         STL  G0000
0331  839F  888 0 70  8922  8928         ADD  ONE        -WR        W2. PLACE IN BUFFER
0332  8928  888 0 60  8807  8930  -WR    STA  NUM        WR4
0333  8930  888 0 25  8931  8932  WR4    LDA              1F
0334  8931  888 0 00  8801  8782         JMP  G0019      G0000
0335  8932  888 0 88  4000  840F  1      TCD  D0000
0336  840F  888 0 25  8814  841F         LDA  WR2
0337  841F  888 0 30  8933  8934         LDL  9F         1F
0338  8933  888 0 00  8600  8581  9      JMP  80199      80180
0339  8934  888 0 80  4000  842F  1      TDC  D0000
0340  842F  888 0 82  8935  843F         TEQ  1F
0341  843F  888 0 70  8936  844F         ADD  TWTW
0342  844F  888 0 60  8814  845F         STA  WR2
0343  845F  888 0 42  8820  846F         HBT  U1
0344  846F  888 0 04  0000  0000         JMP1  0000
0345  8935  888 0 25  8937  8938  1      LDA  8F         1F
0346  8937  888 0 00  8420  8401  8      JMP  80019      80000
0347  8938  888 0 60  8814  847F  1      STA  WR2
0348  847F  888 0 42  8820  848F         HBT  U1
0349  848F  888 0 25  8401  849F         LDA  80000
0350  849F  888 0 60  8601  850F         STA  80200
0351  850F  888 1 02  8939  8805         LIR2 5F         CKWR       W3. CHECK PREV WRITE
0352  8936  888 0 00  0020  0020  TWTW   CON  00002       00020
0353  8939  888 0 C6  8402  8940  5      TBL  80001      1F
0354  8940  888 0 H2  0300  851F  1      TWR   0300
0355  851F  888 0 C2  8941  8942         TST              7F
0356  8941  888 0 42  8820  8940         HBT  U1          1B
0357  8942  888 0 25  8943  852F  7      LDA  WRON
0358  852F  888 0 60  8805  853F         STA  CKWR
0359  853F  888 0 04  0000  0000         JMP1  0000
0360  8929  888 0 0B  8944  8930  &WR    LIR1             WR4        W4. WRITE SENTINEL.
0361  8944  888 0 25  8814  854F         LDA  WR2
0362  854F  888 0 30  8937  855F         LDL  8B
0364  855F  888 0 82  8945  8929         TEQ              &WR
0365  8945  888 1 02  8946  8809         LIR2 5F         CKWR       W5. CLEAN UP.
0366  8946  888 0 0B  8947  8870  5      LIR1 5F         STOP
0367  8947  888 0 C6  8402  8948  5      TBL  80001      5F
0368  8948  888 0 H2  0300  856F  5      TWR   0300
0369  856F  888 0 C2  8948  857F         TST  5B
0370  857F  888 0 F2  0200  8804         TRW   0200      PASS2
0371  8804  888 0 F2  0300  858F  PASS2  TRW   0300                W6. END.
0372  858F  888 0 G2  0400  859F         TRD   0400
0373  859F  888 0 F6  8000  8000         TBU   8000       8000
0374  8803  888 1 00  0000  0000  WROF   JMP2  0000                W50. PREVIOUS WRITE...
0375  8943  888 0 C7  8949  860F  WRON   TBT  1F
```

```
0376   860F  888 0 42  8820  8943          HBT  U1        WRON
0377   8949  888 0 26  8950  8950    1     CLA
0378   8950  888 0 82  8951  861F          TEQ  3F                  W51.WAIT READY.
0379   861F  888 0 06  0000  862F          IIR1  0000
0380   862F  888 0 20  8952  8953          BUF            2F
0381   8952  888 0 08  0000  8954          LIR1  0000     CKW1
0382   8953  888 0 60  8955  863F    2     STA  CKW2
0383   863F  888 0 08  8955  8870          LIR1 CKW2      STOP
0384   8954  888 0 67  0005  8803    CKW1  HLT   0005     WROF
0385   8951  888 0 25  8803  864F    3     LDA  WROF
0386   864F  888 0 60  8805  8803          STA  CKWR      WROF
- 0387                                     END  INIT
```

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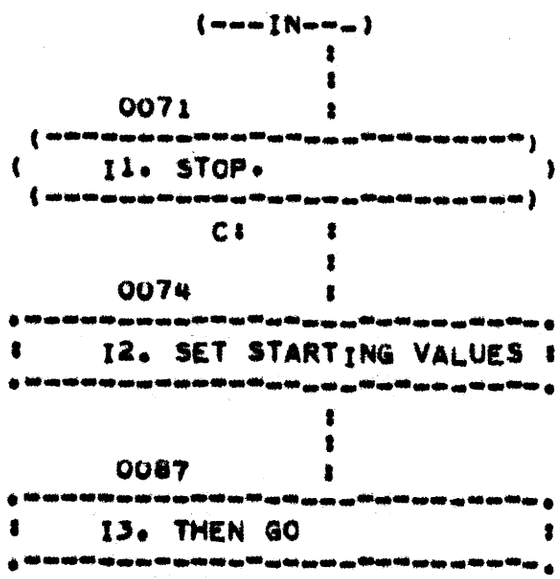
```
*    1.  QADAAD ASSEMBLER PASS 1.
*    TABLE OF CONTENTS
*         C.  COPY ROUTINE
*         G.  GET NEXT CARD IMAGE ROUTINE
*         I.  INITIALIZE ROUTINE
*         M.  MASTER CONTROL ROUTINE
*         U.  CARD BUFFER UNLOAD CO-ROUTINE
*         W.  TAPE WRITE ROUTINE
*         THIS PASS READS CARDS ONTO TAPE, UPDATING
*         A PREVIOUS TAPE.
*         THE SHOW BEGINS AT ROUTINE I.
*         ERROR STOPS
*         M   MEANING
*         1   CARD READ COMPARISON ERROR
*         2   HSR OFF NORMAL
*         5   TAPE WRITE ERROR
*         6   TAPE READ ERROR
*
```

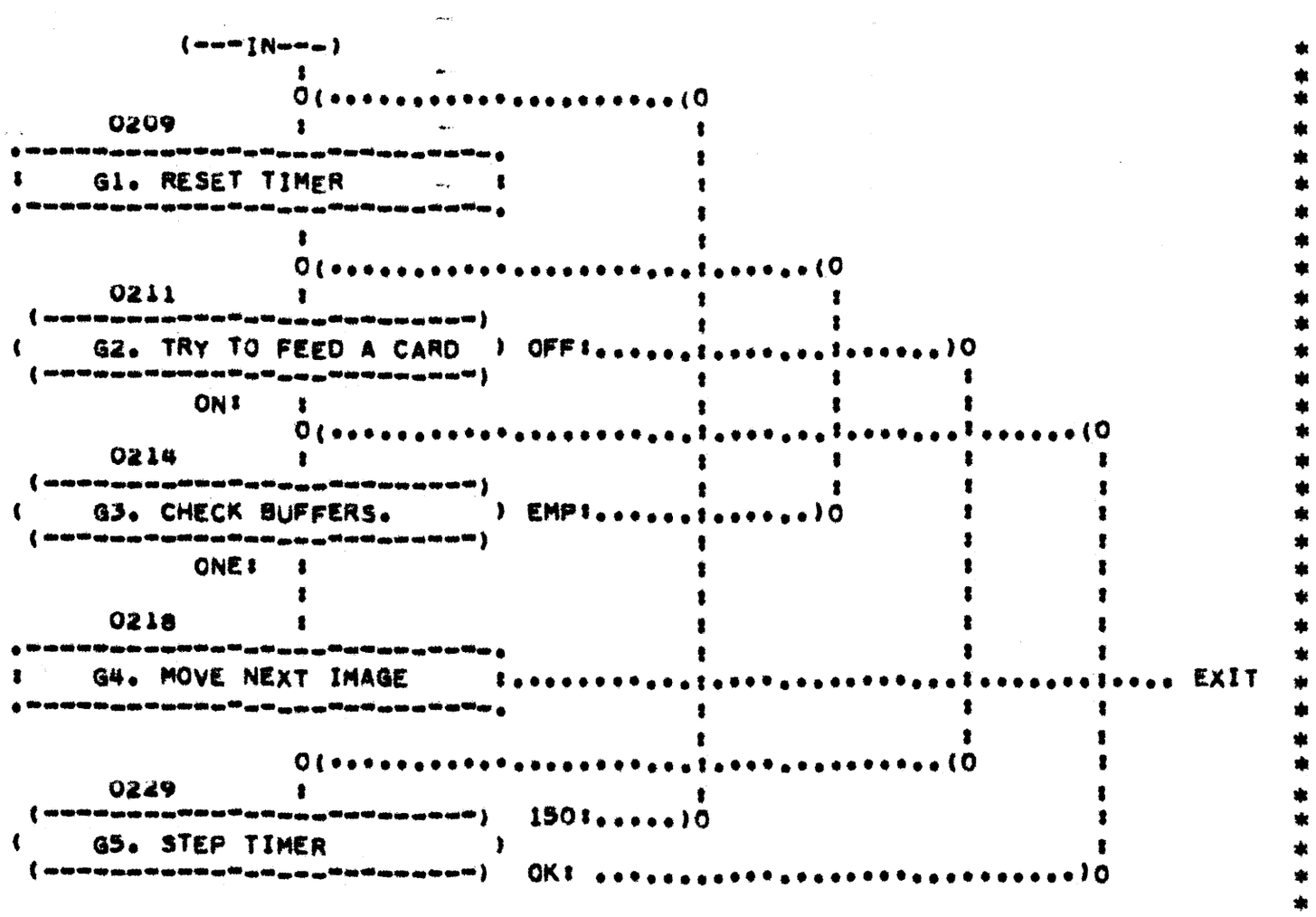



```
*    I.  INITIALIZE.
*    I1. STOP.
*        HALT. IF M RESTART GO TO PAS2 (#6).
*    I2. SET STARTING VALUES
*        SET LINE COUNT TO 0
*        SET STACKER SELECT COUNT TO 0
*        SET STACKER SELECT TO POCKET 0
*        RESET OUTPUT BUFFER
*        SET CURRENT TAPE INPUT LINE COUNT TO -10
*        CLEAR CARD INPUT BUFFERS
*    I3. THEN GO
*        TO MASTER CONTROL M1.
```

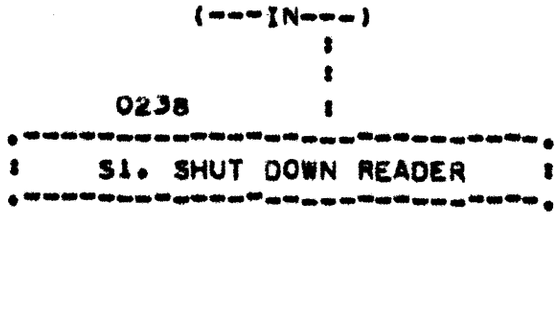
```
             (---IN---)
                  :
                  :
       0091       :
.---------------------------------.
:    U1. UNLOAD BUFFER            :
.---------------------------------.
                  :
                  :
       0095       :
 (--------------------------------)
(    U2. CHECK 2ND                ) EMPT.....)O
 (--------------------------------)           :
            FULL  :                           :
                  :                           :
       0099       :                           :
 (--------------------------------)           :
(    U3. COMPARE 2ND STATION      ) ERR:......:.......)O
 (--------------------------------)           :       :
            OK:   :                           :       :
                  :                           :       :
       0107       :                           :       :
.---------------------------------.           :       :
:    U4. CHECK FOR 600 CARDS      :           :       :
.---------------------------------.           :       :
                  :                           :       :
                  O(..........................(O      :
       0120       :                                   :
.---------------------------------.                   :
:    U5. FILL INTERNAL BUFFER     :                   :
.---------------------------------.                   :
                  :                                   :
                  O(..................................(O
       0202       :
.---------------------------------.
:    U6. MOVE STATION 1           :......................................... EXIT
.---------------------------------.


       0205
.---------------------------------.
:    U7. SELECT STACKER 2         :......................................... EXIT
.---------------------------------.
```

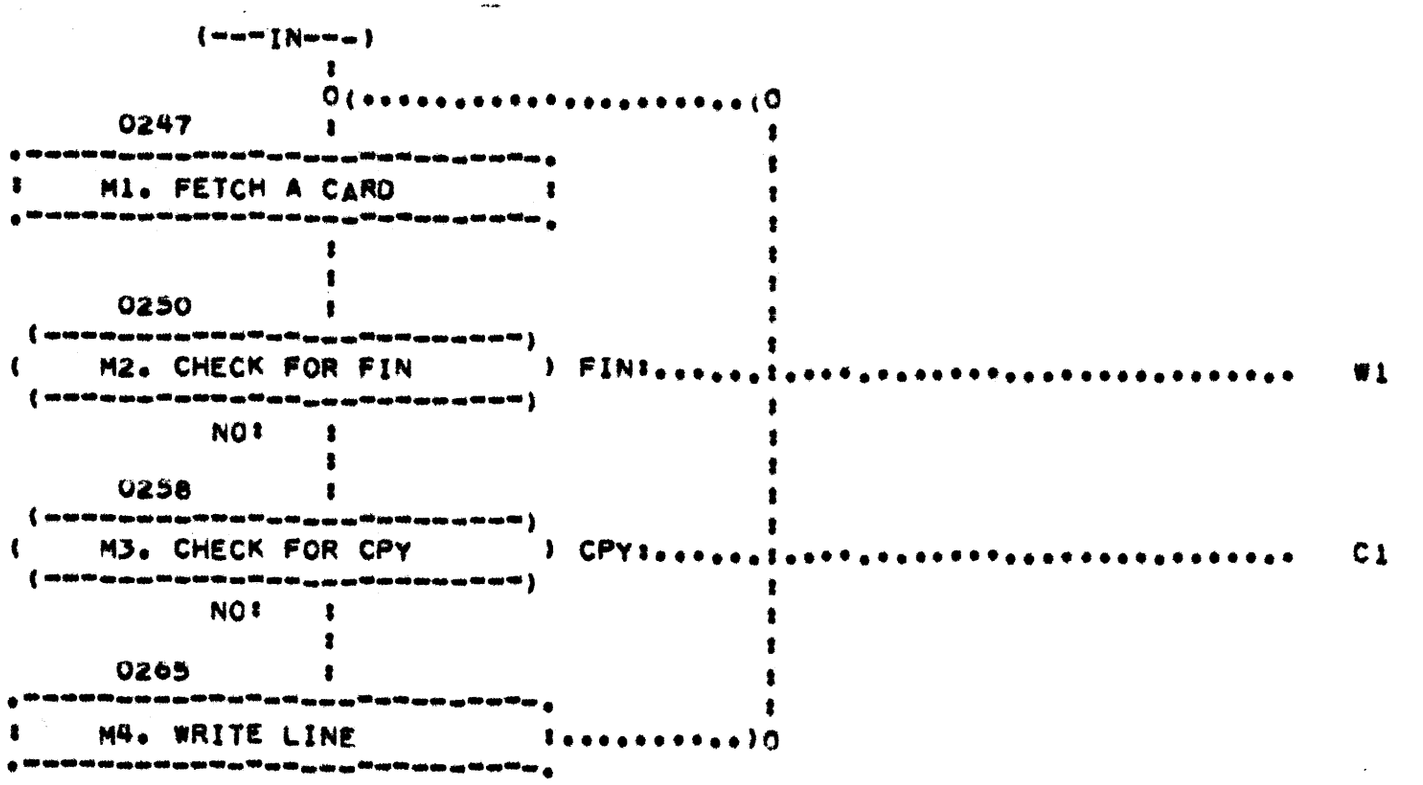
```
*    U.   UNLOAD SECTION
*    U1.  UNLOAD BUFFER
*         FILL 2ND STATION AREA
*    U2.  CHECK 2ND
*         STATION EMPTY.
*         IF EMPTY, GO TO U5.
*    U3.  COMPARE 2ND STATION
*         WITH PREVIOUS 1ST STATION FOR CHECK.
*         GO TO U6 IF COMPARISON FAILS.
*    U4.  CHECK FOR 600 CARDS
*         IF SO SWAP CARD POCKETS 0 AND 1
*    U5.  FILL INTERNAL BUFFER
*         EDIT 2ND STATION TO E REGION
*         SEE QADAAD PASS 2, SECTION E FOR OUTPUT
*         FORMAT
*         MOVE REGION E TO NEXT
*         FREE CARD INPUT BUFFER
*         THEN CYCLE EMPTY BUFFER CONTROL LINK K1.
*    U6.  MOVE STATION 1
*         TO 1ST STATION AREA.  THEN EXIT.
*    U7.  SELECT STACKER 2
*         BEGINNING WITH BAD COMPARISON CARD. HALT,
*         THEN EXIT.
```



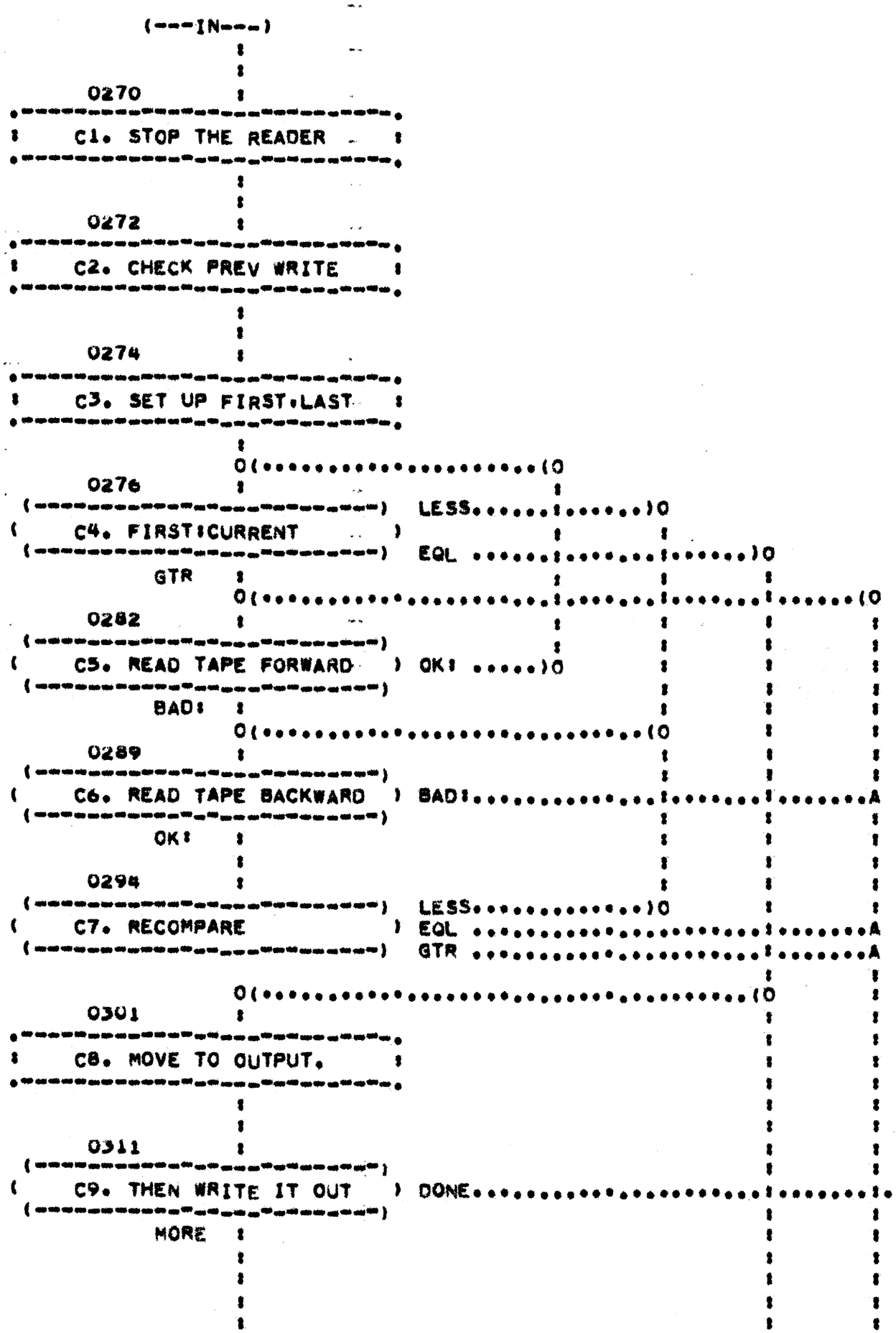

```
*   G.  FETCH NEXT CARD SECTION
*   G1. RESET TIMER
*       FOR OFF NORMAL
*   G2. TRY TO FEED A CARD
*       IF OFF NORMAL GO TO G5.
*   G3. CHECK BUFFERS.
*       IF BUFFERS ARE EMPTY GO TO G2
*       AND FEED ANOTHER CARD.
*   G4. MOVE NEXT IMAGE
*       TO AREA G.
*       THEN CYCLE FULL BUFFER CONTROL LINK KO.
*       AFTER THAT EXIT.
*   G5. STEP TIMER
*       STEP THE OFF NORMAL TIMER.
*       IF TOO LONG STOP.
*       THEN TRY AGAIN BY GOING TO G1.
*       OTHERWISE GO TO G3 AND EMPTY A BUFFER.
```




```
*    S.  STOP ROUTINE
*    S1. SHUT DOWN READER
*        COUNT TO 150 TO MAKE SURE ALL COMMITTED
*        CARDS HAVE BEEN READ.
*        THEN EXIT.
```




```
*    M.  MASTER PROCESS CONTROL
*    M1. FETCH A CARD
*        BY GOING TO SECTION G.
*    M2. CHECK FOR FIN
*        IF SO SET LINE NUMBER TO SENTINEL
*        AND WRITE TAPE AT W1.
*    M3. CHECK FOR CPY
*        IF SO JUMP TO COPY ROUTINE C1.
*    M4. WRITE LINE
*        THIS IS A CARD TO BE PROCESSED BY PASS 2 SO
*        WE WRITE IT OUT, USING ROUTINE W, AND GO
*        BACK TO M1.
```




```
*    C.  COPY OLD TAPE
*    C1. STOP THE READER
*        ROUTINE S.
*    C2. CHECK PREV WRITE
*        AT W50.
*    C3. SET UP FIRST,LAST
*        LINE NUMBERS FOR OLD TAPE.
*    C4. FIRST:CURRENT
*        IF FIRST IS LESS THAN CURRENT GO TO C6.
*        IF FIRST EQUALS CURRENT GO TO C8.
*    C5. READ TAPE FORWARD
*        THEN GO BACK TO C4.
*        IF ERROR ON TAPE READ, HOWEVER, HALT AND
*        REVERSE DIRECTION
*    C6. READ TAPE BACKWARD
*        IF ERROR REVERSE DIRECTION AT C5.
*    C7. RECOMPARE
*        IF FIRST IS STILL LESS THAN CURRENT, GO TO C6
*        IF THEY ARE EQUAL, REREAD FORWARD AT C5.
*        IF GREATER, WE ALSO GO TO C5 (PROBABLY A BAD
*        MACHINE ERROR)
*    C8. MOVE TO OUTPUT.
*        MOVE A RECORD FROM THE OLD TAPE TO
*        WORKING STORAGE (REGION G).
*    C9. THEN WRITE IT OUT
*        THE OLD TAPE IS NOW POSITIONED TO WRITE
*        PROPERLY. USE SECTION W TO WRITE OUT A LINE.
*        INCREMENT 'FRST' AND CHECK FOR END.
*        IF DONE WITH THIS COPY CARD,GO BACK TO MASTER
*        CONTROL M1
*   C10.CHECK INPUT BUFFER
*        IF EXHAUSTED READ ANOTHER RECORD AT C5.
*        OTHERWISE GO BACK TO C8.
```

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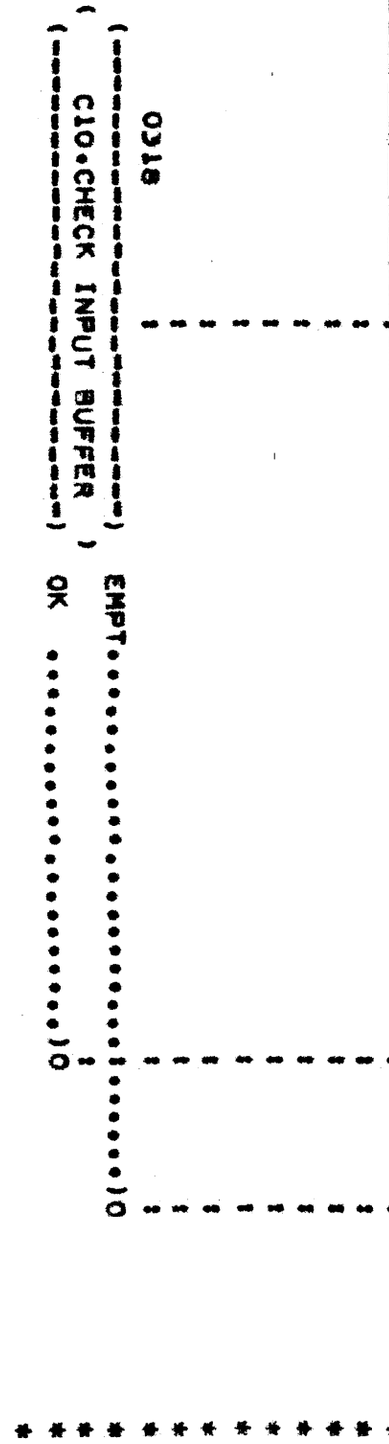

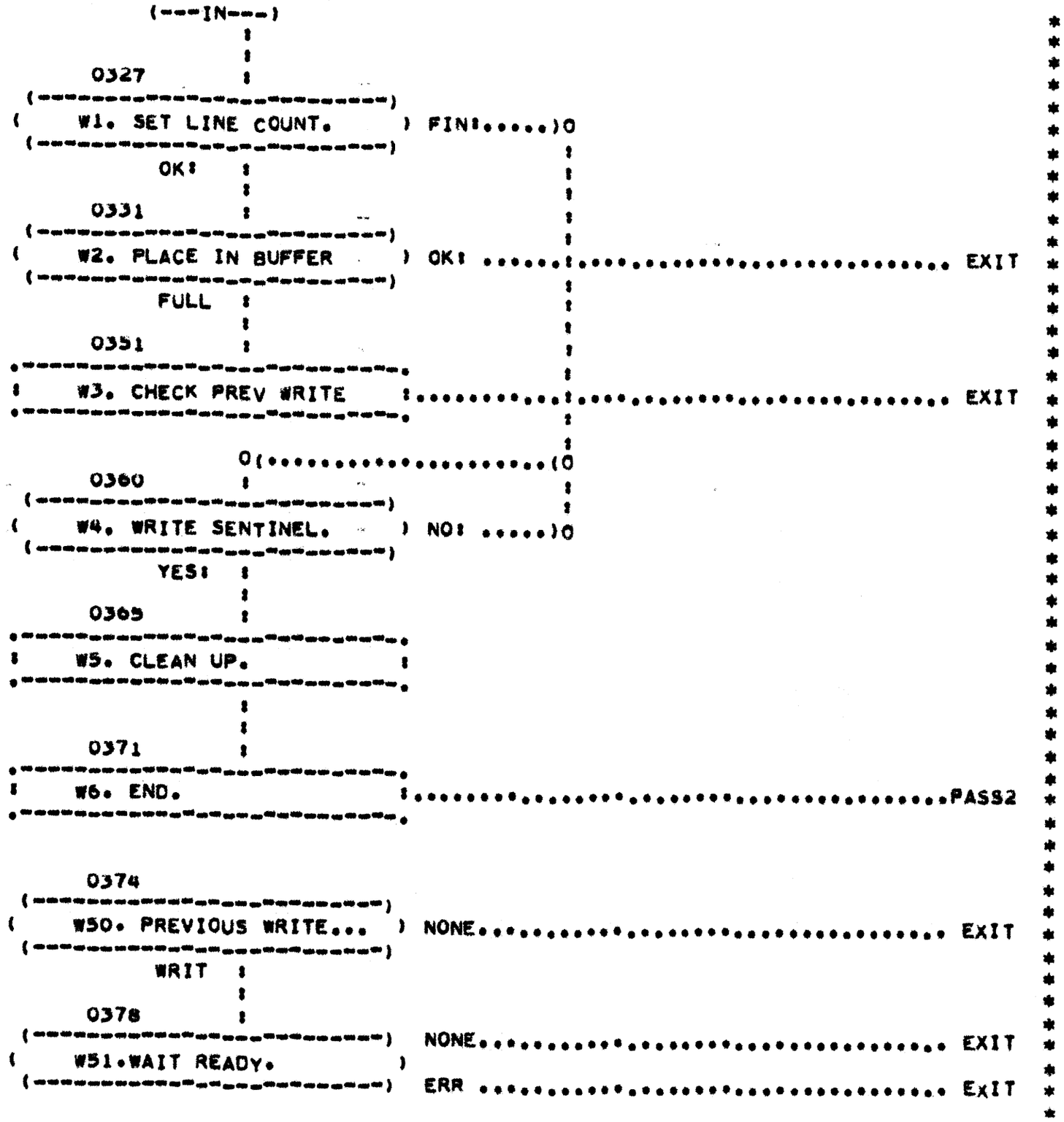


```
*    W.  TAPE WRITE CONTROL SECTION.
*    W1. SET LINE COUNT.
*        AND INCREMENT
*        IF SENTINEL JUMP TO W4.
*    W2. PLACE IN BUFFER
*        THEN CHECK FOR BUFFER FULL.
*        IF NOT, EXIT.
*    W3. CHECK PREV WRITE
*        AT W50.
*        LOAD THE BUFFER, WRITE, AND SET THE
*        CHECKING SWITCH ON.
*        THEN EXIT.
*    W4. WRITE SENTINEL.
*        CHECK FOR END OF TAPE RECORD.
*        IF NOT,RETURN TO W4,WRITING SENTINELS UNTIL
*        A TAPE RECORD IS DUMPED OUT.
*    W5. CLEAN UP.
*        CHECK THE WRITE.  USE W50.
*        WRITE ANOTHER SENTINEL BLOCK.
*    W6. END.
*        REWIND TAPES, READ PASS2 AND EXECUTE IT.
*    W50. PREVIOUS WRITE...
*        SWITCH TESTS EXISTENCE OF PREVIOUS WRITE.
*        IF NONE EXIT.
*    W51.WAIT READY.
*        WHEN TAPE IS FINISHED CHECK FOR ERRORS.
*        IF OK SET SWITCH OFF AND EXIT.
*        IF ERROR STOP THE READER (SECTION S),
*        HALT, AND THEN EXIT.
*
```

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```
0000                        FLO                          2.  QADAAD ASSEMBLER PASS 2.
0001                                                     TABLE OF CONTENTS
0002                                                     X   A. AJST* SUBROUTINE.
0003                                                     X   B. BEGINNING OF ASSEMBLY
0004                                                     X   C. CONTROL OPS.
0005                                                     X   D. DEFINE ADDRESS (DEFN*)
0006                                                     X   E. EDIT INPUT CARD
0007                                                     X   F. FIND AND RESERVE BEST LOCATION (FARB*)
0008                                                     X   L. PROCESS A ADDRESS.
0009                                                     X   O. OUTPUT SUBROUTINE.
0010                                                     X   P. PROCESSING OF INSTRUCTIONS.
0011                                                     X   Q. MASTER ADDRESS CALCULATOR (FIND*)
0012                                                     X   S. SYMBOL TABLE SEARCH (SRCH*
0013                                                     X   X. EXAMINE REMARKS FIELD
0014                                                     X   Z. ENDING OF ASSEMBLY.
0015                                                     X   THIS PASS DOES THE ACTUAL ASSEMBLY.
0016                                                     X   THE SHOW BEGINS AT ROUTINE B.
0017                        BLR   0000      0399
0018                  88AH  NEW1  00001     00000      G   CAUSES ASSEMBLY INTO B00A - B99F AREA.
0019                 50000  COR   0201                 G   INPUT BUFFER
0020                 60000  COR   0201                 G   INPUT BUFFER
0021                 70000  BLR   4800      4999       G   OUTPUT BUFFER
0022                 80000  COR   0014                 G   BLA.BLR CONTROL
0023                 C0000  BLR   4030      4035       G   C ADDRESS CONTROL
0024                 D0000  COR   0202                 G   DRUM AVAILABILITY TABLE
0025                 E0000  COR   0006                 G   DEFN* CONTROL
0026                 F0000  COR   0024                 G   FARB* CONTROL
0027                 I0000  COR   0010                 G   FORWARD LOCAL TABLE
0028                 J0000  COR   0010                 G   BACKWARD LOCAL TABLE
0029                 L0000  BLR   4010      4015       G   A ADDRESS CONTROL
0030                 M0000  BLR   4020      4025       G   M ADDRESS CONTROL
0031                 Q0000  BLR   4000      4009       G   INDEX REGISTER CODES
0032                 R0000  COR   0011                 G   REMARKS
0033                 U0000  COR   0004                 G   H FIELDS
0034                 V0000  COR   0004                 G   H FIELD CONTROL
0035                 W0000  EQU   5200
0036                 X0000  COR   0006                 G   EQU CONTROL
0037                 Y0000  EQU   7800                 G   BAND FOR LOADING ROUTINE
0038                 Z0000  BLR   0989      0999       G   BLANK COMMENTS
0039                 10000  COR   0005                 G   PAIR ADDRESS CONTROL
0040                 30000  COR   0007                 G   EDITING
0041                 STAB   BLR   1000      1999       G   SYMBOL TABLE
0042                 ETAB   BLR   2000      2999       G   EQUIVALENTS TABLE
0043                 A      COR   0001                 G   A  FIELD  ZZZZZNNNNN
0044                 AH     COR   0001                 G   AH FIELD  00ZZZ00NNN
0045                 M      COR   0001
0046                 MH     COR   0001
0047                 C      COR   0001
0048                 CH     COR   0001
```

```
0049                ITAP1   EQU   0300              G   INPUT TAPE
0050                OTAP1   EQU   0500              G   OUTPUT TAPE
0051                OTAP2   EQU   0600              G   CONTROL FOR FLOW PASS -- PSEUDOCODE
0052                OTAP3   EQU   0700              G   COMMENTS FOR FLOW PASS
0053                COMTS   BLR   3400      3599
0054                CMTS1   EQU   3401
0055                STOPT   EQU   #9801
0056                EXIT    EQU   80FB              G   VARIOUS TEMP STORAGES
0057                EXIT1   EQU   81FB
0058                EXIT2   EQU   82FB
0059                TEMP    EQU   83FB
0060                TEMP1   EQU   84FB
0061                TEMP2   EQU   85FB
0062                ERROR   EQU   86FB              G   ERRORS ON CURRENT LINE
0063                DEFX    EQU   87FB
0064                UDEFX   EQU   88FB
0065                SYMBL   EQU   89FB
0066                INCRE   EQU   80FC
0067                PANIC   EQU   81FC
0068                MASK    EQU   82FC
0069                CORE    EQU   83FC
0070                BLANK   EQU   84FC
0071                ALOC    EQU   85FC
0072                MLOC    EQU   86FC
0073                CLOC    EQU   87FC
0074                DEXIT   EQU   88FC
0075                SIGN    EQU   89FC
0076                R       EQU   80FG
0077                LINE    EQU   81FG
0078                MCN     EQU   82FG              G   NUM CONSTANT
0079                MCZ     EQU   83FG              G   ZON CONSTANT
0080                MC      EQU   84FG              G   CON CONSTANT
0081                OP      EQU   85FG
0082                IR      EQU   86FG
0083                TAPEI   EQU   87FG              G   LINE COUNTER IN INPUT BUFFER
0084                TCONT   EQU   88FG              G   CONTROL FOR TAPE BUFFER UNLOAD
0085                LTAPE   EQU   89FG              G   LAST TAPE COMMAND
0086                TEX1    EQU   80FH
0087                TEX     EQU   81FH
0088                AEX     EQU   82FH
0089                ALEV    EQU   83FH
0090                MLEV    EQU   84FH
0091                CLEV    EQU   85FH
0092                HTAG    EQU   86FH
0093                FTAG    EQU   87FH
0094                RTAG    EQU   88FH
0095                OPTIM   EQU   89FH
0096                SHR1    EQU   80AC
0097                SHR2    EQU   81AC
0098                LC      EQU   82AC              G   LINE COUNTER ON OUTPUT PAGE
```

```
0099
0100
0101
0102
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0112
0113
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0115
0116
0117
0118
0119
0120
0121
0122
0123
0124
0125
0126
0127   8679  888 0 HH   HHHH  HHHH   ROO10   CON  HHHHH      HHHHH
0128   83FH  888 0 00   0000  0000   ALEV    CON  00000      00000
0129   84FH  888 0 00   0000  0000   MLEV    CON  00000      00000
0130   85FH  888 0 00   0000  0000   CLEV    CON  00000      00000
0131   85FC  888 0 00   0000  0000   ALOC    CON  00000      00000
0132   86FC  888 0 00   0000  0000   MLOC    CON  00000      00000
0133   87FC  888 0 00   0000  0000   CLOC    CON  00000      00000
0134   87AC  888 0 00   0000  0000   MUML    CON  00000      00000
0135   88AH  888 0 00   2000  0000   FUNNY   CON  00200      00000
0136   84AB  888 0 22   2220  0000   HSB     CON  22222      00000
0137   89AB  888 0 00   0000  4000   HSB1    CON  00000      04000
0138                                         HHH        C
0139   8712  888 0 60   81FB  800A   SRCH*   STA  EXIT1
0140   800A  888 0 65   82FB  801A           STX  EXIT2
0141   801A  888 0 50   83FB  802A           STL  TEMP
0142   802A  888 0 26   8713  8713           CLA
0143   8713  888 0 75   0008  803A           SUB  RL
0144   803A  888 0 77   803A  804A           ATL
0145   804A  888 0 85   8714  805A           MUL# 10010      01001
0146   805A  888 0 32   0600  806A           SHR   0600
0147   806A  888 0 07   0HHH  807A           IIR   0HHH
0148   807A  888 0 35   000C  808A           ERS   RX

LINEO   EQU  83AC      G   LINE COUNTER IN OUTPUT BUFFER
FLAG    EQU  84AC
ACCUM   EQU  85AC      G   ERRORS ON LAST ERRONEOUS LINE
MUMI    EQU  86AC
MUML    EQU  87AC
COMI    EQU  88AC
KEY     EQU  89AC
DK      EQU  80AB
HSB     EQU  84AB
HSB1    EQU  89AB
BLA     EQU  80AG      G   CONTROL OPS STARTING LOCATIONS
BLR     EQU  81AG
COR     EQU  82AG
PSUDX   EQU  83AG
EQU     EQU  84AG
HHH     EQU  85AG
FLO     EQU  86AG
END     EQU  87AG
NEW     EQU  88AG
CON     EQU  80AH
NUM     EQU  81AH
ZON     EQU  82AH
PAT     EQU  83AH
ALF     EQU  84AH
OFF     EQU  85AH
TYP     EQU  86AH
FUNNY   EQU  88AH
BOP1    EQU  89AH
```

G B00A - B99F PART OF CORE USUALLY UNAVAILABLE
G WHAT QADAAD CHOOSES FOR H
G HIGH-SPEED BANDS

S. SYMBOL TABLE SEARCH (SRCH*)
THIS SUBROUTINE LOOKS UP A 5-CHARACTER QUANTITY TO SEE IF IT IS IN THE SYMBOL TABLE. OP-CODES, REGIONAL ADDRESSES, PAIR ADDRESSES, AS WELL AS SYMBOLIC ADDRESSES ARE KEPT IN THE SYMBOL TABLE. THERE ARE TWO EXITS, DEPENDING ON WHETHER THE SYMBOL IS OR IS NOT IN THE TABLE. ALL REFERENCES TO THE SYMBOL TABLE ARE MADE VIA SRCH*.

S1. SCRAMBLE

```
0149
0150   808A  888 0 30  83FB  8716          LDL  TEMP      &SR2
0151
0152   8716  888 0 20  8717  000A  &SR2    BUF            RA
0153   8717  888 0 08  0000  8715          LIR1  0000     -SR2
0154   8715  888 0 29  1000  809A  -SR2    LDA1 STAB
0155   809A  888 0 82  8718  810A          TEQ  3F
0156   810A  888 0 70  8719  8720          ADD            -SR1
0157   8719  888 0 99  9999  9999          CON  99999     99999
0158   8721  888 0 0G  0023  811A  &SR1    IIR1  0023
0159   811A  888 0 70  8722  8715          ADD            -SR2
0160   8722  888 0 99  9000  0000          CON  99900     00000
0161
0162   8720  888 0 54  1000  81FB  -SR1    STL1 STAB      EXIT1
0163   8718  888 0 29  2000  82F8  3       LDA1 ETAB      EXIT2
0164
0165
0166
0167
0168
0169
0170
0171
0172
0173
0174   8723  888 0 50  80FB  812A  FARB*   STL  EXIT
0175   812A  888 1 09  8707  813A          LDX3 AH
0176   813A  888 0 70  8724  814A          ADD# 00000     10000
0177   814A  888 0 60  83FB  815A          STA  TEMP
0178
0179   815A  888 0 31  8725  8725          CLL
0180   8725  888 0 50  81FC  816A          STL  PANIC
0181   816A  888 5 02  0000  8726          LIR6  0000     2F
0182   8726  888 0 30  000C  8727  2       LDL  RX        3F
0183   8727  888 0 50  8683  817A  3       STL  U0003
0184   817A  888 0 25  8728  818A          LDA# 00000     00888
0185   818A  888 0 82  8729  8730          TEQ            3F
0186   8729  888 0 30  86FH  819A          LDL  HTAG
0187   819A  888 0 82  8684  820A          TEQ  V0000
0188   820A  888 0 05  0008  8727          LDX  RL        3B
0189   8730  888 5 25  8680  821A  3       LDA6 U0000
0190   821A  888 5 82  8684  822A          TEQ6 V0000
0191   822A  888 5 07  0001  8730          IIR6  0001     3B
0192   8680  888 0 00  1000  0488  U0000   CON  00100     00488
0193   8681  888 0 00  1000  0388  U0001   CON  00100     00388
0194   8682  888 0 00  1000  0888  U0002   CON  00100     00888
0195   8687  888 0 25  0008  823A  V0003   LDA  RL
0196   823A  888 0 75  000A  824A          SUB  RA
0197   824A  888 0 31  8731  8731          CLL
0198   8731  888 0 82  8732  825A          TEQ  1F
```

```
X   THE SYMBOL IS CONVERTED TO A THREE-DIGIT NUM-
    BER TO INDICATE WHERE THE SEARCH WILL START.
X   THIS SPEEDS UP THE SEARCH CONSIDERABLY.


S2. SYMBOL:TABLE
EQ: IF THE SYMBOL IS AT THIS PLACE IN THE
    TABLE, GO TO#DEF.
NEQ:
S3. TABLE:ZERO
EQ: IF THE TABLE ENTRY IS ZERO,GO TO#S4.
NEQ:OTHERWISE WE MOVE TO THE NEXT TABLE ENTRY
X   AND RETURN TO#S2.
S4. NOT FOUND.
    WE HAVE ENCOUNTERED A NEW SYMBOL SINCE THE
X   TABLE IS INITIALLY ALL ZEROES.
X   STORE THE NEW SYMBOL IN THE TABLE HERE
    AND GO TO#UNDEF.
CODING DETAILS:
    ON INPUT, RL IS THE SYMBOL, RA IS UNDEF.
    AND RX IS DEF.  OUTPUT IN RB1 IS THE LOCATION
    IN THE TABLE, AND IF DEFINED THE EQUIVALENT
    OF THE SYMBOL APPEARS IN RA. THERE IS ROOM
    FOR 1000 SYMBOLS. IF THE 1001ST SYMBOL
    COMES ALONG, THE MACHINE LOOPS INDEFINITELY.
F.  FIND AND RESERVE BEST LOCATION (FARB*)
    THIS SUBROUTINE IS USED TO CHOOSE LOCATIONS
    FOR A  M  OR  C  ADDRESSES OF INSTRUCTIONS.
    THE CORRESPONDING H-FIELD IS INTERPRETED AND
X   THE CHOICE IS MADE ON THIS BASIS.

F1. EXAMINE H-FIELD
C  :IF IT SPECIFIES C(CORE) GO TO#F4.
D  :IF IT SPECIFIES D(DRUM) OR IS BLANK,
    GO TO#F3 WITH RB6 SET TO 0.
H  :IF IT SPECIFIES H(HIGH SPEED BANDS),
    GO TO#F3 WITH RB6 EQUAL TO 2.
NNN:THREE NUMERICS OR +NN MEANS A HAND-PICKED
    LEVEL OR A CHANGE IN LEVEL ON THE DRUM,TO#F2.
 NN:TWO NUMERICS MEANS A HANDPICKED HIGH SPEED
    LEVEL, GO TO#F2.
ERR:ANY OTHER MEANS THE H-FIELD IS IN ERROR.
    GO TO#F3 AND TREAT AS BLANK.
```

```
0199  8825A  888 0 30  8733  826A          LDL# 00000     00400
0200  826A   888 0 82  8734  827A          TEQ  3F
0201  827A   888 1 0G  0001  828A          IIR3  0001
0202  828A   888 0 30  8735  8736          LDL            ERR1*
0203  8735   888 1 0G  9999  8684          IIR3  9999     V0000
0204  8732   888 0 25  000B  829A    1     LDA  RL
0205  829A   888 0 70  8737  8738          ADD            -NU
0206  8737   888 0 00  7000  0000          CON  00700     00000
0207  8739   888 0 70  83FB  830A    &NU   ADD  TEMP
0208  830A   888 0 60  83FB  8684          STA  TEMP      V0000
0209  8738   888 5 07  9998  831A    -NU   IIR6  9998
0210  831A   888 0 60  81FC  832A          STA  PANIC
0211  832A   888 0 65  83FB  8740          STX  TEMP      2F
0212  8734   888 0 25  8741  833A    3     LDA# 00000     000HH
0213  833A   888 0 60  81FC  834A          STA  PANIC
0214  834A   888 0 35  000C  835A          ERS  RX
0215  835A   888 0 60  83FB  8740          STA  TEMP      2F
0216  8740   888 5 07  9999  8684    2     IIR6  9999     V0000
0217  8684   888 1 07  0000  8742    V0000 IIR2  0000     2F
0218  8686   888 1 07  0000  8742    V0002 IIR2  0000     2F
0219  8742   888 0 70  8743  8744    2     ADD            -F1
0220  8743   888 0 99  9995  0000          CON  99999     90000
0221  8744   888 0 26  8746  8746    -F1   CLA  3F
0222  8745   888 5 07  0001  836A    &F1   IIR6  0001
0223  836A   888 3 07  0000  8746          IIR5  0000     3F
0224  8746   888 0 60  84FB  8747    3     STA  TEMP1      -FARB
0225
0226
0227
0228  8685   888 1 07  0000  837A    V0001 IIR2  0000
0229  837A   888 0 70  8749  8750          ADD            -F8
0230  8749   888 0 99  9995  0000          CON  99999     50000
0231  8750   888 0 07  0001  8752    -F8   IIR   0001     1F
0232  8751   888 0 07  0002  8752    &F8   IIR   0002     1F
0233  8752   888 0 70  83FC  838A    1     ADD  CORE
0234  838A   888 0 05  000A  839A          LDX  RA
0235  839A   888 0 70  8753  8754          ADD            -F9
0236  8753   888 0 99  9000  0000          CON  99900     00000
0237  8754   888 0 65  83FC  840A    -F9   STX  CORE
0238  840A   888 0 65  88AB  841A          STX  RB9
0239  841A   888 8 07  8999  842A          IIR9  8999
0240  842A   888 0 60  8695  843A          STA  10001
0241  843A   888 8 07  0001  8756          IIR9  0001     FAREX
0242  8755   888 0 25  8758  844A    &F9   LDA# 00000     0000G
0243  844A   888 0 05  8759  8760          LDX            ERR2*
0244  8759   888 0 00  8761  8761          JMP
0245  8761   888 5 07  0001  8686          IIR6  0001     V0002
0246  8747   888 0 25  83FB  845A    -FARB LDA  TEMP
0247  845A   888 0 37  0400  846A          SHL  0400
0248  846A   888 0 70  84FB  847A          ADD  TEMP1
```

F2. USE HAND LEVEL
THE H-FIELD SPECIFIES A HAND PICKED LEVEL.
THIS SUPERCEDES THE LEVEL CALCULATED
BY QADAAD. ALTHOUGH IT WILL BE CHECKED
LATER BY THE AJST* ROUTINE.

