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                        /------------------------------------------------------------------------
                        /
                        /       REDAC SOFTWARE LIMITED
                        /
                        /1      SUITE           :  P.C.B. LAYOUT
                        /2      PROGRAM TITLE   :  REDAL3 MARK 5
                        /3      ROUTINE TITLE   :
                        /
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                        /
                        /4      AUTHOR          :  ORIGINAL DEVELOPMENT
                        /5      DATE            :
                        /
                        /6      PURPOSE         :
                        /
                                .EJECT
```

```
                        /
                        /7      CALLING SEQUENCE AND DESCIPTION OF ARGUMENTS :
                        /
                        /8      I/O DEVICES AND FUNCTIONS :
                        /
                        /9      REGISTERS USED :
                        /
                        /10     EXTERNAL COMMON AREAS :
                        /
                        /11     INTERNAL COMMON AREAS :
                        /
                        /12     EXTERNAL GLOBALS :
                        /
                        /13     INTERNAL GLOBALS :
                        /
                        /14     CONDITIONAL ASSEMBLY PARAMETERS :
                        /
                        /15     METHOD :
                        /
                        /16     AMENDMENTS :
                        /
                        /-------------------------------------------------------------------------
                                .EJECT
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45                      / SUBROUTINE MANHAT (COMPON(1),EOCOMP,CONNEX(1),EOCONN,
46                      / LIB(1),ROUTES(1),EOROUT,TRAKS(1),PADS(1),DISNO,OPMODE)
47                      /
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```
                                .TITLE MANHAT
                                .GLOBL MANHAT,READRT,WRITRT,SUBNOD,.DA,TREE,STATE
00000 R 740040 A    MANHAT XX
00001 R 126230 E     JMS* .DA
00002 R 600016 R     JMP .+14
00003 R 000000 A    COMPAD 0
00004 R 000000 A    EOCPAD 0
00005 R 000000 A    CONNAD 0
00006 R 000000 A    EOCNAD 0
00007 R 000000 A    LIBAD 0
00010 R 000000 A    ROUTAD 0
00011 R 000000 A    EORAD 0
00012 R 000000 A    TRKAD 0
00013 R 000000 A    PADAD 0
00014 R 000000 A    DISNAD 0 / ADDR OF SELECTED ROUTE IN D.F
00015 R 000000 A    OPMODE 0
00016 R 220010 R     LAC* ROUTAD
00017 R 040010 R     DAC ROUTAD
                    /
00020 R 206231 R     LAC (1
00021 R 066224 E     DAC* STATE / SET FLASHING MODE
00022 R 104010 R     JMS GETASS
00023 R 200012 R     LAC TRKAD
00024 R 206232 R     LAC (11
00025 R 206233 R     LAC (10
00026 R 546231 R     SAD (1
00027 R 046202 R     DAC SPACE
00030 R 104010 R     JMS GETASS
00031 R 200012 R     LAC TRKAD
00032 R 206232 R     LAC (11
00033 R 206233 R     LAC (10
00034 R 546234 R     SAD (2
00035 R 740031 A     TCA
00036 R 346202 R     TAD SPACE
00037 R 740100 A     SMA
00040 R 600044 R     JMP ASITIS
00041 R 740031 A     TCA
00042 R 346202 R     TAD SPACE
00043 R 046202 R     DAC SPACE
00044 R 206202 R    ASITIS LAC SPACE
00045 R 723061 A     AAC 61
00046 R 046202 R     DAC SPACE
                    / FIND DISNO IN CONNEX ARRAY AND CHECK FOR ROUTE
                    /
00047 R 146160 R     DZM FFLAG /CLEARD IF OK
00050 R 220015 R     LAC* OPMODE
00051 R 751100 A     SPA!CLA
00052 R 220015 R     LAC* OPMODE
00053 R 046152 R     DAC CFLAG# / -2 CHECK ONE,-1 NO OPTION,0 ALL SQUARE,1 ALL ROUND
00054 R 220015 R     LAC* OPMODE
00055 R 750230 A     SZA!CLA!IAC
00056 R 750000 A     CLA
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100         00057 R 046203 R      DA[redacted]QFLG  / [redacted]T TO ONE FOR SQUARE CHECK
101         00060 R 200000 R      LAC MANHAT
102         00061 R 040063 R      DAC PSMH
103         00062 R 741000 A      SKP
104         00063 R 740040 A     PSMH XX /THIS CONTAINS EXIT ADDRSS
105         00064 R 206235 R      LAC (TIME2
106         00065 R 040000 R      DAC MANHAT
107         00066 R 200005 R      LAC CONNAD
108         00067 R 046201 R      DAC SCANNN / SET TO CONNEXIONS
109         00070 R 360006 R      TAD* EOCNAD
110         00071 R 723777 A      AAC -1
111         00072 R 046154 R      DAC ENDKON# / 1ST FREE WORD IN CONN
112         00073 R 546201 R      SAD SCANNN#
113         00074 R 620063 R      JMP* PSMH
114         00075 R 226201 R     CLUP LAC* SCANNN
115         00076 R 506236 R      AND (777
116         00077 R 740031 A      TCA
117         00100 R 046173 R      DAC NUFCNS# / - NO OF CONNEXIONS
118         00101 R 226201 R      LAC* SCANNN
119         00102 R 506237 R      AND (777000
120         00103 R 046204 R      DAC STAW# / 1ST WORD OF PP
121         00104 R 744000 A      CLL
122         00105 R 640511 A      LRS 11
123         00106 R 046174 R      DAC OCP# /PTER. BACK TO COMP
124         00107 R 446201 R     LUPC ISZ SCANNN
125         00110 R 226201 R      LAC* SCANNN
126         00111 R 744000 A      CLL
127         00112 R 446201 R      ISZ SCANNN
128         00113 R 446201 R      ISZ SCANNN
129         00114 R 640511 A      LRS 11
130         00115 R 740031 A      TCA
131         00116 R 346174 R      TAD OCP
132         00117 R 741100 A      SPA
133         00120 R 600134 R      JMP TIME2
134         00121 R 206152 R      LAC CFLAG
135         00122 R 741100 A      SPA
136         00123 R 600130 R      JMP DISCON
137         00124 R 226201 R      LAC* SCANNN
138         00125 R 506240 R      AND (77777
139         00126 R 060014 R      DAC* DISNAD /DF. POINTER SET FOR REST OF SUBR.
140         00127 R 600161 R      JMP FOUND
141         00130 R 226201 R     DISCON LAC* SCANNN
142         00131 R 506240 R      AND (77777 / AND OUT DF POINTER
143         00132 R 560014 R      SAD* DISNAD / SEARCH FOR D.F POINTER
144         00133 R 600161 R      JMP FOUND
145         00134 R 446173 R     TIME2 ISZ NUFCNS
146         00135 R 600107 R      JMP LUPC
147         00136 R 446201 R      ISZ SCANNN
148         00137 R 206201 R      LAC SCANNN
149         00140 R 546154 R      SAD ENDKON / CHECK FOR END OF CONNS
150         00141 R 741000 A      SKP
151         00142 R 600075 R      JMP CLUP
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00143 R 206152 R     LAC CFLAG
00144 R 740100 A     SMA
00145 R 600157 R     JMP NTSIN
00146 R 206146 R     LAC ACPT#
00147 R 060014 R     DAC* DISNAD
00150 R 206160 R     LAC FFLAG
00151 R 741200 A     SNA
00152 R 620063 R     JMP* PSMH /EXIT
00153 R 220014 R     LAC* DISNAD
00154 R 740031 A     TCA
00155 R 060014 R     DAC* DISNAD /NEGATE TO SHOW FILURE
00156 R 620063 R     JMP* PSMH
00157 R 160014 R    NTSIN DZM* DISNAD /SET TO ZERO FOR CONTINUOUS MODE
00160 R 620063 R     JMP* PSMH
                     /
00161 R 206154 R    FOUND LAC ENDKON
00162 R 044126 R     DAC ENDCO
00163 R 206204 R     LAC STAW
00164 R 045016 R     DAC PP
00165 R 206174 R     LAC OCP
00166 R 744000 A     CLL
00167 R 653122 A     MUL
00170 R 000006 A     6
00171 R 641002 A     LACQ
00172 R 340003 R     TAD COMPAD
00173 R 046146 R     DAC ACPT /ABS. POINTER TO COMPONENT
00174 R 206201 R     LAC SCANNN
00175 R 723776 A     AAC -2
00176 R 046201 R     DAC SCANNN
00177 R 226201 R     LAC* SCANNN
00200 R 640506 A     LRS 6
00201 R 506241 R     AND (7
00202 R 340012 R     TAD TRKAD
00203 R 044127 R     DAC WYDE
00204 R 224127 R     LAC* WYDE
00205 R 506236 R     AND (777 /CHANGE HERE IF DIFF TRACK WIDTHS ALLOWED
00206 R 044127 R     DAC WYDE / WYDE CONTAINS WIDTH IN THOU UNITS
00207 R 226201 R     LAC* SCANNN
00210 R 506242 R     AND (77
00211 R 345016 R     TAD PP
00212 R 045016 R     DAC PP / STORE IN FIRST WORD OF PP
00213 R 044130 R     DAC PSTART / STARTING PAD
00214 R 226201 R     LAC* SCANNN
00215 R 506237 R     AND (777000
00216 R 652000 A     LMQ
00217 R 446201 R     ISZ SCANNN
00220 R 226201 R     LAC* SCANNN
00221 R 506242 R     AND (77
00222 R 640002 A     OMQ
00223 R 044131 R     DAC PFINIS / FINISHING PAD
                     /
                     / CHECK CONN ROUTED
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                                    /
00224 R 226201 R                    LAC* SCANNN
00225 R 652000 A                    LMQ
00226 R 446201 R                    ISZ SCANNN
00227 R 226201 R                    LAC* SCANNN
00230 R 744010 A                    RCL
00231 R 742010 A                    RTL
00232 R 506243 R                    AND (3
00233 R 660614 A                    LLSS 14
00234 R 741200 A                    SNA
00235 R 620000 R                    JMP* MANHAT / EXIT. NOT ROUTED
00236 R 046175 R                    DAC PNTRU#  /ROUTES POINTER
00237 R 340010 R                    TAD ROUTAD
00240 R 723776 A                    AAC -2
00241 R 066244 R                    DAC* (12 /TEMP USEAGE
00242 R 220012 A                    LAC* 12
00243 R 741100 A                    SPA   /MAY BE VALID
00244 R 600263 R                    JMP INVAL  /INVALID
00245 R 220012 A                    LAC* 12
00246 R 744000 A                    CLL
00247 R 640512 A                    LRS 12  /NO. OF WORDS
00250 R 723776 A                    AAC -2
00251 R 740031 A                    TCA
00252 R 040302 R                    DAC TARG1  /USED AS COUNT
00253 R 220012 A                    LAC* 12
00254 R 741100 A                    SPA
00255 R 600263 R                    JMP INVAL
00256 R 440302 R                    ISZ TARG1
00257 R 600253 R                    JMP .-4
00260 R 206152 R                    LAC CFLAG
00261 R 740100 A                    SMA  /SINGLE ROUTE MODE
00262 R 620000 R                    JMP* MANHAT
                                    /
                                    / NOW BUILD UP A TREE FOR ALL CONNECTED NODES
                                    /
00263 R 200003 R                    INVAL LAC COMPAD
00264 R 040302 R                    DAC TARG1
00265 R 042206 R                    DAC HAR1
00266 R 200005 R                    LAC CONNAD
00267 R 041522 R                    DAC MARG4
00270 R 040403 R                    DAC ARG3
00271 R 040303 R                    DAC TARG2
00272 R 200007 R                    LAC LIBAD
00273 R 042207 R                    DAC HAR2 / SUBNOD ARGS
00274 R 777300 A                    LAW -500
00275 R 046172 R                    DAC NTREE# / MAX ALLOWABLE TREE SIZE
00276 R 200012 R                    LAC TRKAD
00277 R 040307 R                    DAC TARG3
00300 R 126226 E                    JMS* TREE
00301 R 600310 R                    JMP .+1+6
00302 R 000000 A                    TARG1 0
00303 R 000000 A                    TARG2 0
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00304 R 005016 R      .DSA PP
00305 R 006245 R      .DSA (0 / PTR TO UNREQUIRED NODE
00306 R 006172 R      .DSA NTREE# / NO OF WORDS ON TREE
00307 R 000000 A     TARG3 0  /ADDRESS OF TRAKS(1)
                     /
                     / ALL NODES ON BOTH CONN TREES ARE NOW STORED IN PP
                     /
                     / SCAN CONN ARRAY AND MARK ALL CONNS WITH NODES ON
                     / THIS TREE BY SETTING THE TOP BIT IN THE DF ADDRESS
                     / IF NOT ON TREE CLEAR THE TOP BIT
                     /
00310 R 200005 R      LAC CONNAD
00311 R 044125 R      DAC SCAN
00312 R 206172 R      LAC NTREE
00313 R 740031 A      TCA
00314 R 044135 R      DAC CNTR / - NO OF WORDS IN PP ARRAY
00315 R 224125 R     CCCLUP LAC* SCAN
00316 R 506236 R      AND (777
00317 R 740031 A      TCA
00320 R 044124 R      DAC NOFCNS / -NO OF CONNS
00321 R 224125 R      LAC* SCAN
00322 R 506237 R      AND (777000
00323 R 652000 A      LMQ / COMP PTR STORED IN MQ
00324 R 444125 R     LUPCCC ISZ SCAN
00325 R 146160 R      DZM FFLAG#  /ZERO IF ROUTED OK.
00326 R 224125 R      LAC* SCAN
00327 R 506242 R      AND (77 / PAD NO
00330 R 640002 A      OMQ / PACK WORD
00331 R 044136 R      DAC TEMP
00332 R 444125 R      ISZ SCAN
00333 R 444125 R      ISZ SCAN / PTS AT DF WORD
00334 R 204135 R      LAC CNTR
00335 R 044137 R      DAC COUNT / LOCAL COUNTER
00336 R 206246 R      LAC (PP-1
00337 R 066233 R      DAC* (10 / AUTO INDEX REGISTER
00340 R 224125 R      LAC* SCAN
00341 R 506247 R      AND (677777 / CLEAR INDICATOR BIT
00342 R 064125 R      DAC* SCAN
00343 R 220010 A     SSLOOP LAC* 10
00344 R 544136 R      SAD TEMP
00345 R 600357 R      JMP MARK
00346 R 444137 R      ISZ COUNT
00347 R 600343 R      JMP SSLOOP
00350 R 444124 R     MARKED ISZ NOFCNS
00351 R 600324 R      JMP LUPCCC
00352 R 444125 R      ISZ SCAN
00353 R 204125 R      LAC SCAN
00354 R 544126 R      SAD ENDCO
00355 R 600363 R      JMP ALLMKD / ALL CONNEXIONS MARKED
00356 R 600315 R      JMP CCCLUP / NEXT COMPONENT
00357 R 224125 R     MARK LAC* SCAN
00360 R 346250 R      TAD (100000 / STORE MARKING BITS
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308         00361 R 064125 R      DAC [redacted]SCAN
309         00362 R 600350 R      JMP MARKED / RETURN
310                               /
311                               / ALL CONNEXIONS ON THE TREES AT BOTH ENDS OF THE
312                               / ROUTE TO BE MANHATTED ARE NOW MARKED
313                               /
314                               / GO TO HOWFAR AND SET EVERYTHING UP
315                               / FOR THE FIRST SEGMENT OF ROUTE
316                               / READ ROUTE INTO BUFFER FIRST
317                               /
318         00363 R 206175 R     ALLMKD LAC PNTRU
319         00364 R 340010 R      TAD ROUTAD
320         00365 R 723777 A      AAC -1
321         00366 R 046150 R      DAC ARG100#
322         00367 R 200011 R      LAC EORAD
323         00370 R 040400 R      DAC ARG2
324         00371 R 144137 R      DZM COUNT / DESTRUCTIVE READ OUT IND
325         00372 R 200006 R      LAC EOCNAD
326         00373 R 040404 R      DAC ARG4
327         00374 R 126223 E      JMS* READRT
328         00375 R 600405 R      JMP .+1+7
329         00376 R 006150 R     ARG1 .DSA ARG100 / ROUTES(PNTR)ADDR
330         00377 R 004660 R      .DSA R1 / 150 WORD BUFFER
331         00400 R 000000 A     ARG2 0 / EOROUT ADDR
332         00401 R 004137 R      .DSA COUNT / DESTRUCTIVE INDICATOR SET
333         00402 R 006175 R      .DSA PNTRU / POINTER
334         00403 R 000000 A     ARG3 0 / CONNEX(1)ADDR
335         00404 R 000000 A     ARG4 0 / EOCONN ADDR
336                               /
337                               / THE ROUTE TO BE MANHATTED HAS NOW BEEN DESTRUCTIVELY
338                               / READ INTO THE BUFFER R1. FIND NO OF SEGMENTS
339                               / TO DETERMINE NO OF LOOPS
340                               /
341         00405 R 204660 R      LAC R1
342         00406 R 740031 A      TCA
343         00407 R 740030 A      IAC
344         00410 R 044140 R      DAC NOSEG /-NO OF SEGMENTS
345         00411 R 146171 R      DZM NO1SEG# / 1ST SEGMENT INDICATOR
346         00412 R 206251 R      LAC (R1
347         00413 R 066244 R      DAC* (12 / USED FOR SCANNING
348         00414 R 220012 A      LAC* 12
349         00415 R 044142 R      DAC X1
350         00416 R 220012 A      LAC* 12
351         00417 R 044143 R      DAC Y1
352                               /
353                               / START STORING MANHATTED ROUTE
354                               /
355         00420 R 206252 R      LAC (MROOT
356         00421 R 066253 R      DAC* (13 / AUTO INDEX NO 13 USED FOR STORING ROUTE
357         00422 R 206231 R      LAC (1
358         00423 R 044232 R      DAC MROOT
359         00424 R 204142 R      LAC X1
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360         00425 R 060013 A     DAC* 13
361         00426 R 204143 R     LAC Y1
362         00427 R 060013 A     DAC* 13
363         00430 R 220012 A    MSEGON LAC* 12
364         00431 R 044141 R     DAC SYDE / SIDE =SYDE
365         00432 R 546231 R     SAD (1  /I.E. SIDE 2
366         00433 R 600436 R     JMP .+3
367         00434 R 206254 R     LAC (SWHA
368         00435 R 741000 A     SKP
369         00436 R 206255 R     LAC (NOP
370         00437 R 041707 R     DAC STOP  /NOP FOR SIDE1, SWHA FOR SIDE 2. USED TO GET PAD DIAM.
