

DR. JOHN MANIOTES
COMPUTER TECHNOLOGY DEPT.
PURDUE UNIVERSITY
CALUMET CAMPUS
HAMMOND, IN 46323

~~H.J.G.~~

~~NOV 25 1966~~

IBM® 1620

Program Library

IBM 1620/1311 AD-APT NUMERICAL CONTROL PROCESSOR
LISTINGS

1620-CN-06X

DR. JOHN MANIOTES
COMPUTER TECHNOLOGY DEPT
PURDUE UNIVERSITY
CALUMET CAMPUS
HAMMOND, IN 46323



40 Saw Mill River Road
Hawthorne, New York 10532
White Plains 9-1900 (Code 914)

International Business Machines Corporation

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IBM 1620/1311 AD-APT NUMERICAL CONTROL PROCESSOR

1620-CN-06X

LISTINGS

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03190 TDAT10 DS 10 03412 00010
 03200 TDAT11 DS 10 03422 00010
 04010 DS 863 04285 00863
 04020* OUTPUT FORMAT-----USING TDATA TABLE AS TEMPORARY STORAGE
 04030 NSEC DS ,TDATA-6, NUMBER OF ADDITIONAL SECTORS TO READ 03327 00000
 04040 NFLW DS ,TDATA-4, NUMBER OF FLOATING POINT WORDS 03329 00000
 04050 SSND DS ,TDATA-4, SOURCE STATEMENT NUMBER 03337 00000
 04060 RND DS ,TDATA+8, INTERNAL RECORD NUMBER 03341 00000
 04070 NRT DS ,TDATA+12, MAJOR RECORD TYPE 03345 00000
 04080 NSRT DS ,TDATA+16, SUBRECORD TYPE 03349 00000
 04090 NSRF DS ,TDATA+18, SURFACE TYPE 03351 00000
 04100* SYMB TABLE-----USED TO COLLECT CANONICAL FORM TO STORE
 04110 DS 1 04286 00001
 04120 SYMB1 DS 3 04289 00003
 04130 SYMB2 DS 12 04301 00012
 04140 SYMB3 DS 2 04303 00002
 04150 SYMB4 DS 2 04305 00002
 04160 SYMB5 DS 10 04315 00010
 04170 SYMB6 DS 10 04325 00010
 04180 SYMB7 DS 10 04335 00010
 04190 DS 851 05186 00851
 04200* MACSUB TABLE ---USED TO STORE VALUES FOR A MACRO
 05010 SAVE DS 1 05187 00001
 05020 MACSUB DS 1 05188 00001
 05030* LEVEL 1
 05040 DS 300 05488 00300
 05050* LEVEL 2
 05060 DS 300 05788 00300
 05070* LEVEL 3
 05080 DS 301 06089 00301
 05090* WORDL TABLE ----USED TO STORE ELEMENTS OF INPUT STATEMENT
 05100 WORDL DAS 1 06091 00002
 05110 DC 50,0 06141 00050
 05120 DC 50,0 06191 00050
 05130 DC 50,0 06241 00050
 05140 DC 50,0 06291 00050
 05150 DC 50,0 06341 00050
 05160 DC 50,0 06391 00050
 05170 DC 50,0 06441 00050
 05180 DC 50,0 06491 00050
 05190 DC 50,0 06541 00050
 05200 DC 50,0 06591 00050
 06010 DC 50,0 06641 00050
 06020 DC 50,0 06691 00050
 06030 DC 50,0 06741 00050
 06040 DC 50,0 06791 00050
 06050 DC 50,0 06841 00050
 06060 UC 50,0 06891 00050
 06070 DC 50,0 06941 00050
 06080 DC 50,0 06991 00050
 06090 DC 50,0 07041 00050
 06100 DC 50,0 07091 00050
 06110 DC 50,0 07141 00050
 06120 DC 50,0 07191 00050
 06130 DC 50,0 07241 00050
 06140 DC 50,0 07291 00050

06150 DC 50,0 07341 00050
 06160 DC 40,0 07381 00040
 06170 ENDL DS ,* 07381 00000
 06180 TOEX DC 5,0 07386 00005
 06190 PIN DC 5,0 07391 00005
 06200* MACRO STATEMENT INPUT AREA
 07010 INDATA1 DC 4,144 07395 00004
 07020 DC 12,999999999999 07407 00012
 07030* CARD OR TYPEWRITER INPUT AREA
 07040 INDATA2 DAS 72 07409 00144
 07050 ALSEQ DS 16 07567 00016
 07060 ALREC DAC 1,* 07569 00002
 07070 DC 1,* 07570 00001
 07080 DS 23 07593 00023
 07090* RECORD AND SUBRECORD TYPE----TEMPORARY STORAGE
 07100 SRTYPE DS 4 07597 00004
 07110 RTYPE DS ,SRTYPE-2 07595 00000
 07120* STORAGE FOR IF OR JUMPTO STATEMENT NUMBER
 07130 DC 8,10000000 07605 00008
 07140 NJUMP DC 2,1 07407 00002
 07150 DC 8,0 07615 00008
 07160 FLCON DC 2,-99 07617 00002
 07170* TEMPORARY STORAGE FOR NUMBER OF PARAMETER WORDS
 07180 NPM DS 5 07622 00005
 07190 IAT2 DS 5 07627 00005
 07200 FOUND DS 1 07628 00001
 08010 HISEQ DC 8,0 07636 00008
 08020 RECND DS 4 07640 00004
 08030 ZEROK DC 8,0 07648 00008
 08040* TEMPORARY STORAGE FOR SOURCE SEQUENCE NUMBER
 08050 SEQMD DS 8 07656 00008
 08060 NAT1 DS 5 07661 00005
 08070 NAT2 DS 5 07666 00005
 08080 DC 2,0 07668 00002
 08090 FLZZ DC 2,0 07670 00002
 08100 DC 8,0 07678 00008
 08110 FLZERO DC 2,-99 07680 00002
 08120 ERR DC 2,0 07682 00002
 08130 DIG1 DC 2,0 07684 00002
 08140 DIG2 DC 2,1 07686 00002
 08150 MAXMAJ DC 3,124 07689 00003
 08160 CHK DS 2 07691 00002
 08170 TENALS DS 5 07696 00005
 08180 ILNEXT DS 2 07698 00002
 08190 IMPREV DS 1 07699 00001
 08200 IWTEMP DS 5 07704 00005
 09010 IHD DS 3 07707 00003
 09020 LCTAPE DS 1 07708 00001
 09030 FORM DS 4 07712 00004
 09040 STOP DS 1 07713 00001
 09050 FILFLG DS 1 07714 00001
 09060 CODE DS 1 07715 00001
 09070 MCDUT DS 2 07717 00002
 09080 MACPIK DS 2 07719 00002
 09090 MACSAV DS 2 07721 00002
 09100 ALTEMP DS 5 07726 00005
 09110 IAT1 DS 5 07731 00005
 09120 PRETEM DS 1 07732 00001
 09130 NEQUAL DS 1 07733 00001
 09140 FSTWD DS 1 07734 00001


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09150 TNEST DS 4
09160 PLACE DS 5
09170 TERM DS 1
09180 IFJUMP DS 1
09190 NSTPLG DS 1
09200 NDLANK DS 1
10010 CT DS 1
10020 ARGDSA DSA NAT1,NAT2

10030 SCOSA DSA INIT
10040 DSC 5,03101
10050 SFLAG DS 1
10060 TABOUT DS 1
10070 DS 99
10080 DGM
10090 NT DS 4
10100 MCT DS 2
10110 TSTUFF DS 8
10120 DEX DC 2,0
10130 OC DC 4,0
10140 NOWRIT DC 3,0
10150 MOGET DS 3
10160 MO3 DC 5,0
10170 MO4 DC 3,0
10180 BB2
10190 INITIALIZE TO START RUN
10200 START TFM RECNO,,8, INITIALIZE RECORD COUNT
11010 TFM INO,,9, INITIALIZE ERROR INDICATOR
11020 TFM TSTUFF,TABOUT*13,, INITIALIZE INDEX TABLE
11030 CF SFLAG
11040 CF LCTAPE
11050 TFL ZSURFX,FLZERO
11060 TFL ZSURFY,FLZERO
11070 TFL ZSURFZ,FLZERO
11080 TFL ZSURFD,FLZERO
11090 CF CT
11100 SF FILFLG
11110 TF SEQNO,ZEROK,, INITIALIZE SEQUENCE NUMBER
11120 TFM MACPIK,,10, INITIALIZE CALL MACRO COUNTER
11130 TFM MACSAV,,10, INITIALIZE SAVE MACRO COUNTER
11140 CF IFJUMP
11150 TOM 0,0
11160 TFM ALTEMP,1,711
11170 ADD20 AM ALTEMP,20000
11180 CHKMDD TR ALTEMP,ALREC-1,6
11190 BMR ADD20,0
11200 BV **12
12010 AM ALTEMP,1,10
12020 BNV SETM
12030 TFM ALTEMP,99998
12040 SETM NOP
12050 BEGN TRA

