R0001 WE ARE DEEPLY INDEBTED TO THE ONE, THE ONLY, THE GREAT JOHN SHAW FOR THE FOLLOWING STRONG MAGIC....
R0003 JSOCTL

```
0004            SETLOC,2    0           B4

0005            MASKGRP,1   S,0         F,0
```

R0006 THE YUL SYSTEM PASS 0 SERVICE MODULE IS LOADED (INTO BANK 4) WHENEVER PASS 0 IS LOADED. IT SERVES TO
R0008 PREVENT PASS 0 FROM OVERFLOWING ITS BANK. THE CONTENTS OF THE SERVICE MODULE FALL INTO THREE MAIN CLASSES:

R0010 1) SYSTEM FUNCTIONS NOT RELATED TO A PARTICULAR COMPUTER OR PROGRAM -- E.G. BACKUP TAPE PROCESSING.
R0012 2) OPERATIONS ON A PARTICULAR PROGRAM OR SUBROUTINE THAT ARE ALIKE FOR ALL COMPUTERS -- E.G. PUNCH SYMB. DECK.
R0014 3) OPERATIONS ON THE STATUS OF A PARTICULAR COMPUTER -- E.G. ADD COMPUTER NAME.

R0016 MAIN PASS 0, RUNNING IN BANK 1, REFERENCES THE SERVICE MODULE BY AUGMENTING SPEC,B4...0 AND USING THE SPEC
R0018 CONSTANT REFERENCED THEREBY.

R0019 RUDIMENTARY TRANSFER VECTOR AT BASE OF SERVICE MODULE:

```
0020    L BACKUP   SPEC                    BACKUP
0021    L PRINT PS SPEC                    PRINT PS
0022    L PUNCH PS SPEC                    PUNCH PS
0023    L XFER PS  SPEC                    XFER PS

0024    L ADD COM  SPEC                    ADD COM
0025    L RMOV COM SPEC                    RMOV COM
0026    L PASS STA SPEC                    PASS STA
0027    L MANU STA SPEC                    MANU STA
```

P0029 ONE-WORD ALPHABETIC CONSTANTS.

```
0030   A999999     ALF          09999990
0031   ASTRISK     ALF          *
0032   COMA 1962   ALF          , 1962
0033   DASH 1T3    ALF          ---
0034   DASHES      ALF          --------

0035   PASSS RE    ALF          RE: ASSE
0036   MANUS RE    ALF            RE: MA
0038   PASS S EQU  ALF            = ASSE
0039   MANJ S EQU  ALF               = MA

0040   S ZERO C1   ALF          0
0041   4 C1        ALF          4
0042   EQUALS C1   ALF          =
0043   L COLUMN 1  ALF          L
0044   T COLUMN 1  ALF          T
0045   P COLUMN 1  ALF          P
0046   Y COLYUM 1  ALF          Y      3
0047   PMAX9 MSJ   ALF          PMAX = 9
0048   S BLANKS    ALF

0049   S BLOTS     ALF          ********
0050   S COLON C1  ALF          :
00505  S SIGH      ALF          (SIGH)
0051   SW CMPUTR   ALF          COMPUTER
0052   S W MOD     ALF          MOD

0053   SW PRINT    ALF          PRINT
0054   SW PUNCH    ALF          PUNCH
0055   W 2542      ALF          254+
0056   W AMENDED   ALF           AMENDED

0057   W AS        ALF          AS
0058   W AUTHORC   ALF          AUTHOR:
0059   W CHECKED   ALF          CHECKED
0060   W COMPUTR   ALF          COMPUTER
0061   W CONTRL    ALF           CONTROL
0062   S FOR       ALF          FOR
0063   W IS        ALF          IS
0064   W NAME      ALF          NAME
0065   S NEW       ALF          NEW
0066   WM NEW      ALF           (NEW)
0067   W NO        ALF             NO
```

W LENGTH ALF LENGTH = (=PATCH)

P0068 ONE-WORD ALPHABETIC CONSTANTS CONCLUDED.

```
0069  W NONE      ALF          (NONE)
0070  W OBS       ALF           *OBS*
0071  W OBSOLET   ALF         OBSOLETE
0072  W OLD       ALF         OLD
0073  W OUT       ALF         OUT
0074  W PASS      ALF         PASS
0075  W PASS 0    ALF         YULPASS0
0076  W PNCHING   ALF         PUNCHING
0077  W PRNTING   ALF         PRINTING
0078  W PROGRMS   ALF         PROGRAMS

0079  W SOFTWAR   ALF         SOFTWARE
0080  W SNONE     ALF         S: NONE
0081  W STATUS    ALF         STATUS:
0082  S NO DISC   ALF         NO DISC;
0083  W UNUSED    ALF         UNUSED
0084  W YES       ALF           YES
00841 YUL D LIST  ALF         YULDLIST
0085  ZSJP ONE    ALF               1
```

R0086 ALPHABETIC ARRAYS.

```
0088  BKUP LINE   ALF,4          DIRECTORY LISTING OF YULPROGS #
0089  BUREL MSG   ALF,2         BACKUP RELABELED
0090  CHEDL MSG   ALF,3         CHECK DIRECTORY LISTING
0091  COMPJ LIN   ALF,2
0092  COMUS MSG   ALF,3         COMPUTER IS STILL IN USE
0093  CONCN MSG   ALF,5         CONFLICT WITH EXISTING COMPUTER NAME:
0094  DCLAV MSG   ALF,3         DECLARED AVAILABLE
0095  DCLOB MSG   ALF,3         DECLARED OBSOLETE
0096  DCLOC MSG   ALF,3         DECLARED CHECKED OUT
0097  MANUS MSG   ALF,2         NUFACTURING FOR
```

```
P0098    ALPHABETIC ARRAYS CONTINUED.

  0099   MNTN LINE  ALF,4          YUL SYSTEM MAINTENANCE FUNCTION:
  0100   NEWCO MSG  ALF,3            NEW COMPUTER:
  0101   NEW LINE   OCT            0
  0102              ALF,5
  0103              ALF,5
  0104              ALF,5
  0105   NOMAT MSG  ALF,4          NO MATCH FOUND FOR THIS CARD:
  0106   NOTAV MSG  ALF,2          NOT AVAILABLE
  0107   NOW OP MSG ALF,4           NOW OPERATING FROM NEW YULPROGS

  0108   OBJWK MSG  ALF,4          FORMER BACKUP WILL BE WORKER
  0109   OP SLP MSG ALF,2          OPERATOR ASLEEP
  0110   PASSS MSG  ALF,2          MBLY PASS * FOR
  0111   PCH CARD   OCT            0
  0112              ALF,5
  0113              ALF,5
```

P0114 ALPHABETIC ARRAYS CONTINUED.

```
 0115   XFR CONFL  ALF,4        CONFLICT WITH EXISTING FILE NAME
 0116   LAK TR MSG ALF,4         INSUFFICIENT TRACKS AVAILABLE;
 0117   W CDIMS ON ALF,3         CARD IMAGES ON DISC

 0118   PRSJB HDS  ALF,4           NAME  REVISION     AUTHOR
 0119              ALF,5        LAST ASSEMBLED  MAINTAINABLE    SUBROUTINES
 0120              ALF,5        (OBSOLETING SUBROUTINES PREFIXED BY "/")

 01202  ASAMB MSG  ALF,4        ASA TO AMEND BACKUP TAPE LABEL;
 01204  S ACA OTHE ALF,2        ACA OTHERWISE
 0121   REDUN MSG  ALF,2           REDUNDANT
 0122   REMCO MSG  ALF,4        REMOVING COMPUTER NAME;
 0123   SFWR HEDS  ALF,3        ASSEMBLY PASS 1
 0124              ALF,3        ASSEMBLY PASS 2
 0125              ALF,3        ASSEMBLY PASS 3
 0126              ALF,5         MANUFACTURING
```

P0127 ALPHABETIC ARRAYS CONTINUED.

```
0130   STATS MSG  ALF,4
0131   STNED MSG  ALF,3        STILL NEEDED BY
0132   SURCD MSG  ALF,4        COMPUTER NAME NOT RECOGNIZED.
0133   UNAVP MSG  ALF,2        UNAVAILABLE
01332  UNCSD MSG  ALF,3        UNNECESSARY SUBDIRECTOR!

0134   USER LOG   OCT          0002
0135              ALF,5
0136              ALF,5
0137              ALF,5         USER'S OWN PAGE NO.

0138   W TRNSFER  ALF          TRANSFER
0139              ALF,5         NEEDS SUBDIRECTOR GIVING DISCFILE NAME
0140   XFR WRSIZ  ALF,4        DISCFILE NAME VOID OR TOO LONG
0141   XFR TERMS  ALF,5        DISCFILE NAME CONTAINS TERMINATOR CHARS.
0143   NO XFR MSG ALF,3         CAN'T PERFORM TRANSFER
```

```
P01435  ALPHABETIC ARRAYS CONCLUDED.


 0144   WAA 10060  ALF,3       W   A   A10060  0000000P
 0145   W AVA_ABL  ALF,2       AVAILABLE
 0146   W CARD DUN ALF,2       CARD OUTPUT SENT
 0147   W END REV  ALF,2         END OF REVISIO

 0148   W LAB AVAL ALF,2          AVAILABLE
 0149   W LAB CHKO ALF,2         CHECKED OUT
 0150   W LAB UNAV ALF,2        NOT AVAILABLE
 0151   W LAST ASS ALF,2       LAST ASSEMBLED O
 0152   W LIST DUN ALF,2       LISTING FINISHED

 0153   W NPR SUBS ALF,5           NUMBER OF PROGRAMS AND SUBROUTINES:
 0154   W PASS 1   ALF,2       ASSEMBLY PASS 1
 0155              ALF,2       ASSEMBLY PASS 2
 0156              ALF,2       ASSEMBLY PASS 3
 0157   W MANUF    ALF,2       MANUFACTURING
 0158   W SUBROS   ALF,2       SUBROUTINES
 0159   YUL BJ MSG ALF,4       PRESENT YULPROGS WILL BE BACKUP

01591   MONTHS     ALF,4         JAN     FEB     MAR     APR
01592              ALF,4         MAY     JUN     JUL     AUG
01593              ALF,4         SEP     OCT     NOV     DEC
```

P0160 NUMERIC CONSTANTS.

```
 0161   5 LINES     OCT          0005
 0162   A ADRES     OCT          0000 7777
 0163   B9          OCT          001
 0164   B10         OCT          0004
 0165   B12         OCT          0001
 01652  B9 B12      OCT          0011
 0166   128 BLOX    OCT          0000 02
 0167   B9B10       OCT          0014

 0168   B7T13       OCT          00774
 0169   S B14T18    OCT          0000 37
 0171   B ADDR 6    OCT          -6 0000
 0172   BAN EDFRI   OCT          -420 0000
 0173   END OF 1    OCT          7611 1111 1111 1150
 0174   LEFT HALF   DEC          GGGGGG
 0175   OCTAL 60    OCT          -60
 0176   S 1 C6      OCT          -1 0000

 0177   DISABLED    DEC          -GF0
 0178   S BIT 32    DEC          -10000
 0180   S13         FXBIN        -13
 0181   S 4SPACE    OCT          0004
 0182   S BIT 1     OCT          4
 0183   S C1T2      OCT          7777
 0184   S CAC 3     DEC          - GGGG
 0185   S D12       DEC          -G
 0186   S NINE      DEC          -9
 0187   S ONE       OCT          -1
 0188   SP1         OCT          0001
 0189   S PLS ZERO  DEC          +0
```

P0190 NUMERIC CONSTANTS CONCLUDED.

```
0191   SSWITCH     OCT          0
0192   S TEN C1    OCT          12
0193   S THRED 10  OCT          -3776
0194   S THRED 11  OCT          -3777
0195   S TWO       OCT          -2

0196   S THREE     OCT          -3
0197   S SIX       DEC          -6
0198   S EIGHT     DEC          -8
0199   S CHAR 1    OCT          77
0200   S CHAR 8    OCT          -77
0201   S C2T7      OCT          0077 7777 7777 7700
0202   S FOUR      OCT          -4

0203   SLASH       OCT          -61
0204   USER PAGE   DEC          0
0205   OK BANNER   OCT          -120 0000, -120 0000, -420 0000
0206               OCT          -120 0000, -120 0000, -420 0000

0207   B ARG       DEC          000EEEEE
0208   AVCO BITS   OCT          4001 4001 4001 4001
0209   MANU MASK   OCT          -7777
0210   S PAV BITS  OCT          0001 0001 0001 0001
0211   PCO BITS    OCT          4000 4000 4000 4000
```

P0212 ASSIGNMENTS IN YUL PASS 0 TRANSFER VECTOR.

```
0213   PROG NAME  ASSIGN    0,0
0214   SWITCH     ASSIGN    0,2
0215   L OLD LINE ASSIGN    0,3
0216   OLD LINE   ASSIGN    0,4

0217   PAGE HEAD  ASSIGN    0,20
0218   PAGE NO    ASSIGN    0,36
0219   L COP BUFS ASSIGN    0,39
0220   LIN COUNT  ASSIGN    0,41

0221   L PROG FIL ASSIGN    0,44
0222   N LINES    ASSIGN    0,45
0223   L COMP NAM ASSIGN    0,46
0224   N COPIES   ASSIGN    0,47

0225   PAPER PLY  ASSIGN    0,48
0226   L AUTH NAM ASSIGN    0,51
0227   COMPUTER   ASSIGN    0,53
0228   YUL TYPER  ASSIGN    0,63

0229   RD SBDIRC  ASSIGN    0,65
0230   HOWZAT     ASSIGN    0,66
0231   IGN SUBDR  ASSIGN    0,68
0232   MANUF RTN  ASSIGN    0,76
0233   YUL MASKS  ASSIGN    0,77
0234   OCTAL 20   ASSIGN    0,78

0235   SERCH KEY  ASSIGN    0,79
0236   WHODUNIT   ASSIGN    0,80
0237   6 COMMA 19 ASSIGN    0,81
0238   L GPB STT  ASSIGN    0,82

0239   L DIRECTY  ASSIGN    0,83
0240   BANK 1     ASSIGN    0,83
02402  CHAS 2500  ASSIGN    0,84
0241   PUNCH CD   ASSIGN    0,87
0242   TYP ABORT  ASSIGN    0,89
0243   L OBJC MSG ASSIGN    0,90

0244   REJEC DIR  ASSIGN    0,91
0245   TASK MSG   ASSIGN    0,93
0246   TASK OBJC  ASSIGN    0,97
0247   TYP TO OBJ ASSIGN    0,98
0248   KNOWN PSR  ASSIGN    0,99
```

(CONTINUED).