371         00440 R 220012 A     LAC* 12
372         00441 R 044144 R     DAC X2
373         00442 R 220012 A     LAC* 12
374         00443 R 044145 R     DAC Y2
375         00444 R 544143 R     SAD Y1
376         00445 R 600456 R     JMP GOON  /NOT ANGLED
377         00446 R 204144 R     LAC X2
378         00447 R 544142 R     SAD X1  /ANGLED
379         00450 R 600456 R     JMP GOON
380         00451 R 206152 R     LAC CFLAG
381         00452 R 546256 R     SAD (-2  /NOT CHECK MODE
382         00453 R 601474 R     JMP FAIL   /ANGLED SEGMENT AND IN CHECK MODE
383         00454 R 741200 A     SNA
384         00455 R 601474 R     JMP FAIL
385         00456 R 446171 R    GOON ISZ NO1SEG / INC SEG INDICATOR
386         00457 R 144146 R     DZM MODE / HOWFAR INDICATOR FOR
387         00460 R 101756 R     JMS HOWFAR / SETTING UP
388                             /
389                             / CHECK P T HOLE VALIDITY (IF ANY)
390                             /
391         00461 R 206231 R     LAC (1
392         00462 R 046155 R     DAC ENF1#
393         00463 R 046156 R     DAC ENF2#
394         00464 R 146153 R     DZM ENDFLG#
395         00465 R 206171 R     LAC NO1SEG
396         00466 R 546231 R     SAD (1
397         00467 R 600511 R     JMP NO1HOL / 1ST SEG SO NO PT HOLE
398         00470 R 146155 R     DZM ENF1  /NOT END SEG. OF ROUTE
399         00471 R 226244 R     LAC* (12
400         00472 R 723773 A     AAC -5
401         00473 R 044125 R     DAC SCAN
402         00474 R 224125 R     LAC* SCAN
403         00475 R 544141 R     SAD SYDE
404         00476 R 600511 R     JMP NO1HOL / NO P T HOLE
405         00477 R 204142 R     LAC X1
406         00500 R 046206 R     DAC XHOL#
407         00501 R 204143 R     LAC Y1
408         00502 R 046213 R     DAC YHOL#
409         00503 R 204144 R     LAC X2
410         00504 R 046207 R     DAC XHOL2#
411         00505 R 204145 R     LAC Y2
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00506 R 046214 R      DAC XHOL2#
00507 R 101700 R      JMS TESHOL / TEST VALIDITY
00510 R 446155 R      ISZ ENF1  /PRETEND IT END IF P.T. HOLE
00511 R 204140 R     NO1HOL LAC NOSEG
00512 R 546257 R      SAD (-1
00513 R 600535 R      JMP NO2HOL / NO PT HOLE. LAST SEGMENT
00514 R 146156 R      DZM ENF2
00515 R 226244 R      LAC* (12
00516 R 740030 A      IAC
00517 R 044125 R      DAC SCAN
00520 R 224125 R      LAC* SCAN
00521 R 544141 R      SAD SYDE
00522 R 600535 R      JMP NO2HOL / NO P T HOLE AT X2 Y2
00523 R 204142 R      LAC X1
00524 R 046207 R      DAC XHOL2
00525 R 204143 R      LAC Y1
00526 R 046214 R      DAC YHOL2
00527 R 204144 R      LAC X2
00530 R 046206 R      DAC XHOL
00531 R 204145 R      LAC Y2
00532 R 046213 R      DAC YHOL
00533 R 101700 R      JMS TESHOL / TEST VALIDITY
00534 R 446156 R      ISZ ENF2
00535 R 206231 R     NO2HOL LAC (1
00536 R 046157 R      DAC FALG# / SET INDICATOR FOR ORD. CASE
                      /
                      / SET UP ROUTE ARRAYS FROM X1Y1 AND X2Y2
                      /
00537 R 204142 R      LAC X1
00540 R 044061 R      DAC TRE1X+1
00541 R 044071 R      DAC TRE1Y+2
00542 R 204143 R      LAC Y1
00543 R 044070 R      DAC TRE1Y+1
00544 R 044062 R      DAC TRE1X+2
00545 R 204144 R      LAC X2
00546 R 044077 R      DAC TRE2X+1
00547 R 044107 R      DAC TRE2Y+2
00550 R 204145 R      LAC Y2
00551 R 044106 R      DAC TRE2Y+1
00552 R 044100 R      DAC TRE2X+2
00553 R 144060 R      DZM TRE1X
00554 R 144076 R      DZM TRE2X
00555 R 144067 R      DZM TRE1Y
00556 R 144105 R      DZM TRE2Y
00557 R 206260 R      LAC (TRE1X+3
00560 R 044120 R      DAC T1X
00561 R 206261 R      LAC (TRE1Y+3
00562 R 044121 R      DAC T1Y
00563 R 206262 R      LAC (TRE2X+3
00564 R 044122 R      DAC T2X
00565 R 206263 R      LAC (TRE2Y+3
00566 R 044123 R      DAC T2Y
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                                    /
                                    / BUILD ROUTE TREES AND TEST FOR X OVERS
                                    /
00567 R 777774 A     LAW -4
00570 R 044151 R     DAC CCNTRR
00571 R 206231 R     LAC (1
00572 R 044150 R     DAC YIND / INDICATES FOR HOWFAR. NOTE
00573 R 206234 R     LAC (2 / REVERSED XIND YIND BEFORE
00574 R 044147 R     DAC XIND / ENTRY
00575 R 204150 R    STRTRR LAC YIND
00576 R 652000 A     LMQ
00577 R 204147 R     LAC XIND
00600 R 044150 R     DAC YIND
00601 R 641002 A     LACQ
00602 R 044147 R     DAC XIND / XIND AND YIND REVERSED
                    /
00603 R 204147 R     LAC XIND
00604 R 044146 R     DAC MODE
00605 R 206155 R     LAC ENF1
00606 R 046153 R     DAC ENDFLG
00607 R 204060 R     LAC TRE1X
00610 R 741100 A     SPA / -VE IF LAST SEG WAS ZERO
00611 R 600634 R     JMP ENT2
00612 R 204120 R     LAC T1X
00613 R 723776 A     AAC -2
00614 R 040625 R     DAC X1ARG1
00615 R 740030 A     IAC
00616 R 040626 R     DAC X1ARG2
00617 R 206264 R     LAC (FINX-1
00620 R 344146 R     TAD MODE
00621 R 044134 R     DAC MZATT
00622 R 224134 R     LAC* MZATT
00623 R 040627 R     DAC X1ARG3
00624 R 101756 R     JMS HOWFAR
00625 R 000000 A    X1ARG1 0
00626 R 000000 A    X1ARG2 0
00627 R 000000 A    X1ARG3 0
00630 R 064120 R     DAC* T1X
00631 R 444120 R     ISZ T1X
00632 R 444060 R     ISZ TRE1X
00633 R 100766 R     JMS CROSS1 / CROSSOVER TEST NO1
                    /
00634 R 204150 R    ENT2 LAC YIND
00635 R 044146 R     DAC MODE
00636 R 206156 R     LAC ENF2
00637 R 046153 R     DAC ENDFLG
00640 R 204105 R     LAC TRE2Y
00641 R 741100 A     SPA
00642 R 600665 R     JMP ENT3
00643 R 204123 R     LAC T2Y
00644 R 723776 A     AAC -2
00645 R 040656 R     DAC Y2ARG1
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```
00646 R 740030 A      IAC
00647 R 040657 R      DAC Y2ARG2
00650 R 206265 R      LAC (STRX-1
00651 R 344146 R      TAD MODE
00652 R 044134 R      DAC MZATT
00653 R 224134 R      LAC* MZATT
00654 R 040660 R      DAC Y2ARG3
00655 R 101756 R      JMS HOWFAR
00656 R 000000 A     Y2ARG1 0
00657 R 000000 A     Y2ARG2 0
00660 R 000000 A     Y2ARG3 0
00661 R 064123 R      DAC* T2Y
00662 R 444123 R      ISZ T2Y
00663 R 444105 R      ISZ TRE2Y
00664 R 101057 R      JMS CROSS2 / LOOK FOR CROSSOVER
                     /
                     / NEXT TWO TREES
                     /
00665 R 204121 R     ENT3 LAC T1Y
00666 R 723776 A      AAC -2
00667 R 040705 R      DAC Y1ARG1
00670 R 740030 A      IAC
00671 R 040706 R      DAC Y1ARG2
00672 R 206155 R      LAC ENF1
00673 R 046153 R      DAC ENDFLG
00674 R 204067 R      LAC TRE1Y
00675 R 741100 A      SPA
00676 R 600714 R      JMP ENT4
00677 R 206264 R      LAC (FINX-1
00700 R 344146 R      TAD MODE
00701 R 044134 R      DAC MZATT
00702 R 224134 R      LAC* MZATT
00703 R 040707 R      DAC Y1ARG3
00704 R 101756 R      JMS HOWFAR / MODE IS AS ABOVE
00705 R 000000 A     Y1ARG1 0
00706 R 000000 A     Y1ARG2 0
00707 R 000000 A     Y1ARG3 0
00710 R 064121 R      DAC* T1Y
00711 R 444121 R      ISZ T1Y
00712 R 444067 R      ISZ TRE1Y
00713 R 101076 R      JMS CROSS3
                     /
00714 R 204147 R     ENT4 LAC XIND
00715 R 044146 R      DAC MODE
00716 R 206156 R      LAC ENF2
00717 R 046153 R      DAC ENDFLG
00720 R 204076 R      LAC TRE2X
00721 R 741100 A      SPA
00722 R 600745 R      JMP ENT5
00723 R 204122 R      LAC T2X
00724 R 723776 A      AAC -2
00725 R 040736 R      DAC X2ARG1
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00726 R 740030 A      IAC
00727 R 040737 R      DAC X2ARG2
00730 R 206265 R      LAC (STRX-1
00731 R 344146 R      TAD MODE
00732 R 044134 R      DAC MZATT
00733 R 224134 R      LAC* MZATT
00734 R 040740 R      DAC X2ARG3
00735 R 101756 R      JMS HOWFAR
00736 R 000000 A     X2ARG1 0
00737 R 000000 A     X2ARG2 0
00740 R 000000 A     X2ARG3 0
00741 R 064122 R      DAC* T2X
00742 R 444122 R      ISZ T2X
00743 R 444076 R      ISZ TRE2X
00744 R 101115 R      JMS CROSS4
00745 R 146155 R     ENT5 DZM ENF1
00746 R 146156 R      DZM ENF2
00747 R 444151 R      ISZ CCNTRR
00750 R 600575 R      JMP STRTRR / CONTINUE
00751 R 601474 R      JMP FAIL
                     /
                     / CROSS OVER TESTS. WORK BY TRYING LAST
                     / SEGMENT AGAINST COMPLETE TREES ON OTHER NODE
                     /
00752 R 740040 A     ZADD XX
00753 R 723775 A      AAC -3
00754 R 044134 R      DAC CRPT
00755 R 224134 R      LAC* CRPT
00756 R 044154 R      DAC Z1
00757 R 444134 R      ISZ CRPT
00760 R 224134 R      LAC* CRPT
00761 R 044156 R      DAC W
00762 R 444134 R      ISZ CRPT
00763 R 224134 R      LAC* CRPT
00764 R 044155 R      DAC Z2
00765 R 620752 R      JMP* ZADD
                     /
                     / ZADD IS A SMALL SET UP ROUTINE USED BY ALL XOVER TESTS
                     /
00766 R 740040 A     CROSS1 XX
00767 R 206266 R      LAC (TRE1X
00770 R 044157 R      DAC ZSCAN2 / BASE ADD OF 1ST TREE
00771 R 206231 R      LAC (1
00772 R 044152 R      DAC ZIND1 / 1ST TREE IS X TREE
00773 R 204120 R      LAC T1X / POINTER
00774 R 100752 R      JMS ZADD / READ LAST SEGMENT
00775 R 544154 R      SAD Z1
00776 R 741000 A      SKP
00777 R 601003 R      JMP NOT0X1 / LAST SEG NON ZERO
01000 R 204060 R      LAC TRE1X
01001 R 740031 A      TCA   /IF ZERO
01002 R 044060 R      DAC TRE1X / NEGATE POINTER
```

```
                                    /
                                    / IF MODE IS 1 LAST SEG IS X IE W IS A Y VALUE
                                    / ELSE IF MODE=2 IT IS A YSEGMENT
                                    /
01003 R 101005 R                    NOT0X1 JMS NOD1TS / NODE 1 TESTS
01004 R 620766 R                     JMP* CROSS1
                                    /
                                    / END OF FIRST X OVER TEST
                                    /
                                    / EXTRA ROUTINES FOR TESTING
                                    /
01005 R 740040 A                    NOD1TS XX
01006 R 204146 R                     LAC MODE
01007 R 723777 A                     AAC -1
01010 R 740200 A                     SZA
01011 R 601022 R                     JMP Y1SEG
01012 R 206231 R                     LAC (1
01013 R 044153 R                     DAC ZIND2
01014 R 206267 R                     LAC (TRE2X / X TREE
01015 R 101134 R                     JMS ZAME / X SEG TESTED ON X TREE
01016 R 444153 R                     ISZ ZIND2
01017 R 206270 R                     LAC (TRE2Y
01020 R 101175 R                     JMS ZOPP / X SEG Y TREE
01021 R 621005 R                     JMP* NOD1TS / EXIT
01022 R 206231 R                    Y1SEG LAC (1
01023 R 044153 R                     DAC ZIND2
01024 R 206267 R                     LAC (TRE2X
01025 R 101175 R                     JMS ZOPP / Y SEG X TREE
01026 R 444153 R                     ISZ ZIND2
01027 R 206270 R                     LAC (TRE2Y
01030 R 101134 R                     JMS ZAME / YSEG YTREE
01031 R 621005 R                     JMP* NOD1TS / EXIT
                                    /
01032 R 740040 A                    NOD2TS XX
01033 R 204146 R                     LAC MODE
01034 R 723777 A                     AAC -1
01035 R 740200 A                     SZA
01036 R 601047 R                     JMP Y2SEG
01037 R 206231 R                     LAC (1
01040 R 044152 R                     DAC ZIND1
01041 R 206266 R                     LAC (TRE1X
01042 R 101134 R                     JMS ZAME
01043 R 444152 R                     ISZ ZIND1
01044 R 206271 R                     LAC (TRE1Y
01045 R 101175 R                     JMS ZOPP
01046 R 621032 R                     JMP* NOD2TS
01047 R 206231 R                    Y2SEG LAC (1
01050 R 044152 R                     DAC ZIND1
01051 R 206266 R                     LAC (TRE1X
01052 R 101175 R                     JMS ZOPP / YSEG XTREE
01053 R 444152 R                     ISZ ZIND1
01054 R 206271 R                     LAC (TRE1Y
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01055 R 101134 R     JMS ZAME / YSEG YTREE
01056 R 621032 R     JMP* NOD2TS / EXIT
                     /
01057 R 740040 A    CROSS2 XX
01060 R 206270 R     LAC (TRE2Y
01061 R 044157 R     DAC ZSCAN2 / 1ST ARRAY BASE
01062 R 206234 R     LAC (2
01063 R 044153 R     DAC ZIND2 / Y TREE
01064 R 204123 R     LAC T2Y
01065 R 100752 R     JMS ZADD / SET UP Z1,Z2,AND W
01066 R 544154 R     SAD Z1
01067 R 741000 A     SKP
01070 R 601074 R     JMP NOT0Y2 / LAST SEG NON ZERO
01071 R 204105 R     LAC TRE2Y
01072 R 740031 A     TCA
01073 R 044105 R     DAC TRE2Y / NEGATE PTR
01074 R 101032 R    NOT0Y2 JMS NOD2TS / NODE 2 TEST
01075 R 621057 R     JMP* CROSS2
                     /
                     / END OF 2ND TEST
                     /
01076 R 740040 A    CROSS3 XX
01077 R 206271 R     LAC (TRE1Y
01100 R 044157 R     DAC ZSCAN2
01101 R 206234 R     LAC (2
01102 R 044152 R     DAC ZIND1 / Y TREE
01103 R 204121 R     LAC T1Y
01104 R 100752 R     JMS ZADD
01105 R 544154 R     SAD Z1
01106 R 741000 A     SKP
01107 R 601113 R     JMP NOT0Y1
01110 R 204067 R     LAC TRE1Y
01111 R 740031 A     TCA
01112 R 044067 R     DAC TRE1Y / NEGATED PTR
01113 R 101005 R    NOT0Y1 JMS NOD1TS
01114 R 621076 R     JMP* CROSS3
                     /
                     / END OF THIRD TEST
                     /
01115 R 740040 A    CROSS4 XX
01116 R 206267 R     LAC (TRE2X
01117 R 044157 R     DAC ZSCAN2
01120 R 206231 R     LAC (1
01121 R 044153 R     DAC ZIND2 / X TREE
01122 R 204122 R     LAC T2X
01123 R 100752 R     JMS ZADD
01124 R 544154 R     SAD Z1
01125 R 741000 A     SKP
01126 R 601132 R     JMP NOT0X2
01127 R 204076 R     LAC TRE2X
01130 R 740031 A     TCA
01131 R 044076 R     DAC TRE2X / NEGATED PTR
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724         01132 R 101032 R     NOT[redacted] JMS NOD[redacted]
725         01133 R 621115 R      JMP* CROSS4
726                               /
727                               / LIST OF TREE VERSUS SEGMENT CROSS OVER ROUTINES
728                               /
729         01134 R 740040 A     ZAME XX / X SEG AND X TREE (OR YANDY)
730         01135 R 046222 R      DAC ZSCAN1# / STORE PNTR