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07738 00004
07743 00005
07744 00001
07745 00001
07746 00001
07747 00001
07748 00001
07753 00005 -7661
07758 00005 -7666
07763 00005 -7976
07764 00005
07769 00001
07770 00001
07869 00099
07870 00001
07874 00004
07876 00002
07881 00005
07883 00002
07887 00004
07890 00003
07893 00003
07898 00005
07901 00003
07902 42 00000 00000
07904 16 07640 0-000
07916 16 07707 00-00
07928 16 07881 -7783
07940 33 07769 00000
07952 33 07708 C0000
07964 06 02501 07680
07976 06 02511 07680
07988 06 02521 07680
08000 06 02531 07680
08012 33 07748 C0000
08024 32 07714 00000
08036 26 07656 07648
08048 16 07719 000-0
08060 16 07721 000-0
08072 33 07745 00000
08084 15 00000 00000
08096 16 07726 -000J
08108 11 07726 K0000
08120 31 07720 07568
08132 45 08108 00000
08144 46 08156 01400
08156 11 07726 000-1
08168 47 08192 01400
08180 16 07726 R4998
08192 41 00000 00000
08204 10 00585 -8223
08216 49 00716 00000
08223 00002 2K

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08225 00005 -8231
08230 00001 *
08231 00006 1J9783
08237 00003 -03
08240 00006 -0000*
07904
07904
07904 17 10980 -3230
07916 49 02410 00000
07928 26 12389 07726
07940 17 10980 -3010
07952 17 10980 -3020
07964 17 10980 -3060
07976 46 07904 00400
07988 06 07597 07670
08000 32 07746 00000
08007
08011 00005
08012 16 07738 -0000
08024 16 09014 -6091
08036 32 07734 00000
08043
08047 00005
08048 32 07732 00000
08059 00005
08060 32 07699 00000
08067
08071 00005
08072 33 07713 00000
08084 14 07719 000-0
08096 47 09984 01200
08108 49 08352 00000
08120 37 07409 00500
08132 47 08284 00100
08144 16 08167 -7567
08156 43 08224 09999
08168 12 08167 000-1
08180 43 08212 0816P
08192 12 08167 000-1
08204 49 08156 00000
08212 11 08167 000-1
08224 11 08167 000-2
08236 15 0816P 00000
08247 00001
08248 34 00000 00102
08260 39 07409 00100
08272 19 0816P 00000

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25010      0      INIT                               10100 49 07976 00000
25020 PSHD  TF  SAVE1,SAVE2,,     PUSHDOWN SECTOR ADDRESS          10112 26 08011 08047
25030      TR  MACSUB,MACSUB+301,, PUSHDOWN MACSUB TABLE 10124 31 05188 05489
25040      CM  SAVE3,,                10136 14 08071 -0000
25050      BNE FULL                    10148 47 10180 01200
25060      TFM SAVE2,,                10160 16 08047 -0000
25070      B7  INIT                     10172 49 07976 00000
25080 FULL  TF  SAVE2,SAVE3,,     PUSHDOWN SECTOR ADDRESS          10180 26 08047 08071
25090      TR  MACSUB+301,MACSUB+601,, PUSHDOWN MACSUB TABLE 10192 31 05489 05789
25100      TFM SAVE3,,                10204 16 08071 -0000
25110      B7  INIT                     10216 49 07976 00000
25120*     COMPLETE STATEMENT IN WORDL ----NOW PROCESS
25130*     IF MACRO STATEMENT REPLACE DUMMY VARIABLES WITH CALL VALUES
25140 PROCES CM  MACPIK,,10          10224 14 07719 000-0
25150      BE  INIT2                    10236 46 10268 01200
25160*     LOAD AND CALL SUBPROGRAM REPLAC
25170      BTM MONITR,03180            10248 17 10980 -3180
25180      B7  REPLAC,,6               10260 49 02410 00000
25190 INIT2 TFM LPAR,,10,           INITIALIZE PARENTHESIS COUNTERS 10268 16 10277 000-0
25200 LPAR  DS  ,*-2                  10277 00000
26010      TF  NAT1,INRED              10280 26 07661 09199
26020      TF  LEFT+6,INRED            10292 26 10426 09199
26030 C22  CM  LEFT+6,22,610,,     CHECK FOR END OF WORD LIST       10304 14 10420 000K2
26040      BNE LEFT                    10316 47 10420 01200
26050      TF  NAT2,LEFT+6            10328 26 07666 10426
26060*     LOAD AND CALL CALC TO PROCESS SIMPLE STATEMENT
26070 DIM502 BT  MONITR,DSA502+5      10340 27 10980 02491
26080      B   CALC,,6                10352 49 02410 00000
26090      DORG *-3                   10360
26100      BNF INIT,SFLAG,,           MUST SIMPLE BE CALLED 10360 44 07976 07769
26110      CF  SFLAG                    10372 33 07769 00000
26120      CF  ARGDSA+1                10384 33 07754 00000
26130*     LOAD AND CALL SIMPLE SUBPROGRAM
26140      BT  MONITR,SCDSA+5          10396 27 10980 07768
26150      BT  SIMPLE,ARGDSA+5,6      10408 27 02410 07758
26160 LEFT  CM  9999,3,10,           CHECK FOR PUNCTUATION 10420 14 09599 000-3
26170      BNE ADDIT                    10432 47 10528 01200
26180      TF  +*30,LEFT+6,,         INITIALIZE SCAN FOR PARENTHESIS 10444 26 10474 10426
26190      AM  +*18,12,10             10456 11 10474 000J2
26200 COMPL CM  9999,24,10,         CHECK FOR LEFT PARENTHESIS       10468 14 09999 000K4
27010      BNE RGTPR                    10480 47 10548 01200
27020      TFM LPAR,1,10              10492 16 10277 000-1
27030      TF  NAT1,LEFT+6,,         STORE ADDRESS OF LEFT PARENTHESIS 10504 26 07661 10426
27040      AM  NAT1,14,10,            INCREMENT TO LOOK AT NEXT WORD   10516 11 07661 000J4
27050 ADDIT AM  LEFT+6,14,10         10528 11 10426 000J4
27060      B   C22                    10540 49 10304 00000
27070      DORG *-3                   10548
27080 RGTPR CM  COMPL+6,4,610,,     CHECK FOR RIGHT PAREN 10548 14 1047M C00-4
27090      BNE ADDIT                    10560 47 10528 01200
27100      TF  NAT2,COMPL+6,,         STORE ADDRESS OF RIGHT PARENTHESIS 10572 26 07666 10474

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27110      SM  NAT2,26,10             10584 12 07666 000K6
27120      SM  LPAR,1,10              10596 12 10277 000-1
27130      BE  SEP                      10608 46 10652 01200
27140*     NO CLOSED SET OF PAREN ---LOAD AND CALL TYPERR
27150      BTM MONITR,03090            10620 17 10980 -3090
27160      BTM TYPERR,106,67          10632 17 02410 -0106
27170      B   INIT                     10644 49 07976 00000
27180      DORG *-3                   10652
27190 SEP  TF  +*18,NAT1,,           SCAN BETWEEN NAT1-NAT2 FOR SLASH 10652 26 10670 07661
27200      CM  9999,3,10              10664 14 09999 000-3
28010      BNE INCR                     10676 47 10822 01200
28020      AM  SEP+18,12,10           10688 11 10670 000J2
28030      CM  SEP+18,21,610,,     CHECK FOR SLASH                   10700 14 1067- 000K1
28040      BNE INCR14+12             10712 47 10792 01200
28050*     CHECK PREVIOUS WORD FOR SYSTEM WORD
28060*     LOAD AND CALL DICT1 SUBPROGRAM
28070      BTM MONITR,03030            10724 17 10980 -3030
28080      SM  SEP+18,14,10           10736 12 10670 000J4
28090      TF  +*23,SEP+18           10748 26 10771 10670
28100      BTM DICT,9999,67          10760 17 02410 -9999
28110      B7  DIM506,,               10772 49 10846 00000
28120 INCR14 AM  SEP+18,12,10,       INCREMENT TO LOOK AT NEXT WORD   10780 11 10670 000J2
28130      AM  SEP+18,2,10           10792 11 10670 000-2
28140      B   SEP+12,,               10804 49 10664 00000
28150      DORG *-3                   10812
28160 SOSA DSA NAT1,NAT2            10816 00005 -7661
28170 FLAGC CF  SOSA+1              10822 33 10817 00000
28180      TRA                       10834 10 00565 J0853
28190      TCD FLAGC                  10846 49 00716 00000
28200      DORG FLAGC                  10853 00002 2K
29010 INCR C  SEP+18,NAT2,,         CHECK FOR END OF WORD LIST       10855 00005 J0861
29020      BNE INCR14                 10860 00001
29030*     LOAD AND CALL SIMPLE TO REDUCE A NEST
29040 DIM506 BT  MONITR,DSA506+5     10861 00006 1J9783
29050      BT  SIMPLE,SOSA+5,6       10867 00003 -03
29060*     LOAD AND CALL POSIMP
29070 DIM501 BT  MONITR,DSA501+5     10870 00006 -0000*
29080      B   POSIMP,,6             10822
29090      DORG *-3                   10822
29100*     CARD SEQUENCE ERROR ---- TYPE WARNING MESSAGE
29110 TYPE RCTY                      10822 24 10670 07666
29120      WATY CORD                    10834 47 10780 01200
29130      B7  CHRD                      10846 27 10980 02481
29140 CORD DAC  %CARD SEQ%          10858 27 02410 10821
29150*     LOAD AND CALL TYPERR SUBPROGRAM TO TYPE MESSAGE
29160 ALSERR BTM MONITR,03090         10870 27 10980 02471
29170      BT  TYPERR,PLACE,6        10882 49 02410 00000
29180 ETC  DS  ,CLSTOP                10890
29190      08072 00000