F3. ADJUST FOR PAIRS
IF RB2 CONTAINS 5 AT THIS POINT WE HAVE
A PAIR ADDRESS. AND RB6 IS INCREASED BY 1.
THE CALCULATED LEVEL IS ADJUSTED 1 IF IT IS
A MINUS-PAIR ADDRESS. RB6 IS NOW EQUAL TO:
0: LOOK ON DRUM
1: LOOK FOR PAIR ON DRUM
2: LOOK FOR HIGH SPEED
X 3: LOOK FOR PAIR ADDRESS IN HIGH SPEED AREA
X THE SETTING OF RB6 IS USED TO CONTROL THE
X APPROPRIATE OPERATIONS BELOW. GO TO#F6.

F4. ROOM IN CORE
IF RB2 CONTAINS 5 WE HAVE A PAIR ADDRESS AND
MUST RESERVE 2 LOCATIONS. OTHERWISE 1 LOCA-
TION IN CORE. IF THERE IS NO ROOM LEFT IN
NO: THE B000-B999 AREA, A SEMICOLON ERROR
INDICATION IS GIVEN AND WE TRY HIGH SPEED
ACCESS BY GOING TO#F3.
YES:

F5. ASSIGN CORE ADDR.
CALCULATE THE EQUIVALENT OF THIS ADDRESS
AND THE ADDRESS ONE LESS IN CASE OF A PAIR
ADDRESS. #EXIT.

F6. INITIALIZE
CALCULATE THE STARTING DRUM LEVEL. AND ALSO
MAKE AN EXTRA COPY OF LEVEL 199 AS LEVEL -1

```
0249  847A  888 0 77  847A  848A          ATL
0250  848A  888 0 60  84AC  849A          STA   FLAG
0251  849A  888 5 00  8641  8641          JMP6  F0016                    IN CASE OF PAIR ADDRESS PROCESSING.
0252  8642  888 0 85  8762  8763  F0017   MUL   1F        2F
0253  8641  888 0 85  8762  8763  F0016   MUL   1F        2F
0254  8762  888 0 00  0000  00A5  1       CON   00000     000A5
0255  8763  888 0 35  8764  850A  2       ERS#  0000H     H5000
0256  850A  888 0 70  000A  8765          ADD   RA        3F
0257  8643  888 0 35  8766  8765  F0018   ERS   1F        3F
0258  8644  888 0 35  8766  8765  F0019   ERS   1F        3F
0259  8766  888 0 00  00CH  0000  1       CON   0000C     H0000
0260  8765  888 0 60  86AB  851A  3       STA   RB7
0261  851A  888 0 31  8767  8767          CLL
0262  8767  888 0 25  8617  852A          LDA   D0200
0263  852A  888 0 60  8417  8768          STA   D0000     -F2
0264  8768  888 6 25  8418  853A  -F2      LDA7  D0001                    F7. TRY LEVEL
0265  853A  888 5 00  8629  8629          JMP6  F0004                    OK: IF A DRUM ADDRESS SATISFYING ALL THE
0266  8630  888 6 35  8417  8629  F0005   ERS7  D0000     F0004              REQUIREMENTS INDICATED BY RB6 EXISTS ON THIS
0267  8631  888 6 20  8468  854A  F0006   BUF7  D0051                        LEVEL. GO TO#F9.
0268  854A  888 6 20  8518  855A          BUF7  D0101                    NO:
0269  855A  888 6 20  8568  8770          BUF7  D0151     1F
0270  8770  888 0 35  84AB  8629  1       ERS   HSB       F0004
0271  8632  888 6 35  8417  856A  F0007   ERS7  D0000
0272  856A  888 0 05  000A  857A          LDX   RA
0273  857A  888 6 25  8468  858A          LDA7  D0051
0274  858A  888 6 35  8467  859A          ERS7  D0050
0275  859A  888 0 20  000C  860A          BUF   RX
0276  860A  888 0 05  000A  861A          LDX   RA
0277  861A  888 6 25  8518  862A          LDA7  D0101
0278  862A  888 6 35  8517  863A          ERS7  D0100
0279  863A  888 0 20  000C  864A          BUF   RX
0280  864A  888 0 05  000A  865A          LDX   RA
0281  865A  888 6 25  8568  866A          LDA7  D0151
0282  866A  888 6 35  8567  867A          ERS7  D0150
0283  867A  888 0 20  000C  8770          BUF   RX        1B
0284  8629  888 0 82  8771  8772  F0004   TEQ             2F
0285  8771  888 0 25  81FC  868A          LDA   PANIC                    F8. DRUM EXHAUSTED
0286  868A  888 0 82  8773  869A          TEQ   3F                           IF THE LEVEL WAS HAND CALCULATED, A SEMICOLON
0287  869A  888 0 50  81FC  870A          STL   PANIC                        ERROR IS INDICATED THE FIRST TIME  STEP F8
0288  870A  888 0 25  8774  871A          LDA#  00000     0000G              IS EXECUTED.
0289  871A  888 0 05  8775  8760          LDX             ERR2*      YES:IF WE HAVE GONE ALL THE WAY AROUND THE DRUM,
0290  8775  888 0 00  8773  8773          JMP   3F
0291  8773  888 6 07  0001  872A  3       IIR7  0001                         A SEMICOLON ERROR IS GIVEN AND THE ADDRESS
0292  872A  888 5 70  8645  8768          ADD6  F0020     -F2                0000 IS ASSIGNED. TO#F11.
0293  8645  888 0 99  9800  0000  F0020   CON   99980     00000      PART:IF WE HAVE EXHAUSTED THE HIGH SPEED BANDS,
0294  8646  888 0 99  9800  0000  F0021   CON   99980     00000              A SEMICOLON ERROR IS GIVEN AND WE TRY THE
0295  8647  888 0 99  9950  0000  F0022   CON   99995     00000              WHOLE DRUM, GOING TO#F6.
0296  8648  888 0 99  9950  0000  F0023   CON   99995     00000      NO: OTHERWISE WE STEP TO THE NEXT DRUM LEVEL
0297  8769  888 0 25  84AC  873A  &F2      LDA   FLAG                        AND RETURN TO#F7.
0298  873A  888 0 82  8776  874A          TEQ   1F
```

```
0299  874A  888 0 50  84AC  875A          STL  FLAG
0300  875A  888 6 02  0000  8768          LIR7  0000      -F2
0301  8776  888 0 25  8777  876A    1     LDA# 00000      00000
0302  876A  888 0 05  8778  8760          LDX             ERR2*
0303  8778  888 0 00  8779  8779          JMP
0304  8779  888 5 07  9998  877A          IIR6  9998
0305  877A  888 0 70  8780  8747          ADD             -FAR8
0306  8780  888 0 99  9998  0000          CON  99999      80000
0307  8748  888 0 26  8781  8781  &FAR8    CLA
0308  8781  888 0 60  8695  8756          STA  10001      FAREX
0309  8772  888 5 00  8633  8633    2     JMP6 F0008
0310  8635  888 6 25  8418  8782  F0010  LDA7 D0001      1F
0311  8782  888 0 35  84AB  878A    1     ERS  HS8
0312  878A  888 0 82  8783  8784          TEQ             2F
0313  8783  888 6 07  0050  8772          IIR7  0050      28
0314  8636  888 6 25  8418  879A  F0011  LDA7 D0001
0315  879A  888 6 35  8417  8782          ERS7 D0000      18
0316  8633  888 6 25  8418  8784  F0008  LDA7 D0001      2F
0317  8634  888 6 25  8418  880A  F0009  LDA7 D0001
0318  880A  888 6 35  8417  8784          ERS7 D0000      2F
0319  8784  888 0 05  000A  881A    2     LDX  RA
0320  881A  888 0 35  8785  882A          ERS# GGGGG      GGGGG
0321  882A  888 0 82  8786  883A          TEQ  1F
0322  883A  888 0 35  8787  884A          ERS# 99999      99999
0323  884A  888 0 82  8788  885A          TEQ  2F
0324  885A  888 0 35  8789  886A          ERS# 55555      55555
0325  886A  888 0 82  8790  887A          TEQ  3F
0326  887A  888 0 25  8791  8792          LDA             4F
0327  8791  888 0 CH  HHHH  HHHH          CON  CHHHH      HHHHH
0328  8790  888 0 25  8793  888A    3     LDA# 8HHHH      HHHHH
0329  888A  888 0 30  8794  8792          LDL             4F
0330  8794  888 0 00  2000  0000          CON  00200      00000
0331  8788  888 0 25  8795  889A    2     LDA# FHHHH      HHHHH
0332  889A  888 0 30  8796  8792          LDL             4F
0333  8796  888 0 00  4000  0000          CON  00400      00000
0334  8786  888 0 25  8797  890A    1     LDA# GHHHH      HHHHH
0335  890A  888 0 30  8798  8792          LDL             4F
0336  8798  888 0 00  6000  0000          CON  00600      00000
0337  8792  888 0 50  88AB  891A    4     STL  R89
0338  891A  888 0 30  000C  892A          LDL  RX
0339  892A  888 0 05  8799  8800          LDX             1F
0340  8799  888 0 HH  HHHH  HHHH          CON  HHHHH      HHHHH
0341  8800  888 0 60  82FC  893A    1     STA  MASK
0342  893A  888 0 35  000B  894A          ERS  RL
0343  894A  888 0 82  8801  8802          TEQ             1F
0344  8801  888 8 07  0200  895A          IIR9  0200
0345  895A  888 0 25  82FC  896A          LDA  MASK
0346  896A  888 0 32  0100  8800          SHR   0100      1B
0347  8802  888 5 00  8637  8637    1     JMP6 F0012
0348  8639  888 6 25  8418  897A  F0014  LDA7 D0001
```

F9. CALCULATE ADDRESS
WE TRY TO FIGURE OUT WHAT DRUM ADDRESS WE HAVE FOUND. PICKING THE SMALLEST ACCEPTABLE ADDRESS ON THIS LEVEL. A SINGLE WORD OF 40 BITS IS KEPT FOR EACH DRUM LEVEL, CORRESPONDING TO BANDS 00 THRU 78. THE 5-BITS COVER BANDS 00 THRU 18, 4-BITS 20 THRU 38, AND SO ON.

F10.RESERVE ADDRESS.
FOR A PAIR ADDRESS THE ADDRESS IN THIS BAND

```
0349  897A  888 0 35  82FC  8637          ERS  MASK     F0012      ON TWO ADJACENT LEVELS IS RESERVED.
0350  8638  888 6 25  8417  8803  F0013   LDA7 D0000    1F         OTHERWISE A SINGLE ADDRESS IS RESERVED. BY
0351  8640  888 6 25  8417  8803  F0015   LDA7 D0000    1F         TURNING ITS BIT OFF IN THE TABLE.  AFTER THE
0352  8803  888 0 35  82FC  898A  1       ERS  MASK                OPERATION, LEVELS -1 AND 199 ARE COMBINED
0353  898A  888 6 60  8417  8639          STA7 D0000    F0014      AS LEVEL 199.
0354  8637  888 6 60  8418  899A  F0012   STA7 D0001
0355  899A  888 0 25  8417  800F          LDA  D0000
0356  800F  888 0 35  8617  801F          ERS  D0200
0357  801F  888 0 60  8617  802F          STA  D0200
0358  802F  888 6 07  0000  803F          IIR7  0000
0359  803F  888 0 31  8804  8804          CLL
0360  8804  888 0 82  8805  8806          TEQ                 1F     F11.FINISH UP
0361  8805  888 0 07  0199  8807          IIR   0199          2F         CALCULATE THE ADDRESS ADJACENT TO THE ONE
0362  8806  888 0 75  8808  8807  1       SUB                 2F         FOUND IN CASE OF A POSSIBLE MINUS-PAIR
0363  8808  888 0 00  0001  0000          CON  00000          10000      ADDRESS, AND#EXIT.
0364  8807  888 0 70  88AB  804F  2       ADD  R89
0365  804F  888 0 60  8695  805F          STA  10001                 CODING DETAILS:
0366  805F  888 6 07  0000  806F          IIR7  0000                     INDEX REGISTERS 1 2 AND 3 ARE NOT CHANGED BY
0367  806F  888 0 70  88AB  8756          ADD  R89            FAREX      FAR8*. ON INPUT THE H FIELD IS SPECIFIED
0368  8756  888 0 06  8809  8809  FAREX   CLX                            BY R83, THE CALCULATED BEST DRUM LEVEL IS IN
0369  8809  888 0 60  8694  807F          STA  10000                     RA, AND THE EXIT IS IN RL. THE OUTPUT
0370  807F  888 0 60  8696  808F          STA  10002                     LOCATION FOUND IS IN RA AND AN ADJACENT
0371  808F  888 0 32  0400  80F8          SHR   0400          EXIT       LOCATION IS STORED IN A SPECIAL TABLE.
0372  8810  888 1 29  8706  809F  FIND*   LDAJ A                     Q.  MASTER ADDRESS CALCULATOR (FIND*)
0373  809F  888 0 65  87F8  810F          STX  DEFX                      THIS SUBROUTINE IS GIVEN THE CONTENTS OF
0374  810F  888 0 50  88F8  811F          STL  UDEFX                     THE SYMBOLIC A,M, OR C FIELD OF THE CARD AND
0375  811F  888 0 60  89F8  812F          STA  SYMBL                     ANALYZES IT. THERE ARE TWO EXITS, ACCORDING
0376  812F  888 0 30  8811  813F          LDL# 00000          88888      TO WHETHER THE ADDRESS IS DEFINED OR NOT.
0377  813F  888 0 82  8812  814F          TEQ  BLNK                  Q1. WHAT KIND
0378  814F  888 0 30  8813  815F          LDL# 20000          88888  BLK:IF BLANK GO TO#Q2.
0379  815F  888 0 82  8814  816F          TEQ  SELF                  *:  IF SELF, GO TO#Q3.
0380  816F  888 0 35  8815  817F          ERS# H0000          H0000  REG:IF FOUR RIGHTHAND PARTS ARE NUMERIC, TO#Q4.
0381  817F  888 0 30  8816  818F          LDL# 00000          80000  ABS:IF THE LEFTMOST CHARACTER IS BLANK:HOWEVER,
0382  818F  888 0 82  8817  819F          TEQ  ABS                       GO TO#Q5.
0383  819F  888 0 25  89F8  820F          LDA  SYMBL                 NF: IF LOCAL FORWARD ADDRESS, TO#Q7.
0384  820F  888 0 35  8818  821F          ERS# 00000          03333  NB: IF LOCAL BACKWARD ADDRESS, TO#Q8.
0385  821F  888 0 C1  821F  822F          MTX                        N:  IF LOCAL PLAIN ADDRESS N, TO#Q9.
0386  822F  888 0 20  8819  823F          BUF# OHHHH          00000  +-: IF PAIR ADDRESS,SET RB2 TO 5 AND GO TO#Q10.
0387  823F  888 0 35  89F8  824F          ERS  SYMBL                 NX: IF THE SYMBOL FAILS TO PASS THE ABOVE AND
0388  824F  888 0 35  8820  825F          ERS# OHHHH          04444      BEGINS WITH A NUMERIC, GO TO#Q6.
0389  825F  888 0 31  8821  8821          CLL                    SYM:OTHERWISE IT IS SYMBOLIC: WE SET RB2 TO 4
0390  8821  888 0 50  80FC  826F          STL  INCRE                     AND GO TO#Q10.
0391  826F  888 0 82  8822  827F          TEQ  REG
0392  827F  888 0 25  89F8  828F          LDA  SYMBL
0393  828F  888 0 35  8823  829F          ERS# 00000          H0000
0394  829F  888 0 60  83AB  830F          STA  RB5
0395  830F  888 0 35  8824  831F          ERS# 00000          30000
0396  831F  888 0 C1  831F  832F          MTX
0397  832F  888 0 20  8825  833F          BUF# HHHHH          0HHHH
0398  833F  888 0 35  89F8  834F          ERS  SYMBL
```

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0399    834F  888 0 35  8826  835F                ERS#  HHHHH     4HHHH
0400    835F  888 0 30  8827  836F                LDL#  01000     06888
0401    836F  888 0 82  8828  837F                TEQ   LOCF
0402    837F  888 0 30  8829  838F                LDL#  01000     02888
0403    838F  888 0 82  8830  839F                TEQ   LOCB
0404    839F  888 0 30  8831  840F                LDL#  00000     08888
0405    840F  888 0 82  8832  841F                TEQ   LOCL
0406    841F  888 0 25  89FB  842F                LDA   SYMBL
0407    842F  888 0 35  8833  843F                ERS#  H0000     H0000
0408    843F  888 0 30  8834  844F                LDL#  10000     C0000
0409    844F  888 0 82  8835  845F                TEQ   PLUS
0410    845F  888 0 30  8836  846F                LDL#  00000     A0000
0411    846F  888 0 82  8837  847F                TEQ   MINUS
0412    847F  888 0 31  8838  8838                CLL
0413    8838  888 0 35  8839  848F                ERS#  H0000     00000
0414    848F  888 0 82  8840  849F                TEQ   ADERR
0415    849F  888 1 02  0004  8841                LIR2   0004     LOOK1
0416    8837  888 3 02  0001  8842  MINUS         LIR5   0001     1F
0417    8835  888 3 02  0000  8842  PLUS          LIR5   0000     1F
0418    8842  888 1 02  0005  8841  1             LIR2   0005     LOOK1
0419    8812  888 0 31  8843  8843  BLNK          CLL
0420    8843  888 0 25  84FC  850F                LDA   BLANK
0421    850F  888 1 02  0002  8844                LIR2   0002     FEX
0422    8844  888 0 82  88FB  87FB  FEX           TEQ   UDEFX     DEFX
0423    8814  888 0 25  85FC  87FB  SELF          LDA   ALOC      DEFX
0424
0425
0426
0427
0428    8822  888 0 25  89FB  851F  REG           LDA   SYMBL
0429    851F  888 0 35  8845  852F                ERS#  00000     0HHHH
0430    852F  888 0 60  80FC  853F                STA   INCRE
0431    853F  888 0 25  89FB  854F                LDA   SYMBL
0432    854F  888 0 35  8846  855F                ERS#  H0000     H0000
0433    855F  888 1 02  0000  8847                LIR2   0000     LOOK
0434    8817  888 0 25  89FB  856F  ABS           LDA   SYMBL
0435    856F  888 0 31  8848  8848                CLL
0436    8848  888 0 35  8849  857F                ERS#  02222     00000
0437    857F  888 0 82  8850  8840                TEQ               ADERR
0438    8850  888 0 25  89FB  858F                LDA   SYMBL
0439    858F  888 0 35  8851  859F                ERS#  HHHHH     0HHHH
0440    859F  888 0 75  000A  860F                SUB   RA
0441    860F  888 0 82  8852  8840                TEQ   1F        ADERR
0442    8840  888 0 30  8853  8736  ADERR         LDL               ERR1*
0443    8853  888 0 26  87FB  87FB                CLA   DEFX
0444    8852  888 0 25  89FB  861F  1             LDA   SYMBL
0445    861F  888 0 35  8854  862F                ERS#  01111     00000
0446    862F  888 0 70  000A  863F                ADD   RA
0447    863F  888 0 70  000A  864F                ADD   RA
0448    864F  888 0 32  0500  865F                SHR    0500
```

```
Q2. BLANK:ZERO
EQL:IF 'BLANK' IS ZERO, THE BLANK ADDRESS IS
    UNDEFINED, AND WE GO TO#UNDEF.
NEQ: ELSE TO#DEF.
Q3. 'A' LOCATION
X   THE * IS DEFINED AS THE VALUE OF A LOCATION.
X   IF IT APPEARS IN A, OR IN CERTAIN CONTROL OPS
X   IT IS THE VALUE OF THE PRECEDING A LOCATION.
X   TO#DEF.
Q4. CHANGE TO R0000.
    CHANGE THE REGIONAL ADDRESS TO R0000 AND SET
    RB2 TO ZERO. WE GO THEN TO LOOK THIS UP
    IN THE SYMBOL TABLE, AT STEP#Q10.

Q5. PROCESS ABS ADDR.
BAD:IF ANY PART OF THE ADDRESS IS BLANK OR
    HAS ZONES OF 2 OR 3, GO TO#Q6. OTHERWISE
    USE THE ZONES TO PRODUCE UNDIGITS FOR ABCFGH,
OK: AND SEND THE RESULTING ADDRESS TO#DEF.

Q6. ERROR
    SET UP ERROR FLAG FOR CURRENT FIELD
    AND SET THE ADDRESS TO ZERO. TO#DEF.
```

```
0449    865F  888 0 20  89F8  866F          BUF  SYMBL
0450    866F  888 0 35  8855  87F8          ERS            DEFX
0451    8855  888 0 00  0000  HHHH          CON  00000     0HHHH
0452    8828  888 3 25  8649  867F  LOCF    LDA5 I0000
0453    867F  888 0 31  8856  8856          CLL
0454
0455    8856  888 1 02  0001  8844          LIR2  0001     FEX
0456    8830  888 3 25  8659  868F  LOCB    LDA5 J0000
0457    868F  888 0 31  8857  8857          CLL
0458
0459
0460    8857  888 0 82  8840  87F8          TEQ  ADERR     DEFX
0461    8832  888 3 25  8649  869F  LOCL    LDA5 I0000
0462    869F  888 0 31  8858  8858          CLL
0463    8858  888 3 50  8649  870F          STL5 I0000
0464    870F  888 1 02  0003  871F          LIR2  0003
0465    871F  888 0 82  88F8  872F          TEQ  UDEFX
0466    872F  888 3 60  8659  87F8          STA5 J0000     DEFX
0467    8841  888 0 25  89F8  8847  LOOK1   LDA  SYMBL     LOOK
0468    8847  888 0 77  8847  873F  LOOK    ATL
0469    873F  888 0 25  88F8  874F          LDA  UDEFX
0470    874F  888 0 05  8859  8712          LDX            SRCH*
0471    8859  888 0 70  80FC  875F          ADD  INCRE
0472    875F  888 0 35  8860  87F8          ERS            DEFX
0473    8860  888 0 00  0000  HHHH          CON  00000     0HHHH
0474
0475
0476
0477
0478
0479
0480
0481
0482
0483
0484
0485
0486
0487    8861  888 1 00  8619  8619  DEFN*   JMP2 E0000
0488
0489
0490
0491
0492
0493    8619  888 0 05  000A  876F  E0000   LDX  RA
0494    876F  888 0 25  8862  877F          LDA# 00000     10000
0495    877F  888 0 75  80FC  878F          SUB  INCRE
0496    878F  888 0 32  0F00  879F          SHR   0F00
0497    879F  888 0 70  000C  880F          ADD  RX
0498    880F  888 0 35  8863  8623          ERS            E0004
```

```
Q7. I(N)=ZERO
EQ: IF THE FORWARD LOCAL TABLE ENTRY FOR N IS
X   ZERO IT IS UNDEFINED,WE GO TO#UNDEF. ELSE IT
NEQ: IS DEFINED AND#DEF.
Q8. J(N)=ZERO
EQ: IF THE BACKWARD LOCAL TABLE ENTRY FOR N IS
X   ZERO IT IS UNDEFINED AND WE GO TO#Q6 SINCE
X   THIS SHOULDN'T HAPPEN. ELSE IT IS A
NEQ:DEFINED ADDRESS WHICH IS SENT TO#DEF.
Q9. I(N)=ZERO
EQ: IF THE FORWARD LOCAL TABLE ENTRY FOR N IS
    ZERO THIS ADDRESS IS UNDEFINED, GO TO#UNDEF.
NEQ:ELSE IT IS DEFINED AND WE TRANSFER IT TO THE
    BACKWARD LOCAL TABLE AND EXIT TO#DEF.
    IN EITHER CASE RESET FORWARD LOCAL ENTRY O.
Q10.SRCH*
    SEARCH FOR THE ITEM IN THE SYMBOL TABLE.
DEF:IF FOUND,GO TO#DEF,ADJUSTING FOR REGIONAL
    ADDRESS IF NECESSARY. IF NOT FOUND, WE GO
UND: TO #UNDEF.

CODING DETAILS:
X   INPUT TO FIND* IS DEF IN RX AND UNDEF IN RL.
X   RB3 CONTAINS THE FIELD TO BE EXAMINED.
    AT EXIT DEF, RA CONTAINS THE DEFINED
X   EQUIVALENT IN ITS C ADDRESS POSITION.
X   AT EXIT UNDEF, RB2 CONTAINS INFORMATION
X   ABOUT THE TYPE OF ADDRESS AS FOLLOWS:
    0: REGIONAL
X   1: LOCAL FORWARD  N IS IN RB5
X   2: BLANK
X   3: LOCAL PLAIN  N IS IN RB5
X   J: SYMBOLIC  SPOT IN SYMBOL TABLE IS RB1
X   K: PAIR ADDRESS  RB5 IS 0 FOR &, 1 FOR -.
D.  DEFINE ADDRESS (DEFN*)
X   THIS SUBROUTINE IS USED AFTER FIND* HAS
X   DETERMINED AN ADDRESS IS UNDEFINED. IF THIS
X   IS NOT AN ERROR CONDITION, SOME WAY OF
X   CALCULATING AN ADDRESS, USUALLY FARB*, IS
X   USED AND THEN THIS ROUTINE DEFN* TAKES OVER.
D1. WHAT TYPE
REG:IF THE ADDRESS TO BE DEFINED IS REGIONAL,
    GO TO#D2.
NF: IF LOCAL FORWARD,ENTER IN I TABLE AND#EXIT.
BLK:IF BLANK, ENTER IN 'BLANK' AND#EXIT.
N:  IF LOCAL PLAIN, ENTER IN J TABLE AND#EXIT.
```