731         01136 R 226222 R      LAC* ZSCAN1
732         01137 R 741200 A      SNA
733         01140 R 621134 R      JMP* ZAME / NO SEGS TO TEST
734         01141 R 740100 A      SMA  /NEGATE UNLESS
735         01142 R 740031 A      TCA  /ALREADY NEGATED
736         01143 R 044160 R      DAC NOSEGS / -NO OF SEGS
737         01144 R 206222 R      LAC ZSCAN1
738         01145 R 740030 A      IAC
739         01146 R 044125 R      DAC SCAN
740         01147 R 224125 R      LAC* SCAN
741         01150 R 044161 R      DAC XX1 / STARTING X OR Y VALUE
742         01151 R 444125 R      ISZ SCAN
743         01152 R 224125 R      LAC* SCAN
744         01153 R 044163 R      DAC YY1 / STARTING Y OR X VALUE
745         01154 R 444125 R     ZAMLUP ISZ SCAN
746         01155 R 224125 R      LAC* SCAN
747         01156 R 044162 R      DAC XX2 / SECOND Y OR X VALUE
748         01157 R 444160 R      ISZ NOSEGS
749         01160 R 741000 A      SKP
750         01161 R 621134 R      JMP* ZAME / ONLY ONE SEGMENT
751         01162 R 204162 R      LAC XX2
752         01163 R 044161 R      DAC XX1
753         01164 R 444125 R      ISZ SCAN
754         01165 R 224125 R      LAC* SCAN
755         01166 R 044164 R      DAC YY2
756         01167 R 101236 R      JMS BASIC / BASIC X OVER TEST
757         01170 R 204164 R      LAC YY2
758         01171 R 044163 R      DAC YY1
759         01172 R 444160 R      ISZ NOSEGS
760         01173 R 601154 R      JMP ZAMLUP
761         01174 R 621134 R      JMP* ZAME
762                               /
763         01175 R 740040 A     ZOPP XX / X SEG AND Y TREE OR VICE VERSA
764         01176 R 046222 R      DAC ZSCAN1
765         01177 R 226222 R      LAC* ZSCAN1
766         01200 R 741200 A      SNA
767         01201 R 621175 R      JMP* ZOPP / NO SEGS TO TEST
768         01202 R 740100 A      SMA
769         01203 R 740031 A      TCA
770         01204 R 044160 R      DAC NOSEGS / -NO OF SEGS
771         01205 R 206222 R      LAC ZSCAN1
772         01206 R 740030 A      IAC
773         01207 R 044125 R      DAC SCAN
774         01210 R 224125 R      LAC* SCAN
775         01211 R 044163 R      DAC YY1 / STARTING X OR Y VALUE
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 776          01212 R 444125 R      ISZ SCAN
 777          01213 R 224125 R      LAC* SCAN
 778          01214 R 044161 R      DAC XX1 / STARTING X OR Y VALUE
 779          01215 R 444125 R     ZOPLUP ISZ SCAN
 780          01216 R 224125 R      LAC* SCAN
 781          01217 R 044164 R      DAC YY2
 782          01220 R 204161 R      LAC XX1
 783          01221 R 044162 R      DAC XX2
 784          01222 R 101236 R      JMS BASIC / X OVER TEST
 785          01223 R 204164 R      LAC YY2
 786          01224 R 044163 R      DAC YY1
 787          01225 R 444160 R      ISZ NOSEGS
 788          01226 R 741000 A      SKP
 789          01227 R 621175 R      JMP* ZOPP
 790          01230 R 444125 R      ISZ SCAN
 791          01231 R 224125 R      LAC* SCAN
 792          01232 R 044161 R      DAC XX1
 793          01233 R 444160 R      ISZ NOSEGS
 794          01234 R 601215 R      JMP ZOPLUP
 795          01235 R 621175 R      JMP* ZOPP
 796                                /
 797                                / BASIC CROSS OVER TEST
 798                                /
 799          01236 R 740040 A     BASIC XX
 800          01237 R 101254 R      JMS BETWEN
 801          01240 R 004161 R      .DSA XX1
 802          01241 R 004154 R      .DSA Z1
 803          01242 R 004155 R      .DSA Z2
 804          01243 R 740200 A      SZA
 805          01244 R 621236 R      JMP* BASIC
 806          01245 R 101254 R      JMS BETWEN
 807          01246 R 004156 R      .DSA W
 808          01247 R 004163 R      .DSA YY1
 809          01250 R 004164 R      .DSA YY2
 810          01251 R 740200 A      SZA
 811          01252 R 621236 R      JMP* BASIC
 812          01253 R 601316 R      JMP MRUTED / CROSS OVER FOUND
 813                                /
 814                                / NOTE THAT MODE DETERMINES THE TYPE (X OR Y) OF THE
 815                                / Z1 TO Z2 SEGMENT. ALSO ZIND1 AND ZIND2 TELL THE
 816                                / TYPE OF EACH END. THUS THE ROUTE IS DETERMINED
 817                                /
 818                                /
 819                                / SUBROUTINE BETWEN. DETECTS WHETHER 1ST ARG IS BETWEEN OR=
 820                                / THE NEXT TWO. IF IT IS RETURNS WITH AC=0. ELSE NON ZERO
 821                                /
 822                                / CALL IS JMS BETWEN
 823                                / .DSA Z1
 824                                / .DSA Z2
 825                                / .DSA Z3
 826          01254 R 740040 A     BETWEN XX
 827          01255 R 221254 R      LAC* BETWEN
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 828          01256 R 041310 R      DA[redacted]ZAT
 829          01257 R 221310 R      LAC* MZAT
 830          01260 R 740031 A      TCA
 831          01261 R 041311 R      DAC XYZTST / - FIRST ARG
 832          01262 R 201254 R      LAC BETWEN
 833          01263 R 506240 R      AND (77777
 834          01264 R 066272 R      DAC* (15
 835          01265 R 220015 A      LAC* 15
 836          01266 R 041310 R      DAC MZAT
 837          01267 R 221310 R      LAC* MZAT
 838          01270 R 341311 R      TAD XYZTST
 839          01271 R 741200 A      SNA
 840          01272 R 601313 R      JMP ZERR1
 841          01273 R 041312 R      DAC XYZSMP
 842          01274 R 220015 A      LAC* 15
 843          01275 R 041310 R      DAC MZAT
 844          01276 R 221310 R      LAC* MZAT
 845          01277 R 341311 R      TAD XYZTST
 846          01300 R 741200 A      SNA
 847          01301 R 620015 A      JMP* 15
 848                                / TEST FOR IDENTICAL LENGTHS (ZERO LENG. SEGS)
 849          01302 R 541312 R      SAD XYZSMP
 850          01303 R 620015 A      JMP* 15
 851          01304 R 241312 R      XOR XYZSMP / TEST SIGNS
 852          01305 R 741100 A      SPA
 853          01306 R 750000 A      CLA
 854          01307 R 620015 A      JMP* 15
 855          01310 R 740040 A     MZAT XX
 856          01311 R 740040 A     XYZTST XX
 857          01312 R 740040 A     XYZSMP XX
 858          01313 R 220015 A     ZERR1 LAC* 15
 859          01314 R 750000 A      CLA
 860          01315 R 620015 A      JMP* 15
 861                                /
 862                                / FIND THE COMPLETE ROUTE AND STORE IN PP ARRAY
 863                                /
 864          01316 R 204146 R     MRUTED LAC MODE
 865          01317 R 546231 R      SAD (1
 866          01320 R 601326 R      JMP .+1+5
 867          01321 R 204161 R      LAC XX1 / DETERMINE THE CROSS
 868          01322 R 044170 R      DAC YCROSS / OVER COORDINATES
 869          01323 R 204156 R      LAC W / XCROSS
 870          01324 R 044167 R      DAC XCROSS / AND
 871          01325 R 601332 R      JMP .+1+4 / YCROSS
 872          01326 R 204161 R      LAC XX1
 873          01327 R 044167 R      DAC XCROSS
 874          01330 R 204156 R      LAC W
 875          01331 R 044170 R      DAC YCROSS
 876          01332 R 204152 R      LAC ZIND1
 877          01333 R 546234 R      SAD (2
 878          01334 R 601351 R      JMP QY1
 879          01335 R 206273 R      LAC (TRE1X+1
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 880          01336 R 652000 A      LMQ
 881          01337 R 206274 R      LAC (PP
 882          01340 R 101525 R      JMS QXPAK
 883          01341 R 204153 R     Q2 LAC ZIND2
 884          01342 R 546234 R      SAD (2
 885          01343 R 601356 R      JMP QY2
 886          01344 R 206275 R      LAC (TRE2X+1
 887          01345 R 652000 A      LMQ
 888          01346 R 206276 R      LAC (PP+100
 889          01347 R 101525 R      JMS QXPAK
 890          01350 R 601362 R      JMP RPAKK
 891          01351 R 206277 R     QY1 LAC (TRE1Y+1
 892          01352 R 652000 A      LMQ
 893          01353 R 206274 R      LAC (PP
 894          01354 R 101612 R      JMS QYPAK
 895          01355 R 601341 R      JMP Q2
 896          01356 R 206300 R     QY2 LAC (TRE2Y+1
 897          01357 R 652000 A      LMQ
 898          01360 R 206276 R      LAC (PP+100
 899          01361 R 101612 R      JMS QYPAK
 900          01362 R 205016 R     RPAKK LAC PP
 901          01363 R 744010 A      RCL / *2
 902          01364 R 345016 R      TAD PP / *3
 903          01365 R 346274 R      TAD (PP
 904          01366 R 066233 R      DAC* (10 / FIRST FREE WORD -1
 905          01367 R 205116 R      LAC PP+100
 906          01370 R 723777 A      AAC -1
 907          01371 R 044165 R      DAC NPOINTS / NO OF SEGS IN SECOND PART
 908          01372 R 345016 R      TAD PP
 909          01373 R 045016 R      DAC PP
 910                               /
 911                               / INVERT SECOND PART OF ROUTE
 912                               /
 913          01374 R 204165 R     RPKLUP LAC NPOINTS
 914          01375 R 744010 A      RCL / *2
 915          01376 R 344165 R      TAD NPOINTS
 916          01377 R 346276 R      TAD (PP+100
 917          01400 R 723775 A      AAC -3
 918          01401 R 066232 R      DAC* (11
 919          01402 R 220011 A      LAC* 11 / SIDE
 920          01403 R 060010 A      DAC* 10
 921          01404 R 220011 A      LAC* 11 / X
 922          01405 R 060010 A      DAC* 10
 923          01406 R 220011 A      LAC* 11 / Y
 924          01407 R 060010 A      DAC* 10
 925          01410 R 204165 R      LAC NPOINTS
 926          01411 R 723777 A      AAC -1
 927          01412 R 044165 R      DAC NPOINTS
 928          01413 R 740200 A      SZA
 929          01414 R 601374 R      JMP RPKLUP
 930                               /
 931                               / ROUTE IS NOW IN PP ARRAY. STORE IN MROUTE
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                                        /
01415 R 205016 R                        LAC PP / NO OF NEW POINTS
01416 R 344232 R                        TAD MROOT
01417 R 723777 A                        AAC -1
01420 R 044232 R                        DAC MROOT
01421 R 723703 A                        AAC -75 / CHECK AGAINST 61 POINTS
01422 R 740100 A                        SMA
01423 R 601474 R                        JMP FAIL
01424 R 205016 R                        LAC PP
01425 R 746010 A                        CLL!RTL / *4
01426 R 740001 A                        CMA
01427 R 723004 A                        AAC 4
01430 R 345016 R                        TAD PP / NO OF PTS TO COPY
01431 R 044165 R                        DAC NPOINTS / -NO OF NEW SEGS
01432 R 206301 R                        LAC (PP+3
01433 R 066232 R                        DAC* (11
01434 R 220011 A                    STORLP LAC* 11
01435 R 060013 A                        DAC* 13
01436 R 444165 R                        ISZ NPOINTS
01437 R 601434 R                        JMP STORLP
                                        /
                                        / NOW GO TO NEXT SEGMENT
                                        /
01440 R 204144 R                        LAC X2
01441 R 044142 R                        DAC X1
01442 R 204145 R                        LAC Y2
01443 R 044143 R                        DAC Y1
01444 R 444140 R                        ISZ NOSEG
01445 R 600430 R                        JMP MSEGON
                                        /
                                        / ROOT IS NOW MANHATTED AND PACKED IN MROOT ARRAY
                                        / IF MANHAT HAS FAILED IT IS IN R1 ARRAY
                                        /
                                        /
                                        / WRITE ROUTE INTO PP ARRAY TO CHECK ITS SIZE
                                        /
01446 R 206252 R                        LAC (MROOT
01447 R 041460 R                        DAC MPOSS+1
01450 R 206274 R                        LAC (PP
01451 R 046167 R                        DAC MPOSS0#
01452 R 144165 R                        DZM NPOINTS / USED TO COUNT SIZE OF ROUTE
01453 R 200005 R                        LAC CONNAD
01454 R 041462 R                        DAC MPOSS+3
01455 R 126227 E                        JMS* WRITRT
01456 R 601465 R                        JMP .+1+6
01457 R 006167 R                    MPOSS .DSA MPOSS0 / ROT
01460 R 000000 A                        0 / MROOT
01461 R 004165 R                        .DSA NPOINTS / COUNTER
01462 R 000000 A                        0 / CONNAD
01463 R 006245 R                        .DSA (0 / PSEUDO END OF CONNS
01464 R 006245 R                        .DSA (0 / PSEUDO D F NO
01465 R 204165 R                        LAC NPOINTS
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 984         01466 R 723741 A     AAC -37 / COMPARE WITH 30
 985         01467 R 740100 A     SMA
 986         01470 R 601474 R     JMP FAIL / >30 IS FAILURE
 987                              /
 988                              /
 989         01471 R 206252 R     LAC (MROOT
 990         01472 R 146160 R     DZM FFLAG   /ZERO IF ROUTE VALID
 991         01473 R 601501 R     JMP .+6
 992         01474 R 204140 R    FAIL LAC NOSEG
 993         01475 R 344660 R     TAD R1
 994         01476 R 740001 A     CMA    /-(SEGMENT NO.+1)
 995         01477 R 046160 R     DAC FFLAG  /IF INVALID
 996         01500 R 206251 R     LAC (R1
 997         01501 R 041520 R     DAC MARG2
 998         01502 R 200010 R     LAC ROUTAD
 999         01503 R 360011 R     TAD* EORAD
1000         01504 R 723777 A     AAC -1
1001         01505 R 046164 R     DAC MARG10#
1002         01506 R 200011 R     LAC EORAD
1003         01507 R 041521 R     DAC MARG3
1004         01510 R 200006 R     LAC EOCNAD
1005         01511 R 041523 R     DAC MARG5
1006         01512 R 200014 R     LAC DISNAD
1007         01513 R 041524 R     DAC MARG6
1008                              /
1009                              / ARGS FOR WRITRT SET UP.