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29190
29200*
30010*
30020*
30030*
30040*
30050*
30060*
30070*
30080*
30090*
30100*
30110*
30120*
30130*
30140*
30150*
30160*
30170*
30180*
30190*
30200*
31010*
31020*
31030*
31040*
31050*
31060*
31070*

HEAD X

00000

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IBM 1620-1311 AD-APT SUBPROGRAM FOR SUPERVISING
THE LOADING OF AD-APT SUBROUTINES AND SUBPROGRAMS

LINKAGE - BTM MONITR,NNNO,67, (ERASABLE PROG.) RCS
BT MONITR,DSALBL+5,6, (NON-ERASABLE PROG.)

NNNN IS THE MONITOR I DIM NO. OF CALLED PROGRAM

FIELD AT DSALBL+5 IS EQUIVALENT TO FOLLOWING...
DSALBL DSA RA RETURN ADDRESS TO CALLING PROG.
DSC 4,NNNN, MONITOR I DIM NO.
DSC 1,1, ANY NON-ZERO DIGIT

*ERASABLE PROGRAMS NEVER CALL OTHER PROGRAMS
*NON-ERASABLE PROGRAMS CALL OTHER PROGRAMS

*ERASABLE PROGRAMS MUST EXIT BY BRANCH BACK
OR BY BRANCH TO A FIXED ADDRESS

*NON-ERASABLE PROGRAMS MUST EXIT BY BRANCH
INDIRECT TO RETURN (IN AD-APT SYSTEM COMMON AREA)

31080 IDENT DS 5 10968 00005
31090 DC 1, 10969 00001
31100 DC 10,0 10979 00010
31110 RETADD DS 5,-5, RETURN ADDRESS FOR BRANCH-EXIT PROGRAMS
10974 00005
31120 DIMNO DS 4,-1, SPS II-D MONITOR PROGRAM DIM NO.
10978 00004
31130 ERAS DS 1,, ERASABILITY INDICATOR 10979 00001
31140*
31150 MONITR SF DIMNO-3 10980 32 10975 00000
31160 DORG -4 10987
31170*
31180 DSA MAPENT+0*20-15 10991 00005 J3105
31190*
31200 NOP 10992 41 00000 00000
32010 TFM CNTR,NE,10 11004 16 11001 00010
32020 BD CALLNE,ERAS,, BRANCH IF CALLING NON-ERASABLE PROGRAM
11016 43 11850 10979
32030*
32040 CALLE TFM POINTR,MAPENT+20*NNE-16 11028 16 11046 J3264
32050 SCAN C ,DIMNO,, SEARCH ERASABLE PROGRAM TABLE FOR DIM NO
11040 24 00000 10978
32060 BE INMAP,,, BRANCH IF DIMNO LOCATED
11052 46 12422 01200
32070*
32080 AM POINTR-1,2,10 11064 11 11045 000-2
32090 SM CNTR,1,10 11076 12 11001 000-1
32100 BNZ SCAN,,, BRANCH IF END OF TABLE NOT ENCOUNTERED
11088 47 11040 01200
32110*
32120 NUDIM SM POINTR-1,2,10, DIM NO NOT ENTERED IN ERASABLE PROG. TABLE

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11100 12 11045 000-2
32130 CM POINTR,MAPENT+NNE*20-20-16 11112 14 11046 J3244
32140 BNP NEOVF,,, BRANCH IF ERASABLE PROG. TABLE CAPACITY EXCEEDED
11124 47 13062 01100
32150*
32160 CM POINTR,,68, SEARCH FOR UNUSED TABLE ENTRY
11136 14 11040 0-000
32170 BNE NUDIM,,, BRANCH IF ENTRY IS NOT ZERO
11148 47 11100 01200
32180*
32190 NUENT AM POINTR,1,10 11160 11 11046 000-1
32200 STDIM TF POINTR,ERAS,6, STORE DIMNO AND ERASABILITY DIGIT
11172 26 11040 10979
33010 AM POINTR,5,10 11184 11 11046 000-5
33020 TFM VARB+6,HILOAD 11196 16 11314 J1316
33030 TF NCORES+11,HI,, SAVE LOAD ADDRESS 11208 26 11375 00434
33040*
33050 TF POINTR,HI,6, STORE LOAD ADDRESS 11220 26 11040 00434
33060*
33070 TF LODE1+25,DIMNO 11232 26 11281 10978
33080 AM LODE1+25,DELDIM,8, ADD DIM NO. INCREMENT 11244 11 11281 0-000
33090 LODE1 CALL LOAD,0,, LOAD DISC-STORED RELOCATABLE PROGRAM
11256 10 00565 J1275
11268 49 00716 00000
11275 00007 L20-000
11282 00001
33110*
33120 AM POINTR,5,10 11284 11 11046 000-5
33130 TF POINTR,ENTRY,6, STORE ENTRY ADDRESS 11296 26 11040 02136
33140 VARB 8 11308 49 00000 00000
33150 DORG -3 11316
33160*
33170 HILOAD AM POINTR,5,10 11316 11 11046 000-5
33180 TF COMP+11,HI,, MOVE HI INDICATOR 11328 26 11503 00434
33190*
33200 BD STRADD,ERAS,, BRANCH IF NON-ERASABLE ENTRY
11340 43 12050 10979
34010*
34020 TF POINTR,HI,6 11352 26 11040 00434
34030 NCORES SM POINTR,,6, STORE NO. CORES (HI-LOAD ADDRESS)
11364 12 11040 00000
34040*
34050 RESET TF HI,-1,, RESTORE HI INDICATOR TO EFFECT OVERLOAD
11376 26 00434 11375
34060*
34070* CLEAR NON-ERASABLE PROGRAM ENTRIES WHOSE HIGHEST
34080* CORE EXCEEDS THE LOAD ADDRESS OF THE LAST LOADED
34090* ERASABLE PROGRAM
34100 TFM PROGX-18,SETPT 11388 16 12956 J1420
34110 TFM PROGX+23,HI 11400 16 12997 -0434
34120 8 CLEAR1 11412 49 12914 00000
34130 DORG -3 11420
34140*
34150 SETPT SM POINTR-1,1,10, POINTR INDICATES ADDRESS OF LOAD ADDRESS
11420 12 11045 000-1
34160 TF LOPRM,LD,, MOVE LD INDICATOR 11432 26 12451 12309
34170*
34180* ERASE ALL PROGRAMS WHOSE LOAD ADDRESSES
34190* ARE LESS THAN HIGHEST CORE POSITION USED

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34200 ERASE1 TFM COMP+6,MAPENT+20+HNE-1+20-10      11444 16 11498 J3250
35010 AM COMP+5,2,10                                  11456 11 11497 000-2
35020 RANGE CM COMP+6,MAPENT+20+HNE+20+NE-1+20-10  11468 14 11498 J3650
35030 BP STNTRY,,, BRANCH IF ERASING COMPLETED 11480 46 11524 01100

35040*
35050 CBMP CM                                           11492 14 00000 -0000
35060 BN ERDIN,,, BRANCH IF PROGRAM DESTROYED 11504 47 11490 01300

35070 B RANGE-12                                       11516 49 11456 00000
35080 DORG *-3                                        11524
35090*

35100 STNTRY TF ENTRY1,ENTRY,, SET PROGRAM ENTRY ADDRESSES
                                          11524 26 02416 02136
35110 TF ENTRY2,ENTRY1,, IN SYSTEM COMMON AREA 11536 26 02421 02416
35120*

35130 BH DIMND;DNBG,8                                   11548 14 18978 0-201
35140 BE ERDN,,, BRANCH IF CALLED PROGRAM IS BINF-COSF 11560 46 11670 01200