```
0499  8863  888 0 00  0000  HHHH          CON  00000   OHHHH    SYM:IF SYMBOLIC, ENTER IN EQUIVALENTS TABLE,#EXIT
0500  8620  888 3 60  8649  0008  E0001   STA5 I0000   RL       +-: IF PAIR ADDRESS, GO TO#D3.
0501  8621  888 0 60  84FC  0008  E0002   STA  BLANK   RL       D2. CALCULATE BASE
0502                                                            X   REGIONAL ADDRESSES ARE DEFINED ONLY BY
0503                                                            X   CONTROL OPS LIKE BLR. THE DEFINING ADDRESS
0504                                                            X   MINUS THE INCREMENT, THE ADDRESS CORRESPON-
0505                                                            X   DING TO R0000, IS STORED IN THE
0506                                                            X   EQUIVALENTS TABLE. #EXIT.
0507  8622  888 3 60  8659  0008  E0003   STA5 J0000   RL
0508  8623  888 0 64  2000  0008  E0004   STA1 ETAB    RL
0509  8624  888 0 50  88FC  881F  E0005   STL  DEXIT                 D3. STORE TWO.
0510  881F  888 3 25  8694  882F          LDA5 10000                     THE DEFINED ADDRESS IS STORED IN THE SYMBOL
0511  882F  888 0 06  8864  8864          CLX                            TABLE. THEN & IS CHANGED TO - OR VICE VERSA
0512  8864  888 0 32  0400  883F          SHR   0400                     AND THAT SYMBOL PLUS ITS EQUIVALENT ARE ALSO
0513  883F  888 0 64  2000  884F          STA1 ETAB                      STORED AWAY. THE ASSUMPTION IS MADE THAT
0514  884F  888 0 60  84FB  885F          STA  TEMP1                     FARB* WAS USED TO CALCULATE THE ADDRESSES.
0515  885F  888 0 29  1000  886F          LDA1 STAB                      #EXIT.
0516  886F  888 3 00  8697  8697          JMP5 10003                 CODING DETAIL:
0517  8697  888 0 35  8865  8866  10003   ERS                 1F         THE EXIT IS INPUT IN RL AND THE CALCULATED
0518  8865  888 0 0H  HHHA  HHHH          CON  OHHHH   AHHHH            ADDRESS IN RA. OTHER INPUTS ACTUALLY USED
0519  8698  888 0 20  8867  8866  10004   BUF                 1F         ARE RB2 TO TELL THE TYPE, AND RB1 AND RB5 TO
0520  8867  888 0 10  000C  0000          CON  10000   C0000          GIVE EXTRA INFORMATION AS SUPPLIED BY THE
0521  8866  888 0 77  8866  887F  1       ATL                         FIND* SUBROUTINE. AT EXIT, RA CONTAINS THE
0522  887F  888 0 25  8868  8712          LDA                 SRCH*      DEFINED EQUIVALENT.
0523  8868  888 0 00  8869  8869          JMP
0524  8869  888 3 25  8695  888F          LDA5 10001
0525  888F  888 0 06  8870  8870          CLX
0526  8870  888 0 32  0400  889F          SHR   0400
0527  889F  888 0 64  2000  890F          STA1 ETAB
0528  890F  888 0 25  84FB  88FC          LDA  TEMP1          DEXIT
0529  8871  888 0 50  80FB  891F  AJST*    STL  EXIT                  A.  AJST* SUBROUTINE.
0530                                                            X   THIS SUBROUTINE IS PART OF THE WAY QADAAD
0531                                                            X   FINDS LATENCY. AJST* IS USED ON M AND C
0532                                                            X   ADDRESSES. FIRST AN OPTIMUM LEVEL
0533                                                            X   'OPTIM' IS CALCULATED BY QADAAD; AJST* USES
0534                                                            X   THIS TO FIND THE CURRENT LEVEL, GIVEN THE
0535                                                            X   ACTUAL M OR C ADDRESS.
0536  891F  888 0 30  000A  892F          LDL  RA                    A1. WHAT TYPE ADDRESS
0537  892F  888 0 25  8872  8873          LDA                 8F     000A IF THE ASSIGNED ADDRESS D HAS ANY UNDIGITS
0538  8872  888 1 00  0000  0000          CON1 00000   00000          IT IS ASSUMED TO BE IMMEDIATE ACCESS AND
0539  8873  888 0 70  000B  893F  8       ADD  RL                        'OPTIM' IS THE ANSWER. #EXIT.
0540  893F  888 0 82  8874  894F          TEQ  1F                    4000 IF THE ASSIGNED ADDRESS D IS ON THE HIGH-
0541  894F  888 0 25  89FH  80FB          LDA  OPTIM   EXIT              SPEED BANDS, GO TO#A2.
0542  8874  888 0 60  84FB  895F  1       STA  TEMP1                 0000IF THE ASSIGNED ADDRESS D IS ON THE STANDARD
0543  895F  888 0 70  8875  896F          ADD# 00000   10000            PART OF THE DRUM, D IS THE ANSWER. GO TO#A3.
0544  896F  888 0 75  89FH  897F          SUB  OPTIM                 A2. FIGURE DRUM ROLL
0545  897F  888 0 60  83FB  898F          STA  TEMP                      THE ANSWER IS  D-OPTIM  MODULO 50,
0546  898F  888 0 25  0008  899F          LDA  RL                        ADDED TO OPTIM.
0547  899F  888 0 35  8876  8877          ERS# 00000   0H000
0548  8877  888 0 30  89A8  8878          LDL  HS81
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0549  8878  888 0 82  8879  8880           TEC  1F
0550  8880  888 0 30  83FB  8881           LDL  TEMP
0551  8881  888 0 85  8882  8883           MUL# 00000     0A005
0552  8883  888 0 30  000C  8884           LDL  RX                    A3. CHECK BAD TIMING.
0553  8884  888 0 25  8885  8886           LDA                2F          IF D COMPARED TO OPTIM INDICATES A WAIT OF
0554  8885  888 0 99  0A00  0000           CON  990A0         00000       48 OR 49 ON HSB OR OF 198 OR 199 ON REST OF
0555  8879  888 0 25  83FB  8887     1     LDA  TEMP                      DRUM, THE ERROR FLAG - IS PUT ON THE LISTING.
0556  8887  888 0 35  8888  8889           ERS# 00000     000CH       CODING DETAILS:
0557  8889  888 0 77  8889  8890           ATL                            INPUT IS THE ASSIGNED ADDRESS IN RA AND THE
0558  8890  888 0 70  89FH  8891           ADD  OPTIM                     EXIT IN RL. OUTPUT IN RA IS SOME LOCATION
0559  8891  888 0 60  84FB  8892           STA  TEMP1                     ON THE APPROPRIATE DRUM LEVEL.
0560  8892  888 0 25  8893  8886           LDA                2F          #EXIT.
0561  8893  888 0 00  0000  0048           CON  00000         00048
0562  8886  888 0 87  8894  8895     2     TGR  1F
0563  8895  888 0 25  8896  8897           LDA# 00000         0000A
0564  8897  888 0 05  8894  8760           LDX  1F            ERR2*
0565  8894  888 0 25  84FB  8898     1     LDA  TEMP1
0566  8898  888 0 35  8899  80FB           ERS                EXIT
0567  8899  888 0 00  0000  0HHH           CON  00000         00HHH
0568  8900  888 0 50  8901  8903  OTPT*     STL  -0EX                  0.  OUTPUT SUBROUTINE.
0569  8903  888 0 77  8903  8904           ATL                            THIS ROUTINE IS USED TO TRANSMIT AN ASSEMBLED
0570  8904  888 0 25  83AC  8905           LDA  LINE0                     INSTRUCTION TO THE OUTPUT TAPE.
0571  8905  888 0 20  8906  000A           BUF                RA          01. TRANSFER
0572  8906  888 0 08  0000  8907           LIR1  0000                         THE LOCATION IS IN THE FORM RRROSOAAAA #HERE
0573  8907  888 0 69  4803  8908           STX1 70003                         RRR ARE RELOCATION DIGITS COPIED FROM THE
0574  8908  888 0 50  84FB  8909           STL  TEMP1                         CARD. S IS THE ASSEMBLED SIGN. AND AAAA IS
0575  8909  888 0 65  85FB  8910           STX  TEMP2                         THE ASSEMBLED LOCATION. MOVE THE LOCATION
0576  8910  888 0 0G  0004  8911           IIR1  0004                         AND THE ASSEMBLED INSTRUCTION INTO THE
0577  8911  888 0 60  83AC  8912           STA  LINE0                         OUTPUT BUFFER.
0578  8912  888 0 54  4797  8913           STL1 79997                 02. BUFFER FULL
0579  8913  888 0 70  8914  8901           ADD                -0EX    NO: IF THE BUFFER DOES NOT HAVE 50 INSTRUCTIONS.
0580  8914  888 0 99  9800  0000           CON  99980         00000       #EXIT.
0581  8902  888 0 60  83AC  8915  &0EX      STA  LINE0                 YES:
0582  8915  888 0 05  8916  8917           LDX  2F                    03. WRITE TAPE
0583  8917  888 0 30  8918  8919           LDL                TSUB*       WRITE THE BUFFER OUT ON THE OUTPUT TAPE AND
0584  8918  888 0 C6  4800  8916           TBL  70000         2F          CLEAR THE BUFFER AGAIN.#EXIT.
0585  8916  888 0 H2  0500  8901     2     TWR  0TAP1         -0EX
0586  8920  888 0 65  81FB  8921  UNDG*     STX  EXIT1                 G   THIS IS AN EDITING SUBROUTINE WHICH TAKES
0587  8921  888 0 05  000A  8922           LDX  RA                    G   A TEN DIGIT WORD IN RA AND PRODUCES IN
0588  8922  888 0 35  8923  8924           ERS# 33333         33333   G   COMPUTER CODE THE CONVENTIONAL NOTATION FOR
0589  8924  888 0 C1  8924  8925           MTX                        G   UNDIGITS. ABCFGH. THE ZONE WORD IS PUT INTO
0590  8925  888 0 35  000C  8926           ERS  RX                    G   RA. NUMERIC IN RX AT EXIT.
0591  8926  888 0 35  8927  8928           ERS# 44444         44444
0592  8928  888 0 70  8929  8930           ADD# 44444         44444
0593  8930  888 0 77  8930  8931           ATL
0594  8931  888 0 20  8932  8933           BUF# 88888         88888
0595  8933  888 0 35  000C  8934           ERS  RX
0596  8934  888 0 05  000A  8935           LDX  RA
0597  8935  888 0 25  8936  8937           LDA# 11111         11111
0598  8937  888 0 35  000B  81F8           ERS  RL            EXIT1
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0599                                                HHH          H
0600   4200  888 0 26  4203  4203   START   CLA   1F
0601   4201  888 0 26  4203  4203   STRT    CLA   1F                    E.  EDIT INPUT CARD.
0602   4203  888 0 60  80FG  4207   1       STA   R
0603   4207  888 0 60  89FC  4211           STA   SIGN                      THIS IS WHERE THE PROCESSING OF EACH CARD
0604   4211  888 0 60  86FB  4215           STA   ERROR                     STARTS. THE PURPOSE IS TO TAKE THE INFOR-
0605   4215  888 0 29  8001  4220           LDA1  8001
0606   4220  888 0 05  000A  4224           LDX   RA                        MATION FROM THE INPUT TAPE AND TRANSFER IT
0607   4224  888 0 75  81FG  4029           SUB   LINE                     TO THE PRINTER AREA READY TO BE PRINTED AND
0608   4029  888 0 30  4231  4233           LDL#  00000      00001        ALSO EDIT IT INTO A FORM MORE DIGESTIBLE FOR
0609   4233  888 0 82  4036  4236           TEQ   1F                      ASSEMBLY PROCESSING.
0610   4236  888 0 67  1111  4036           HLT   1111       1F           THE CARDS ARE REPRESENTED AS 20 WORDS ON
0611   4036  888 0 65  81FG  4040   1       STX   LINE                    TAPE, A ZONE WORD IMMEDIATELY PRECEDING ITS
0612                                                                      CORRESPONDING NUMERIC.
0613                                                                X     0,1 LINE NUMBER
0614                                                                X     2,3 A AR AH  AS  1111123330
0615                                                                X     4,5 M MR MH  AS  1111123330
0616                                                                X     6,7 C CR CH  AS  1111123330
0617                                                                X     8,9 OP IR    AS  1112000000
0618   4040  888 0 29  8003  4045           LDA1  8003                X     10-19 REMARKS AS 0111111...
0619   4045  888 0 09  8009  4400           LDX1  8009                E1. CHECK LINE NO.
0620   4400  888 0 32  0500  4208           SHR   0500                BAD:IF THE LINE NUMBER IS NOT EXACTLY 1 HIGHER
0621   4208  888 0 20  4210  4212           BUF#  88888      00000        THAN THE PRECEDING, STOP THE MACHINE AND
0622   4212  888 0 60  0334  4436           STA   0334                    THEN RETURN TO#E1.
0623   4436  888 0 25  000C  4240           LDA   RX                  OK:
0624   4240  888 0 20  4042  4044           BUF#  0000B      0000B    E2. TRANSFER
0625   4044  888 0 60  0218  4420           STA   0218                    MOVE THE LEFT HALF OF THE CARD TO THE PRINTER
0626   4420  888 0 29  8002  4225           LDA1  8002                    AREA EDITING IT SLIGHTLY FOR READABILITY.
0627   4225  888 0 09  8008  4230           LDX1  8008
0628   4230  888 0 32  0500  4038           SHR   0500
0629   4038  888 0 60  0339  4041           STA   0339
0630   4041  888 0 65  0223  4425           STX   0223
0631   4425  888 0 29  8007  4430           LDA1  8007
0632   4430  888 0 20  4232  4234           BUF#  00000      0000B
0633   4234  888 0 09  8006  4039           LDX1  8006
0634   4039  888 0 60  0241  4043           STA   0241
0635   4043  888 0 65  0246  4048           STX   0246
0636   4048  888 0 29  8005  4403           LDA1  8005
0637   4403  888 0 20  4205  4407           BUF#  00000      0000B
0638   4407  888 0 09  8004  4412           LDX1  8004
0639   4412  888 0 60  0303  4405           STA   0303
0640   4405  888 0 65  0308  4410           STX   0308
0641                                                HHH          C
0642   4410  888 1 02  0000  8938           LIR2  0000       -ST      E3. SEPARATE OFF R, H.
0643   8938  888 0 29  8003  8940   -ST     LDA1  8003                    EDIT THE A-AR-AH,M-MR-MH,C-CR-CH, CHANGING
0644   8940  888 0 06  8941  8941           CLX                           THE SYMBOLIC PORTION TO A SINGLE WORD WITH
0645   8941  888 0 32  0500  8942           SHR   0500                    THE ZONES AT THE LEFT: ZZZZZNNNNN;
0646   8942  888 1 60  8699  8943           STA2  30000                   ACCUMULATE THE R DIGITS, AND PUT THE
0647   8943  888 0 25  80FG  8944           LDA   R                       H-FIELD INTO THE FORM 00ZZZ00NNN.
0648   8944  888 0 32  0900  8945           SHR   0900
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0649  8945  888 0 65  80FG  8946          STX  R
0650  8946  888 0 06  8947  8947          CLX
0651  8947  888 0 32  0700  8948          SHR   0700
0652  8948  888 1 60  8707  8949          STA2 AH
0653  8949  888 0 29  8002  8950          LDA1  8002
0654  8950  888 0 35  8951  8952          ERS# HHHHH      00000
0655  8952  888 1 60  8700  8953          STA2 30001
0656  8953  888 1 20  8699  8954          BUF2 30000
0657  8954  888 1 60  8706  8955          STA2 A
0658  8955  888 0 29  8002  8956          LDA1  8002
0659  8956  888 0 37  0400  8957          SHL   0400
0660  8957  888 0 35  8958  8959          ERS# 00HHH      00000
0661  8959  888 1 20  8707  8960          BUF2 AH
0662  8960  888 1 60  8707  8961          STA2 AH
0663  8961  888 0 06  0002  8962          IIR1  0002
0664  8962  888 1 07  0002  8963          IIR2  0002
0665  8963  888 0 70  8964  8938          ADD             -ST
0666  8964  888 0 99  9994  0000          CON  99999      40000
0667                                      HHH         H
0668  8939  888 0 29  8004  4244  &ST    LDA1  8004                E4. MOVE COMMENTS
0669  4244  888 0 60  8669  4248          STA  R0000                    MOVE THE REMARKS FIELD INTO REGION R.
0670  4248  888 0 29  8005  4603          LDA1  8005
0671  4603  888 0 20  4605  4607          BUF# 80000      00000
0672  4607  888 0 60  8670  4411          STA  R0001
0673  4411  888 0 29  8006  4016          LDA1  8006
0674  4016  888 0 60  8671  4620          STA  R0002
0675  4620  888 0 29  8007  4625          LDA1  8007
0676  4625  888 0 60  8672  4229          STA  R0003
0677  4229  888 0 29  8008  4434          LDA1  8008
0678  4434  888 0 60  8673  4238          STA  R0004
0679  4238  888 0 29  8009  4243          LDA1  8009
0680  4243  888 0 60  8674  4047          STA  R0005
0681  4047  888 0 29  8010  4202          LDA1  8010
0682  4202  888 0 60  8675  4206          STA  R0006
0683  4206  888 0 29  8011  4611          LDA1  8011
0684  4611  888 0 60  8676  4415          STA  R0007
0685  4415  888 0 29  8012  4070          LDA1  8012
0686  4070  888 0 60  8677  4424          STA  R0008
0687  4424  888 0 29  8013  4429          LDA1  8013
0688  4429  888 0 60  8678  4433          STA  R0009
0689  4433  888 0 25  8701  4037          LDA  30002
0690  4037  888 0 37  0500  4245          SHL   0500                E5. CONSTRUCT CONSTANTS
0691  4245  888 0 20  8703  4049          BUF  30004                    PUT TOGETHER THE M AND C FIELDS INTO
0692  4049  888 0 60  82FG  4053          STA  MCN                      POSITIVE CONSTANTS MC,MCZ,AND MCN AS THE
0693  4053  888 0 25  8704  4057          LDA  30005                    CON NUM ZON CONTROL OPS ARE SUPPOSED TO DO.
0694  4057  888 0 06  4610  4610          CLX
0695  4610  888 0 32  0500  4018          SHR   0500
0696  4018  888 0 20  8702  4222          BUF  30003
0697  4222  888 0 60  83FG  4026          STA  MCZ
0698  4026  888 0 35  4028  4630          ERS# 11111      11111
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0699  4630  888 0 70  000A  4235          ADD  RA
0700  4235  888 0 70  000A  4440          ADD  RA
0701  4440  888 0 20  B2FG  4444          BUF  MCN
0702  4444  888 0 60  B4FG  4448          STA  MC
0703  4448  888 0 29  8003  4253          LDA1  8003
0704  4253  888 0 06  4406  4406          CLX                          E6. EDIT OP CODE.
0705  4406  888 0 32  0700  4216          SHR   0700                       PUT THE OPERATION CODE FIELD INTO THE FORM
0706  4216  888 0 30  000A  4270          LDL  RA                          88ZZZ88NNN.  THIS FORM IS USED BECAUSE IT
0707  4270  888 0 29  8002  4075          LDA1  8002                       CANNOT CONFLICT WITH ANY SYMBOL IN THE
0708  4075  888 0 32  0700  4435          SHR   0700                       SYMBOL TABLE.
0709  4435  888 0 37  0500  4443          SHL   0500                       PUT THE IR FIELD INTO THE FORM Z000000N00.
0710  4443  888 0 20  000B  4247          BUF  RL
0711  4247  888 0 20  4249  4401          BUF#  88000      88000
0712  4401  888 0 60  85FG  4055          STA  OP
0713  4055  888 0 65  86FG  4209          STX  IR
0714  4209  888 0 0G  0014  4213          IIR1  0014       2F
0715  4213  888 0 60  87FG  4017  2       STA  TAPEI                   E7. INPUT BUFFER EMPTY
0716  4017  888 0 29  8000  4422          LDA1  8000                   NO: IF THE CURRENT INPUT BUFFER IS NOT YET
0717  4422  888 0 31  4275  4275          CLL                              EMPTY, GO TO#E9.
0718  4275  888 0 82  4228  4428          TEQ  6F                      YES:
0719  4428  888 0 09  8001  4633          LDX1  8001
0720  4633  888 0 30  000C  8919          LDL  RX          TSUB*       E8. SWAP BUFFERS
0721  8201  888 0 G2  0300  4218  50200   TRD  ITAP1                       AN INPUT BUFFER HAS ALREADY BEEN LOADED
0722  4218  888 0 08  0201  4221          LIR1  0201                      WE SWAP INPUT BUFFERS AND INITIATE READING IN
0723  4221  888 0 25  4223  4475          LDA  TCON1       1F             TO THE EMPTY BUFFER.
0724  4223  888 0 F6  8001  4453  TCON1   TBU  50000       -5
0725  4454  888 0 67  8888  4453  &5      HLT   8888       -5
0726  4453  888 0 60  8200  4257  -5      STA  50199       3F
0727  8402  888 0 G2  0300  4019  60200   TRD  ITAP1
0728  4019  888 0 08  0000  4622          LIR1  0000
0729  4622  888 0 25  4624  4475          LDA  TCON2       1F
0730  4624  888 0 F6  8202  4653  TCON2   TBU  60000       -6
0731  4654  888 0 67  8888  4653  &6      HLT   8888       -6
0732  4653  888 0 60  8401  4257  -6      STA  60199       3F
0733  4257  888 0 31  4060  4060  3       CLL  3F
0734  4475  888 0 60  88FG  4629  1       STA  TCONT
0735  4629  888 0 0G  0000  4083          IIR1  0000
0736  4083  888 0 60  87FG  4228          STA  TAPEI       6F
0737  8919  888 0 50  80FH  4423  TSUB*   STL  TEX1                G   TAPE SUBROUTINE. RL IS EXIT, RX IS TAPE INST.
0738  4423  888 0 65  81FH  4027          STX  TEX         1F
0739  4027  888 0 C7  4432  4027  1       TBT              *       G   WAIT UNTIL PREV TAPE INSTRUCTION CLEARS.
0740  4432  888 0 26  4635  4635          CLA
0741  4635  888 0 82  4438  4638          TEQ  2F
0742  4638  888 0 25  89FG  4242          LDA  LTAPE
0743  4242  888 0 67  2222  000A          HLT   2222       RA      G   HALT IF INDICATOR LIGHT ON
0744  4438  888 0 25  88FG  4442  2       LDA  TCONT               G   IF PRECEDING WAS A READ, UNLOAD BUFFER
0745  4442  888 0 31  4445  4445          CLL
0746  4445  888 0 82  4060  000A          TEQ  3F          RA
0747  4060  888 0 50  88FG  4402  3       STL  TCONT               G   PUT NEXT TAPE INSTRUCTION INTO LTAPE
0748  4402  888 0 25  81FH  4606          LDA  TEX
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0749   4606  888 0 35  4408  4260                ERS# HHHHH     H0000
0750   4260  888 0 20  4612  4214                BUF            8F
0751   4612  888 0 00  0000  4027                JMP   0000     1B
0752   4214  888 0 60  89FG  80FH          8     STA   LTAPE    TEX1
0753   4228  888 0 30  85FG  4632          6     LDL   OP
0754   4632  888 0 25  4634  4636                LDA#  88220    88658
0755   4636  888 0 82  4239  4439                TEQ   ONN      SWICH
0756   4056  888 1 08  0006  4409          ONSW  LIRJ  0006
0757   4409  888 0 05  4061  4413                LDX   1F
0758   4413  888 0 25  4615  8712                LDA            SRCH*
0759   4615  888 0 30  4219  8736                LDL            ERR1*
0760   4219  888 0 25  4623  4675                LDA# 67220     00000
0761   4675  888 0 64  2000  4061                STA1  ETAB     1F
0762   4061  888 0 30  4613  4065          1     LDL#  CCCCC    CCCCC
0763   4065  888 0 87  4418  000A                TGR            RA
0764   4418  888 0 60  85FG  4072                STA   OP
0765   4072  888 0 30  4074  4226                LDL   PROCM    PROCA
0766                                            HHH          H
0767   4226  888 1 08  0000  4079          PROCA LIRJ  0000
0768   4079  888 0 50  82FH  4283                STL   AEX
0769   4283  888 0 25  8706  4237                LDA   A
0770   4237  888 0 30  4639  4241                LDL#  00000    88888
0771   4241  888 0 82  4644  4094                TEQ   1F
0772   4094  888 0 31  4447  4447                CLL
0773   4447  888 0 25  84FC  4601                LDA   BLANK
0774   4601  888 0 82  4644  4204                TEQ   1F
0775   4204  888 0 30  4644  8736                LDL   1F       ERR1*
0776   4644  888 0 05  4648  4600          1     LDX   2F
0777   4600  888 0 30  4602  8810                LDL            FIND*
0778   4602  888 1 00  4010  4010                JMP2  L0000
- 0779   4010  888 1 02  0002  4012          L0000 LIR2  0002     L0002
- 0780   4011  888 1 02  0002  4012          L0001 LIR2  0002     L0002
0781   4012  888 0 30  4014  8736          L0002 LDL   L0004    ERR1*
0782   4013  888 0 25  81FG  4217          L0003 LDA   LINE     1F
- 0783   4014  888 0 25  81FG  4217          L0004 LDA   LINE     1F
- 0784   4015  888 0 25  81FG  4217          L0005 LDA   LINE     1F
0785   4217  888 0 30  4419  8723          1     LDL            FARB*
0786   4419  888 0 30  4648  8861                LDL   2F       DEFN*
0787   4648  888 0 60  85FC  4404          2     STA   ALOC
0788   4404  888 0 30  86FC  4608                LDL   MLOC
0789   4608  888 0 82  4261  4461                TEQ   3F
0790   4461  888 0 30  87FC  4265                LDL   CLOC
0791   4265  888 0 82  4618  4068                TEQ   4F       2F
0792   4618  888 0 25  85FH  4272          4     LDA   CLEV     1F
0793   4261  888 0 30  87FC  4465          3     LDL   CLOC
0794   4465  888 0 25  4417  4619                LDA            8F
0795   4417  888 1 00  0000  0000                CON1  00000    00000
0796   4619  888 0 70  0008  4274          8     ADD   RL
0797   4274  888 0 82  4227  4618                TEQ            4B
0798   4227  888 0 25  84FH  4272                LDA   MLEV     1F
```

E9. OP SRCH*.
ON: IF OP IS 'ON' GO TO#C6.
OFF:IF MASTER SWITCH IS OFF GO TO#C7.
ELSE SEARCH FOR OP-CODE IN THE SYMBOL TABLE.
CONT IF IT IS A CONTROL OP, GO TO#C1.
SYM:IF IT IS A MACHINE SYMBOLIC OP, GO TO THE
MAIN PROCESSING ROUTINE#P1.
BAD:IF IT IS NOT IN THE TABLE, GIVE AN ERROR
INDICATION AND CHANGE OP TO 67. GO TO #P1.

L. PROCESS A ADDRESS.
THIS ROUTINE IS USED FOR INSTRUCTIONS AND
ALSO FOR CONTROL OPS CON,NUM, AND ZON.
L1. CHECK BLANK A
IF A IS NOT BLANK BUT THE PRECEDING INSTRUC-
TION HAD A BLANK ADDRESS, GIVE AN ERROR
INDICATION.

L2. FIND* A.
DEF:FIND A (ROUTINE Q). IF IT IS ALREADY DEFINED,
GO TO#L4.
UND:

L3. FARB*,DEFN*.
A IS AN UNDEFINED ADDRESS. IF IT IS REGIONAL,
LOCAL FORWARD, OR BLANK THIS IS AN ERROR
CONDITION AND A NEW LOCATION IS ASSEMBLED.
OTHERWISE USE THE LINE NUMBER AS RANDOM DRUM
LEVEL AND GO THRU FARB* (ROUTINE F) AND
DEFN* (ROUTINE D).
L4. ADJUST A LEVEL.
IF THE NEW A ADDRESS MATCHES THE LAST M OR C
ADDRESS, USE THEIR LEVEL, EXCEPT ON M ADDRESS
MATCH WHERE THE C ADDRESS HAD UNDIGITS. IN
THE LATTER CASE THE PREVIOUS C LEVEL IS USED.
OTHERWISE USE THE A ADDRESS AS THE DRUM LEVEL

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0799  4272  888 0 60  83FH  4426      1        STA  ALEV
0800  4426  888 0 31  4279  4279               CLL
0801  4279  888 0 50  84FC  82FH               STL  BLANK     AEX        L5. ZERO TO BLANK.
0802                                                                        THE LOCATION 'BLANK' IS SET TO ZERO SINCE AT
0803                                                                     X  THIS POINT BLANK ADDRESSES ARE UNDEFINED.
0804  4068  888 0 25  4470  4472      2        LDA                8F     X  #EXIT.
0805  4470  888 1 00  0000  0000               CON1 00000        00000
0806  4472  888 0 70  85FC  4272      8        ADD  ALOC          1B
0807  4074  888 0 25  86FG  4628      PROCM    LDA  IR                     P.  PROCESSING OF INSTRUCTIONS
0808  4628  888 0 30  4080  4082               LDL# 00000        00800     P1. PROCESS A
0809  4082  888 0 82  4085  4285               TEQ  1F                         EXECUTE THE L ROUTINE.
0810  4285  888 0 30  4437  4089               LDL# 10000        00H00     P2. CALCULATE M OPTIM
0811  4089  888 0 82  4085  4642               TEQ  1F                         IF THE IR FIELD IS NON BLANK AND NOT A
0812  4642  888 0 25  83FH  4046               LDA  ALEV                       LITERAL, ADD 1 TO A LEVEL FOR INDEX REGISTER
0813  4046  888 0 70  4098  4051               ADD# 00000        00001         MODIFICATION TIME. THEN ADD THE APPROPRIATE
0814  4051  888 0 60  83FH  4085               STA  ALEV         1F            AMOUNT TO GET THE OPTIMUM M ADDRESS LEVEL,
0815  4085  888 0 25  85FG  4289      1        LDA  OP                         AS DETERMINED BY THE OPERATION CODE.
0816  4289  888 0 32  0200  4294               SHR   0200                      PUT THIS IN 'OPTIM'.
0817  4294  888 0 35  4246  4298               ERS# 00000        000HH
0818  4298  888 0 70  83FH  4103               ADD  ALEV
0819  4103  888 0 60  89FH  4457               STA  OPTIM
0820  4457  888 1 08  0002  4460               LIR3  0002
0821  4460  888 0 25  86FG  4414               LDA  IR
0822  4414  888 0 30  4416  4268               LDL# 10000        00H00     P3. LITERAL
0823  4268  888 0 82  4421  4621               TEQ  5F                     YES:IF THE IR FIELD CONTAINS A NUMBER SIGN GO TO
0824  4621  888 0 37  0200  4626               SHL   0200                      #P5.
0825  4626  888 0 31  4479  4479               CLL                         NO:
0826  4479  888 0 06  4282  4282               CLX
0827  4282  888 0 70  4084  000A               ADD  3F            RA       P4. FIGURE INDEXING
0828  4084  888 0 25  4000  4052      3        LDA  Q0000         4F            ADJUST BIT 4 OF THE OPERATION CODE AND
0829  4000  888 0 00  0000  0000      Q0000    CON  00000         00000         THE SIGN OF THE RESULT TO GIVE THE INDEX
0830  4001  888 0 40  0000  0000      Q0001    CON  40000         00000         REGISTER MODIFICATION DESIRED. GO TO#P6.
0831  4002  888 0 00  0000  0001      Q0002    CON  00000         00001
0832  4003  888 0 40  0000  0001      Q0003    CON  40000         00001
0833  4004  888 0 00  0000  0002      Q0004    CON  00000         00002
0834  4005  888 0 00  0000  0003      Q0005    CON  00000         00003
0835  4006  888 0 00  0000  0005      Q0006    CON  00000         00005
0836  4007  888 0 00  0000  0006      Q0007    CON  00000         00006
0837  4008  888 0 00  0000  0007      Q0008    CON  00000         00007
0838  4009  888 0 00  0000  0008      Q0009    CON  00000         00008
0839  4052  888 0 60  89FC  4256      4        STA  SIGN
0840  4256  888 0 32  0100  4660               SHR   0100
0841  4660  888 0 20  85FG  4614               BUF  OP
0842  4614  888 0 60  85FG  4468               STA  OP            PRCM1
0843  4421  888 0 25  89FH  4125      5        LDA  OPTIM                  P5. CREATE CONSTANT
0844  4125  888 0 30  4427  8723               LDL                FARB*        GO THRU FARB* AND AJST* (ROUTINES F AND A)
0845  4427  888 0 60  86FC  4483               STA  MLOC                       TO DETERMINE AN ADDRESS AND DRUM LEVEL FOR
0846  4483  888 0 30  4485  8871               LDL                AJST*        THE LITERAL CONSTANT. ASSEMBLE THE POSITIVE
0847  4485  888 0 60  84FH  4441               STA  MLEV                       CONSTANT INTO THIS LOCATION. (ROUTINE O)
0848  4441  888 0 25  86FC  4645               LDA  MLOC                       TRANSFERRING THE MR DIGIT INTO AN AR DIGIT
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0849  4645  888 0 32  0800  4456          SHR   0800                    FOR THE CONSTANT.
0850  4456  888 0 25  80FG  4110          LDA   R                       MARK THE C FIELD BLANK AND GO TO#P9.
0851  4110  888 0 35  4062  4064          ERS#  00000     000H0
0852  4064  888 0 32  0200  4069          SHR    0200
0853  4069  888 0 25  84FG  4073          LDA   MC
0854  4073  888 0 30  4325  8900          LDL                 0TPT*
0855  4325  888 0 25  4679  4431          LDA#  00000       8B8B8
0856  4431  888 0 60  8710  4685          STA   C             PROCC
0857  4468  888 0 05  4670  4672  PRCM1   LDX   2F                      P6. FIND* M.
0858  4672  888 0 30  4474  8810          LDL                 FIND*     DEF!FIND M(ROUTINE Q). IF IT IS ALREADY DEFINED,
0859  4474  888 0 31  4129  4129          CLL                           GO TO#P8.
0860  4129  888 1 00  4020  4020          JMP2  M0000                   UND:
0861  4022  888 0 25  85FG  4076  M0002   LDA   OP                      P7. FARB*, DEFN*.
0862  4076  888 0 35  4078  4280          ERS#  00020       00000           M IS AN UNDEFINED ADDRESS. IF IT IS
0863  4280  888 0 82  4021  4683          TEQ   M0001                       REGIONAL OR LOCAL PLAIN THIS IS AN ERROR
0864  4683  888 0 25  85FC  4670          LDA   ALOC        2F              CONDITION AND ZERO IS ASSEMBLED. IF IT IS
0865  4020  888 0 30  4122  8736  M0000   LDL   1F          ERR1*           BLANK AND IF THE OP-CODE IS ONE THAT IGNORES
0866  4023  888 0 30  4122  8736  M0003   LDL   1F          ERR1*           M, * IS ASSEMBLED.
0867  4122  888 0 26  4670  4670  1       CLA   2F                        OTHERWISE FARB* AND DEFN* (ROUTINES F,D) ARE
0868  4025  888 0 25  89FH  4329  M0005   LDA   OPTIM       1F              USED TO DEFINE M ON THE BASIS OF OPTIM AND
0869  4024  888 0 25  89FH  4329  M0004   LDA   OPTIM       1F              THE MH-FIELD.
0870  4021  888 0 25  89FH  4329  M0001   LDA   OPTIM       1F
0871  4329  888 0 30  4631  8723  1       LDL                 FARB*
0872  4631  888 0 30  4670  8861          LDL   2F            DEFN*
0873  4670  888 0 60  86FC  4276  2       STA   MLOC                    P8. ADJUST M LEVEL
0874  4276  888 0 30  4278  8871          LDL                 AJST*           THE DRUM LEVEL AT THIS POINT IS NOW
0875  4278  888 0 60  84FH  4685          STA   MLEV          PROCC           DETERMINED BY SUBROUTINE A.
0876  4685  888 0 25  85FG  4489  PROCC   LDA   OP
0877  4489  888 0 35  4641  4643          ERS#  00H00       00000
0878  4643  888 0 70  4095  4498          ADD                 -C1
0879  4095  888 0 99  7000  0000          CON   99700       00000
0880  4499  888 0 25  86FC  4303  &C1     LDA   MLOC                    P9. CALCULATE C OPTIM
0881  4303  888 0 30  4255  4657          LDL#  00000       00F00           WE BEGIN TO WORK ON THE C ADDRESS NOW.
0882  4657  888 0 82  4310  4510          TEQ                 1F              THE OP CODE FOUND IN THE SYMBOL TABLE IS IN A
0883  4310  888 0 25  4262  4510          LDA                 1F              SPECIAL FORMAT OPTSOOMMCC.
0884  4262  888 0 00  0000  1000          CON   00000       01000           HERE OP IS THE TWO DIGIT OPERATION CODE.
0885  4510  888 0 06  4063  4063  1       CLX                               S IS 1 FOR IGNORE C; 2 FOR IGNORE M.
0886  4063  888 0 32  0200  4668          SHR    0200                       MM AND CC ARE INCREMENTS FOR DETERMINING
0887  4668  888 0 70  85FG  4273          ADD   OP                          LATENCY.  T IS THE TYPE OF LATENCY RULE
0888  4273  888 0 60  85FG  4477          STA   OP            &C2           REQUIRED, AS FOLLOWS:
0889                                                                  X    0: C IS MMCC FIXED LEVEL.
0890  4498  888 0 30  4251  4503  -C1     LDL#  99800       00000           1: C IS MMCC FIXED LEVEL.
0891  4503  888 0 82  4656  4106          TEQ                 3F              2: C IS A+CC
0892  4656  888 0 25  85FG  4710          LDA   OP                            3: SHIFT COMMANDS C IS A+N+CC.
0893  4710  888 0 35  4462  4264          ERS                 2F
0894  4462  888 0 00  0000  HHHH          CON   00000       0HHHH
0895  4106  888 0 70  4058  4476  3       ADD                 -C2           WE NOW CALCULATE OPTIM FOR C, ACCORDING TO
0896  4058  888 0 00  1000  0000          CON   00100       00000         THE RULE GIVEN BY T.
0897  4477  888 0 30  83FH  4081  &C2     LDL   ALEV          3F
0898  4476  888 0 30  84FH  4081  -C2     LDL   MLEV          3F
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0899  4081  888 0 25  85FG  4135      3        LDA  OP
0900  4135  888 0 35  4637  4689               ERS# 00000      000HH
0901  4689  888 0 70  000B  4264               ADD  RL         2F
0902  4264  888 0 60  89FH  4118      2        STA  OPTIM
0903  4118  888 1 08  0004  4071               LIRJ  0004                  P10.FIND* C.
0904  4071  888 0 05  4473  4525               LDX  2F                     DEF: FIND C(ROUTINE Q). IF IT IS ALREADY DEFINED,
0905  4525  888 0 30  4627  3810               LDL                 FIND*       GO TO#P12.
- 0906  4627  888 1 00  4030  4030               JMP2 C0000                  UND:
0907  4033  888 0 30  4335  8736      C0003    LDL  1F             ERR1*       P11.FARB*,DEFN*.
0908  4030  888 0 30  4335  8736      C0000    LDL  1F             ERR1*            C IS AN UNDEFINED ADDRESS. IF IT IS
0909  4335  888 0 26  4473  4473      1        CLA  2F                          REGIONAL OR LOCAL PLAIN, THIS IS AN ERROR
0910  4032  888 0 25  85FG  4086      C0002    LDA  OP                          CONDITION AND ZERO IS ASSEMBLED.
0911  4086  888 0 35  4088  4640               ERS# 00010      00000            IF IT IS BLANK AND THE OP-CODE IGNORES C,
0912  4640  888 0 31  4093  4093               CLL                              IT IS MADE EQUAL TO M. OTHERWISE FARB* AND
0913  4093  888 0 82  4446  4646               TEQ  1F                          DEFN* (ROUTINES F,D) ARE ACTIVATED TO DEFINE
0914  4646  888 0 25  86FC  4473               LDA  MLOC           2F           C ON THE BASIS OF OPTIM.
0915  4446  888 0 07  0010  4449      1        IIR   0010                       BLANK ADDRESS HERE MAY BE PUT IN B00A
0916  4449  888 0 70  88AH  4604               ADD  FUNNY                       OR B00F REGION OF CORE.
0917  4604  888 0 30  4306  4258               LDL# 00199      00000
0918  4258  888 0 87  4031  4661               TGR  C0001
0919  4661  888 0 60  88AH  4665               STA  FUNNY
0920  4665  888 0 05  000A  4269               LDX  RA
0921  4269  888 0 70  4271  4724               ADD                 -FNNY
0922  4271  888 0 99  9000  0000               CON  99900      00000
0923  4725  888 0 20  4077  4529      &FNNY    BUF                 1F
0924  4077  888 0 00  800F  0000               CON  00800      F0000
0925  4724  888 0 07  800A  4277      -FNNY    IIR   800A
- 0926  4277  888 0 20  000C  4529               BUF  RX             1F
0927  4529  888 0 32  0400  4286      1        SHR   0400           3F
0928  4035  888 0 25  89FH  4139      C0005    LDA  OPTIM          1F
0929  4034  888 0 25  89FH  4139      C0004    LDA  OPTIM          1F
0930  4031  888 0 25  89FH  4139      C0001    LDA  OPTIM          1F
0931  4139  888 0 30  4286  8723      1        LDL  3F             FARB*
0932  4286  888 0 30  4473  8861      3        LDL  2F             DEFN*
0933  4473  888 0 60  87FC  4729      2        STA  CLOC                       P12.ADJUST C LEVEL
0934  4729  888 0 30  4281  8871               LDL                 AJST*            THE DRUM LEVEL AT THIS POINT IS NOW
0935  4281  888 0 60  85FH  4087               STA  CLEV           BUILD            DETERMINED BY SUBROUTINE A.
0936  4087  888 0 25  87FC  4091      BUILD    LDA  CLOC                       P13. SYNTHESIZE
0937  4091  888 0 32  0400  4698               SHR   0400                       THE OP, M AND C ARE NOW PUT TOGETHER
0938  4698  888 0 25  86FC  4252               LDA  MLOC                        INTO A TEN-DIGIT INSTRUCTION.
0939  4252  888 0 32  0600  4111               SHR   0600
0940  4111  888 0 25  85FG  4115               LDA  OP
0941  4115  888 0 35  4617  4469               ERS# HH000      00000
0942  4469  888 0 20  000C  4673               BUF  RX
0943  4673  888 0 77  4673  4676               ATL                 BILD1
0944  4676  888 0 25  85FC  4480      BILD1    LDA  ALOC                       P14.ASSEMBLE
0945  4480  888 0 06  4133  4133               CLX
0946  4133  888 0 32  0500  4291               SHR   0500                       USE ROUTINE O TO OUTPUT THE ASSEMBLED
0947  4291  888 0 25  89FC  4295               LDA  SIGN                        LINE OF CODE.
0948  4295  888 0 32  0200  4050               SHR   0200
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0949  4050  BBB 0 25  B0FG  4054          LDA  R
0950  4054  BBB 0 32  0300  4160          SHR   0300
0951  4160  BBB 0 25  000B  4464          LDA  RL
0952  4464  BBB 0 30  4616  8900          LDL            OTPT*
0953  4616  BBB 0 25  B4FB  4322          LDA  TEMP1     1F        P15.EDIT
0954  4322  BBB 0 05  4674  8920    1     LDX            UNDG*         THE ASSEMBLED INSTRUCTION IS EDITED AND
0955  4674  BBB 0 65  B4FB  4680          STX  TEMP1                   SENT TO THE PRINTER AREA.
0956  4680  BBB 0 06  4333  4333          CLX                          FOR CONTROL OPERATIONS, HOWEVER, THIS PART
0957  4333  BBB 0 32  0400  4090          SHR   0400                   IS SET TO BLANKS.
0958  4090  BBB 0 37  0200  4495          SHL   0200
0959  4495  BBB 0 32  0600  4254          SHR   0600
0960  4254  BBB 0 65  0255  4107          STX   0255
0961  4107  BBB 0 37  0200  4662          SHL   0200
0962  4662  BBB 0 60  B3FB  4066          STA  TEMP
0963  4066  BBB 0 25  B5FB  4120          LDA  TEMP2
0964  4120  BBB 0 05  4522  8920          LDX            UNDG*
0965  4522  BBB 0 65  B5FB  4478          STX  TEMP2
0966  4478  BBB 0 77  4478  4481          ATL
0967  4481  BBB 0 35  4533  4535          ERS#  HHHHH    H0000
0968  4535  BBB 0 20  B3FB  4339          BUF   TEMP
0969  4339  BBB 0 60  0370  4722          STA   0370
0970  4722  BBB 0 25  000B  4126          LDA  RL
0971  4126  BBB 0 35  4678  4130          ERS#  00000    0HHHH
0972  4130  BBB 0 37  0200  4735          SHL   0200
0973  4735  BBB 0 60  0286  4288          STA   0286
0974  4288  BBB 0 25  B5FB  4092          LDA  TEMP2
0975  4092  BBB 0 35  4494  4096          ERS#  00000    0HHHH
0976  4096  BBB 0 37  0200  4451          SHL   0200
0977  4451  BBB 0 20  4703  4455          BUF#  BBBB0    000BB
0978  4455  BBB 0 60  0281  4733          STA   0281
0979  4733  BBB 0 25  B5FB  4287          LDA  TEMP2
0980  4287  BBB 0 35  4539  4491          ERS#  HHHHH    H0000
0981  4491  BBB 0 77  4491  4694          ATL
0982  4694  BBB 0 25  B4FB  4148          LDA  TEMP1
0983  4148  BBB 0 06  4651  4651          CLX
0984  4651  BBB 0 32  0400  4458          SHR   0400
0985  4458  BBB 0 37  0200  4263          SHL   0200
0986  4263  BBB 0 32  0600  4172          SHR   0600
0987  4172  BBB 0 37  0200  4677          SHL   0200
0988  4677  BBB 0 20  000B  4681          BUF   RL
0989  4681  BBB 0 20  4183  4185          BUF#  00080    B008B
0990  4185  BBB 0 60  0365  4067          STA   0365
0991  4067  BBB 0 25  000C  4471          LDA  RX
0992  4471  BBB 0 20  4123  4175          BUF#  0000B    B0000
0993  4175  BBB 0 60  0250  4452          STA   0250     ALLX
0994  0205  BBB 0 00  0000  0000    0205  CON   00000    00000
0995  B3AG  BBB 0 06  4669  4669    PSUDX CLX
0996  4669  BBB 0 63  4669  4372          ZAP
0997  4372  BBB 0 60  0250  4652          STA   0250
0998  4652  BBB 0 65  0255  4307          STX   0255
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0999  4307  888 0 60  0281  4383          STA   0281
1000  4383  888 0 65  0286  4488          STX   0286
1001  4488  888 0 60  0365  4267          STA   0365
1002  4267  888 0 65  0370  4452          STX   0370      ALLX
1003  4452  888 0 31  4655  4655  ALLX    CLL
1004  4655  888 0 25  87FH  4609          LDA   FTAG                  P16.FLOW CHART
1005  4609  888 0 82  4112  4312          TEQ   FIN       FLOW            IF THE CONTROL OPERATION FLO
1006  4112  888 0 25  8678  4266  FIN     LDA   R0009                 YES:HAS APPEARED EARLIER, GO TO THE FLOW-
1007  4266  888 0 05  8677  4320          LDX   R0008                     CHARTING ROUTINE#X1.
1008  4320  888 0 60  0262  4664          STA    0262                 NO:
1009  4664  888 0 65  0267  4119          STX    0267                 P17. PRINT
1010  4119  888 0 25  8674  4323          LDA   R0005                     MOVE THE REMARKS TO THE PRINTER AREA FROM
1011  4323  888 0 05  8673  4127          LDX   R0004                     REGION R. TAKE ALL ERROR CONDITIONS THAT
1012  4127  888 0 60  0294  4296          STA    0294                     HAVE BEEN DETECTED AND PUT THEM ON THE LIST-
1013  4296  888 0 65  0299  4101          STX    0299                     ING. THERE IS ROOM FOR AT MOST 5 ERRORS.
1014  4101  888 0 25  8670  4105          LDA   R0001                     INTERROGATE THE PAGE-LINE COUNTER TO SEE IF
1015  4105  888 0 05  8669  4059          LDX   R0000                     A SKIP TO NEXT PAGE IS NECESSARY.
1016  4059  888 0 60  0325  4327          STA    0325                     FINALLY PRINT THE LINE, AND GET READY FOR
1017  4327  888 0 65  0330  4482          STX    0330                     THE NEXT LINE, GOING TO#E1.
1018  4482  888 0 25  8676  4486          LDA   R0007
1019  4486  888 0 05  8675  4290          LDX   R0006
1020  4290  888 0 60  0378  4330          STA    0378
1021  4330  888 0 65  0383  4385          STX    0383
1022  4385  888 0 25  8672  4739          LDA   R0003
1023  4739  888 0 05  8671  4293          LDX   R0002
1024  4293  888 0 60  0209  4311          STA    0209
1025  4311  888 0 65  0214  4466          STX    0214
1026  4466  888 0 25  86F8  4520          LDA   ERROR
1027  4520  888 0 06  4523  4523          CLX
1028  4523  888 0 62  4523  4527          ZUP
1029  4527  888 0 37  0400  4284          SHL    0400
1030  4284  888 0 20  81FG  4688          BUF   LINE
1031  4688  888 0 20  4490  4292          BUF#  00000       80000
1032  4292  888 0 60  0200  4102          STA    0200
1033  4102  888 0 25  82AC  4506          LDA   LC
1034  4506  888 0 70  4658  4511          ADD                -PR
1035  4658  888 0 99  9999  9951          CON   99999        99951
1036  4511  888 0 75  4114  4467  -PR     SUB#  99999        99950
1037  4467  888 0 60  82AC  4671          STA   LC
1038  4671  888 0 11  0201  4189          PRN    0201        -PR1
1039  4512  888 0 60  82AC  4666  &PR     STA   LC
1040  4666  888 0 11  0217  4189          PRN    0217        -PR1
1041  4190  888 0 67  3333  000A  &PR1    HLT    3333        RA
1042  4189  888 0 25  87FG  4493  -PR1    LDA   TAPE1
1043  4493  888 0 70  4695  000A          ADD                RA
-- 1044  4695  888 0 08  0000  4200          LIR1   0000        START
1045
1046                                                          C.  CONTROL OPS.
1047                                                          C1. BRANCH TO OP
1048                                                          G   RA CONTAINS A TRANSFER TO CONTROL OP.
                                                              G   FROM STEP E9.
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1049                                                                    ;IF OP IS BLANK, GO TO#P15.
1050                                                                CON;FOR CON,NUM,ZON,ALF, GO TO#C2.
1051                                                                BLR;FOR BLA,BLR GO TO#C3.
1052                                                                COR;FOR COR GO TO#C4.
1053                                                                EQU;FOR EQU GO TO#C5.
1054                                                                HHH;FOR HHH, SET MH INTO HTAG AND GO TO#P15.
1055                                                                OFF;FOR OFF GO TO#C6
1056                                                                FLO;FOR FLO, SET FLOWCHARTING TAG ON AND GO TO
1057                                                                    #P15 ALSO.
1058                                                                PAT;FOR PAT,PRINT THE AVAILABILITY TABLE AND
1059                                                                    GO TO#E1.
1060                                                                TYP;FOR TYP, HALT AND INSERT RA IN TYPE OF PROG.
1061                                                                X   GO TO#P15.
1062                                                                ERR;IF AN ERROR OCCURS WHILE PROCESSING ONE OF
1063                                                                    THE ABOVE, NO ADDITIONAL ACTION TAKES PLACE
1064                                                                    AND WE GO TO#P15.
1065                                                                END;FOR END, GO TO THE ENDING ROUTINE#Z1.
1066  85AG  88B 0 25  8709  4720   HHH     LDA   MH
1067  4720  88B 0 60  86FH  83AG           STA   HTAG      PSUDX
1068  86AG  88B 0 25  4318  4170   FLO     LDA#  HHHHH     HHHHH
1069  4170  88B 0 67  1212  4712           HLT    1212
1070  4712  88B 0 60  87FH  83AG           STA   FTAG      PSUDX   G   OPERATOR SHOULD CLEAR A IF FLOWCHARTING
1071                                                                G   IS NOT DESIRED.
1072  81AH  88B 0 25  82FG  4572   NUM     LDA   MCN       1F      C2. PROCESS A
1073  82AH  88B 0 25  83FG  4572   ZON     LDA   MCZ       1F          USE ROUTINE L TO GET THE A ADDRESS,
1074  84AH  88B 0 25  8708  4572   ALF     LDA   M         1F          THEN USE THE IR FIELD TO INDICATE THE
1075  4572  88B 0 60  84FG  80AH   1       STA   MC        CON
1076  80AH  88B 0 30  4128  4530   CON     LDL             PSIGN       SIGN AND GO TO#P14 TO ASSEMBLE THE INSTRUC-
1077  4128  88B 0 30  4730  4226           LDL             PROCA       TION.
1078  4730  88B 0 30  84FG  4676           LDL   MC        BILD1
1079  4530  88B 0 50  80FB  4484   PSIGN   STL   EXIT
1080  4484  88B 0 25  86FG  4138           LDA   IR
1081  4138  88B 0 30  4690  4492           LDL#  00000     00000
1082  4492  88B 0 82  4145  4345           TEQ   1F
1083  4345  88B 0 32  0200  4145           SHR    0200     1F
1084  4145  88B 0 60  89FC  80FB   1       STA   SIGN      EXIT
1085  80AG  88B 2 02  0000  4319   BLA     LIR4   0000     1F          C3. UPDATE AVAIL TABLE
1086  81AG  88B 2 02  0003  4319   BLR     LIR4   0003     1F              CHECK CH-FIELD FOR INCREMENT. IF BLANK,
1087  4319  88B 0 25  8711  4723   1       LDA   CH                       USE 1, ELSE USE CH MOD 100. FIND* M.
1088  4723  88B 0 30  4375  4727           LDL#  00000     00BBB           IF UNDEFINED, ERROR. IF C IS BLANK, SET
1089  4727  88B 0 82  4180  4380           TEQ   1F                        C EQUAL TO M, ELSE FIND* C. IF UNDEFINED,
1090  4380  88B 0 35  4682  4684           ERS#  00000     000HH           ERROR.  FIND THE STARTING PLACE IN THE
1091  4684  88B 0 37  0400  4691           SHL    0400     2F              AVAILABILITY TABLE, AND KEEP RESERVING OR
1092  4180  88B 0 07  0001  4691   1       IIR    0001     2F              UNRESERVING ONE LOCATION AT A TIME
1093  4691  88B 0 77  4691  4144   2       ATL                             UNTIL DONE. GO TO#C5.
1094  4144  88B 0 20  4496  4348           BUF   BVAR1
1095  4348  88B 0 60  4450  4302           STA   BVAR
1096  4302  88B 0 25  0008  4706           LDA   RL
1097  4706  88B 0 06  4259  4259           CLX
1098  4259  88B 0 32  0400  4116           SHR    0400
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1099  4116  888 0 75  4518  4121          SUB#  00000     00001
1100  4121  888 0 60  84FB  4575          STA   TEMP1     1F
1101  4575  888 0 05  4177  4179  1       LDX   2F        FP2ER
1102  4179  888 1 08  0002  4132  FP2ER   LIRJ   0002     FPERR
1103  4177  888 0 60  86FC  4131  2       STA   MLOC
1104  4131  888 0 25  8710  4585          LDA   C
1105  4585  888 0 30  4487  4389          LDL#  00000     88888
1106  4389  888 0 82  4692  4142          TEQ               1F
1107  4692  888 0 26  4545  4545          CLA   3F
1108  4142  888 1 08  0004  4745  1       LIRJ   0004
1109  4745  888 0 05  4647  4132          LDX   2F        FPERR
1110  4132  888 0 30  4134  8810  FPERR   LDL   PERR      FIND*
1111  4647  888 0 75  86FC  4545  2       SUB   MLOC      3F
1112  4545  888 0 60  85FB  4649  3       STA   TEMP2
1113  4649  888 0 25  86FC  4153          LDA   MLOC      7F
1114  4153  888 0 30  000A  4507  7       LDL   RA
1115  4507  888 0 85  4459  4686          MUL#  00000     0A005
1116  4686  888 0 60  83FB  4140          STA   TEMP
1117  4140  888 0 26  4693  4693          CLA
1118  4693  888 0 32  0400  4650          SHR    0400
1119  4650  888 0 25  000C  4104          LDA   RX
1120  4104  888 0 70  000A  4659          ADD   RA
1121  4659  888 0 35  4711  4463          ERS#  00HHH     H0000
1122  4463  888 0 20  4315  000A          BUF               RA
1123  4315  888 0 08  0000  4370          LIR1   0000
1124  4370  888 0 26  4173  4173          CLA
1125  4173  888 0 75  83FB  4328          SUB   TEMP
1126  4328  888 0 37  0300  4334          SHL    0300
1127  4334  888 0 35  4136  4338          ERS#  00000     30000
1128  4338  888 0 75  4340  000A          SUB               RA
1129  4340  888 0 02  0000  4195          LIR    0000
1130  4195  888 0 25  83F8  4099          LDA   TEMP
1131  4099  888 0 37  0600  4108          SHL    0600
1132  4108  888 0 35  4360  4162          ERS#  000H0     00000
1133  4162  888 0 20  4314  4316          BUF   1F
1134                                      HHH         C
1135  4316  888 0 77  4316  8965          ATL               0F
1136  8965  888 2 00  8403  8403  0       JMP4  80000
1137  8403  888 1 25  8409  8966  80000   LDA2  80006     2F
1138  8406  888 1 25  8413  8966  80003   LDA2  80010     2F
1139  8404  888 0 00  0000  0000  80001   CON   00000     00000
1140  8407  888 0 HH  HHHH  HHHH  80004   CON   HHHHH     HHHHH
1141  8966  888 2 05  8404  0008  2       LDX4  80001     RL
1142  4314  888 0 32  0000  8967  1       SHR    0000     7F
1143  8967  888 0 60  82FC  8968  7       STA   MASK
1144  8968  888 2 30  8405  8969          LDL4  80002     -B2
1145  8969  888 0 29  8418  0008  -B2      LDA1  00001     RL
1146  8405  888 0 20  82FC  8971  80002   BUF   MASK      8F
1147  8408  888 0 35  82FC  8971  80005   ERS   MASK      8F
1148  8409  888 0 50  0000  0000  80006   CON   50000     00000
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1149   8410  888 0 40  0000  0000   B0007   CON  40000      00000
1150   8411  888 0 20  0000  0000   B0008   CON  20000      00000
1151   8412  888 0 10  0000  0000   B0009   CON  10000      00000
1152   8413  888 0 CH  HHHH  HHHH   B0010   CON  CHHHH      HHHHH
1153   8414  888 0 8H  HHHH  HHHH   B0011   CON  8HHHH      HHHHH
1154   8415  888 0 FH  HHHH  HHHH   B0012   CON  FHHHH      HHHHH
1155   8416  888 0 GH  HHHH  HHHH   B0013   CON  GHHHH      HHHHH
1156   8971  888 0 64  8418  8972   8       STA1 00001
1157   8972  888 0 25  85FB  8973           LDA  TEMP2
1158   8973  888 0 75  84FB  8974           SUB  TEMP1
1159   8974  888 0 70  8975  8976           ADD             -B1
1160   8975  888 0 99  9999  9999           CON  99999      99999
1161   8977  888 0 60  85FB  4450   &B1     STA  TEMP2      BVAR
1162   4496  888 0 0G  0000  8978   BVAR1   IIR1  0000
1163   8978  888 0 70  8979  8969           ADD             -B2
1164   8979  888 0 99  9800  0000           CON  99980      00000
1165   8970  888 0 20  8980  000A   &B2     SUF             RA
1166   8980  888 0 08  0000  8981           LIR1  0000
1167   8981  888 0 25  82FC  8982           LDA  MASK
1168   8982  888 0 30  000C  8983           LDL  RX
1169   8983  888 0 32  0100  8984           SHR   0100
1170   8984  888 0 82  8985  8967           TEQ             7B
1171   8985  888 1 07  0001  8986           IIR2  0001
1172   8986  888 0 30  8967  8965           LDL  7B         0B
1173                                        HHH         H
1174   84AG  888 0 05  4718  4179   EQU      LDX  2F         FP2ER
1175   4718  888 0 60  86FC  8976   2        STA  MLOC       -B1
1176   4134  888 0 30  83AG  8736   PERR     LDL  PSUDX      ERR1*
1177   82AG  888 0 25  83FC  4570   COR      LDA  CORE
1178   4570  888 0 70  4772  4775           ADD# 00000      10000
1179   4775  888 0 06  4528  4528           CLX
1180   4528  888 0 32  0400  4785           SHR   0400
1181   4785  888 0 20  4687  4589           BUF# 00000      0B000
1182   4589  888 0 60  86FC  4143           STA  MLOC
1183   4143  888 0 05  4395  4179           LDX  2F         FP2ER
1184   4395  888 0 37  0400  4502   2        SHL   0400
1185   4502  888 0 70  83FC  4707           ADD  CORE
1186   4707  888 0 05  000A  4161           LDX  RA
1187   4161  888 0 70  4663  4516           ADD             -B3
1188   4663  888 0 99  9000  0000           CON  99900      00000
1189   4517  888 0 25  4169  4321   &B3      LDA# 00000      0000G
1190   4321  888 0 05  4134  8760           LDX  PERR       ERR2*
1191   4516  888 0 65  83FC  8976   -B3      STX  CORE       -B1
1192   8976  888 1 08  0000  4373   -B1      LIR3  0000
1193   4373  888 0 05  4134  4336           LDX  PERR
1194   4336  888 0 30  4538  8810           LDL             FIND*
1195   4538  888 1 00  8688  8688           JMP2 X0000
1196   8688  888 0 25  86FC  4097   X0000    LDA  MLOC       1F
1197   8689  888 0 25  86FC  4097   X0001    LDA  MLOC       1F
1198   8690  888 0 00  83AG  83AG   X0002    JMP  PSUDX
```

C4. RESERVE CORE
IF M IS UNDEFINED, OR THERE ISNT ENOUGH ROOM IN CORE THIS IS AN ERROR. OTHERWISE RESERVE THE SPACE IN CORE, AND GO TO#C5.

C5. DEFINE ADDRESS
FIND A (ROUTINE Q). IF DEFINED, OR IF A PAIR ADDRESS, THE A FIELD IS IN ERROR, ELSE IF NONBLANK DEFINE IT (ROUTINE D).
GO TO#P15.