1010                              / STORE ROUTE FAIL OR NO FAIL
1011                              /
1012         01514 R 206160 R     LAC FFLAG
1013         01515 R 126227 E     JMS* WRITRT
1014         01516 R 620000 R     JMP* MANHAT
1015         01517 R 006164 R    MARG1 .DSA MARG10 / ROUTES(EOROUT) ADDR
1016         01520 R 000000 A    MARG2 0 / ROOT(1) ADDR (EQUIV)
1017         01521 R 000000 A    MARG3 0 / EOROUT ADDR
1018         01522 R 000000 A    MARG4 0 / CONNAD
1019         01523 R 000000 A    MARG5 0 / EOCNAD
1020         01524 R 000000 A    MARG6 0 / DISNAD
1021                              /
1022                              / END OF MANHAT
1023                              /
1024                              /
1025                              / SUBROUTINES TO UNPACK TREES INTO PP ARRAY
1026                              /
1027         01525 R 740040 A    QXPAK XX
1028         01526 R 044166 R     DAC POINT / ADDR OF PP OR PP+100
1029         01527 R 066302 R     DAC* (16
1030         01530 R 641002 A     LACQ / ADDR OF TREE
1031         01531 R 044125 R     DAC SCAN
1032         01532 R 204141 R     LAC SIDE
1033         01533 R 060016 A     DAC* 16
1034         01534 R 224125 R     LAC* SCAN
1035         01535 R 060016 A     DAC* 16
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1036        01536 R 044142 R     DA[redacted]
1037        01537 R 444125 R     ISZ SCAN
1038        01540 R 224125 R     LAC* SCAN
1039        01541 R 060016 A     DAC* 16
1040        01542 R 044143 R     DAC Y1
1041        01543 R 164166 R     DZM* POINT
1042        01544 R 464166 R     ISZ* POINT
1043        01545 R 444125 R    QXLUP ISZ SCAN
1044        01546 R 224125 R     LAC* SCAN
1045        01547 R 044142 R     DAC X1
1046        01550 R 204141 R     LAC SYDE
1047        01551 R 060016 A     DAC* 16
1048        01552 R 204143 R     LAC Y1
1049        01553 R 544170 R     SAD YCROSS / CHECK FOR CROSSOVER
1050        01554 R 601577 R     JMP QXYS
1051        01555 R 204142 R     LAC X1
1052        01556 R 060016 A     DAC* 16
1053        01557 R 204143 R     LAC Y1
1054        01560 R 060016 A     DAC* 16
1055        01561 R 464166 R     ISZ* POINT
1056        01562 R 444125 R     ISZ SCAN / POINTS TO NEXT WORD IN TREE
1057        01563 R 204141 R     LAC SYDE
1058        01564 R 060016 A     DAC* 16
1059        01565 R 224125 R     LAC* SCAN
1060        01566 R 044143 R     DAC Y1
1061        01567 R 204142 R     LAC X1
1062        01570 R 544167 R     SAD XCROSS
1063        01571 R 601605 R     JMP QYXS
1064        01572 R 060016 A     DAC* 16
1065        01573 R 204143 R     LAC Y1
1066        01574 R 060016 A     DAC* 16
1067        01575 R 464166 R     ISZ* POINT
1068        01576 R 601545 R     JMP QXLUP
1069        01577 R 204167 R    QXYS LAC XCROSS
1070        01600 R 060016 A     DAC* 16
1071        01601 R 204143 R     LAC Y1
1072        01602 R 060016 A     DAC* 16
1073        01603 R 464166 R     ISZ* POINT
1074        01604 R 621525 R     JMP* QXPAK
1075        01605 R 060016 A    QYXS DAC* 16
1076        01606 R 204170 R     LAC YCROSS
1077        01607 R 060016 A     DAC* 16
1078        01610 R 464166 R     ISZ* POINT
1079        01611 R 621525 R     JMP* QXPAK
1080                            /
1081        01612 R 740040 A    QYPAK XX
1082        01613 R 044166 R     DAC POINT
1083        01614 R 066302 R     DAC* (16
1084        01615 R 641002 A     LACQ
1085        01616 R 044125 R     DAC SCAN
1086        01617 R 204141 R     LAC SYDE / SYDE=SIDE
1087        01620 R 060016 A     DAC* 16
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1088        01621 R 224125 R     LAC* SCAN
1089        01622 R 044143 R     DAC Y1
1090        01623 R 444125 R     ISZ SCAN
1091        01624 R 224125 R     LAC* SCAN
1092        01625 R 044142 R     DAC X1
1093        01626 R 060016 A     DAC* 16
1094        01627 R 204143 R     LAC Y1
1095        01630 R 060016 A     DAC* 16
1096        01631 R 164166 R     DZM* POINT
1097        01632 R 464166 R     ISZ* POINT
1098        01633 R 444125 R    QYLUP ISZ SCAN
1099        01634 R 224125 R     LAC* SCAN
1100        01635 R 044143 R     DAC Y1
1101        01636 R 204141 R     LAC SYDE
1102        01637 R 060016 A     DAC* 16
1103        01640 R 204142 R     LAC X1
1104        01641 R 544167 R     SAD XCROSS
1105        01642 R 601665 R     JMP QXYE
1106        01643 R 060016 A     DAC* 16
1107        01644 R 204143 R     LAC Y1
1108        01645 R 060016 A     DAC* 16
1109        01646 R 464166 R     ISZ* POINT
1110        01647 R 444125 R     ISZ SCAN
1111        01650 R 204141 R     LAC SYDE
1112        01651 R 060016 A     DAC* 16
1113        01652 R 224125 R     LAC* SCAN
1114        01653 R 044142 R     DAC X1
1115        01654 R 204143 R     LAC Y1
1116        01655 R 544170 R     SAD YCROSS
1117        01656 R 601672 R     JMP QYXE
1118        01657 R 204142 R     LAC X1
1119        01660 R 060016 A     DAC* 16
1120        01661 R 204143 R     LAC Y1
1121        01662 R 060016 A     DAC* 16
1122        01663 R 464166 R     ISZ* POINT
1123        01664 R 601633 R     JMP QYLUP
1124        01665 R 060016 A    QXYE DAC* 16
1125        01666 R 204170 R     LAC YCROSS
1126        01667 R 060016 A     DAC* 16
1127        01670 R 464166 R     ISZ* POINT
1128        01671 R 621612 R     JMP* QYPAK
1129        01672 R 204167 R    QYXE LAC XCROSS
1130        01673 R 060016 A     DAC* 16
1131        01674 R 204143 R     LAC Y1
1132        01675 R 060016 A     DAC* 16
1133        01676 R 464166 R     ISZ* POINT
1134        01677 R 621612 R     JMP* QYPAK
1135                            /
1136                            / SUBROUTINE TESHOL. TESTS P T HOLE VALIDITY.
1137                            /
1138        01700 R 740040 A    TESHOL XX
1139        01701 R 206231 R     LAC (1
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1140        01702 R 044146 R     DAC MODE
1141        01703 R 146157 R     DZM FALG / VALIDITY IND SET FOR SPECIAL CASE
1142        01704 R 204127 R     LAC WYDE
1143        01705 R 046205 R     DAC WYDEST# / TEMP STORE
1144        01706 R 206303 R     LAC (002001
1145        01707 R 740040 A    STOP XX /NOP FOR SIDE 1, SWHA FOR SIDE 2
1146        01710 R 506236 R     AND (777
1147        01711 R 046163 R     DAC LAYER#
1148        01712 R 104010 R     JMS GETASS
1149        01713 R 200013 R     LAC PADAD
1150        01714 R 206304 R     LAC (40
1151        01715 R 206245 R     LAC (0
1152        01716 R 546163 R     SAD LAYER
1153        01717 R 044127 R     DAC WYDE  /PT HOLE DIAM IN THOU
1154        01720 R 740031 A     TCA
1155        01721 R 346205 R     TAD WYDEST
1156        01722 R 741100 A     SPA
1157        01723 R 601726 R     JMP .+3
1158        01724 R 206205 R     LAC WYDEST
1159        01725 R 044127 R     DAC WYDE
1160        01726 R 101756 R     JMS HOWFAR
1161        01727 R 006206 R     .DSA XHOL
1162        01730 R 006213 R     .DSA YHOL
1163        01731 R 006207 R     .DSA XHOL2
1164        01732 R 546206 R     SAD XHOL
1165        01733 R 741000 A     SKP
1166        01734 R 601740 R     JMP .+1+3
1167        01735 R 206157 R     LAC FALG / IS FALG SET
1168        01736 R 740200 A     SZA
1169        01737 R 601474 R     JMP FAIL / P T HOLE IS INVALID.
1170        01740 R 444146 R     ISZ MODE
1171        01741 R 101756 R     JMS HOWFAR
1172        01742 R 006213 R     .DSA YHOL
1173        01743 R 006206 R     .DSA XHOL
1174        01744 R 006214 R     .DSA YHOL2
1175        01745 R 546213 R     SAD YHOL
1176        01746 R 741000 A     SKP
1177        01747 R 601753 R     JMP .+1+3
1178        01750 R 206157 R     LAC FALG
1179        01751 R 740200 A     SZA
1180        01752 R 601474 R     JMP FAIL
1181        01753 R 206205 R     LAC WYDEST / PICK UP WIDTH
1182        01754 R 044127 R     DAC WYDE
1183        01755 R 621700 R     JMP* TESHOL
1184                            /
1185                            / SUBROUTINE HOWFAR. JUST HOW FAR CAN YOU GO ?
1186                            /
1187        01756 R 740040 A    HOWFAR XX
1188                            /
1189                            / FIRST ARG IS Y OR X OF STARTING POINT
1190                            / NEXT IS CORRESPONDING X OR Y
1191                            / THIRD ARG IS TARGET (EG X2 FOR XSEG FROM X1)
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1192                                / MODE INDICATES:
1193                                / 0 FOR SET UP. READS NO ARGS IF MODE=0
1194                                / 1 FOR X SEGMENT
1195                                / 2 FOR Y SEGMENT
1196                                / HOWFAR USES BETWEN TO TEST PAD POSITIONS
1197                                /
1198        01757 R 204146 R         LAC MODE
1199        01760 R 740200 A         SZA
1200        01761 R 603043 R         JMP HWORK / NOT FOR SETTING UP
1201                                /
1202                                / SET UP SECTION
1203                                /
1204                                / DETERMINE WHETHER X2>X1,Y2>Y1
1205                                /
1206        01762 R 204144 R         LAC X2
1207        01763 R 740031 A         TCA
1208        01764 R 344142 R         TAD X1
1209        01765 R 740100 A         SMA
1210        01766 R 601773 R         JMP HOTHER
1211        01767 R 204142 R         LAC X1 / X2>X1
1212        01770 R 652000 A         LMQ
1213        01771 R 204144 R         LAC X2
1214        01772 R 601776 R         JMP .+1+3
1215        01773 R 204144 R        HOTHER LAC X2 / X2<X1
1216        01774 R 652000 A         LMQ
1217        01775 R 204142 R         LAC X1
1218        01776 R 723014 A         AAC 14 / 300 THOU=12 UNITS
1219        01777 R 044175 R         DAC XU
1220        02000 R 641002 A         LACQ
1221        02001 R 723764 A         AAC -14
1222        02002 R 044173 R         DAC XL
1223                                /
1224        02003 R 204145 R         LAC Y2
1225        02004 R 740031 A         TCA
1226        02005 R 344143 R         TAD Y1
1227        02006 R 740100 A         SMA
1228        02007 R 602014 R         JMP HYOTH
1229        02010 R 204143 R         LAC Y1 / Y2>Y1
1230        02011 R 652000 A         LMQ
1231        02012 R 204145 R         LAC Y2
1232        02013 R 602017 R         JMP .+1+3
1233        02014 R 204145 R        HYOTH LAC Y2 / Y1>Y2
1234        02015 R 652000 A         LMQ
1235        02016 R 204143 R         LAC Y1
1236        02017 R 723014 A         AAC 14
1237        02020 R 044176 R         DAC YU
1238        02021 R 641002 A         LACQ
1239        02022 R 723764 A         AAC -14
1240        02023 R 044174 R         DAC YL
1241                                /
1242                                / SCAN ALL COMPONENTS AND CHECK PAD POSITIONS
1243                                /
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1244        02024 R 206274 R     LAC [redacted]P
1245        02025 R 044202 R     DAC HSCAN / PAD STORING POINTER
1246        02026 R 144200 R     DZM RELPT6 / REL PTR TO COMP /6
1247        02027 R 204130 R     LAC PSTART
1248        02030 R 102173 R     JMS ZUBNOD
1249        02031 R 202214 R     LAC XP
1250        02032 R 046211 R     DAC XPSTAR#
1251        02033 R 202215 R     LAC YP
1252        02034 R 046217 R     DAC YPSTAR#
1253        02035 R 204131 R     LAC PFINIS
1254        02036 R 102173 R     JMS ZUBNOD
1255        02037 R 202214 R     LAC XP
1256        02040 R 046210 R     DAC XPFINI#
1257        02041 R 202215 R     LAC YP
1258        02042 R 046215 R     DAC YPFINI# / STARTING AND FINISHING COORDINATES
1259        02043 R 204200 R    HCOMLP LAC RELPT6
1260        02044 R 744010 A     RCL
1261        02045 R 344200 R     TAD RELPT6
1262        02046 R 744010 A     RCL /*6
1263        02047 R 740030 A     IAC
1264        02050 R 046177 R     DAC RELPT# / REL PTR
1265        02051 R 560004 R     SAD* EOCPAD
1266        02052 R 602216 R     JMP HROUTE / EXIT NO COMPS LEFT
1267        02053 R 340003 R     TAD COMPAD
1268        02054 R 346234 R     TAD (2 / PTR TO LIBRARY
1269        02055 R 044177 R     DAC HZOT
1270        02056 R 224177 R     LAC* HZOT
1271        02057 R 741200 A     SNA
1272        02060 R 602171 R     JMP HCEND / DELETED COMP
1273        02061 R 506236 R     AND (777 / REL LIB ADDR
1274        02062 R 340007 R     TAD LIBAD
1275        02063 R 723777 A     AAC -1
1276        02064 R 044177 R     DAC HZOT / ABS ADDR OF LIB
1277                            /
1278                            / FIND ALL COMP PADS AND CHECK AGAINST XLYL XU YU
1279                            /
1280        02065 R 224177 R     LAC* HZOT / NO OF LIB WORDS
1281        02066 R 723775 A     AAC -3
1282        02067 R 044177 R     DAC HZOT
1283        02070 R 744010 A     RCL / *2
1284        02071 R 344177 R     TAD HZOT / *3
1285        02072 R 744020 A     RCR
1286        02073 R 744020 A     RCR / DIVIDED BY 4
1287        02074 R 044201 R     DAC NPADS / NP=(NW-3)*3/4
1288        02075 R 204200 R     LAC RELPT6
1289        02076 R 660711 A     ALSS 11 / SHIFT TO TOP 9 BITS
1290        02077 R 044177 R     DAC HZOT
1291        02100 R 204201 R    HLUP LAC NPADS
1292        02101 R 741200 A     SNA
1293        02102 R 602171 R     JMP HCEND / NO PADS LEFT
1294        02103 R 344177 R     TAD HZOT / PACKED PNTR AND PAD
1295        02104 R 064202 R     DAC* HSCAN
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1296                                    /
1297                                    / CHECK AGAINST STARTING AND FINISHING PADS
1298                                    /
1299          02105 R 544130 R           SAD PSTART / TEST AGAINST STARTING PAD
1300          02106 R 602165 R           JMP PADEND
1301          02107 R 544131 R           SAD PFINIS / TEST AGAINST FINISHING PAD
1302          02110 R 602165 R           JMP PADEND
1303          02111 R 102173 R           JMS ZUBNOD / LOCAL SUBNOD CALL RETURNS
1304          02112 R 226305 R           LAC* (17 / PAD TYPE
1305          02113 R 741200 A           SNA
1306          02114 R 602165 R           JMP PADEND / IDNORE TYPE 0 PADS
1307          02115 R 202214 R           LAC XP / XP AND YP
1308          02116 R 546211 R           SAD XPSTAR
1309          02117 R 741000 A           SKP
1310          02120 R 602124 R           JMP NO2SY1 / NOT ON PAD 1
1311          02121 R 202215 R           LAC YP
1312          02122 R 546217 R           SAD YPSTAR
1313          02123 R 602165 R           JMP PADEND / IDENTICAL X,Y
1314          02124 R 202214 R          NO2SY1 LAC XP
1315          02125 R 546210 R           SAD XPFINI
1316          02126 R 741000 A           SKP
1317          02127 R 602133 R           JMP NO2SY2
1318          02130 R 202215 R           LAC YP
1319          02131 R 546215 R           SAD YPFINI
1320          02132 R 602165 R           JMP PADEND / IDENTICAL X,Y
1321          02133 R 202214 R          NO2SY2 LAC XP / START RECTANGLE TEST
1322          02134 R 740031 A           TCA
1323          02135 R 044134 R           DAC MZATT / - XP
1324          02136 R 344173 R           TAD XL
1325          02137 R 740100 A           SMA
1326          02140 R 602165 R           JMP PADEND
1327          02141 R 204134 R           LAC MZATT
1328          02142 R 344175 R           TAD XU
1329          02143 R 741100 A           SPA
1330          02144 R 602165 R           JMP PADEND
1331          02145 R 202215 R           LAC YP
1332          02146 R 740031 A           TCA
1333          02147 R 044134 R           DAC MZATT / - YP
1334          02150 R 344174 R           TAD YL
1335          02151 R 740100 A           SMA
1336          02152 R 602165 R           JMP PADEND