35150*
35160 OVOPF BV **12,,, TURN OFF MONITOR I OVERFLOW
                                          11572 46 11584 01400

35170 BNC4 **84                                        11584 47 11668 00400
35180 NOP                                           11596 41 00000 00000
35190 NOP                                           11608 41 00000 00000
35200 NOP                                           11620 41 00000 00000
36010 NOP                                           11632 41 00000 00000
36020 NOP                                           11644 41 00000 00000
36030 NOP                                           11656 41 00000 00000
36040 BB                                           11668 42 00000 00000
36050 DORG *-9                                       11670
36060*

36070 COSM AM ENTRY2,72,10, FABRICATE ENTRY ADDRESS TO COSF SUBR.
                                          11670 11 02421 000P2
36080 B OVOPF                                           11682 49 11572 CG000
36090 DORG *-3                                        11690
36100*

36110 ERDIN C COMP+6,POINTR                             11690 24 11498 11046
36120 BE RANGE-12,,, NO ERASURE IF PROGRAM JUST LOADED
                                          11702 46 11456 01200

36130*
36140 SM COMP+6,5,10                                  11714 12 11498 000-5
36150 BNF ERASE,COMP+6,11, BRANCH IF PROGRAM NOT ERASED
                                          11726 44 11758 11490

36160*
36170 AM COMP+6,25,10                                  11738 11 11498 000K5
36180 B RANGE                                       11750 49 11468 CC000
36190 DORG *-3                                        11758
36200*

37010 ERASE SF COMP+6,,6, ERASE PROGRAM FROM MEMORY
                                          11758 32 11490 00000

37020*
37030 AM COMP+6,5,10                                  11770 11 11498 000-5
37040 C COMP+6,LOPRM,6                                11782 24 11490 12457
37050 BN RANGE-12,,, BRANCH IF PROGRAM NOT LOADED BY LO INDICATOR
                                          11794 47 11456 01300

37060*
37070 AM COMP+5,1,10                                   11806 11 11497 000-1
37080 A LO,COMP+6,11, RE-DEFINE LO INDICATOR
                                          11818 21 12389 11490

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37090*
37100 AM COMP+5,1,10                                   11830 11 11497 000-1
37110 B RANGE                                       11842 49 11468 00000
37120 DORG *-3                                        11850
37130*

37140* *ENTRY FOR CALLING NON-ERASABLE PROGRAM
37150 CALLNE TFM POINTR,MAPENT+0+20-15                 11850 16 11046 J3105
37160 BNF INDEX,POINTR,11, BRANCH IF USED ENTRY 11862 44 12190 11040
37170*

37180 SM POINTR,1,10                                   11874 12 11046 000-1
37190 C DIMND,POINTR,11                              11886 24 10978 11040
37200 BNE STDIM-12,,, BRANCH IF PROGRAM MUST BE LOADED
                                          11898 47 11160 01200

38010*
38020 AM POINTR,6,10, MGN-ERASABLE PROGRAM IS IN MEMORY
                                          11910 11 11046 000-6
38030 C POINTR,HI,6                                   11922 24 11040 00434
38040 BNE MENHAP,,, 11934 47 13082 01200
38050 SM POINTR,5,10                                  11946 12 11046 000-5
38060 CF POINTR,,6, CLEAR ERASURE FLAG 11958 33 11040 00000
38070*

38080 AM POINTR-1,1,10,                               11970 11 11045 000-1
38090 TF ENTRY1,POINTR,11, SET ENTRY ADDRESS IN SYSTEM COMMON AREA
                                          11982 26 02416 11040

38100*
38110 AM POINTR,5,10                                  11994 11 11046 000-5
38120 TF COMP+11,POINTR,11, RESTORE COMP+11 (SIMULATE LOADING)
                                          12006 26 11503 11040

38130 TF POINTR,RETADD,6, REPLACE RETURN ADDRESS
                                          12018 26 11040 10974
38140 TF HI,COMP+11,, RESTORE HI INDICATOR 12030 26 00434 11503
38150 B STNTRY+12                                     12042 49 11536 00000
38160 DORG *-3                                        12050
38170*

38180 STAAD TF POINTR,RETADD,6, STORE RETURN ADDRESS 12050 26 11040 10974
38190*

38200* CLEAR NON-ERASABLE PROGRAM ENTRIES WHOSE LOAD
39010* ADDRESSES ARE LESS THAN THE HI INDICATOR

39020 SM POINTR-1,1,10                                 12062 12 11045 000-1
39030 TF ENDTAB+18,POINTR                             12074 26 12128 11046
39040 AM ENDTAB+17,2,10                               12086 11 12127 000-2
39050 CM ENDTAB+18,MAPENT+20+HNE-10                 12098 14 12128 J3270
39060 ENDTAB BNM SETPT+12,,, BRANCH IF END OF TABLE ENCOUNTERED
                                          12110 46 11432 01300

39070*
39080 C HI                                           12122 24 00000 00434
39090 BNM ENDTAB-24,,, BRANCH IF ENTRY NEED NOT BE CLEARED
                                          12134 46 12086 01300

39100*
39110 SM ENDTAB+18,5,10                               12146 12 12128 000-5
39120 TFM ENDTAB+18,,6711, CLEAR NON-ERASABLE ENTRY FROM TABLE
                                          12158 16 12120 -000-
39130 AM ENDTAB+18,25,10                             12170 11 12128 000K5
39140 B ENDTAB-12                                     12182 49 12098 00000
39150 DORG *-3                                        12190
39160*

39170 INDEA AM POINTR-1,2,10                          12190 11 11045 000-2
39180 CM POINTR,MAPENT+HNE+20-15                   12202 14 11046 J3265
39190 BN CALLNE+12,,, BRANCH IF NON-ERASABLE PROGRAM TABLE
                                          12214 47 11862 01300

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45020 B STDIM*24 12906 49 11196 00000
45030 DORG *-3 12914
45040
45050 CLEAR1 TFM PROGX-1,MAPENT-1*20-15 12914 16 12973 J3085
45060 AM PROGX-2,2,10 12926 11 12972 000-2
45070 CM PROGX-1,MAPENT+ANE*20-1*20-15 12938 14 12973 J3245
45080 BP ... BRANCH IF ENTRY CLEARING COMPLETED
12950 46 00000 01100
45090*
45100 BNF CLEAR1*12,... BRANCH IF PROGRAM NOT EXITED
12962 44 12926 CC003
45110*
45120 PROGX AM PROGX-1,15,10 12974 11 12973 000J5
45130 C PROGX-1,,6 12986 24 1297L CC000
45140 BP CLENT1,... BRANCH IF ENTRY CLEARING IS REQUIREC
12998 46 13030 01100
45150*
45160 AM PROGX-1,5,10 13010 11 12973 000-5
45170 B CLEAR1*24 13022 49 12938 CC000
45180 DORG *-3 13030
45190*
45200 CLENT1 SM PROGX-1,15,10 13030 12 12973 000J5
46010 TFM PROGX-1,,6711, CLEAR NON-ERASARLF PROGRAM ENTRY
13042 16 1297L -000-
46020 B CLEAR1*12 13054 49 12926 CC000
46030 DORG *-3 13062
46040*
46050 NEOVF TFM WRERR*11,NECON,9 13062 16 12273 00J41
46060 B NNEOVF*12 13074 49 12238 CC000
46070 DORG *-3 13082
46080 MENGAP SM POINTR,6,10 13082 12 11046 000-6
46090 B STDIM-12 13094 49 11160 CC000
46100 DORG *-4 13101
46110*
46120 NNE DS 2,8 00008 00002
46130 NE DS 2,30 00030 00002
46140 MAPFMT DSB 20,NNE 13120 00160
46150 DSB 20,NE 13280 00600
46160*
46170* *FORMAT OF NON-ERASABLE PROGRAM ENTRIES...
46180*
46190* MONITOR I NON-ZERO LOAD ENTRY RETURN
46200* DIM NO DIGIT ADDRESS ADDRESS ADDRESS
47010* XXXX X XXXXX XXXXX XXXXX
47020*
47030 DORG MAPENT*0*20-19 13101
47040 DC 5,-0 13105 00005
47050 DC 5,0 13110 00005
47060 DORG MAPENT*0*20-4 13116
47070 DC 5,0 13120 00005
47080 DC 5,-0 13125 00005
47090 DC 5,0 13130 00005
47100 DORG MAPENT*1*20-4 13136
47110 DC 5,0 13140 00005
47120 DC 5,-0 13145 00005
47130 DC 5,0 13150 00005
47140 DORG MAPENT*2*20-4 13156
47150 DC 5,0 13160 00005
47160 DC 5,-0 13165 00005
47170 DC 5,0 13170 00005