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1199
1200  8691  888 0 25  86FC  4097   X0003   LDA  MLOC      1F
1201  8692  888 0 25  86FC  4097   X0004   LDA  MLOC      1F
1202  8693  888 0 00  4134  4134   X0005   JMP  PERR
1203  4097  888 0 30  83AG  8861   1       LDL  PSUDX     DEFN*
1204                                       HHH
1205  4239  888 0 05  4056  0458   ONN     LDX  ONSW      1F
1206  85AH  888 0 05  0470  0458   OFF     LDX  OFFSW     1F          C6. ON OFF
1207  0458  888 0 65  89FH  0462   1       STX  OPTIM                     IF M ADDRESS MATCHES THE TYPE OF PROGRAM, THE
1208  0462  888 0 05  0464  4179           LDX                FP2ER       MASTER SWITCH IS TURNED ON OR OFF. GO TO#P15.
1209  0464  888 0 30  0466  0468           LDL  TYPE
1210  0468  888 0 82  0471  83AG           TEQ                PSUDX
1211  0471  888 0 30  89FH  0475           LDL  OPTIM
1212  0475  888 0 50  4439  83AG           STL  SWICH     PSUDX
1213  86AH  888 0 67  000B  0568   TYP     HLT  RL
1214  0568  888 0 50  0466  0668           STL  TYPE
1215  0668  888 0 50  0241  83AG           STL   0241     PSUDX
1216  0470  888 0 31  0473  0473   OFFSW   CLL
1217  0473  888 0 25  87FH  0477           LDA  FTAG                  C7. ASSEMBLER OFF
1218  0477  888 0 82  0480  4189           TEQ                -PR1    FLO:IF FLOWCHARTING, GO TO#E1.
1219  0480  888 0 25  0482  0484           LDA  1F                    OFF:OTHERWISE PRINT THE WORD OFF ON THE LISTING,
1220  0484  888 0 05  0486  0488           LDX  2F                        RETURNING TO#P17.
1221  0488  888 0 60  0365  0567           STA   0365
1222  0567  888 0 65  0370  0572           STX   0370
1223  0572  888 0 06  0575  0575           CLX
1224  0575  888 0 63  0575  0578           ZAP
1225  0578  888 0 60  0250  0452           STA   0250
1226  0452  888 0 65  0255  0457           STX   0255
1227  0457  888 0 60  0281  0483           STA   0281
1228  0483  888 0 65  0286  4112           STX   0286     FIN
1229  0482  888 0 88  8866  6888   1       NUM  *** 0     FF **
1230  0486  888 0 22  2021  1022   2       ZON  *** 0     FF **
1231                                       HHH        H
1232  4332  888 0 77  4332  4536   CMPL*   ATL                        X.  EXAMINE REMARKS FIELD
1233  4536  888 0 25  86AC  4540           LDA  MUMI                  G   CMPL* PUTS INSTRUCTION IN RA INTO MUM CODE
1234  4540  888 0 60  87AC  4344           STA  MUML      1F          G   MUML IS THE LOCATION OF LAST MUM INSTR.
1235  4736  888 0 25  86AC  4344   COMP*   LDA  MUMI      1F          G   COMP* PUTS WORD IN RL INTO MUM CODE
1236  4344  888 0 70  4696  4299   1       ADD# 00000     20000       G   BUT IT ISNT REALLY AN INSTRUCTION
1237  4299  888 0 60  86AC  4353           STA  MUMI      2F          G   EXIT IS IN RX, IN BOTH CASES.
1238  4353  888 0 70  4305  000A   2       ADD                RA          THIS ROUTINE IS ENTERED ON EVERY CARD EXCEPT
1239  4305  888 0 50  5199  000C           STL  W9999     RX              PAT AFTER FLO HAS APPEARED.
1240  4740  888 0 50  4342  4544   COMT*   STL  -COM                      THE PURPOSE IS TO SEND INFORMATION TO PASS 3
1241  4544  888 0 25  88AC  4548           LDA  COMI                      FOR FLOWCHARTING. THIS INFORMATION IS
1242  4548  888 0 60  82AB  4702           STA  RB4                       TRANSMITTED AS A 'MADE-UP-MACHINE' OR MUM
1243  4702  888 0 25  4304  4156           LDA                8F          PSEUDOCODE. SPECIFICATIONS OF MUM GIVEN
1244  4304  888 0 00  8678  8669           JMP  R0009     R0000           IN THE PASS 3 LISTING.
1245  4156  888 2 88  3400  4573   8       TCD4 COMTS                 G   MOVE ALL REMARKS TO THE COMMENTS TAPE
1246  4573  888 2 07  0010  4377           IIR4  0010                 G   FOR USE BY PASS 3.
1247  4377  888 0 60  88AC  4331           STA  COMI
1248  4331  888 0 70  4583  4342           ADD                -COM
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1249  4583  888 0 99  9800  0000                CON  99980     00000
1250  4343  888 0 60  88AC  4297  &COM          STA  COMI
1251  4297  888 0 05  4699  4301                LDX  2F
1252  4301  888 0 30  4553  8919                LDL              TSUB*
1253  4553  888 0 C6  3400  4699                TBL  COMTS       2F
1254  4699  888 0 H2  0700  4342  2             TWR  OTAP3       -COM
1255  4505  888 0 25  8669  4109  BDK           LDA  R0000                  G   BDK: BLANK OUT COLS 32-35 AND GO TO RL.
1256  4109  888 0 35  4361  4313                ERS# 00000       HHHHH
1257  4313  888 0 60  8669  4667                STA  R0000
1258  4667  888 0 25  8670  4521                LDA  R0001
1259  4521  888 0 35  4773  4326                ERS# 00000       HHHHH
1260  4326  888 0 20  4728  4580                BUF# 88888       00000
1261  4580  888 0 60  8670  0008                STA  R0001       RL
1262  4312  888 1 08  0007  4515  FLOW          LIR3  0007                  X1. WHAT DK FIELD
1263  4515  888 0 25  8670  4519                LDA  R0001                      COLUMNS 32-35 ARE THE DOCUMENTATION KEY OR DK
1264  4519  888 0 06  4124  4124                CLX                             FIELD, AND THEY CONTROL THE FLOWCHARTING OPER
1265  4124  888 0 65  88FH  4178                STX  RTAG                       ATION.
1266  4178  888 0 32  0500  4186                SHR   0500                    ;IF THE DK FIELD IS BLANK, GO TO#X2.
1267  4186  888 0 77  4186  4789                ATL                         G  ;IF IT IS G, BLANK IT OUT AND GO TO#P17.
1268  4789  888 0 25  8669  4543                LDA  R0000                      G IS USED TO PUT REMARKS ON THE ASSEMBLY
1269  4543  888 0 35  4595  4497                ERS# HHHHH       00000          LISTING.
1270  4497  888 0 20  0008  4501                BUF  RL                     COD:IF IT IS COD1, THIS IS THE BEGINNING OF THE
1271  4501  888 0 60  80AB  4705                STA  DK                         WORDS CODING DETAILS. TO#X3.
1272  4705  888 0 30  4157  4309                LDL# 00000       88888      TAB:IF IT IS TABL, THIS IS THE BEGINNING OF THE
1273  4309  888 0 82  4362  4562                TEQ  S5                         WORDS TABLE OF CONTENTS. COMPILE THE DK
1274  4562  888 0 30  4514  4716                LDL# 03000       87888          FIELD AS AN 03 OP IN MUM CODE. THIS SPECIAL
1275  4716  888 0 82  4719  4369                TEQ              1F             CASE IS EXAMINED BY PASS 3, THEN GO TO#X3.
1276  4719  888 0 60  88FH  4324                STA  RTAG                   K. :IF IT IS THE FORM K. THIS INDICATES A NEW
1277  4324  888 0 30  4362  4505                LDL  S5          8DK            SECTION WITH KEY K. GO TO#X6.
1278  4369  888 0 30  4721  4524  1             LDL# 01000       87888      KN.:IF IT IS OF THE FORM KN. OR KNN. IT IS A NEW
1279  4524  888 0 82  4577  4777                TEQ              1F             SUBSECTION NAME. CHECK THAT THEY ARE NUM-
1280  4577  888 0 30  4112  4505                LDL  FIN         8DK            BERED SEQUENTIALLY AND IF NO ERROR GO TO#X4.
1281  4777  888 0 30  4379  4531  1             LDL# 01211       83649      OTHRANYTHING ELSE IS A CONDITION NAME. TO#X5.
1282  4531  888 0 82  4534  4734                TEQ  S6
1283  4734  888 0 30  4386  4738                LDL# 03112       83123
1284  4738  888 0 82  4141  4341                TEQ              1F
1285  4141  888 0 05  4534  4736                LDX  S6          COMP*
1286  4341  888 0 35  4743  4795  1             ERS# H0HHH       H0HHH
1287  4795  888 0 30  4697  4149                LDL# 00100       80AB8
1288  4149  888 0 82  4152  4352                TEQ  S4
1289  4352  888 0 35  4504  4356                ERS# HHHHH       HH0HH
1290  4356  888 0 30  4308  4560                LDL# 00010       800AB
1291  4560  888 0 82  4513  4713                TEQ  1F
1292  4713  888 0 35  4715  4117                ERS# HHHHH       HHH0H
1293  4117  888 0 30  4569  4171                LDL# 00001       8000A
1294  4171  888 0 82  4174  4374                TEQ              S3
1295  4174  888 0 25  80AB  4378                LDA  DK
1296  4378  888 0 35  4780  4532                ERS# 00000       00HH0
1297  4532  888 0 37  0300  4188                SHL   0300       2F
1298  4513  888 0 25  80AB  4317  1             LDA  DK
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1299  4317  888 0 35  4769  4371          ERS#  00000     00H00
1300  4371  888 0 37  0200  4188          SHL    0200     2F
1301  4188  888 0 70  000A  4193  2       ADD   RA
1302  4193  888 0 30  4146  4748          LDL   N
1303  4748  888 0 87  4701  4151          TGR   S2
1304  4151  888 0 30  4362  8736          LDL   S5        ERR1*
1305  4362  888 0 08  0000  4367  S5      LIR1   0000     -NO#      X2. SCAN FOR #
1306  4367  888 0 29  8670  4574  -NO#    LDA1  R0001                  LOOK THROUGH ALL REMARKS FOR A NUMBER SIGN.
1307  4574  888 0 35  4526  4578          ERS#  88888     88888
1308  4578  888 0 75  000A  4783          SUB   RA                     GATHER TOGETHER THE SHARACTERS FOLLOWING IT.
1309  4783  888 0 77  4783  4586          ATL                          UP UNTIL THE NEXT CHARACTER WITH UNDIGITS.
1310  4586  888 0 29  8670  4541          LDA1  R0001                  THE PRINTING CHARACTERS + AND / ARE NOT
1311  4541  888 0 35  4393  4346          ERS#  66666     66666      DELIMITERS. THE OTHERS ARE.) THIS FORMS THE
1312  4346  888 0 C1  4346  4349          MTX                          BRANCH WORD. IF NO CONDITION PRECEDED.
1313  4349  888 0 70  4351  4704          ADD#  33333     33333      COMPILE AN 09 OP. IF THE BRANCH WORD REFERS
1314  4704  888 0 35  0008  4508          ERS   RL                     TO THIS CHART. PUT M AND C INTO THE LAST
1315  4508  888 0 77  4508  4561          ATL                          COMPILES INSTRUCTION. PUT A RECORD FOR THIS
1316  4561  888 0 29  8669  4166          LDA1  R0000                  ENTRY AND N IN THE STOP TABLE AS THE LAST
1317  4166  888 0 70  4568  4571          ADD#  33333     33333      BRANCH TO M. OTHERWISE. COMPILE THE BRANCH
1318  4571  888 0 35  0008  4726          ERS   RL                     WORD INTO THE MUM CODE.
1319  4726  888 0 31  4579  4579          CLL
1320  4579  888 0 82  4732  4182          TEQ                  1F
1321  4732  888 0 06  0002  4786          IIR1   0002
1322  4786  888 0 70  4388  4367          ADD                  -NO#
1323  4388  888 0 99  9990  0000          CON   99999     00000
1324  4368  888 0 00  4534  4534  &NO#    JMP   S6
1325  4182  888 0 30  4184  4137  1       LDL#  11111     11111
1326  4137  888 0 20  0008  4741          BUF   RL
1327  4741  888 0 85  000A  4770          MUL   RA
1328  4770  888 0 35  4774  4176          ERS#  00000     0000H
1329  4176  888 0 37  0600  4337          SHL    0600
1330  4337  888 0 77  4337  4390          ATL
1331  4390  888 0 70  4542  4546          ADD   1F
1332  4546  888 0 60  80AC  4100          STA   SHR1
1333  4100  888 0 25  4552  4154          LDA#  00090     00000
1334  4154  888 0 75  000B  4509          SUB   RL
1335  4509  888 0 70  4542  4746          ADD   1F
1336  4746  888 0 60  81AC  4300          STA   SHR2        2F
1337  4542  888 0 32  0000  0008  1       SHR    0000      RL
1338  4300  888 0 29  8670  4155  2       LDA1  R0001
1339  4155  888 0 09  8672  4760          LDX1  R0003
1340  4760  888 0 30  4762  80AC          LDL                  SHR1
1341  4762  888 0 35  4366  4768          ERS#  HHHHH     HHHH8
1342  4768  888 0 65  83FB  4376          STX   TEMP
1343  4376  888 0 30  4778  81AC          LDL                  SHR2
1344  4778  888 0 32  0100  4384          SHR    0100
1345  4384  888 0 69  8670  4590          STX1  R0001
1346  4590  888 0 29  8669  4196          LDA1  R0000
1347  4196  888 0 09  8671  4551          LDX1  R0002
1348  4551  888 0 30  4753  80AC          LDL                  SHR1
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1349    4753  888 0 35  4357  4709            ERS# HHHHH      HHHHO
1350    4709  888 0 30  4761  81AC            LDL             SHR2
1351    4761  888 0 32  0100  4717            SHR   0100
1352    4717  888 0 69  8669  4576            STX1 R0000
1353    4576  888 0 30  4779  80AC            LDL             SHR1
1354    4779  888 0 35  4584  4537            ERS# HHHHH      00000
1355    4537  888 0 77  4537  4790            ATL
1356    4790  888 0 25  83FB  4744            LDA  TEMP
1357    4744  888 0 06  4147  4147            CLX
1358    4147  888 0 32  0500  4355            SHR   0500
1359    4355  888 0 20  0008  4159            BUF  RL
1360    4159  888 0 60  83FB  4163            STA  TEMP
1361    4163  888 0 25  87AC  4167            LDA  MUML
1362    4167  888 0 60  82A8  4771            STA  RB4
1363    4771  888 2 25  5201  4354            LDA4 W0001
1364    4354  888 0 70  4556  4363            ADD             -#
1365    4556  888 0 98  0000  0000            CON  98000      00000
1366    4363  888 0 25  4566  4776  -#        LDA# 09000      00000
1367    4776  888 0 05  4364  4332            LDX  &#         CMPL*
1368    4364  888 0 30  83FB  4731  &#        LDL  TEMP
1369    4731  888 0 05  4784  4737            LDX             1F
1370    4784  888 0 88  88B0  0000            CON  BBBBB      00000
1371    4737  888 0 25  4191  4593  1         LDA             8F
1372    4191  888 1 00  0000  0000            CON1 00000      00000
1373    4593  888 0 70  0008  4198  8         ADD  RL
1374    4198  888 0 82  4751  4752            TEQ  2F
1375    4752  888 0 25  0008  4756            LDA  RL
1376    4756  888 0 32  0100  4563            SHR   0100
1377    4563  888 0 35  4165  4567            ERS# OHHHH      OHHHH
1378    4567  888 0 77  4567  4737            ATL             1B
1379    4751  888 0 25  000C  4555  2         LDA  RX
1380    4555  888 0 35  4557  4359            ERS# 00000      HHHHH
1381    4359  888 0 20  0008  4763            BUF  RL
1382    4763  888 0 77  4763  4766            ATL             2F
1383    4766  888 0 25  83FB  4181  2         LDA  TEMP
1384    4181  888 0 50  83FB  4187            STL  TEMP
1385    4187  888 0 35  4391  4793            ERS# H0000      H0000
1386    4793  888 0 30  89AC  4347            LDL  KEY
1387    4347  888 0 82  4500  4700            TEQ             2F
1388    4500  888 0 25  83FB  4554            LDA  TEMP
1389    4554  888 0 35  4757  4559            ERS# HHHOH      HHH00
1390    4559  888 0 30  4714  4767            LDL# 00000      8B800
1391    4767  888 0 82  4381  4581            TEQ             3F
1392    4381  888 0 25  4387  4591            LDA             4F
1393    4387  888 0 00  0000  000H            CON  00000      0000H
1394    4581  888 0 25  83FB  4587  3         LDA  TEMP
1395    4587  888 0 35  4791  4194            ERS# HHOHH      HH000
1396    4194  888 0 30  4396  4398            LDL# 00000      8B000
1397    4398  888 0 82  4754  4700            TEQ             2F
1398    4754  888 0 25  4708  4591            LDA             4F
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1399  4708  888 0 00  0000  00HH                  CON  00000   000HH
1400  4591  888 0 35  B3FB  4596    4             ERS  TEMP
1401  4596  888 0 37  0400  4755                  SHL   0400
1402  4755  888 0 70  000A  4164                  ADD  RA
1403  4164  888 0 60  B2AB  4781                  STA  RB4
1404  4781  888 0 77  4781  4787                  ATL
1405  4787  888 0 25  4742  4394                  LDA  SERAL
1406  4394  888 0 70  4796  4549                  ADD# 00000   00001
1407  4549  888 0 60  4742  4594                  STA  SERAL
1408  4594  888 0 70  0008  4749                  ADD  RL
1409  4749  888 0 05  B7AC  4158                  LDX  MUML
1410  4158  888 0 65  B3A8  4564                  STX  RB5
1411  4564  888 3 70  5201  4358                  ADD5 W0001
1412  4358  888 3 60  5201  4558                  STA5 W0001
1413  4558  888 0 25  4146  4598                  LDA  N
1414  4598  888 0 70  4742  4547                  ADD  SERAL
1415  4547  888 2 60  5001  4534                  STA4 STOPT   S6
1416  4700  888 0 30  B3FB  4758    2             LDL  TEMP
1417  4758  888 0 05  4534  4736                  LDX  S6      COMP*
1418  4534  888 0 30  4588  4192    S6            LDL# 88888   88888      X3. TRANSFER REMARKS
1419  4192  888 0 25  8670  4747                  LDA  R0001                   IF THE REMARKS AREN'T ALL BLANK, COPY THEM
1420  4747  888 0 82  4150  4350                  TEQ          1F              ONTO THE COMMENTS TAPE 7. GO TO#P17 UNLESS
1421  4150  888 0 25  8672  4759                  LDA  R0003                   DK FIELD WAS X, IN WHICH CASE WE GO TO
1422  4759  888 0 82  4764  4350                  TEQ          1F              E1 DIRECTLY.
1423  4764  888 0 25  8674  4382                  LDA  R0005
1424  4382  888 0 82  4788  4350                  TEQ          1F
1425  4788  888 0 25  8676  4392                  LDA  R0007
1426  4392  888 0 82  4197  4350                  TEQ          1F
1427  4197  888 0 25  8678  4365                  LDA  R0009
1428  4365  888 0 82  4582  4350                  TEQ  2F      1F
1429  4350  888 0 30  4765  4740    1             LDL          COMT*
1430  4765  888 0 25  4782  4592                  LDA          8F
1431  4782  888 0 00  8678  8669                  JMP  R0009   R0000
1432  4592  888 0 80  0989  4582    8             TDC  Z0000   2F
1433  4582  888 0 25  B8FH  4792    2             LDA  RTAG
1434  4792  888 0 31  4397  4397                  CLL
1435  4397  888 0 82  4112  4189                  TEQ  FIN     -PR1
1436  0989  888 0 00  0000  0000    Z0000         CON  00000   00000
1437  0991  888 0 00  0000  0000    Z0002         CON  00000   00000
1438  0993  888 0 00  0000  0000    Z0004         CON  00000   00000
1439  0995  888 0 00  0000  0000    Z0006         CON  00000   00000
1440  0997  888 0 00  0000  0000    Z0008         CON  00000   00000
1441  0990  888 0 88  8888  8888    Z0001         CON  88888   88888
1442  0992  888 0 88  8888  8888    Z0003         CON  88888   88888
1443  0994  888 0 88  8888  8888    Z0005         CON  88888   88888
1444  0996  888 0 88  8888  8888    Z0007         CON  88888   88888
1445  0998  888 0 88  8888  8888    Z0009         CON  88888   88888
1446                                              HHH
1447  4701  888 0 60  4146  0548    S2            STA  N                    X4. COMPILE 01 OP
1448  0548  888 0 70  0550  0553                  ADD# 01000   00000           COMPILE AN 01 OP FOLLOWED BY THE LINE NUMBER.
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1449  0553  888 0 05  0555  4332          LDX          CMPL*        AND TRANSFER THE SUBSECTION NAME, COLUMNS
1450  0555  888 0 30  81FG  0559          LDL  LINE                 32-60. TO THE MUM CODE AREA AND THE COMMENTS
1451  0559  888 0 05  0561  4736          LDX          COMP*        TAPE ALSO. TO#P17.
1452  0561  888 0 30  0563  4740          LDL          CONT*
1453  0563  888 0 25  86AC  0767          LDA  MUMI
1454  0767  888 0 60  82AB  0571          STA  RB4
1455  0571  888 2 07  0006  0775          IIR4  0006
1456  0775  888 0 60  86AC  0579          STA  MUMI
1457  0579  888 0 25  0581  0583          LDA          8F
1458  0581  888 0 00  8670  8669          JMP  R0001   R0000
1459  0583  888 2 88  5194  0599    8     TCD4 W9994
1460  0599  888 0 70  0401  0404          ADD# 00000   20002
1461  0404  888 2 88  5196  0420          TCD4 W9996
1462  0420  888 0 70  0422  0425          ADD# 00000   20002
1463  0425  888 2 88  5198  4112          TCD4 W9998   FIN
1464  4374  888 0 30  0576  4505    S3    LDL          8DK          X5. COMPILE CONDITION
1465  0576  888 0 25  8670  0580          LDA  R0001                    BLANK OUT THE DK FIELD. IF COLS 36-40 ARE
1466  0580  888 0 35  0582  0584          ERS# 00000   HHHHH            BLANK THIS INDICATES A BRANCH TO THE NEXT
1467  0584  888 0 30  0586  0588          LDL# 00000   88888            SECTION SO AN 08 OP IS SELECTED. OTHERWISE
1468  0588  888 0 82  0591  0791          TEQ  1F                       THE LAST OP COMPILED IS INCREASED BY 1.
1469  0791  888 0 25  87AC  0595          LDA  MUML                     IF IT WAS AN 01, SELECT OP 06 ELSE SELECT
1470  0595  888 0 60  82AB  0799          STA  RB4                      OP 05. FINALLY COMPILE THE SELECTED OP
- 1471  0799  888 2 25  5201  0403          LDA4 W0001                    FOLLOWED BY THE CONDITION NAME. GO TO#X2
1472  0403  888 0 70  0405  0408          ADD# 01000   00000            TO SCAN THE REST OF THE REMARKS.
1473  0408  888 2 60  5201  0603          STA4 W0001
1474  0603  888 0 70  0605  0608          ADD          -FLO
1475  0605  888 0 97  0000  0000          CON  97000   00000
1476  0608  888 0 25  0410  0412   -FLO   LDA          2F
1477  0410  888 0 06  0000  0000          CON  06000   00000
- 1478  0609  888 0 25  0411  0412   &FLO   LDA          2F
1479  0411  888 0 05  0000  0000          CON  05000   00000
1480  0591  888 0 25  0593  0412    1     LDA          2F
1481  0593  888 0 08  0000  0000          CON  08000   00000
1482  0412  888 0 05  0414  4332    2     LDX          CMPL*
1483  0414  888 0 30  80AB  0418          LDL  DK
1484  0418  888 0 05  4362  4736          LDX  S5      COMP*
1485  4152  888 0 05  0554  0556    S4    LDX# 03000   00000
1486  0556  888 0 30  0558  0560          LDL          TERM*        X6. FINISH PREV SECTION
1487  0558  888 0 25  80AB  0562          LDA  DK                       COMPILE 03 OP AND THEN PUT OUT A
1488  0562  888 0 37  0100  0566          SHL   0100                    SENTINEL ON THE COMMENTS TAPE. WRITE THE
1489  0566  888 0 35  0768  0570          ERS# H0000   H0000            STOP TABLE FOLLOWED BY ALL THE MUM CODE
1490  0570  888 0 60  89AC  0574          STA  KEY                      ON THE CONTROL TAPE 6. THERE IS ROOM FOR
1491  0574  888 0 31  0577  0577          CLL                           ABOUT 1500 LINES OF MUM CODE.
1492  0577  888 0 08  0000  0780          LIR1  0000   -CLR         X7. INITIALIZE
1493  0780  888 0 54  5001  0803   -CLR   STL1 STOPT                    RECORD THE NEW KEY LETTER  SKIP TO THE NEXT
1494  0803  888 0 06  0002  0407          IIR1  0002                    PAGE ON THE ASSEMBLY LISTING.
1495  0407  888 0 70  0409  0780          ADD          -CLR            WRITE THIS LINE ON THE COMMENTS TAPE AND
1496  0409  888 0 99  9800  0000          CON  99980   00000           RETURN TO#P17.
1497  0781  888 0 50  86AC  0585   &CLR   STL  MUMI
1498  0585  888 0 50  88AC  0589          STL  COMI
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1499  0589  888 0 50  4742  0594            STL  SERAL
1500  0594  888 0 50  4146  0598            STL  N
1501  0598  888 0 30  0400  0402            LDL            PAGE*
1502  0400  888 0 30  4112  4740            LDL  FIN       COMT*
1503  0402  888 0 50  0804  0406  PAGE*     STL  -SKIP                    G   SKIP TO BEGINNING OF PAGE SUBROUTINE
1504  0406  888 0 25  0808  0610            LDA# 00000     00066
1505  0610  888 0 75  B2AC  0415            SUB  LC
1506  0415  888 0 31  0618  0618            CLL
1507  0618  888 0 50  B2AC  0622            STL  LC
1508  0622  888 0 37  0400  0429            SHL   0400
1509  0429  888 0 30  0431  0433            LDL# 00004     90000
1510  0433  888 0 87  0436  0636            TGR            1F
1511  0436  888 0 70  0438  0441            ADD# 00001     00000
1512  0441  888 0 20  0443  0636            BUF            1F
1513  0443  888 0 00  0040  0000            CON  00004     00000
1514  0636  888 0 70  0638  000A  1         ADD            RA
1515  0638  888 0 16  0000  0804            PFD   0000     -SKIP
1516  0805  888 0 67  3333  000A  &SKIP     HLT   3333     RA
1517  0560  888 0 50  80FB  0564  TERM*     STL  EXIT                     G   TERMINATE SECTION SUBROUTINE.
1518  0564  888 0 31  0967  0967            CLL                           G   RL IS THE EXIT. RX IS THE 03 OR 04 TO COMPILE
1519  0967  888 0 25  B6AC  0771            LDA  MUMI                     G   THIS SUBROUTINE DOES WHAT IS DESCRIBED
1520  0771  888 0 82  80FB  0774            TEQ  EXIT                     G   UNDER SUBSECTION X6.
1521  0774  888 0 30  000C  0778            LDL  RX
1522  0778  888 0 05  0980  4736            LDX            COMP*
1523  0980  888 0 25  B8AC  0784            LDA  COMI
1524  0784  888 0 30  0786  0788            LDL# 99999     99999
1525  0788  888 0 70  0590  000A            ADD            RA
1526  0590  888 0 50  3401  3003            STL  CMTS1
1527  3003  888 0 05  3005  0607            LDX  2F
1528  0607  888 0 30  0809  8919            LDL            TSUB*
1529  0809  888 0 C6  3400  3005            TBL  COMTS     2F
1530  3005  888 0 H2  0700  0822  2         TWR  OTAP3
1531  0822  888 0 08  0000  0625            LIR1  0000     4F
1532  0532  888 0 0G  0200  0536  1         IIR1  0200
1533  0536  888 0 30  B6AC  0540            LDL  MUMI
1534  0540  888 0 87  0543  0625            TGR  3F        4F
1535  0625  888 0 05  0427  0629  4         LDX  2F
1536  0629  888 0 30  0631  8919            LDL            TSUB*
1537  0631  888 0 CF  5000  0427            TBL1 W9800     2F
1538  0427  888 0 H2  0600  0532  2         TWR  OTAP2     1B
1539  0543  888 0 25  0545  0547  3         LDA# 99999     99999
1540  0547  888 0 64  5199  0601            STA1 W9999
1541  0601  888 0 05  3203  3205            LDX  2F
1542  3205  888 0 30  0807  8919            LDL            TSUB*
1543  0807  888 0 CF  5000  3203            TBL1 W9800     2F
1544  3203  888 0 H2  0600  80F8  2         TWR  OTAP2     EXIT
1545  0745  888 0 G2  0300  0762  80P       TRD  ITAP1                    B.  BEGINNING OF ASSEMBLY
1546  0762  888 0 C7  3167  0565            TBT            1F             B1. CHECK INPUT TAPE
1547  3167  888 0 67  4444  0745            HLT   4444     80P            HOLD IF INPUT TAPE ISNT READY.HALT AND RETURN
1548  0565  888 0 25  4223  0975  1         LDA  TCON1                        TO#B1.
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1549  0975  888 0 60  88FG  0779          STA  TCONT                 G01
1550  0779  888 0 25  0745  0747          LDA  BOP                   B2. READ BLOCK
1551  0747  888 0 60  89FG  0551          STA  LTAPE                     READ IN FIRST BLOCK INTO INPUT BUFFER
1552  0551  888 0 05  0753  0755          LDX  1F
1553  0755  888 0 30  000C  8919          LDL  RX              TSUB*
1554  0753  888 0 G2  0300  0770  1       TRD  ITAP1                     UNLOAD FIRST TAPE BUFFER AND INITIATE
1555  0770  888 0 25  4624  0776          LDA  TCON2                     READING SECOND BLOCK. THE INPUT TAPE IS
1556  0776  888 0 60  88FG  3180          STA  TCONT                     ALWAYS READING ONE BLOCK AHEAD. THERE MUST
1557                                                                X    THEREFORE BE AN EXTRA HASH BLOCK AFTER THE
1558                                                                X    ENDING SENTINEL.
1559                                                                X    EACH TAPE BLOCK CONTAINS 10 LINES.
1560  3180  888 0 30  0782  0984          LDL                  1F
1561  0782  888 1 00  0000  0001          CON1 00000           00001
1562  0984  888 0 50  81FG  0988  1       STL  LINE
1563  0988  888 0 31  3191  3191          CLL
1564  3191  888 0 50  87FG  0795          STL  TAPE1           1F        B3. INITIALIZE
1565  89AH  888 0 08  0999  0671  BOP1    LIR1  0999
1566  0671  888 0 31  0474  0474          CLL  2F
1567  0474  888 0 29  1000  0602  2       LDA1 STAB                      G   CLEAR SYMBOL TABLE IN MULTIPLE ASSEMBLY.
1568  0602  888 0 70  0604  3007          ADD                  -BOPR
1569  0604  888 0 12  0000  0000          CON  12000           00000
1570  3007  888 0 54  1000  3008  -BOPR    STL1 STAB            &BOPR
1571  3008  888 0 0G  9999  0612  &BOPR    IIR1  9999
1572  0612  888 0 82  0795  0474          TEQ  1F              2B
1573  0795  888 0 50  83FC  3199  1       STL  CORE                      SET LOWER CORE AVAILABLE
1574  3199  888 0 50  84FC  3603          STL  BLANK                     SET BLANK ADDRESS UNDEFINED
1575  3603  888 0 50  87FH  3207          STL  FTAG                      SET FLO MODE OFF
1576  3207  888 0 50  85AC  0611          STL  ACCUM
1577  0611  888 0 50  86AC  0615          STL  MUMI
1578  0615  888 0 50  82AC  0419          STL  LC                        SET LINE COUNTERS TO ZERO
1579  0419  888 0 50  83AC  0423          STL  LINE0
1580  0423  888 0 08  0000  0626          LIR1  0000           -BP
1581  0626  888 0 54  8649  0831  -BP     STL1 I0000                     SET FORWARD AND BACKWARD LOCAL TABLES
1582  0831  888 0 0G  0001  0435          IIR1  0001                     (I AND J TABLES) TO UNDEFINED.
1583  0435  888 0 70  0437  0626          ADD                  -BP
1584  0437  888 0 99  9980  0000          CON  99998           00000
1585  0627  888 0 25  0829  3031  &BP     LDA                  8F
1586  0829  888 0 00  8616  8417          JMP  D0199           D0000
1587  3031  888 0 80  7800  0446  8       TDC  Y0000
1588  0446  888 0 88  4800  0461          TCD  70000
1589  0461  888 0 30  0463  0465          LDL# BGGGG           99999     SET DRUM STATUS SO THAT 0001 TO 4999
1590  0465  888 0 50  8418  0469          STL  D0001                     ARE AVAILABLE
1591  0469  888 0 08  0001  0472          LIR1  0001
1592  0472  888 0 30  0674  0676          LDL                  -BP1
1593  0674  888 0 GG  GGG9  9999          CON  GGGGG           99999
1594  0676  888 0 54  8418  0481  -BP1    STL1 D0001
1595  0481  888 0 0G  0001  0485          IIR1  0001
1596  0485  888 0 70  0487  0676          ADD                  -BP1
1597  0487  888 0 99  9800  0000          CON  99980           00000
1598  0677  888 0 30  0479  0681  &BP1    LDL# 00000           00888     SET HHH BLANK.
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1599  0681  888 0 50  86FH  0685          STL  HTAG
1600  0685  888 0 30  4056  0508          LDL  ONSW
1601  0508  888 0 50  4439  0541          STL  SWICH
1602  0541  888 0 30  4201  0953          LDL  STRT
1603  0953  888 0 50  4200  0802          STL  START
1604  0802  888 0 25  4189  0641          LDA  -PR1       WRITE    84. OUTPUT GETS LOADER
1605  0641  888 0 60  8901  0445  WRITE   STA  -0EX                    WRITE LOADING ROUTINE ON OUTPUT TAPE.
1606  0445  888 0 26  8902  8902          CLA  &0EX                    NEITHER TAPE IS EVER REWOUND BY THE PROGRAM.
1607                                                                X   WE ARE NOW READY TO TAKE OFF,GOING TO#E1.
1608  87AG  888 1 08  0002  0669  END     LIRJ  0002                   Z.  ENDING OF ASSEMBLY.
1609  0669  888 0 05  0871  0673          LDX  2F                      Z1. FIND* M.
1610  0673  888 0 30  0675  8810          LDL              FIND*           FIND M. IF UNDEFINED, HALT AND THE OPERATOR
1611  0675  888 0 67  000A  0871          HLT  RA          2F              IS SUPPOSED TO FILL RA WITH THE RIGHT THING.
1612  0871  888 0 20  0873  0875  2       BUF  1F                      Z2. ASSEMBLE TRANSFER
1613  0875  888 0 05  0877  0679          LDX  2F                          ASSEMBLE  HLT HHHH MLOC  INTO LOCATION 0105
1614  0679  888 0 30  0881  8900          LDL              OTPT*           WHICH WILL CAUSE THE LOADING TO STOP WITH
1615  0881  888 0 25  85AC  0687          LDA  ACCUM                       THIS INSTRUCTION.
1616  0687  888 0 60  86FB  0491          STA  ERROR                   Z3. CLEAN OUTPUT BUFFER.
1617  0491  888 0 25  0493  0495          LDA  3F                          WRITE THE LAST BUFFER LOAD ON THE OUTPUT
1618  0495  888 0 60  4200  0502          STA  START                       TAPE.  PRINT THE END LINE AND THE ERROR
1619  0502  888 0 25  83AG  0641          LDA  PSUDX       WRITE           INDICATION ON THIS LINE IS BLANK IF AND ONLY
1620  0873  888 0 67  HHHH  0000  1       HLT   HHHH        0000           IF NO ERRORS OCCURRED DURING ASSEMBLY.
1621  0493  888 0 30  0695  0402  3       LDL              PAGE*       Z4. EJECT PAPER
1622  0695  888 0 30  0497  0402          LDL              PAGE*           SKIP THE PRINTER PAPER ABOUT 2 PAGES AHEAD.
1623  0497  888 0 05  0499  0501          LDX# 04000       00000       Z5. FINISH FLO
1624  0501  888 0 30  0503  0560          LDL              TERM*           FINISH PROCESSING THE LAST SECTION OF FLOW-
1625  0503  888 0 67  89AH  0703          HLT  BOP1                        CHART, IF ANY (SEE X6, EXCEPT COMPILE
1626  0703  888 0 F2  0500  0500          TRW  OTAP1                       04 INSTEAD OF 03 OP).
1627  0500  888 0 31  0903  0903          CLL                          Z6. HALT
1628  0903  888 0 25  87FH  0507          LDA  FTAG                        HALT THE COMPUTER, PASS 2 IS FINISHED.
1629  0507  888 0 82  0510  0710          TEQ  1F                      Z7. FLOWCHARTING
1630  0710  888 0 F2  0600  0600          TRW  OTAP2                   NO. IF NOT FLOWCHARTING,#LOAD THE ASSEMBLED
1631  0600  888 0 F2  0700  0700          TRW  OTAP3                   YES:PROGRAM. IF FLOWCHARTING,GO ON TO#PASS3.
1632  0700  888 0 G2  0400  0517          TRD   0400
1633  0517  888 0 F6  B000  B000          TBU   B000       B000
1634  0510  888 0 G2  0500  0527  1       TRD  OTAP1
1635  0527  888 0 C7  0510  0530          TBT  1B
1636  0530  888 0 F6  7800  7801          TBU  Y0000       Y0001
1637  0877  888 0 00  0000  7905  2       JMP   0000       Y0105
1638  83AH  888 0 30  0670  0402  PAT     LDL              PAGE*
1639  0670  888 0 06  3073  3073          CLX
1640  3073  888 0 63  3073  0476          ZAP
1641  0476  888 0 60  0200  3002          STA   0200
1642  3002  888 0 65  0223  0825          STX   0223
1643  0825  888 0 60  0262  0664          STA   0262
1644  0664  888 0 65  0267  0869          STX   0267
1645  0869  888 0 60  0294  0496          STA   0294
1646  0496  888 0 65  0299  0701          STX   0299
1647  0701  888 0 60  0303  0505          STA   0303
1648  0505  888 0 65  0308  0910          STX   0308
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1649  0910 888 0 60 0325 0727          STA  0325
1650  0727 888 0 65 0330 0732          STX  0330
1651  0732 888 0 60 0334 0736          STA  0334
1652  0736 888 0 65 0339 0741          STX  0339
1653  0741 888 0 60 0365 3367          STA  0365
1654  3367 888 0 65 0370 0772          STX  0370
1655  0772 888 0 60 0378 3380          STA  0378
1656  3380 888 0 65 0383 0785          STX  0383
1657  0785 888 0 08 9999 3188          LIR1 9999      -PAT
1658  3188 888 0 0G 0001 0592 -PAT     IIR1 0001
1659  0592 888 0 30 0794 0596          LDL# 00005     00000
1660  0596 888 0 82 3399 3799          TEQ  1F
1661  3799 888 0 60 0218 0620          STA  0218
1662  0620 888 0 29 8418 3025          LDA1 D0001
1663  3025 888 0 05 0827 8920          LDX            UNDG*
1664  0827 888 0 65 0281 0683          STX  0281
1665  0683 888 0 60 0286 0688          STA  0286
1666  0688 888 0 29 8468 0693          LDA1 D0051
1667  0693 888 0 05 0895 8920          LDX            UNDG*
1668  0895 888 0 65 0250 0652          STX  0250
1669  0652 888 0 60 0255 0657          STA  0255
1670  0657 888 0 29 8518 0662          LDA1 D0101
1671  0662 888 0 05 0864 8920          LDX            UNDG*
1672  0864 888 0 65 0241 0643          STX  0241
1673  0643 888 0 60 0246 0448          STA  0246
1674  0448 888 0 29 8568 0453          LDA1 D0151
1675  0453 888 0 05 0455 8920          LDX            UNDG*
1676  0455 888 0 65 0209 0811          STX  0209
1677  0811 888 0 60 0214 0416          STA  0214
- 1678  0416 888 0 11 0201 3188          PRN  0201      -PAT
1679  3189 888 0 67 3333 000A &PAT     HLT  3333      RA
1680  3399 888 0 16 0016 4189 1        PFD  0016      -PR1
1681  88AG 888 0 25 8706 0970 NEW      LDA  A                    G  SPECIAL SECRET OP NEW
1682  0970 888 1 08 0000 0573          LIR3 0000                 G  FIND A. IF UNDEFINED PUT IT AS OP IN
1683  0573 888 0 08 9999 0976          LIR1 9999                 G  SYMBOL TABLE WITH EQUIVALENT IN M AND C.
1684  0976 888 0 05 0978 3780          LDX  2F                   G  IF DEFINED PUT CONTENTS OF M AND C INTO
1685  3780 888 0 30 0982 8810          LDL  1F        FIND*      G  THE QADAAD PROGRAM IN THIS LOCATION.
1686  0978 888 0 60 85FC 3182 2       STA  ALOC
1687  3182 888 0 30 3184 4530          LDL            PSIGN
1688  3184 888 0 32 0100 3388          SHR  0100
1689  3388 888 0 30 84FG 0792          LDL  MC
1690  0792 888 0 90 000C 0796          SML  RX
1691  0796 888 0 25 85FC 0800          LDA  ALOC
1692  0800 888 0 37 0400 3607          SHL  0400
1693  3607 888 0 70 3009 000A          ADD            RA
1694  3009 888 0 50 0000 83AG          STL  0000      PSUDX
1695  0982 888 0 25 8706 0986 1        LDA  A
1696  0986 888 0 06 0789 0789          CLX
1697  0789 888 0 69 1000 3202          STX1 STAB
- 1698  3202 888 0 32 0200 3807          SHR  0200
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1699  3807  888 0 20  3209  3011          BUF#  88000     88000
1700  3011  888 0 05  0413  0815          LDX   1F
1701  0815  888 0 77  0815  0818          ATL
1702  0818  888 0 25  000C  8712          LDA   RX          SRCH*
1703  0413  888 0 30  3015  4530    1     LDL               PSIGN
1704  3015  888 0 32  0100  0619          SHR    0100
1705  0619  888 0 30  84FG  0623          LDL   MC
1706  0623  888 0 90  000C  3027          SML   RX
1707  3027  888 0 54  2000  83AG          STL1  ETAB        PSUDX
1708  8736  888 0 60  83FB  0740  ERR1*   STA   TEMP                    G   ERROR SUBROUTINE
1709  0740  888 0 65  84FB  0544          STX   TEMP1                     G   ACCUMULATES IN ERROR THE ERROR CODES
1710  0544  888 1 0G  0001  0748          IIR3   0001                     G   FOR A LINE.
1711  0748  888 0 06  0751  0751          CLX                             G   ERR1*: CODE IS RB3+1, INDICATING THE FIELD
1712  0751  888 0 32  0400  0758          SHR    0400                     G       EXIT IS IN RL.
1713  0758  888 0 05  0760  8760          LDX   1F          ERR2*
1714  8760  888 0 20  86FB  0766  ERR2*   BUF   ERROR                   G   ERR2*: CODE IS IN RA, EXIT IS IN RX.
1715  0766  888 0 37  0100  3170          SHL    0100
1716  3170  888 0 60  86FB  0974          STA   ERROR
1717  0974  888 0 60  85AC  000C          STA   ACCUM       RX
1718  0760  888 1 0G  9999  0764    1     IIR3   9999
1719  0764  888 0 25  83FB  0968          LDA   TEMP
1720  0968  888 0 05  84FB  0008          LDX   TEMP1       RL
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0000044044	0055544044	0000000000	0000544044	0027544044
0000544044	0055544044	0000010000	0000544044	0000544044
0000000044	0000544044	0000020000	0005544044	0055544044
0000000004	0005544044	0000030000	0000044044	0000044044
0000044044	0055544044	0000040000	0055544044	0005544044
0000000044	0005544044	0000050000	0005544044	0000544044
0005544044	0055544044	0000060000	0055544044	0005544044
0000000000	0000544044	0000070000	0005544044	0055544044
0000004044	0005544044	0000080000	0005544044	0000544044
0000000044	0055544044	0000090000	0055544044	0005544044
0000544044	0055544044	0000100000	0000044044	0000544044
0000004044	0005544044	0000110000	0055544044	0005544044
0000544044	0000544044	0000120000	0055544044	0000544044
0005544044	0005544044	0000130000	0055544044	0005544044
0005544044	0000044044	0000140000	0055544044	0000544044
0000004044	0005544044	0000150000	0055544044	0005544044
0005544044	0005544044	0000160000	0055544044	0000544044
0055544044	0055544044	0000170000	0005544044	0000000044
0000044044	0000544044	0000180000	0055544044	0000044044
0000544044	0000044044	0000190000	0055544044	0055544044
0000544044	0000544044	0000200000	0055544044	0000004044
0055544044	0000044044	0000210000	0055544044	0000544044
0000044044	0005544044	0000220000	0055544044	0000544044
0000544044	0000004044	0000230000	0055544044	0005544044
0055544044	0000544044	0000240000	0055544044	0000044044
0000004044	0000044044	0000250000	0055544044	0000044044
0050544044	0000544044	0000260000	0055544044	0000044044
0000004044	0000044044	0000270000	0000544044	0005544044
0055544044	0005544044	0000280000	0055544044	0000044044
0000044044	0000544044	0000290000	0055544044	0000544044
0055544044	0005544044	0000300000	0005544044	0000000004
0000004044	0000044044	0000310000	0055544044	0000544044
0055544044	0005544044	0000320000	0000544044	0000004044
0005544044	0000544044	0000330000	0055544044	0005544044
0055544044	0005544044	0000340000	0055544044	0000004044
0005544044	0000544044	0000350000	0055544044	0000544044
0000544044	0005544044	0000360000	0000544044	0000044044
0005544044	0000544044	0000370000	0055544044	0055544044
0000544044	0000544044	0000380000	0055544044	0000000044
0055544044	0055544044	0000390000	0055544044	0000004044
0055544044	0055544044	0000400000	0000544044	0005044044
0000544044	0005544044	0000410000	0000544044	0000004044
0055544044	0055544044	0000420000	0055544044	0000044044
0000544044	0000544044	0000430000	0005544044	0005044044
0055544044	0055544044	0000440000	0005544044	0002044044
0005544044	0000044044	0000450000	0000544044	0000044044
0005544044	0005544044	0000460000	0055544044	0000044044
0055544044	0005544044	0000470000	0000544044	0077044044
0005544044	0055544044	0000480000	0000544044	0007044044
0055544044	0005544044	0000490000	0055544044	2222000004