P02485 FURTHER ASSIGNMENTS.

```
 0249   TAPE SRCH  ASSIGN      0,100
 0250   L PGHED P3 ASSIGN      0,101
 0251   ASSY SUBD  ASSIGN      0,102
 0252   COMMON     ASSIGN      0,103

 0253   PUT CHAR   ASSIGN      0,105
 0254   WRIT OBJC  ASSIGN      0,114
 0255   LABEL YUL  ASSIGN      0,115
 0256   POSIT YUL  ASSIGN      0,116

 0259   PHI MAA    ASSIGN      0,117
 0260   GROUP A    ASSIGN      0,118
 0261   YUL D2A ZS ASSIGN      0,119
 0262   FOUND BUF  ASSIGN      0,120
 0263   GROUP MAP  ASSIGN      0,122

 0264   SUB THRDS  ASSIGN      0,125
 0265   DISASTER   ASSIGN      0,126
 0266   COMP NAME  ASSIGN      0,128
 0267   1 COMMA 8  ASSIGN      0,129

 0268   ACCEPT M2  ASSIGN      0,130
 0269   DECOD CPN  ASSIGN      0,131
 0270   CPN FIXER  ASSIGN      0,132
 0271   GIVE PAIR  ASSIGN      0,133
 0272   FIND COMP  ASSIGN      0,134
 0273   FIND PAIR  ASSIGN      0,135
 0274   L BLANCO   ASSIGN      0,136
 0275   REVNO      ASSIGN      0,137
 0276   S LINE     ASSIGN      2,0
```

```
P0277   ADDRESS CONSTANTS.

 0278   BANK 5      SPEC*B5                          DAMN ZERO
 0279   L BUF 1     SPEC*B5                          512
 0280   L BUF 2     SPEC*B5                          1024
 0281   L BUF 3     SPEC*B5                          1536
 0282   L TEMP MSK  SPEC                             TEMP MASK
 0283   L END MLIS  SPEC                             END M LIST
 0284   L NEW LINE  SPEC                             NEW LINE

 0285   L LONG CUS  SPEC                             LONG CUSS
 0286   L PUT IT    SPEC                             PUT IT ON
 0287   L PCH CARD  SPEC                             PCH CARD +1
 0288               SPEC                             PCH CARD +6
 0289   L 5 MONTHS  SPEC                             MONTHS -1
 0290   L BANK 1    SPEC*B1                          DAMN ZERO

 0291   L M PASS 1  SPEC                             M PASS 1
 0292   INIT MD 8   CAC*B7        6          6       10
 0293   S BANK 1    CAC           2048               MOR SUBM Q
 0294   S END THR   SPEC*B7                          6

 0295   XFR BUFFS   SPEC*B7                          2045
 0296   XFR LIMIT   SPEC*BC                          2043
 0297               SPEC*BC                          2046
 0298               SPEC*BG                          2044
 0299               RESERVE       2

R0300   RESERVATIONS.

 0301   TRINDEX     RESERVE       15
 0302   COMP LOCN   RESERVE       1
 0303   PASS MASK   RESERVE       1
 0304   SAVE X23    RESERVE       2
 0305   SAVE X4     RESERVE       1
 0306   TASK2       RESERVE       1

 0307   TEMP MSK    RESERVE       1
 0308   PRG OR SUB  RESERVE       1
 0309   DISCA_IM    RESERVE       1
 0310   TRACK LOG   RESERVE       1
 0311   DISC ADDR   RESERVE       1
 0312   XFR PLACE   RESERVE       1
```

```
P0313   EQUIVALENCES.

 0314   ALPHA       EQUALS      0
 0315   BINARY      EQUALS      16
 0316   L JUNC      EQUALS      L BUF 2
 03161  L MOR SBWD  EQUALS      S BANK 1
 0317   S CITY      EQUALS      LEFT HALF
 0318   SP2         EQUALS      USER LOG
 0319   SP3         EQUALS      PAGE HEAD
 0320   S ZERO      EQUALS      PCH CARD
 0321   DEPAGING    EQUALS      L PGHED P3
 0322   S STOPPER   EQUALS      S CAC 3
 0323   SNATRACK    EQUALS      SLASH


R0324   JUMP TABLE FOR UNSQUEEZING CARD IMAGES FROM TAPE.

 0325   EXPANDER    MT          N,X4,1      5           N,X6,1
 0326               TN          N,X4,4      4           6,1
 0327               TX          N,X4,1      -           N,X6          C
 0328               TN          N,X4,3      3           6,2
 0329               TX          N,X4,1      -           N,X6          C
 0330               TS          N,X4,1      6,1         C,+2          C
 0331               TX          N,X4,1      -           N,X6          C
 0332               TN          N,X4,2      2           6,3
 0333               TX          N,X4,1      -           N,X6          C
 0334               TS          N,X4,1      6,1         C,+2          C
 0335               MT          N,X4,1      3           N,X6,2
 0336               TS          N,X4,1      6,2         C,+4          C
 0337               TX          N,X4,1      -           N,X6          C
 0338               TS          N,X4,1      6,1         C,+2          C
 0339               MT          N,X4,1      2           N,X6,4
 0340               TX          N,X4,1      -           6,4
 0341               MT          N,X4,1      4           N,X6,1
 0342               TN          N,X4,3      3           6,1
 0343               TX          N,X4,1      -           N,X6          C
 0344               TN          N,X4,2      2           6,2
 0345               TX          N,X4,1      -           N,X6          C
 0346               TS          N,X4,1      6,1         C,+2          C
 0347               MT          N,X4,1      2           N,X6,3
 0348               TX          N,X4,1      -           6,3
 0349               MT          N,X4,1      3           N,X6,1
 0350               TN          N,X4,2      2           6,1
 0351               MT          N,X4,1      2           N,X6,2
 0352               TX          N,X4,1      -           6,2
 0353               MT          N,X4,1      2           N,X6,1
 0354               TX          N,X4,1      -           6,1
 0355               TX          N,X4,1      -           N,X6
 0356               TX          -           -           -
```

```
P0357                ROUTINE IN SERVICE MODULE FOR PRINTING A SYMBOLIC LISTING, PUNCHING A SYMBOLIC DECK, OR BOTH SIMUL-
R0359   TANEOUSLY.  FOR THE LATTER CASE, THE VERB ON THE DIRECTOR CARD MAY BE EITHER "PRINT, PUNCH" OR "PUNCH, PRINT".
R0361   THE SYMBOLIC DECK PUNCHED BY THIS ROUTINE IS HEADED BY AN EXACT COPY OF THE YUL DIRECTOR CARD, THUS IDENTIFYING
R0363   THE DECK AND INCIDENTALLY SHOWING WHETHER A LISTING WAS MADE AT THE SAME TIME.  THE FORMAT OF THE LISTING IS
R0365   THAT OF A YUL ASSEMBLY LISTING IN WHICH ALL CARDS ARE REMARKS CARDS.  THE NUMBER OF COPIES AND THE NUMBER OF
R0367   LINES PER PAGE ARE GOVERNED BY THE SAME SUBDIRECTORS AS IN ASSEMBLY.


R0368   ENTRY TO PRINT A SYMBOLIC LISTING OF A PROGRAM OR SUBROUTINE.

 0369   PRINT PS    NA          6,19        SW PUNCH    C,+4                BRANCH UNLESS PUNCHING ALSO WANTED.
 0371               TN          6,22        33          6,19                SHIFT UP SENTENCE TO COVER 2ND VERB.
 0373               TX          B10         -           SSWITCH             SET INDICATOR BIT FOR PUNCHING.
 0375               TS          W PNCHING   TASK2       PRINTASK

 0376               NA          6,19        W TRNSFER   C,+3                BRANCH IF NOT "PRINT, TRANSFER".
 0378               TS, BIT12   S ONES      S SWITCH    PRINT PS +1     C   SET INDICATOR BIT FOR TRANSFERRING.
 0380               TX          W TRNSFER   -           TASK2

 0381   PRINTASK    TS          W PRNTING   TASK MSG    TASK OBJC           BREAK DOWN AND RE-FORM REST OF DIRECTOR.
 0383               TS, BIT9    S ONES      SSWITCH     PRINT PCH           SET INDICATOR BIT FOR PRINTING.

R0385   ENTRY TO PUNCH A SYMBOLIC DECK OF A PROGRAM OR SUBROUTINE.

 0386   PUNCH PS    NA          6,19        SW PRINT    C,+4                BRANCH UNLESS PRINTING ALSO WANTED.
 0388               TN          6,22        33          6,19                SHIFT UP SENTENCE TO COVER 2ND VERB.
 0390               TX          B9          -           SSWITCH             SET INDICATOR BIT FOR PRINTING.
 0392               TX          W PRNTING   -           TASK2
 0393               TS          W PNCHING   TASK MSG    TASK OBJC           BREAK DOWN AND RE-FORM REST OF DIRECTOR.
 0395               TS, BIT10   S ONES      SSWITCH     PRINT PCH           SET INDICATOR BIT FOR PUNCHING.

R0397   SIMILAR ENTRANCE FOR FILING ON THE DISC ALL OR PART OF A PROGRAM OR SUBROUTINE IN SYMBOLIC CARD IMAGE FORM.  MAY
R0399   ALSO SPECIFY PRINTING.  REQUIRES A SUBDIRECTOR WITH "AS" AND A DISC FILE NAME CHOSEN BY THE USER.

 0401   XFER PS     NA          6,19        SW PRINT    C,+4                BRANCH UNLESS PRINTING ALSO WANTED.
 0403               TN          6,22        33          6,19                SHIFT UP SENTENCE TO COVER 2ND VERB.
 0405               TX          B9          -           S SWITCH            SET INDICATOR BIT FOR PRINTING.
 0407               TX          W PRNTING   -           TASK2
 0408               TS          W TRNSFER   TASK MSG    TASK OBJC           BREAK DOWN AND RE-FORM REST OF DIRECTOR.
 0410               TS, BIT12   S ONES      S SWITCH    PRINT PCH           SET INDICATOR BIT FOR TRANSFERRING.
```

```
P0412   COMMON PROCEDURE, PRINTING, PUNCHING, AND TRANSFERRING.

 0413   PRINT PCH  SWE, CAC3     S BANK 1      32            Z,X0
 0414              SWS, D12      S ZERO        0             S SWITCH          INITIALIZE CARD SELECTION MODE.
 0416              LA            B9 B10        S SWITCH      C,+2              BRANCH IF PRINTING AND PUNCHING.
 0418              NA            S SWITCH      B9 B12        C,+3              BRANCH IF DOING ONLY ONE TASK.
 0420              S, YUL TYPER  TASK MSG      AMTF +4       C,+1              TYPE FIRST TASK MESSAGE OF TWO.
 0422              TX            TASK2         -             TASK MSG
 0423              TS            Z,SC          WHODUNIT      TYP TKOB.I        TYPE LAST TASK AND OBJECT OF TASK(S).
 0425              SWE, CAC3     S BANK 1      32            Z,X0
 0426              TS            Z,X4          SAVE X4       KNOWN PSR         CHECK REVN, AUTHOR NAME, ETC.
 0428              SWE, CAC3     S BANK 1      32            Z,X0
 0429              TS            PROG NAME     SERCH KEY     TAPE SRCH    C    SET GRP B SEARCHING FOR PROG OR SJBRO.
 0431              NA, BIT12     S SWITCH      S ONES        NOT XFER          BRANCH IF NOT TRANSFERRING.

 0433              LA, CHAR5     S ONES        DISC STAT     C,+3
 0434              S, MON TYPER  S NO DISC     SPRAM +8      -                 "NO DISC;".
 0436   CANT XFER  S, MON TYPER  NO XFR MSG    SPRAMR +24    TYP ABORT         " CAN'T PERFORM TRANSFER".

 0438              EX            DISC STAT     S B14T18      DISCALIM          EXTRACT NUMBER OF DISCS.
 04392             TN            6,16          39            6,120
 0440              TS            -             -             RD SBDIRC
 0441              S, MON TYPER  W TRNSFER     SPRAMR +48    CANT XFER         CUSS LACK OF "AS FILENAME" SUBDIRECTOR.
 0443              NA            6,16          W AS          C,-1
 0444              LA, CHAR1     S ONES        6,18          C,-2              BRANCH IF FILE NAME NOT ON CARD.
 0446              LA, CHAR6     6,21          S ZERO        C,+2              BRANCH IF NAME HAS ZERO LENGTH.
 0448              LA, CHAR6     6,21          S BIT 32      C,+2              BRANCH IF LENGTH IS 16 OR LESS.
 0450              S, MON TYPER  XFR WRSIZ     SPRAMR +32    REJEC DIR         "DISCFILE NAME VOID OR TOO LONG".

 0452              LA, CHAR1     S ONES        6,22          C,+2
 0453              S, MON TYPER  XFR TERMS     SPRAMR +40    REJEC DIR         "DISCFILE NAME CONTAINS TERMINATORS".
 0455              TN            6,19          2             TRINDEX
 0456              S, YUL TYPER  6,2           A +9          C,+1              "AS OUTPUTFILENAME  ".
 04572             TN            6,120         39            6,16
 0458   XFR RE TLU TS            S ONES        TRINDEX +2    TR LOOKUP         RESTART LOOKUP AFTER TRACK RELEASE.

 0460              SS            S ZERO        S D 12        TRINDEX +3
 0461              NA, C7T8      TRINDEX       DISABLED      SETRALOG -1       IGNORE DISABLED FILES.

 0463   TR LOOKUP  TS            S ZERO        TRINDEX +4    DISCAP       C
 0464              OCT           -15
 0465              SPEC                                      TRINDEX
 0466              SSL, THREE    TR LOOKUP +1  0             C,+1              TO C,+2 ON LOOKUP, TO C,+4 ON RELEASE.
 0468              TS            SNATRACK      TRINDEX +3    SETRALOG          THERE ARE NO FILE NAME CONFLICTS; BEGIN.

 0470              NA, C7T8      TRINDEX +3    SNATRACK      XFR RE TLU +1     IGNORE OTHER-TYPE FILE WITH SAME NAME.
 0472              SSL, ONE      TRINDEX +4    0             C,+2              TEST PSEUDO-CONFIRMATION BIT.
 0474              TS, CHAR8     S BLANKS      TR LOOKUP +1  XFR RE TLU        RESTORE LOOKUP MODE AFTER TRACK RELEASE.

 0476              TS, CHAR8     S D 12        TR LOOKUP +1  TR LOOKUP         RELEASE OLD UNCONFIRMED TRACKS.
 0478              S, MON TYPER  XFR CONFL     SPRAMR +32    TYP ABORT         "CONFLICT WITH EXISTING FILE NAME".

 0480   SETRALOG   SWE, C5T8     YUL LOG       D,6           TRACK LOG         JOB'S LOG ON 1ST TRACK, 1 LESS EACH SJC.
 0482              TS            CHAS 2500     TRINDEX +5    PRINT HED -1      SET UP CHARLIE-WORD OF 2500 FOR ALL TRX.
```

P04835 INITIALIZATION OF PUNCHING AND PRINTING.

```
0484   NOT XFER    NA, BIT10      SSWITCH        S ONES         PRINT HED          BRANCH IF NOT PUNCHING.

0486               TX             Y COLYUM 1     -              PCH CARD +1
0487               TN             6,2            9              PCH CARD +2
0488               S, PUNCH CD    PCH CARD       ALPHA          C,+1               PUNCH YUL DIRECTOR CARD AS HEADER.
0490               NA, BIT9       SSWITCH        S ONES         INIT PRNT +1       BRANCH IF NOT PRINTING.

0492   PRINT HED   wA             Z,X6           OCTAL 20       Z,X5               INCLUDE COMPUTER NAME IN PAGE HEAD.
0494               TX             L PGHED P3     -              Z,S2
0495               TS             N,X5,2         COMMON         PUT CHAR +7    C
0496               wA             N,X5           S 1 C6         N,X5
0497               TS             SAVE X4        Z,X4           WRIT OBJC          WRITE OBJECT MESSAGE IN PAGE HEAD.

0499               TX             S ZERO         -              N COPIES
0500               TS, B2B11      S ONES         SWITCH         RD SBDIRC          PROHIBIT "RENUMBER", GET SUBDIRECTOR.
0502               TX             Z,SC,1         -              -                  CHECK ON NUMBER OF COPIES WHEN SBDS END.
0504               TS             S ZERO         PAPER PLY      ASSY SJBn          PROCESS PRINTING SUBDIRECTORS.

0506               LA             N COPIES       S ZERO         INIT PRNT          BRANCH IF NO EXTRA COPIES TO BE MADE.

0508   PLY WAIT    TX             C,+0           0              Z,AU2,31
0509               TX             C,+0           0              Z,AU1,31
0510               NA             PAPER PLY      S ZERO         9 PLY CHEK         BRANCH WHEN OPERATOR HAS REPLIED.
0512               NA             Z,AU1,1        S ONE          C,-1
0513               NA             Z,AU2,1        S ONE          C,-3
0514               S, MON TYPER   OP SLP MSJ     SPRA +16       -                  AFTER TOO LONG, TYPE "OPERATOR ASLEEP".
0516               TS             S ONE          PAPER PLY      OK PLY

0517   9 PLY CHEK  LA             PAPER PLY      S NINE         OK PLY
0518               S, MON TYPER   PMAX9 MSJ      SPRAMR +8      -
0519               TX             S ZERO         -              PAPER PLY
0520               S, MON TYPER   WAA 10060      SPRA +24       PLY WAIT           ASK AGAIN AFTER UNSATISFACTORY REPLY.

0522               TS             S ZERO         N COPIES       INIT PRNT
0523   OK PLY      LA             N COPIES       PAPER PLY      C,-1               BRANCH IF ONE RUN THRU PRINTER WILL DO.
0525               S, MON TADDR   COPY OP
0526               TS             PAPER PLY      COMMON         POSIT CPY          GO POSITION PRE-SNATCHED TAPE.

0528               TS             PAPER PLY      COMMON         PHI SNACH
0529               ALF,2          W10Y0102YULWRK2
0530   S ONES      DEC            GGGG GGGG GGGG
```