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47180 DORG MAPENT*3*20-4 13176
47190 DC 5,0 13180 00005
47200 DC 5,-0 13185 00005
48010 DC 5,0 13190 00005
48020 DORG MAPENT*4*20-4 13196
48030 DC 5,0 13200 00005
48040 DC 5,-0 13205 00005
48050 DC 5,0 13210 00005
48060 DORG MAPENT*5*20-4 13216
48070 DC 5,0 13220 00005
48080 DC 5,-0 13225 00005
48090 DC 5,0 13230 00005
48100 DORG MAPENT+NNE*20-2*20-4 13236
48110 DC 5,0 13240 00005
48120 DC 5,-0 13245 00005
48130 DC 5,0 13250 00005
48140 DORG MAPENT+NNE*20-1*20-4 13256
48150 DC 5,0 13260 00005
48160*
48170* *FORMAT OF ERASABLE PROGRAM ENTRIES...
48180*
48190* MONITOR I ZERO LOAD ENTRY NUMBER
48200* DIM NO DIGIT ADDRESS ADDRESS CORES
49010* XXXX X XXXXX XXXXX XXXXX
49020*
49030 DORG MAPENT+NNE*20+0*20-19 13261
49040 DC 4,0302,, WASH DIMNO 13264 00004
49050 DC 1,0 13265 00001
49060 DC 5,99999,, DUMMY LOAD ADDRESS 13270 00005
49070 DORG MAPENT+NNE*20+0*20-4 13276
49080 DC 5,290,, WASH CORE LENGTH 13280 00005
49090 DC 4,0301,, ALPHA DIMNO 13284 00004
49100 DC 1,0 13285 00001
49110 DC 5,99999,, DUMMY LOAD ADDRESS 13290 00005
49120 DORG MAPENT+NNE*20+1*20-4 13296
49130 DC 5,1042 13300 00005
49140 DC 4,0306,, ALSCAN DIMNO 13304 00004
49150 DC 1,0 13305 00001
49160 DC 5,99999,, DUMMY LOAD ADDRESS 13310 00005
49170 DORG MAPENT+NNE*20+2*20-4 13316
49180 DC 5,1644 13320 00005
49190 DC 4,0303,, DICT1 DIMNO 13324 00004
49200 DC 1,0 13325 00001
50010 DC 5,99999,, DUMMY LOAD ADDRESS 13330 00005
50020 DORG MAPENT+NNE*20+3*20-4 13336
50030 DC 5,1170,, DICT1 CORE LENGTH 13340 00005
50040 DC 4,0313,, OUTPUT DIMNO 13344 00004
50050 DC 1,0 13345 00001
50060 DC 5,99999,, DUMMY LOAD ADDRESS 13350 00005
50070 DORG MAPENT+NNE*20+4*20-4 13356
50080 DC 5,704 13360 00005
50090 DC 4,0319,, FILE1 DIMNO 13364 00004
50100 DC 1,0 13365 00001
50110 DC 5,99999,, DUMMY LOAD ADDRESS 13370 00005
50120 DORG MAPENT+NNE*20+5*20-4 13376
50130 DC 5,2130,, FILE1 CORE LENGTH 13380 00005
50140 DC 4,0314,, FINDZ DIMNO 13384 00004
50150 DC 1,0 13385 00001
50160 DC 5,99999,, DUMMY LOAD ADDRESS 13390 00005
50170 DORG MAPENT+NNE*20+6*20-4 13396

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50180	DC	5,170		13400	00005
50190	DC	4,0315,,	ZSURF DIMNO	13404	00004
50200	DC	1,0		13405	00001
51010	DC	5,99999,,	DUMMY LOAD ADDRESS	13410	00005
51020	DORG	HAPENT+NNE=20+7*20-4		13416	
51030	DC	5,302,,	ZSURF CORE LENGTH	13420	00005
51040	DC	4,0200,,	SQRTF DIMNO	13424	00004
51050	DC	1,0		13425	00001
51060	DC	5,99999,,	DUMMY LOAD ADDRESS	13430	00005
51070	DORG	HAPENT+NNE=20+8*20-4		13436	
51080	DC	5,446,,	SQRTF CORE LENGTH	13440	00005
51090	DC	4,0212,,	LCNCN1 DIMNO	13444	00004
51100	DC	1,0		13445	00001
51110	DC	5,99999,,	DUMMY LOAD ADDRESS	13450	00005
51120	DORG	HAPENT+NNE=20+9*20-4		13456	
51130	DC	5,292,,LCNON1	CORE LENGTH	13460	00005
51140	DC	4,0214,,	NORMLN DIMNO	13464	00004
51150	DC	1,0		13465	00001
51160	DC	5,99999,,	DUMMY LOAD ADDRESS	13470	00005
51170	DORG	HAPENT+NNE=20+10*20-4		13476	
51180	DC	5,236,,	NORMLN CORE LENGTH	13480	00005
51190	DC	4,0205,,	LINLIN DIMNO	13484	00004
51200	DC	1,0		13485	00001
52010	DC	5,99999,,	DUMMY LOAD ADDRESS	13490	00005
52020	DORG	HAPENT+NNE=20+11*20-4		13496	
52030	DC	5,228,,	LINLIN CORE LENGTH	13500	00005
52040	DC	4,0213,,	MINF DIMNO	13504	00004
52050	DC	1,0		13505	00001
52060	DC	5,99999,,	DUMMY LOAD ADDRESS	13510	00005
52070	DORG	HAPENT+NNE=20+12*20-4		13516	
52080	DC	5,92,,	MINF CORE LENGTH	13520	00005
52090	DC	4,0201,,	SINF COSF DIMNO	13524	00004
52100	DC	1,0		13525	00001
52110	DC	5,99999,,	DUMMY LOAD ADDRESS	13530	00005
52120	DORG	HAPENT+NNE=20+13*20-4		13536	
52130	DC	5,488,,	SINF COSF CORE LENGTH	13540	00005
52140	DC	4,0202,,	ATANF DIMNO	13544	00004
52150	DC	1,0		13545	00001
52160	DC	5,99999,,	DUMMY LOAD ADDRESS	13550	00005
52170	DORG	HAPENT+NNE=20+14*20-4		13556	
52180	DC	5,738,,	ATANF CORE LENGTH	13560	00005
52190	DC	4,0203,,	EXPF DIMNO	13564	00004
52200	DC	1,0		13565	00001
53010	DC	5,99999,,	DUMMY LOAD ADDRESS	13570	00005
53020	DORG	HAPENT+NNE=20+15*20-4		13576	
53030	DC	5,768,,	EXPF CORE LENGTH	13580	00005
53040	DC	4,0204,,	LOGF DIMNO	13584	00004
53050	DC	1,0		13585	00001
53060	DC	5,99999,,	DUMMY LOAD ADDRESS	13590	00005
53070	DORG	HAPENT+NNE=20+16*20-4		13596	
53080	DC	5,632,,	LOGF CORE LENGTH	13600	00005
53090	DC	4,0318,,	REPLAC DIMNO	13604	00004
53100	DC	1,0		13605	00001
53110	DC	5,99999,,	DUMMY LOAD ADDRESS	13610	00005
53120	DORG	HAPENT+NNE=20+17*20-4		13616	
53130	DC	5,484,,	REPLAC CORE LENGTH	13620	00005
53140	DC	4,0309,,	TYPERR DIMNO	13624	00004
53150	DC	1,0		13625	00001
53160	DC	5,99999,,	DUMMY LOAD ADDRESS	13630	00005
53170	DORG	HAPENT+NNE=20+18*20-4		13636	

53180	DC	5,396		13640	00005
53190	DC	4,0304,,	DICT2 DIMNO	13644	00004
53200	DC	1,0		13645	00001
54010	DC	5,99999,,	DUMMY LOAD ADDRESS	13650	00005
54020	DORG	HAPENT+NNE=20+19*20-4		13656	
54030	DC	5,1192		13660	00005
54040	DC	4,0305,,	DICT3 DIMNO	13664	00004
54050	DC	1,0		13665	00001
54060	DC	5,99999,,	DUMMY LOAD ADDRESS	13670	00005
54070	DORG	HAPENT+NNE=20+20*20-4		13676	
54080	DC	5,520,,	DICT3 CORE LENGTH	13680	00005
54090	DC	4,0320,,	FILE2 DIMNO	13684	00004
54100	DC	1,0		13685	00001
54110	DC	5,99999		13690	00005
54120	DORG	HAPENT+NNE=20+21*20-4		13696	
54130	DC	5,610,,	FILE2 CORE LENGTH	13700	00005
54140	DC	4,0321,,	FILE3 DIMNO	13704	00004
54150	DC	1,0		13705	00001
54160	DC	5,99999		13710	00005
54170	DORG	HAPENT+NNE=20+22*20-4		13716	
54180	DC	5,1656		13720	00005
54190	DC	4,0322,,	FILE4 DIMNO	13724	00004
54200	DC	1,0		13725	00001
55010	DC	5,99999,,	DUMMY LOAD ADDRESS	13730	00005
55020	DORG	HAPENT+NNE=20+23*20-4		13736	
55030	DC	5,128,,	FILE4 CORE LENGTH	13740	00005
55040	DC	4,0360,,	PTSLECT DIMNO	13744	00004
55050	DC	1,0		13745	00001
55060	DC	5,99999,,	DUMMY LOAD ADDRESS	13750	00005
55070	DORG	HAPENT+NNE=20+24*20-4		13756	
55080	DC	5,310,,	PTSLECT CORE LENGTH	13760	00005
55090	DC	4,0323,,	ITDUMP DIMNO	13764	00004
55100	DC	1,0		13765	00001
55110	DC	5,99999,,	DUMMY LOAD ADDRESS	13770	00005
55120	DORG	HAPENT+NNE=20+25*20-4		13776	
55130	DC	5,474,,	ITDUMP CORE LENGTH	13780	00005
55140	DC	4,0251,,	OTDS DIMNO	13784	00004
55150	DC	1,0		13785	00001
55160	DC	5,99999		13790	00005
55170	DORG	HAPENT+NNE=20+26*20-4		13796	
55180	DC	5,136,,	OTDS CORE LENGTH	13800	00005
55190	DC	4,0,,	OPEN DIMNO FIELD	13804	00004
55200	DC	1,0		13805	00001
56010	DC	5,99999		13810	00005
56020	DORG	HAPENT+NNE=20+27*20-4		13816	
56030	DC	5,0,,	OPEN CORE LENGTH FIELD	13820	00005
56040	DC	4,0,,	OPEN DIMNO	13824	00004
56050	DC	1,0		13825	00001
56060	DC	5,99999,,	DUMMY LOAD ADDRESS	13830	00005
56070	DORG	HAPENT+NNE=20+28*20-4		13836	
56080	DC	5,0,,	OPEN CORE LENGTH	13840	00005
56090	DC	4,0,,	OPEN DIMNO FIELD	13844	00004
56100	DC	1,0		13845	00001
56110	DC	5,99999,,	OPEN LENGTH FIELD	13850	00005
56120	DORG	HAPENT+NNE=20+NE=20-20-4		13856	
56130	DC	5,0,,		13860	00005
56140*					
56150 CNTR	DS	2,MONITR+21		11001	00002
56160 POINTR	DS	,SCAN+6		11046	00000
56170 HI	DS	5,434		00434	00005