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1722                                                    BLR   0000      4999      G   SIMPLE OBJECT PROGRAM LOADING ROUTINE
1723                                                    BLA   Y0003     Y0199 002 G   GOES INTO BAND 7800. THE ODD LOCATIONS.
1724                                                    BLR   Y0101     Y0105 004
1725  0000  888 0 67  0000  0000        0000          HLT             *
1726  7801  888 0 25  7803  7805        Y0001         LDA   1F
1727  7805  888 0 60  7902  7907                      STA   Y0102     2F
1728  7907  888 0 G2  0500  7925        2             TRD   OTAP1
1729  7925  888 0 C7  7931  7925                      TBT             *
1730  7931  888 0 87  7935  7937                      TGR             3F
1731  7935  888 0 67  7935  7907                      HLT             2B
1732  7937  888 0 F6  8600  7901        3             TBU   8600      Y0101
1733  7803  888 0 67  7803  7937        1             HLT             3B
1734  7901  888 0 0B  0000  7905        Y0101         LIR1  0000      Y0105
1735  7905  888 0 34  8601  7807        Y0105         LDL1  8601
1736  7807  888 0 29  8603  7809                      LDA1  8603
1737  7809  888 0 37  0400  7817                      SHL   0400
1738  7817  888 0 90  000A  7821                      SML   RA
1739  7821  888 0 35  7823  7825                      ERS#  00HHH     H0000
1740  7825  888 0 20  7827  000A                      BUF             RA
1741  7827  888 0 50  0000  7811                      STL   0000
1742  7811  888 0 0G  0004  7815                      IIR1  0004
1743  7815  888 0 30  7819  7829                      LDL#  00020     00000
1744  7829  888 0 82  7907  7905                      TEQ   2B        Y0105
- 1745                                                END   BOP
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0000                    FLO                                 2.  QADAAD ASSEMBLER PASS 2.
0001
0017                    BLR   0000      0399
0018          B8AH      NEW1  00001     00000         CAUSES ASSEMBLY INTO B00A - B99F AREA.
0019         50000      COR   0201                    INPUT BUFFER
0020         60000      COR   0201                    INPUT BUFFER
0021         70000      BLR   4800      4999          OUTPUT BUFFER
0022         B0000      COR   0014                    BLA,BLR CONTROL
0023         C0000      BLR   4030      4035          C ADDRESS CONTROL
0024         D0000      COR   0202                    DRUM AVAILABILITY TABLE
0025         E0000      COR   0006                    DEFN* CONTROL
0026         F0000      COR   0024                    FARB* CONTROL
0027         I0000      COR   0010                    FORWARD LOCAL TABLE
0028         J0000      COR   0010                    BACKWARD LOCAL TABLE
0029         L0000      BLR   4010      4015          A ADDRESS CONTROL
0030         M0000      BLR   4020      4025          M ADDRESS CONTROL
0031         Q0000      BLR   4000      4009          INDEX REGISTER CODES
0032         R0000      COR   0011                    REMARKS
0033         U0000      COR   0004                    H FIELDS
0034         V0000      COR   0004                    H FIELD CONTROL
0035         W0000      EQU   5200
0036         X0000      COR   0006                    EQU CONTROL
0037         Y0000      EQU   7800                    BAND FOR LOADING ROUTINE
0038         Z0000      BLR   0989      0999          BLANK COMMENTS
0039         10000      COR   0005                    PAIR ADDRESS CONTROL
0040         30000      COR   0007                    EDITING
0041          STAB      BLR   1000      1999          SYMBOL TABLE
0042          ETAB      BLR   2000      2999          EQUIVALENTS TABLE
0043             A      COR   0001                    A  FIELD  ZZZZZNNNNN
0044            AH      COR   0001                    AH FIELD  00ZZZ00NNN
0045             M      COR   0001
0046            MH      COR   0001
0047             C      COR   0001
0048            CH      COR   0001
0049         ITAP1      EQU   0300                    INPUT TAPE
0050         OTAP1      EQU   0500                    OUTPUT TAPE
0051         OTAP2      EQU   0600                    CONTROL FOR FLOW PASS -- PSEUDOCODE
0052         OTAP3      EQU   0700                    COMMENTS FOR FLOW PASS
0053         COMTS      BLR   3400      3599
0054         CMTS1      EQU   3401
0055         STOPT      EQU   W9801
0056          EXIT      EQU   B0F8                    VARIOUS TEMP STORAGES
0057         EXIT1      EQU   B1F8
0058         EXIT2      EQU   B2F8
0059          TEMP      EQU   B3F8
0060         TEMP1      EQU   B4F8
0061         TEMP2      EQU   B5F8
0062         ERROR      EQU   B6F8                    ERRORS ON CURRENT LINE
0063          DEFX      EQU   B7F8
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0064                UDEFX   EQU   88F8
0065                SYMBL   EQU   89F8
0066                INCRE   EQU   80FC
0067                PANIC   EQU   81FC
0068                MASK    EQU   82FC
0069                CORE    EQU   83FC
0070                BLANK   EQU   84FC
0071                ALOC    EQU   85FC
0072                MLOC    EQU   86FC
0073                CLOC    EQU   87FC
0074                DEXIT   EQU   88FC
0075                SIGN    EQU   89FC
0076                R       EQU   80FG
0077                LINE    EQU   81FG
0078                MCN     EQU   82FG      NUM CONSTANT
0079                MCZ     EQU   83FG      ZON CONSTANT
0080                MC      EQU   84FG      CON CONSTANT
0081                OP      EQU   85FG
0082                IR      EQU   86FG
0083                TAPEI   EQU   87FG      LINE COUNTER IN INPUT BUFFER
0084                TCONT   EQU   88FG      CONTROL FOR TAPE BUFFER UNLOAD
0085                LTAPE   EQU   89FG      LAST TAPE COMMAND
0086                TEX1    EQU   80FH
0087                TEX     EQU   81FH
0088                AEX     EQU   82FH
0089                ALEV    EQU   83FH
0090                MLEV    EQU   84FH
0091                CLEV    EQU   85FH
0092                HTAG    EQU   86FH
0093                FTAG    EQU   87FH
0094                RTAG    EQU   88FH
0095                OPTIM   EQU   89FH
0096                SHR1    EQU   80AC
0097                SHR2    EQU   81AC
0098                LC      EQU   82AC      LINE COUNTER ON OUTPUT PAGE
0099                LINEO   EQU   83AC      LINE COUNTER IN OUTPUT BUFFER
0100                FLAG    EQU   84AC
0101                ACCUM   EQU   85AC      ERRORS ON LAST ERRONEOUS LINE
0102                MUMI    EQU   86AC
0103                MUML    EQU   87AC
0104                COMI    EQU   88AC
0105                KEY     EQU   89AC
0106                DK      EQU   80AB
0107                HSB     EQU   84AB
0108                HSB1    EQU   89AB
0109                BLA     EQU   80AG      CONTROL OPS STARTING LOCATIONS
0110                BLR     EQU   81AG
0111                COR     EQU   82AG
0112                PSUDX   EQU   83AG
0113                EQU     EQU   84AG
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0114                                        HHH     EQU   B5AG
0115                                        FLO     EQU   B6AG
0116                                        END     EQU   B7AG
0117                                        NEW     EQU   B8AG
0118                                        CON     EQU   B0AH
0119                                        NUM     EQU   B1AH
0120                                        ZON     EQU   B2AH
0121                                        PAT     EQU   B3AH
0122                                        ALF     EQU   B4AH
0123                                        OFF     EQU   B5AH
0124                                        TYP     EQU   B6AH
0125                                        FUNNY   EQU   B8AH
0126                                        BOP1    EQU   B9AH
0127   B079  B8B 0 HH  HHHH  HHHH           ROO10   CON   HHHHH    HHHHH
0128   B3FH  B8B 0 00  0000  0000           ALEV    CON   00000    00000
0129   B4FH  B8B 0 00  0000  0000           MLEV    CON   00000    00000
0130   B5FH  B8B 0 00  0000  0000           CLEV    CON   00000    00000
0131   B5FC  B8B 0 00  0000  0000           ALOC    CON   00000    00000
0132   B6FC  B8B 0 00  0000  0000           MLOC    CON   00000    00000
0133   B7FC  B8B 0 00  0000  0000           CLOC    CON   00000    00000
0134   B7AC  B8B 0 00  0000  0000           MUML    CON   00000    00000
0135   B8AH  B8B 0 00  2000  0000           FUNNY   CON   00200    00000   B00A - B99F PART OF CORE USUALLY UNAVAILABLE
0136   B4AB  B8B 0 22  2220  0000           HSB     CON   22222    00000   WHAT QADAAD CHOOSES FOR H
0137   B9AB  B8B 0 00  0000  4000           HSB1    CON   00000    04000   HIGH-SPEED BANDS
0138                                               HHH         C
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0139   8712  888 0 60  81FB  800A   SRCH*    STA  EXIT1                 S.  SYMBOL TABLE SEARCH  (SRCH*)
0140   800A  888 0 65  82FB  801A            STX  EXIT2
0141   801A  888 0 50  83FB  802A            STL  TEMP
0142   802A  888 0 26  8713  8713            CLA
0143   8713  888 0 75  000B  803A            SUB  RL
0144   803A  888 0 77  803A  804A            ATL
0145   804A  888 0 85  8714  805A            MUL# 10010      01001
0146   805A  888 0 32  0600  806A            SHR   0600
0147   806A  888 0 07  0HHH  807A            IIR   0HHH
0148   807A  888 0 35  000C  808A            ERS  RX                   S1. SCRAMBLE
0150   808A  888 0 30  83FB  8716            LDL  TEMP       &SR2
0152   8716  888 0 20  8717  000A   &SR2     BUF              RA
0153   8717  888 0 08  0000  8715            LIR1  0000       -SR2
0154   8715  888 0 29  1000  809A   -SR2     LDA1 STAB                 S2. SYMBOL TABLE
0155   809A  888 0 82  8718  810A            TEQ  3F
0156   810A  888 0 70  8719  8720            ADD              -SR1
0157   8719  888 0 99  9999  9999            CON  99999       99999
0158   8721  888 0 06  0023  811A   &SR1     IIR1  0023                S3. TABLE ZERO
0159   811A  888 0 70  8722  8715            ADD              -SR2
0160   8722  888 0 99  9000  0000            CON  99900       00000
0162   8720  888 0 54  1000  81FB   -SR1     STL1 STAB        EXIT1    S4. NOT FOUND.
0163   8718  888 0 29  2000  82FB   3        LDA1 ETAB        EXIT2
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0174  8723  888 0 50  80FB  812A  FARB*  STL  EXIT                    F.  FIND AND RESERVE BEST LOCATION (FARB*)
0175  812A  888 1 09  8707  813A         LDX3 AH
0176  813A  888 0 70  8724  814A         ADD# 00000      10000
0177  814A  888 0 60  83FB  815A         STA  TEMP
0179  815A  888 0 31  8725  8725         CLL
0180  8725  888 0 50  81FC  816A         STL  PANIC                   F1. EXAMINE H-FIELD
0181  816A  888 5 02  0000  8726         LIR6  0000      2F
0182  8726  888 0 30  000C  8727  2      LDL  RX         3F
0183  8727  888 0 50  8683  817A  3      STL  U0003
0184  817A  888 0 25  8728  818A         LDA# 00000      00888
0185  818A  888 0 82  8729  8730         TEQ             3F
0186  8729  888 0 30  86FH  819A         LDL  HTAG
0187  819A  888 0 82  8684  820A         TEQ  V0000
0188  820A  888 0 05  000B  8727         LDX  RL         3B
0189  8730  888 5 25  8680  821A  3      LDA6 U0000
0190  821A  888 5 82  8684  822A         TEQ6 V0000
0191  822A  888 5 07  0001  8730         IIR6  0001      3B
0192  8680  888 0 00  1000  0488  U0000  CON  00100      00488
0193  8681  888 0 00  1000  0388  U0001  CON  00100      00388
0194  8682  888 0 00  1000  0888  U0002  CON  00100      00888
0195  8687  888 0 25  000B  823A  V0003  LDA  RL
0196  823A  888 0 75  000A  824A         SUB  RA
0197  824A  888 0 31  8731  8731         CLL
0198  8731  888 0 82  8732  825A         TEQ  1F
0199  825A  888 0 30  8733  826A         LDL# 00000      00400
0200  826A  888 0 82  8734  827A         TEQ  3F
0201  827A  888 1 0G  0001  828A         IIR3  0001
0202  828A  888 0 30  8735  8736         LDL              ERR1*
0203  8735  888 1 0G  9999  8684         IIR3  9999      V0000
0204  8732  888 0 25  000B  829A  1      LDA  RL
0205  829A  888 0 70  8737  8738         ADD              -NU
0206  8737  888 0 00  7000  0000         CON  00700      00000
0207  8739  888 0 70  83FB  830A  &NU    ADD  TEMP
0208  830A  888 0 60  83FB  8684         STA  TEMP       V0000
0209  8738  888 5 07  9998  831A  -NU    IIR6  9998                   F2. USE HAND LEVEL
0210  831A  888 0 60  81FC  832A         STA  PANIC
0211  832A  888 0 65  83FB  8740         STX  TEMP       2F
0212  8734  888 0 25  8741  833A  3      LDA# 00000      000HH
0213  833A  888 0 60  81FC  834A         STA  PANIC
0214  834A  888 0 35  000C  835A         ERS  RX
0215  835A  888 0 60  83FB  8740         STA  TEMP       2F
0216  8740  888 5 07  9999  8684  2      IIR6  9999      V0000
0217  8684  888 1 07  0000  8742  V0000  IIR2  0000      2F       F3. ADJUST FOR PAIRS
0218  8686  888 1 07  0000  8742  V0002  IIR2  0000      2F
0219  8742  888 0 70  8743  8744  2      ADD              -F1
0220  8743  888 0 99  9995  0000         CON  99999      50000
0221  8744  888 0 26  8746  8746  -F1    CLA  3F
0222  8745  888 5 07  0001  836A  &F1    IIR6  0001
0223  836A  888 3 07  0000  8746         IIR5  0000      3F
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0224  8746  888 0 60  84FB  8747  3       STA  TEMP1     -FAR8
0228  8685  888 1 07  0000  837A  V0001   IIR2  0000                F4. ROOM IN CORE
0229  837A  888 0 70  8749  8750          ADD               -F8
0230  8749  888 0 99  9995  0000          CON  99999        50000
0231  8750  888 0 07  0001  8752  -F8     IIR   0001        1F
0232  8751  888 0 07  0002  8752  &F8     IIR   0002        1F
0233  8752  888 0 70  83FC  838A  1       ADD  CORE
0234  838A  888 0 05  000A  839A          LDX  RA
0235  839A  888 0 70  8753  8754          ADD               -F9
0236  8753  888 0 99  9000  0000          CON  99900        00000
0237  8754  888 0 65  83FC  840A  -F9     STX  CORE                 F5. ASSIGN CORE ADDR.
0238  840A  888 0 65  88AB  841A          STX  RB9
0239  841A  888 8 07  8999  842A          IIR9  8999
0240  842A  888 0 60  8695  843A          STA  10001
0241  843A  888 8 07  0001  8756          IIR9  0001        FAREX
0242  8755  888 0 25  8758  844A  &F9     LDA# 00000        0000G
0243  844A  888 0 05  8759  8760          LDX               ERR2*
0244  8759  888 0 00  8761  8761          JMP
0245  8761  888 5 07  0001  8686          IIR6  0001        V0002
0246  8747  888 0 25  83FB  845A  -FAR8    LDA  TEMP                 F6. INITIALIZE
0247  845A  888 0 37  0400  846A          SHL   0400
0248  846A  888 0 70  84F8  847A          ADD  TEMP1
0249  847A  888 0 77  847A  848A          ATL
0250  848A  888 0 60  84AC  849A          STA  FLAG
0251  849A  888 5 00  8641  8641          JMP6 F0016
0252  8642  888 0 85  8762  8763  F0017   MUL  1F           2F
0253  8641  888 0 85  8762  8763  F0016   MUL  1F           2F
0254  8762  888 0 00  0000  00A5  1       CON  00000        000A5
0255  8763  888 0 35  8764  850A  2       ERS# 0000H        H5000
0256  850A  888 0 70  000A  8765          ADD  RA           3F
0257  8643  888 0 35  8766  8765  F0018   ERS  1F           3F
0258  8644  888 0 35  8766  8765  F0019   ERS  1F           3F
0259  8766  888 0 00  00CH  0000  1       CON  0000C        H0000
0260  8765  888 0 60  86AB  851A  3       STA  RB7
0261  851A  888 0 31  8767  8767          CLL
0262  8767  888 0 25  8617  852A          LDA  D0200
0263  852A  888 0 60  8417  8768          STA  D0000        -F2
0264  8768  888 6 25  8418  853A  -F2     LDA7 D0001                F7. TRY LEVEL
0265  853A  888 5 00  8629  8629          JMP6 F0004
0266  8630  888 6 35  8417  8629  F0005   ERS7 D0000        F0004
0267  8631  888 6 20  8468  854A  F0006   BUF7 D0051
0268  854A  888 6 20  8518  855A          BUF7 D0101
0269  855A  888 6 20  8568  8770          BUF7 D0151        1F
0270  8770  888 0 35  84AB  8629  1       ERS  H5B          F0004
0271  8632  888 6 35  8417  856A  F0007   ERS7 D0000
0272  856A  888 0 05  000A  857A          LDX  RA
0273  857A  888 6 25  8468  858A          LDA7 D0051
0274  858A  888 6 35  8467  859A          ERS7 D0050
0275  859A  888 0 20  000C  860A          BUF  RX
0276  860A  888 0 05  000A  861A          LDX  RA
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0277   8761A  888 6 25  8518  862A          LDA7 D0101
0278   862A   888 6 35  8517  863A          ERS7 D0100
0279   863A   888 0 20  000C  864A          BUF  RX
0280   864A   888 0 05  000A  865A          LDX  RA
0281   865A   888 6 25  8568  866A          LDA7 D0151
0282   866A   888 6 35  8567  867A          ERS7 D0150
0283   867A   888 0 20  000C  8770          BUF  RX          1B
0284   8629   888 0 82  8771  8772  F0004   TEQ              2F
0285   8771   888 0 25  81FC  868A          LDA  PANIC                  F8. DRUM EXHAUSTED
0286   868A   888 0 82  8773  869A          TEQ  3F
0287   869A   888 0 50  81FC  870A          STL  PANIC
0288   870A   888 0 25  8774  871A          LDA# 00000       0000G
0289   871A   888 0 05  8775  8760          LDX              ERR2*
0290   8775   888 0 00  8773  8773          JMP  3F
0291   8773   888 6 07  0001  872A  3       IIR7  0001
0292   872A   888 5 70  8645  8768          ADD6 F0020       -F2
0293   8645   888 0 99  9800  0000  F0020   CON  99980       00000
0294   8646   888 0 99  9800  0000  F0021   CON  99980       00000
0295   8647   888 0 99  9950  0000  F0022   CON  99995       00000
0296   8648   888 0 99  9950  0000  F0023   CON  99995       00000
0297   8769   888 0 25  84AC  873A  &F2      LDA  FLAG
0298   873A   888 0 82  8776  874A          TEQ  1F
0299   874A   888 0 50  84AC  875A          STL  FLAG
0300   875A   888 6 02  0000  8768          LIR7  0000       -F2
0301   8776   888 0 25  8777  876A  1       LDA# 00000       0000G
0302   876A   888 0 05  8778  8760          LDX              ERR2*
0303   8778   888 0 00  8779  8779          JMP
0304   8779   888 5 07  9998  877A          IIR6  9998
0305   877A   888 0 70  8780  8747          ADD              -FARB
0306   8780   888 0 99  9998  0000          CON  99999       80000
0307   8748   888 0 26  8781  8781  &FARB   CLA
0308   8781   888 0 60  8695  8756          STA  10001       FAREX
0309   8772   888 5 00  8633  8633  2       JMP6 F0008                  F9. CALCULATE ADDRESS
0310   8635   888 6 25  8418  8782  F0010   LDA7 D0001       1F
0311   8782   888 0 35  84A8  878A  1       ERS  HSB
0312   878A   888 0 82  8783  8784          TEQ              2F
0313   8783   888 6 07  0050  8772          IIR7  0050       2F
0314   8636   888 6 25  8418  879A  F0011   LDA7 D0001
0315   879A   888 6 35  8417  8782          ERS7 D0000       1F
0316   8633   888 6 25  8418  8784  F0008   LDA7 D0001       2F
0317   8634   888 6 25  8418  880A  F0009   LDA7 D0001
0318   880A   888 6 35  8417  8784          ERS7 D0000       2F
0319   8784   888 0 05  000A  881A  2       LDX  RA
0320   881A   888 0 35  8785  882A          ERS# GGGGG       GGGGG
0321   882A   888 0 82  8786  883A          TEQ  1F
0322   883A   888 0 35  8787  884A          ERS# 99999       99999
0323   884A   888 0 82  8788  885A          TEQ  2F
0324   885A   888 0 35  8789  886A          ERS# 55555       55555
0325   886A   888 0 82  8790  887A          TEQ  3F
0326   887A   888 0 25  8791  8792          LDA              4F
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0327  8791  888 0 CH  HHHH  HHHH            CON   CHHHH     HHHHH
0328  8790  888 0 25  8793  888A    3       LDA#  8HHHH     HHHHH
0329  888A  888 0 30  8794  8792            LDL             4F
0330  8794  888 0 00  2000  0000            CON   00200     00000
0331  8788  888 0 25  8795  889A    2       LDA#  FHHHH     HHHHH
0332  889A  888 0 30  8796  8792            LDL             4F
0333  8796  888 0 00  4000  0000            CON   00400     00000
0334  8786  888 0 25  8797  890A    1       LDA#  GHHHH     HHHHH
0335  890A  888 0 30  8798  8792            LDL             4F
0336  8798  888 0 00  6000  0000            CON   00600     00000
0337  8792  888 0 50  88AB  891A    4       STL   RB9
0338  891A  888 0 30  000C  892A            LDL   RX
0339  892A  888 0 05  8799  8800            LDX             1F
0340  8799  888 0 HH  HHHH  HHHH            CON   HHHHH     HHHHH
0341  8800  888 0 60  82FC  893A    1       STA   MASK
0342  893A  888 0 35  0008  894A            ERS   RL
0343  894A  888 0 82  8801  8802            TEQ             1F
0344  8801  888 8 07  0200  895A            IIR9  0200
0345  895A  888 0 25  82FC  896A            LDA   MASK
0346  896A  888 0 32  0100  8800            SHR    0100     1B
0347  8802  888 5 00  8637  8637    1       JMP6  F0012                F10.RESERVE ADDRESS.
0348  8639  888 6 25  8418  897A    F0014   LDA7  D0001
0349  897A  888 0 35  82FC  8637            ERS   MASK      F0012
0350  8638  888 6 25  8417  8803    F0013   LDA7  D0000     1F
0351  8640  888 6 25  8417  8803    F0015   LDA7  D0000     1F
0352  8803  888 0 35  82FC  898A    1       ERS   MASK
0353  898A  888 6 60  8417  8639            STA7  D0000     F0014
0354  8637  888 6 60  8418  899A    F0012   STA7  D0001
0355  899A  888 0 25  8417  800F            LDA   D0000
0356  800F  888 0 35  8617  801F            ERS   D0200
0357  801F  888 0 60  8617  802F            STA   D0200
0358  802F  888 6 07  0000  803F            IIR7   0000
0359  803F  888 0 31  8804  8804            CLL
0360  8804  888 0 82  8805  8806            TEQ             1F          F11.FINISH UP
0361  8805  888 0 07  0199  8807            IIR    0199     2F
0362  8806  888 0 75  8808  8807    1       SUB             2F
0363  8808  888 0 00  0001  0000            CON   00000     10000
0364  8807  888 0 70  88AB  804F    2       ADD   RB9
0365  804F  888 0 60  8695  805F            STA   10001
0366  805F  888 6 07  0000  806F            IIR7   0000
0367  806F  888 0 70  88AB  8756            ADD   RB9       FAREX
0368  8756  888 0 06  8809  8809    FAREX   CLX
0369  8809  888 0 60  8694  807F            STA   10000
0370  807F  888 0 60  8696  808F            STA   10002
0371  808F  888 0 32  0400  80F8            SHR    0400     EXIT
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0372  8810  888 1 29  8706  909F   FIND*   LDA3 A                          Q.  MASTER ADDRESS CALCULATOR (FIND*)
0373  809F  888 0 65  87FB  810F           STX  0EFX
0374  810F  888 0 50  88FB  811F           STL  UDEFX
0375  811F  888 0 60  89FB  812F           STA  SYMBL
0376  812F  888 0 30  8811  813F           LDL# 00000      88888
0377  813F  888 0 82  8812  814F           TEQ  BLNK                       Q1. WHAT KIND
0378  814F  888 0 30  8813  815F           LDL# 20000      88888
0379  815F  888 0 82  8814  816F           TEQ  SELF
0380  816F  888 0 35  8815  817F           ERS# H0000      H0000
0381  817F  888 0 30  8816  818F           LDL# 00000      80000
0382  818F  888 0 82  8817  819F           TEQ  ABS
0383  819F  888 0 25  89FB  820F           LDA  SYMBL
0384  820F  888 0 35  8818  821F           ERS# 00000      03333
0385  821F  888 0 C1  821F  822F           MTX
0386  822F  888 0 20  8819  823F           BUF# OHHHH      00000
0387  823F  888 0 35  89FB  824F           ERS  SYMBL
0388  824F  888 0 35  8820  825F           ERS# OHHHH      04444
0389  825F  888 0 31  8821  8821           CLL
0390  8821  888 0 50  80FC  826F           STL  INCRE
0391  826F  888 0 82  8822  827F           TEQ  REG
0392  827F  888 0 25  89FB  828F           LDA  SYMBL
0393  828F  888 0 35  8823  829F           ERS# 00000      H0000
0394  829F  888 0 60  83AB  830F           STA  RB5
0395  830F  888 0 35  8824  831F           ERS# 00000      30000
0396  831F  888 0 C1  831F  832F           MTX
0397  832F  888 0 20  8825  833F           BUF# HHHHH      0HHHH
0398  833F  888 0 35  89FB  834F           ERS  SYMBL
0399  834F  888 0 35  8826  835F           ERS# HHHHH      4HHHH
0400  835F  888 0 30  8827  836F           LDL# 01000      06888
0401  836F  888 0 82  8828  837F           TEQ  LOCF
0402  837F  888 0 30  8829  838F           LDL# 01000      02888
0403  838F  888 0 82  8830  839F           TEQ  LOCB
0404  839F  888 0 30  8831  840F           LDL# 00000      08888
0405  840F  888 0 82  8832  841F           TEQ  LOCL
0406  841F  888 0 25  89FB  842F           LDA  SYMBL
0407  842F  888 0 35  8833  843F           ERS# H0000      H0000
0408  843F  888 0 30  8834  844F           LDL# 10000      C0000
0409  844F  888 0 82  8835  845F           TEQ  PLUS
0410  845F  888 0 30  8836  846F           LDL# 00000      A0000
0411  846F  888 0 82  8837  847F           TEQ  MINUS
0412  847F  888 0 31  8838  8838           CLL
0413  8838  888 0 35  8839  848F           ERS# H0000      00000
0414  848F  888 0 82  8840  849F           TEQ  ADERR
0415  849F  888 1 02  0004  8841           LIR2  0004      LOOK1
0416  8837  888 3 02  0001  8842   MINUS   LIR5  0001      1F
0417  8835  888 3 02  0000  8842   PLUS    LIR5  0000      1F
0418  8842  888 1 02  0005  8841   1       LIR2  0005      LOOK1
0419  8812  888 0 31  8843  8843   BLNK    CLL                             Q2. BLANK:ZERO
0420  8843  888 0 25  84FC  850F           LDA  BLANK
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0421  850F  888 1 02  0002  8844                LIR2  0002      FEX
0422  8844  888 0 82  88F8  87F8      FEX       TEQ   UDEFX     DEFX
0423  8814  888 0 25  85FC  87F8      SELF      LDA   ALOC      DEFX        Q3. 'A' LOCATION
0428  8822  888 0 25  89F8  851F      REG       LDA   SYMBL                 Q4. CHANGE TO R0000.
0429  851F  888 0 35  8845  852F                ERS#  00000     OHHHH
0430  852F  888 0 60  80FC  853F                STA   INCRE
0431  853F  888 0 25  89F8  854F                LDA   SYMBL
0432  854F  888 0 35  8846  855F                ERS#  H0000     H0000
0433  855F  888 1 02  0000  8847                LIR2  0000      LOOK
0434  8817  888 0 25  89F8  856F      ABS       LDA   SYMBL                 Q5. PROCESS ABS ADDR.
0435  856F  888 0 31  8848  8848                CLL
0436  8848  888 0 35  8849  857F                ERS#  02222     00000
0437  857F  888 0 82  8850  8840                TEQ             ADERR
0438  8850  888 0 25  89F8  858F                LDA   SYMBL
0439  858F  888 0 35  8851  859F                ERS#  HHHHH     OHHHH
0440  859F  888 0 75  000A  860F                SUB   RA
0441  860F  888 0 82  8852  8840                TEQ   1F        ADERR
0442  8840  888 0 30  8853  8736      ADERR     LDL             ERR1*       Q6. ERROR
0443  8853  888 0 26  87F8  87F8                CLA   DEFX
0444  8852  888 0 25  89F8  861F      1         LDA   SYMBL
0445  861F  888 0 35  8854  862F                ERS#  01111     00000
0446  862F  888 0 70  000A  863F                ADD   RA
0447  863F  888 0 70  000A  864F                ADD   RA
0448  864F  888 0 32  0500  865F                SHR    0500
0449  865F  888 0 20  89F8  866F                BUF   SYMBL
0450  866F  888 0 35  8855  87F8                ERS             DEFX
0451  8855  888 0 00  0000  HHHH                CON   00000     OHHHH
0452  8828  888 3 25  8649  867F      LOCF      LDA5  I0000                 Q7. I(N)=ZERO
0453  867F  888 0 31  8856  8856                CLL
0455  8856  888 1 02  0001  8844                LIR2  0001      FEX
0456  8830  888 3 25  8659  868F      LOCB      LDA5  J0000                 Q8. J(N)=ZERO
0457  868F  888 0 31  8857  8857                CLL
0460  8857  888 0 82  8840  87F8                TEQ   ADERR     DEFX
0461  8832  888 3 25  8649  869F      LOCL      LDA5  I0000                 Q9. I(N)=ZERO
0462  869F  888 0 31  8858  8858                CLL
0463  8858  888 3 50  8649  870F                STL5  I0000
0464  870F  888 1 02  0003  871F                LIR2  0003
0465  871F  888 0 82  88F8  872F                TEQ   UDEFX
0466  872F  888 3 60  8659  87F8                STA5  J0000     DEFX
0467  8841  888 0 25  89F8  8847      LOOK1     LDA   SYMBL     LOOK        Q10.SRCH*
0468  8847  888 0 77  8847  873F      LOOK      ATL
0469  873F  888 0 25  88F8  874F                LDA   UDEFX
0470  874F  888 0 05  8859  8712                LDX             SRCH*
0471  8859  888 0 70  80FC  875F                ADD   INCRE
0472  875F  888 0 35  8860  87F8                ERS             DEFX
0473  8860  888 0 00  0000  HHHH                CON   00000     OHHHH
0474
0477
0481
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0487   8861  888 1 00  8619  8619      DEFN*   JMP2 E0000                  D.  DEFINE ADDRESS (DEFN*)
0493   8619  888 0 05  000A  876F      E0000   LDX  RA                      D1. WHAT TYPE
0494   876F  888 0 25  8862  877F              LDA# 00000      10000
0495   877F  888 0 75  80FC  878F              SUB  INCRE
0496   878F  888 0 32  0F00  879F              SHR   0F00
0497   879F  888 0 70  000C  880F              ADD  RX
0498   880F  888 0 35  8863  8623              ERS             E0004
0499   8863  888 0 00  0000  HHHH              CON  00000      0HHHH
0500   8620  888 3 60  8649  0008      E0001   STA5 10000      RL
0501   8621  888 0 60  84FC  0008      E0002   STA  BLANK      RL          D2. CALCULATE BASE
0507   8622  888 3 60  8659  0008      E0003   STA5 J0000      RL
0508   8623  888 0 64  2000  0008      E0004   STA1 ETAB       RL
0509   8624  888 0 50  88FC  881F      E0005   STL  DEXIT                  D3. STORE TWO.
0510   881F  888 3 25  8694  882F              LDA5 10000
0511   882F  888 0 06  8864  8864              CLX
0512   8864  888 0 32  0400  883F              SHR   0400
0513   883F  888 0 64  2000  884F              STA1 ETAB
0514   884F  888 0 60  84FB  885F              STA  TEMP1
0515   885F  888 0 29  1000  886F              LDA1 STAB
0516   886F  888 3 00  8697  8697              JMP5 10003
0517   8697  888 0 35  8865  8866      10003   ERS             1F
0518   8865  888 0 0H  HHHA  HHHH              CON  0HHHH      AHHHH
0519   8698  888 0 20  8867  8866      10004   BUF             1F
0520   8867  888 0 10  000C  0000              CON  10000      C0000
0521   8866  888 0 77  8866  887F      1       ATL
0522   887F  888 0 25  8868  8712              LDA             SRCH*
0523   8868  888 0 00  8869  8869              JMP
0524   8869  888 3 25  8695  888F              LDA5 10001
0525   888F  888 0 06  8870  8870              CLX
0526   8870  888 0 32  0400  889F              SHR   0400
0527   889F  888 0 64  2000  890F              STA1 ETAB
0528   890F  888 0 25  84F8  88FC              LDA  TEMP1      DEXIT
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0529  8871  888 0 50  80FB  891F  AJST*  STL  EXIT                  A.  AJST* SUBROUTINE.
0536  891F  888 0 30  000A  892F         LDL  RA                    A1. WHAT TYPE ADDRESS
0537  892F  888 0 25  8872  8873         LDA            8F
0538  8872  888 1 00  0000  0000         CON1 00000     00000
0539  8873  888 0 70  000B  893F  8      ADD  RL
0540  893F  888 0 82  8874  894F         TEQ  1F
0541  894F  888 0 25  89FH  80F8         LDA  OPTIM     EXIT
0542  8874  888 0 60  84FB  895F  1      STA  TEMP1
0543  895F  888 0 70  8875  896F         ADD# 00000     10000
0544  896F  888 0 75  89FH  897F         SUB  OPTIM                 A2. FIGURE DRUM ROLL
0545  897F  888 0 60  83FB  898F         STA  TEMP
0546  898F  888 0 25  000B  899F         LDA  RL
0547  899F  888 0 35  8876  8877         ERS# 00000     0H000
0548  8877  888 0 30  89AB  8878         LDL  HSB1
0549  8878  888 0 82  8879  8880         TEQ  1F
0550  8880  888 0 30  83FB  8881         LDL  TEMP
0551  8881  888 0 85  8882  8883         MUL# 00000     0A005
0552  8883  888 0 30  000C  8884         LDL  RX                    A3. CHECK BAD TIMING.
0553  8884  888 0 25  8885  8886         LDA            2F
0554  8885  888 0 99  0A00  0000         CON  990A0     00000
0555  8879  888 0 25  83FB  8887  1      LDA  TEMP
0556  8887  888 0 35  8888  8889         ERS# 00000     000CH
0557  8889  888 0 77  8889  8890         ATL
0558  8890  888 0 70  89FH  8891         ADD  OPTIM
0559  8891  888 0 60  84FB  8892         STA  TEMP1
0560  8892  888 0 25  8893  8886         LDA            2F
0561  8893  888 0 00  0000  0048         CON  00000     00048
0562  8886  888 0 87  8894  8895  2      TGR  1F
0563  8895  888 0 25  8896  8897         LDA# 00000     0000A
0564  8897  888 0 05  8894  8760         LDX  1F        ERR2*
0565  8894  888 0 25  84FB  8898  1      LDA  TEMP1
0566  8898  888 0 35  8899  80FB         ERS            EXIT
0567  8899  888 0 00  0000  0HHH         CON  00000     00HHH
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0568  8900  888 0 50  8901  8903  OTPT*   STL  -OEX                    0.  OUTPUT SUBROUTINE.
0569  8903  888 0 77  8903  8904          ATL
0570  8904  888 0 25  83AC  8905          LDA  LINEO
0571  8905  888 0 20  8906  000A          BUF            RA            01. TRANSFER
0572  8906  888 0 08  0000  8907          LIR1  0000
0573  8907  888 0 69  4803  8908          STX1 70003
0574  8908  888 0 50  84F8  8909          STL  TEMP1
0575  8909  888 0 65  85F8  8910          STX  TEMP2
0576  8910  888 0 0G  0004  8911          IIR1  0004
0577  8911  888 0 60  83AC  8912          STA  LINEO
0578  8912  888 0 54  4797  8913          STL1 79997                    02. BUFFER FULL
0579  8913  888 0 70  8914  8901          ADD            -OEX
0580  8914  888 0 99  9800  0000          CON  99980     00000
0581  8902  888 0 60  83AC  8915  &OEX    STA  LINEO
0582  8915  888 0 05  8916  8917          LDX  2F                       03. WRITE TAPE
0583  8917  888 0 30  8918  8919          LDL            TSUB*
0584  8918  888 0 C6  4800  8916          TBL  70000     2F
0585  8916  888 0 H2  0500  8901  2       TWR  OTAP1     -OEX
0586  8920  888 0 65  81F8  8921  UNDG*   STX  EXIT1                        THIS IS AN EDITING SUBROUTINE WHICH TAKES
0587  8921  888 0 05  000A  8922          LDX  RA                           A TEN DIGIT WORD IN RA AND PRODUCES IN
0588  8922  888 0 35  8923  8924          ERS# 33333     33333              COMPUTER CODE THE CONVENTIONAL NOTATION FOR
0589  8924  888 0 C1  8924  8925          MTX                               UNDIGITS, ABCFGH. THE ZONE WORD IS PUT INTO
0590  8925  888 0 35  000C  8926          ERS  RX                           RA, NUMERIC IN RX AT EXIT.
0591  8926  888 0 35  8927  8928          ERS# 44444     44444
0592  8928  888 0 70  8929  8930          ADD# 44444     44444
0593  8930  888 0 77  8930  8931          ATL
0594  8931  888 0 20  8932  8933          BUF# 88888     88888
0595  8933  888 0 35  000C  8934          ERS  RX
0596  8934  888 0 05  000A  8935          LDX  RA
0597  8935  888 0 25  8936  8937          LDA# 11111     11111
0598  8937  888 0 35  000B  81F8          ERS  RL        EXIT1
0599                                      HHH        H
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0600  4200  888 0 26  4203  4203   START  CLA  1F                      E.  EDIT INPUT CARD.
0601  4201  888 0 26  4203  4203   STRT   CLA  1F
0602  4203  888 0 60  80FG  4207   1      STA  R
0603  4207  888 0 60  89FC  4211          STA  SIGN
0604  4211  888 0 60  86FB  4215          STA  ERROR
0605  4215  888 0 29  8001  4220          LDA1  8001
0606  4220  888 0 05  000A  4224          LDX  RA
0607  4224  888 0 75  81FG  4029          SUB  LINE
0608  4029  888 0 30  4231  4233          LDL# 00000      00001
0609  4233  888 0 82  4036  4236          TEQ  1F
0610  4236  888 0 67  1111  4036          HLT   1111      1F
0611  4036  888 0 65  81FG  4040   1      STX  LINE
0618  4040  888 0 29  8003  4045          LDA1  8003                  E1. CHECK LINE NO.
0619  4045  888 0 09  8009  4400          LDX1  8009
0620  4400  888 0 32  0500  4208          SHR   0500
0621  4208  888 0 20  4210  4212          BUF# 88888      00000
0622  4212  888 0 60  0334  4436          STA   0334
0623  4436  888 0 25  000C  4240          LDA  RX                     E2. TRANSFER
0624  4240  888 0 20  4042  4044          BUF# 00008      00008
0625  4044  888 0 60  0218  4420          STA   0218
0626  4420  888 0 29  8002  4225          LDA1  8002
0627  4225  888 0 09  8008  4230          LDX1  8008
0628  4230  888 0 32  0500  4038          SHR   0500
0629  4038  888 0 60  0339  4041          STA   0339
0630  4041  888 0 65  0223  4425          STX   0223
0631  4425  888 0 29  8007  4430          LDA1  8007
0632  4430  888 0 20  4232  4234          BUF# 00000      00008
0633  4234  888 0 09  8006  4039          LDX1  8006
0634  4039  888 0 60  0241  4043          STA   0241
0635  4043  888 0 65  0246  4048          STX   0246
0636  4048  888 0 29  8005  4403          LDA1  8005
0637  4403  888 0 20  4205  4407          BUF# 00000      00008
0638  4407  888 0 09  8004  4412          LDX1  8004
0639  4412  888 0 60  0303  4405          STA   0303
0640  4405  888 0 65  0308  4410          STX   0308
0641                                      HHH          C
0642  4410  888 1 02  0000  8938          LIR2  0000      -ST         E3. SEPARATE OFF R, H.
0643  8938  888 0 29  8003  8940   -ST    LDA1  8003
0644  8940  888 0 06  8941  8941          CLX
0645  8941  888 0 32  0500  8942          SHR   0500
0646  8942  888 1 60  8699  8943          STA2 30000
0647  8943  888 0 25  80FG  8944          LDA  R
0648  8944  888 0 32  0900  8945          SHR   0900
0649  8945  888 0 65  80FG  8946          STX  R
0650  8946  888 0 06  8947  8947          CLX
0651  8947  888 0 32  0700  8948          SHR   0700
0652  8948  888 1 60  8707  8949          STA2 AH
0653  8949  888 0 29  8002  8950          LDA1  8002
0654  8950  888 0 35  8951  8952          ERS# HHHHH      00000
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0655  8952  888 1 60  8700  8953          STA2 30001
0656  8953  888 1 20  8699  8954          BUF2 30000
0657  8954  888 1 60  8706  8955          STA2 A
0658  8955  888 0 29  8002  8956          LDA1  8002
0659  8956  888 0 37  0400  8957          SHL   0400
0660  8957  888 0 35  8958  8959          ERS# 00HHH      00000
0661  8959  888 1 20  8707  8960          BUF2 AH
0662  8960  888 1 60  8707  8961          STA2 AH
0663  8961  888 0 06  0002  8962          IIR1  0002
0664  8962  888 1 07  0002  8963          IIR2  0002
0665  8963  888 0 70  8964  8938          ADD              -ST
0666  8964  888 0 99  9994  0000          CON  99999       40000
0667                                      HHH         H
0668  8939  888 0 29  8004  4244  &ST    LDA1  8004                    E4. MOVE COMMENTS
0669  4244  888 0 60  8669  4248          STA  R0000
0670  4248  888 0 29  8005  4603          LDA1  8005
0671  4603  888 0 20  4605  4607          BUF# 80000      00000
0672  4607  888 0 60  8670  4411          STA  R0001
0673  4411  888 0 29  8006  4016          LDA1  8006
0674  4016  888 0 60  8671  4620          STA  R0002
0675  4620  888 0 29  8007  4625          LDA1  8007
0676  4625  888 0 60  8672  4229          STA  R0003
0677  4229  888 0 29  8008  4434          LDA1  8008
0678  4434  888 0 60  8673  4238          STA  R0004
0679  4238  888 0 29  8009  4243          LDA1  8009
0680  4243  888 0 60  8674  4047          STA  R0005
0681  4047  888 0 29  8010  4202          LDA1  8010
0682  4202  888 0 60  8675  4206          STA  R0006
0683  4206  888 0 29  8011  4611          LDA1  8011
0684  4611  888 0 60  8676  4415          STA  R0007
0685  4415  888 0 29  8012  4070          LDA1  8012
0686  4070  888 0 60  8677  4424          STA  R0008
0687  4424  888 0 29  8013  4429          LDA1  8013
0688  4429  888 0 60  8678  4433          STA  R0009
0689  4433  888 0 25  8701  4037          LDA  30002
0690  4037  888 0 37  0500  4245          SHL   0500                    E5. CONSTRUCT CONSTANTS
0691  4245  888 0 20  8703  4049          BUF  30004
0692  4049  888 0 60  82FG  4053          STA  MCN
0693  4053  888 0 25  8704  4057          LDA  30005
0694  4057  888 0 06  4610  4610          CLX
0695  4610  888 0 32  0500  4018          SHR   0500
0696  4018  888 0 20  8702  4222          BUF  30003
0697  4222  888 0 60  83FG  4026          STA  MCZ
0698  4026  888 0 35  4028  4630          ERS# 11111      11111
0699  4630  888 0 70  000A  4235          ADD  RA
0700  4235  888 0 70  000A  4440          ADD  RA
0701  4440  888 0 20  82FG  4444          BUF  MCN
0702  4444  888 0 60  84FG  4448          STA  MC
0703  4448  888 0 29  8003  4253          LDA1  8003
0704  4253  888 0 06  4406  4406          CLX                           E6. EDIT OP CODE.
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0705  4406  888 0 32  0700  4216            SHR   0700
0706  4216  888 0 30  000A  4270            LDL   RA
0707  4270  888 0 29  8002  4075            LDA1  8002
0708  4075  888 0 32  0700  4435            SHR   0700
0709  4435  888 0 37  0500  4443            SHL   0500
0710  4443  888 0 20  0008  4247            BUF   RL
0711  4247  888 0 20  4249  4401            BUF#  88000     88000
0712  4401  888 0 60  85FG  4055            STA   OP
0713  4055  888 0 65  86FG  4209            STX   IR
0714  4209  888 0 06  0014  4213            IIR1  0014      2F
0715  4213  888 0 60  87FG  4017  2         STA   TAPEI                 E7. INPUT BUFFER EMPTY
0716  4017  888 0 29  8000  4422            LDA1  8000
0717  4422  888 0 31  4275  4275            CLL
0718  4275  888 0 82  4228  4428            TEQ   6F
0719  4428  888 0 09  8001  4633            LDX1  8001
0720  4633  888 0 30  000C  8919            LDL   RX          TSUB*     E8. SWAP BUFFERS
0721  8201  888 0 G2  0300  4218  50200     TRD   ITAP1
0722  4218  888 0 08  0201  4221            LIR1  0201
0723  4221  888 0 25  4223  4475            LDA   TCON1       1F
0724  4223  888 0 F6  8001  4453  TCON1     TBU   50000       -5
0725  4454  888 0 67  8888  4453  &5        HLT    8888       -5
0726  4453  888 0 60  8200  4257  -5        STA   50199       3F
0727  8402  888 0 G2  0300  4019  60200     TRD   ITAP1
0728  4019  888 0 08  0000  4622            LIR1  0000
- 0729  4622  888 0 25  4624  4475            LDA   TCON2       1F
0730  4624  888 0 F6  8202  4653  TCON2     TBU   60000       -6
0731  4654  888 0 67  8888  4653  &6        HLT    8888       -6
0732  4653  888 0 60  8401  4257  -6        STA   60199       3F
0733  4257  888 0 31  4060  4060  3         CLL   3F
0734  4475  888 0 60  88FG  4629  1         STA   TCONT
0735  4629  888 0 0G  0000  4083            IIR1  0000
0736  4083  888 0 60  87FG  4228            STA   TAPEI       6F
0737  8919  888 0 50  80FH  4423  TSUB*     STL   TEX1                  TAPE SUBROUTINE. RL IS EXIT; RX IS TAPE INST.
0738  4423  888 0 65  81FH  4027            STX   TEX         1F
0739  4027  888 0 C7  4432  4027  1         TBT               *         WAIT UNTIL PREV TAPE INSTRUCTION CLEARS.
0740  4432  888 0 26  4635  4635            CLA
0741  4635  888 0 82  4438  4638            TEQ   2F
0742  4638  888 0 25  89FG  4242            LDA   LTAPE
0743  4242  888 0 67  2222  000A            HLT    2222       RA        HALT IF INDICATOR LIGHT ON
0744  4438  888 0 25  88FG  4442  2         LDA   TCONT
0745  4442  888 0 31  4445  4445            CLL                         IF PRECEDING WAS A READ; UNLOAD BUFFER
0746  4445  888 0 82  4060  000A            TEQ   3F          RA
0747  4060  888 0 50  88FG  4402  3         STL   TCONT                 PUT NEXT TAPE INSTRUCTION INTO LTAPE
0748  4402  888 0 25  81FH  4606            LDA   TEX
0749  4606  888 0 35  4408  4260            ERS#  HHHHH       H0000
0750  4260  888 0 20  4612  4214            BUF               8F
0751  4612  888 0 00  0000  4027            JMP    0000       1B
0752  4214  888 0 60  89FG  80FH  8         STA   LTAPE       TEX1
0753  4228  888 0 30  85FG  4632  6         LDL   OP                   E9. OP SRCH*.
0754  4632  888 0 25  4634  4636            LDA#  88220       88658
```

```
0755  4636 888 0 82  4239  4439
0756  4056 888 1 08  0006  4409    ONSW
0757  4409 888 0 05  4061  4413
0758  4413 888 0 25  4615  7712
0759  4615 888 0 30  4219  8736
0760  4219 888 0 25  4623  4675
0761  4675 888 0 64  2000  4061    1
0762  4061 888 0 30  4613  4065
0763  4065 888 0 87  4418  000A
0764  4418 888 0 60  85FG  4072
0765  4072 888 0 30  4074  4226
0766
```

```
      TEQ   ONN
      LIRJ  0006
      LDX   1F
      LDA
      LDL
      LDA#  67220
      STA1  ETAB
      LDL#  CCCCC
      TGR
      STA   OP
      LDL   PROCM
HHH
H
```

```
      SWICH
      SRCH#
      ERR1#
      00000
      1F
      CCCCC
      RA
      PROCA
```

```
  0767  4226  888 1 08  0000  4079      PROCA   LIR3  0000                    L.  PROCESS A ADDRESS.
  0768  4079  888 0 50  B2FH  4283              STL   AEX
  0769  4283  888 0 25  8706  4237              LDA   A
  0770  4237  888 0 30  4639  4241              LDL#  00000     88888       L1. CHECK BLANK A
  0771  4241  888 0 82  4644  4094              TEQ   1F
  0772  4094  888 0 31  4447  4447              CLL
  0773  4447  888 0 25  B4FC  4601              LDA   BLANK
  0774  4601  888 0 82  4644  4204              TEQ   1F
  0775  4204  888 0 30  4644  8736              LDL   1F        ERR1*
  0776  4644  888 0 05  4648  4600      1       LDX   2F                        L2. FIND* A.
  0777  4600  888 0 30  4602  8810              LDL           FIND*
  0778  4602  888 1 00  4010  4010              JMP2  L0000
- 0779  4010  888 1 02  0002  4012      L0000   LIR2  0002    L0002
- 0780  4011  888 1 02  0002  4012      L0001   LIR2  0002    L0002
  0781  4012  888 0 30  4014  8736      L0002   LDL   L0004    ERR1*
  0782  4013  888 0 25  B1FG  4217      L0003   LDA   LINE     1F              L3. FARB*,DEFN*.
- 0783  4014  888 0 25  B1FG  4217      L0004   LDA   LINE     1F
- 0784  4015  888 0 25  B1FG  4217      L0005   LDA   LINE     1F
  0785  4217  888 0 30  4419  8723      1       LDL           FARB*
  0786  4419  888 0 30  4648  8861              LDL   2F        DEFN*
  0787  4648  888 0 60  B5FC  4404      2       STA   ALOC
  0788  4404  888 0 30  B6FC  4608              LDL   MLOC
  0789  4608  888 0 82  4261  4461              TEQ   3F                        L4. ADJUST A LEVEL.
  0790  4461  888 0 30  B7FC  4265              LDL   CLOC
  0791  4265  888 0 82  4618  4068              TEQ   4F        2F
  0792  4618  888 0 25  B5FH  4272      4       LDA   CLEV      1F
  0793  4261  888 0 30  B7FC  4465      3       LDL   CLOC
  0794  4465  888 0 25  4417  4619              LDA           8F
  0795  4417  888 1 00  0000  0000              CON1  00000     00000
  0796  4619  888 0 70  000B  4274      8       ADD   RL
  0797  4274  888 0 82  4227  4618              TEQ           4B
  0798  4227  888 0 25  B4FH  4272              LDA   MLEV      1F
  0799  4272  888 0 60  B3FH  4426      1       STA   ALEV
  0800  4426  888 0 31  4279  4279              CLL                           L5. ZERO TO BLANK.
  0801  4279  888 0 50  B4FC  B2FH              STL   BLANK     AEX
  0804  4068  888 0 25  4470  4472      2       LDA           8F
  0805  4470  888 1 00  0000  0000              CON1  00000     00000
  0806  4472  888 0 70  B5FC  4272      8       ADD   ALOC      1B
```