P0531 INITIALIZATION FOR MULTIPLE PRINTER RUNS, RECEPTION OF CARD IMAGES.

```
 0532  POSIT CPY   TS          -             -           PHI TAPE
 0533  COPY OP     RW,2        -             -           -
 0534              TS          S STOPPER     Z,X4        PHI TAPE
 0535              RF,2        4,0           -           -                    SPACE FORWARD OVER LABEL.
 0537              WD          N COPIES      S ONE       N COPIES
 0538              WA          COMMON        PAPER PLY   COMMON
 0539              LA          COMMON        N COPIES    C,-1                 COMPUTE EXACT NUMBER OF COPIES.
 0541              TS          COMMON        N COPIES    PHI TAPE
 0542              RF,2        -             -           -

 0543  INIT PRNT   TN          PAGE HEAD +1  13          OLD LINE +1          SET UP TITLE ON COVER SHEET.
 0545              TS          L NEW LINE    Z,X2        RD SBDIRC            SLINE IS ASSIGNED TO 2,0.
 0547              TS          S BLANKS      PAGE HEAD +14 FETCH SYM -2         PROCEED WHEN OUT OF SUBDIRECTORS.
 05472             S, MON TYPER UNCSD MSG    SPRAMR +24  -                    "UNNECESSARY SUBDIRECTOR:".
 05474             S, YUL TYPER 6,2          A +9        INIT PRNT +1
 0548              TS          L JUNK        Z,X3        FETCH SYM            FAIL-SAFE WHEN 1ST CARD IS RIGHT PRINT.

 0550              NA          5,2           EOR         FIX CARD             BRANCH IF MORE CARDS IN CURRENT RECORD.
 0552  FETCH SYM   NA          SERCH KEY     EOR         GROUP NAP            SLEEP UNTIL GRP B LOCATES RECORD.
 0554              TX          FOUND BUF     -           Z,X4
 0555              EX          N,X4          LEFT HALF   TASK 2               SAVE INDICATOR: SQUEEZED OR NOT.
 0557              TX          L BUF 1       -           Z,X5
 0558              RT          N,X4          -           N,X5,2               MOVE RECORD TO SAFETY.
 0560              WD          Z,AU2         S 13        Z,AU2
 0561              TX          Z,AU2,10      -           Z,AU1
 0562              NA          END OF 1      N,AJ1,1     C,+2                 SEE IF THIS RECORD CONTAINS "END OF".
 05632             TS          -             -           PR PCH REW
 0564              NA          Z,AU1         Z,AJ2       C,-2
 0565              TX          PROG NAME     -           SERCH KEY
 0566  SET UP GPB  TX          L GPB STT     -           Z,SH
 0567              TS          N,SC,3        N,SH        MON WAKE         C   SET GRP B GOING AFTER NEXT RECORD.
 0569              SPEC                                  SRCH TEST -3

 0570  PR PCH REW  TS          -             -           PHI TAPE
 0571              RW,1        -             -           -                    REWIND YULPROGS AFTER READING LAST RECD.

 0573  FIX CARD    TX          L PCH CARD    -           Z,X6
 0574              LA          TASK 2        S ZERO      END OF Q -1          BRANCH IF RECORD IS NOT CONDENSED.

 0576              TX          Z,X5          -           Z,X4                 KEEP FWA IN X5.
 0578              MT          S BLANKS      10          N,X6,1
 0579              TX          L PCH CARD    -           Z,X6
 0580              SSL, LOWS   N,X4,1        0           EXPANDER         C   RECONSTITUTE FIRST HALF OF CARD.
 0582              TX          L PCH CARD +1 -           Z,X6
 0583              SSL, LOWS   N,X5          5           EXPANDER         C   RECONSTITUTE SECOND HALF OF CARD.
 0585              TS          Z,X4          Z,X5        END OF Q

 0586              MT          N,X5,1        10          N,X6,1               MOVE UNCONDENSED CARD.
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P0588   SELECT CARD IMAGES FOR SYMBOLIC-CARD-IMAGE TYPE TASK.

 0589   END OF Q    LA              END OF 1        PCH CARD +1     END PR PCH              BRANCH IF JUST RECONSTITUTED "END OF".

 0591   TEST MODE   SSL, D12        S SWITCH        0               C,+1                    BRANCH ON 4-WAY CARD SELECTION MODE.
 0593               TS              PHI WAA         Z,X4            SEL PEEK                INITIAL MODE = 0.
 0595               TS              PHI WAA         Z,X4            SEEK MTCH               REQUEST-SEEKING MODE = 1.
 0597               SSL, ONE        PCH CARD +1     5               C,+1                    ACCEPT UNTIL SEQBREAK (MODE = 2).
 0599               TS              -               -               USE CARD                ACCEPT ALL (MODE = 3) OR COND. ACCEPT.

 0601               TX              PHI WAA         -               Z,X4
 0602   SEL PEEK    TS              Z,X4,1          Z,X5            PHI PEEK        C       PEEK AT POSSIBLE REQUEST CARD.
 0604               NA, CHAR1       4,0             ASTRISK         C,+2
 0605               SSL, ONE        S SWITCH        1               C,+3                    IF MONITOR CARD, TEST MODE AGAIN.
 0607               NA, CHAR1       4,0             Y COLYUM 1      C,+3
 0608               SSL, ONE        S SWITCH        1               C,+1                    IF YUL DIRECTOR, TEST MODE AGAIN.
 0610               TS, CHAR8       S THREE         S SWITCH        USE CARD                ACCEPT ALL IF NO REQUESTS.
 0612               TN              N,X4            10              6,1
 0613               TX              Z,X5            -               SAVE X4
 0614               TX, CHAR8       S ONE           -               S SWITCH                SET UP MODE 1 (SEEK 80-COLUMN MATCH).
 0616               TX              L TEMP MSK      -               Z,AU1
 0617               NA, CHAR1       6,1             T COLUMN 1      C,+2
 0618               TS, CHAR1       L COLUMN 1      6,1             C,+2                    CHANGE "T" CARD TO "L" CARD.
 0620               NA, CHAR1       6,1             L COLUMN 1      SEL UNLOG               BRANCH IF NOT ANY KIND OF LOG CARD.
 0622               NA,DATE MASK    6,9             S BLANKS        C,+2
 0623               TS              S CHAR 1        N,AJ1           SEEK MTCH -1            DO NOT TEST COLUMNS 2-8 OF LOG CARDS.
 0625               TX, CHAR6       DASHES          -               6,9
 0626               TS, CHAR1       DASHES          6,10            C,-2                    PUT DASHES INTO DATE.

 0628   SEL UNLOG   SM              S CHAR 1        S C2T7          N,AJ1                   CHECK ALL BUT COLUMN 8 OF NON-LOG CARDS.
 0630               SWE,YYNNYYYY    6,1             A,3             6,12
 0631               TS              S SIX           Z,X5            C,+2                    SET UP CHECK ON 6-COLUMN CARD NO. FIELD.
 0633   COND CHEK   SWS, ONES       6,12            A,1             6,12
 0634               LA, CHAR2       6,12            END OF 1        C,+3                    BRANCH IF CHARACTER IS A DIGIT.
 0636               NA, CHAR2       6,12            S BLANKS        SEEK MTCH -1
 0637               TX, CHAR2       S ZERO          -               6,12                    REPLACE BLANK BY ZERO.
 0639               NA              Z,X5,1          S ONE           COND CHEK
 0640               LA              A999999         6,12            SEEK MTCH -1            CARD NUMBER 999999 IS ALSO A SEQ. BREAK.
 0642               SS              6,12            S C2T7          6,1                     STANDARDIZE NON-SEQUENCE-BREAK NUMBER.
 0644               TS              SAVE X4         Z,X5            TEST MODE +2            REQUEST CARD IS NOW READY TO LOOK AT.

 0646   SEEK MTCH   NA, TEMPMASK    PCH CARD +1     4,1             FETCH SYM -1            FAST IGNORE IF FIRST WORD DOESN'T MATCH.
 0648               TN              PCH CARD +1     1               4,1                     SET UP AU1 AND AU2.
 0650               TX              S NINE          -               Z,CSH
 0651               NA              N,AU1,1         N,AJ2,1         FETCH SYM -1            IGNORE CARD IF ANY NON-MATCH.
 0653               NA              Z,CSH,1         S ONE           C,-1
 0654               S, PHI READ     4,1                                                     READ USED REQUEST CARD AFTER SUCCESS.
 0656               TX, CHAR8       S TWO           -               S SWITCH                SET UP MODE 2 TO ACCEPT UNTIL SEQBREAK.
```

P0658 PREPARE A CARD IMAGE FOR TRANSFERRING, PRINTING, PUNCHING, OR PRINTING WITH EITHER TRANSFERRING OR PUNCHING.

```
0660  USE CARD    NA, BIT12     S SWITCH      S ONES        NOT XFER 2          BRANCH IF NOT TRANSFERRING.
0662               TS            S ZERO        C,+0          SNATCH TR           SNATCH TRACK HERE FIRST TIME ONLY.
0664               TX            XFR PLACE     -             Z,X4
0665               NA            XFR PLACE     XFR LIMIT     SEND XFER           BRANCH IF NOT END OF OUTPUT BUFFER.

0667               EX            EOR           LEFT HALF     N,X4,2              PLANT END-OF-BUFFER FLAG.
0669               TS            EOR           N,X4          DISC CHEK
0670  XFR LD X4    TX            XFR BUFFS     -             Z,X4          S
0671               TN            XFR BUFFS     2             XFR BUFFS +4
0672               TN            N,AU1         4             XFR BUFFS           SWAP OUTPUT BUFFER NAMES.
0674               S, DISC WRIT  4,0           128           DISC ADDR           WRITE BLOCKS OF 8192 WORDS ON THE DISC.
0676               WA            DISC ADDR     128 BLOX      DISC ADDR
0678               TS            XFR BUFFS     XFR PLACE     XFR LD X4     C
0679               NA            DISC ADDR     DISCALIM      SEND XFER

0680  SNATCH TR    SWE, C1T4     TRACK LOG     D,6,L         TRINDEX +2
0681               TS, C1T4      TRINDEX +2    TRINDEX +5    DISCAP        C
0682  TR CODE WD   OCT           -1016                                     SNATCH A TRACK, GIVE IT A LOG NUMBER.
0684               SPEC                                      TRINDEX
0685               TS            XFR BUFFS     Z,X4          NEW TRACK           TRACK SNATCH WAS SUCCESSFUL.
0687  XFER FAIL    NA, C1T4      TRINDEX +2    YUL LOG       C,+2                BRANCH UNLESS ALL TRACKS ARE RELEASED.
0689               S, MON TYPER  LAK TR MSG    SPRAM +32     CANT XFER           "INSUFFICIENT TRACKS AVAILABLE".

0691               DA            TRACK LOG     S ONE         TRACK LOG           INCREMENT LOG NUMBER TOWARD JOB LOG NO.
0693               SWE, C1T4     TRACK LOG     D,6,L         TRINDEX +2
0694               TS            -             -             DISCAP        C
0695               OCT           -1017
0696               SPEC                                      TRINDEX
0697               TS            -             -             XFER FAIL
0698               TS            -             -             DISASTER            BAD RETURN SHOULD BE IMPOSSIBLE HERE.

0700  NEW TRACK    DS            TRACK LOG     S ONE         TRACK LOG           DECREMENT LOG NUMBER FOR EACH TRACK.
0702               EX            TR CODE WD    B7T13         DISC ADDR
0703               SS            DISC ADDR     B7T13         DISCALIM            FORM DISC ADDRESSES OF TRACK AND TR +1.

0705  SEND XFER    TN            PCH CARD +1   10            N,X4,10
07052              TX            Z,X4          -             XFR PLACE
0706               LA            END OF 1      PCH CARD +1   CLOSE XFR          BRANCH IF THAT WAS "END OF" CARD.
```

P0708 PREPARE A CARD IMAGE FOR PRINTING AND/OR PUNCHING.

```
0709  NOT XFER 2 SSL, FOUR    PCH CARD +1   3          C,+1          BRANCH IF CARD IS A SEQUENCE BREAK.
0711             NA, CHAR7    PCH CARD +1   S ZERO     C,+4          BACKWARDS ZERO SUPPRESS IN COLUMNS 7,6.
0713             TX, CHAR7    S BLANKS      -          PCH CARD +1
0714             NA, CHAR6    PCH CARD +1   S ZERO     C,+2
0715             TX, CHAR6    S BLANKS      -          PCH CARD +1

0716             SS           S ZERO        OCTAL 60   PCH CARD +1   REMOVE SEQUENCE BREAK FLAG & ASTERISK.
0718             NA, CHAR8    PCH CARD +1   S NINE     C,+3          BRANCH IF CARD NOT RIGHT PRINT REMARKS.
0720             TN           PCH CARD +2   5          3,11          DEPOSIT RIGHT PRINT IN OLD LINE.
0722             TS           -             -          ASK PUNCH

0723             NA, BIT9     SSWITCH       S ONES     ASK PUNCH     BRANCH IF NOT PRINTING.

0725             TN           PCH CARD +1   10         SLINE +1
0726             MT           S BLANKS      5          N,AU2,1
0727             SWE, BIT 1   SLINE +1       4          SLINE
0728             SWS, ACO2    SLINE +1       12         SLINE
0729             TX, CHAR8    S BLANKS      -          SLINE +1      TRANSLATE UPSPACING NOTATION.
0731  SET OLD    TX           L OLD LINE    -          Z,X3
0732             TX           Z,X2          -          L OLD LINE    BEGIN SWAP OF PRINT BUFFERS.
0734             NA, CHAR1    SLINE +1      L COLUMN 1 NO NEW LOG

0735             TX, C5T8     ZSUP ONE      -          USERLOG +13   INITIALIZE USER'S OWN PAGE NUMBER.
0737             TX, C5T8     S BLANKS      -          SLINE +10     DELETE ANY PAGE NUMBER IN CARD.
0739             TN           SLINE +1      10         USERLOG +1    SET LOG LINE ASIDE AS SUBHEAD.
0741             MT           N,AU2,1       5          N,AU1,1       BUT PRINT "USER'S OWN PAGE NO.   1".
0743             TS           S ONE         USER PAGE  PRIN SKIP -1  SKIP BEFORE PRINTING LOG CARD.

0745  NO NEW LOG NA, CHAR1    SLINE +1      P COLUMN 1 C,+2          UNLESS IMMEDIATELY PRECEDED BY LOG CARD,
0746             NA, CHAR1    3,1           L COLUMN 1 PRIN SKIP -1  SKIP BEFORE PRINTING "P" CARD.

0748             LA           S BIT 1       N,X3       PRIN SKIP     SKIP IF LAST LINE SO SPECIFIED.
0750             WA           LIN COUNT     N,X3       LIN COUNT     ADD IN UPSPACING OF LAST LINE.
0752             LA           LIN COUNT     N LINES    PRINT OLD     BRANCH IF MORE ROOM ON THIS PAGE.

0754             TX           S BIT 1       -          N,X3
0755  PRIN SKIP  NA           N COPIES      S ZERO     COPY PRT2
0756             S, PHI PRINT DEPAGING
0757             NA           N COPIES      S ZERO     COPY PRT2     BRANCH IF MUST WRITE ON COPY TAPE.
0759             S, PHI PRINT 3,0                                    PRINT LAST LINE ON PREVIOUS PAGE.
0761             DA           PAGE NO       S ONE      PAGE NO
0762             SWE, ONES    PAGE NO       D,4,L      SERV ARG
0763             TS           Z,SC          Z,AJ1      S D2A ZSUP
0764             TX, C5T8     SERV ARG +2   -          PAGE HEAD +15
0765             NA           N COPIES      S ZERO     COPY PRT2     BRANCH IF MUST WRITE ON COPY TAPE.
0767             S, PHI PRINT PAGE HEAD
0768             TX           PAGE HEAD     -          LIN COUNT     RESET LINE COUNT TO 3.
0770             LA           USER PAGE     SZERO      PRINT OLD +2  BRANCH IF NO LOG CARDS YET.
```

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P0772  PRINT LOG LINE HERE ON ITS 2ND AND SUBSEQUENT APPEARANCES.

 0773              NA          USER PAGE     S ONE         PRINT LOG     BRANCH IF LOG CARD ALREADY ESTABLISHED.
 0775              TS          S TWO         USER PAGE     PRINT OLD +2  SET PAGE NUMBER FOR NEXT TIME.

 0777  PRINT LOG   SWE, ONES   USER PAGE     D,4,L         SERV ARG
 0778              TS          Z,SC          Z,AJ1         S D2A Z5HP
 0779              TX, C5T8    SERV ARG +2   -             USER LOG +13
 0780              NA          N COPIES      S ZERO        COPY PRT2     BRANCH IF MUST WRITE ON COPY TAPE.
 0782              S,PHI PRINT USER LOG
 0783              DA          USER PAGE     S ONE         USER PAGE
 0784              TS          S LINES       LIN COUNT     PRINT OLD +2

 0785  PRINT OLD   NA          N COPIES      S ZERO        COPY PRT2     BRANCH IF MUST WRITE ON COPY TAPE.
 0787              S, PHI PRINT 3,0                                      NORMAL WAY OF PRINTING OLD LINE.
 0789              TX          Z,X3,1        -             Z,X2
 0790              MT          S BLANKS      15            N,X3,1
 0791              TX          L OLD LINE    -             Z,X3
 0792              TS          S ZERO        N,X2          ASK PUNCH     FINISH BUFFER SWAP, SWAB OUT NEW LINE.

R0794  MINOR SUBROUTINE TO COPY EACH LINE PRINTED ONTO THE COPY TAPE WHEN MORE THAN ONE PRINTER RUN IS REQUIRED.

 0796  COPY PRT2   SS          N,SH          A ADRES       C,+2
 0797              WA          L COP BUFS    S ONE         Z,X6
 0798              TN                        16            N,X6,15       COLLECT 4 LINES BEFORE WRITING.
 0800               TX         Z,SH          -              COMMON
 0801               NA         6,3           EOR           COPY EXIT     BRANCH IF RECORD NOT FILLED YET.