56180	ENTRY	DS	5,2136	02136	00005
56190	DMSC	DS	4,0201	00201	00004
56200	TEMP	DS	5,ERASE+11	11769	00005
57010	LOPRM	DS	5,INMAP+35	12457	00005
57020	NECOM	DS	,141	00141	00000
57030	NNECOM	DS	,140	00140	00000
57040	ERRDIM	DS	,03090	03090	00000
57050	ERROUT	DS	,2416	02416	00000
57060	MENDRY	DS	,20000	20000	00000
57070	DEND	8	START+24	07928	

SYMBOL TABLE

TYPERR	02416	TERMAC	00987R	SETDIG	00474R	SEEMAC	08976	REMARK	01011R
PARTNO	01023R	OVFL03	00334R	MONITR	02406	MACSAY	07721	INSRT1	09516
INSERT	00999R	INDAT4	07409	IFJUMP	07745	FLZERO	00985R	FINISH	09820
DIMS03	08780	CHKOF2	00204R	BRBACK	00960R	ADDTWO	00850R	ADDII	00026R
ADD11	00378R	ADD2	00314R	ALPHA	00002R	BDIG	00346R	CF	00038R
CHEK4	00542R	CHKOF	00136R	CLEAR	00276R	FINI	01035R	FLCCN	07617
HUB	08680	HUB2	08968	INIT	07976	NJUMP	07607	PLACE	07743
PRNO	09492	RD	00586R	SAVO	00912R	SETFI	00754R	SETF2	00838R
SF	00862R	TERM	07744	TPOS	00975R	TRAND	00414R	TRYD	00554R

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01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAN SUBPROGRAM ALPHA
01040*      THE FUNCTION OF THIS SUBPROGRAM
01050*      IS TO CHECK FOR SPECIAL WORDS
01060*      PARTNO INSERT REMARK FINI TERMAC
01070*      LINKAGE IS      BTM MONITR,MNNNO
01080*      B ALPHA
01090*
01100      DC      2,0      00001 00002
01110 ALPHA CF      TERM,,,      CLEAR TERMAC INDICATOR 00002 33 07744 00000
01120*      CLEAR FLAGS IN THE INPUT AREA
01130      TFM      CF+6,INDAT4-1      00014 J6 00044 -7408
01140 ADDII AM      CF+6,2,10      00026 J1 00044 000-2
01150 CF      CF      99999      00038 33 09999 00000
01160      CM      CF+6,INDAT4+141      00050 J4 00044 -7550
01170      BNE      ADDII      00062 M7 00026 01200
01180      BV      +12      00074 M6 00086 01400
01190      C      INDAT4+10,REMARK+10,, CHECK FOR REMARK      00086 2M 07419 01021
01200      BV      CHKOF      00098 M6 00136 01400
02010      BNE      CHKOF      00110 M7 00136 01200
02020      TFM      HUB+6,INIT,,      SET ADDRESS IN MAINLINE TO INIT
      00122 16 08686 -7976
02030*      RETURN TO CALLING PROGRAM
02040      B82      00134 42 00000 00000
02050 CHKOF      BV      +12      00136 M6 00148 01400
02060      C      INDAT4+10,INSERT+10,, CHECK FOR INSERT      00148 2M 07419 01009
02070      BV      CHKOF2      00160 M6 00204 01400
02080      BNE      CHKOF2      00172 M7 00204 01200
02090      TFM      HUB+6,INSRT1,,SET ADDRESS IN MAINLINE TO INSRT1
      00184 16 08686 -9516
02100      B7      CLEAR-12      00196 M9 00264 00000
02110 CHKOF2      BV      +12      00204 M6 00216 01400
02120      C      INDAT4+10,PARTNO+10,, CHECK FOR PARTNO      00216 2M 07419 01033
02130      BV      OVFL03      00228 M6 00334 01400
02140      BNE      OVFL03      00240 M7 00334 01200
02150      TFM      HUB+6,PRTNO,,SET ADDRESS IN MAINLINE TO PRTNO
      00252 16 08686 -9492
02160*      PART NO ---CLEAR FLAGS IN INPUT AREA
02170      TFM      CLEAR+6,INDAT4-1      00264 J6 00282 -7408
02180 CLEAR      CF      99999      00276 33 09999 00000
02190      CM      CLEAR+6,INDAT4+157      00288 J4 00282 -7566
02200      BNE      ADD2      00300 M7 00314 01200
03010*      RETURN TO CALLING PROGRAM
03020      B82      00312 42 00000 00000
03030 ADD2      AM      CLEAR+6,2,10      00314 J1 00282 000-2
    