```
0807  4074  BBB 0 25  B6FG  4628  PROCM  LDA  IR                    P.  PROCESSING OF INSTRUCTIONS
0808  4628  BBB 0 30  4080  4082        LDL# 00000  00800          P1. PROCESS A
0809  4082  BBB 0 82  4085  4285        TEQ  1F
0810  4285  BBB 0 30  4437  4089        LDL# 10000  00H00          P2. CALCULATE M OPTIM
0811  4089  BBB 0 82  4085  4642        TEQ  1F
0812  4642  BBB 0 25  B3FH  4046        LDA  ALEV
0813  4046  BBB 0 70  4098  4051        ADD# 00000  00001
0814  4051  BBB 0 60  B3FH  4085        STA  ALEV   1F
0815  4085  BBB 0 25  B5FG  4289  1     LDA  OP
0816  4289  BBB 0 32  0200  4294        SHR   0200
0817  4294  BBB 0 35  4246  4298        ERS# 00000  000HH
0818  4298  BBB 0 70  B3FH  4103        ADD  ALEV
0819  4103  BBB 0 60  B9FH  4457        STA  OPTIM
0820  4457  BBB 1 08  0002  4460        LIR3  0002
0821  4460  BBB 0 25  B6FG  4414        LDA  IR
0822  4414  BBB 0 30  4416  4268        LDL# 10000  00H00          P3. LITERAL
0823  4268  BBB 0 82  4421  4621        TEQ  5F
0824  4621  BBB 0 37  0200  4626        SHL   0200
0825  4626  BBB 0 31  4479  4479        CLL
0826  4479  BBB 0 06  4282  4282        CLX
0827  4282  BBB 0 70  4084  000A        ADD  3F     RA              P4. FIGURE INDEXING
0828  4084  BBB 0 25  4000  4052  3     LDA  Q0000  4F
0829  4000  BBB 0 00  0000  0000  Q0000 CON  00000  00000
0830  4001  BBB 0 40  0000  0000  Q0001 CON  40000  00000
0831  4002  BBB 0 00  0000  0001  Q0002 CON  00000  00001
0832  4003  BBB 0 40  0000  0001  Q0003 CON  40000  00001
0833  4004  BBB 0 00  0000  0002  Q0004 CON  00000  00002
0834  4005  BBB 0 00  0000  0003  Q0005 CON  00000  00003
0835  4006  BBB 0 00  0000  0005  Q0006 CON  00000  00005
0836  4007  BBB 0 00  0000  0006  Q0007 CON  00000  00006
0837  4008  BBB 0 00  0000  0007  Q0008 CON  00000  00007
0838  4009  BBB 0 00  0000  0008  Q0009 CON  00000  00008
0839  4052  BBB 0 60  B9FC  4256  4     STA  SIGN
0840  4256  BBB 0 32  0100  4660        SHR   0100
0841  4660  BBB 0 20  B5FG  4614        BUF  OP
0842  4614  BBB 0 60  B5FG  4468        STA  OP     PRCM1
0843  4421  BBB 0 25  B9FH  4125  5     LDA  OPTIM                  P5. CREATE CONSTANT
0844  4125  BBB 0 30  4427  8723        LDL          FARB*
0845  4427  BBB 0 60  B6FC  4483        STA  MLOC
0846  4483  BBB 0 30  4485  8871        LDL          AJST*
0847  4485  BBB 0 60  B4FH  4441        STA  MLEV
0848  4441  BBB 0 25  B6FC  4645        LDA  MLOC
0849  4645  BBB 0 32  0800  4456        SHR   0800
0850  4456  BBB 0 25  B0FG  4110        LDA  R
0851  4110  BBB 0 35  4062  4064        ERS# 00000  000H0
0852  4064  BBB 0 32  0200  4069        SHR   0200
0853  4069  BBB 0 25  B4FG  4073        LDA  MC
0854  4073  BBB 0 30  4325  8900        LDL          OTPT*
0855  4325  BBB 0 25  4679  4431        LDA# 00000  BBBBB
```

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0856   4431  888 0 60  8710  4685          STA  C        PROCC
0857   4468  888 0 05  4670  4672  PRCM1   LDX  2F                    P6. FIND* M.
0858   4672  888 0 30  4474  8810          LDL           FIND*
0859   4474  888 0 31  4129  4129          CLL
0860   4129  888 1 00  4020  4020          JMP2 M0000
0861   4022  888 0 25  85FG  4076  M0002   LDA  OP                    P7. FARB*, DEFN*.
0862   4076  888 0 35  4078  4280          ERS# 00020    00000
0863   4280  888 0 82  4021  4683          TEQ  M0001
0864   4683  888 0 25  85FC  4670          LDA  ALOC     2F
0865   4020  888 0 30  4122  8736  M0000   LDL  1F       ERR1*
0866   4023  888 0 30  4122  8736  M0003   LDL  1F       ERR1*
0867   4122  888 0 26  4670  4670  1       CLA  2F
0868   4025  888 0 25  89FH  4329  M0005   LDA  OPTIM    1F
0869   4024  888 0 25  89FH  4329  M0004   LDA  OPTIM    1F
0870   4021  888 0 25  89FH  4329  M0001   LDA  OPTIM    1F
0871   4329  888 0 30  4631  8723  1       LDL           FARB*
0872   4631  888 0 30  4670  8861          LDL  2F       DEFN*
0873   4670  888 0 60  86FC  4276  2       STA  MLOC                  P8. ADJUST M LEVEL
0874   4276  888 0 30  4278  8871          LDL           AJST*
0875   4278  888 0 60  84FH  4685          STA  MLEV     PROCC
0876   4685  888 0 25  85FG  4489  PROCC   LDA  OP
0877   4489  888 0 35  4641  4643          ERS# 00H00    00000
0878   4643  888 0 70  4095  4498          ADD           -C1
0879   4095  888 0 99  7000  0000          CON  99700    00000
0880   4499  888 0 25  86FC  4303  &C1      LDA  MLOC                  P9. CALCULATE C OPTIM
0881   4303  888 0 30  4255  4657          LDL# 00000    00F00
0882   4657  888 0 82  4310  4510          TEQ           1F
0883   4310  888 0 25  4262  4510          LDA           1F
0884   4262  888 0 00  0000  1000          CON  00000    01000
0885   4510  888 0 06  4063  4063  1       CLX
0886   4063  888 0 32  0200  4668          SHR   0200
0887   4668  888 0 70  85FG  4273          ADD  OP
0888   4273  888 0 60  85FG  4477          STA  OP       &C2
0890   4498  888 0 30  4251  4503  -C1      LDL# 99800    00000
0891   4503  888 0 82  4656  4106          TEQ           3F
0892   4656  888 0 25  85FG  4710          LDA  OP
0893   4710  888 0 35  4462  4264          ERS           2F
0894   4462  888 0 00  0000  HHHH          CON  00000    0HHHH
0895   4106  888 0 70  4058  4476  3       ADD           -C2
0896   4058  888 0 00  1000  0000          CON  00100    00000
0897   4477  888 0 30  83FH  4081  &C2      LDL  ALEV     3F
0898   4476  888 0 30  84FH  4081  -C2      LDL  MLEV     3F
0899   4081  888 0 25  85FG  4135  3       LDA  OP
0900   4135  888 0 35  4637  4689          ERS# 00000    000HH
0901   4689  888 0 70  000R  4264          ADD  RL       2F
0902   4264  888 0 60  89FH  4118  2       STA  OPTIM
0903   4118  888 1 08  0004  4071          LIR3  0004                 P10.FIND* C.
0904   4071  888 0 05  4473  4525          LDX  2F
0905   4525  888 0 30  4627  8810          LDL           FIND*
- 0906   4627  888 1 00  4030  4030          JMP2 C0000
```

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0907  4033  888 0 30  4335  8736   C0003   LDL  1F        ERR1*      P11.FARB*,DEFN*.
0908  4030  888 0 30  4335  8736   C0000   LDL  1F        ERR1*
0909  4335  888 0 26  4473  4473   1       CLA  2F
0910  4032  888 0 25  85FG  4086   C0002   LDA  OP
0911  4086  888 0 35  4088  4640           ERS# 00010     00000
0912  4640  888 0 31  4093  4093           CLL
0913  4093  888 0 82  4446  4646           TEQ  1F
0914  4646  888 0 25  86FC  4473           LDA  MLOC      2F
0915  4446  888 0 07  0010  4449   1       IIR   0010
0916  4449  888 0 70  88AH  4604           ADD  FUNNY
0917  4604  888 0 30  4306  4258           LDL# 00199     00000
0918  4258  888 0 87  4031  4661           TGR  C0001
0919  4661  888 0 60  88AH  4665           STA  FUNNY
0920  4665  888 0 05  000A  4269           LDX  RA
0921  4269  888 0 70  4271  4724           ADD            -FNNY
0922  4271  888 0 99  9000  0000           CON  99900     00000
0923  4725  888 0 20  4077  4529   &FNNY   BUF            1F
0924  4077  888 0 00  B00F  0000           CON  00B00     F0000
0925  4724  888 0 07  B00A  4277   -FNNY   IIR   B00A
0926  4277  888 0 20  000C  4529           BUF  RX        1F
0927  4529  888 0 32  0400  4286   1       SHR   0400     3F
0928  4035  888 0 25  89FH  4139   C0005   LDA  OPTIM      1F
0929  4034  888 0 25  89FH  4139   C0004   LDA  OPTIM      1F
0930  4031  888 0 25  89FH  4139   C0001   LDA  OPTIM      1F
0931  4139  888 0 30  4286  8723   1       LDL  3F        FARB*
0932  4286  888 0 30  4473  8861   3       LDL  2F        DEFN*
0933  4473  888 0 60  87FC  4729   2       STA  CLOC                 P12.ADJUST C LEVEL
0934  4729  888 0 30  4281  8871           LDL            AJST*
0935  4281  888 0 60  85FH  4087           STA  CLEV      BUILO
0936  4087  888 0 25  87FC  4091   BUILO   LDA  CLOC                 P13. SYNTHESIZE
0937  4091  888 0 32  0400  4698           SHR   0400
0938  4698  888 0 25  86FC  4252           LDA  MLOC
0939  4252  888 0 32  0600  4111           SHR   0600
0940  4111  888 0 25  85FG  4115           LDA  OP
0941  4115  888 0 35  4617  4469           ERS# HH000     00000
0942  4469  888 0 20  000C  4673           BUF  RX
0943  4673  888 0 77  4673  4676           ATL            BILD1
0944  4676  888 0 25  85FC  4480   BILD1   LDA  ALOC                 P14.ASSEMBLE
0945  4480  888 0 06  4133  4133           CLX
0946  4133  888 0 32  0500  4291           SHR   0500
0947  4291  888 0 25  89FC  4295           LDA  SIGN
0948  4295  888 0 32  0200  4050           SHR   0200
0949  4050  888 0 25  80FG  4054           LDA  R
0950  4054  888 0 32  0300  4160           SHR   0300
0951  4160  888 0 25  0008  4464           LDA  RL
0952  4464  888 0 30  4616  8900           LDL            OTPT*
0953  4616  888 0 25  84FB  4322           LDA  TEMP1     1F         P15.EDIT
0954  4322  888 0 05  4674  8920   1       LDX            UNDG*
0955  4674  888 0 65  84FB  4680           STX  TEMP1
0956  4680  888 0 06  4333  4333           CLX
```

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0957   4333  888 0 32  0400  4090          SHR   0400
0958   4090  888 0 37  0200  4495          SHL   0200
0959   4495  888 0 32  0600  4254          SHR   0600
0960   4254  888 0 65  0255  4107          STX   0255
0961   4107  888 0 37  0200  4662          SHL   0200
0962   4662  888 0 60  83FB  4066          STA   TEMP
0963   4066  888 0 25  85FB  4120          LDA   TEMP2
0964   4120  888 0 05  4522  8920          LDX                UNDG*
0965   4522  888 0 65  85FB  4478          STX   TEMP2
0966   4478  888 0 77  4478  4481          ATL
0967   4481  888 0 35  4533  4535          ERS#  HHHHH        H0000
0968   4535  888 0 20  83FB  4339          BUF   TEMP
0969   4339  888 0 60  0370  4722          STA    0370
0970   4722  888 0 25  0008  4126          LDA   RL
0971   4126  888 0 35  4678  4130          ERS#  00000        0HHHH
0972   4130  888 0 37  0200  4735          SHL    0200
0973   4735  888 0 60  0286  4288          STA    0286
0974   4288  888 0 25  85FB  4092          LDA   TEMP2
0975   4092  888 0 35  4494  4096          ERS#  00000        0HHHH
0976   4096  888 0 37  0200  4451          SHL    0200
0977   4451  888 0 20  4703  4455          BUF#  88880        0008B
0978   4455  888 0 60  0281  4733          STA    0281
0979   4733  888 0 25  85FB  4287          LDA   TEMP2
0980   4287  888 0 35  4539  4491          ERS#  HHHHH        H0000
0981   4491  888 0 77  4491  4694          ATL
0982   4694  888 0 25  84FB  4148          LDA   TEMP1
0983   4148  888 0 06  4651  4651          CLX
0984   4651  888 0 32  0400  4458          SHR    0400
0985   4458  888 0 37  0200  4263          SHL    0200
0986   4263  888 0 32  0600  4172          SHR    0600
0987   4172  888 0 37  0200  4677          SHL    0200
0988   4677  888 0 20  0008  4681          BUF   RL
0989   4681  888 0 20  4183  4185          BUF#  00080        80088
0990   4185  888 0 60  0365  4067          STA    0365
0991   4067  888 0 25  000C  4471          LDA   RX
0992   4471  888 0 20  4123  4175          BUF#  00008        80000
0993   4175  888 0 60  0250  4452          STA    0250        ALLX
0994   0205  888 0 00  0000  0000   0205   CON   00000        00000
0995   83AG  888 0 06  4669  4669   PSUDX  CLX
0996   4669  888 0 63  4669  4372          ZAP
0997   4372  888 0 60  0250  4652          STA    0250
0998   4652  888 0 65  0255  4307          STX    0255
0999   4307  888 0 60  0281  4383          STA    0281
1000   4383  888 0 65  0286  4488          STX    0286
1001   4488  888 0 60  0365  4267          STA    0365
1002   4267  888 0 65  0370  4452          STX    0370        ALLX
1003   4452  888 0 31  4655  4655   ALLX   CLL                            P16.FLOW CHART
1004   4655  888 0 25  87FH  4609          LDA   FTAG
1005   4609  888 0 82  4112  4312          TEQ   FIN          FLOW
1006   4112  888 0 25  8678  4266   FIN    LDA   R0009
```

```
1007  4266  BBB 0 05  B677  4320          LDX  R0008
1008  4320  BBB 0 60  0262  4664          STA   0262                P17. PRINT
1009  4664  BBB 0 65  0267  4119          STX   0267
1010  4119  BBB 0 25  B674  4323          LDA  R0005
1011  4323  BBB 0 05  B673  4127          LDX  R0004
1012  4127  BBB 0 60  0294  4296          STA   0294
1013  4296  BBB 0 65  0299  4101          STX   0299
1014  4101  BBB 0 25  B670  4105          LDA  R0001
1015  4105  BBB 0 05  B669  4059          LDX  R0000
1016  4059  BBB 0 60  0325  4327          STA   0325
1017  4327  BBB 0 65  0330  4482          STX   0330
1018  4482  BBB 0 25  B676  4486          LDA  R0007
1019  4486  BBB 0 05  B675  4290          LDX  R0006
1020  4290  BBB 0 60  0378  4330          STA   0378
1021  4330  BBB 0 65  0383  4385          STX   0383
1022  4385  BBB 0 25  B672  4739          LDA  R0003
1023  4739  BBB 0 05  B671  4293          LDX  R0002
1024  4293  BBB 0 60  0209  4311          STA   0209
1025  4311  BBB 0 65  0214  4466          STX   0214
1026  4466  BBB 0 25  B6FB  4520          LDA  ERROR
1027  4520  BBB 0 06  4523  4523          CLX
1028  4523  BBB 0 62  4523  4527          ZUP
1029  4527  BBB 0 37  0400  4284          SHL   0400
1030  4284  BBB 0 20  B1FG  4688          BUF  LINE
1031  4688  BBB 0 20  4490  4292          BUF# 00000      B0000
1032  4292  BBB 0 60  0200  4102          STA   0200
1033  4102  BBB 0 25  B2AC  4506          LDA  LC
1034  4506  BBB 0 70  4658  4511          ADD              -PR
1035  4658  BBB 0 99  9999  9951          CON  99999       99951
1036  4511  BBB 0 75  4114  4467  -PR     SUB# 99999       99950
1037  4467  BBB 0 60  B2AC  4671          STA  LC
1038  4671  BBB 0 11  0201  4189          PRN   0201       -PR1
1039  4512  BBB 0 60  B2AC  4666  &PR     STA  LC
1040  4666  BBB 0 11  0217  4189          PRN   0217       -PR1
1041  4190  BBB 0 67  3333  000A  &PR1    HLT   3333       RA
1042  4189  BBB 0 25  B7FG  4493  -PR1    LDA  TAPE1
1043  4493  BBB 0 70  4695  000A          ADD              RA
-- 1044  4695  BBB 0 08  0000  4200          LIR1  0000       START
```

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1045                                                                    C.  CONTROL OPS.
1046                                                                    C1. BRANCH TO OP
1047                                                                        RA CONTAINS A TRANSFER TO CONTROL OP.
1048                                                                        FROM STEP E9.
1049
1050
1051
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1059
1060
1062
1063
1064
1065
1066    85AG  888 0 25  8709  4720    HHH     LDA   HH
1067    4720  888 0 60  86FH  83AG            STA   HTAG      PSUDX
1068    86AG  888 0 25  4318  4170    FLO     LDA#  HHHHH     HHHHH
1069    4170  888 0 67  1212  4712            HLT    1212
1070    4712  888 0 60  87FH  83AG            STA   FTAG      PSUDX       OPERATOR SHOULD CLEAR A IF FLOWCHARTING
1071                                                                        IS NOT DESIRED.
1072    81AH  888 0 25  82FG  4572    NUM     LDA   MCN       1F      C2. PROCESS A
1073    82AH  888 0 25  83FG  4572    ZON     LDA   MCZ       1F
1074    84AH  888 0 25  8708  4572    ALF     LDA   M         1F
1075    4572  888 0 60  84FG  80AH    1       STA   MC        CON
1076    80AH  888 0 30  4128  4530    CON     LDL             PSIGN
1077    4128  888 0 30  4730  4226            LDL             PROCA
1078    4730  888 0 30  84FG  4676            LDL   MC        BILD1
1079    4530  888 0 50  80F8  4484    PSIGN   STL   EXIT
1080    4484  888 0 25  86FG  4138            LDA   IR
1081    4138  888 0 30  4690  4492            LDL#  00000     00800
1082    4492  888 0 82  4145  4345            TEQ   1F
1083    4345  888 0 32  0200  4145            SHR    0200     1F
1084    4145  888 0 60  89FC  80F8    1       STA   SIGN      EXIT
1085    80AG  888 2 02  0000  4319    BLA     LIR4   0000     1F          C3. UPDATE AVAIL TABLE
1086    81AG  888 2 02  0003  4319    BLR     LIR4   0003     1F
1087    4319  888 0 25  8711  4723    1       LDA   CH
1088    4723  888 0 30  4375  4727            LDL#  00000     00888
1089    4727  888 0 82  4180  4380            TEQ   1F
1090    4380  888 0 35  4682  4684            ERS#  00000     000HH
1091    4684  888 0 37  0400  4691            SHL    0400     2F
1092    4180  888 0 07  0001  4691    1       IIR    0001     2F
1093    4691  888 0 77  4691  4144    2       ATL
1094    4144  888 0 20  4496  4348            BUF   BVAR1
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1095   4348  888 0 60  4450  4302            STA  BVAR
1096   4302  888 0 25  000B  4706            LDA  RL
1097   4706  888 0 06  4259  4259            CLX
1098   4259  888 0 32  0400  4116            SHR   0400
1099   4116  888 0 75  4518  4121            SUB# 00000      00001
1100   4121  888 0 60  B4FB  4575            STA  TEMP1      1F
1101   4575  888 0 05  4177  4179  1         LDX  2F         FP2ER
1102   4179  888 1 08  0002  4132  FP2ER     LIRJ  0002      FPERR
1103   4177  888 0 60  B6FC  4131  2         STA  MLOC
1104   4131  888 0 25  B710  4585            LDA  C
1105   4585  888 0 30  4487  4389            LDL# 00000      BBBBB
1106   4389  888 0 82  4692  4142            TEQ             1F
1107   4692  888 0 26  4545  4545            CLA  3F
1108   4142  888 1 08  0004  4745  1         LIRJ  0004
1109   4745  888 0 05  4647  4132            LDX  2F         FPERR
1110   4132  888 0 30  4134  8810  FPERR     LDL  PERR       FIND*
1111   4647  888 0 75  B6FC  4545  2         SUB  MLOC       3F
1112   4545  888 0 60  B5FB  4649  3         STA  TEMP2
1113   4649  888 0 25  B6FC  4153            LDA  MLOC       7F
1114   4153  888 0 30  000A  4507  7         LDL  RA
1115   4507  888 0 85  4459  4686            MUL# 00000      0A005
1116   4686  888 0 60  B3FB  4140            STA  TEMP
1117   4140  888 0 26  4693  4693            CLA
1118   4693  888 0 32  0400  4650            SHR   0400
1119   4650  888 0 25  000C  4104            LDA  RX
1120   4104  888 0 70  000A  4659            ADD  RA
1121   4659  888 0 35  4711  4463            ERS# 00HHH      H0000
1122   4463  888 0 20  4315  000A            BUF             RA
1123   4315  888 0 08  0000  4370            LIR1  0000
1124   4370  888 0 26  4173  4173            CLA
1125   4173  888 0 75  B3FB  4328            SUB  TEMP
1126   4328  888 0 37  0300  4334            SHL   0300
1127   4334  888 0 35  4136  4338            ERS# 00000      30000
1128   4338  888 0 75  4340  000A            SUB             RA
1129   4340  888 0 02  0000  4195            LIR   0000
1130   4195  888 0 25  B3FB  4099            LDA  TEMP
1131   4099  888 0 37  0600  4108            SHL   0600
1132   4108  888 0 35  4360  4162            ERS# 000H0      00000
1133   4162  888 0 20  4314  4316            BUF  1F
1134                                         HHH         C
1135   4316  888 0 77  4316  8965            ATL             0F
1136   8965  888 2 00  8403  8403  0         JMP4 80000
1137   8403  888 1 25  8409  8966  80000     LDA2 80006      2F
1138   8406  888 1 25  8413  8966  80003     LDA2 80010      2F
1139   8404  888 0 00  0000  0000  80001     CON  00000      00000
1140   8407  888 0 HH  HHHH  HHHH  80004     CON  HHHHH      HHHHH
1141   8966  888 2 05  8404  000B  2         LDX4 80001      RL
1142   4314  888 0 32  0000  8967  1         SHR   0000      7F
1143   8967  888 0 60  B2FC  8968  7         STA  MASK
1144   8968  888 2 30  8405  8969            LDL4 80002      -82
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1145  8969  888 0 29  8418  0008      -B2      LDA1 00001      RL
1146  8405  888 0 20  B2FC  8971      B0002    BUF  MASK       8F
1147  8408  888 0 35  B2FC  8971      B0005    ERS  MASK       8F
1148  8409  888 0 50  0000  0000      B0006    CON  50000      00000
1149  8410  888 0 40  0000  0000      B0007    CON  40000      00000
1150  8411  888 0 20  0000  0000      B0008    CON  20000      00000
1151  8412  888 0 10  0000  0000      B0009    CON  10000      00000
1152  8413  888 0 CH  HHHH  HHHH      B0010    CON  CHHHH      HHHHH
1153  8414  888 0 8H  HHHH  HHHH      B0011    CON  8HHHH      HHHHH
1154  8415  888 0 FH  HHHH  HHHH      B0012    CON  FHHHH      HHHHH
1155  8416  888 0 GH  HHHH  HHHH      B0013    CON  GHHHH      HHHHH
1156  8971  888 0 64  8418  8972      8        STA1 00001
1157  8972  888 0 25  85F8  8973               LDA  TEMP2
1158  8973  888 0 75  84F8  8974               SUB  TEMP1
1159  8974  888 0 70  8975  8976               ADD               -B1
1160  8975  888 0 99  9999  9999               CON  99999        99999
1161  8977  888 0 60  85F8  4450      &B1      STA  TEMP2        BVAR
1162  4496  888 0 0G  0000  8978      BVAR1    IIR1  0000
1163  8978  888 0 70  8979  8969               ADD               -B2
1164  8979  888 0 99  9800  0000               CON  99980        00000
1165  8970  888 0 20  8980  000A      &B2      BUF               RA
1166  8980  888 0 08  0000  8981               LIR1  0000
1167  8981  888 0 25  B2FC  8982               LDA  MASK
1168  8982  888 0 30  000C  8983               LDL  RX
1169  8983  888 0 32  0100  8984               SHR   0100
1170  8984  888 0 82  8985  8967               TEQ               7B
1171  8985  888 1 07  0001  8986               IIR2  0001
1172  8986  888 0 30  8967  8965               LDL  7B           0B
1173                                           HHH          H
1174  84AG  888 0 05  4718  4179      EQU      LDX  2F           FP2ER
1175  4718  888 0 60  86FC  8976      2        STA  MLOC         -B1
1176  4134  888 0 30  83AG  8736      PERR     LDL  PSUDX        ERR1*
1177  82AG  888 0 25  83FC  4570      COR      LDA  CORE                    C4. RESERVE CORE
1178  4570  888 0 70  4772  4775               ADD# 00000        10000
1179  4775  888 0 06  4528  4528               CLX
1180  4528  888 0 32  0400  4785               SHR   0400
1181  4785  888 0 20  4687  4589               BUF# 00000        0B000
1182  4589  888 0 60  86FC  4143               STA  MLOC
1183  4143  888 0 05  4395  4179               LDX  2F           FP2ER
1184  4395  888 0 37  0400  4502      2        SHL   0400
1185  4502  888 0 70  83FC  4707               ADD  CORE
1186  4707  888 0 05  000A  4161               LDX  RA
1187  4161  888 0 70  4663  4516               ADD               -B3
1188  4663  888 0 99  9000  0000               CON  99900        00000
1189  4517  888 0 25  4169  4321      &B3      LDA# 00000        0000G
1190  4321  888 0 05  4134  8760               LDX  PERR         ERR2*
1191  4516  888 0 65  83FC  8976      -B3      STX  CORE         -B1
1192  8976  888 1 08  0000  4373      -B1      LIR3  0000                  C5. DEFINE ADDRESS
1193  4373  888 0 05  4134  4336               LDX  PERR
1194  4336  888 0 30  4538  9810               LDL               FIND*
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1195   4538  888 1 00  8688  8688                JMP2  X0000
1196   8688  888 0 25  86FC  4097  X0000        LDA   MLOC      1F
1197   8689  888 0 25  86FC  4097  X0001        LDA   MLOC      1F
1198   8690  888 0 00  83AG  83AG  X0002        JMP   PSUDX
1199
1200   8691  888 0 25  86FC  4097  X0003        LDA   MLOC      1F
1201   8692  888 0 25  86FC  4097  X0004        LDA   MLOC      1F
1202   8693  888 0 00  4134  4134  X0005        JMP   PERR
1203   4097  888 0 30  83AG  8861  1            LDL   PSUDX     DEFN*
1204                                            HHH
1205   4239  888 0 05  4056  0458  ONN          LDX   ONSW      1F
1206   85AH  888 0 05  0470  0458  OFF          LDX   OFFSW     1F          C6. ON OFF
1207   0458  888 0 65  89FH  0462  1            STX   OPTIM
1208   0462  888 0 05  0464  4179               LDX           FP2ER
1209   0464  888 0 30  0466  0468               LDL   TYPE
1210   0468  888 0 82  0471  83AG               TEQ           PSUDX
1211   0471  888 0 30  89FH  0475               LDL   OPTIM
1212   0475  888 0 50  4439  83AG               STL   SWICH     PSUDX
1213   86AH  888 0 67  000B  0568  TYP          HLT   RL
1214   0568  888 0 50  0466  0668               STL   TYPE
1215   0668  888 0 50  0241  83AG               STL    0241     PSUDX
1216   0470  888 0 31  0473  0473  OFFSW        CLL
1217   0473  888 0 25  87FH  0477               LDA   FTAG                  C7. ASSEMBLER OFF
1218   0477  888 0 82  0480  4189               TEQ           -PR1
1219   0480  888 0 25  0482  0484               LDA   1F
1220   0484  888 0 05  0486  0488               LDX   2F
1221   0488  888 0 60  0365  0567               STA    0365
1222   0567  888 0 65  0370  0572               STX    0370
1223   0572  888 0 06  0575  0575               CLX
1224   0575  888 0 63  057%  0578               ZAP
1225   0578  888 0 60  0250  0452               STA    0250
1226   0452  888 0 65  0255  0457               STX    0255
1227   0457  888 0 60  0281  0483               STA    0281
1228   0483  888 0 65  0286  4112               STX    0286        FIN
1229   0482  888 0 88  8866  6888  1            NUM   *** 0       FF **
1230   0486  888 0 22  2021  1022  2            ZON   *** 0       FF **
1231                                            HHH           H
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1232  4332  888 0 77  4332  4536  CMPL*  ATL                          X.  EXAMINE REMARKS FIELD
1233  4536  888 0 25  86AC  4540         LDA   MUMI                       CMPL* PUTS INSTRUCTION IN RA INTO MUM CODE
1234  4540  888 0 60  87AC  4344         STA   MUML      1F             MUML IS THE LOCATION OF LAST MUM INSTR.
1235  4736  888 0 25  86AC  4344  COMP*  LDA   MUMI      1F             COMP* PUTS WORD IN RL INTO MUM CODE
1236  4344  888 0 70  4696  4299  1      ADD#  00000     20000          BUT IT ISNT REALLY AN INSTRUCTION
1237  4299  888 0 60  86AC  4353         STA   MUMI      2F             EXIT IS IN RX. IN BOTH CASES.
1238  4353  888 0 70  4305  000A  2      ADD           RA
1239  4305  888 0 50  5199  000C         STL   W9999     RX
1240  4740  888 0 50  4342  4544  COMT*  STL   -COM
1241  4544  888 0 25  88AC  4548         LDA   COMI
1242  4548  888 0 60  82AB  4702         STA   RB4
1243  4702  888 0 25  4304  4156         LDA           8F
1244  4304  888 0 00  8678  8669         JMP   R0009     R0000
1245  4156  888 2 88  3400  4573  8      TCD4  COMTS                      MOVE ALL REMARKS TO THE COMMENTS TAPE
1246  4573  888 2 07  0010  4377         IIR4   0010                      FOR USE BY PASS 3.
1247  4377  888 0 60  88AC  4331         STA   COMI
1248  4331  888 0 70  4583  4342         ADD           -COM
1249  4583  888 0 99  9800  0000         CON   99980     00000
1250  4343  888 0 60  88AC  4297  &COM   STA   COMI
1251  4297  888 0 05  4699  4301         LDX   2F
1252  4301  888 0 30  4553  8919         LDL           TSUB*
1253  4553  888 0 C6  3400  4699         TBL   COMTS     2F
1254  4699  888 0 H2  0700  4342  2      TWR   OTAP3     -COM
1255  4505  888 0 25  8669  4109  BDK    LDA   R0000                      BDK: BLANK OUT COLS 32-35 AND GO TO RL.
1256  4109  888 0 35  4361  4313         ERS#  00000     HHHHH
1257  4313  888 0 60  8669  4667         STA   R0000
1258  4667  888 0 25  8670  4521         LDA   R0001
1259  4521  888 0 35  4773  4326         ERS#  00000     HHHHH
1260  4326  888 0 20  4728  4580         BUF#  BBBBB     00000
1261  4580  888 0 60  8670  0008         STA   R0001     RL
1262  4312  888 1 08  0007  4515  FLOW   LIRJ   0007                                 X1. WHAT OK FIELD
1263  4515  888 0 25  8670  4519         LDA   R0001
1264  4519  888 0 06  4124  4124         CLX
1265  4124  888 0 65  88FH  4178         STX   RTAG
1266  4178  888 0 32  0500  4186         SHR    0500
1267  4186  888 0 77  4186  4789         ATL
1268  4789  888 0 25  8669  4543         LDA   R0000
1269  4543  888 0 35  4595  4497         ERS#  HHHHH     00000
1270  4497  888 0 20  000B  4501         BUF   RL
1271  4501  888 0 60  80AB  4705         STA   DK
1272  4705  888 0 30  4157  4309         LDL#  00000     BBBBB
1273  4309  888 0 82  4362  4562         TEQ   S5
1274  4562  888 0 30  4514  4716         LDL#  03000     B7BBB
1275  4716  888 0 82  4719  4369         TEQ           1F
1276  4719  888 0 60  88FH  4324         STA   RTAG
1277  4324  888 0 30  4362  4505         LDL   S5        BDK
1278  4369  888 0 30  4721  4524  1      LDL#  01000     B7BBB
1279  4524  888 0 82  4577  4777         TEQ           1F
1280  4577  888 0 30  4112  4505         LDL   FIN       BDK
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1281  4777  888 0 30  4379  4531  1      LDL# 01211   83649
1282  4531  888 0 82  4534  4734        TEQ  S4
1283  4734  888 0 30  4386  4738        LDL# 03112   83123
1284  4738  888 0 82  4141  4341        TEQ          1F
1285  4141  888 0 05  4534  4736        LDX  S6      COMP*
1286  4341  888 0 35  4743  4795  1     ERS# H0HHH   H0HHH
1287  4795  888 0 30  4697  4149        LDL# 00100   80A88
1288  4149  888 0 82  4152  4352        TEQ  S4
1289  4352  888 0 35  4504  4356        ERS# HHHHH   HH0HH
1290  4356  888 0 30  4308  4560        LDL# 00010   800A8
1291  4560  888 0 82  4513  4713        TEQ  1F
1292  4713  888 0 35  4715  4117        ERS# HHHHH   HHH0H
1293  4117  888 0 30  4569  4171        LDL# 00001   8000A
1294  4171  888 0 82  4174  4374        TEQ          S3
1295  4174  888 0 25  80A8  4378        LDA  DK
1296  4378  888 0 35  4780  4532        ERS# 00000   00HH0
1297  4532  888 0 37  0300  4188        SHL   0300   2F
1298  4513  888 0 25  80A8  4317  1     LDA  DK
1299  4317  888 0 35  4769  4371        ERS# 00000   00H00
1300  4371  888 0 37  0200  4188        SHL   0200   2F
1301  4188  888 0 70  000A  4193  2     ADD  RA
1302  4193  888 0 30  4146  4748        LDL  N
1303  4748  888 0 87  4701  4151        TGR  S2
1304  4151  888 0 30  4362  8736        LDL  S5      ERR1*
1305  4362  888 0 08  0000  4367  S5    LIR1  0000   -NO#      X2. SCAN FOR #
1306  4367  888 0 29  8670  4574  -NO#  LDA1 R0001
1307  4574  888 0 35  4526  4578        ERS# 88888   88888
1308  4578  888 0 75  000A  4783        SUB  RA
1309  4783  888 0 77  4783  4586        ATL
1310  4586  888 0 29  8670  4541        LDA1 R0001
1311  4541  888 0 35  4393  4346        ERS# 66666   66666
1312  4346  888 0 C1  4346  4349        MTX
1313  4349  888 0 70  4351  4704        ADD# 33333   33333
1314  4704  888 0 35  000B  4508        ERS  RL
1315  4508  888 0 77  4508  4561        ATL
1316  4561  888 0 29  8669  4166        LDA1 R0000
1317  4166  888 0 70  4568  4571        ADD# 33333   33333
1318  4571  888 0 35  000B  4726        ERS  RL
1319  4726  888 0 31  4579  4579        CLL
1320  4579  888 0 82  4732  4182        TEQ          1F
1321  4732  888 0 0G  0002  4786        IIR1  0002
1322  4786  888 0 70  4388  4367        ADD          -NO#
1323  4388  888 0 99  9990  0000        CON  99999   00000
1324  4368  888 0 00  4534  4534  &NO#  JMP  S6
1325  4182  888 0 30  4184  4137  1     LDL# 11111   11111
1326  4137  888 0 20  000B  4741        SUF  RL
1327  4741  888 0 85  000A  4770        MUL  RA
1328  4770  888 0 35  4774  4176        ERS# 00000   0000H
1329  4176  888 0 37  0600  4337        SHL   0600
1330  4337  888 0 77  4337  4390        ATL
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1331  4390  888 0 70  4542  4546          ADD  1F
1332  4546  888 0 60  80AC  4100          STA  SHR1
1333  4100  888 0 25  4552  4154          LDA# 00090     00000
1334  4154  888 0 75  000B  4509          SUB  RL
1335  4509  888 0 70  4542  4746          ADD  1F
1336  4746  888 0 60  81AC  4300          STA  SHR2      2F
1337  4542  888 0 32  0000  000B  1       SHR   0000     RL
1338  4300  888 0 29  8670  4155  2       LDA1 R0001
1339  4155  888 0 09  8672  4760          LDX1 R0003
1340  4760  888 0 30  4762  80AC          LDL            SHR1
1341  4762  888 0 35  4366  4768          ERS# HHHHH     HHHH8
1342  4768  888 0 65  83FB  4376          STX  TEMP
1343  4376  888 0 30  4778  81AC          LDL            SHR2
1344  4778  888 0 32  0100  4384          SHR   0100
1345  4384  888 0 69  8670  4590          STX1 R0001
1346  4590  888 0 29  8669  4196          LDA1 R0000
1347  4196  888 0 09  8671  4551          LDX1 R0002
1348  4551  888 0 30  4753  80AC          LDL            SHR1
1349  4753  888 0 35  4357  4709          ERS# HHHHH     HHHH0
1350  4709  888 0 30  4761  81AC          LDL            SHR2
1351  4761  888 0 32  0100  4717          SHR   0100
1352  4717  888 0 69  8669  4576          STX1 R0000
1353  4576  888 0 30  4779  80AC          LDL            SHR1
1354  4779  888 0 35  4584  4537          ERS# HHHHH     00000
1355  4537  888 0 77  4537  4790          ATL
1356  4790  888 0 25  83FB  4744          LDA  TEMP
1357  4744  888 0 06  4147  4147          CLX
1358  4147  888 0 32  0500  4355          SHR   0500
1359  4355  888 0 20  000B  4159          BUF  RL
1360  4159  888 0 60  83FB  4163          STA  TEMP
1361  4163  888 0 25  87AC  4167          LDA  MUML
1362  4167  888 0 60  82AB  4771          STA  RB4
1363  4771  888 2 25  5201  4354          LDA4 W0001
1364  4354  888 0 70  4556  4363          ADD            -#
1365  4556  888 0 98  0000  0000          CON  98000     00000
1366  4363  888 0 25  4566  4776  -#      LDA# 09000     00000
1367  4776  888 0 05  4364  4332          LDX  &#        CMPL*
1368  4364  888 0 30  83FB  4731  &#      LDL  TEMP
1369  4731  888 0 05  4784  4737          LDX            1F
1370  4784  888 0 88  8880  0000          CON  88888     00000
1371  4737  888 0 25  4191  4593  1       LDA            8F
1372  4191  888 1 00  0000  0000          CON1 00000     00000
1373  4593  888 0 70  000B  4198  8       ADD  RL
1374  4198  888 0 82  4751  4752          TEQ  2F
1375  4752  888 0 25  000B  4756          LDA  RL
1376  4756  888 0 32  0100  4563          SHR   0100
1377  4563  888 0 35  4165  4567          ERS# OHHHH     OHHHH
1378  4567  888 0 77  4567  4737          ATL            1B
1379  4751  888 0 25  000C  4555  2       LDA  RX
1380  4555  888 0 35  4557  4359          ERS# 00000     HHHHH
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1381  4359  888 0 20  000B  4763          BUF  RL
1382  4763  888 0 77  4763  4766          ATL             2F
1383  4766  888 0 25  83FB  4181    2     LDA  TEMP
1384  4181  888 0 50  83FB  4187          STL  TEMP
1385  4187  888 0 35  4391  4793          ERS# H0000      H0000
1386  4793  888 0 30  89AC  4347          LDL  KEY
1387  4347  888 0 82  4500  4700          TEQ             2F
1388  4500  888 0 25  83FB  4554          LDA  TEMP
1389  4554  888 0 35  4757  4559          ERS# HHH0H      HHH00
1390  4559  888 0 30  4714  4767          LDL# 00000      88800
1391  4767  888 0 82  4381  4581          TEQ             3F
1392  4381  888 0 25  4387  4591          LDA             4F
1393  4387  888 0 00  0000  000H          CON  00000      0000H
1394  4581  888 0 25  83FB  4587    3     LDA  TEMP
1395  4587  888 0 35  4791  4194          ERS# HH0HH      HH000
1396  4194  888 0 30  4396  4398          LDL# 00000      88000
1397  4398  888 0 82  4754  4700          TEQ             2F
1398  4754  888 0 25  4708  4591          LDA             4F
1399  4708  888 0 00  0000  00HH          CON  00000      000HH
1400  4591  888 0 35  83FB  4596    4     ERS  TEMP
1401  4596  888 0 37  0400  4755          SHL  0400
1402  4755  888 0 70  000A  4164          ADD  RA
1403  4164  888 0 60  82AB  4781          STA  R84
1404  4781  888 0 77  4781  4787          ATL
1405  4787  888 0 25  4742  4394          LDA  SERAL
1406  4394  888 0 70  4796  4549          ADD# 00000      00001
1407  4549  888 0 60  4742  4594          STA  SERAL
1408  4594  888 0 70  0008  4749          ADD  RL
1409  4749  888 0 05  87AC  4158          LDX  MUML
1410  4158  888 0 65  83AB  4564          STX  RB5
1411  4564  888 3 70  5201  4358          ADD5 W0001
1412  4358  888 3 60  5201  4558          STA5 W0001
1413  4558  888 0 25  4146  4598          LDA  N
1414  4598  888 0 70  4742  4547          ADD  SERAL
1415  4547  888 2 60  5001  4534          STA4 STOPT      S6
1416  4700  888 0 30  83FB  4758    2     LDL  TEMP
1417  4758  888 0 05  4534  4736          LDX  S6         COMP*
1418  4534  888 0 30  4588  4192    S6    LDL# 88888      88888     X3. TRANSFER REMARKS
1419  4192  888 0 25  8670  4747          LDA  R0001
1420  4747  888 0 82  4150  4350          TEQ             1F
1421  4150  888 0 25  8672  4759          LDA  R0003
1422  4759  888 0 82  4764  4350          TEQ             1F
1423  4764  888 0 25  8674  4382          LDA  R0005
1424  4382  888 0 82  4788  4350          TEQ             1F
1425  4788  888 0 25  8676  4392          LDA  R0007
1426  4392  888 0 82  4197  4350          TEQ             1F
1427  4197  888 0 25  8678  4365          LDA  R0009
1428  4365  888 0 82  4582  4350          TEQ  2F         1F
1429  4350  888 0 30  4765  4740    1     LDL             COMT*
1430  4765  888 0 25  4782  4592          LDA             8F
```

```
1431  4782  888 0 00  8678  8669          JMP  R0009    R0000
1432  4592  888 0 80  0989  4582  8       TDC  Z0000    2F
1433  4582  888 0 25  88FH  4792  2       LDA  RTAG
1434  4792  888 0 31  4397  4397          CLL
1435  4397  888 0 82  4112  4189          TEQ  FIN      -PR1
1436  0989  888 0 00  0000  0000  Z0000   CON  00000    00000
1437  0991  888 0 00  0000  0000  Z0002   CON  00000    00000
1438  0993  888 0 00  0000  0000  Z0004   CON  00000    00000
1439  0995  888 0 00  0000  0000  Z0006   CON  00000    00000
1440  0997  888 0 00  0000  0000  Z0008   CON  00000    00000
1441  0990  888 0 88  8888  8888  Z0001   CON  88888    88888
1442  0992  888 0 88  8888  8888  Z0003   CON  88888    88888
1443  0994  888 0 88  8888  8888  Z0005   CON  88888    88888
1444  0996  888 0 88  8888  8888  Z0007   CON  88888    88888
1445  0998  888 0 88  8888  8888  Z0009   CON  88888    88888
1446                                      HHH
1447  4701  888 0 60  4146  0548  S2      STA  N                      X4. COMPILE 01 OP
1448  0548  888 0 70  0550  0553          ADD# 01000    00000
1449  0553  888 0 05  0555  4332          LDX            CMPL*
1450  0555  888 0 30  81F6  0559          LDL  LINE
1451  0559  888 0 05  0561  4736          LDX            COMP*
1452  0561  888 0 30  0563  4740          LDL            COMT*
1453  0563  888 0 25  86AC  0767          LDA  MUMI
1454  0767  888 0 60  82A8  0571          STA  RB4
1455  0571  888 2 07  0006  0775          IIR4  0006
1456  0775  888 0 60  86AC  0579          STA  MUMI
1457  0579  888 0 25  0581  0583          LDA            8F
1458  0581  888 0 00  8670  8669          JMP  R0001    R0000
1459  0583  888 2 88  5194  0599  8       TCD4 #9994
1460  0599  888 0 70  0401  0404          ADD# 00000    20002
1461  0404  888 2 88  5196  0420          TCD4 #9996
1462  0420  888 0 70  0422  0425          ADD# 00000    20002
1463  0425  888 2 88  5198  4112          TCD4 #9998    FIN
1464  4374  888 0 30  0576  4505  S3      LDL            8DK          X9. COMPILE CONDITION
1465  0576  888 0 25  8670  0580          LDA  R0001
1466  0580  888 0 35  0582  0584          ERS# 00000    HHHHH
1467  0584  888 0 30  0586  0588          LDL# 00000    88888
1468  0588  888 0 82  0591  0791          TEQ  1F
1469  0791  888 0 25  87AC  0595          LDA  MUML
1470  0595  888 0 60  82A8  0799          STA  RB4
- 1471  0799  888 2 25  5201  0403          LDA4 W0001
1472  0403  888 0 70  0405  0408          ADD# 01000    00000
1473  0408  888 2 60  5201  0603          STA4 W0001
1474  0603  888 0 70  0605  0608          ADD            -FLO
1475  0605  888 0 97  0000  0000          CON  97000    00000
1476  0608  888 0 25  0410  0412  -FLO    LDA            2F
1477  0410  888 0 06  0000  0000          CON  06000    00000
- 1478  0609  888 0 25  0411  0412  &FLO    LDA            2F
1479  0411  888 0 05  0000  0000          CON  05000    00000
1480  0591  888 0 25  0593  0412  1       LDA            2F
```

```
1481  0593  888 0 08  0000  0000          CON  08000     00000
1482  0412  888 0 05  0414  4332  2       LDX           CMPL*
1483  0414  888 0 30  80AB  0418          LDL  DK
1484  0418  888 0 05  4362  4736          LDX  S5       COMP*
1485  4152  888 0 05  0554  0556  S4      LDX# 03000     00000
1486  0556  888 0 30  0558  0560          LDL           TERM*      X6. FINISH PREV SECTION
1487  0558  888 0 25  80AB  0562          LDA  DK
1488  0562  888 0 37  0100  0566          SHL   0100
1489  0566  888 0 35  0768  0570          ERS# H0000     H0000
1490  0570  888 0 60  89AC  0574          STA  KEY
1491  0574  888 0 31  0577  0577          CLL
1492  0577  888 0 08  0000  0780          LIR1  0000     -CLR       X7. INITIALIZE
1493  0780  888 0 54  5001  0803  -CLR     STL1 STOPT
1494  0803  888 0 06  0002  0407          IIR1  0002
1495  0407  888 0 70  0409  0780          ADD           -CLR
1496  0409  888 0 99  9800  0000          CON  99980     00000
1497  0781  888 0 50  86AC  0585  &CLR     STL  MUMI
1498  0585  888 0 50  88AC  0589          STL  COMI
1499  0589  888 0 50  4742  0594          STL  SERAL
1500  0594  888 0 50  4146  0598          STL  N
1501  0598  888 0 30  0400  0402          LDL           PAGE*
1502  0400  888 0 30  4112  4740          LDL  FIN      COMT*
1503  0402  888 0 50  0804  0406  PAGE*    STL  -SKIP                    SKIP TO BEGINNING OF PAGE SUBROUTINE
1504  0406  888 0 25  0808  0610          LDA# 00000     00066
1505  0610  888 0 75  82AC  0415          SUB  LC
1506  0415  888 0 31  0618  0618          CLL
1507  0618  888 0 50  82AC  0622          STL  LC
1508  0622  888 0 37  0400  0429          SHL   0400
1509  0429  888 0 30  0431  0433          LDL# 00004     90000
1510  0433  888 0 87  0436  0636          TGR           1F
1511  0436  888 0 70  0438  0441          ADD# 00001     00000
1512  0441  888 0 20  0443  0636          BUF           1F
1513  0443  888 0 00  0040  0000          CON  00004     00000
1514  0636  888 0 70  0638  000A  1       ADD           RA
1515  0638  888 0 16  0000  0804          PFD   0000     -SKIP
1516  0805  888 0 67  3333  000A  &SKIP    HLT   3333     RA
1517  0560  888 0 50  80FB  0564  TERM*    STL  EXIT
1518  0564  888 0 31  0967  0967          CLL
1519  0967  888 0 25  86AC  0771          LDA  MUMI
1520  0771  888 0 82  80FB  0774          TEQ  EXIT
1521  0774  888 0 30  000C  0778          LDL  RX
1522  0778  888 0 05  0980  4736          LDX           COMP*
1523  0980  888 0 25  88AC  0784          LDA  COMI
1524  0784  888 0 30  0786  0788          LDL# 99999     99999
1525  0788  888 0 70  0590  000A          ADD           RA
1526  0590  888 0 50  3401  3003          STL  CMTS1
1527  3003  888 0 05  3005  0607          LDX  2F
1528  0607  888 0 30  0809  8919          LDL           TSUB*
1529  0809  888 0 C6  3400  3005          TBL  COMTS    2F
1530  3005  888 0 H2  0700  0822  2       TWR  OTAP3
```

TERMINATE SECTION SUBROUTINE.
RL IS THE EXIT, RX IS THE 03 OR 04 TO COMPILE
THIS SUBROUTINE DOES WHAT IS DESCRIBED
UNDER SUBSECTION X6.

Remington Rand Univac
DIVISION OF SPERRY RAND CORPORATION
PHILADELPHIA, PA.