 0803              TX          6,4           -              Z,X6
 0804              CC          6,1           -             6,65
 0805              TS          N,X6          L COP BUFS    PHI TAPE      SWAP TAPE BUFFERS.
 0807              WF,2        6,1           -             DISASTER

 0808              TX          COMMON        -             Z,SC
 0809  COPY EXIT   TS          Z,X6          L COP BUFS    C,-1          ADVANCE POINTER WITHIN BUFFER.


 0811  ASK PUNCH   NA, BIT10   SSWITCH       S ONES        FETCH SYM -1  BRANCH IF NOT PUNCHING.
 0813              NA, CHAR8   PCH CARD +1   S ONE         C,+2
 0814              TX, CHAR8   S BLANKS      -             PCH CARD +1   BLANK OUT "1" IN COLUMN 8.
 0816              S, PUNCH CD PCH CARD      ALPHA         FETCH SYM -1
```

P0817 CLOSE OUT PUNCHING, PRINTING, TRANSFERRING, OR PRINTING WITH PUNCHING OR TRANSFERRING.

```
0819  END PRINCH TS          PAGE HEAD     N,X3          SEL PEEK -1     C   FORCE SP3 BEFORE "END OF" CARD.
0821              TX          Z,X4,1        -             Z,X6
0822              TS          S BIT 1       SLINE         PHI PEEK        C   PEEK AHEAD FOR (HOPEFULLY) Y OR *.
0824              TN          W END REV     2             SLINE +1
0825              TN          PCH CARD +2   6             SLINE +3
0826              TN          W LAST ASS    2             SLINE +11
0827              TN          PCH CARD +8   2             SLINE +13           FORM UP COMPLETE "END OF " LINE.
0829              NA, CHAR1   4,0           Y COLUMN 1    C,+2                BRANCH IF NEXT CARD NOT A YUL DIRECTOR.
0831              TS, CHAR1   PCH CARD +2   SLINE +13     C,+5                (INCLUDE "N" IN "LAST ASSEMBLED ON".)
0833              NA, CHAR1   4,0           ASTRISK       C,+2                BRANCH IF THERE'S AN UNUSED DETAIL CARD.
0835              TS          Y COLUMN 1    6,1           C,-2                HIDE ASTERISK FROM "END CHECK" IN BNK 1.
0837              S, YUL TYPER NOMAT MSG    AMTF +4       C,+1                CUSS 1ST UNUSED DETAIL CARD ON CONSOLE.
0839              S, YUL TYPER 4,0          A +10         C,-2
0840              NA, BIT9    S SWITCH      S ONES        CLOSFER 0           BRANCH IF NOT PRINTING.

0842  CLOSE PRT   NA          Z,X3          L JUNK        C,+2
0843              TS          L OLD LINE    Z,X3          END PR PCH      C   IN CASE NOTHING WAS PRINTED.
0845              NA          N COPIES      S ZERO        COPY PRT2           BRANCH IF MUST WRITE ON COPY TAPE.
0847              S, PHI PRINT 3,0                                            PRINT LAST ORDINARY LINE.
0849              NA          N COPIES      S ZERO        COPY PRT2           BRANCH IF MUST WRITE ON COPY TAPE.
0851              S, PHI PRINT SLINE                                          PRINT "END OF" LINE.
0853  CLOSFER 0   NA, BIT12   S SWITCH      S ZERO        USE CARD +1         IF TRANSFERRING, SEND "END OF" CARD.
0855              NA, BIT10   SSWITCH       S ONES        END PRINT           BRANCH IF NOT PUNCHING.

0857  CLOSE PCH   S, PUNCH CO EOR           BINARY        C,+1                CLOSE OUT PUNCHING.
0859              NA, BIT9    SSWITCH       S ZERO        C,+2                BRANCH IF PRINTING ALSO.
0861              S, MON TYPER W CARD DUN    SPRAMR +16    RELOAD P0           ANNOUNCE END OF CARD OUTPUT.
0863              S, MON TYPER W CARD DUN    SPRA +16      END PRINT

08639             MT          S ZERO        10            N,X4,1
0864  CLOSE XFR   NA          Z,X4          XFR LIMIT     C,-1
0865              EX          EOR           LEFT HALF     N,X4,2
0866              TS          EOR           N,X4          XFR LD X4       C
0867              S, DISC WRIT 4,0          128           DISC ADDR           CLOSE OUT, SEND RECD W/ "END OF" CARD.
0869              TS          -             -             DISC CHEK           PREPARE PSEUDO-CONFIRMATION BIT.

0871  TCONFIRM    DA          TRACK LOG     S ONE         TRACK LOG           INCREMENT LOG TOWARD JOB LOG.
0873              SWE, C1T4   TRACK LOG     D,6,L         TRINDEX +2
08732             TS          -             -             DISCAP          C
08733             OCT         -1
08734             SPEC                                    TRINDEX             LOOK UP EACH TRACK, THEN MODIFY INDEX.
08736             TS          S ONE         TRINDEX +4    C,+2                PLANT PSEUDO-CONFIRMATION BIT.
08738             TS          -             -             DISASTER
0874              TX          CHAS 2500     -             TRINDEX +5          CLEAN OUT SUPERFLUOUS BITS IN ADDRESS.
0876              TS, C1T4    TRINDEX +2    TRINDEX +5    DISCAP          C
0877              OCT         -12                                             PLANT PSEUDO-CONFIRMATION BIT IN INDEX.
0879              SPEC                                    TRINDEX
0880              NA, C1T4    TRINDEX +2    YUL LOG       TCONFIRM

0881              SWS, CHAR6  PAGE HEAD +1  A,1,L         W CDIMS ON +2       PUT 1800 SUFFIX LETTER IN MESSAGE.
0883              NA, BIT9    S SWITCH      S ZERO        C,+2                BRANCH IF PRINTING ALSO.
0885              S, MON TYPER W CDIMS ON    SPRAMR +24    RELOAD P0
0886              S, MON TYPER W CDIMS ON    SPRA +24      END PRINT           ANNOUNCE "CARD IMAGES ON DISC X".
```

P08875 RUN COPY TAPE ONTO PRINTER AS REQUIRED, AND END TASK.

```
0888  END PRINT  LA            N COPIES      S ZERO        RUNOUT PR          BRANCH IF ONE PRINTER RUN WAS ENOUGH.
0890              NA            Z,X6          L COP BUFS    C,+3               BRANCH WHEN LAST COPY BUFFER CLOSED OUT.
0892              TS            L BLANCD      Z,X2          COPY PRT2          FILL OUT LAST COPY BUFFER.
0894              TS            2,0           2,0           C,-2
0895              S, MON EOFRI  COPY OP       -             S ZERO             CLOSE OUT COPY TAPE.

0898  COPIES      TS            S TWO         Z,R2          PHI TAPE
0899              RW,2          -             -             -
0900              TS            L COP BUFS    Z,X4          PHI TAPE           FETCH BUFFER ADDRESSES.
0902              RF,2          4,1           -             DISASTER           SPACE OVER LABEL, READ FIRST LINE.
0904              NA            Z,R2,1        S ONE         C,-2
0905              WD            N COPIES      PAPER PLY     N COPIES
0906              TS            -             -             GET LOG NO     C
0907              SWS, D8T12    Z,SC,4        16            N,AU2              CLEAR MONITOR'S PRINTLINE COUNTER & TAB.

0909  PRINT COP   S, PHI PRINT  3,1
0910              S, PHI PRINT  3,17
0911              S, PHI PRINT  3,33
0912              S, PHI PRINT  3,49
0913              TX            Z,X4          -             Z,X3
0914              TS            N,X3          Z,X4          PHI TAPE
0915              RF,2          4,1           -             DISASTER           READ AND SWAP BUFFERS.
0917              NA, BANBITS   3,1           BAN EOFRI     PRINT COD

0918              TS            Z,X4          Z,X2          PHI TAPE           (IN CASE X2 WAS SET TO BLANCARD).
0920              RF,2          -             -             -                  FINISH READING SECOND EOFRI.

0922              NA            N COPIES      PAPER PLY     COPIES             BRANCH IF MORE RUNS ARE NEEDED.
0924              TS            Z,X2,1        -             PHI PEEK       C   X4 HAS AN OK VALUE HERE.
0926              NA, CHAR1     4,0           ASTRISK       C,+2               BRANCH IF ANOTHER YUL TASK FOLLOWS.
0928              TS            Z,SC,1        -             MON RLEAS          OTHERWISE RELEASE COPY TAPE.
0930              TS            -             -             PHI TAPE
0931              RW,2          -             -             -

0932  RUNOUT PR   TS            S 4SPACE      N,X2,1        GET LOG NO     C
0933              SWS, D8T12    S ZERO                      N,AU2
0934              MT            S BLANKS      15            N,X2,1
0935              WD            Z,X2          OCTAL 20      Z,X2
0936              S, PHI PRINT  2,0
0937              S, PHI PRINT  2,0
0938              S, PHI PRINT  2,0                                            FORCE LAST LINES THROUGH BUFPRINT.
0940              S, MON TYPER  W LIST DUN    SPRAMR +16    -                  ANNOUNCE END OF LISTING.

0942  RELOAD P0   S, MON TYPER  S BLANKS      SPRA +8       -
0943              S, PHI LOAD   W   PASS 0    2             BASE ADDR          RELOAD PASS 0 AND DO NEXT TASK (IF ANY).
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P0945                PROCEDURE IN THE SERVICE MODULE TO ENSURE THAT THE BACKUP YULPROGS IS BROUGHT ENTIRELY UP TO DATE AT
R0947   THE END OF EACH JOB, AND TO CHECK WHETHER THE BACKUP IS UP TO DATE AT THE BEGINNING OF A JOB.  THIS AIM IS AC-
R0949   COMPLISHED IN ONE OF TWO WAYS: IF AN ASSEMBLY (NOT REJECTED AS A BAD MERGE) HAS BEEN RECORDED ON ONE TAPE BUT
R0951   NOT ON THE OTHER, THE CURRENT YULPROGS IS COPIED IN ITS ENTIRETY ONTO A WORKER, WHICH THEN BECOMES THE NEW
R0953   YULPROGS.  IF A DELETION OR OTHER "FILE-MAINTENANCE" ACTIVITY (ONE THAT AFFECTS THE LABEL RECORD ONLY) HAS BEEN
R0955   RECORDED ON ONE TAPE BUT NOT ON THE OTHER, THE BACKUP IS CALLED FOR AND ITS LABEL RECORD IS AMENDED.  THE ENTIRE
R0957   COPY OCCURS IF AT THE BEGINNING OR END OF A JOB LOCATION 7,0000 CONTAINS 6034 0020 0020 0001.  IT CAN OCCUR AT
R0959   THE BEGINNING OF A JOB WHEN A BACKUP TAPE IS MOUNTED AS THE PRINCIPAL YULPROGS.  THIS IS TYPICALLY DONE WHEN THE
R0961   REGULAR YULPROGS HAS BEEN CLOBBERED IN SOME WAY.  AN ASSEMBLY PLACES THIS PATTERN IN 7,0000 AS SOON AS IT IS AS-
R0963   SURED OF NOT BEING REJECTED FOR BAD MERGING.  WHENEVER A NEW YULPROGS IS MADE AT THE END OF A JOB, THE FORMER
R0965   BACKUP IS CALLED FOR AND RETURNED TO WORKER STATUS.  LABEL AMENDMENT IS EVOKED AT EITHER END OF A JOB BY THE
R0967   PATTERN 6034 0020 0020 0002 IN 7,0000.  THIS IS GENERATED BY DELETION, ADDING A NEW COMPUTER NAME, PUNCHING A
R0969   MASTER DECK, ETC.  A DIRECTORY LISTING IS PRINTED AS DESCRIBED BELOW, BUT IT IS CALLED AN "AMENDED" LISTING.

R0971                GROUP B PRINTS A DIRECTORY LISTING.  FOR EACH ESTABLISHED COMPUTER, THE SOFTWARE STATUS IS PRINTED,
R0973   AND THE PROGRAMS AND SUBROUTINES FOR THAT COMPUTER ARE LISTED, WITH REVISION NUMBER, AUTHOR, DATE LAST
R0975   ASSEMBLED, EXISTENCE OF BINARY RECORD (PROGRAMS) OR CONTROL STATUS (SUBROUTINES), AND LIST OF SUBSIDIARY SUB-
R0977   ROUTINES GIVEN FOR EACH.  ESTABLISHED AUTHORS ARE LISTED, WITH THE NUMBER OF PROGRAMS AND SUBROUTINES CREDITED
R0979   TO EACH.  WHEN THE LISTING IS FINISHED, GROUP B HOISTS A FLAG AND EXPIRES.


 0981   BACKUP      TS          S ZERO      COMMON      SET UP GpB      C    COMMUNICATION FLAG FOR END.
 0983               TS          Z,SC,4      N,SH        MON WAKE        C

 0984   BK1 VIA X0  TX          L BANK 1    -           Z,X0
 0985               TX          L DIRECTY   -           Z,X1
 0986               TX          PHI WAA     -           Z,X6
 0987               TS          YUL MASKS   Z,MXR       LIST LABT       START GROUP B GOING ON LISTING.

 0989               TX          1,1         -           YUL BU MsG +1
 0991               NA, CHAR8   1,0         S ONE       AMEND BJ1       BRANCH IF ONLY MUST AMEND BACKUP LABEL.
```

P0993 PROCEDURE TO MAKE A WORKER INTO A NEW YULPROGS.

```
 0994              S, YUL TYPER YUL BU MSG   A+4          C,+1          ANNOUNCE TASK ON TYPEWRITER.
 0996              TX          1,1           -            SNATCH T6 +2
 0997              TS          1,2           SNATCH T5 +3 MON RLEAS     RELEASE YULPROGS, PREPARE RESNATCH.
 0999 YUL PROP     RW,1        -             -            -
 1000              DA, C7T8    1,2           S ONE        1,2           INCREMENT YULPROGS SERIAL NUMBER.
 1002 SNATCH T6    TS, C1T4    YUL LOG       1,2          PHI SNACH     RESNATCH YULPROGS, PROTECT AND SAVE.
 1004              ALF,3       N00J0006YULPROGSLLLLRRSS
 1005              TS          S ONE         TASK 2       PHI TAPE      PLAY SAFE WITH T6.
 1007              RW,6        -             -            -
 1008              S, MON TADDR COPY OP                                  SKIP IF WE POSSESS A TAPE 2.
 1010              TS          Z,SC,1        -            MON RLEAS     YES, SO WE MUST RELEASE IT.
 1012              TX          Z,SC,1        -            -             NO, SO SKIP AGAIN.
 1014              RW,2        -             -            -             (GOES WITH RELEASE CALL ABOVE).
 1016              TS          L BUF 3       Z,X5         PHI SNACH     SNATCH WORKER AS NEW YULPROGS.
 1018              ALF,3       W10Y01D1NEWYULPR
 1019              TS          L BUF 2       Z,X4         POSIT YUL     POSITION, LIKE OLD TAPE, AFTER LABEL.
 1021              TS          S STOPPER     Z,X2         PHI TAPE
 1022              RF,6        2,0           -            -             BYPASS LABEL ON OLD YULPROGS.
 1024              TX          L BUF 1       -            Z,X3
 1025              TN          OK BANNER +3  3            OK BANNER     INITIALIZE CHECKING FUNCTION IN COPYING.
 1027              TS          L BUF 3       Z,X2         PHI TAPE
 1028              RF,6        2,0           -            -             READ FIRST RECORD TO BE COPIED.

R1030 LOOP TO COPY OLD YULPROGS TO NEW.                                  THE DANCE OF THE INDEX REGISTERS, AS IN
 1032 BAKJP LUP    TS          Z,X3          Z,X2         PHI TAPE      PASS 3, THE EFFECT BEING AN EFFICIENT
 1034              RF,6        2,0           -            DISASTER      AND QUIET TRIPLE-BUFFERED COPY OF OLD
 1036              TX          Z,X4          -            Z,X3          YULPROGS TO NEW.
 1038              NA, CAC3    5,0           TASK2        CLOBBERD      BRANCH IF RECORD NUMBER IS WRONG.
 1040              LA, BANBITS 5,0           S ZERO       INC RECNO     BRANCH ON GOOD RECD NO. AND ZERO BANNER.
 1042              NA, BANBITS 5,0           OK BANNER    CLOBBERD      BRANCH IF WRONG BANNER BITS.
 1044              TN          OK BANNER +1  2            OK BANNER     MOVE NEXT LEGAL BANNER CONFIG. UP.
 1046 INC RECNO    WA          TASK2         S ONE        TASK2
 1047              NA, BANBITS 5,0           BAN EOFRI    C,+5          BRANCH UNLESS ABOUT TO WRITE 1ST EOFRI.

 1049              S, MON EOFRI YUL PROP                  5,0           CLOSE NEW YULPROGS OSTENTATIOUSLY.
 1051              TS          Z,SC,3        -            MON RLEAS     NOW RELEASE OLD YULPROGS FOR GOOD.