1337          02153 R 204134 R           LAC MZATT
1338          02154 R 344176 R           TAD YU
1339          02155 R 740100 A           SMA
1340          02156 R 444202 R           ISZ HSCAN / STORE POINTER TO PAD IN PP
1341                                    /
1342                                    / CHECK PP FOR OVERFLOW: LEAVE 4 CLEAR WORDS
1343                                    /
1344          02157 R 204202 R           LAC HSCAN
1345          02160 R 740001 A           CMA
1346          02161 R 346274 R           TAD (PP
1347          02162 R 346306 R           TAD (1125 / 600-3-1FROM CMA NOT TCA
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1348        02163 R 741100 A     SP[redacted]
1349        02164 R 601474 R     JMP FAIL
1350        02165 R 204201 R    PADEND LAC NPADS
1351        02166 R 723777 A     AAC -1
1352        02167 R 044201 R     DAC NPADS
1353        02170 R 602100 R     JMP HLUP
1354        02171 R 444200 R    HCEND ISZ RELPT6
1355        02172 R 602043 R     JMP HCOMLP / CONTINUE
1356                            /
1357                            / LOCAL SUBNOD CALL
1358                            /
1359        02173 R 740040 A    ZUBNOD XX
1360        02174 R 652000 A     LMQ
1361        02175 R 506242 R     AND (77
1362        02176 R 042213 R     DAC HPIN / PAD NUMBER
1363        02177 R 750000 A     CLA
1364        02200 R 660611 A     LLSS 11
1365        02201 R 042212 R     DAC HCOMPT / COMP PTR / 6
1366        02202 R 126225 E     JMS* SUBNOD
1367        02203 R 622173 R     JMP* ZUBNOD
1368        02204 R 002214 R     .DSA XP
1369        02205 R 002215 R     .DSA YP
1370        02206 R 000000 A    HAR1 0 / COMPAD
1371        02207 R 000000 A    HAR2 0 / LIBAD
1372        02210 R 002212 R     .DSA HCOMPT
1373        02211 R 002213 R     .DSA HPIN
1374        02212 R 740040 A    HCOMPT XX
1375        02213 R 740040 A    HPIN XX
1376        02214 R 740040 A    XP XX
1377        02215 R 740040 A    YP XX
1378                            /
1379                            / ROUTINE FOR CHECKING ROUTES
1380                            /
1381        02216 R 204202 R    HROUTE LAC HSCAN
1382        02217 R 044204 R     DAC HRSTRT / PTR TO 1ST FREE WORD IN PP
1383                            /
1384        02220 R 200005 R     LAC CONNAD
1385        02221 R 044214 R     DAC CSCAN / CONNEXION SCAN
1386        02222 R 224214 R    HCLOOP LAC* CSCAN
1387        02223 R 652000 A     LMQ
1388        02224 R 506236 R     AND (777
1389        02225 R 740031 A     TCA
1390        02226 R 044124 R     DAC NOFCNS / -NO OF CONNS
1391        02227 R 660611 A     LLSS 11
1392        02230 R 506236 R     AND (777
1393        02231 R 046161 R     DAC HPNT1# / POINTER / 6
1394        02232 R 444214 R    HCLUP ISZ CSCAN
1395        02233 R 224214 R     LAC* CSCAN
1396        02234 R 640511 A     LRS 11
1397        02235 R 506236 R     AND (777
1398        02236 R 740031 A     TCA
1399        02237 R 346161 R     TAD HPNT1
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1400        02240 R 741100 A      SPA
1401        02241 R 602267 R      JMP HNOT
1402        02242 R 224214 R      LAC* CSCAN
1403        02243 R 640711 A      ALS 11 / 9 BITS
1404        02244 R 506307 R      AND (700000 / WIDTH IN TOP 3 BITS
1405        02245 R 044213 R      DAC WIDE / WIDTH OF ROUTE
1406        02246 R 444214 R      ISZ CSCAN
1407        02247 R 224214 R      LAC* CSCAN
1408        02250 R 652000 A      LMQ
1409        02251 R 444214 R      ISZ CSCAN
1410        02252 R 224214 R      LAC* CSCAN
1411        02253 R 506250 R      AND (100000
1412        02254 R 740200 A      SZA
1413        02255 R 602271 R      JMP HNOT+2 / IGNORE CONNEXION ON TREE
1414        02256 R 224214 R      LAC* CSCAN
1415        02257 R 744010 A      RCL
1416        02260 R 742010 A      RTL
1417        02261 R 506243 R      AND (3
1418        02262 R 660614 A      LLSS 14 / ROUTES PNTR IN AC
1419        02263 R 741200 A      SNA
1420        02264 R 602271 R      JMP HNOT+2 / CONNEXION NOT ROUTED
1421        02265 R 102303 R      JMS RTEST
1422        02266 R 602271 R      JMP .+1+2
1423        02267 R 444214 R    HNOT ISZ CSCAN
1424        02270 R 444214 R      ISZ CSCAN
1425        02271 R 444124 R      ISZ NOFCNS
1426        02272 R 602232 R      JMP HCLUP
1427        02273 R 444214 R      ISZ CSCAN
1428        02274 R 204214 R      LAC CSCAN
1429        02275 R 544126 R      SAD ENDCO / END CONNEX CHECK
1430        02276 R 741000 A      SKP
1431        02277 R 602222 R      JMP HCLOOP
1432        02300 R 204202 R      LAC HSCAN
1433        02301 R 044203 R      DAC HREND
1434        02302 R 621756 R      JMP* HOWFAR / EXIT INSTRUCTION
1435                              /
1436                              / SUBROUTINE RTEST. TESTS A ROUTE TO SEE IF
1437                              / ANY OF IT LIES INSIDE THE RECTANGLE DEFINED BY
1438                              / XL YL XU YU. OFFENDING SEGS STORED IN PP. IF PP
1439                              / ARRAY IS TOO SMALL MANHAT FAILS.
1440                              /
1441        02303 R 740040 A    RTEST XX
1442        02304 R 340010 R      TAD ROUTAD
1443        02305 R 723777 A      AAC -1
1444        02306 R 046162 R      DAC H10000#
1445        02307 R 200011 R      LAC EORAD
1446        02310 R 042315 R      DAC H2
1447        02311 R 126223 E      JMS* READRT
1448        02312 R 602322 R      JMP .+1+7
1449        02313 R 006162 R    H1 .DSA H10000
1450        02314 R 004522 R       .DSA ROT
1451        02315 R 000000 A    H2 0
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1452          02316 R 006231 R      .D[illegible] (1
1453          02317 R 002317 R      . / DUMMY ARG1
1454          02320 R 002320 R      . / DUMMY ARG2
1455          02321 R 002321 R      . / DUMMY ARG3
1456          02322 R 204522 R      LAC ROT
1457          02323 R 740001 A      CMA
1458          02324 R 346234 R      TAD (2
1459          02325 R 044212 R      DAC HSEGS / -NO OF SEGMENTS
1460          02326 R 144216 R      DZM HSTRT
1461          02327 R 206310 R      LAC (ROT
1462          02330 R 066311 R      DAC* (14 / A.I. NO 14
1463          02331 R 220014 A      LAC* 14
1464          02332 R 044205 R      DAC HX1
1465          02333 R 220014 A      LAC* 14
1466          02334 R 044206 R      DAC HY1
1467          02335 R 220014 A     HRUTLP LAC* 14
1468          02336 R 044211 R      DAC HSIDE
1469          02337 R 220014 A      LAC* 14
1470          02340 R 044207 R      DAC HX2
1471          02341 R 220014 A      LAC* 14
1472          02342 R 044210 R      DAC HY2
1473          02343 R 602354 R      JMP XOVATS / X OVER TEST. UGH
1474          02344 R 444216 R     XOUT ISZ HSTRT / STARTING INDICATOR
1475          02345 R 204207 R      LAC HX2
1476          02346 R 044205 R      DAC HX1
1477          02347 R 204210 R      LAC HY2
1478          02350 R 044206 R      DAC HY1
1479          02351 R 444212 R      ISZ HSEGS
1480          02352 R 602335 R      JMP HRUTLP
1481          02353 R 622303 R      JMP* RTEST
1482                                /
1483                                / 1ST CROSS OVER TEST ROUTINE
1484                                /
1485          02354 R 204211 R     XOVATS LAC HSIDE
1486          02355 R 544141 R      SAD SIDE / CHECK SIDE
1487          02356 R 741000 A      SKP
1488          02357 R 602344 R      JMP XOUT / OPP SIDES WHEW
1489                                /
1490                                / RECTANGLE TEST. Y VALS FIRST
1491                                /
1492          02360 R 204206 R      LAC HY1
1493          02361 R 740031 A      TCA
1494          02362 R 344210 R      TAD HY2
1495          02363 R 042524 R      DAC DELTAY
1496          02364 R 740100 A      SMA
1497          02365 R 602401 R      JMP Y2BIG
1498          02366 R 204206 R      LAC HY1 / Y1>Y2
1499          02367 R 740031 A      TCA
1500          02370 R 344174 R      TAD YL
1501          02371 R 740100 A      SMA
1502          02372 R 602344 R      JMP XOUT / NO CROSS Y1>YL
1503          02373 R 204176 R      LAC YU
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1504        02374 R 740031 A      TCA
1505        02375 R 344210 R      TAD HY2
1506        02376 R 740100 A      SMA
1507        02377 R 602344 R      JMP XOUT / NO CROSS Y2>YU
1508        02400 R 602413 R      JMP XSTST / TEST X VALS
1509        02401 R 204210 R     Y2BIG LAC HY2 / Y2>Y1
1510        02402 R 740031 A      TCA
1511        02403 R 344174 R      TAD YL
1512        02404 R 740100 A      SMA
1513        02405 R 602344 R      JMP XOUT / NO CROSS Y2<YL
1514        02406 R 204176 R      LAC YU
1515        02407 R 740031 A      TCA
1516        02410 R 344206 R      TAD HY1
1517        02411 R 740100 A      SMA
1518        02412 R 602344 R      JMP XOUT / NO CROSS Y1>YU
1519                             /
1520                             /
1521                             / REPEAT FOR X VALUES
1522                             /
1523        02413 R 204205 R     XSTST LAC HX1
1524        02414 R 740031 A      TCA
1525        02415 R 344207 R      TAD HX2
1526        02416 R 042526 R      DAC DELTAX
1527        02417 R 740100 A      SMA
1528        02420 R 602434 R      JMP X2BIG
1529        02421 R 204205 R      LAC HX1 / X1>X2
1530        02422 R 740031 A      TCA
1531        02423 R 344173 R      TAD XL
1532        02424 R 740100 A      SMA
1533        02425 R 602344 R      JMP XOUT / NO CROSS X1<XL
1534        02426 R 204175 R      LAC XU
1535        02427 R 740031 A      TCA
1536        02430 R 344207 R      TAD HX2
1537        02431 R 740100 A      SMA
1538        02432 R 602344 R      JMP XOUT / NO CROSS Y2>YU
1539        02433 R 602446 R      JMP ANGLE / ANGLE TEST
1540        02434 R 204207 R     X2BIG LAC HX2
1541        02435 R 740031 A      TCA
1542        02436 R 344173 R      TAD XL
1543        02437 R 740100 A      SMA
1544        02440 R 602344 R      JMP XOUT / NO CROSS X2<XL
1545        02441 R 204175 R      LAC XU
1546        02442 R 740031 A      TCA
1547        02443 R 344205 R      TAD HX1
1548        02444 R 740100 A      SMA
1549        02445 R 602344 R      JMP XOUT / NO CROSS X1>XU
1550                             /
1551                             / ANGLED LINE TEST
1552                             /
1553        02446 R 202526 R     ANGLE LAC DELTAX
1554        02447 R 741200 A      SNA
1555        02450 R 602753 R      JMP CROSS / VERTICAL LINE. CROSS
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1556          02451 R 202524 R      LA[redacted]DELTAY
1557          02452 R 741200 A      SNA
1558          02453 R 602753 R      JMP CROSS / HORIZONTAL LINE CROSS
1559                                /
1560          02454 R 204173 R      LAC XL
1561          02455 R 740031 A      TCA
1562          02456 R 044132 R      DAC BASEX
1563          02457 R 204174 R      LAC YL
1564          02460 R 740031 A      TCA
1565          02461 R 044133 R      DAC BASEY
1566                                /
1567          02462 R 204175 R      LAC XU
1568          02463 R 344132 R      TAD BASEX
1569          02464 R 046212 R      DAC XUX#
1570          02465 R 204176 R      LAC YU
1571          02466 R 344133 R      TAD BASEY
1572          02467 R 046221 R      DAC YUX#
1573          02470 R 204205 R      LAC HX1
1574          02471 R 344132 R      TAD BASEX
1575          02472 R 044226 R      DAC TX1
1576          02473 R 204207 R      LAC HX2
1577          02474 R 344132 R      TAD BASEX
1578          02475 R 044227 R      DAC TX2
1579          02476 R 204206 R      LAC HY1
1580          02477 R 344133 R      TAD BASEY
1581          02500 R 044230 R      DAC TY1
1582          02501 R 204210 R      LAC HY2
1583          02502 R 344133 R      TAD BASEY
1584          02503 R 044231 R      DAC TY2
1585                                /
1586                                / WORK OUT THE EQUATION OF THE LINE IN THE FORM
1587                                / Y=MX+C IF DELTAX>DELTAY AND
1588                                / X=MY+C IF DELTAY>DELTAX
1589                                /
1590          02504 R 144217 R      DZM HHIND
1591          02505 R 202526 R      LAC DELTAX
1592          02506 R 741100 A      SPA
1593          02507 R 102652 R      JMS NEGAT / NEGATE
1594          02510 R 042526 R      DAC DELTAX
1595          02511 R 202524 R      LAC DELTAY
1596          02512 R 741100 A      SPA
1597          02513 R 102652 R      JMS NEGAT
1598          02514 R 042524 R      DAC DELTAY
1599          02515 R 740031 A      TCA
1600          02516 R 342526 R      TAD DELTAX
1601          02517 R 741100 A      SPA
1602          02520 R 602722 R      JMP TOPSY / XCH DELTAX AND DELTAY ETC
1603          02521 R 206212 R     TURVY LAC XUX
1604          02522 R 744000 A      CLL
1605          02523 R 653122 A      MUL
1606          02524 R 000000 A     DELTAY 0
1607          02525 R 640323 A      DIV
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1608          02526 R 000000 A    DELTAX 0
1609          02527 R 641002 A     LACQ
1610          02530 R 046170 R     DAC MXUX# / MX PART. MAG ONLY
1611          02531 R 204217 R     LAC HHIND
1612          02532 R 506231 R     AND (1
1613          02533 R 741200 A     SNA / CHECKS SIGN OF DELTAS
1614          02534 R 602540 R     JMP .+1+3
1615          02535 R 206170 R     LAC MXUX
1616          02536 R 740031 A     TCA
1617          02537 R 046170 R     DAC MXUX / MX. MAG AND SIGN
1618                              /
1619                              / WORK OUT C=(X1Y2-X2Y1)/(X1-X2)
1620                              /
1621          02540 R 144134 R     DZM TOP
1622          02541 R 144215 R     DZM BOTT
1623          02542 R 204231 R     LAC TY2
1624          02543 R 652000 A     LMQ
1625          02544 R 204226 R     LAC TX1
1626          02545 R 102656 R     JMS MULTT
1627          02546 R 204227 R     LAC TX2
1628          02547 R 652000 A     LMQ
1629          02550 R 204230 R     LAC TY1
1630          02551 R 740031 A     TCA
1631          02552 R 102656 R     JMS MULTT / 36 BIT NO COMPLETE
1632          02553 R 144217 R     DZM HHIND
1633          02554 R 204227 R     LAC TX2
1634          02555 R 740031 A     TCA
1635          02556 R 344226 R     TAD TX1
1636          02557 R 741100 A     SPA
1637          02560 R 102652 R     JMS NEGAT
1638          02561 R 042604 R     DAC DELX
1639          02562 R 204215 R     LAC BOTT
1640          02563 R 652000 A     LMQ
1641          02564 R 204134 R     LAC TOP
1642          02565 R 740100 A     SMA
1643          02566 R 602602 R     JMP TOPPOS
1644          02567 R 444217 R     ISZ HHIND
1645          02570 R 740001 A     CMA
1646          02571 R 044134 R     DAC TOP
1647          02572 R 204215 R     LAC BOTT
1648          02573 R 744000 A     CLL
1649          02574 R 740031 A     TCA
1650          02575 R 741400 A     SZL
1651          02576 R 444134 R     ISZ TOP
1652          02577 R 740000 A     NOP
1653          02600 R 652000 A     LMQ
1654          02601 R 204134 R     LAC TOP / 36 BIT NO IN AC AND MQ
1655          02602 R 744000 A    TOPPOS CLL
1656          02603 R 640323 A     DIV
1657          02604 R 000000 A    DELX 0
1658          02605 R 641002 A     LACQ
1659          02606 R 046151 R     DAC CCC# / CONSTANT
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1660          02607 R 204217 R      LA[redacted]HIND
1661          02610 R 506231 R      AND (1
1662          02611 R 741200 A      SNA
1663          02612 R 602616 R      JMP .+1+3
1664          02613 R 206151 R      LAC CCC
1665          02614 R 740031 A      TCA
1666          02615 R 046151 R      DAC CCC
1667          02616 R 206221 R      LAC YUX
1668          02617 R 740031 A      TCA
1669          02620 R 046221 R      DAC YUX / - YUX