```
1531  0822  888 0 0B  0000  0625
1532  0532  888 0 0G  0200  0536          1
1533  0536  888 0 30  86AC  0540
1534  0540  888 0 87  0543  0625
1535  0625  888 0 05  0427  0629          4
1536  0629  888 0 30  0631  8919
1537  0631  888 0 CF  5000  0427          2
1538  0427  888 0 H2  0600  0532          3
1539  0543  888 0 25  0545  0547
1540  0547  888 0 64  5199  0601
1541  0601  888 0 05  3203  3205
1542  3205  888 0 30  0807  8919
1543  0807  888 0 CF  5000  3203          2
1544  3203  888 0 H2  0600  80FB

                      LIR1  0000    4F
                      IIR1  0200
                      LDL   MUMI
                      TGR   3F
                      LDX   2F
                      LDL
                      TBL1  W9800   TSUB*
                      TWR   OTAP2   2F
                      LDA#  99999   1B
                      STA1  W9999   99999
                      LDX   2F
                      LDL
                      TBL1  W9800   TSUB*
                      TWR   OTAP2   2F
                                    EXIT
```

```
1545  0745  888 0 G2  0300  0762  BOP     TRD  ITAP1                  8.  BEGINNING OF ASSEMBLY
1546  0762  888 0 C7  3167  0565          TBT                 1F      81. CHECK INPUT TAPE
1547  3167  888 0 67  4444  0745          HLT   4444          BOP
1548  0565  888 0 25  4223  0975  1       LDA  TCON1
1549  0975  888 0 60  88FG  0779          STA  TCONT
1550  0779  888 0 25  0745  0747          LDA  BOP                    82. READ BLOCK
1551  0747  888 0 60  89FG  0551          STA  LTAPE
1552  0551  888 0 05  0753  0755          LDX  1F
1553  0755  888 0 30  000C  8919          LDL  RX             TSUB*
1554  0753  888 0 G2  0300  0770  1       TRD  ITAP1
1555  0770  888 0 25  4624  0776          LDA  TCON2
1556  0776  888 0 60  88FG  3180          STA  TCONT
1560  3180  888 0 30  0782  0984          LDL                 1F
1561  0782  888 1 00  0000  0001          CON1 00000          00001
1562  0984  888 0 50  81FG  0988  1       STL  LINE
1563  0988  888 0 31  3191  3191          CLL
1564  3191  888 0 50  87FG  0795          STL  TAPE1          1F      83. INITIALIZE
1565  89AH  888 0 08  0999  0671  BOP1    LIR1  0999
1566  0671  888 0 31  0474  0474          CLL  2F
1567  0474  888 0 29  1000  0602  2       LDA1 STAB                       CLEAR SYMBOL TABLE IN MULTIPLE ASSEMBLY.
1568  0602  888 0 70  0604  3007          ADD                 -BOPR
1569  0604  888 0 12  0000  0000          CON  12000          00000
1570  3007  888 0 54  1000  3008  -BOPR   STL1 STAB          &BOPR
1571  3008  888 0 0G  9999  0612  &BOPR   IIR1  9999
1572  0612  888 0 82  0795  0474          TEQ  1F             2B
1573  0795  888 0 50  83FC  3199  1       STL  CORE
1574  3199  888 0 50  84FC  3603          STL  BLANK
1575  3603  888 0 50  87FH  3207          STL  FTAG
1576  3207  888 0 50  85AC  0611          STL  ACCUM
1577  0611  888 0 50  86AC  0615          STL  MUMI
1578  0615  888 0 50  82AC  0419          STL  LC
1579  0419  888 0 50  83AC  0423          STL  LINEO
1580  0423  888 0 0B  0000  0626          LIR1  0000          -BP
1581  0626  888 0 54  8649  0831  -BP     STL1 I0000
1582  0831  888 0 0G  0001  0435          IIR1  0001
1583  0435  888 0 70  0437  0626          ADD                 -BP
1584  0437  888 0 99  9980  0000          CON  99998          00000
1585  0627  888 0 25  0829  3031  &BP     LDA                 8F
1586  0829  888 0 00  8616  8417          JMP  D0199          D0000
1587  3031  888 0 80  7800  0446  8       TDC  Y0000
1588  0446  888 0 88  4800  0461          TCD  70000
1589  0461  888 0 30  0463  0465          LDL#  8GGGG         99999
1590  0465  888 0 50  8418  0469          STL  D0001
1591  0469  888 0 0B  0001  0472          LIR1  0001
1592  0472  888 0 30  0674  0676          LDL                 -BP1
1593  0674  888 0 GG  GGG9  9999          CON  GGGGG          99999
1594  0676  888 0 54  8418  0481  -BP1    STL1 D0001
1595  0481  888 0 0G  0001  0485          IIR1  0001
1596  0485  888 0 70  0487  0676          ADD                 -BP1
```

```
1597  0487  888 0 99  9800  0000          CON   99980
1598  0677  888 0 30  0479  0681  &BP1    LDL#  00000
1599  0681  888 0 50  86FH  0685          STL   HTAG
1600  0685  888 0 30  4056  0508          LDL   ONSW
1601  0508  888 0 50  4439  0541          STL   SWICH
1602  0541  888 0 30  4201  0953          LDL   STRT
1603  0953  888 0 50  4200  0802          STL   START
1604  0802  888 0 25  4189  0641          LDA   -PRI
1605  0641  888 0 60  8901  0445  WRITE    STA   -OEX
1606  0445  888 0 26  8902  3902          CLA   &OEX

1597  0487  888 0 99  9800  0000          CON   99980
1598  0677  888 0 30  0479  0681  &BP1    LDL#  00000
1599  0681  888 0 50  86FH  0685          STL   HTAG
1600  0685  888 0 30  4056  0508          LDL   ONSW
1601  0508  888 0 50  4439  0541          STL   SWICH
1602  0541  888 0 30  4201  0953          LDL   STRT
1603  0953  888 0 50  4200  0802          STL   START
1604  0802  888 0 25  4189  0641          LDA   -PRI
1605  0641  888 0 60  8901  0445  WRITE    STA   -OEX
1606  0445  888 0 26  8902  3902          CLA   &OEX
```

WRITE B4. OUTPUT GETS LOADER

```
1608   87AG  888 1 08  0002  0669   END      LIR3  0002                    Z.  ENDING OF ASSEMBLY.
1609   0669  888 0 05  0871  0673            LDX   2F                      Z1. FIND* M.
1610   0673  888 0 30  0675  8810            LDL                 FIND*
1611   0675  888 0 67  000A  0871            HLT   RA            2F
1612   0871  888 0 20  0873  0875   2        BUF   1F                      Z2. ASSEMBLE TRANSFER
1613   0875  888 0 05  0877  0679            LDX   2F
1614   0679  888 0 30  0881  8900            LDL                 OTPT*
1615   0881  888 0 25  85AC  0687            LDA   ACCUM
1616   0687  888 0 60  86FB  0491            STA   ERROR                   Z3. CLEAN OUTPUT BUFFER.
1617   0491  888 0 25  0493  0495            LDA   3F
1618   0495  888 0 60  4200  0502            STA   START
1619   0502  888 0 25  83AG  0641            LDA   PSUDX         WRITE
1620   0873  888 0 67  HHHH  0000   1        HLT    HHHH          0000
1621   0493  888 0 30  0695  0402   3        LDL                 PAGE*     Z4. EJECT PAPER
1622   0695  888 0 30  0497  0402            LDL                 PAGE*
1623   0497  888 0 05  0499  0501            LDX# 04000          00000     Z5. FINISH FLO
1624   0501  888 0 30  0503  0560            LDL                 TERM*
1625   0503  888 0 67  89AH  0703            HLT   BOP1
1626   0703  888 0 F2  0500  0500            TRW   OTAP1
1627   0500  888 0 31  0903  0903            CLL                           Z6. HALT
1628   0903  888 0 25  87FH  0507            LDA   FTAG
1629   0507  888 0 82  0510  0710            TEQ   1F                      Z7. FLO#CHARTING
1630   0710  888 0 F2  0600  0600            TRW   OTAP2
1631   0600  888 0 F2  0700  0700            TRW   OTAP3
1632   0700  888 0 G2  0400  0517            TRD    0400
1633   0517  888 0 F6  8000  8000            TBU    8000         8000
1634   0510  888 0 G2  0500  0527   1        TRD   OTAP1
1635   0527  888 0 C7  0510  0530            TBT   18
1636   0530  888 0 F6  7800  7801            TBU   Y0000         Y0001
1637   0877  888 0 00  0000  7905   2        JMP   0000          Y0105
1638   83AH  888 0 30  0670  0402   PAT      LDL                 PAGE*
1639   0670  888 0 06  3073  3073            CLX
1640   3073  888 0 63  3073  0476            ZAP
1641   0476  888 0 60  0200  3002            STA   0200
1642   3002  888 0 65  0223  0825            STX   0223
1643   0825  888 0 60  0262  0664            STA   0262
1644   0664  888 0 65  0267  0869            STX   0267
1645   0869  888 0 60  0294  0496            STA   0294
1646   0496  888 0 65  0299  0701            STX   0299
1647   0701  888 0 60  0303  0505            STA   0303
1648   0505  888 0 65  0308  0910            STX   0308
1649   0910  888 0 60  0325  0727            STA   0325
1650   0727  888 0 65  0330  0732            STX   0330
1651   0732  888 0 60  0334  0736            STA   0334
1652   0736  888 0 65  0339  0741            STX   0339
1653   0741  888 0 60  0365  3367            STA   0365
1654   3367  888 0 65  0370  0772            STX   0370
1655   0772  888 0 60  0378  3380            STA   0378
1656   3380  888 0 65  0383  0785            STX   0383
```

```
1657  0785  888 0 08  9999  3188          LIR1  9999      -PAT
1658  3188  888 0 06  0001  0592  -PAT    IIR1  0001
1659  0592  888 0 30  0794  0596          LDL# 00005      00000
1660  0596  888 0 82  3399  3799          TEQ   1F
1661  3799  888 0 60  0218  0620          STA    0218
1662  0620  888 0 29  8418  3025          LDA1 D0001
1663  3025  888 0 05  0827  8920          LDX                UNDG*
1664  0827  888 0 65  0281  0683          STX    0281
1665  0683  888 0 60  0286  0688          STA    0286
1666  0688  888 0 29  8468  0693          LDA1 D0051
1667  0693  888 0 05  0895  8920          LDX                UNDG*
1668  0895  888 0 65  0250  0652          STX    0250
1669  0652  888 0 60  0255  0657          STA    0255
1670  0657  888 0 29  8518  0662          LDA1 D0101
1671  0662  888 0 05  0864  8920          LDX                UNDG*
1672  0864  888 0 65  0241  0643          STX    0241
1673  0643  888 0 60  0246  0448          STA    0246
1674  0448  888 0 29  8568  0453          LDA1 D0151
1675  0453  888 0 05  0455  8920          LDX                UNDG*
1676  0455  888 0 65  0209  0811          STX    0209
1677  0811  888 0 60  0214  0416          STA    0214
1678  0416  888 0 11  0201  3188          PRN    0201        -PAT
1679  3189  888 0 67  3333  000A  &PAT    HLT    3333        RA
1680  3399  888 0 16  0016  4189  1       PFD    0016        -PR1
1681  88AG  888 0 25  8706  0970  NEW     LDA    A                    SPECIAL SECRET OP NEW
1682  0970  888 1 08  0000  0573          LIR3   0000                 FIND A. IF UNDEFINED PUT IT AS OP IN
1683  0573  888 0 08  9999  0976          LIR1   9999                 SYMBOL TABLE WITH EQUIVALENT IN M AND C.
1684  0976  888 0 05  0978  3780          LDX    2F                   IF DEFINED PUT CONTENTS OF M AND C INTO
1685  3780  888 0 30  0982  8810          LDL    1F          FIND*    THE QADAAD PROGRAM IN THIS LOCATION.
1686  0978  888 0 60  85FC  3182  2       STA    ALOC
1687  3182  888 0 30  3184  4530          LDL                PSIGN
1688  3184  888 0 32  0100  3388          SHR     0100
1689  3388  888 0 30  84FG  0792          LDL    MC
1690  0792  888 0 90  000C  0796          SML    RX
1691  0796  888 0 25  85FC  0800          LDA    ALOC
1692  0800  888 0 37  0400  3607          SHL     0400
1693  3607  888 0 70  3009  000A          ADD                RA
1694  3009  888 0 50  0000  83AG          STL     0000       PSUDX
1695  0982  888 0 25  8706  0986  1       LDA    A
1696  0986  888 0 06  0789  0789          CLX
1697  0789  888 0 69  1000  3202          STX1   STAB
1698  3202  888 0 32  0200  3807          SHR     0200
1699  3807  888 0 20  3209  3011          BUFN  88000        88000
1700  3011  888 0 05  0413  0815          LDX    1F
1701  0815  888 0 77  0815  0818          ATL
1702  0818  888 0 25  000C  8712          LDA    RX          SRCH*
1703  0413  888 0 30  3015  4530  1       LDL                PSIGN
1704  3015  888 0 32  0100  0619          SHR     0100
1705  0619  888 0 30  84FG  0623          LDL    MC
1706  0623  888 0 90  000C  3027          SML    RX
```

```
1707  3027  888 0 54  2000  83AG          STL1  ETAB      PSUDX
1708  0736  888 0 60  83FB  0740  ERR1*   STA   TEMP                ERROR SUBROUTINE
1709  0740  888 0 65  84FB  0544          STX   TEMP1               ACCUMULATES IN ERROR THE ERROR CODES
1710  0544  888 1 0G  0001  0748          IIR3  0001                FOR A LINE.
1711  0748  888 0 06  0751  0751          CLX                       ERR1*: CODE IS RB3+1, INDICATING THE FIELD
1712  0751  888 0 32  0400  0758          SHR   0400                     EXIT IS IN RL.
1713  0758  888 0 05  0760  8760          LDX   1F        ERR2*
1714  8760  888 0 20  86FB  0766  ERR2*   BUF   ERROR               ERR2*: CODE IS IN RA, EXIT IS IN RX.
1715  0766  888 0 37  0100  3170          SHL   0100
1716  3170  888 0 60  86FB  0974          STA   ERROR
1717  0974  888 0 60  85AC  000C          STA   ACCUM     RX
1718  0760  888 1 0G  9999  0764  1       IIR3  9999
1719  0764  888 0 25  83FB  0968          LDA   TEMP
1720  0968  888 0 05  84FB  0008          LDX   TEMP1     RL
```

0000044044	0055544044	0000000000	0000544044	0027544044
0000544044	0055544044	0000010000	0000544044	0000544044
0000000044	0000544044	0000020000	0005544044	0055544044
0000000004	0005544044	0000030000	0000044044	0000044044
0000044044	0055544044	0000040000	0055544044	0005544044
0000000044	0005544044	0000050000	0005544044	0000544044
0005544044	0055544044	0000060000	0055544044	0005544044
0000000000	0000544044	0000070000	0005544044	0055544044
0000004044	0005544044	0000080000	0005544044	0000544044
0000000044	0055544044	0000090000	0055544044	0005544044
0000544044	0055544044	0000100000	0000044044	0000544044
0000004044	0005544044	0000110000	0055544044	0005544044
0000544044	0000544044	0000120000	0055544044	0000544044
0005544044	0005544044	0000130000	0055544044	0005544044
0005544044	0000044044	0000140000	0055544044	0000544044
0000004044	0005544044	0000150000	0055544044	0005544044
0005544044	0005544044	0000160000	0055544044	0000544044
0055544044	0055544044	0000170000	0005544044	0000000044
0000044044	0000544044	0000180000	0055544044	0000044044
0000544044	0000044044	0000190000	0055544044	0055544044
0000544044	0000544044	0000200000	0055544044	0000004044
0055544044	0000044044	0000210000	0055544044	0000544044
0000044044	0005544044	0000220000	0055544044	0000544044
0000544044	0000004044	0000230000	0055544044	0005544044
0055544044	0000544044	0000240000	0055544044	0000044044
0000004044	0000044044	0000250000	0055544044	0000044044
0050544044	0000544044	0000260000	0055544044	0000044044
0000004044	0000044044	0000270000	0000544044	0005544044
0055544044	0005544044	0000280000	0055544044	0000044044
0000044044	0000544044	0000290000	0055544044	0000544044
0055544044	0005544044	0000300000	0005544044	0000000004
0000004044	0000044044	0000310000	0055544044	0000544044
0055544044	0005544044	0000320000	0000544044	0000004044
0005544044	0000544044	0000330000	0055544044	0005544044
0055544044	0005544044	0000340000	0055544044	0000004044
0005544044	0000544044	0000350000	0055544044	0000544044
0000544044	0005544044	0000360000	0000544044	0000044044
0005544044	0000544044	0000370000	0055544044	0055544044
0000544044	0000544044	0000380000	0055544044	0000000044
0055544044	0055544044	0000390000	0055544044	0000004044
0055544044	0055544044	0000400000	0000544044	0005044044
0000544044	0005544044	0000410000	0000544044	0000004044
0055544044	0055544044	0000420000	0055544044	0000044044
0000544044	0000544044	0000430000	0005544044	0005044044
0055544044	0055544044	0000440000	0005544044	0002044044
0005544044	0000044044	0000450000	0000544044	0000044044
0005544044	0005544044	0000460000	0055544044	0000044044
0055544044	0005544044	0000470000	0000544044	0077044044
0005544044	0055544044	0000480000	0000544044	0007044044
0055544044	0005544044	0000490000	0055544044	2222000004

```
1722
1723
1724
1725  0000  888 0 67  0000  0000   0000
1726  7801  888 0 25  7803  7805   Y0001
1727  7805  888 0 60  7902  7907
1728  7907  888 0 G2  0500  7925   2
1729  7925  888 0 C7  7931  7925
1730  7931  888 0 87  7935  7937
1731  7935  888 0 67  7935  7907
1732  7937  888 0 F6  8600  7901   3
1733  7803  888 0 67  7803  7937   1
1734  7901  888 0 08  0000  7905   Y0101
1735  7905  888 0 34  8601  7807   Y0105
1736  7807  888 0 29  8603  7809
1737  7809  888 0 37  0400  7817
1738  7817  888 0 90  000A  7821
1739  7821  888 0 35  7823  7825
1740  7825  888 0 20  7827  000A
1741  7827  888 0 50  0000  7811
1742  7811  888 0 0G  0004  7815
1743  7815  888 0 30  7819  7829
1744  7829  888 0 82  7907  7905
1745
```

```
BLR   0000     4999          SIMPLE OBJECT PROGRAM LOADING ROUTINE
BLA   Y0003    Y0199 002     GOES INTO BAND 7800. THE ODD LOCATIONS.
BLR   Y0101    Y0105 004
HLT            *
LDA   1F
STA   Y0102    2F
TRD   0TAP1
TBT            *
TGR            3F
HLT            2B
TBU   8600     Y0101
HLT            3B
LIR1  0000     Y0105
LDL1  8601
LDA1  8603
SHL   0400
SML   RA
ERS#  00HHH    H0000
BUF            RA
STL   0000
IIR1  0004
LDL#  00020    00000
TEQ   2B       Y0105
END   BOP
```

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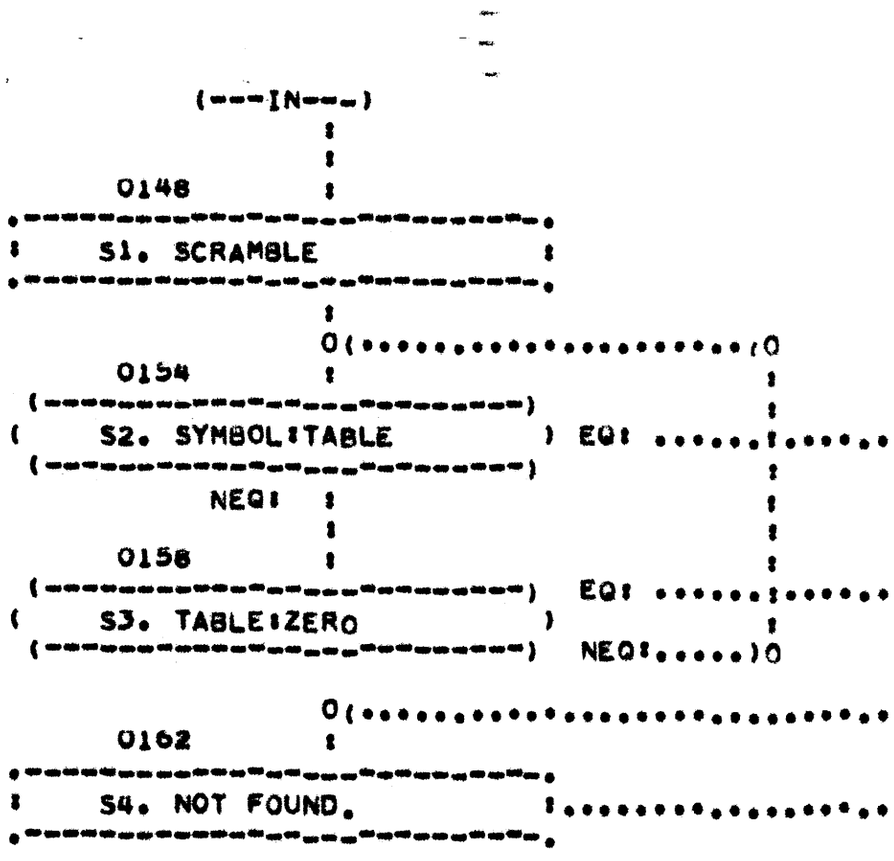
```
*    2.  QADAAD ASSEMBLER PASS 2.
*    TABLE OF CONTENTS
*       A. AJST* SUBROUTINE.
*       B. BEGINNING OF ASSEMBLY
*       C. CONTROL OPS.
*       D. DEFINE ADDRESS (DEFN*)
*       E. EDIT INPUT CARD
*       F. FIND AND RESERVE BEST LOCATION (FARB*)
*       L. PROCESS A ADDRESS.
*       O. OUTPUT SUBROUTINE.
*       P. PROCESSING OF INSTRUCTIONS.
*       Q. MASTER ADDRESS CALCULATOR (FIND*)
*       S. SYMBOL TABLE SEARCH (SRCH*
*       X. EXAMINE REMARKS FIELD
*       Z. ENDING OF ASSEMBLY.
*       THIS PASS DOES THE ACTUAL ASSEMBLY.
*       THE SHOW BEGINS AT ROUTINE B.
*
```




```
*    S.  SYMBOL TABLE SEARCH  (SRCH*)
*        THIS SUBROUTINE LOOKS UP A 5-CHARACTER
*        QUANTITY TO SEE IF IT IS IN THE SYMBOL TABLE.
*        OP-CODES,REGIONAL ADDRESSES,PAIR ADDRESSES,
*        AS WELL AS SYMBOLIC ADDRESSES ARE KEPT IN THE
*        SYMBOL TABLE. THERE ARE TWO EXITS,DEPENDING
*        ON WHETHER THE SYMBOL IS OR IS NOT IN THE
*        TABLE. ALL REFERENCES TO THE SYMBOL TABLE
*        ARE MADE VIA SRCH*.
*    S1. SCRAMBLE
*        THE SYMBOL IS CONVERTED TO A THREE-DIGIT NUM-
*        BER TO INDICATE WHERE THE SEARCH WILL START.
*        THIS SPEEDS UP THE SEARCH CONSIDERABLY.
*    S2. SYMBOL:TABLE
*        IF THE SYMBOL IS AT THIS PLACE IN THE
*        TABLE, GO TO DEF.
*    S3. TABLE:ZERO
*        IF THE TABLE ENTRY IS ZERO,GO TO S4.
*        OTHERWISE WE MOVE TO THE NEXT TABLE ENTRY
*        AND RETURN TO S2.
*    S4. NOT FOUND.
*        WE HAVE ENCOUNTERED A NEW SYMBOL SINCE THE
*        TABLE IS INITIALLY ALL ZEROES.
*        STORE THE NEW SYMBOL IN THE TABLE HERE
*        AND GO TO UNDEF.
*    CODING DETAILS:
*        ON INPUT, RL IS THE SYMBOL, RA IS UNDEF,
*        AND RX IS DEF.  OUTPUT IN RB1 IS THE LOCATION
*        IN THE TABLE, AND IF DEFINED THE EQUIVALENT
*        OF THE SYMBOL APPEARS IN RA. THERE IS ROOM
*        FOR 1000 SYMBOLS. IF THE 1001ST SYMBOL
*        COMES ALONG, THE MACHINE LOOPS INDEFINITELY.
*
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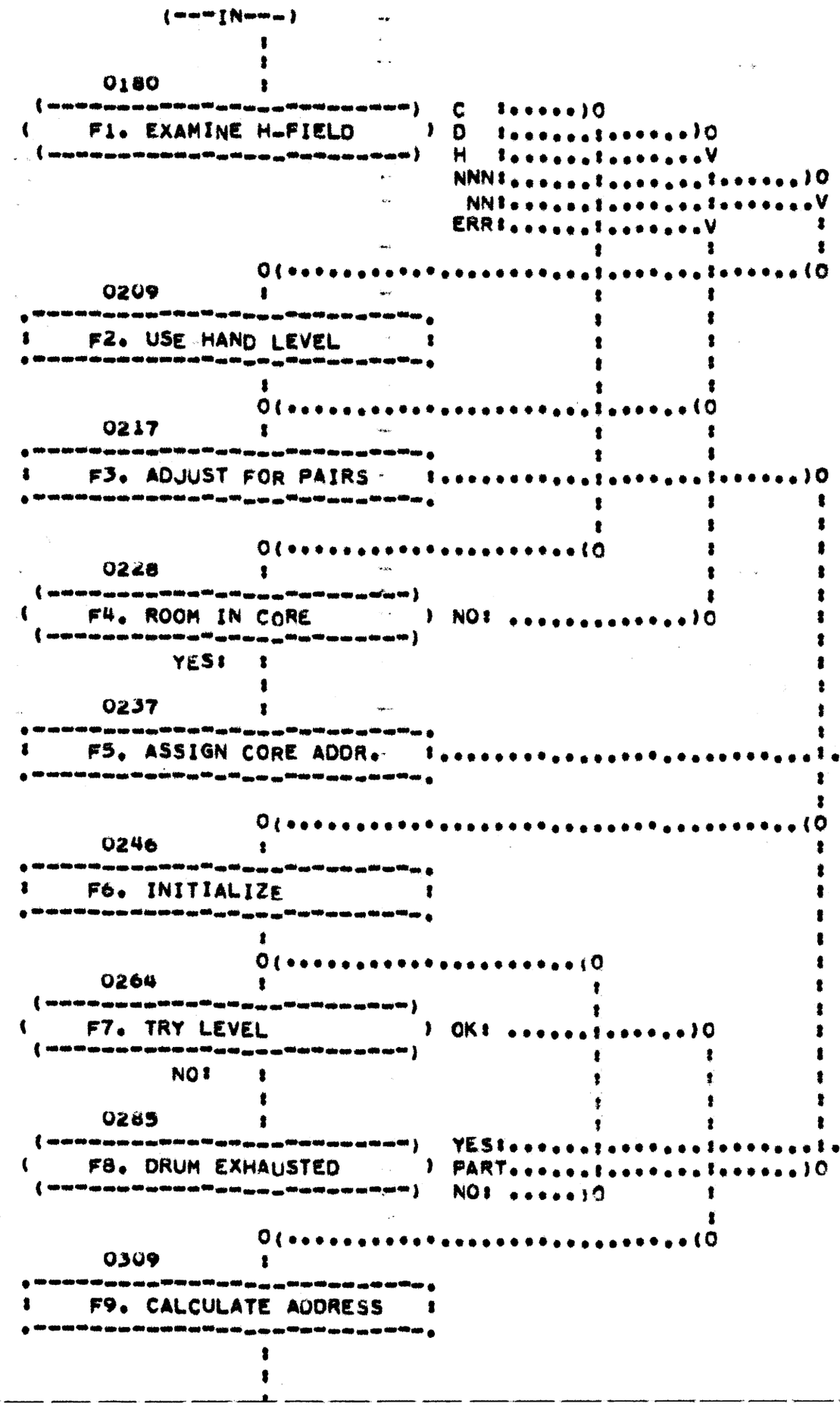


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*   F.  FIND AND RESERVE BEST LOCATION (FARB*)
*       THIS SUBROUTINE IS USED TO CHOOSE LOCATIONS
*       FOR A  M  OR  C  ADDRESSES OF INSTRUCTIONS.
*       THE CORRESPONDING H-FIELD IS INTERPRETED AND
*       THE CHOICE IS MADE ON THIS BASIS.
*   F1. EXAMINE H-FIELD
*       IF IT SPECIFIES C(CORE) GO TO F4.
*       IF IT SPECIFIES D(DRUM) OR IS BLANK,
*       GO TO F3 WITH RB6 SET TO 0.
*       IF IT SPECIFIES H(HIGH SPEED BANDS),
*       GO TO F3 WITH RB6 EQUAL TO 2.
*       THREE NUMERICS OR +NN MEANS A HAND-PICKED
*       LEVEL OR A CHANGE IN LEVEL ON THE DRUM,TO F2.
*       TWO NUMERICS MEANS A HANDPICKED HIGH SPEED
*       LEVEL, GO TO F2.
*       ANY OTHER MEANS THE H-FIELD IS IN ERROR.
*       GO TO F3 AND TREAT AS BLANK.
*   F2. USE HAND LEVEL
*       THE H-FIELD SPECIFIES A HAND PICKED LEVEL.
*       THIS SUPERCEDES THE LEVEL CALCULATED
*       BY QADAAD, ALTHOUGH IT WILL BE CHECKED
*       LATER BY THE AJST* ROUTINE.
*   F3. ADJUST FOR PAIRS
*       IF RB2 CONTAINS 5 AT THIS POINT WE HAVE
*       A PAIR ADDRESS, AND RB6 IS INCREASED BY 1.
*       THE CALCULATED LEVEL IS ADJUSTED 1 IF IT IS
*       A MINUS-PAIR ADDRESS. RB6 IS NOW EQUAL TO:
*       0: LOOK ON DRUM
*       1: LOOK FOR PAIR ON DRUM
*       2: LOOK FOR HIGH SPEED
*       3: LOOK FOR PAIR ADDRESS IN HIGH SPEED AREA
*       THE SETTING OF RB6 IS USED TO CONTROL THE
*       APPROPRIATE OPERATIONS BELOW. GO TO F6.
*   F4. ROOM IN CORE
*       IF RB2 CONTAINS 5 WE HAVE A PAIR ADDRESS AND
*       MUST RESERVE 2 LOCATIONS, OTHERWISE 1 LOCA-
*       TION IN CORE. IF THERE IS NO ROOM LEFT IN
*       THE 8000-8999 AREA, A SEMICOLON ERROR
*       INDICATION IS GIVEN AND WE TRY HIGH SPEED
*       ACCESS BY GOING TO F3.
*   F5. ASSIGN CORE ADDR.
*       CALCULATE THE EQUIVALENT OF THIS ADDRESS
*       AND THE ADDRESS ONE LESS IN CASE OF A PAIR
*       ADDRESS.  EXIT.
*   F6. INITIALIZE
*       CALCULATE THE STARTING DRUM LEVEL, AND ALSO
*       MAKE AN EXTRA COPY OF LEVEL 199 AS LEVEL -1
*       IN CASE OF PAIR ADDRESS PROCESSING.
*   F7. TRY LEVEL
*       IF A DRUM ADDRESS SATISFYING ALL THE
*       REQUIREMENTS INDICATED BY RB6 EXISTS ON THIS
*       LEVEL, GO TO F9.
*   F8. DRUM EXHAUSTED
*       IF THE LEVEL WAS HAND CALCULATED, A SEMICOLON
*       ERROR IS INDICATED THE FIRST TIME  STEP F8
*       IS EXECUTED.
*       IF WE HAVE GONE ALL THE WAY AROUND THE DRUM,
*       A SEMICOLON ERROR IS GIVEN AND THE ADDRESS
*       0000 IS ASSIGNED. TO F11.
*
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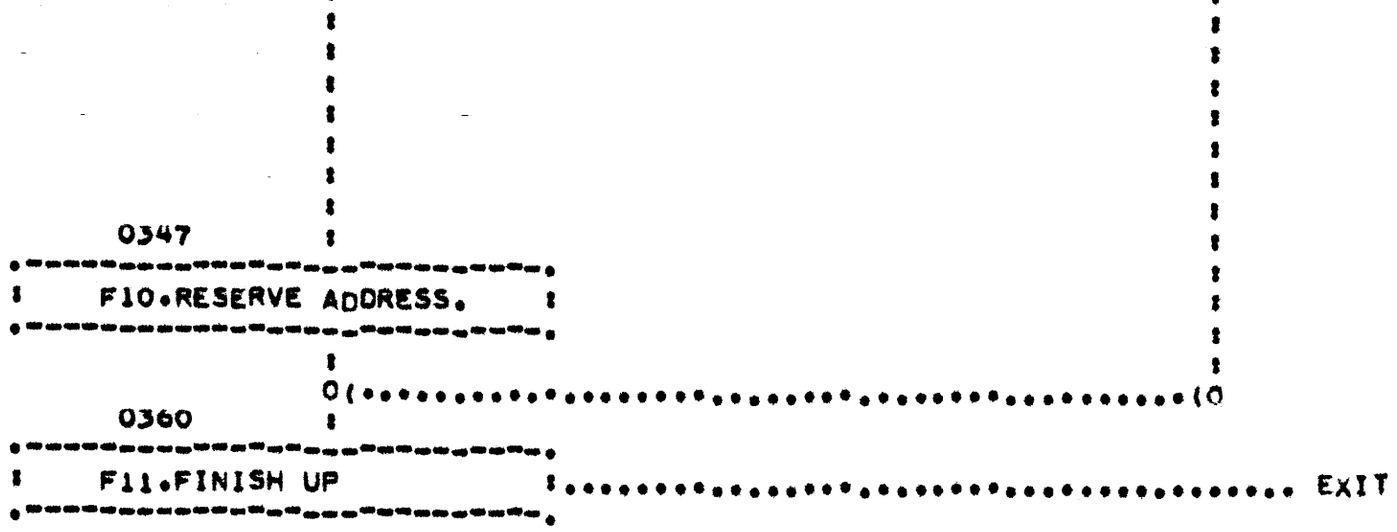


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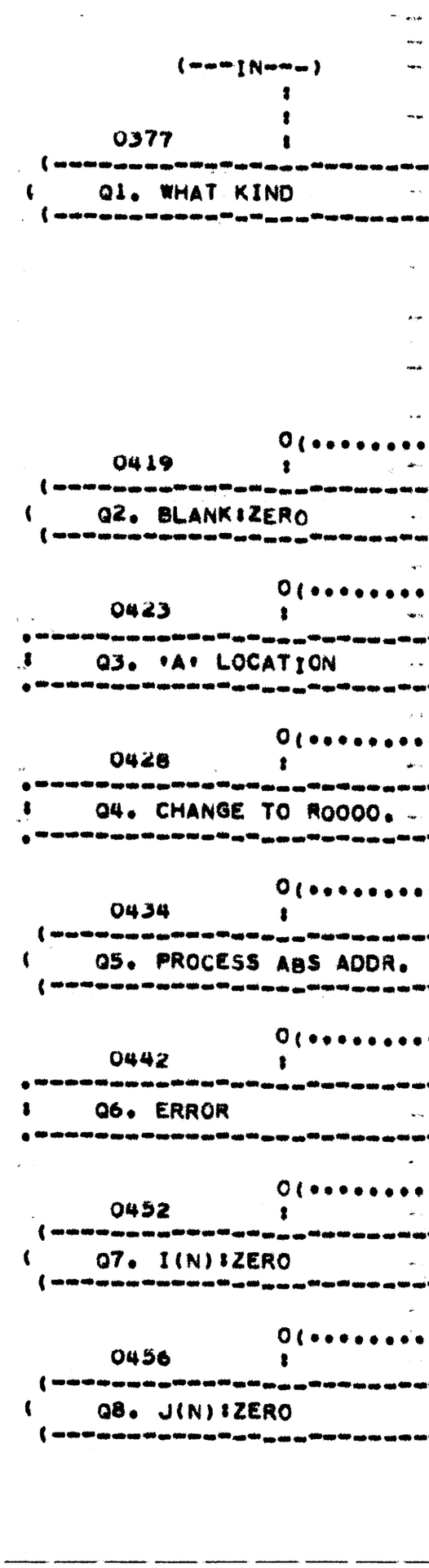
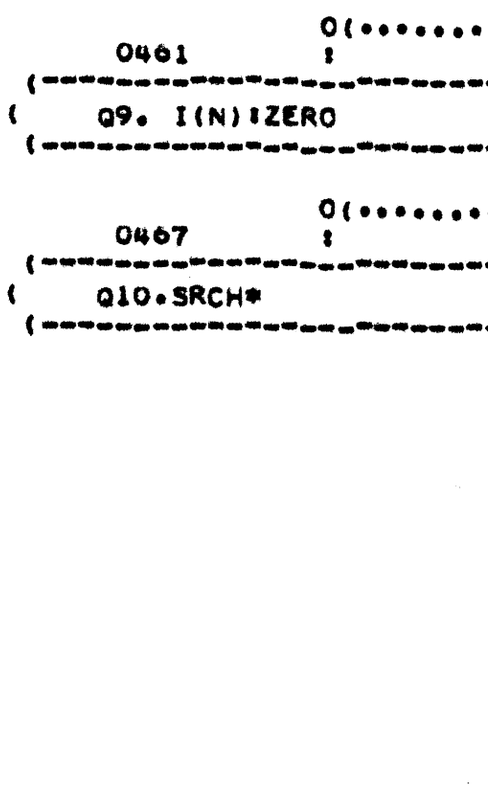
*       IF WE HAVE EXHAUSTED THE HIGH SPEED BANDS,
*       A SEMICOLON ERROR IS GIVEN AND WE TRY THE
*       WHOLE DRUM, GOING TO F6.
*       OTHERWISE WE STEP TO THE NEXT DRUM LEVEL
*       AND RETURN TO F7.
*   F9. CALCULATE ADDRESS
*       WE TRY TO FIGURE OUT WHAT DRUM ADDRESS WE
*       HAVE FOUND, PICKING THE SMALLEST ACCEPTABLE
*       ADDRESS ON THIS LEVEL.  A SINGLE WORD OF
*       40 BITS IS KEPT FOR EACH DRUM LEVEL,
*       CORRESPONDING TO BANDS 00 THRU 78, THE 5-BITS
*       COVER BANDS 00 THRU 18, 4-BITS 20 THRU 38,
*       AND SO ON.
*   F10.RESERVE ADDRESS.
*       FOR A PAIR ADDRESS THE ADDRESS IN THIS BAND
*       ON TWO ADJACENT LEVELS IS RESERVED,
*       OTHERWISE A SINGLE ADDRESS IS RESERVED, BY
*       TURNING ITS BIT OFF IN THE TABLE.  AFTER THE
*       OPERATION, LEVELS -1 AND 199 ARE COMBINED
*       AS LEVEL 199.
*   F11.FINISH UP
*       CALCULATE THE ADDRESS ADJACENT TO THE ONE
*       FOUND IN CASE OF A POSSIBLE MINUS-PAIR
*       ADDRESS, AND EXIT.
*   CODING DETAILS:
*       INDEX REGISTERS 1 2 AND 3 ARE NOT CHANGED BY
*       FARB*. ON INPUT THE H FIELD IS SPECIFIED
*       BY RB3, THE CALCULATED BEST DRUM LEVEL IS IN
*       RA, AND THE EXIT IS IN RL. THE OUTPUT
*       LOCATION FOUND IS IN RA AND AN ADJACENT
*       LOCATION IS STORED IN A SPECIAL TABLE.
*
```




```
*   Q.  MASTER ADDRESS CALCULATOR (FIND*)
*       THIS SUBROUTINE IS GIVEN THE CONTENTS OF
*       THE SYMBOLIC A,M, OR C FIELD OF THE CARD AND
*       ANALYZES IT. THERE ARE TWO EXITS, ACCORDING
*       TO WHETHER THE ADDRESS IS DEFINED OR NOT.
*   Q1. WHAT KIND
*       IF BLANK GO TO Q2.
*       IF SELF, GO TO Q3.
*       IF FOUR RIGHTHAND PARTS ARE NUMERIC, TO Q4.
*       IF THE LEFTMOST CHARACTER IS BLANK,HOWEVER,
*       GO TO Q5.
*       IF LOCAL FORWARD ADDRESS, TO Q7.
*       IF LOCAL BACKWARD ADDRESS, TO Q8.
*       IF LOCAL PLAIN ADDRESS N, TO Q9.
*       IF PAIR ADDRESS,SET RB2 TO 5 AND GO TO Q10.
*       IF THE SYMBOL FAILS TO PASS THE ABOVE AND
*       BEGINS WITH A NUMERIC, GO TO Q6.
*       OTHERWISE IT IS SYMBOLIC; WE SET RB2 TO 4
*       AND GO TO Q10.
*   Q2. BLANK:ZERO
*       IF 'BLANK' IS ZERO, THE BLANK ADDRESS IS
*       UNDEFINED, AND WE GO TO UNDEF,
*        ELSE TO DEF.
*   Q3. 'A' LOCATION
*       THE * IS DEFINED AS THE VALUE OF A LOCATION,
*       IF IT APPEARS IN A, OR IN CERTAIN CONTROL OPS
*       IT IS THE VALUE OF THE PRECEDING A LOCATION.
*       TO DEF.
*   Q4. CHANGE TO R0000.
*       CHANGE THE REGIONAL ADDRESS TO R0000 AND SET
*       RB2 TO ZERO. WE GO THEN TO LOOK THIS UP
*       IN THE SYMBOL TABLE, AT STEP Q10.
*   Q5. PROCESS ABS ADDR.
*       IF ANY PART OF THE ADDRESS IS BLANK OR
*       HAS ZONES OF 2 OR 3, GO TO Q6. OTHERWISE
*       USE THE ZONES TO PRODUCE UNDIGITS FOR ABCFGH,
*       AND SEND THE RESULTING ADDRESS TO DEF.
*   Q6. ERROR
*       SET UP ERROR FLAG FOR CURRENT FIELD
*       AND SET THE ADDRESS TO ZERO. TO DEF.
*   Q7. I(N):ZERO
*       IF THE FORWARD LOCAL TABLE ENTRY FOR N IS
*       ZERO IT IS UNDEFINED;WE GO TO UNDEF. ELSE IT
*        IS DEFINED AND DEF.
*   Q8. J(N):ZERO
*       IF THE BACKWARD LOCAL TABLE ENTRY FOR N IS
*       ZERO IT IS UNDEFINED AND WE GO TO Q6 SINCE
*       THIS SHOULDN'T HAPPEN. ELSE IT IS A
*       DEFINED ADDRESS WHICH IS SENT TO DEF.
*   Q9. I(N):ZERO
*       IF THE FORWARD LOCAL TABLE ENTRY FOR N IS
*       ZERO THIS ADDRESS IS UNDEFINED, GO TO UNDEF.
*       ELSE IT IS DEFINED AND WE TRANSFER IT TO THE
*       BACKWARD LOCAL TABLE AND EXIT TO DEF.
*       IN EITHER CASE RESET FORWARD LOCAL ENTRY 0.
*  Q10.SRCH*
*       SEARCH FOR THE ITEM IN THE SYMBOL TABLE.
```

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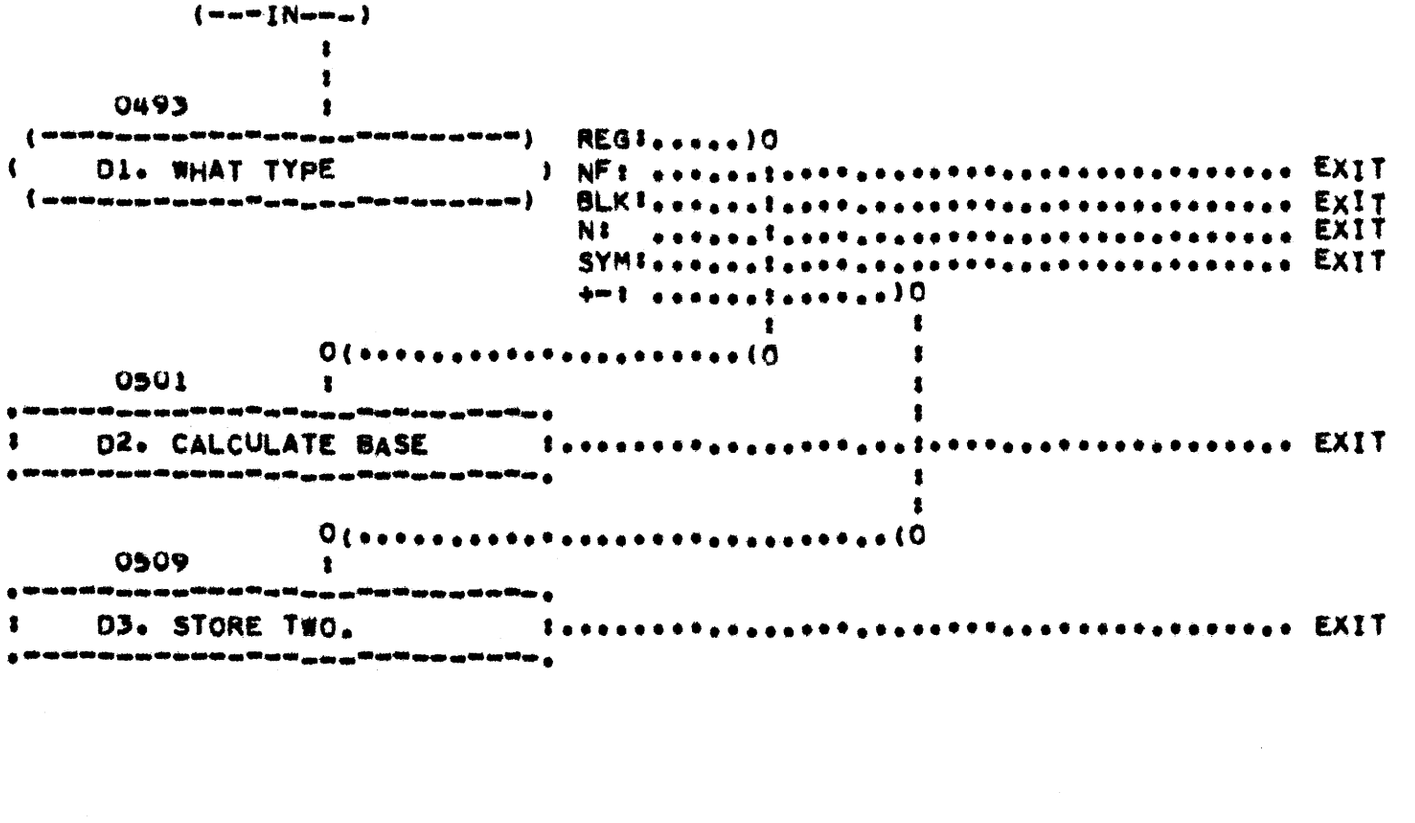
*
*       IF FOUND,GO TO DEF,ADJUSTING FOR REGIONAL
*       ADDRESS IF NECESSARY. IF NOT FOUND, WE GO
*        TO  UNDEF.
*   CODING DETAILS:
*       INPUT TO FIND* IS DEF IN RX AND UNDEF IN RL.
*       RB3 CONTAINS THE FIELD TO BE EXAMINED.
*       AT EXIT DEF, RA CONTAINS THE DEFINED
*       EQUIVALENT IN ITS C ADDRESS POSITION.
*       AT EXIT UNDEF, RB2 CONTAINS INFORMATION
*       ABOUT THE TYPE OF ADDRESS AS FOLLOWS:
*       0: REGIONAL
*       1: LOCAL FORWARD  N IS IN RB5
*       2: BLANK
*       3: LOCAL PLAIN  N IS IN RB5
*       J: SYMBOLIC  SPOT IN SYMBOL TABLE IS RB1
*       K: PAIR ADDRESS  RB5 IS 0 FOR &, 1 FOR -.
*
```




```
*    D.  DEFINE ADDRESS (DEFN*)
*        THIS SUBROUTINE IS USED AFTER FIND* HAS
*        DETERMINED AN ADDRESS IS UNDEFINED. IF THIS
*        IS NOT AN ERROR CONDITION, SOME WAY OF
*        CALCULATING AN ADDRESS, USUALLY FARB*, IS
*        USED AND THEN THIS ROUTINE DEFN* TAKES OVER.
*    D1. WHAT TYPE
*        IF THE ADDRESS TO BE DEFINED IS REGIONAL,
*        GO TO D2.
*        IF LOCAL FORWARD,ENTER IN I TABLE AND EXIT.
*        IF BLANK, ENTER IN 'BLANK' AND EXIT.
*        IF LOCAL PLAIN, ENTER IN J TABLE AND EXIT.
*        IF SYMBOLIC, ENTER IN EQUIVALENTS TABLE, EXIT
*        IF PAIR ADDRESS, GO TO D3.
*    D2. CALCULATE BASE
*        REGIONAL ADDRESSES ARE DEFINED ONLY BY
*        CONTROL OPS LIKE BLR. THE DEFINING ADDRESS
*        MINUS THE INCREMENT, THE ADDRESS CORRESPON-
*        DING TO R0000, IS STORED IN THE
*        EQUIVALENTS TABLE.  EXIT.
*    D3. STORE TWO.
*        THE DEFINED ADDRESS IS STORED IN THE SYMBOL
*        TABLE. THEN & IS CHANGED TO - OR VICE VERSA
*        AND THAT SYMBOL PLUS ITS EQUIVALENT ARE ALSO
*        STORED AWAY. THE ASSUMPTION IS MADE THAT
*        FARB* WAS USED TO CALCULATE THE ADDRESSES.
*         EXIT.
*    CODING DETAIL:
*        THE EXIT IS INPUT IN RL AND THE CALCULATED
*        ADDRESS IN RA. OTHER INPUTS ACTUALLY USED
*        ARE R82 TO TELL THE TYPE, AND R81 AND R85 TO
*        GIVE EXTRA INFORMATION AS SUPPLIED BY THE
*        FIND* SUBROUTINE. AT EXIT, RA CONTAINS THE
*        DEFINED EQUIVALENT.
*
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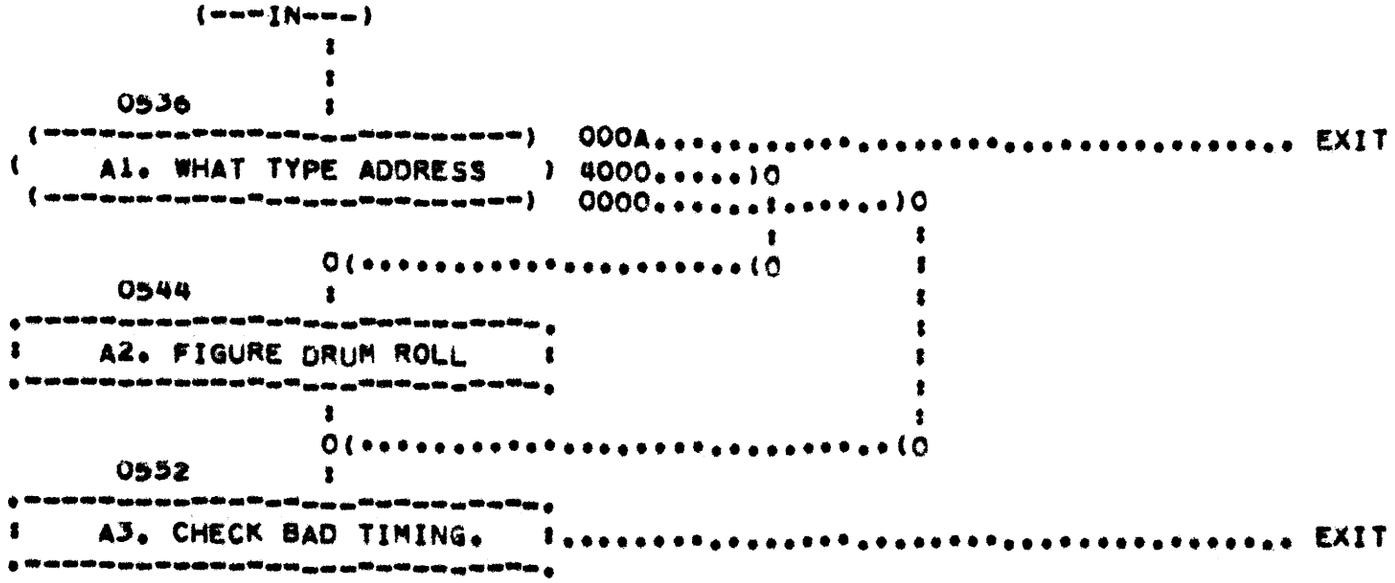
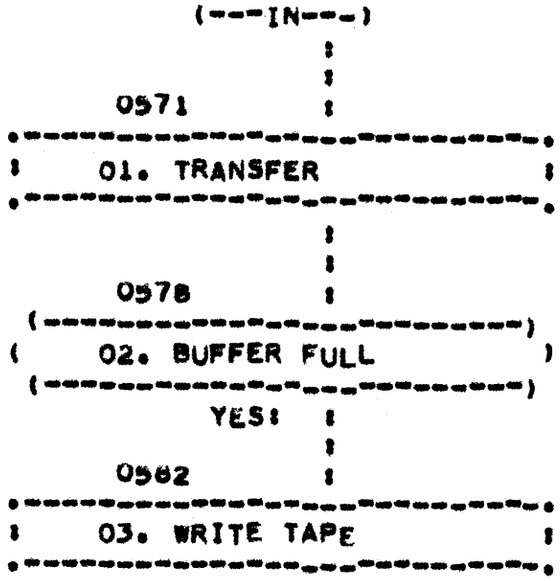