 1053              TS          Z,X5          Z,X4         PHI TAPE
 1054              WF,1        4,0           -            DISASTER
 1055              TS          Z,X2          Z,X5         BAKJP LJP

 1056              RW,6        -             -            -             GOES WITH RELEASE CALL ABOVE.
 1058              TS          L BUF 3       Z,X3         PHI TAPE
 1059              RB,1        3,0           -            SHORTEN       READ BACKWARD, BRANCHING AT BEGINNING.
 1061              TS          Z,SC          COMMON       MON MAKE   C  SIGNAL END OF COPYING LOOP.
 1063              TS          C,+0          C,-1         C,-3          SAVE TIME BY DOING THAT JUST ONCE.
```

S, MONTYPER W LENGTH SPRM +8 -
S, MONTYPER TABR2 SPRA -56
= PATCH

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P1065  PROCEDURE TO SHORTEN LABEL BY PACKING UP USED WORDS AND REVALUING THE THREADS, USING SOMETHING SIMILAR IN FORM
R1067  TO A SIMPLE TWO-PASS ASSEMBLER.  THIS PAGE: PASS 1, LEAVING BANK 7 ADDRESSES IN BANK 5.

 1069  SHORTEN      TX            BANK 5      -          Z,X3
 1070               TX            Z,X3        -          Z,R1
 1071               TX            Z,X3        -          Z,R2              DISTRIBUTE BANK 5 INDICATOR TO R1,2.
 1073               TX            1,8         -          Z,X2
 1074               RT            1,6         N,X2       3,6               COPY LABEL INTO BANK 5.
 1076  INIT SLOT    TX            INIT WD 8   -          1,8
 1077               TX            INIT WD 8   -          Z,X2              PREPARE TO BUILD SHORTER LABEL IN BNK 7.
 1079               SWS,THREAD10  3,9         32         Z,R1              BANK 5 (OLD) ADDRESS OF FIRST COMPUTER.
 1081               TS            5 ONES      3,6        LAST COM Q        MAKE ANY TERMINAL THREAD LOOK AT ONES.

 1083  MOVE COMP    TN            N,R1        2          N,X2              MOVE COMPUTER NAME WITH SOFTWARE STATUS.
 1085               TX            Z,X2        -          N,R1              LEAVE FORWARDING ADDRESS.
 1087               SWS,THREAD10  N,X2        0          Z,R1              THREAD TO NEXT COMPUTER (OLD ADDRESS).
 1089               SWS,THREAD10  N,X2,2      12         Z,R2              B5 THREAD TO PROGRAMS OF COMPUTER.
 1091               TS            Z,R2        Z,R3       LAST PRG Q        PUT BANK INDICATOR 5 IN R3.

 1093  MOVE PSR     TN            N,R2        2          N,X2              MAIN WORD PAIR OF PROG/SUB ENTRY.
 1095               TX            Z,X2,1      -          N,R2              LEAVE FORWARDING ADDRESS.
 1097               SWS,THREAD10  N,X2        0          Z,R2              THREAD TO NEXT PROG/SUB OF COMPUTER.
 1099               NA, BIT25     2,0         5 ONES     LAST PRG Q -1     BRANCH IF PROG/SUB HAS NO SUBROUTINES.

 1101               SWS,THREAD11  N,X2        24         Z,R3              THREAD TO WORD 3 (1ST SUBRO THREAD WD).
 1103               SM            Z,X2,1      Z,SC,1     -
 1104               SWS,THREAD11  Z,AU1       0          Z,R3              THREAD TO NEXT WORD OF SUBRO THREADS.
 1106               TS            N,R3        N,X2       PUT 1 WORD    C   STORE THREAD WORD PENDING CHECK.
 1108               SSL, FOUR     Z,AU1       9          C,-2              AFTER CHECK, STEP BACK IF MORE THREDWDS.
 1110               TX            Z,X2,1      -          -                 (DONE FOR SUBRO-LESS PROGRAM OR SUBRO).
 1112  LAST PRG Q   NA            N,R2        5 ONES     MOVE PSR          BRANCH IF MORE PROG/SUBS FOR THIS COMP.

 1114  LAST COM Q   NA            N,R1        5 ONES     MOVE COMP         BRANCH IF MORE COMPUTERS TO MOVE.

 1116               SWS,THREAD10  3,9         16         Z,R1              BANK 5 ADDRESS OF FIRST AUTHOR NAME.
 1118               LA            5 ONES      N,R1       LAS AUTH Q +1     BRANCH IF THERE ARE NO AUTHORS.

 1120  MOVE AUTN    TN            N,R1        2          N,X2              MOVE 1ST HALF AND THREADS OF AUTHORNAME.
 1122               TX            Z,X2,1      -          N,R1              LEAVE FORWARDING ADDRESS.
 1124               SWS,THREAD10  N,X2        12         Z,R1              THREAD TO NEXT AUTHOR NAME.
 1126               SWS,THREAD11  N,X2,1      0          Z,R3              THREAD TO 2ND HALF OF AUTHOR NAME.
 1128               TS            N,R3        N,X2       PUT 1 WORD    C   STORE LIKE PROG/SUB THREAD WORD, ABOVE.
 1130  LAS AUTH Q   NA            N,R1        5 ONES     MOVE AUTN         BRANCH IF MORE AUTHOR NAMES TO MOVE.

 1132               SWS,THREAD10  3,9         0          Z,R1              BANK 5 ADDRESS OF FIRST DELETE.
 1134               LA            5 ONES      N,R1       LAS DELE Q +1     BRANCH IF THERE ARE NO DELETES.

 1136  MOV DELES    TN            N,R1        2          N,X2              MOVE DELETE ENTRY.
 1138               TX            Z,X2,1      -          N,R1              LEAVE FORWARDING ADDRESS.
 1140               SWS,THREAD10  N,X2,1      0          Z,R1              THREAD TO NEXT DELETE.
 1142  LAS DELE Q   NA            N,R1        5 ONES     MOV DELES         BRANCH IF MORE DELETES TO MOVE.
```

P1144 SHORTENING PROCEDURE CONTINUED: PASS 2, USING SUBADDRESSES IN BANK 7 TO REFERENCE LOCATIONS IN BANK 5 CONTAINING
R1146 NEW SUBADDRESSES FOR BANK 7. IN OTHER WORDS FILL IN DEFINITIONS OF SYMBOLS.

```
1148                SS          Z,X2        S CAC 3     1,8                    STORE LENGTH OF SHORTENED LABEL.
1150                TX          S END THR   -           3,6                    CLOSE TERMINAL THREAD ON ITSELF.
1152                SWS,THREAD10 3,9        32          Z,R1                   BANK 5 ADDRESS OF FIRST COMPUTER.
1154                SWS, CAC1   N,R1        32,L        1,9                    ...YIELDS BANK 7 ADDRESS OF DITTO.
1156                TX          Z,R1        -           Z,AU2                  SUPPLY BANK 5 INDICATOR TO AU2.
1158                TS          N,R1        Z,R4        CMPS DUN Q

1159  XFORM CMP     SWS,THREAD10 N,R4       12          Z,R2
1160                SWS,BTHRED10 N,R2       12,_        N,R4                   REVALUE THREAD TO FIRST PROGRAM/SUBRO.
1162                SWS,THREAD10 N,R4       0           Z,R1
1163                SWS,THREAD10 N,R1       0           N,R4,1                 REVALUE THREAD TO NEXT COMPUTER.
1165                TS          Z,R4        Z,AU1       4 THREADS     C        REVALUE ALL FOUR SOFTWARE THREADS.
1167                TS          N,R1        Z,R4        10 BIT THR             SET UP THREAD TO NEXT COMPUTER NAME.

1169  XFORM PSR     WA          N,R2        S ONE       Z,X2
1170                TS          Z,X2        Z,AU1       2 THREADS     C        REVALUE AUTHOR AND PROG/SUBRO THREADS.
1172                SWS,THREAD10 N,X2       0           Z,R2                   SAVE PROGRAM/SUBROUTINE THREAD.
1174                SWS,THREAD10 N,R2       0           N,X2
1175                NA, BIT 25  2,0         S ONES      PSRS DUN Q             PROG/SUBRO WITHOUT SUBROUTINES IS DONE.

1177                SWS,THREAD11 N,X2       24          Z,R3                   THREAD TO WORD 3 (1ST SUBRO THREAD WD).
1179                SWS,ATHRED11 N,R3       24,L        N,X2                   REVALUE THREAD TO WORD 3.
1181                TS          N,R3        Z,AU1       3 THREADS     C        FIRST SUBRO THREAD WORD HAS 3 THREADS.
1183  MOR SUBW Q    SSL, ONE    N,AU1       11          C,+3                   BRANCH IF JUST ONE SUBRO THREAD WORD.
1185                SWS,THREAD11 N,AU1      0           Z,AU1                  FOLLOW THREAD TO NEXT SUBRO THREAD WORD.
1187                TS          L MOR SBWQ  Z,SC        4 THREADS     C        SUBRO THREAD WORDS HAVE UP TO 4 THREADS.
1189                TX          Z,SH        -           Z,SC          C        DO 11-BIT THREAD AND GO AROUND AGAIN.

1191  10 BIT THR    TX          Z,CSC,3     -           -             C        DO 10-BIT THREAD AT END OF PROG/SUB PRC.
1193  PSRS DUN Q    NA          N,R2        S END THR   XFORM PSB               BRANCH IF MORE PROG/SUBS FOR THIS COMP.

1195  CMPS DUN Q    NA          Z,R4        S END THR   XFORM CMP               BRANCH IF MORE COMPUTERS TO REVALUE.

1197                SWS,THREAD10 3,9        16          Z,R1                   BANK 5 ADDRESS OF FIRST AUTHOR NAME.
1199                SWS, CAC2   N,R1        16,L        1,9                    REVALUE THREAD TO FIRST AUTHOR.
1201                TS          N,R1        Z,R4        AUTS DUN Q

1202  XFORM AUT     TS          Z,R4        Z,AU1       3 THREADS     C        AUTHOR THREAD WORD HAS 3 THREADS.
1204                SWS,THREAD11 N,R4       12          Z,R4          C
1205  AUTS DUN Q    NA          Z,R4,1      S END THR   XFORM AUT               BRANCH IF MORE AUTHORS TO REVALUE.
1207                SWS,THREAD10 3,9        0           Z,R1                   BANK 5 ADDRESS OF FIRST DELETE.
1209                SWS, CAC3   N,R1        0           1,9                    REVALUE THREAD TO FIRST DELETE.
1211                TS          N,R1        Z,R4        DELS DUN Q

1212  XFORM DEL     SWS,THREAD10 N,R4       0           Z,R1
1213                SWS, CAC3   N,R1        0           N,R4                   REVALUE THREAD TO NEXT DELETE.
1215                TX          N,R4        -           Z,R4
1216  DELS DUN Q    NA          Z,R4,1      S END THR   XFORM DEL               BRANCH IF MORE DELETES TO REVALUE.
```

```
P1218   TERMINATION OF FULL COPY.  WRITE SHORTENED LABEL RECORD ON NEW YULPROGS AND INSTALL IT IN OFFICE.

 1220               T5            1,1           NOW OP MSG +3 PHI TAPE
 1221               RB,1          -             -
 1222               NA, CHAR8     1,0           S ONE         C,+2          BRANCH IF FULL-COPY FLAG IS NOW OFF.
 1224               LA            REVERT ID     S ZERO        C,-1          WAIT FOR SEQUENCE # OF FORMER BACKUP.
 1226               T5, CHAR8     S ZERO        1,0           LABEL YUL     LABEL AND UPGRADE NEW YULPROGS.
 1228               TS            S ONES        COMMON        MON WAKE      C  SHOW END OF READBACK IF WE GET HERE 1ST.
 1230   BKUP STOP   TS            -             -             GROUP MAP
 1231               S, MON TYPER NOW OP MSG     SPRAMR +32    RELOAD PD     REPLACES BKUP STOP WHEN GROUP 3 IS DONE.


R1233   MINOR SUBROUTINE TO PLACE A SINGLE WORD IN THE NEW LABEL AREA.

 1234   PUT 1 WORD  SWE, CAC3     1,8           32            Z,AU2         C  ADDRESS OF FIRST 1-WORD EMPTY SPACE.
 1236               TX            N,R3          -             Z,AU1         C  SAVE RIGHT 12 BITS OF WORD.
 1238               NA            Z,AU2         S END THR     INSERT WD     C  BRANCH IF THERE IS A HOLE FOR IT.

 1240               TX            Z,X2,1        -             N,R3          C  LEAVE FORWARDING ADDRESS.
 1242               SWS, CAC1     Z,AU2         32,L          N,X2          C  PLACE TERMINAL THREAD IN HOLE.
 1244               SWS, CAC1     Z,X2,1        32,L          1,8              RECORD PRESENCE OF HOLE, EXIT.

 1246   INSERT WD   TX            N,R3          -             N,AU2         C  PLACE WORD IN HOLE.
 1248               TS            Z,AU2         N,R3          INIT SLOT     C  LEAVE FORWARDING ADDRESS, RESET THREAD.
```

```
R1250   FOUR MINOR SUBROUTINES TO REVALUE FROM ONE TO FOUR THREADS IN THE WORD AT N,AU1.  TEN-BIT THREADS ARE ASSUMED.

 1252   4 THREADS   SWS,THREAD10 N,AU1         36            Z,AU2         C
 1253               SWS,QTHREAD10 N,AU2         36,L          N,AU1         C  REVALUE OPCODE-FIELD THREAD.

 1255   3 THREADS   SWS,THREAD10 N,AU1         24            Z,AU2         C
 1256               SWS,ATHREAD10 N,AU2         24,L          N,AU1         C  REVALUE A-ADDRESS-FIELD THREAD.

 1258   2 THREADS   SWS,THREAD10 N,AU1         12            Z,AU2         C
 1259               SWS,BTHREAD10 N,AU2         12,L          N,AU1            REVALUE B-ADDRESS-FIELD THREAD AND EXIT.

 1261   1 THREAD    SWS,THREAD11 N,AU1         0             Z,AU2         C  BACK INTO CSC MODE GETS 11-BIT THREAD.
 1263               SWS,THREAD11 N,AU2         0             N,AU1         C
 1264               SWS, ONE     S ZERO        0             Z,AU2

 1265               SWS,THREAD10 N,AU1         0             Z,AU2         C  INCR CSC BY 3 AND DITTO FOR 10-BIT THRD.
 1267               SWS,THREAD10 N,AU2         0             N,AU1
```

P1268 AMEND LABEL OF BACKUP TAPE.

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 1269  AMEND BUL   SWS, CHAR3    GROUP A        A,5,L          ASAMB MSG
 12692             S, MON TYPER  ASAMB MSG      SPRAMR +32     -                    "ASA TO AMEND BACKUP TAPE LABEL;"
 12694             TX, CHAR3     ASAMB MSG      -              S ACA OTHE
 12696             S, MON TYPER  S ACA OTHE     SPRA +16       AMEND SC             "ACA OTHERWISE"
 1270  AMEND QST   STOP                                       -                 S
 12702             TS, CHAR8     S ZERO         1,0            C,+1              S  WIPE OUT AMEND FLAG AFTER REFUSAL.
 12704             NA            BKUP STOP      BKUP STOP +1   GROUP NAP            WAIT FOR GROUP B TO FINISH LISTING.
 12706             S, MON TYPER  S SIGH         SPRAMR +8      RELOAD P0            "(SIGH)"
 12708  AMEND SC   TS            -              -              AMEND QST         C  ARA OR DON A AMENDS BACKUP TAPE LABEL.
 1271              DS, C7T8      1,2            S ONE          SNATCH B6 +2
 1272              TS            1,1            SNATCH B6 +1   PHI SNACH
 1273  SNATCH B6   ALF,2         N00/0006YULPROGS
 1274              DEC           GGGGGG GGG 000                                      SNATCH BACKUP TAPE FOR RELABELING.
 1276              TS            L BUF 3        Z,X2           PHI TAPE
 1277              RW,6          -              -              -
 1278              TS            L BUF 3        Z,X3           PHI TAPE
 1279              RF,6          2,0            -              -                    READ LABEL INTO TEMPORARY AREA.
 1281              WD            1,8            Z,X1           Z,X4
 1282              WA            Z,X3           Z,X4           Z,X3                 LOCATE END OF NEW LABEL IN TEMP. AREA.
 1284              TS            1,8            Z,X4           PHI TAPE
 1285              RF,6          -              -              -
 1286              LA, CAC3      2,8            1,8            C,+2                 BRANCH IF BACKUP LABEL IS NO LONGER.
 1288              TX            2,8            -              Z,X3                 STRETCH LABEL RECORD OUT TO OLD LENGTH.
 1290              TS            1,5            2,5            MON UNLOK         C
 1291              WF,6          -              -              -                    UNLOCK BACKUP BEFORE RELABELING IT.
 1293              IT            1,6            N,X4           2,6                  MOVE NEW FACTS INTO TEMPORARY AREA.
 1295              CC            N,X2           -              N,X3
 1296              TS            2,1            S FIX SN +1    PHI LABEL
 1297              WF,6          2,0            -              -                    WRITE AMENDED LABEL ON BACKUP TAPE.
 1299              TS            2,2            S FIX SN +2    PHI SNACH
 1300  S FIX SN    ALF,3         N00/0006YULPROGS                                    UNDO EVIL EFFECTS OF LABELING.
 1302              TS            -              -              MON RLEAS
 1303              RW,6          -              -              -                    PUT BACKUP TAPE BACK ON SHELF.
 1305              TS            -              -              MON UNLOK      C
 1306              WF,1          -              -              -                    UNLOCK CURRENT TAPE BEFORE RELABELING.
 1308              NA            BKUP STOP      BKUP STOP +1   GROUP NAP            SLEEP UNTIL GROUP B FINISHES.
 1310              TS, CHAR8     S ZERO         1,0            LABEL YUL            NOW WRITE CLEAN LABEL ON CURRENT TAPE.
 1312              S, MON TYPER  BUREL MSG      SPRAMR +16     RELOAD P0            TYPE "BACKUP RELABELED".