1670                                /
1671                                / ALL VARIABLES ARE NOW AVAILABLE
1672                                /
1673          02621 R 206151 R      LAC CCC
1674          02622 R 740100 A      SMA
1675          02623 R 602637 R      JMP REVERSE
1676          02624 R 346221 R      TAD YUX
1677          02625 R 740100 A      SMA
1678          02626 R 602753 R      JMP CROSS
1679          02627 R 346170 R      TAD MXUX
1680          02630 R 740100 A      SMA
1681          02631 R 602753 R      JMP CROSS
1682          02632 R 206151 R      LAC CCC
1683          02633 R 346170 R      TAD MXUX
1684          02634 R 740100 A      SMA
1685          02635 R 602753 R      JMP CROSS
1686          02636 R 602344 R      JMP XOUT
1687          02637 R 346221 R     REVERSE TAD YUX
1688          02640 R 741100 A      SPA
1689          02641 R 602753 R      JMP CROSS
1690          02642 R 346170 R      TAD MXUX
1691          02643 R 741100 A      SPA
1692          02644 R 602753 R      JMP CROSS
1693          02645 R 206151 R      LAC CCC
1694          02646 R 346170 R      TAD MXUX
1695          02647 R 741100 A      SPA
1696          02650 R 602753 R      JMP CROSS
1697          02651 R 602344 R      JMP XOUT
1698                                /
1699          02652 R 740040 A     NEGAT XX
1700          02653 R 740031 A      TCA
1701          02654 R 444217 R      ISZ HHIND
1702          02655 R 622652 R      JMP* NEGAT
1703                                /
1704          02656 R 740040 A     MULTT XX
1705          02657 R 144217 R      DZM HHIND
1706          02660 R 741100 A      SPA
1707          02661 R 102652 R      JMS NEGAT
1708          02662 R 042670 R      DAC MULXX
1709          02663 R 641002 A      LACQ
1710          02664 R 741100 A      SPA
1711          02665 R 102652 R      JMS NEGAT
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1712          02666 R 744000 A      CLL
1713          02667 R 653122 A      MUL
1714          02670 R 000000 A     MULXX 0
1715          02671 R 042670 R      DAC MULXX
1716          02672 R 204217 R      LAC HHIND
1717          02673 R 506231 R      AND (1
1718          02674 R 741200 A      SNA
1719          02675 R 602720 R      JMP RESTT
1720          02676 R 202670 R      LAC MULXX
1721          02677 R 740001 A      CMA / INVERT
1722          02700 R 042670 R      DAC MULXX
1723          02701 R 641002 A      LACQ
1724          02702 R 740031 A      TCA
1725          02703 R 741400 A      SZL
1726          02704 R 442670 R      ISZ MULXX
1727          02705 R 740000 A      NOP
1728          02706 R 744000 A      CLL
1729          02707 R 344215 R     RESXIN TAD BOTT
1730          02710 R 741400 A      SZL
1731          02711 R 442670 R      ISZ MULXX
1732          02712 R 740000 A      NOP
1733          02713 R 044215 R      DAC BOTT
1734          02714 R 202670 R      LAC MULXX
1735          02715 R 344134 R      TAD TOP
1736          02716 R 044134 R      DAC TOP
1737          02717 R 622656 R      JMP* MULTT
1738          02720 R 641002 A     RESTT LACQ
1739          02721 R 602707 R      JMP RESXIN
1740                                /
1741          02722 R 202526 R     TOPSY LAC DELTAX
1742          02723 R 652000 A      LMQ
1743          02724 R 202524 R      LAC DELTAY
1744          02725 R 042526 R      DAC DELTAX
1745          02726 R 641002 A      LACQ
1746          02727 R 042524 R      DAC DELTAY
1747          02730 R 204226 R      LAC TX1
1748          02731 R 652000 A      LMQ
1749          02732 R 204230 R      LAC TY1
1750          02733 R 044226 R      DAC TX1
1751          02734 R 641002 A      LACQ
1752          02735 R 044230 R      DAC TY1
1753          02736 R 204227 R      LAC TX2
1754          02737 R 652000 A      LMQ
1755          02740 R 204231 R      LAC TY2
1756          02741 R 044227 R      DAC TX2
1757          02742 R 641002 A      LACQ
1758          02743 R 044231 R      DAC TY2
1759          02744 R 206212 R      LAC XUX
1760          02745 R 652000 A      LMQ
1761          02746 R 206221 R      LAC YUX
1762          02747 R 046212 R      DAC XUX
1763          02750 R 641002 A      LACQ
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1764        02751 R 046221 R     DA[redacted]X
1765        02752 R 602521 R     JMP [redacted]URVY
1766                             /
1767                             / UPDATE PROCEDURE FOR CRITICAL ROUTES
1768                             /
1769        02753 R 146165 R    CROSS DZM MARK1#
1770        02754 R 146166 R     DZM MARK2#
1771        02755 R 226311 R     LAC* (14
1772        02756 R 723773 A     AAC -5 / LAST SIDE PNTR
1773        02757 R 044134 R     DAC TOP
1774        02760 R 204216 R     LAC HSTRT / INDICATES FIRST SEG (0) OR NOT 1ST SEG (>0)
1775        02761 R 740200 A     SZA  /FIRST SEGMENT
1776        02762 R 602766 R     JMP .+4
1777        02763 R 206312 R     LAC (2000
1778        02764 R 046165 R     DAC MARK1
1779        02765 R 602773 R     JMP STX1
1780        02766 R 224134 R     LAC* TOP
1781        02767 R 544211 R     SAD HSIDE
1782        02770 R 603035 R     JMP STX12
1783        02771 R 206312 R     LAC (2000 / PT HOLE INDICATOR
1784        02772 R 046165 R     DAC MARK1  /OFFSET TRACK IF PT. HOLE
1785        02773 R 344205 R    STX1 TAD HX1
1786        02774 R 344213 R     TAD WIDE / WIDE CONTAINS WIDTH IN TOP 3 BITS
1787        02775 R 064202 R     DAC* HSCAN
1788        02776 R 444202 R     ISZ HSCAN
1789        02777 R 204206 R     LAC HY1
1790        03000 R 346165 R     TAD MARK1
1791        03001 R 064202 R     DAC* HSCAN
1792        03002 R 444202 R     ISZ HSCAN
1793        03003 R 204134 R     LAC TOP
1794        03004 R 723006 A     AAC 6
1795        03005 R 044134 R     DAC TOP
1796        03006 R 204212 R     LAC HSEGS
1797        03007 R 546257 R     SAD (-1 / CHECK FOR LAST SEG
1798        03010 R 603037 R     JMP STX23
1799        03011 R 224134 R     LAC* TOP
1800        03012 R 544211 R     SAD HSIDE
1801        03013 R 603041 R     JMP STX22 / NO PT HOLE
1802        03014 R 206312 R     LAC (2000
1803        03015 R 046166 R     DAC MARK2
1804        03016 R 344207 R    STX2 TAD HX2
1805        03017 R 064202 R     DAC* HSCAN
1806        03020 R 444202 R     ISZ HSCAN
1807        03021 R 204210 R     LAC HY2
1808        03022 R 346166 R     TAD MARK2
1809        03023 R 064202 R     DAC* HSCAN
1810        03024 R 444202 R     ISZ HSCAN
1811        03025 R 204202 R     LAC HSCAN
1812        03026 R 723004 A     AAC 4
1813        03027 R 740031 A     TCA
1814        03030 R 346274 R     TAD (PP
1815        03031 R 346313 R     TAD (1130 / TEST FOR END OF PP ARRAY
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1816          03032 R 741100 A      SPA
1817          03033 R 601474 R      JMP FAIL
1818          03034 R 602344 R      JMP XOUT
1819          03035 R 750000 A     STX12 CLA
1820          03036 R 602773 R      JMP STX1
1821          03037 R 206312 R     STX23 LAC (2000
1822          03040 R 046166 R      DAC MARK2
1823          03041 R 750000 A     STX22 CLA
1824          03042 R 603016 R      JMP STX2
1825                               /
1826                               / HOWFAR ENTRY(EFFECTIVE)WHEN MODE=1 OR 2
1827                               /
1828          03043 R 221756 R     HWORK LAC* HOWFAR
1829          03044 R 041310 R      DAC MZAT
1830          03045 R 221310 R      LAC* MZAT
1831          03046 R 044220 R      DAC ZXS / STARTING X OR Y VALUE
1832          03047 R 441756 R      ISZ HOWFAR
1833          03050 R 221756 R      LAC* HOWFAR
1834          03051 R 041310 R      DAC MZAT
1835          03052 R 221310 R      LAC* MZAT
1836          03053 R 044221 R      DAC ZYS / OTHER STARTING CO ORD
1837          03054 R 441756 R      ISZ HOWFAR
1838          03055 R 221756 R      LAC* HOWFAR
1839          03056 R 041310 R      DAC MZAT
1840          03057 R 221310 R      LAC* MZAT
1841          03060 R 044222 R      DAC ZXE
1842          03061 R 044223 R      DAC ZEND / VALUE TO BE CALCULATED
1843          03062 R 441756 R      ISZ HOWFAR / RETURN ADDRESS
1844                               /
1845          03063 R 204220 R      LAC ZXS
1846          03064 R 740031 A      TCA
1847          03065 R 344222 R      TAD ZXE
1848          03066 R 740100 A      SMA
1849          03067 R 750000 A      CLA
1850          03070 R 044224 R      DAC DIRN / 0 FOR+VE INC ELSE NOT 0
1851          03071 R 206157 R      LAC FALG
1852          03072 R 740200 A      SZA
1853          03073 R 603105 R      JMP NOTTPT / NOT P T HOLE SPECIAL CASE
1854          03074 R 204146 R      LAC MODE
1855          03075 R 546234 R      SAD (2
1856          03076 R 603102 R      JMP PTYYYY / DUMMY SUB.
1857          03077 R 206314 R      LAC (PTXCHP
1858          03100 R 043471 R      DAC XYCHOP
1859          03101 R 603115 R      JMP MYLINE+2
1860          03102 R 206315 R     PTYYYY LAC (PTYCHP
1861          03103 R 043471 R      DAC XYCHOP
1862          03104 R 603115 R      JMP MYLINE+2
1863          03105 R 204146 R     NOTTPT LAC MODE
1864          03106 R 546234 R      SAD (2
1865          03107 R 603113 R      JMP MYLINE / Y LINE REQUESTED
1866          03110 R 206316 R      LAC (XCHOPP
1867          03111 R 043471 R      DAC XYCHOP
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1868          03112 R 603115 R      JM[redacted]+1+2
1869          03113 R 206317 R     MYLINE LAC (YCHOPP
1870          03114 R 043471 R      DAC XYCHOP
1871                                /
1872                                / 1ST CHECK IS AGAINST PADS IN PP ARRAY UP TO PNTR HRSTRT
1873                                /
1874          03115 R 206274 R      LAC (PP
1875          03116 R 044202 R      DAC HSCAN
1876          03117 R 204202 R     PLUPX LAC HSCAN
1877          03120 R 544204 R      SAD HRSTRT / CHECK FOR END OF PADS
1878          03121 R 603144 R      JMP RLUPX
1879          03122 R 224202 R      LAC* HSCAN
1880          03123 R 102173 R      JMS ZUBNOD / RETURNS XP AND YP
1881          03124 R 226305 R      LAC* (17
1882          03125 R 044225 R      DAC PADDIA  /POINTER TO PAD ASSIGN TABLE
1883          03126 R 206303 R      LAC (002001
1884          03127 R 401707 R      XCT STOP  /NOP FOR SIDE 1, SWHA FOR SIDE 2
1885          03130 R 506236 R      AND (777
1886          03131 R 046163 R      DAC LAYER
1887          03132 R 104010 R      JMS GETASS
1888          03133 R 200013 R      LAC PADAD
1889          03134 R 206304 R      LAC (40
1890          03135 R 204225 R      LAC PADDIA
1891          03136 R 546163 R      SAD LAYER
1892          03137 R 346202 R      TAD SPACE#  /WITH ROUND OFF ALLOWANCE (+49)
1893          03140 R 044225 R      DAC PADDIA
1894          03141 R 423471 R      XCT* XYCHOP / UPDATES ZEND IF NECESSARY
1895          03142 R 444202 R      ISZ HSCAN
1896          03143 R 603117 R      JMP PLUPX / CONTINUE
1897                                /
1898                                / ALL PADS TESTED. NOW START ON ROUTES
1899                                /
1900          03144 R 204202 R     RLUPX LAC HSCAN
1901          03145 R 544203 R      SAD HREND
1902          03146 R 603261 R      JMP HOWZAT
1903          03147 R 224202 R      LAC* HSCAN
1904          03150 R 652000 A      LMQ / STORE COPY
1905          03151 R 042214 R      DAC XP
1906          03152 R 444202 R      ISZ HSCAN
1907          03153 R 224202 R      LAC* HSCAN
1908          03154 R 506320 R      AND (1777
1909          03155 R 042215 R      DAC YP
1910          03156 R 044230 R      DAC TY1
1911          03157 R 224202 R      LAC* HSCAN
1912          03160 R 506312 R      AND (2000
1913          03161 R 046165 R      DAC MARK1
1914          03162 R 640603 A      LLS 3 / GET WIDTH FROM MQ COPY
1915          03163 R 506241 R      AND (7
1916          03164 R 340012 R      TAD TRKAD
1917          03165 R 044213 R      DAC WYDE2
1918          03166 R 224213 R      LAC* WYDE2
1919          03167 R 506236 R      AND (777 /CHANGE HERE IF DIFFERENT TRACK WIDTHS ALLOWED
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1920          03170 R 044213 R      DAC WYDE2 / WIDTH OF ROUTE. THOU UNITS
1921          03171 R 202214 R      LAC XP
1922          03172 R 652000 A      LMQ
1923          03173 R 506320 R      AND (1777
1924          03174 R 042214 R      DAC XP
1925          03175 R 044226 R      DAC TX1
1926          03176 R 641002 A      LACQ
1927          03177 R 506312 R      AND (2000
1928          03200 R 741200 A      SNA
1929          03201 R 603216 R      JMP NOPT1 / NO PLATED THROUGH HOLE
1930          03202 R 206303 R      LAC (002001
1931          03203 R 401707 R      XCT STOP  /NOP FOR SIDE 1, SWHA FOR SIDE 2
1932          03204 R 506236 R      AND (777
1933          03205 R 046163 R      DAC LAYER
1934          03206 R 104010 R      JMS GETASS
1935          03207 R 200013 R      LAC PADAD
1936          03210 R 206304 R      LAC (40
1937          03211 R 750000 A      CLA
1938          03212 R 546163 R      SAD LAYER
1939          03213 R 346202 R      TAD SPACE
1940          03214 R 044225 R      DAC PADDIA  /IN THOU UNITS (INCLUDING TOLERANCE)
1941          03215 R 423471 R      XCT* XYCHOP / UPDATE ZEND IF REQUIRED
1942                                /
1943                                / REPEAT FOR OTHER END OF ROUTE
1944                                /
1945          03216 R 444202 R    NOPT1 ISZ HSCAN
1946          03217 R 224202 R      LAC* HSCAN
1947          03220 R 652000 A      LMQ
1948          03221 R 506320 R      AND (1777
1949          03222 R 042214 R      DAC XP
1950          03223 R 044227 R      DAC TX2
1951          03224 R 444202 R      ISZ HSCAN
1952          03225 R 224202 R      LAC* HSCAN
1953          03226 R 506320 R      AND (1777
1954          03227 R 042215 R      DAC YP
1955          03230 R 044231 R      DAC TY2
1956          03231 R 224202 R      LAC* HSCAN
1957          03232 R 506312 R      AND (2000
1958          03233 R 046166 R      DAC MARK2
1959          03234 R 641002 A      LACQ
1960          03235 R 506312 R      AND (2000
1961          03236 R 741200 A      SNA
1962          03237 R 603254 R      JMP NOPT2
1963          03240 R 206303 R      LAC (002001
1964          03241 R 401707 R      XCT STOP
1965          03242 R 506236 R      AND (777
1966          03243 R 046163 R      DAC LAYER
1967          03244 R 104010 R      JMS GETASS
1968          03245 R 200013 R      LAC PADAD
1969          03246 R 206304 R      LAC (40
1970          03247 R 206245 R      LAC (0
1971          03250 R 546163 R      SAD LAYER
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1972  03251 R 346202 R     TAD SPACE
1973  03252 R 044225 R     DAC PADDIA
1974  03253 R 423471 R     XCT* XYCHOP / UPDATE ZEND IF REQ
1975  03254 R 444202 R    NOPT2 ISZ HSCAN / PTS TO NEXT SEGMENT
1976  03255 R 204146 R     LAC MODE
1977  03256 R 546234 R     SAD (2
1978  03257 R 603773 R     JMP YRTST / TEST FOR Y LINE AND CONTINUE
1979  03260 R 603472 R     JMP XRTST / TEST FOR X LINE AND CONTINUE
1980                       /
1981                       / EXIT INSTRUCTIONS FOR HOWFAR
1982                       /
1983  03261 R 204223 R    HOWZAT LAC ZEND
1984  03262 R 621756 R     JMP* HOWFAR
1985                       /
1986                       / SUBROUTINE XCHOP. UPDATES ZEND IF NECESSARY
1987                       / PAD AGAINST X LINE
1988                       /
1989  03263 R 740040 A    XCHOP XX
1990  03264 R 204225 R     LAC PADDIA
1991  03265 R 344127 R     TAD WYDE / WIDTH OF ROUTE
1992  03266 R 652000 A     LMQ
1993  03267 R 754000 A     CLA!CLL
1994  03270 R 640323 A     DIV
1995  03271 R 000062 A     62
1996  03272 R 641002 A     LACQ
1997  03273 R 046176 R     DAC RADIUS# / PAD RAD.