```
*    A.  AJST* SUBROUTINE.
*        THIS SUBROUTINE IS PART OF THE WAY QADAAD
*        FINDS LATENCY. AJST* IS USED ON M AND C
*        ADDRESSES. FIRST AN OPTIMUM LEVEL
*        'OPTIM' IS CALCULATED BY QADAAD; AJST* USES
*        THIS TO FIND THE CURRENT LEVEL, GIVEN THE
*        ACTUAL M OR C ADDRESS.
*    A1. WHAT TYPE ADDRESS
*         IF THE ASSIGNED ADDRESS D HAS ANY UNDIGITS
*        IT IS ASSUMED TO BE IMMEDIATE ACCESS AND
*        'OPTIM' IS THE ANSWER.  EXIT.
*         IF THE ASSIGNED ADDRESS D IS ON THE HIGH-
*        SPEED BANDS, GO TO A2.
*        IF THE ASSIGNED ADDRESS D IS ON THE STANDARD
*        PART OF THE DRUM, D IS THE ANSWER. GO TO A3.
*    A2. FIGURE DRUM ROLL
*        THE ANSWER IS  D-OPTIM  MODULO 50,
*        ADDED TO OPTIM.
*    A3. CHECK BAD TIMING.
*        IF D COMPARED TO OPTIM INDICATES A WAIT OF
*        48 OR 49 ON HSB OR OF 198 OR 199 ON REST OF
*        DRUM, THE ERROR FLAG - IS PUT ON THE LISTING.
*    CODING DETAILS:
*        INPUT IS THE ASSIGNED ADDRESS IN RA AND THE
*        EXIT IN RL. OUTPUT IN RA IS SOME LOCATION
*        ON THE APPROPRIATE DRUM LEVEL.
*         EXIT.
*
```




```
*    0.  OUTPUT SUBROUTINE.
*        THIS ROUTINE IS USED TO TRANSMIT AN ASSEMBLED
*        INSTRUCTION TO THE OUTPUT TAPE.
*    01. TRANSFER
*        THE LOCATION IS IN THE FORM RRROSOAAAA WHERE
*        RRR ARE RELOCATION DIGITS COPIED FROM THE
*        CARD, S IS THE ASSEMBLED SIGN, AND AAAA IS
*        THE ASSEMBLED LOCATION.  MOVE THE LOCATION
*        AND THE ASSEMBLED INSTRUCTION INTO THE
*        OUTPUT BUFFER.
*    02. BUFFER FULL
*        IF THE BUFFER DOES NOT HAVE 50 INSTRUCTIONS,
*         EXIT.
*    03. WRITE TAPE
*        WRITE THE BUFFER OUT ON THE OUTPUT TAPE AND
*        CLEAR THE BUFFER AGAIN. EXIT.
*
*
*
*
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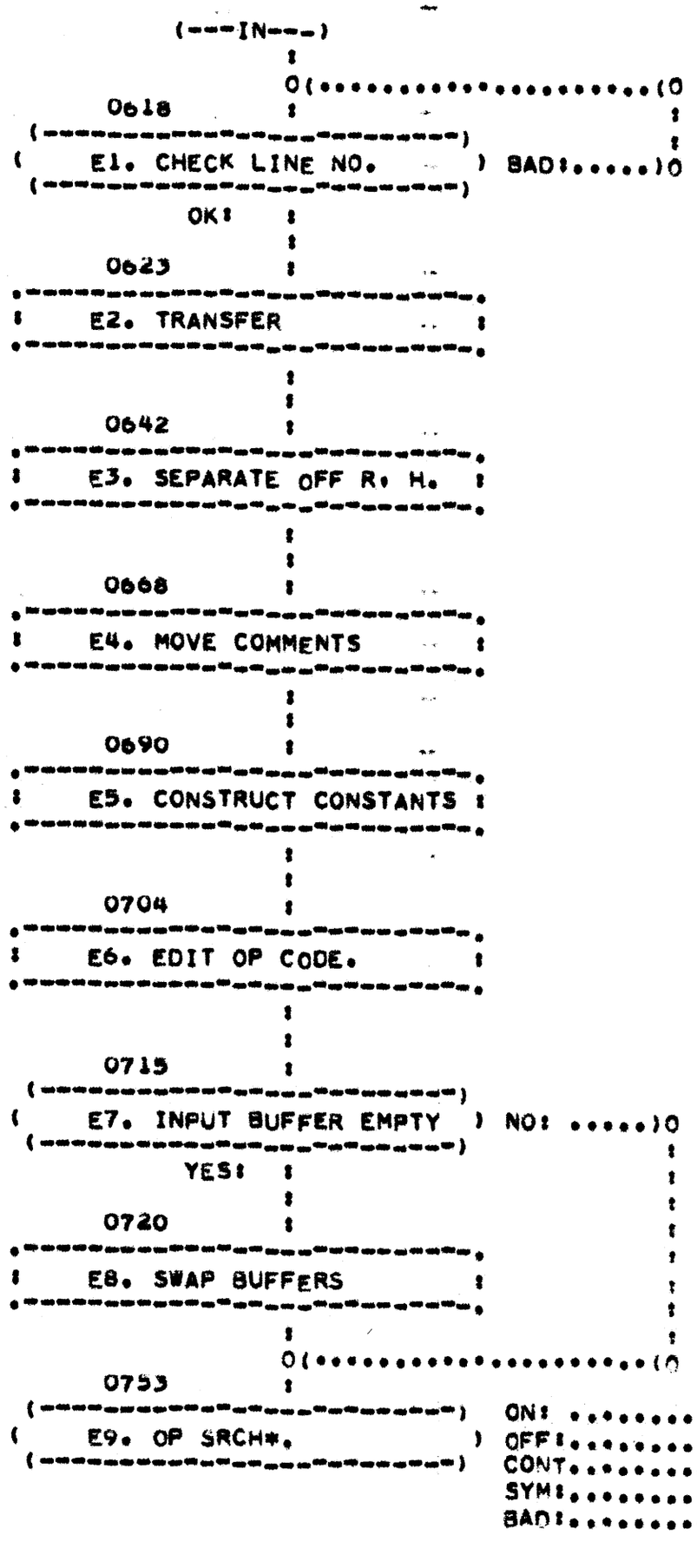


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*   E.  EDIT INPUT CARD.
*       THIS IS WHERE THE PROCESSING OF EACH CARD
*       STARTS. THE PURPOSE IS TO TAKE THE INFOR-
*       MATION FROM THE INPUT TAPE AND TRANSFER IT
*       TO THE PRINTER AREA READY TO BE PRINTED AND
*       ALSO EDIT IT INTO A FORM MORE DIGESTIBLE FOR
*       ASSEMBLY PROCESSING.
*       THE CARDS ARE REPRESENTED AS 20 WORDS ON
*       TAPE. A ZONE WORD IMMEDIATELY PRECEDING ITS
*       CORRESPONDING NUMERIC.
*       0,1 LINE NUMBER
*       2,3 A AR AH  AS  1111123330
*       4,5 M MR MH  AS  1111123330
*       6,7 C CR CH  AS  1111123330
*       8,9 OP IR    AS  1112000000
*       10-19 REMARKS AS 0111111...
*   E1. CHECK LINE NO.
*       IF THE LINE NUMBER IS NOT EXACTLY 1 HIGHER
*       THAN THE PRECEDING, STOP THE MACHINE AND
*       THEN RETURN TO E1.
*   E2. TRANSFER
*       MOVE THE LEFT HALF OF THE CARD TO THE PRINTER
*       AREA EDITING IT SLIGHTLY FOR READABILITY.
*   E3. SEPARATE OFF R, H.
*       EDIT THE A-AR-AH,M-MR-MH,C-CR-CH, CHANGING
*       THE SYMBOLIC PORTION TO A SINGLE WORD WITH
*       THE ZONES AT THE LEFT: ZZZZZNNNNN;
*       ACCUMULATE THE R DIGITS, AND PUT THE
*       H-FIELD INTO THE FORM 00ZZZ00NNN.
*   E4. MOVE COMMENTS
*       MOVE THE REMARKS FIELD INTO REGION R.
*   E5. CONSTRUCT CONSTANTS
*       PUT TOGETHER THE M AND C FIELDS INTO
*       POSITIVE CONSTANTS MC,MCZ,AND MCN AS THE
*       CON NUM ZON CONTROL OPS ARE SUPPOSED TO DO.
*   E6. EDIT OP CODE.
*       PUT THE OPERATION CODE FIELD INTO THE FORM
*       88ZZZ88NNN.  THIS FORM IS USED BECAUSE IT
*       CANNOT CONFLICT WITH ANY SYMBOL IN THE
*       SYMBOL TABLE.
*       PUT THE IR FIELD INTO THE FORM Z000000N00.
*   E7. INPUT BUFFER EMPTY
*       IF THE CURRENT INPUT BUFFER IS NOT YET
*       EMPTY, GO TO E9.
*   E8. SWAP BUFFERS
*       AN INPUT BUFFER HAS ALREADY BEEN LOADED
*       WE SWAP INPUT BUFFERS AND INITIATE READING IN
*       TO THE EMPTY BUFFER.
*   E9. OP SRCH*.
*       IF OP IS 'ON' GO TO C6.
*       IF MASTER SWITCH IS OFF GO TO C7.
*       ELSE SEARCH FOR OP-CODE IN THE SYMBOL TABLE.
*         IF IT IS A CONTROL OP, GO TO C1.
*       IF IT IS A MACHINE SYMBOLIC OP, GO TO THE
*       MAIN PROCESSING ROUTINE P1.
*       IF IT IS NOT IN THE TABLE, GIVE AN ERROR
*       INDICATION AND CHANGE OP TO 57. GO TO  P1.
*
*
*
```

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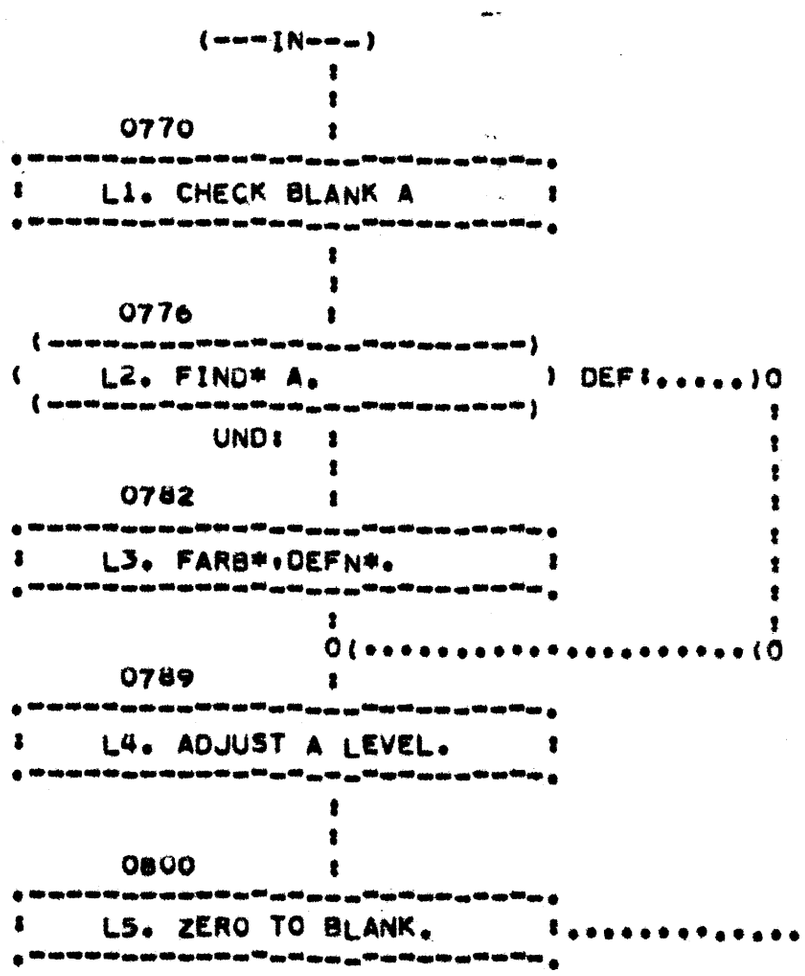
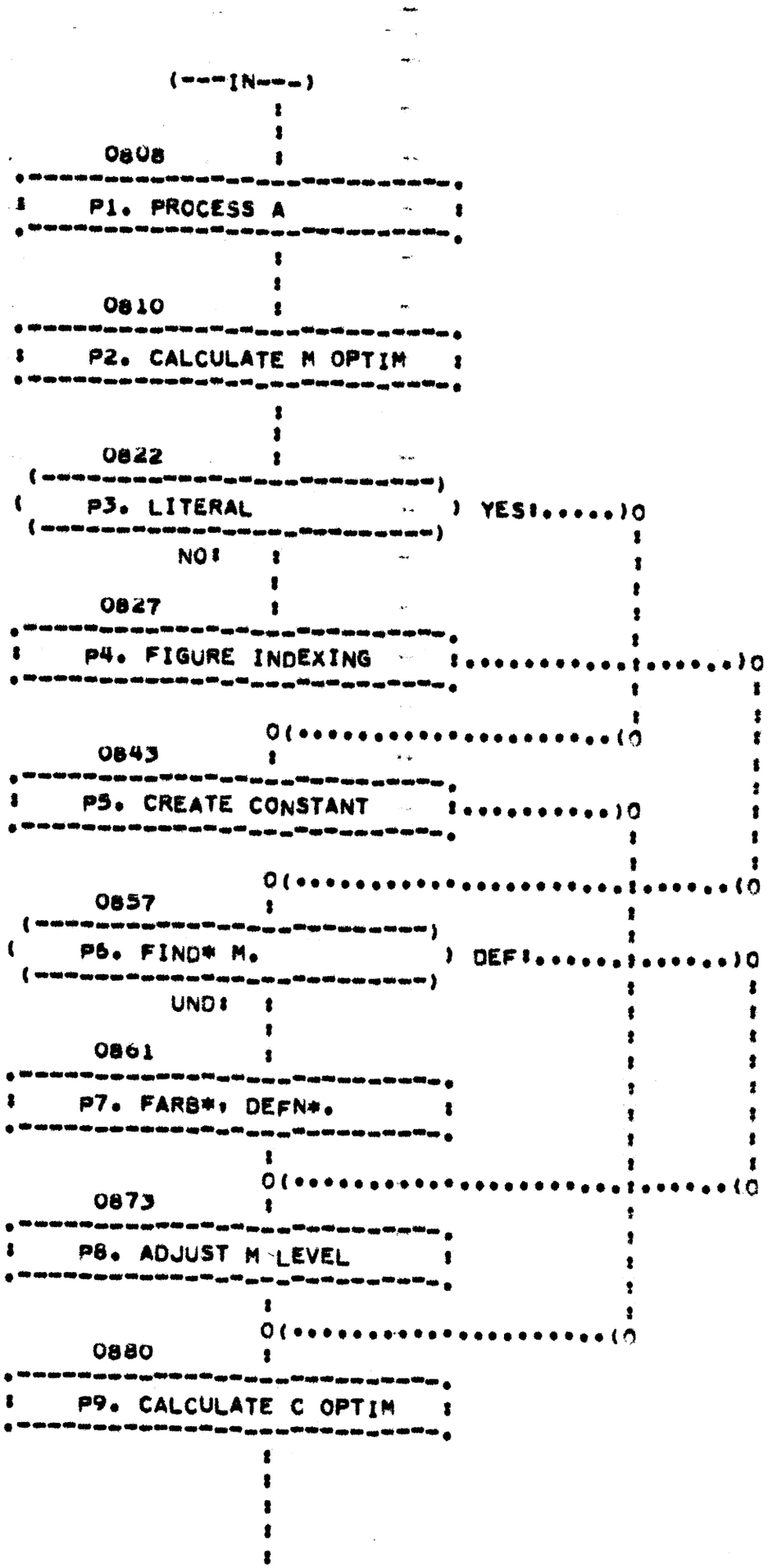



```
*    L.  PROCESS A ADDRESS.
*        THIS ROUTINE IS USED FOR INSTRUCTIONS AND
*        ALSO FOR CONTROL OPS CON,NUM, AND ZON.
*    L1. CHECK BLANK A
*        IF A IS NOT BLANK BUT THE PRECEDING INSTRUC-
*        TION HAD A BLANK ADDRESS, GIVE AN ERROR
*        INDICATION.
*    L2. FIND* A.
*        FIND A (ROUTINE G). IF IT IS ALREADY DEFINED,
*        GO TO L4.
*    L3. FARB*,DEFN*.
*        A IS AN UNDEFINED ADDRESS. IF IT IS REGIONAL,
*        LOCAL FORWARD, OR BLANK THIS IS AN ERROR
*        CONDITION AND A NEW LOCATION IS ASSEMBLED.
*        OTHERWISE USE THE LINE NUMBER AS RANDOM DRUM
*        LEVEL AND GO THRU FARB* (ROUTINE F) AND
*        DEFN* (ROUTINE D).
*    L4. ADJUST A LEVEL.
*        IF THE NEW A ADDRESS MATCHES THE LAST M OR C
*        ADDRESS, USE THEIR LEVEL, EXCEPT ON M ADDRESS
*        MATCH WHERE THE C ADDRESS HAD UNDIGITS. IN
*        THE LATTER CASE THE PREVIOUS C LEVEL IS USED.
*        OTHERWISE USE THE A ADDRESS AS THE DRUM LEVEL
*    L5. ZERO TO BLANK.
*        THE LOCATION 'BLANK' IS SET TO ZERO SINCE AT
*        THIS POINT BLANK ADDRESSES ARE UNDEFINED.
*         EXIT.
*
*
*
*
```




```
*   P.  PROCESSING OF INSTRUCTIONS
*   P1. PROCESS A
*       EXECUTE THE L ROUTINE.
*   P2. CALCULATE M OPTIM
*       IF THE IR FIELD IS NON BLANK AND NOT A
*       LITERAL, ADD 1 TO A LEVEL FOR INDEX REGISTER
*       MODIFICATION TIME. THEN ADD THE APPROPRIATE
*       AMOUNT TO GET THE OPTIMUM M ADDRESS LEVEL,
*       AS DETERMINED BY THE OPERATION CODE.
*       PUT THIS IN 'OPTIM'.
*   P3. LITERAL
*       IF THE IR FIELD CONTAINS A NUMBER SIGN GO TO
*        P5.
*   P4. FIGURE INDEXING
*       ADJUST BIT 4 OF THE OPERATION CODE AND
*       THE SIGN OF THE RESULT TO GIVE THE INDEX
*       REGISTER MODIFICATION DESIRED. GO TO P6.
*   P5. CREATE CONSTANT
*       GO THRU FARB* AND AJST* (ROUTINES F AND A)
*       TO DETERMINE AN ADDRESS AND DRUM LEVEL FOR
*       THE LITERAL CONSTANT. ASSEMBLE THE POSITIVE
*       CONSTANT INTO THIS LOCATION, (ROUTINE 0)
*       TRANSFERRING THE MR DIGIT INTO AN AR DIGIT
*       FOR THE CONSTANT.
*       MARK THE C FIELD BLANK AND GO TO P9.
*   P6. FIND* M.
*       FIND M(ROUTINE Q). IF IT IS ALREADY DEFINED,
*       GO TO P8.
*   P7. FARB*, DEFN*.
*       M IS AN UNDEFINED ADDRESS. IF IT IS
*       REGIONAL OR LOCAL PLAIN THIS IS AN ERROR
*       CONDITION AND ZERO IS ASSEMBLED. IF IT IS
*       BLANK AND IF THE OP-CODE IS ONE THAT IGNORES
*       M, * IS ASSEMBLED.
*       OTHERWISE FARB* AND DEFN* (ROUTINES F,D) ARE
*       USED TO DEFINE M ON THE BASIS OF OPTIM AND
*       THE MH-FIELD.
*   P8. ADJUST M LEVEL
*       THE DRUM LEVEL AT THIS POINT IS NOW
*       DETERMINED BY SUBROUTINE A.
*   P9. CALCULATE C OPTIM
*       WE BEGIN TO WORK ON THE C ADDRESS NOW.
*       THE OP CODE FOUND IN THE SYMBOL TABLE IS IN A
*       SPECIAL FORMAT OPTSDOMMCC.
*       HERE OP IS THE TWO DIGIT OPERATION CODE.
*       S IS 1 FOR IGNORE C, 2 FOR IGNORE M.
*       MM AND CC ARE INCREMENTS FOR DETERMINING
*       LATENCY.  T IS THE TYPE OF LATENCY RULE
*       REQUIRED, AS FOLLOWS:
*       0: C IS MMCC FIXED LEVEL.
*       1: C IS MMCC FIXED LEVEL.
*       2: C IS A+CC
*       3: SHIFT COMMANDS C IS A+N+CC.
*       WE NOW CALCULATE OPTIM FOR C, ACCORDING TO
*       THE RULE GIVEN BY T.
*   P10.FIND* C.
*
*
*
*
```

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                           :
                           :
        0903               :
    (-------------------------------)
   (    P10.FIND* C.                 ) DEF:.....)0
    (-------------------------------)           :
               UND:        :                    :
                           :                    :
        0907               :                    :
   .---------------------------------.          :
   :    P11.FARB*,DEFN*.             :          :
   .---------------------------------.          :
                           :                    :
                           0(...................(0
        0933               :
   .---------------------------------.
   :    P12.ADJUST C LEVEL           :
   .---------------------------------.
                           :
                           :
        0936               :
   .---------------------------------.
   :    P13. SYNTHESIZE              :
   .---------------------------------.
                           :
                           :
        0944               :
   .---------------------------------.
   :    P14.ASSEMBLE                 :
   .---------------------------------.
                           :
                           :
        0953               :
   .---------------------------------.
   :    P15.EDIT                     :
   .---------------------------------.
                           :
                           :
        1003               :
    (-------------------------------)
   (    P16.FLOW CHART               ) YES:................................   X1
    (-------------------------------)
               NO:         :
                           :
        1008               :
   .---------------------------------.
   :    P17. PRINT                   :.....................................   E1
   .---------------------------------.
```

FIND C(ROUTINE Q). IF IT IS ALREADY DEFINED, GO TO P12.

P11.FARB*,DEFN*.

C IS AN UNDEFINED ADDRESS. IF IT IS REGIONAL OR LOCAL PLAIN, THIS IS AN ERROR CONDITION AND ZERO IS ASSEMBLED.
IF IT IS BLANK AND THE OP-CODE IGNORES C, IT IS MADE EQUAL TO M. OTHERWISE FARB* AND DEFN* (ROUTINES F,D) ARE ACTIVATED TO DEFINE C ON THE BASIS OF OPTIM.
BLANK ADDRESS HERE MAY BE PUT IN BOOA OR BOOF REGION OF CORE.

P12.ADJUST C LEVEL

THE DRUM LEVEL AT THIS POINT IS NOW DETERMINED BY SUBROUTINE A.

P13. SYNTHESIZE

THE OP, M AND C ARE NOW PUT TOGETHER INTO A TEN-DIGIT INSTRUCTION.

P14.ASSEMBLE

USE ROUTINE O TO OUTPUT THE ASSEMBLED LINE OF CODE.

P15.EDIT

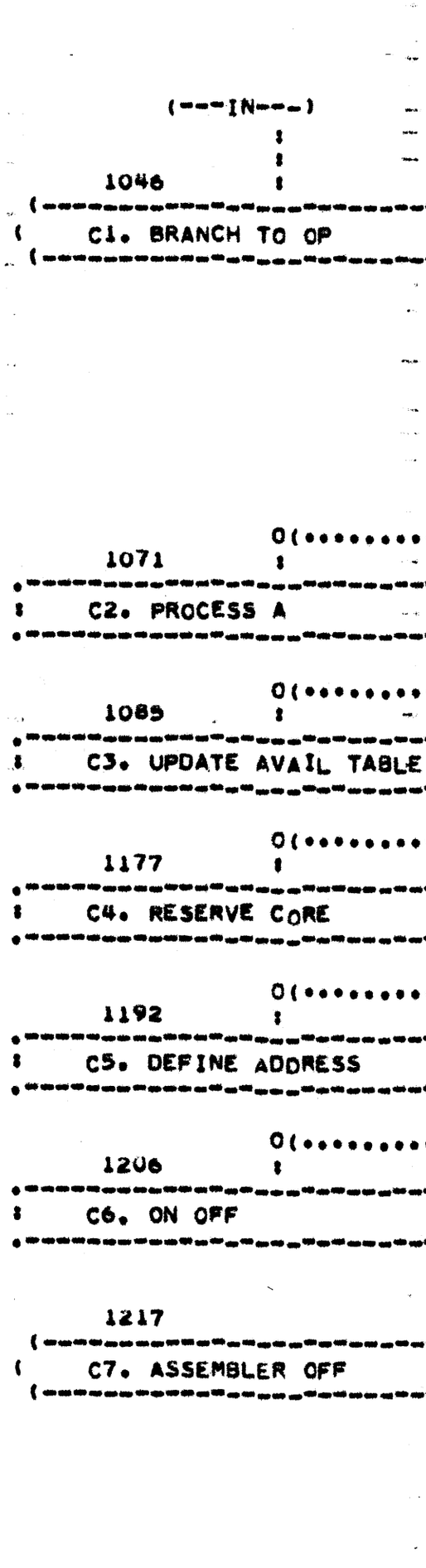
THE ASSEMBLED INSTRUCTION IS EDITED AND SENT TO THE PRINTER AREA.
FOR CONTROL OPERATIONS, HOWEVER, THIS PART IS SET TO BLANKS.

P16.FLOW CHART

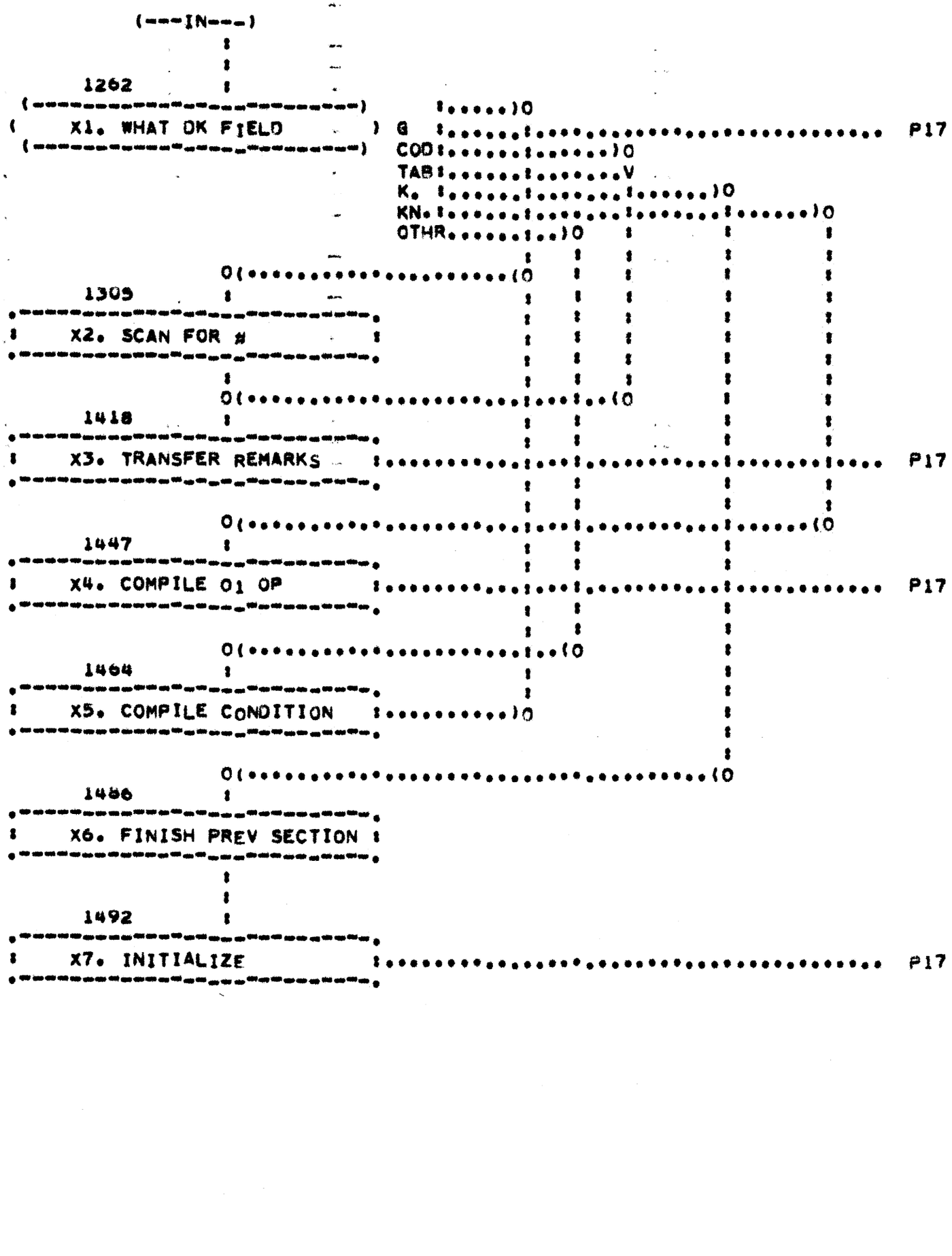
IF THE CONTROL OPERATION FLO HAS APPEARED EARLIER, GO TO THE FLOW-CHARTING ROUTINE X1.

P17. PRINT

MOVE THE REMARKS TO THE PRINTER AREA FROM REGION R. TAKE ALL ERROR CONDITIONS THAT HAVE BEEN DETECTED AND PUT THEM ON THE LISTING. THERE IS ROOM FOR AT MOST 5 ERRORS.
INTERROGATE THE PAGE-LINE COUNTER TO SEE IF A SKIP TO NEXT PAGE IS NECESSARY.
FINALLY PRINT THE LINE, AND GET READY FOR THE NEXT LINE, GOING TO E1.

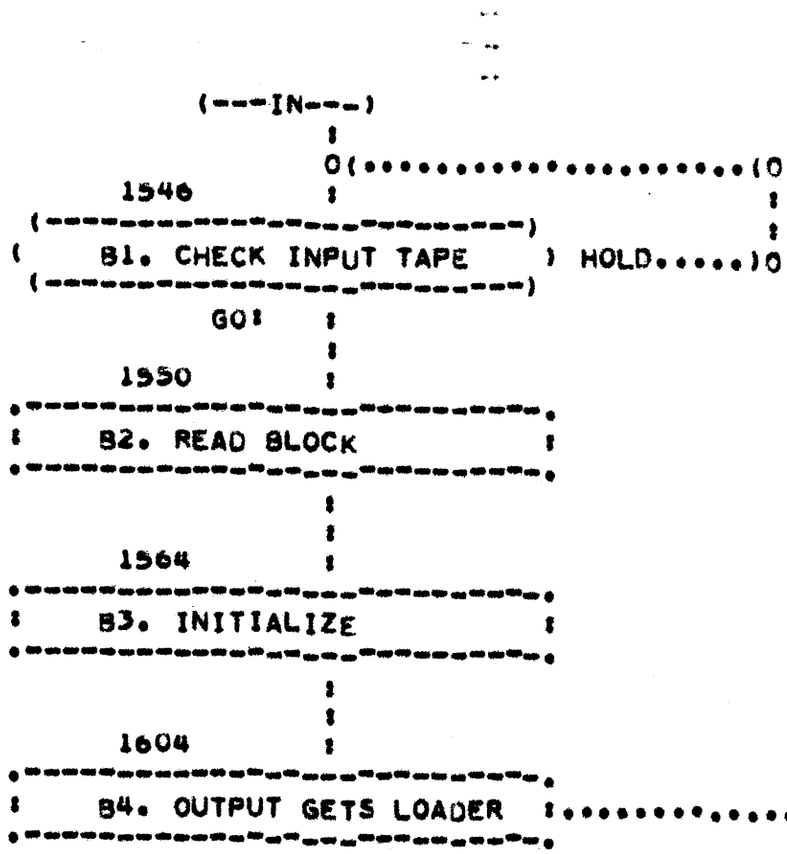



```
*   C.  CONTROL OPS.
*   C1. BRANCH TO OP
*       IF OP IS BLANK, GO TO P15.
*       FOR CON,NUM,ZON,ALF, GO TO C2.
*       FOR BLA,BLR GO TO C3.
*       FOR COR GO TO C4.
*       FOR EQU GO TO C5.
*       FOR HHH, SET MH INTO HTAG AND GO TO P15.
*       FOR OFF GO TO C6
*       FOR FLO, SET FLOWCHARTING TAG ON AND GO TO
*        P15 ALSO.
*       FOR PAT,PRINT THE AVAILABILITY TABLE AND
*       GO TO E1.
*       FOR TYP, HALT AND INSERT RA IN TYPE OF PROG.
*       GO TO P15.
*       IF AN ERROR OCCURS WHILE PROCESSING ONE OF
*       THE ABOVE, NO ADDITIONAL ACTION TAKES PLACE
*       AND WE GO TO P15.
*       FOR END, GO TO THE ENDING ROUTINE Z1.
*   C2. PROCESS A
*       USE ROUTINE L TO GET THE A ADDRESS,
*       THEN USE THE IR FIELD TO INDICATE THE
*       SIGN AND GO TO P14 TO ASSEMBLE THE INSTRUC-
*       TION.
*   C3. UPDATE AVAIL TABLE
*       CHECK CH-FIELD FOR INCREMENT. IF BLANK,
*       USE 1, ELSE USE CH MOD 100. FIND* M.
*       IF UNDEFINED, ERROR. IF C IS BLANK, SET
*       C EQUAL TO M, ELSE FIND* C. IF UNDEFINED,
*       ERROR.  FIND THE STARTING PLACE IN THE
*       AVAILABILITY TABLE, AND KEEP RESERVING OR
*       UNRESERVING ONE LOCATION AT A TIME
*       UNTIL DONE. GO TO C5.
*   C4. RESERVE CORE
*       IF M IS UNDEFINED, OR THERE ISNT ENOUGH ROOM
*       IN CORE THIS IS AN ERROR. OTHERWISE RESERVE
*       THE SPACE IN CORE, AND GO TO C5.
*   C5. DEFINE ADDRESS
*       FIND A (ROUTINE Q). IF DEFINED, OR IF A
*       PAIR ADDRESS, THE A FIELD IS IN ERROR, ELSE
*       IF NONBLANK DEFINE IT (ROUTINE D).
*       GO TO P15.
*   C6. ON OFF
*       IF M ADDRESS MATCHES THE TYPE OF PROGRAM, THE
*       MASTER SWITCH IS TURNED ON OR OFF. GO TO P15.
*   C7. ASSEMBLER OFF
*       IF FLOWCHARTING, GO TO E1.
*       OTHERWISE PRINT THE WORD OFF ON THE LISTING,
*       RETURNING TO P17.
*
*
```




```
*   X.  EXAMINE REMARKS FIELD
*       THIS ROUTINE IS ENTERED ON EVERY CARD EXCEPT
*       PAT AFTER FLO HAS APPEARED.
*       THE PURPOSE IS TO SEND INFORMATION TO PASS 3
*       FOR FLOWCHARTING. THIS INFORMATION IS
*       TRANSMITTED AS A 'MADE-UP-MACHINE' OR MUM
*       PSEUDOCODE. SPECIFICATIONS OF MUM GIVEN
*       IN THE PASS 3 LISTING.
*   X1. WHAT DK FIELD
*       COLUMNS 32-35 ARE THE DOCUMENTATION KEY OR DK
*       FIELD, AND THEY CONTROL THE FLOWCHARTING OPER
*       ATION.
*       IF THE DK FIELD IS BLANK, GO TO X2.
*       IF IT IS G, BLANK IT OUT AND GO TO P17.
*       G IS USED TO PUT REMARKS ON THE ASSEMBLY
*       LISTING.
*       IF IT IS CODI, THIS IS THE BEGINNING OF THE
*       WORDS CODING DETAILS. TO X3.
*       IF IT IS TABL, THIS IS THE BEGINNING OF THE
*       WORDS TABLE OF CONTENTS. COMPILE THE DK
*       FIELD AS AN 03 OP IN MUM CODE. THIS SPECIAL
*       CASE IS EXAMINED BY PASS 3. THEN GO TO X3.
*       IF IT IS THE FORM K. THIS INDICATES A NEW
*       SECTION WITH KEY K. GO TO X6.
*       IF IT IS OF THE FORM KN. OR KNN. IT IS A NEW
*       SUBSECTION NAME. CHECK THAT THEY ARE NUM-
*       BERED SEQUENTIALLY AND IF NO ERROR GO TO X4.
*       ANYTHING ELSE IS A CONDITION NAME. TO X5.
*   X2. SCAN FOR #
*       LOOK THROUGH ALL REMARKS FOR A NUMBER SIGN.
*       GATHER TOGETHER THE SHARACTERS FOLLOWING IT,
*       UP UNTIL THE NEXT CHARACTER WITH UNDIGITS.
*       THE PRINTING CHARACTERS + AND / ARE NOT
*       DELIMITERS, THE OTHERS ARE.) THIS FORMS THE
*       BRANCH WORD. IF NO CONDITION PRECEDED,
*       COMPILE AN 09 OP. IF THE BRANCH WORD REFERS
*       TO THIS CHART, PUT M AND C INTO THE LAST
*       COMPILES INSTRUCTION. PUT A RECORD FOR THIS
*       ENTRY AND N IN THE STOP TABLE AS THE LAST
*       BRANCH TO M. OTHERWISE, COMPILE THE BRANCH
*       WORD INTO THE MUM CODE.
*   X3. TRANSFER REMARKS
*       IF THE REMARKS AREN'T ALL BLANK, COPY THEM
*       ONTO THE COMMENTS TAPE 7. GO TO P17 UNLESS
*       DK FIELD WAS X, IN WHICH CASE WE GO TO
*       E1 DIRECTLY.
*   X4. COMPILE 01 OP
*       COMPILE AN 01 OP FOLLOWED BY THE LINE NUMBER,
*       AND TRANSFER THE SUBSECTION NAME, COLUMNS
*       32-60, TO THE MUM CODE AREA AND THE COMMENTS
*       TAPE ALSO. TO P17.
*   X5. COMPILE CONDITION
*       BLANK OUT THE DK FIELD. IF COLS 36-40 ARE
*       BLANK THIS INDICATES A BRANCH TO THE NEXT
*       SECTION SO AN 08 OP IS SELECTED. OTHERWISE
*
*
*
*
*
```

```
*
*
*
*
*
*
*       THE LAST OP COMPILED IS INCREASED BY 1.
*       IF IT WAS AN 01. SELECT OP 06 ELSE SELECT
*       OP 05. FINALLY COMPILE THE SELECTED OP
*       FOLLOWED BY THE CONDITION NAME. GO TO X2
*       TO SCAN THE REST OF THE REMARKS.
*   X6. FINISH PREV SECTION
*       COMPILE 03 OP AND THEN PUT OUT A
*       SENTINEL ON THE COMMENTS TAPE. WRITE THE
*       STOP TABLE FOLLOWED BY ALL THE MUM CODE
*       ON THE CONTROL TAPE 6. THERE IS ROOM FOR
*       ABOUT 1500 LINES OF MUM CODE.
*   X7. INITIALIZE
*       RECORD THE NEW KEY LETTER  SKIP TO THE NEXT
*       PAGE ON THE ASSEMBLY LISTING.
*       WRITE THIS LINE ON THE COMMENTS TAPE AND
*       RETURN TO P17.
*
```




```
*    B.  BEGINNING OF ASSEMBLY
*    B1. CHECK INPUT TAPE
*         IF INPUT TAPE ISNT READY,HALT AND RETURN
*        TO B1.
*    B2. READ BLOCK
*        READ IN FIRST BLOCK INTO INPUT BUFFER
*        UNLOAD FIRST TAPE BUFFER AND INITIATE
*        READING SECOND BLOCK. THE INPUT TAPE IS
*        ALWAYS READING ONE BLOCK AHEAD. THERE MUST
*        THEREFORE BE AN EXTRA HASH BLOCK AFTER THE
*        ENDING SENTINEL.
*        EACH TAPE BLOCK CONTAINS 10 LINES.
*    B3. INITIALIZE
*        SET LOWER CORE AVAILABLE
*        SET BLANK ADDRESS UNDEFINED
*        SET FLO MODE OFF
*        SET LINE COUNTERS TO ZERO
*        SET FORWARD AND BACKWARD LOCAL TABLES
*        (I AND J TABLES) TO UNDEFINED.
*        SET DRUM STATUS SO THAT 0001 TO 4999
*        ARE AVAILABLE
*        SET HHH BLANK.
*    B4. OUTPUT GETS LOADER
*        WRITE LOADING ROUTINE ON OUTPUT TAPE.
*        NEITHER TAPE IS EVER REWOUND BY THE PROGRAM.
*        WE ARE NOW READY TO TAKE OFF,GOING TO E1.
*
```

```
         (---IN---)
               :
               :
      1609     :
.-----------------------------.
:   Z1. FIND* M.              :
.-----------------------------.
               :
               :
      1612     :
.-----------------------------.
:   Z2. ASSEMBLE TRANSFER     :
.-----------------------------.
               :
               :
      1616     :
.-----------------------------.
:   Z3. CLEAN OUTPUT BUFFER.  :
.-----------------------------.
               :
               :
      1621     :
.-----------------------------.
:   Z4. EJECT PAPER           :
.-----------------------------.
               :
               :
      1623     :
.-----------------------------.
:   Z5. FINISH FLO            :
.-----------------------------.
               :
               :
      1627     :
.-----------------------------.
:   Z6. HALT                  :
.-----------------------------.
               :
               :
      1629     :
 (---------------------------)  NO. ................................... LOAD
(   Z7. FLOWCHARTING          )
 (---------------------------)  YES:...................................PASS3
```

```
*    Z.   ENDING OF ASSEMBLY.
*    Z1.  FIND* M.
*         FIND M. IF UNDEFINED, HALT AND THE OPERATOR
*         IS SUPPOSED TO FILL RA WITH THE RIGHT THING.
*    Z2.  ASSEMBLE TRANSFER
*         ASSEMBLE  HLT HHHH MLOC  INTO LOCATION 0105
*         WHICH WILL CAUSE THE LOADING TO STOP WITH
*         THIS INSTRUCTION.
*    Z3.  CLEAN OUTPUT BUFFER.
*         WRITE THE LAST BUFFER LOAD ON THE OUTPUT
*         TAPE.  PRINT THE END LINE AND THE ERROR
*         INDICATION ON THIS LINE IS BLANK IF AND ONLY
*         IF NO ERRORS OCCURRED DURING ASSEMBLY.
*    Z4.  EJECT PAPER
*         SKIP THE PRINTER PAPER ABOUT 2 PAGES AHEAD.
*    Z5.  FINISH FLO
*         FINISH PROCESSING THE LAST SECTION OF FLOW-
*         CHART, IF ANY (SEE X6, EXCEPT COMPILE
*         04 INSTEAD OF 03 OP).
*    Z6.  HALT
*         HALT THE COMPUTER, PASS 2 IS FINISHED.
*    Z7.  FLOWCHARTING
*         IF NOT FLOWCHARTING, LOAD THE ASSEMBLED
*         PROGRAM. IF FLOWCHARTING,GO ON TO PASS3.
```