R1314  SUBROUTINE IN SERVICE MODULE TO COMBINE THE FUNCTIONS OF THE MONITOR DECIMAL-TO-ALPHABETIC CONVERTER AND LEFT
R1316  ZERO SUPPRESSOR.  SET UP ARGUMENT IN SERV ARG, SEQUENCE CALL WITH RETURN IN AU1.  USE EITHER RESULT OR BOTH.

 1319  S D2A ZSUP  TX            Z,AU1          -              SERV ARG +2          SAVE RETURN DURING TRIP TO BANK 1.
 1321              TS            Z,SC           Z,AJ1          YUL D2A ZS
 1322  SERV ARG    RESERVE       1
 1323              TX            N,SC,1         -              Z,AJ1
 1324              RESERVE       1
 1325              TX            N,SH,2         -              SERV ARG
 1326              TS            N,SH           SERV ARG +2    N,AU1                MOVE RESULTS TO THIS BANK AND EXIT.
```

P1328 GROUP B ACTIVITY DURING YULPROGS COPY, PRINTING A COMPLETE DIRECTORY LISTING.

```
1330  LIST LABL  TX          YUL LOG A     -          PAGE HEAD +1
1331             TN          MNTN LINE     4          PAGE HEAD +2      ANNOUNCE YUL SYSTEM MAINTENANCE FCN.
1333             SWS, C7T8   1,1           A,2,L      BKUP LINE +2
1334             SWS, C1T6   1,1           A,2,L      BKUP LINE +3      PUT ACTUAL NAME OF TAPE INTO PAGE HEAD.
1336             NA, CHAR8   1,0           S ONE      C,+2              BRANCH IF NOT DOING FULL BACKUP COPY.
1338             TS          1,2           COMMON +1  C,+3              OTHERWISE LISTING IS OF CURRENT TAPE.
1340             TX          W AMENDED     -          N,AU2,1           INSERT "AMENDED" INTO PAGE HEAD.
1342             DS, C7T8    1,2           S ONE      COMMON +1         SUPPLY SERIAL NO. OF BACKUP.

1344             TX          B ARG         -          SERV ARG
1345             SWS,B1THRU12 COMMON +1    D,9,L      SERV ARG
1346             TX          Z,AU2         -          Z,X5
1347             TS          Z,SC          Z,AJ1      S D2A ZSUP        CONVERT YULPROGS SERIAL NUMBER TO ALPHA.
1349             TN          BKUP LINE     4          N,X5
1350             TX          SERV ARG      -          N,AJ2             PUT SERIAL NO. IN PAGE HEAD.
1352             TN          YUL DATE      2          PAGE HEAD +12
1353             TX          S BLANKS      -          N,AJ2
1354             TS          L NEW LINE    Z,X2       INIT PRNT      C  SET UP FRONT PAGE COVER.
1356             SWE, CAC3   1,9           32         Z,X5              GET ADDRESS OF FIRST COMPUTER NAME.
1358  SET SP1    TS          SP1           SLINE      SET OLD        C  SLINE IS ASSIGNED TO 2,0.
1360             TN          SW CMPUTR     1          SLINE +1
1361             MT          S BLANKS      2          N,AJ2,1
1362             NA          Z,X5          S END THR  M LIS CMPS        BRANCH IF THERE ARE ANY COMPUTERS.
1364             TX          W SNONE       -          SLINE +2
1365             TS          L END M LIS   Z,X4       PRINT LIN         PRINT LACK AND GO TO FINALIZATION.

1367  M LIS CMPS TX          S COLON C1    -          SLINE +2
1368             SWS, C3T6   N,X5          A,2        SLINE +2          PRINT COMPUTER NAME.
1370             TX          S BLANKS      -          COMPU LIN
1371             TX          S BLANKS      -          COMPU LIN +1
1372             TX, C1T6    S BLOTS       -          COMPU LIN
1373             NA, CHAR6   SLINE +2      S BLANKS   C,+6
1374             TX, CHAR6   SLINE +2      -          COMPU LIN
1375             NA, CHAR5   SLINE +2      S BLANKS   C,+4
1376             TX, CHAR5   SLINE +2      -          COMPU LIN
1377             NA, CHAR4   SLINE +2      S BLANKS   C,+2
1378             TX, CHAR4   SLINE +2      -          COMPU LIN         UNDERLINE COMPUTER NAME WITH BLOTS.
1380             LA, CHAR1   S TEN C1      5,0        PRIN CNAM         BRANCH UNLESS NAME BEGINS WITH DIGIT.
1382             LA, CHAR3   5,0           END OF 1   PRIN CNAM         BRANCH ALSO IF 3RD CHARACTER IS A DIGIT.

1384             SWS, C1T2   SLINE +2      A,4        SLINE +3
1385             SWS, C7T8   SLINE +2      A,4        SLINE +2          MOVE NAME OVER...
1387             SWS, C3T6   S W MOD       A,2        SLINE +2          ...AND INSERT "MOD".
1389             SWS, ONES   COMPU LIN     A,4        COMPU LIN
1390             SWS, C1T2   COMPU LIN     0          COMPU LIN +1
1391             TX, C1T6    S BLOTS       -          COMPU LIN         MOVE UNDERLINE OVER ACCORDINGLY.

1393  PRIN C NAM TS          Z,SC          Z,X4       PRINT LIN         PRINT ACTUAL COMPUTER NAME.
1395  SET SP3    TX          SP3           -          SLINE
1396             TX          S BLOTS       -          SLINE +1
1397             TN          COMPU LIN     2          SLINE +2          SET UP UNDERLINE OF BLOTS.
1399  GO PRINT   TS          Z,SC          Z,X4       PRINT LIN
```

```
P1400   PROCEDURE TO TEST AND PRINT THE STATUS OF SOFTWARE FOR EACH COMPUTER.

 1401               TX          W SOFTWAR     -           SLINE +2              SET UP HEADING ABOUT SOFTWARE STATUS.
 1403   MSPACE1     TS          SP1           SLINE       GO PRINT      C
 1404               TS          DASHES        SLINE +2    MSPACE2       C       UNDERLINE IT.
 1406               TN          SFWR HEDS     14          SLINE +2              SET UP COLUMN HDGS FOR SOFTWARE STATUS.
 1408   MSPACE2     TS          SP2           SLINE       GO PRINT      C
 1409               TX          Z,X5          -           Z,CSC                 SET BANK INDICATOR 7, EVEN BIT INTO CSC.
 1411               TX          S FOUR        -           Z,CSH
 1412               NA          Z,X2          S TWO       Z,AU2                 POINT TO SECOND WORD OF PRINT LINE.

 1414   SOF ST LUP  NA, BIT12   5,1           S ZERO      C,+2                  BRANCH IF THIS PASS IS AVAILABLE.
 1416               TS          L SFW STAS    Z,AU1       SET STATS

 1417               LA          S BIT 1       5,1         C,+3                  BRANCH IF THIS PASS IS CHECKED OUT.
 1419               SWE, CAC3   N,SC,2        16          Z,AU1

 1420   L SFW STAS  CAC         W LAB CHKO    W LAB AVAL  W LAB UNAV
 1421               SWE, CAC3   L SFW STAS    32          Z,AU1

 1422   SET STATS   MT          N,AU1,1       2           N,AU2,1               SET SOFTWARE PASS STATUS IN PRINT.
 1424               SWS,THREAD10 5,1          36          Z,CSC
 1425               NA          Z,CSC         Z,X5        C,+2                  BRANCH IF SOFTWARE IS BORROWED.
 1427               TS          S BLANKS      N,AU2,1     C,+2                  NO SPECIAL MARK WHEN PASS USES OWN SFW.
 1429               SWS, CIT4   N,CSC         0           N,AU2,1               NAME OF OWNER OF BORROWED SOFTWARE.
 1431               SWE, ONES   5,1           12,L        5,1                   ROTATE WORD TO STATUS OF NEXT PASS.
 1433               NA          Z,CSH,1       S ONE       SOF ST LUP            BRANCH IF HAVEN'T DONE 4 PASSES YET.

 1449   M SPACE 3   TS          SP3           SLINE       GO PRINT      C
```

P1450 PROCEDURE TO PRINT A LIST OF PROGRAMS AND A LIST OF SUBROUTINES FOR EACH COMPUTER, WITH STATUS INFORMATION.

```
1452                TS              W PROGRMS       SLINE +2        MSPACE 1        C
1453                TS              Z,X5            COMP LOCN       MSPACE1 +1      C       PRINT AND UNDERLINE PROGRAM HEADING.
1455                TX              S ZERO          -               PRG OR SUB              DO THE LIST OF PROGRAMS FIRST.

1457  LIST PR SU    TN              PRSUB HDS       14              SLINE +2
1458                SS              W CONTRL        PRG OR SUB      SLINE +8                ALTER PROG HEADER TO SUBRO IF NECESSARY.
1460                TS              SP2             SLINE           GO PRINT        C       PRINT COL HDGS FOR PROG OR SUBRO LIST.
1462                SWS,THREAD10    N,X5            12              Z,X5                    THREAD TO FIRST PROG OR SUBRO OF COMP.
1464                LA              Z,X5            S END THR       NO PRSUBS               BRANCH IF NO PROGRAMS OR SUBROS.

1466  M LIST PS     NA, BIT 36      5,1             PRG OR SUB      END PRSB Q              BR IF PRG WHEN WANT SUBS OR VICE VERSA.
1468                TX              N,X5            -               SLINE +2                SET PROGRAM OR SUBROUTINE NAME IN PRINT.
1470                SSL, TWO        5,1             22              C,+1                    FIND OUT WHERE REVISION NO. IS STORED.
1472                SWE, C1T2       5,1             D,3,L           SERV ARG                IN WORD 2 IF NO SUBROUTINES.
1474                TS              W NONE          SLINE +10       ALF REVN                SHOW LACK OF SUBSIDIARY SUBROS.

1476                TX              Z,X5            -               Z,R2                    HANG ON TO BANK INDICATOR.
1478                SWS,THREAD11    5,1             24              Z,R2
1479                EX              N,R2            S C1T2          SERV ARG                REVISION NUMBER IS IN WORD 3.

1481  ALF REVN      NA              SERV ARG        S ZERO          C,+2
1482                TS              WM NEW          SLINE +3        C,+3                    SAY "NEW" IF REVISION 0.

1484                TS              Z,SC            Z,AJ1           S D2A ZSUP
1485                SWS, C3T5       SERV ARG +2     A,2             SLINE +3                SET UP ZERO-SUPPRESSED REVISION NUMBER.

1487                NA              PRG OR SUB      S ZERO          JNUSJB Q                BRANCH IF DOING SUBROUTINE LIST.
1489                SSL, ONE        5,1             35              C,+1                    TEST OBSOLESCENCE BIT.
1491  PSN VIA X4    TS              Z,X5            Z,X4            LIST AUTH               HANG ON TO BANK INDICATOR.
1493                SSL, TWO        5,1             22              C,-1                    IF NO SUBROS, THAT WAS NOT AN OBS BIT.
1495                TS              W OBS           SLINE +1        C,-2                    SUBSIDIARY SUBROS HAVE CHANGED.
```

R1497 IF A SUBROUTINE IS NOT CALLED BY ANY PROGRAM OR SUBROUTINE, MARK IT "UNUSED". (IGNORE BANK ERROR AT 0982.1).

```
1499  JNUSJB Q      TN              Z,X2            2               SAVE X23
1500                TX              COMP LOCN       -               Z,X2                    POINT TO COMPUTER NAME ENTRY.
1502                TN              Z,X2            2               Z,X3                    DISTRIBUTE BANK INDICATOR 7.
1504                SWS,THREAD10    N,X2            12              Z,X2                    POINT TO FIRST PROGRAM OR SUBROUTINE.
1506                TS              N,SC,6          -               SUB THRDS       C       ASK FOR PRESENTATION OF SUBRO THREADS.
1508                WD              Z,SC            FOUR            Z,SC            S       (DISPOSITION WHEN THREADS RUN OUT).

1510                TS              Z,X4            Z,X2            C,-2                    GO TO EXAMINE NEXT PROGRAM OR SUBRO.
1512                NA              Z,X4            S END THR       C,-1                    BRANCH IF THERE ARE MORE PROGS OR SUBS.
1514                TN              SAVE X23        2               Z,X2
1515                TS              W UNUSED        S LINE +1       PSN VIA X4              PUT "UNUSED" AT LEFT OF SUBROUTINE NAME.

1517                TX              -               -               -               C       ASK FOR NEXT SUBROUTINE CALL THREAD.
1519                NA              Z,X4            Z,X5            C,-1                    BRANCH IF SUB NOT CALLED VIA THIS THRED.
1521                TN              SAVE X23        2               Z,X2                    LEAVE LOOP WHEN FIRST USER IS FOUND.
```

P1523 SET UP AUTHOR NAME, DATE OF LAST ASSEMBLY, WHETHER A PROGRAM HAS BINARY RECORDS, OR WHETHER A SUBROUTINE IS
R1525 CONTROLLED.

```
 1526  LIST AUTH  SWS,THREAD10 4,1          12              Z,X4
 1527             LA           4,1          S PLS ZERO      C,-1          BRANCH IF AUTHOR NAME NOT FOUND.

 1529             TX           N,X4         -               SLINE +4      SET UP FIRST WORD OF AUTHOR NAME.
 1531             SS           4,1          S THRED 11      Z,X4
 1532             TX           N,X4         -               SLINE +5      SET UP SECOND WORD OF AUTHOR NAME.
 1534             SWE, D12     5,1          44              Z,R2
 1535             WA           Z,R2         L S MONTHS      Z,R2
 1536             TX           N,R2         -               SLINE +6      SET UP ALPHABETIC MONTH ABBREVIATION.
 1538             SWE, THREE   5,1          42              COMMON +1
 1539             DT           COMMON +1    8               COMMON +1
 1540             SWE, SEVEN   5,1          39              Z,R2
 1541             DA           COMMON +1    Z,R2            COMMON +1
 1542             LA           COMMON +1    S D12           C,+2          BRANCH IF 1-DIGIT DECIMAL DAY NUMBER.
 1544             SWS, CHAR7   COMMON +1    2,L             SLINE +6
 1545             SS           COMMON +1    S D12           SLINE +6      SET UP DECIMAL DAY NUMBER.
 1547             SWE, 7C6     5,1          24              COMMON +1
 1548             WA           COMA 1962    COMMON +1       SLINE +7      SET UP COMMA AND YEAR NUMBER.
 1550             SSL, ONE     5,1          11              C,+1          TEST FOR BINARY (PROG) OR CONTROL (SUB).
 1552             TS           W NO         SLINE +8        C,+2
 1553             TX           W YES        -               SLINE +8
 1554             NA, BIT 25   5,1          S ONES          END PRSB Q -1 BRANCH IF NO SUBSIDIARY SUBROUTINES.
```

P1556 LIST THE NAMES OF SUBSIDIARY SUBROUTINES OF THE PROGRAM OR SUBROUTINE BEING DESCRIBED, AT FOUR TO THE LINE.

```
1558                TN          Z,X4        2           Z,R1                HANG ON TO BANK INDICATORS.
1560                SWS,THREAD11 5,1        24          Z,R1                THREAD TO WORD 3 (1ST SUBRO THREAD WD).
1562                wA          Z,X2        S EIGHT     Z,R7
1563                TS          Z,R7,8      Z,R5        PRA SUBTH           POINT TO ENDS OF SUBRO LIST AREA.

1565  PRO SUBTH     SS          N,R1        S THRED 11  Z,R1                FOLLOW THREAD TO NEXT SUBRO THREAD WORD.
1567                SWS,THREAD10 N,R1       36          Z,R2                GET SUBROUTINE THREAD FROM OP CODE.
1569                SSL, ONE    N,R1        36          PR SLAVES     C     TEST OBSOLETING BIT AND PRINT.