1998  03274 R 044134 R     DAC MZATT
1999  03275 R 342215 R     TAD YP
2000  03276 R 046220 R     DAC YPU# / UPPER PAD LIMIT
2001  03277 R 204134 R     LAC MZATT
2002  03300 R 740031 A     TCA
2003  03301 R 342215 R     TAD YP
2004  03302 R 046216 R     DAC YPL# / LOWER PAD LIMIT
2005  03303 R 204221 R     LAC ZYS
2006  03304 R 740031 A     TCA
2007  03305 R 346216 R     TAD YPL
2008  03306 R 740100 A     SMA
2009  03307 R 623263 R     JMP* XCHOP / NOT OBSTACLE YPL > ZYS
2010  03310 R 206220 R     LAC YPU
2011  03311 R 740031 A     TCA
2012  03312 R 344221 R     TAD ZYS
2013  03313 R 740100 A     SMA
2014  03314 R 623263 R     JMP* XCHOP / NOT OBSTACLE YPU < ZYS
2015                       /
2016                       / PAD IS NOW IDENTIFIED AS A POSSIBLE OBSTACLE
2017                       /
2018  03315 R 204224 R     LAC DIRN
2019  03316 R 740200 A     SZA / DIRN =0 FOR +VE DIRECTION
2020  03317 R 603323 R     JMP RADOK / +VE RAD WANTED
2021  03320 R 206176 R     LAC RADIUS
2022  03321 R 740031 A     TCA
2023  03322 R 046176 R     DAC RADIUS
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2024        03323 R 206176 R    RADOK LAC RADIUS
2025        03324 R 342214 R     TAD XP / CRITICAL EDGE
2026        03325 R 044134 R     DAC MZATT
2027        03326 R 101254 R     JMS BETWEN
2028        03327 R 004134 R     .DSA MZATT
2029        03330 R 004220 R     .DSA ZXS
2030        03331 R 004223 R     .DSA ZEND
2031        03332 R 740200 A     SZA
2032        03333 R 603337 R     JMP .+4
2033        03334 R 204134 R     LAC MZATT
2034        03335 R 044223 R     DAC ZEND
2035        03336 R 623263 R     JMP* XCHOP
2036        03337 R 101254 R     JMS BETWEN
2037        03340 R 004220 R     .DSA ZXS
2038        03341 R 004134 R     .DSA MZATT
2039        03342 R 002214 R     .DSA XP
2040        03343 R 740200 A     SZA
2041        03344 R 603350 R     JMP .+4
2042        03345 R 204220 R     LAC ZXS
2043        03346 R 044223 R     DAC ZEND
2044        03347 R 603356 R     JMP .+7
2045        03350 R 206176 R     LAC RADIUS
2046        03351 R 740031 A     TCA
2047        03352 R 342214 R     TAD XP
2048        03353 R 044136 R     DAC TEMP / NON CRIT EDGE
2049        03354 R 544220 R     SAD ZXS
2050        03355 R 623263 R     JMP* XCHOP / JUST SCRAPES IN
2051        03356 R 206203 R     LAC SQFLG#
2052        03357 R 741200 A     SNA
2053        03360 R 603371 R     JMP RND
2054        03361 R 204136 R     LAC TEMP
2055        03362 R 101254 R     JMS BETWEN
2056        03363 R 004220 R     .DSA ZXS
2057        03364 R 004136 R     .DSA TEMP
2058        03365 R 004134 R     .DSA MZATT
2059        03366 R 740200 A     SZA
2060        03367 R 623263 R     JMP* XCHOP
2061        03370 R 603461 R     JMP SQFAIL / FAILED HERE ON SQUARE END TEST
2062        03371 R 206153 R    RND LAC ENDFLG
2063        03372 R 741200 A     SNA
2064        03373 R 603377 R     JMP CHEK
2065        03374 R 204127 R     LAC WYDE
2066        03375 R 744020 A     RCR   /DIVIDE BY TWO
2067        03376 R 044171 R     DAC OFSET
2068        03377 R 103412 R    CHEK JMS PTXCH  /TO CHECK VALIDITY
2069        03400 R 623263 R     JMP* XCHOP
2070                            /
2071                            / SUBROUTINE YCHOP. PAD AGAINST Y LINE
2072                            /
2073        03401 R 740040 A    YCHOP XX
2074        03402 R 202214 R     LAC XP
2075        03403 R 652000 A     LMQ
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2076        03404 R 202215 R     LAC [illegible]P
2077        03405 R 042214 R     DAC XP / SWAP XP YP SO THAT
2078        03406 R 641002 A     LACQ / XCHOP CAN BE USED
2079        03407 R 042215 R     DAC YP
2080        03410 R 103263 R     JMS XCHOP
2081        03411 R 623401 R     JMP* YCHOP
2082                            /
2083                            / SUBS TO TEST P T HOLE CLEARANCES
2084                            /
2085        03412 R 740040 A    PTXCH XX
2086        03413 R 204225 R     LAC PADDIA
2087        03414 R 344127 R     TAD WYDE
2088        03415 R 723720 A     AAC -60  /CHANGE ROUNDIN ERROR CORRECTION TO 1
2089        03416 R 744020 A     RCR   /DIVIDE BY 2
2090        03417 R 144134 R     DZM TOP
2091        03420 R 144215 R     DZM BOTT
2092        03421 R 652000 A     LMQ
2093        03422 R 740031 A     TCA
2094        03423 R 102656 R     JMS MULTT / - AC SQ.
2095                            /
2096                            / NOW ADD IN X SQ + Y SQ
2097                            /
2098        03424 R 202214 R     LAC XP
2099        03425 R 740031 A     TCA
2100        03426 R 344220 R     TAD ZXS
2101        03427 R 741100 A     SPA
2102        03430 R 740031 A     TCA
2103        03431 R 744000 A     CLL
2104        03432 R 653122 A     MUL
2105        03433 R 000031 A     31
2106        03434 R 641002 A     LACQ
2107        03435 R 344171 R     TAD OFSET
2108        03436 R 652000 A     LMQ
2109        03437 R 144171 R     DZM OFSET
2110        03440 R 102656 R     JMS MULTT / X SQ ADDED
2111        03441 R 202215 R     LAC YP
2112        03442 R 740031 A     TCA
2113        03443 R 344221 R     TAD ZYS
2114        03444 R 741100 A     SPA
2115        03445 R 740031 A     TCA
2116        03446 R 744000 A     CLL
2117        03447 R 653122 A     MUL
2118        03450 R 000031 A     31
2119        03451 R 641002 A     LACQ
2120        03452 R 344172 R     TAD OFSET2
2121        03453 R 652000 A     LMQ
2122        03454 R 102656 R     JMS MULTT
2123        03455 R 204134 R     LAC TOP
2124        03456 R 740100 A     SMA
2125        03457 R 623412 R     JMP* PTXCH / DIST. OK
2126        03460 R 144172 R     DZM OFSET2
2127        03461 R 206231 R    SQFAIL LAC (1
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2128        03462 R 046157 R     DAC FALG / SET ERROR IND
2129        03463 R 204220 R     LAC ZXS
2130        03464 R 621756 R     JMP* HOWFAR / EXIT FROM HOWFAR
2131                            /
2132                            /
2133                            / LINKAGE FOR XCT INSTRUCTIONS
2134                            /
2135        03465 R 103263 R    XCHOPP JMS XCHOP
2136        03466 R 103401 R    YCHOPP JMS YCHOP
2137        03467 R 103412 R    PTXCHP JMS PTXCH
2138        03470 R 740000 A    PTYCHP NOP
2139        03471 R 740040 A    XYCHOP XX
2140                            /
2141                            /
2142                            / ROUTINE XRTST TESTS A SEGMENT AGAINST
2143                            / AN X LINE BY CALCULATING
2144                            / X=X1+ (X2-X1)(YP-Y1) / (Y2-Y1)
2145                            / CHECKS INSIDE RECTANGLE FIRST
2146                            /
2147        03472 R 204230 R    XRTST LAC TY1
2148        03473 R 740031 A     TCA
2149        03474 R 344231 R     TAD TY2
2150        03475 R 741200 A     SNA
2151        03476 R 603144 R     JMP RLUPX  /HORIZ LINE
2152        03477 R 043604 R     DAC DELLY
2153        03500 R 204127 R     LAC WYDE
2154        03501 R 344213 R     TAD WYDE2
2155        03502 R 346202 R     TAD SPACE
2156        03503 R 652000 A     LMQ
2157        03504 R 754000 A     CLA!CLL
2158        03505 R 640323 A     DIV
2159        03506 R 000062 A     62
2160        03507 R 641002 A     LACQ
2161        03510 R 723777 A     AAC -1
2162        03511 R 044134 R     DAC MZATT / CLEARANCE REQUIRED IN THOU UNITS
2163        03512 R 203604 R     LAC DELLY
2164        03513 R 741100 A     SPA
2165        03514 R 603525 R     JMP TY1BIG
2166        03515 R 204231 R    DYP LAC TY2
2167        03516 R 344134 R     TAD MZATT
2168        03517 R 044176 R     DAC YU
2169        03520 R 204134 R     LAC MZATT
2170        03521 R 740031 A     TCA
2171        03522 R 344230 R     TAD TY1
2172        03523 R 044174 R     DAC YL
2173        03524 R 603552 R     JMP DYPOS
2174        03525 R 740031 A    TY1BIG TCA
2175        03526 R 043604 R     DAC DELLY
2176        03527 R 204230 R     LAC TY1
2177        03530 R 652000 A     LMQ
2178        03531 R 204231 R     LAC TY2
2179        03532 R 044230 R     DAC TY1
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2180          03533 R 641002 A      LA[redacted]
2181          03534 R 044231 R      DAC TY2
2182          03535 R 204226 R      LAC TX1
2183          03536 R 652000 A      LMQ
2184          03537 R 204227 R      LAC TX2
2185          03540 R 044226 R      DAC TX1
2186          03541 R 641002 A      LACQ
2187          03542 R 044227 R      DAC TX2
2188          03543 R 206165 R      LAC MARK1
2189          03544 R 652000 A      LMQ
2190          03545 R 206166 R      LAC MARK2
2191          03546 R 046165 R      DAC MARK1
2192          03547 R 641002 A      LACQ
2193          03550 R 046166 R      DAC MARK2
2194          03551 R 603515 R      JMP DYP / DELTAY IS NOW POSITIVE
2195          03552 R 101254 R     DYPOS JMS BETWEN
2196          03553 R 004221 R      .DSA ZYS
2197          03554 R 004176 R      .DSA YU
2198          03555 R 004174 R      .DSA YL
2199          03556 R 740200 A      SZA
2200          03557 R 603144 R      JMP RLUPX / NOT CRITICAL
2201          03560 R 146147 R      DZM ANGIND# / ANGLED LINE INDICATOR
2202                                /
2203                                / CHECK FOR ANGLED LINE
2204                                /
2205          03561 R 144217 R      DZM HHIND
2206          03562 R 204226 R      LAC TX1
2207          03563 R 740031 A      TCA
2208          03564 R 344227 R      TAD TX2
2209          03565 R 741200 A      SNA
2210          03566 R 603621 R      JMP HH0+1 / DELTAX = 0
2211          03567 R 741100 A      SPA
2212          03570 R 102652 R      JMS NEGAT
2213          03571 R 043602 R      DAC DELLX
2214          03572 R 446147 R      ISZ ANGIND / ANGLED LINE
2215          03573 R 204230 R      LAC TY1
2216          03574 R 740031 A      TCA
2217          03575 R 344221 R      TAD ZYS
2218          03576 R 741100 A      SPA
2219          03577 R 102652 R      JMS NEGAT
2220          03600 R 744000 A      CLL
2221          03601 R 653122 A      MUL
2222          03602 R 000000 A     DELLX 0
2223          03603 R 640323 A      DIV
2224          03604 R 000000 A     DELLY 0
2225          03605 R 741400 A      SZL
2226          03606 R 603144 R      JMP RLUPX / NO CROSS DIVISION OVERFLOWED
2227          03607 R 046200 R      DAC REMAIN# / REMAINDER
2228          03610 R 204217 R      LAC HHIND
2229          03611 R 506231 R      AND (1
2230          03612 R 044217 R      DAC HHIND
2231          03613 R 741200 A      SNA
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2232          03614 R 603620 R      JMP HH0
2233          03615 R 641002 A      LACQ
2234          03616 R 740031 A      TCA
2235          03617 R 652000 A      LMQ
2236          03620 R 641002 A     HH0 LACQ / CORRECT SIGN
2237          03621 R 344226 R      TAD TX1
2238                                /
2239                                / NOW PRETEND THE POINT IS A PAD SO THAT WE CAN USE
2240                                / THE SAME SUBROUTINE FOR UPDATING ZEND
2241                                /
2242          03622 R 042214 R      DAC XP
2243          03623 R 204213 R      LAC WYDE2
2244          03624 R 744020 A      RCR
2245          03625 R 044225 R      DAC PADDIA
2246          03626 R 206165 R      LAC MARK1
2247          03627 R 741200 A      SNA     /FIRST SEGMENT
2248          03630 R 603652 R      JMP NOTFST
2249          03631 R 204221 R      LAC ZYS
2250          03632 R 740031 A      TCA
2251          03633 R 344230 R      TAD TY1
2252          03634 R 744000 A      CLL
2253          03635 R 657122 A      MULS
2254          03636 R 000031 A      31
2255          03637 R 641002 A      LACQ
2256          03640 R 741100 A      SPA
2257          03641 R 723001 A      AAC 1
2258          03642 R 344225 R      TAD PADDIA
2259          03643 R 044172 R      DAC OFSET2
2260          03644 R 741100 A      SPA
2261          03645 R 603652 R      JMP NOTFST  /NO OFFSET
2262          03646 R 740031 A      TCA
2263          03647 R 344225 R      TAD PADDIA
2264          03650 R 740100 A      SMA    /NO OFFSET REQUIRED
2265          03651 R 603676 R      JMP NOTLST
2266          03652 R 206166 R     NOTFST LAC MARK2
2267          03653 R 741200 A      SNA    /LAST SEGMENT
2268          03654 R 603675 R      JMP NOTLST-1
2269          03655 R 204231 R      LAC TY2
2270          03656 R 740031 A      TCA
2271          03657 R 344221 R      TAD ZYS
2272          03660 R 744000 A      CLL
2273          03661 R 657122 A      MULS
2274          03662 R 000031 A      31
2275          03663 R 641002 A      LACQ
2276          03664 R 741100 A      SPA
2277          03665 R 723001 A      AAC 1
2278          03666 R 344225 R      TAD PADDIA
2279          03667 R 044172 R      DAC OFSET2
2280          03670 R 741100 A      SPA
2281          03671 R 603675 R      JMP NOTLST-1
2282          03672 R 740031 A      TCA
2283          03673 R 344225 R      TAD PADDIA
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2284        03674 R 741100 A     SP[redacted]
2285        03675 R 144172 R     DZM OFSET2
2286        03676 R 204221 R    NOTLST LAC ZYS
2287        03677 R 740031 A     TCA
2288        03700 R 344231 R     TAD TY2
2289        03701 R 741100 A     SPA
2290        03702 R 603713 R     JMP ABOVE   /ZYS>TY2
2291        03703 R 204221 R     LAC ZYS
2292        03704 R 740031 A     TCA
2293        03705 R 344230 R     TAD TY1
2294        03706 R 740100 A     SMA
2295        03707 R 603723 R     JMP BELOW   /ZYS<TY1
2296        03710 R 204221 R     LAC ZYS
2297        03711 R 042215 R     DAC YP   /TRUE PAD POSITION
2298        03712 R 603732 R     JMP BEETWN
2299        03713 R 344221 R    ABOVE TAD ZYS
2300        03714 R 042215 R     DAC YP  /TRUE PAD POSITION
2301        03715 R 206166 R     LAC MARK2
2302        03716 R 741200 A     SNA
2303        03717 R 603732 R     JMP BEETWN
2304        03720 R 204225 R     LAC PADDIA
2305        03721 R 044172 R     DAC OFSET2
2306        03722 R 603732 R     JMP BEETWN
2307        03723 R 344221 R    BELOW TAD ZYS
2308        03724 R 042215 R     DAC YP
2309        03725 R 206165 R     LAC MARK1
2310        03726 R 741200 A     SNA
2311        03727 R 603732 R     JMP BEETWN
2312        03730 R 204225 R     LAC PADDIA
2313        03731 R 044172 R     DAC OFSET2
2314        03732 R 204213 R    BEETWN LAC WYDE2
2315        03733 R 346202 R     TAD SPACE /INCLUDES ROUND OFF ERROR CORRECTION
2316        03734 R 044225 R     DAC PADDIA
2317                            /
2318                            / ROUNDOFF ERROR CORRECTION
2319                            /
2320        03735 R 206147 R     LAC ANGIND
2321        03736 R 741200 A     SNA
2322        03737 R 603770 R     JMP WIDED / NOT ANGLED LINE
2323        03740 R 206200 R     LAC REMAIN
2324        03741 R 741200 A     SNA
2325        03742 R 603761 R     JMP WIDEN / LINE CROSSES EXACT GRIDD POSN
2326        03743 R 204224 R     LAC DIRN
2327        03744 R 740200 A     SZA / 0 FOR +VE DIRECTION
2328        03745 R 603755 R     JMP THREO4 / CASE 3 OR 4
2329        03746 R 204217 R     LAC HHIND
2330        03747 R 741200 A     SNA
2331        03750 R 603761 R     JMP WIDEN / CASE 1 DIRN=0 HHIND=0
2332        03751 R 202214 R     LAC XP
2333        03752 R 723777 A     AAC -1
2334        03753 R 042214 R     DAC XP
2335        03754 R 603761 R     JMP WIDEN / CASE 2 DIRN =0 HHIND = 1
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2336          03755 R 204217 R     THREO4 LAC HHIND
2337          03756 R 740200 A      SZA
2338          03757 R 603761 R      JMP WIDEN / CASE 4 DIRN NE 0 HHIND NE 0
2339          03760 R 442214 R      ISZ XP
2340          03761 R 204225 R     WIDEN LAC PADDIA
2341          03762 R 744010 A      RCL / *2
2342          03763 R 344225 R      TAD PADDIA
2343          03764 R 344127 R      TAD WYDE
2344          03765 R 723747 A      AAC -31
2345          03766 R 744020 A      RCR
2346          03767 R 044225 R      DAC PADDIA / ROUNDOFF ADJ. FOR ANGLES > 42 DEGS.