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03040	B7	CLEAR		00326	M9	00276	00000
03050	OVFLO3	TFM	BDIG+11,INDAT4-1,,	SET UP ADDRESS TO CHECK FOR 1ST DIGIT			
				00334	J6	00357	-7408
03060	BDIG	BD	ADD11,9999,,	CHECK FOR A DIGIT			
03070	AM		BDIG+11,2,10,	INCREMENT TO NEXT POSITION			
				00358	J1	00357	000-2
03080	B7	BDIG		00370	M9	00346	00000
03090	ADD11	TFL	FLCON,FLZERO				
03100	BNF	CHEK4,IFJUMP		00378	00	07617	00985
03110	TFM	SETDIG+6,FLCON-9		00390	M4	00542	07745
03120	TRAND	TD	TPOS,BDIG+11,11	00402	J6	00480	-7608
03130	CF	TPOS		00414	KN	00975	0035P
03140	CM	TPOS,7,10		00426	L3	00975	00000
03150	BNE	CHEK4		00438	J4	00975	000-7
03160	AM	BDIG+11,1,10		00450	M7	00542	01200
03170	SETDIG	TD	9999,BDIG+11,11	00462	J1	00357	000-1
03180	AM	FLCON,1,10		00474	2N	09999	0035P
03190	SF	FLCON-9		00486	11	07617	000-1
03200	AM	SETDIG+6,1,10		00498	32	07608	00000
04010	AM	BDIG+11,1,10		00510	J1	00480	000-1
04020	B7	TRAND		00522	J1	00357	000-1
04030	CHEK4	TFM	TRYD+11,INDAT4+141	00534	M9	00414	00000
04040	TRYD	BD	RD,9999	00542	J6	00565	-7550
04050	SM	TRYD+11,2,10		00554	M3	00586	09999
04060	B7	TRYD		00566	J2	00565	000-2
04070	RD	SM	TRYD+11,10,10	00578	M9	00554	00000
04080	SF	TRYD+11,,6		00586	J2	00565	000J0
04090	AM	TRYD+11,11,10		00598	L2	0056N	00000
04100	BV	++12		00610	J1	00565	000J1
04110	C	TRYD+11,TERNAC+10,6		00622	M6	00634	01400
04120	BV	SETF1		00634	KM	0056N	00997
04130	BNE	SETF1		00646	M6	00754	01400
04140	SF	TERM		00658	M7	00754	01200
04150	BNF	SETF2,IFJUMP		00670	32	07744	00000
04160	CF	IFJUMP		00682	M4	00838	07745
04170	FSUB	FLCON,NJUMP		00694	33	07745	00000
04180	BE	SETF2		00706	02	07617	07607
04190	BTM	MONITR,03090,67		00718	M6	00838	01200
04200	BTM	TYPERR,150,67		00730	17	02400	-3090
05010	SETF1	SM	TRYD+11,7,10	00742	17	02410	-0150
05020	SF	TRYD+11,,6		00754	J2	00565	000-7
05030	AM	TRYD+11,7,10		00766	L2	0056N	00000
05040	BV	++12		00778	J1	00565	000-7
05050	C	TRYD+11,FINI+6,6, CHECK FOR FINI		00790	M6	00802	01400
05060	BV	SETF2		00802	KM	0056N	01041
05070	BE	SAVO		00814	M6	00838	01400
05080*			RESET THE FLAGS IN THE INPUT AREA	00826	M6	00912	01200
05090	SETF2	TFM	SF+6,INDAT4-1	00838	M6	00868	-7408
05100	ADDTWO	AM	SF+6,2,10	00850	M1	00868	000-2
05110	SF	SF	9999	00862	32	09999	00000
05120	CM	SF+6,INDAT4+141		00874	J4	00868	-7550
05130	BNE	ADDTWO		00886	M7	00850	01200
05140	TFM	HUB+6,DIM503,,	SET MAINLINE BRANCH TO DIM503	00898	16	08686	-8780
05150*			RETURN TO CALLING PROGRAM	00910	42	00000	00000
05160	BB2	CM	MACSAV,,10,	00912	14	07721	000-0
05170	SAVO	CM	MACSAV,,10,	00924	M6	00960	01200
05180	BE	BRBACK					
05190*			LOAD AND CALL TYPERR SUBPROGRAM				
05200	BTM	MONITR,03090,67		00936	17	02400	-3090
06010	BTM	TYPERR,129,67		00948	17	02410	-0129
06020	BRBACK	TFM	HUB+6,FINISH,,	SET MAINLINE BRANCH TO FINISH			
				00960	16	08686	-9820
06030*			RETURN TO CALLING PROGRAM				
06040	BB2			00972	42	00000	00000
06050	TPOS	DC	2,0	00975	00002		
06060	DC		8,0	00983	00008		
06070	FLZERO	DC	2,0	00985	00002		
06080	TERMAC	DAC	6,TERMAC	00987	00012		
06090	INSERT	DAC	6,INSERT	00999	00012		
06100	REMARK	DAC	6,REMARK	01011	00012		
06110	PARTNO	DAC	6,PARTNO	01023	00012		
06120	FINI	DAC	4,FINI	01035	00008		
06130*			COMMON AREA WITH MAINLINE				
06140	INDAT4	DS	,07409	07409	00000		
06150	INIT	DS	,07976	07976	00000		
06160	PLACE	DS	,07743	07743	00000		
06170	TERM	DS	,07744	07744	00000		
06180	PRTNO	DS	,09492	09492	00000		
06190	HUB	DS	,08680	08680	00000		
06200	HUB2	DS	,08968	08968	00000		
07010	INSRT1	DS	,09516	09516	00000		
07020	SEEMAC	DS	,08976	08976	00000		
07030	FINISH	DS	,09820	09820	00000		
07040	DIM503	DS	,08780	08780	00000		
07050	TYPERR	DS	,02416	02416	00000		
07060	MACSAV	DS	,07721	07721	00000		
07070	MONITR	DS	,02406	02406	00000		
07080	FLCON	DS	,7617	07617	00000		
07090	NJUMP	DS	,7607	07607	00000		
07100	IFJUMP	DS	,07745	07745	00000		
07110	DEND	ALPHA		00002			

SYMBOL TABLE

TYPERR 02416	SBLANK 00152R	NBLANK 07747	MOVREC 00222R	MONITR 02406
INDAT4 07409	INDAT1 07395	ALTEMP 07726	ERROR 00042R	INIT 07976
MLBR 08804	NEXT 08816	PLUS2 00176R	SPEC 00208R	STEMP 00138R
TCHAR 00066R	WASH 00006R	XREC 00270R		

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01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAN SUBPROGRAM WASH
01040*      THE FUNCTION OF THIS SUBPROGRAM IS TO
01050*      COMPRESS THE BLANKS IN THE INPUT STATEMENT
01060*      LINKAGE IS      BTM MONITR,NNNN0
01070*                        BTM WASH,INDAT4
01080*                        INDAT4 IS THE 1ST POSITION IN INPUT AREA
01090*
01100      DC      6,0                      00005 00006
01110 WASH  TFM  INDAT4+144,,10,      SET RECORD MARK AT END OF INPUT AREA
                                           00006 16 07553 000-0
01120      DC      1,,*                      00017 00001
01130      SF  INDAT4+144,,*      FLAG RECORD MARK      00018 32 07553 00000
01140      BNR  TCHAR,WASH-1,11,    CHECK FOR RECORD MARK IN INPUT STATEMENT
                                           00030 MN 00066 0000N
01150*      LOAD AND CALL TYPERR SUBPROGRAM
01160 ERROR  BTM  MONITR,03090,67      00042 17 02400 -3090
01170      BTM  TYPERR,107,67      00054 17 02410 -0107
01180 TCHAR  BNR  SBLANK,WASH-1,11,    CHECK FOR END OF INPUT AREA
                                           00066 MN 00152 0000N
01190      BNF  ERROR,WASH-1,11,    TEST FOR RECORD MARK IN STATEMENT
                                           00078 MN 00042 0000N
01200      BNF  SPEC,NBLANK,,      CHECK FOR BLANK CARD      00090 M4 00208 07747
02010      TFM  MLBR+6,NEXT ,,      NO BLANK CARD---SET MAINLINE BRANCH
                                           00102 16 08810 -8816
02020      CF  WASH-1,,6                      00114 L3 0000M 00000
02030      CF  NBLANK                      00126 33 07747 00000
02040 STEMP  TF  ALTEMP,WASH-1          00138 20 07726 00005
02050*      RETURN TO CALLING PROGRAM
02060      BB2                                00150 42 00000 00000
02070 SBLANK CM  WASH-1,,610,      CHECK FOR BLANK      00152 J4 0000M 000-0
02080      BE  MOVREC                  00164 M6 00222 01200
02090 PLUS2  AM  WASH-1,2,10,      INCREMENT TO NEXT CHARACTER
                                           00176 J1 00005 000-2
02100      SF  NBLANK                  00188 32 07747 00000
02110      B   TCHAR                  00200 M9 00066 00000
02120      DORG e-3                    00208
02130 SPEC  TFM  MLBR+6,INIT,,      BLANK CARD ---SET MAINLINE BRANCH
                                           00208 16 08810 -7976
02140*      RETURN TO CALLING PROGRAM
02150      BB2                                00220 42 00000 00000
02160*      PREPARE ADDRESS TO ELIMINATE BLANK
02170 MOVREC  TF  XREC+6,WASH-1      00222 K0 00276 00005
02180      TF  XREC+11,WASH-1      00234 K0 00281 00005
02190      SM  XREC+6,1,10          00246 J2 00276 000-1
02200      AM  XREC+11,1,10        00258 J1 00281 000-1
03010 XREC   TR  ,,      MOVE LEFT TO ELIMINATE BLANK
                                           00270 31 00000 00000
03020      DSC  2,49                  00282 00002
03030      DSA  TCHAR                  00288 00005 -0066
    
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03040*      COMMON AREA WITH MAINLINE
03050 MLBR  DS  ,08804                08804 00000
03060 INIT  DS  ,07976                07976 00000
03070 NEXT  DS  ,08816                08816 00000
03080 NBLANK DS  ,07747                07747 00000
03090 MONITR DS ,02406                02406 00000
03100 TYPERR DS ,02416                02416 00000
03110 INDAT1 DS ,07395                07395 00000
03120 INDAT4 DS ,07409                07409 00000
03130 ALTEMP DS ,07726                07726 00000
03140      DEND WASH                  00006
    
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SYMBOL TABLE

SRTYPE 07597	MAXMAJ 00225R	ADSPOT 00150R	DICT 00006R	MAJOR 00227R
MATCH 00054R	MJRT 00937R	NXTRY 00200R	RTYPE 07595	SPOT 00222R