1571  PRA SUBTH     SWS,THREAD10 N,R1       24          Z,R2                GET SUBROUTINE THREAD FROM A ADDRESS.
1573                SSL, ONE    N,R1        24          PR SLAVES     C     TEST OBSOLETING BIT AND PRINT.
1575                SSL, ONE    N,R1        35          LASJB THR     C     SEE IF THIS IS THE LAST SUBRO THREAD.

1577  PRB SUBTH     SWS,THREAD10 N,R1       12          Z,R2                GET SUBROUTINE THREAD FROM B ADDRESS.
1579                SSL, ONE    N,R1        12          PR SLAVES     C     TEST OBSOLETING BIT AND PRINT.
1581                SSL, ONE    N,R1        23          LASJB THR     C     SEE IF THIS IS THE LAST SUBRO THREAD.

1583  PRC SUBTH     SSL, ONE    N,R1        11          C,+1                SEE IF THIS IS THE LAST SUBRO THREAD.
1585                TS          -           -           PRO SUBTH
1586                SS          N,R1        S THRED 10  Z,R2                GET SUBROUTINE THREAD FROM C ADDRESS.
1588                SSL, ONE    N,R1        0           PR SLAVES     C     TEST OBSOLETING BIT AND PRINT.

1590  LASJB THR     TX          -           -           -                   RETURN EXCEPT FROM C ADDRESS.
1592                TS          Z,R6,8      -           C,+1                FORCE SEQUENCE MODE.
1594                LA          Z,R6        Z,R7        C,+2                BRANCH IF LIST IS ALL PRINTED.
1596                TS          SP2         SLINE       GO PRINT      C     OTHERWISE PRINT PARTIAL LINE NOW.
1598                TS          SP2         N,X3        END PRSB Q          DOUBLE-SPACE RETROACTIVELY.
```

R1600 MINOR SUBROUTINE TO SET IN PRINT THE NAMES OF SUBSIDIARY SUBROUTINES, PREFIXING OBSOLETING ONES BY "/".

```
1602  PR SLAVES     SM          Z,R6,1      Z,CSC,1     -             C     ENTER HERE IF NOT AN OBSOLETING SUBRO.
1604                SS          SLASH       S CHAR 8    N,R6,1        C     ENTER HERE TO SHOW PATH OF OBSOLESCENCE.
1606                TX          N,R2        -           N,R6,1        C     SET SUBROUTINE NAME IN PRINT.
1608                NA          Z,R6        Z,R7        N,SC,1        C     RETURN IF LINE NOT FULL YET.
1610                wA          Z,X3        S EIGHT     Z,R7          C     RESET POINTERS TO OTHER PRINT BUFFER.
1612                TS          Z,R7,8      Z,R5        M SPACE 1     C     PRINT 4 SUBSIDIARY SUBRO NAMES, RETURN.

1614                TS          SP2         S LINE      GO PRINT      C     PRINT PROG OR SUBRO WITHOUT SUBROUTINES.
1616  END PRSB Q    SS          5,1         S THRED 10  Z,X5
1617                NA          Z,X5        S END THR   M LIST PS             BRANCH IF THERE ARE MORE PROGS OR SUBS.
```

```
P1619   TERMINATION OF EITHER THE PROGRAM LIST OR THE SUBROUTINE LIST.

 1620             NA          3,2          PR SUB HDS     NO PRSUBS +2        BRANCH IF THE LIST IS NOT EMPTY.
 1622 NO PRSUBS   TN          3,1          14             3,2
 1623             TX          W NONE       -              3,2                 ERASE HEADINGS AND SUBSTITUTE "(NONE)".
 1625             TX          SP3          -              N,X3
 1626             SS          S BIT 1      PRG OR SUB     N,X3                SP3 AFTER PROG LIST, SKIP AFTER SUBRO.
 1628             NA          PRG OR SUB   S ZERO         EN COMPS Q          BRANCH IF JUST FINISHED SUBROUTINE LIST.

 1630             TS          W SUBROS     SLINE +2       EN COMPS Q     C
 1631             TS          W SUBROS +1  SLINE +3       M SPACE 1      C
 1632             TS          DASH 1T3     SLINE +3       M SPACE 1 +1   C    PRINT AND UNDERLINE SUBROUTINE HEADING.
 1634             TS          S ONES       PRG OR SUB     LIST PRSU           BEGIN LIST OF SUBROUTINES FOR COMPUTER.

 1636 EN COMPS Q  TX          COMP LOCN    -              Z,X5
 1637             TS          SW CMPUTR    SLINE +1       SET SP1        C
 1638             SS          N,X5         S THRED 10     Z,X5
 1639             NA          Z,X5         S END THR      M LIS CMPS          BRANCH IF THERE ARE MORE COMPUTERS.

R1641   PROCEDURE TO LIST ESTABLISHED AUTHORS.

 1642 M LIS AUTS  SWE, CAC3   1,9          16             Z,X5                GET ADDRESS OF FIRST AUTHOR NAME.
 1644             LA          Z,X5         S END THR      END M LIST          BRANCH IF THERE ARE NO AUTHORS.

 1646 M LIS AUTH  TX          W AUTHOR C   -              SLINE +1
 1647             TX          N,X5         -              SLINE +2            SET UP FIRST WORD OF AUTHOR NAME.
 1649             TX          Z,X5         -              Z,R2
 1650             SS          5,1          S THRED 11     Z,R2
 1651             TX          N,R2         -              SLINE +3            SET UP SECOND WORD OF AUTHOR NAME.
 1653             TN          W NPR SUBS   5              SLINE +4
 1654             LA          5,1          S C1T2         C,+2                BRANCH IF LESS THAN 255 PROGS AND SUBS.
 1656             TS          W 254P       SLINE +9       MOR AUTH Q          OTHERWISE JUST SAY "254+".

 1658             SWE, 3D8    5,1          26             SERV ARG
 1659             DT          SERV ARG     8              SERV ARG            CONVERT NUMBER TO DECIMAL.
 1661             SWE, 7D8    5,1          23             COMMON +1
 1662             DA          SERV ARG     COMMON +1      SERV ARG
 1663             DT          SERV ARG     8              SERV ARG
 1664             SWE, 7D8    5,1          20             COMMON +1
 1665             DA          SERV ARG     COMMON +1      SERV ARG
 1666             TS          Z,SC         Z,ADJ1         S D2A ZSUP          CONVERT TO ALPHABETIC.
 1668             SWS, C1T3   SERV ARG +2   A,5,L          SLINE +9

 1669 MOR AUTH Q  TS          SP2          SLINE          GO PRINT       C    PRINT AN AUTHOR LINE.
 1671             SWS,THREAD10 5,1         12             Z,X5
 1672             NA          Z,X5         S END THR      M LIS AUTH          BRANCH IF THERE ARE MORE AUTHORS.
```

P1674 FINALIZING PROCEDURE IN DIRECTORY LISTING.

```
 1675   END M LIST TX            S BIT 1        -              N,X3
 1676              S, PHI PRINT  3,0            -              -                        PRINT FINAL LINE OF LISTING.
 16762             NA, CHAR5     DISC STAT      S ONES         AFTER YDI +2             AVOID YULDLIST IF DISC IS INOPERATIVE.
 16764             S, MON RELOX  YUL D LIST                    XFR LIMIT                YULDLIST WILL RUN IN BANK C HERE.
 16766             TS            Z,AU2,1        Z,AJ1          YDL RETRN +1   C         SAVE BASE ADDRESS.
 16768             NA            N,AU2          BYE BYE        AFTER YDI                CANCEL QUIETLY IF WRONG REV OF YULDLIST.
 1677              TS            YDL RETRN      N,AJ2          N,AU1                    PLANT SPECIAL EXIT AND EXECUTE YULDLIST.

 16772  BYE BYE    TS            -              -              MONITOR                  (SHOULD BE AT BASE ADDRESS +1).
 16773  YDL RETRN  TS            -              -              N,S3
 16774             TX            Z,CSC          -              Z,S3           S         MAKE S3 POINT TO SPECIAL RETURN.

 16776  AFTER YDL  TS            L BANK 1       Z,X0           BK1 VIA X0 +1  C
 16778             TX            YUL MASKS      -              Z,MXR          C         SET UP ALL SPECIAL REGS AFTER YULDLIST.
 1678              TN            S 4 SPACE      1              N,X3
 1679              MT            S BLANKS       14             N,AJ2,1                  FORM SPACER LINE.
 16802             S, PHI PRINT  DEPAGING
 1681              S, PHI PRINT  3,0
 1682              S, PHI PRINT  3,0
 1683              S, PHI PRINT  3,0                                                     FORCE LAST LINES THROUGH BUFPRINT.
 1685              NA, CHAR8     1,0            S ONE          LIST XIT                 BRANCH IF NOT DOING FULL BACKUP COPY.
 1687              TS            N,SC,2         Z,X4           C,+2           C
 1688              SPEC,B7                                     601
 1689              NA,CHAR1      4,0            ASTRISK        PHI PEEK       C         CHECK ON STAR WHETHER HAVE READ OR NOT.
 1691              NA, CHAR1     4,0            ASTRISK        LIST XIT                 BRANCH IF MORE TASKS IN THIS JOB.

 1693              LA            COMMON         S ZERO         GROUP NAP                SLEEP IF COPYING NOT DONE YET.
 16948             TS            S ONES         REVERT ID      -
 1695              DS, C7T8      1,2            S TWO          REVERT ID                FORM SEQUENCE NUMBER OF GRANDFATHER.
 1697              NA            COMMON         S ONES         GROUP NAP                SLEEP IF READ-BACK NOT DONE YET.

 16981             NA, BTHREE10  SPAR IDLE       S ZERO         REVERT GF                BRANCH IF NOT FIRST BACKUP IN THE JOB.
 169812            TX, BTHREE10  S ONES         -              SPAR IDLE                REVERT ALL GRAMPAS MADE IN THIS JOB.
 16982             NA            1,1            N,SC,6         C,+2                     TEMPORARY UNTIL SUPER-CAREFUL TAPE OPS.
 16984             ALF           NANSTONE
 1699   REVERT GF  S, MON TYPER  OBUWK MSG      SPRA +32       -                        TYPE "FORMER BACKUP WILL BE WORKER".
 1701              TS            1,1            C,+2           PHI SNACK                SUPPLY TRUE NAME OF GRANDFATHER TAPE.
 1703              ALF,2         N00L0006YULPROGS                                      SNATCH FORMER BACKUP, TYPE 3 DISPO.
 1705   REVERT ID  DEC           0

 1706              TS            -              -              MON RLEAS
 1707              RW,6          -              -              -                        DEMOTE GRANDFATHER TO WORKER.

 1709   LIST KIT   TS            BKUP STOP +1   BKUP STOP      MON WAKE       C         ALLOW GROUP A TO EXIT FROM TASK.
 1711              TS            S ONES         REVERT ID      N,RO                     GROUP B GOES TO BED.
```

```
P1713           PRINTING SUBROUTINE IN PASS 0 WITH ONE-LINE DELAY, AS IN PASSES 2 AND 3.  PERFORMS PAGINATION.  ENTER
R1715   WITH RETURN IN X4.


 1716   PRINT LIN  LA          S BIT 1       N,X3          PRINZ SKIP        ALWAYS SKIP IF CODE SAYS SO.
 1718              WA          LIN COUNT     N,X3          LIN COUNT
 1719              LA          LIN COUNT     N LINES       PRINT OLE         BRANCH IF STILL IN SAME PAGE.

 1721              TX          S BIT 1       -             N,X3              SUPPLY SKIP WHEN COUNT OVERFLOWS.
 1723   PRINZ SKIP S, PHI PRINT DEPAGING
 1724              S, PHI PRINT 3,0
 1725              DA          PAGE NO       S ONE         PAGE NO
 1726              SWE, ONES   PAGE NO       D,4,L         SERV ARG
 1727              TS          Z,SC          Z,ADJ1        S D2A ZSUP
 1728              TX, CSTB    SERV ARG +2   -             PAGE HEAD +15
 1729              S, PHI PRINT PAGE HEAD                                    PRINT HEADING WITH ZERO-SUPPRESSED PGNO.
 1731              TS          PAGE HEAD     LIN COUNT     PRINT OLE +1

 1732   PRINT OLE  S, PHI PRINT 3,0

 1733              TX          Z,X2          -             L OLD LINE
 1734              TX          Z,X3,1        -             Z,X2              SWAP PRINT DELAY BUFFERS.
 1736              MT          S BLANKS      15            N,X3,1            SWAB OUT CURRENT LINE.
 1738              TX          L OLD LINE    -             Z,X3
 1739              TS          S ZERO        N,X2          N,X4


R1740   BRUTAL ROUTINE TO TYPE OUT THE LONG CUSS (SEE NEXT PAGE) AND COME TO AN IMMUTABLE STOP.

 1742   CLOBBERD   S, MON TYPER OH DAMN       SPRAMR +8     -
 1743              TX          1,1           -             LONG CUSS         FILL IN ACTUAL TAPE NAME.
 1745              TX          L LONG CUS    -             Z,X6
 1746              S, MON TYPER 6,0          SPRAMR +40    -
 1747              NA          Z,X6,5        L PUT IT      C,-1

 1748              S, MON TYPER S BLANKS     SPRA +8       -
 1749              TS          Z,SC          Z,RD          C,+1              C NEITHER ASA NOR ACA NOR ARA NOR FAX
 1751              STOP                                    -                 SHALL BUDGE US FROM THIS SPOT.
 1753              TS          -             -             C,-2
```

P1754 A LONG CUSS FOR A DISTRESSING SITUATION.

```
 1755  OH DAMN     ALF          OH DAMN.
 1756  LONG CUSS   ALF,5        YULPROGS IS CLOBBERED. PLEASE DO THUNDER
 1757              ALF,5        EDIT *TEI.A72 (T = ACTUAL DRIVE NUMBER),
 1758              ALF,5        ASK FIELD SERVICE TO INSPECT THIS TAPE,
 1759              ALF,5        MOUNT BACKUP AND RERUN JOB AS REQUIRED.
 1760              ALF,5        IF NO BACKUP, FREEZE OPERATIONS ON THIS
 1761              ALF,5        TAPE UNTIL I CAN REPAIR THE DAMAGE. IF I
 1762              ALF,5        AM UNAVAILABLE AND THERE IS NO BACKUP
 1763              ALF,5        AND THE JOB HAS TO BE DONE  IN A HURRY,
 1764              ALF,5        TRANSFER THE PROGRAM TO THE DISC, AND
 1765  PUT IT ON   ALF,5        PUT IT ON ANOTHER TAPE.   (SIGNED) H B-S
```

P1766 ROUTINE TO PROCESS THE ANNOUNCEMENT THAT A NEW COMPUTER NAME IS TO BE RECOGNIZED.

```
1768  ADD COM     NA          N,X5        S NEW       C,+2
1769              TX          Z,X5,3      -           -           "NEW" IS OPTIONAL HERE.
1771              TX          Z,X5        -           WHODUNIT
1772              NA          N,X5,1      W COMPUTR   HOWZAT
1773              NA          N,X5,2      S BLANKS    HOWZAT      "COMPUTER" IS REQUIRED.
1775              NA          N,X5        W NAME      C,+2
1776              TX          Z,X5,3      -           -           "NAME" IS OPTIONAL.

1778              TS          -           -           DECOD CPN   C   DECODE COMPUTER NAME.
1780              TX          Z,SC,2      -           Z,CSC       C   MAKE FOLLOWING TWO WORDS A SUBROUTINE.
1782  NO EXTRAS   WA          Z,X5        S THREE     WHODUNIT    C
1783              NA          5,3         S ONES      HOWZAT          SUPERFLUOUS WORDS ARE FORBIDDEN.
1785              TS          N,X5        NEWCO MSG +2 FIND PAIR  C   FIND ROOM FOR COMPUTER NAME ENTRY.
1787              S, YUL TYPER NEWCO MSG  AMTF +3     C,+1            ANNOUNCE NEW NAME.

1789              TS          -           -           FIND COMP   C   SEE IF IT EXISTS ALREADY.
1791              TS          Z,SC,1      -           CHED LIST +1 C  X0 TO X2, L BANK 1 TO X0.
1792              S, MON TYPER CONCN MSG  SPRAMR +40   SM ABORT       CUSS AND ABORT IF CONFLICT.
1794              EX          COMP NAME   S C1T4      N,X3            FORM COMPUTER NAME ENTRY.
1796              SS          Z,X2        S THRED 10  N,X3
1797              SWS,BTHRED10 S END THR  12,L        N,X3            INSERT VACUOUS PROGRAM THREAD.
1799              EX          Z,X3        S THRED 10  3,1
1800              SWS,BTHRED10 3,1        12,L        3,1
1801              SWS, C1T4   3,1         24,L        3,1             ASSUME IT HAS ITS OWN PARTICULAR PASSES.
1803              NA          Z,R4        S ZERO      C,+3            BRANCH IF NOT SMALLEST OF COMPUTER NAMS.