2347                                /
2348          03770 R 103263 R     WIDED JMS XCHOP
2349          03771 R 144172 R      DZM OFSET2
2350          03772 R 603144 R      JMP RLUPX
2351                                /
2352                                / ROUTINE YRTST. CUNNINGLY TESTS AGAINST AN
2353                                / XSEG BY SWAPPING ALL THE VARIABLES AND THEN USING
2354                                / XRTST. THE LOGIC OF ALL THIS MAY SEEM STRANGE
2355                                /
2356          03773 R 204226 R     YRTST LAC TX1
2357          03774 R 652000 A      LMQ
2358          03775 R 204230 R      LAC TY1
2359          03776 R 044226 R      DAC TX1
2360          03777 R 641002 A      LACQ
2361          04000 R 044230 R      DAC TY1
2362          04001 R 204227 R      LAC TX2
2363          04002 R 652000 A      LMQ
2364          04003 R 204231 R      LAC TY2
2365          04004 R 044227 R      DAC TX2
2366          04005 R 641002 A      LACQ
2367          04006 R 044231 R      DAC TY2
2368          04007 R 603472 R      JMP XRTST
2369                                /
2370                                /
2371                                /
2372                                /
2373                                /    GET ASSIGNMENT OUT OF NEW STYLE ASSIGNMENT TABLE.
2374                                /    CALL IS:-
2375                                /
2376                                /
2377                                /
2378                                /       JMS*    GETASS
2379                                /       LAC     TABLE ADDRESS
2380                                /       LAC     LENGTH OF FIXED PART OF TABLE
2381                                /       LAC     ASSIGNMENT CODE
2382                                /       SAD     LAYER NUMBER
2383                                /
2384                                /
2385                    641000 A    ECLA=641000
2386                                /
2387                                /
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2388        04010 R 000000 A    GET[illegible]S 0
2389        04011 R 424010 R            XCT*    GETASS
2390        04012 R 044055 R            DAC     BASE    /ASSIGNMENT TABLE ADDRESS
2391        04013 R 444010 R            ISZ     GETASS
2392        04014 R 424010 R            XCT*    GETASS
2393        04015 R 044056 R            DAC     FIX     /LENGTH OF FIXED PART OF TABLE
2394        04016 R 444010 R            ISZ     GETASS
2395        04017 R 424010 R            XCT*    GETASS
2396        04020 R 721000 A            PAX
2397        04021 R 444010 R            ISZ     GETASS
2398        04022 R 234055 R            LAC*    BASE,X  /GET PRINCIPAL ASSIGNMENT
2399        04023 R 653605 A            LMQ!ECLA!LLS 5  /GET REASS. POINTER
2400        04024 R 741200 A            SNA
2401        04025 R 604052 R            JMP     FOUND3  /NO REASSIGNMENTS
2402        04026 R 721000 A            PAX
2403        04027 R 640604 A            LLS     4       /MOVE ASS. TO TOP OF MQ
2404        04030 R 641611 A            ECLA!LLS        11
2405        04031 R 044057 R            DAC     ASSIGN
2406        04032 R 204055 R            LAC     BASE
2407        04033 R 344056 R            TAD     FIX
2408        04034 R 723777 A            AAC     -1
2409        04035 R 044055 R            DAC     BASE    /BASE ADDRESS OF REASSIGNMENTS
2410                                    /
2411        04036 R 234055 R    LUPZ    LAC*    BASE,X
2412        04037 R 653605 A            LMQ!ECLA!LLS 5
2413        04040 R 721000 A            PAX
2414        04041 R 641604 A            ECLA!LLS        4
2415        04042 R 424010 R            XCT*    GETASS  /SAD LAYER NUMBER
2416        04043 R 604053 R            JMP     FOUND1  /YES. RIGHT LAYER
2417        04044 R 724000 A            PXA
2418        04045 R 740200 A            SZA
2419        04046 R 604036 R            JMP     LUPZ    /MORE REASSIGNMENTS
2420        04047 R 204057 R            LAC     ASSIGN
2421        04050 R 444010 R    LEXIT   ISZ     GETASS
2422        04051 R 624010 R            JMP*    GETASS
2423                                    /
2424        04052 R 640604 A    FOUND3  LLS     4
2425        04053 R 641611 A    FOUND1  ECLA!LLS        11
2426        04054 R 604050 R            JMP     LEXIT
2427                                    /
2428        04055 R 000000 A    BASE /ASSIGNMENT TABLE ADDRESS
2429        04056 R 000000 A    FIX /LENGTH OF FIXED PORTION OF ASSIGNMENT TABLE
2430        04057 R 000000 A    ASSIGN /HOLDS ASSIGNMENT VALUE WHILE SEARCHING FOR AN EXCEPTION
2431                                       / ON THAT LAYER
2432                             .EJECT
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2433                                / END OF HOW FAR. THREE LOUD CHEERS.
2434                                /
2435                                /
2436                                / MANHAT AND HOWFAR SYMBOL TABLE
2437                                /
2438        04060 R 000000 A    TRE1X 0 / COUNT
2439        04061 R 000000 A     0 / X1
2440        04062 R 000000 A     0 / Y1
2441        04063 R 000000 A     0 / X
2442        04064 R 000000 A     0 / Y
2443        04065 R 000000 A     0 / X
2444        04066 R 000000 A     0 / Y
2445        04067 R 000000 A    TRE1Y 0 / COUNT
2446        04070 R 000000 A     0 / Y1
2447        04071 R 000000 A     0 / X1
2448        04072 R 000000 A     0 / Y
2449        04073 R 000000 A     0 / X
2450        04074 R 000000 A     0 / Y
2451        04075 R 000000 A     0 / X
2452        04076 R 000000 A    TRE2X 0 / COUNT
2453        04077 R 000000 A     0 / X2
2454        04100 R 000000 A     0 / Y2
2455        04101 R 000000 A     0 / X
2456        04102 R 000000 A     0 / Y
2457        04103 R 000000 A     0 / X
2458        04104 R 000000 A     0 / Y
2459        04105 R 000000 A    TRE2Y 0 / COUNT
2460        04106 R 000000 A     0 / Y2
2461        04107 R 000000 A     0 / X2
2462        04110 R 000000 A     0 / Y
2463        04111 R 000000 A     0 / X
2464        04112 R 000000 A     0 / Y
2465        04113 R 000000 A     0 / X
2466        04114 R 004142 R    STRX .DSA X1
2467        04115 R 004143 R     .DSA Y1
2468        04116 R 004144 R    FINX .DSA X2
2469        04117 R 004145 R     .DSA Y2
2470        04120 R 000000 A    T1X 0 / POINTER TO TRE1X ARRAY
2471        04121 R 000000 A    T1Y 0 / POINTER TO TRE1Y
2472        04122 R 000000 A    T2X 0 / TRE2X
2473        04123 R 000000 A    T2Y 0 / TRE2Y
2474        04124 R 000000 A    NOFCNS 0
2475        04125 R 000000 A    SCAN 0
2476        04126 R 000000 A    ENDCO 0
2477        04127 R 000000 A    WYDE 0 / WIDTH OF ROUTE BEING MANHATTED
2478        04130 R 000000 A    PSTART 0 / STARTING PAD
2479        04131 R 000000 A    PFINIS 0 / FINISHING PAD
2480        04132 R 000000 A    BASEX 0
2481        04133 R 000000 A    BASEY 0
2482        04134 R 000000 A    CRPT 0
2483        04135 R 000000 A    CNTR 0
2484        04136 R 000000 A    TEMP 0
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2485        04137 R 000000 A    COU[redacted]0
2486        04140 R 000000 A    NOSEG 0 /-NO OF SEGMENTS IN ROUTE BEING MANHATTED
2487        04141 R 000000 A    SYDE 0 / SIDE OF ROUTE SEGMENTS
2488        04142 R 000000 A    X1 0 / SEGMENTS ARE FROM
2489        04143 R 000000 A    Y1 0 / X1 Y1
2490        04144 R 000000 A    X2 0 / TO X2Y2
2491        04145 R 000000 A    Y2 0 / ON SYDE
2492        04146 R 000000 A    MODE 0 / HOWFAR INDICATOR
2493        04147 R 000000 A    XIND 0 / HOWFAR INDICATOR
2494        04150 R 000000 A    YIND 0 / OR THIS ONE
2495        04151 R 000000 A    CCNTRR 0 / TREE SEGMENT COUNTER
2496        04152 R 000000 A    ZIND1 0 / TRE1 INDICATOR
2497        04153 R 000000 A    ZIND2 0 / TRE2 INDICATOR
2498        04154 R 000000 A    Z1 0 /
2499        04155 R 000000 A    Z2 0 / SEGMENT COORDINATES
2500        04156 R 000000 A    W 0 /
2501        04157 R 000000 A    ZSCAN2 0 / POINTER IN X OVER TESTS
2502        04160 R 000000 A    NOSEGS 0 / NO OF SEGS IN TREE
2503        04161 R 000000 A    XX1 0
2504        04162 R 000000 A    XX2 0
2505        04163 R 000000 A    YY1 0
2506        04164 R 000000 A    YY2 0
2507        04165 R 000000 A    NPOINTS 0 / USED TO CONSTITUTE ROUTE
2508        04166 R 000000 A    POINT 0
2509        04167 R 000000 A    XCROSS 0 / X VALUE AT TREE INTERSECTION
2510        04170 R 000000 A    YCROSS 0 / Y VALUE AT TREE INTERSECTION
2511                            /
2512                            / HOWFAR VARIABLES
2513                            /
2514        04171 R 000000 A    OFSET 0   /OF TRACKS FROM PADS
2515        04172 R 000000 A    OFSET2 0
2516        04173 R 000000 A    XL 0 /
2517        04174 R 000000 A    YL 0 / WINDOW IN WHICH OBSTACLES WILL
2518        04175 R 000000 A    XU 0 / BE CONSIDERED
2519        04176 R 000000 A    YU 0 /
2520        04177 R 000000 A    HZOT 0
2521        04200 R 000000 A    RELPT6 0
2522        04201 R 000000 A    NPADS 0
2523        04202 R 000000 A    HSCAN 0 / POINTER
2524        04203 R 000000 A    HREND 0 / PTR TO END OF STORES SEGS (+1)
2525        04204 R 000000 A    HRSTRT 0 / PTR TO END OF STORES PADS (+1)
2526        04205 R 000000 A    HX1 0 /
2527        04206 R 000000 A    HY1 0 / COORDINATES OF SEGMENT
2528        04207 R 000000 A    HX2 0 / ON SIDE HSIDE
2529        04210 R 000000 A    HY2 0 /
2530        04211 R 000000 A    HSIDE 0
2531        04212 R 000000 A    HSEGS 0 / SEGMENT COUNTER
2532              004141 R      SIDE=SYDE
2533        04213 R 000000 A    WIDE 0 / WIDTH OF ROUTES TESTED.TOP 3 BITS
2534        04214 R 000000 A    CSCAN 0
2535              004134 R      TOP=CRPT
2536        04215 R 000000 A    BOTT 0
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2537          04216 R 000000 A     HSTRT 0
2538          04217 R 000000 A     HHIND 0
2539          04220 R 000000 A     ZXS 0
2540          04221 R 000000 A     ZYS 0
2541          04222 R 000000 A     ZXE 0
2542          04223 R 000000 A     ZEND 0
2543          04224 R 000000 A     DIRN 0 / DIRECTION OF SEGMENT
2544          04225 R 000000 A     PADDIA 0
2545                  004134 R     MZATT=TOP
2546                  004213 R     WYDE2=WIDE
2547          04226 R 000000 A     TX1 0
2548          04227 R 000000 A     TX2 0
2549          04230 R 000000 A     TY1 0
2550          04231 R 000000 A     TY2 0
2551                               .DEC
2552          04232 R         A    MROOT .BLOCK 184
2553          04522 R         A    ROT .BLOCK 94
2554          04660 R         A    R1 .BLOCK 94
2555          05016 R         A    PP .BLOCK 600
2556                  000000 A      .END
              06223 R 006223 E *E
              06224 R 006224 E *E
              06225 R 006225 E *E
              06226 R 006226 E *E
              06227 R 006227 E *E
              06230 R 006230 E *E
              06231 R 000001 A *L
              06232 R 000011 A *L
              06233 R 000010 A *L
              06234 R 000002 A *L
              06235 R 000134 R *L
              06236 R 000777 A *L
              06237 R 777000 A *L
              06240 R 077777 A *L
              06241 R 000007 A *L
              06242 R 000077 A *L
              06243 R 000003 A *L
              06244 R 000012 A *L
              06245 R 000000 A *L
              06246 R 005015 R *L
              06247 R 677777 A *L
              06250 R 100000 A *L
              06251 R 004660 R *L
              06252 R 004232 R *L
              06253 R 000013 A *L
              06254 R 742030 A *L
              06255 R 740000 A *L
              06256 R 777776 A *L
              06257 R 777777 A *L
              06260 R 004063 R *L
              06261 R 004072 R *L
              06262 R 004101 R *L
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06263 R 004110 R *L
06264 R 004115 R *L
06265 R 004113 R *L
06266 R 004060 R *L
06267 R 004076 R *L
06270 R 004105 R *L
06271 R 004067 R *L
06272 R 000015 A *L
06273 R 004061 R *L
06274 R 005016 R *L
06275 R 004077 R *L
06276 R 005116 R *L
06277 R 004070 R *L
06300 R 004106 R *L
06301 R 005021 R *L
06302 R 000016 A *L
06303 R 002001 A *L
06304 R 000040 A *L
06305 R 000017 A *L
06306 R 001125 A *L
06307 R 700000 A *L
06310 R 004522 R *L
06311 R 000014 A *L
06312 R 002000 A *L
06313 R 001130 A *L
06314 R 003467 R *L
06315 R 003470 R *L
06316 R 003465 R *L
06317 R 003466 R *L
06320 R 001777 A *L
    SIZE=06347     NO ERROR LINES
```

```
Y1ARG2  00706   538    551*
Y1ARG3  00707   548    552*
Y1SEG   01022   635    644*
Y2      04145   374    411    431    449    957   1224   1231   1233
               2469   2491*
Y2ARG1  00656   515    524*
Y2ARG2  00657   517    525*
Y2ARG3  00660   522    526*
Y2BIG   02401  1497   1509*
Y2SEG   01047   657    666*
ZADD    00752   592*   603    613    681    699    717
ZAME    01134   639    650    661    672    729*   733    750    761
ZAMLUP  01154   745*   760
ZEND    04223  1842   1983   2030   2034   2043   2542*
ZERR1   01313   840    858*
ZIND1   04152   611    659    662    667    670    697    876   2496*
ZIND2   04153   637    640    645    648    679    715    883   2497*
ZOPLUP  01215   779*   794
ZOPP    01175   642    647    664    669    763*   767    789    795
ZSCAN1  06222   730    731    737    764    765    771
ZSCAN2  04157   609    677    695    713   2501*
ZUBNOD  02173  1248   1254   1303   1359*  1367   1880
ZXE     04222  1841   1847   2541*
ZXS     04220  1831   1845   2029   2037   2042   2049   2056   2100
               2129   2539*
ZYS     04221  1836   2005   2012   2113   2196   2217   2249   2271
               2286   2291   2296   2299   2307   2540*
Z1      04154   596    614    682    700    718    802   2498*
Z2      04155   602    803   2499*
.DA     06230    49     51
```