1805              SWS, CAC1   Z,X3        32,L        1,9             OTHERWISE THREAD TO IT THUS.
1807              TS          -           -           ACCEPT M5
1808              SS          Z,X3        S THRED 10  N,R4
1809              TS          -           -           ACCEPT M5       THREAD TO THIS FROM NEXT SMALLER CNAME.
```

R1811 TRIVIAL ROUTINES TO ABORT A TASK FROM THE SERVICE MODULE.

```
1812  SM ABORT    TS          L BANK 1    Z,XO        TYP ABORT
1813  SM REJECT   TS          L BANK 1    Z,XO        REJEC DIR
```

P1814 PROCEDURE TO PROCESS THE ANNOUNCEMENT THAT AN OLD COMPUTER (NAME) IS TO BE REMOVED.

```
1816  RMOV COM   NA          N,X5        W OLD       C,+2                "OLD" IS OPTIONAL HERE.
1818             TX          Z,X5,3      -           -
1819             TX          Z,X5        -           WHODUNIT
1820             NA          N,X5,1      W COMPUTR   HOWZAT
1821             NA          N,X5,2      S BLANKS    HOWZAT              "COMPUTER" IS REQUIRED.
1823             NA          N,X5        W NAME      C,+2                "NAME" IS OPTIONAL.
1825             TX          Z,X5,3      -           -

1826             TS          -           -           DECOD CPN       C
1827             TS          N,X5        REMCD MSG +3 NO EXTRAS      C
1828             S, MON TYPER REMCD MSG  SPRAMR +32  -                   DECODE COMPUTER NAME AND ANNOUNCE TASK.

1830             TS          -           -           FIND COMP       C   LOOK UP COMPUTER NAME.
1832             S, MON TYPER SURCD MSG  SPRAMR +32  SM  ABORT           CUSS AND ABORT IF NO SUCH COMPUTER.

1834             LA,BTHREDID 0,0         B ADDR 6    C,+3                BRANCH IF COMPUTER HAS NO PROGRAMS.
1836             S, MON TYPER COMUS MSG  SPRAMR +24  CHED LIST           CUSS ABOUT REMOVING COMPUTER IN USE.
1838  CHED LIST  S, MON TYPER CHEDL MSG  SPRAMR +24  SM  ABORT           TELL HIM TO CHECK THE DIRECTORY LISTING.

1840             TS          Z,X0        Z,X2        BKI VIA X0      C
1841             SWE, CAC3   1,9         32          Z,X3                CHECKING ON SOFTWARE SHARING: LOCATION
1843             TS          Z,X2        L COMP NAM  THIS COM Q           OF 1ST COMPUTER AND OF THIS ARE SET UP.

1845  SOFT SHAR  TX          N,X3        -           N,X5
1846             TS          -           -           CPN FIXER       C   EXPAND COMPUTER NAME TO STANDARD FORM.
1848             TX          N,X5        -           STNED MSG +2
1849             TX          L W PASS 1  -           Z,X4

1850  SHAR LOOP  SWS, ONES   3,1         12,L        3,1                 ROTATE SOFTWARE THREADS.
1852             NA, THREAD10 3,1        L COMP NAM  4 PASS CT           BRANCH IF NO SHARING HERE.
1854             SM          L COMP NAM  S CHAR 1    L COMP NAM          SET FLAG TO SHOW SOME SHARING.
1856             S, MON TYPER 4,0        SPRAM +15   -
1857             S, MON TYPER STNED MSG  SPRAMR +24  -                   TYPE OUT WHO NEEDS WHICH SOFTWARE.
1859  4 PASS CT  NA          N,X4,2      W MANUF     SHAR LOOP           DO ALL 4 "PASSES" FOR EACH OTHER COMP.

1861             SS          N,X3        S THRED 10  Z,X3                FOLLOW THE THREAD TO NEXT COMPUTER.
1863             LA          Z,X3        1 COMMA 8   CHK SHARE           BRANCH IF ALL COMPUTERS DONE.
1865  THIS COM Q NA          Z,X3        Z,X2        SOFT SHAR           BRANCH IF NOT COMPUTER BEING REMOVED.
1867             TS          -           -           C,-3

1868  CHK SHARE  LA          S CHAR 1    L COMP NAM  TYP ABORT           ABORT IF THERE WAS ANY SHARING.
1870             NA          Z,R4        S ZERO      NOT 1ST CO          BRANCH IF COMPUTER NOT 1ST IN LIST.
1872             SS          N,X2        S THRED 10  Z,X3
1873             SWS, CAC1   Z,X3        32,L        1,9                 SEW UP THREAD AROUND THIS COMPUTER.
1875             TX          Z,SC,1      -           -

1876  NOT 1ST CO SS          N,X2        S THRED 10  N,R4                SEW UP THREAD AROUND THIS COMPUTER.
1878             TS          Z,X2        Z,ADJ1      GIVE PAIR       C   GIVE UP ITS TWO WORDS.
1880             TS          -           -           ACCEPT MP           CALL FOR BACKUP LABEL AMENDMENT IF NEC.
```

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P1882                ROUTINE TO PROCESS A DECLARATION THAT ASSEMBLY PASS 1, ASSEMBLY PASS 2, ASSEMBLY PASS 3, OR MANUFACT-
R1884   URING FOR A PARTICULAR COMPUTER IS AVAILABLE, CHECKED OUT, OR OBSOLETE.  CUSSES RESULT FROM VARIOUS INCONSISTEN-
R1886   CIES AND REDUNDANCIES IN SUCH DECLARATIONS.  A PASS (GENERIC TERM FOR THE FOUR ITEMS ABOVE) MAY BE DECLARED
R1888   CHECKED OUT OR OBSOLETE ONLY AFTER BEING DECLARED AVAILABLE.  ANY PASS MAY BE DECLARED EQUIVALENT TO THE CORRES-
R1890   PONDING PASS FOR ANOTHER COMPUTER.


 1893   PASS STA    TX              Z,X5            -               WHODUNIT                ENTRY FOR STATUS OF ASSEMBLY PASSES.
 1895               NA              N,X5,3          W PASS          HOWZAT                  "PASS" IS REQUIRED.
 1897               TX              Z,X5            -               WHODUNIT
 1898               NA, CHAR6       5,2             S 1 C6          HOWZAT                  PASS NUMBER MUST BE ONE DIGIT.
 1900               LA              N,X5            S ZERO C1       HOWZAT
 1901               LA              4 C1            N,X5            HOWZAT                  AND MUST BE IN THE RANGE 1-3.
 1903               SWS, CHAR3      N,X5,3          A,2             PASSS MSG +1            PUT PASS NUMBER IN ANNOUNCEMENT.
 1905               SSL, CHAR8      PASSS MSG +1    A,5             MASKIFTS -1     C       SHIFT MASK ACCORDING TO PASS.
 1907               TN              PASSS MSG       2               STATS MSG +1            STATUS MESSAGE DEALS WITH A PASS.
 1909               TS              PASSS RE        STATS MSG       CHECK FOR

 1910   MASKIFTS    SWE, ONES       MANU MASK       12              PASS MASK
 1911               SWE, ONES       MANU MASK       24              PASS MASK
 1912               SWE, ONES       MANU MASK       36              PASS MASK               MASK FOR 2ND WD OF COMPUTER NAME ENTRY.

 1914   MANU STA    TX              MANU MASK       -               PASS MASK               ENTRY FOR STATUS OF MANUFACTURING.
 1916               TN              MANUS MSG       2               STATS MSG +1
 1917               TX              MANUS RE        -               STATS MSG

 1922   CHECK FOR   TX              Z,X5            -               WHODUNIT                JOINT ROUTINE FOR STATUS DECLARATIONS.
 1924               NA              N,X5,3          S FOR           HOWZAT

 1925   WHOS STAT   TS              -               -               DECOD CPN       C       DECODE COMPUTER NAME.
 1927               TX              N,X5            -               STATS MSG +3
 1928               S, YUL TYPER    STATS MSG       A +4            C,+1                    ANNOUNCE WHICH PASS FOR WHICH COMPUTER.
 1930               TS              -               -               FIND COMP       C       FIND COMPUTER NAME IN DIRECTORY.
 1932               S, MON TYPER    SURCD MSG       SPRAMR +32      SM REJECT               CUSS AND ABORT IF NONEXISTENT COMPUTER.
 1934               TS              Z,X0            Z,X2            BK1 VIA X0      C
 1937               NA, CHAR1       5,2             EQUALS C1       CHECK IS                BRANCH IF ABSOLUTE DECLARATION.
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P1939   PROCEDURE FOR EQUIVALENCE DECLARATIONS.

 1940                WA         Z,X6          OCTAL 20      Z,X4
 1941   EQIV LOOP    WA         Z,X5,3        S THREE       WHODUNIT              WHEN "=" IS THE NON-BLANK TERMINATOR OF
 1943                NA         N,X5          N,X4,1        HOWZAT                THE COMPUTER NAME, THE DECLARATION IS:
 1945                NA         5,1           N,X4,2        HOWZAT                A PASS (NOT SIMULATION) FOR THE 1ST-
 1947                NA         N,X5          S FOR         EQIV LOOP             NAMED COMPUTER = THAT FOR THE 2ND-NAMED.

R1949   AT THIS POINT WE KNOW THAT ALL THE WORDS THROUGH "FOR" WERE DUPLICATED.

 1950                NA         STATS MSG     MANUS RE      C,+2
 1951                TS         MANUS EQU     STATS MSG     C,+2                  CHANGE "RE:" TO "=" (MANUFACTURING).
 1953                TX         PASSS EQU     -             STATS MSG             CHANGE "RE:" TO "=" (ASSEMBLY PASSES).
 1955                TS         Z,X5,3        -             WHOS STAT       C     DECODE SECOND COMPUTER NAME.

 1957                TX         COMP NAME     -             STATS MSG +3
 1958                S, YUL TYPER STATS MSG   A +4          C,+1                  ANNOUNCE EQUIVALENCE.
 1960                TS         Z,X2          Z,X4          FIND COMP       C     SAVE ADDR. OF 1ST NAME, FIND 2ND.
 1962                S, YUL TYPER SURCO MSG   AMTF +4       TYP ABORT             CUSS AND ABORT IF NO SUCH COMPUTER.
 19632               TS         Z,X0          Z,X2          BK1 VIA X0      C
 1964                NA         Z,X2          Z,X4          XFER STAT             BRANCH IF NAMES ARE DIFFERENT.
 1966                EX         Z,X2          S THRED 10    TEMP MSK              WHEN NAMES ARE SAME, IT MEANS THAT THE
 1968                SWS, C1T6  TEMP MSK      12,L          TEMP MSK               COMPUTER HAS STOPPED SHARING A PASS.
 1970                SWS, C1T4  TEMP MSK      24,L          TEMP MSK              MAKE 4 COPIES OF COMPUTER NAME ADDRESS.
 1972                SS         TEMP MSK      PASS MASK     2,1                   SHOW THAT COMPUTER HAS OWN VERSION.

 1974   XFER STAT    SS         2,1           PASS MASK     4,1                   TRANSFER KNOWN STATUS.

 1976                EX         PASS MASK     S PAV BITS    TEMP MSK              FORM AVAILABILITY BIT FOR THIS PASS.
 1978                S, MON TYPER W STATUS    SPRAM +8      -                     TYPE "STATUS: ".
 1980                EX         2,1           TEMP MSK      COMMON
 1981                NA         COMMON        S ZERO        C,+2
 1982                S, MON TYPER UNAVP MSG   SPRAMR +16    AC PA STAT            ANNOUNCE AND EXIT IF UNAVAILABLE.
 1984                EX         PASS MASK     PCO BITS      TEMP MSK              FORM CHECKOUT BIT FOR THE PASS.
 1986                EX         2,1           TEMP MSK      COMMON
 1987                NA         COMMON        S ZERO        C,+2
 1988                S, MON TYPER W AVALABL   SPRAMR +16    AC PA STAT            ANNOUNCE AND EXIT IF AVAILABLE.
 1990                S, MON TYPER W CHECKED   SPRAMR +16    AC PA STAT            ANNOUNCE AND EXIT IF CHECKED OUT.
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P2000   PROCEDURE FOR ABSOLUTE, RATHER THAN EQUIVALENCE, DECLARATIONS.

 2001   CHECK IS    NA              5,3             W IS            C,+2            "IS" IS OPTIONAL HERE.
 2003                TX              Z,X5,3          -               -
 2004                wA              Z,X5,3          S THREE         WHODJNIT
 2005                NA              N,X5            W AVALABL       CHK OR OBS      BRANCH IF CANNOT BE "AVAILABLE".
 2007                NA              5,1             W AVALABL +1    HOWZAT          CUSS AND ABORT IF MIS-SPELLED.
 2009                S, YUL TYPER    DCLAV MSG       AMTF +3         C,+1            TYPE "DECLARED AVAILABLE".
 2011                EX              PASS MASK       S PAV BITS      TEMP MSK        FORM AVAILABILITY BIT FOR PASS.
 2016                EX              2,1             TEMP MSK        COMMON
 2017                NA              COMMON          TEMP MSK        C,+2
 2018   TYP REDUN    S, YUL TYPER    REDUN MSG       AMTF +2         TYP ABORT       CUSS AND ABORT IF REDUNDANT.
 2020                SM              2,1             TEMP MSK        2,1
 2021                TS              -               -               AC PA STAT      SIGNAL AVAILABILITY OR CHECKOUT, EXIT.

 2023   CHK OR OBS   NA              N,X5            W CHECKED       OBSOLETE        BRANCH IF CANNOT BE "CHECKED OUT".
 2025                wA              Z,X5,3          S THREE         WHODJNIT
 2026                NA              N,X5            W OUT           HOWZAT          CUSS AND ABORT IF MIS-SPELLED.
 2028                S, YUL TYPER    DCLOK MSG       AMTF +3         C,+1            TYPE "DECLARED CHECKED OUT".
 2030                EX              PASS MASK       S PAV BITS      TEMP MSK        FORM AVAILABILITY BIT FOR THE PASS.
 2035                EX              2,1             TEMP MSK        COMMON
 2036                NA              COMMON          S ZERO          C,+2
 2037                S, YUL TYPER    NOTAV MSG       AMTF +2         TYP ABORT       CUSS AND ABORT IF NOT AVAILABLE.
 2039                EX              PASS MASK       PCO BITS        TEMP MSK        FORM CHECKOUT BIT FOR THE PASS.
 2041                TS              -               -               TYP REDUN -2

 2042   OBSOLETE     NA              N,X5,1          W OBSOLET       HOWZAT
 2043                NA              N,X5            S BLANKS        HOWZAT          CUSS AND ABORT IF NOT "OBSOLETE".
 2045                S, YUL TYPER    DCLOB MSG       AMTF +3         C,+1            TYPE "DECLARED OBSOLETE".
 2047                EX              PASS MASK       AVCO BITS       TEMP MSK        FORM AVAIL AND CHKO BITS FOR PASS.
 2051                EX              2,1             TEMP MSK        COMMON
 2052                NA              COMMON          S ZERO          C,+2            BRANCH IF NOW CALLED AVAILABLE.
 2054                S, YUL TYPER    NOTAV MSG       AMTF +2         TYP ABORT       CUSS AND ABORT OTHERWISE.
 2056                SS              S ZERO          TEMP MSK        2,1             ERASE AVAIL AND CHKO BITS, EXIT.

R2058   COMMON EXIT FOR ACCEPTANCE OF ANY PASS STATUS CHANGE.

 2059   AC PA STAT   NA, CHAR8       1,0             S ZERO          MANUF RTN       BRANCH IF SOME BACKUP ALREADY WANTED.
 2061                TS, CHAR8       S TWO           1,0             MANUF RTN       CALL FOR BACKUP LABEL AMENDMENT.
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P3000                COMMON SUBSEGMENT IN BANK 4 FOR OVERSPILL OF BANK 1.

 3001   OVERSPIL     EQUALS      AC PA STAT + L BACKUP +12          LEAVE ROOM FOR 10 PATCHES.

 3002                SETLOC.5C   OVERSPIL      B4

 3003   NUMERALS     OCT         3442 4242 34,  4040 7644 40
 3004                OCT         4452 4262 44,  2452 5252 42
 3005                OCT         2076 2430 20,  2252 5252 56
 3006                OCT         2252 5252 34,  0206 1222 42
 3007                OCT         2452 5252 24,  3452 5252 44


  END OF REVISION 19 OF PROGRAM YULPASS0 BY HB_S
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SYMBOL TABLE LISTING, INCLUDING PAGE NUMBER OF DEFINITION, AND NUMBER OF REFERENCES WITH FIRST AND LAST PAGE NUMBERS 112

THERE ARE NO SYMBOLS IN THIS ASSEMBLY.

THE ASSEMBLY WAS GOOD: MANUFACTURABLE BINARY RECORDS STORED ON EXPEROGS.