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01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAM SUBPROGRAM DICT1
01040*      THIS SUBPROGRAM DOES A TABLE LOOKUP OF AD-APT SYSTEM WORDS
01050*      TO DETERMINE IF A GIVEN WORD IS A MAJOR SYSTEM WORD
01060*      BTM MONITR,NNNG
01070*      BTM DICT1,PLACE
01080*      PLACE IS THE ADDRESS OF THE WORD TO BE LOOKED UP
01090*
01100      DC      6,0                      00005 00006
01110 DICT  TFM  SPOT,,9,                 INITIALIZE NUMBER OF TRIES COUNTER
                                           00006 J6 00222 00-00
                                           00018 J3 07596 00000
01120      CF  SRTYPE-1
01130      TFM  MATCH+6,MAJOR+10,,        INITIALIZE TO COMPARE FIRST SYSTEM WORD
                                           00030 J0 00060 -0237
                                           00042 M6 00054 01400
01140      BV  **12
01150 MATCH  C  9999,DICT-1,11,          COMPARE WORD WITH SYSTEM WORD
                                           00054 ZM 09999 0000N
                                           00066 M6 00150 01400
                                           00078 M7 00150 01200
01160      BV  ADSPOT
01170      BNE  ADSPOT
01180*      INDEX TO RECORD CORRESPONDING TO WORD FOUND
01190      MM  SPOT,4,10                  00090 J3 00222 000-4
01200      AM  99,MJRT                    00102 LJ 00099 -0937
02010      TF  SRTYPE,99,11,             STORE RECORD IN COMMON AREA
                                           00114 Z6 07597 0009R
                                           00126 Z2 07596 00000
02020      SF  SRTYPE-1
02030      BB  ...
                                           00138 Z2 00000 00000
02040 ADSPOT AM SPOT,1,9,                ADD 1 TO NUMBER OF TRIES
                                           00150 J1 00222 00-01
02050*      CHECK TO SEE IF ENTIRE DICTIONARY HAS BEEN SCANNED
02060      C  SPOT,MAXMAJ
02070      BNH  NXTRY
02080      TFM  SRTYPE,,8,                SET COMMON STORAGE AREA TO ZEROS
                                           00186 Z6 07597 0-000
02090      BBZ  ...
                                           00198 Z2 00000 00000
02100 NXTRY AM MATCH+6,12,10,           INCREMENT TO NEXT DICTIONARY WORD
                                           00200 J1 00060 000JZ
02110      B  MATCH-12,...                BRANCH TO COMPARE WITH NEXT WORD
                                           00212 M9 00042 00000
                                           00220
02120      DORG *-3
02130*      COMMON AREA WITH MAINLINE
02140 SPOT  DC      3,0                      00222 00003
02150 RTYPE DS      ,07595                  07595 00000
02160 SRTYPE DS     ,07597                  07597 00000
02170 MAXMAJ DC     3,58                    00225 00003
02180*      DICTIONARY WORDS
02190 MAJOR  DAC     6,CLEARP                00227 00012
02200      DAC     1,X                       00239 00002
03010      DAC     5,THARK                   00241 00010
03020      DAC     6,REWIND                  00251 00012
03030      DAC     6,FEDRAT                  00263 00012

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03040      DAC     1,X                       00275 00002
03050      DAC     5,DELAY                   00277 00010
03060      DAC     6,MACHIN                  00287 00012
03070      DAC     1,X                       00299 00002
03080      DAC     5,SEQNO                   00301 00010
03090      DAC     6,AUXFUN                  00311 00012
03100      DAC     6,TOOLND                  00323 00012
03110      DAC     6,COOLNT                  00335 00012
03120      DAC     6,SPINDL                  00347 00012
03130      DAC     6,TRACUT                  00359 00012
03140      DAC     1,X                       00371 00002
03150      DAC     5,TLLFT                   00373 00010
03160      DAC     1,X                       00383 00002
03170      DAC     5,TLRGT                   00385 00010
03180      DAC     2,XX                      00395 00004
03190      DAC     4,TLON                    00399 00008
03200      DAC     3,XXX                     00407 00006
04010      DAC     3,CUT                    00413 00006
04020      DAC     6,DNTCUT                  00419 00012
04030      DAC     3,XXX                     00431 00006
04040      DAC     3,END                     00437 00006
04050      DAC     2,XX                      00443 00004
04060      DAC     4,STOP                    00447 00008
04070      DAC     6,OPSTOP                  00455 00012
04080      DAC     1,X                       00467 00002
04090      DAC     5,RAPID                   00469 00010
04100      DAC     6,INDIRP                  00479 00012
04110      DAC     6,INDIRV                  00491 00012
04120      DAC     2,XX                      00503 00004
04130      DAC     4,FROM                    00507 00008
04140      DAC     6,GODLTA                  00515 00012
04150      DAC     2,XX                      00527 00004
04160      DAC     4,GOTO                    00531 00008
04170      DAC     1,X                       00539 00002
04180      DAC     5,TOLER                   00541 00010
04190      DAC     1,X                       00551 00002
04200      DAC     5,INTOL                   00553 00010
05010      DAC     6,OUTTOL                  00563 00012
05020      DAC     6,CUTTER                  00575 00012
05030      DAC     2,XX                      00587 00004
05040      DAC     4,PSIS                    00591 00008
05050      DAC     4,XXXX                    00599 00008
05060      DAC     2,GD                      00607 00004
05070      DAC     6,OFFSET                  00611 00012
05080      DAC     1,X                       00623 00002
05090      DAC     5,GOLFT                   00625 00010
05100      DAC     1,X                       00635 00002
05110      DAC     5,GORGT                   00637 00010
05120      DAC     1,X                       00647 00002
05130      DAC     5,GOFWD                   00649 00010
05140      DAC     6,GODBACK                 00659 00012
05150      DAC     2,XX                      00671 00004
05160      DAC     4,LINE                    00675 00008
05170      DAC     6,CIRCLE                  00683 00012
05180      DAC     6,GCONIC                  00695 00012
05190      DAC     6,TABCYL                  00707 00012
05200      DAC     6,VECTOR                  00719 00012
06010      DAC     6,ELLIPS                  00731 00012
06020      DAC     6,MATRIX                  00743 00012
06030      DAC     1,X                       00755 00002

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06040	DAC	5, PLANE	00757	00010	
06050	DAC	1, X	00767	00002	
06060	DAC	5, POINT	00769	00010	
06070	DAC	6, POCKET	00779	00012	
06080	DAC	6, NOPOST	00791	00012	
06090	DAC	6, LEADER	00803	00012	
06100	DAC	6, LOOPST	00815	00012	
06110	DAC	6, LOOPND	00827	00012	
06120	DAC	6, RESERV	00839	00012	
06130	DAC	2, XX	00851	00004	
06140	DAC	4, CALL	00855	00008	
06150	DAC	1, X	00863	00002	
06160	DAC	5, MACRO	00865	00010	
06170	DAC	6, JUMPTO	00875	00012	
06180	DAC	1, X	00887	00002	
06190	DAC	5, ZSURF	00889	00010	
06200	DAC	4, XXX	00899	00008	
07010	DAC	2, IF	00907	00004	
07020	DAC	6, CFMTYP	00911	00012	
07030	DAC	6, CFMRUN	00923	00012	
07040*	RECORD TYPES CORRESPONDING TO SYSTEM WORDS				
07050	MJRT	DC	4, 204	00937	00004
07060		DC	4, 205	00941	00004
07070		DC	4, 206	00945	00004
07080		DC	4, 209	00949	00004
07090		DC	4, 210	00953	00004
07100		DC	4, 215	00957	00004
07110		DC	4, 219	00961	00004
07120		DC	4, 222	00965	00004
07130		DC	4, 225	00969	00004
07140		DC	4, 230	00973	00004
07150		DC	4, 231	00977	00004
07160		DC	4, 238	00981	00004
07170		DC	4, 401	00985	00004
07180		DC	4, 402	00989	00004
07190		DC	4, 403	00993	00004
07200		DC	4, 410	00997	00004
08010		DC	4, 411	01001	00004
08020		DC	4, 421	01005	00004
08030		DC	4, 422	01009	00004
08040		DC	4, 423	01013	00004
08050		DC	4, 425	01017	00004
08060		DC	4, 501	01021	00004
08070		DC	4, 502	01025	00004
08080		DC	4, 503	01029	00004
08090		DC	4, 504	01033	00004
08100		DC	4, 505	01037	00004
08110		DC	4, 602	01041	00004
08120		DC	4, 604	01045	00004
08130		DC	4, 605	01049	00004
08140		DC	4, 606	01053	00004
08150		DC	4, 611	01057	00004
08160		DC	4, 701	01061	00004
08170		DC	4, 702	01065	00004
08180		DC	4, 801	01069	00004
08190		DC	4, 802	01073	00004
08200		DC	4, 803	01077	00004
09010		DC	4, 804	01081	00004
09020		DC	4, 1001	01085	00004
09030		DC	4, 1002	01089	00004

09040		DC	4, 1003	01093	00004
09050		DC	4, 1004	01097	00004
09060		DC	4, 1005	01101	00004
09070		DC	4, 1006	01105	00004
09080		DC	4, 1007	01109	00004
09090		DC	4, 1008	01113	00004
09100		DC	4, 1009	01117	00004
09110		DC	4, 1010	01121	00004
09120		DC	4, 1101	01125	00004
09130		DC	4, 1102	01129	00004
09140		DC	4, 1103	01133	00004
09150		DC	4, 1104	01137	00004
09160		DC	4, 1105	01141	00004
09170		DC	4, 1201	01145	00004
09180		DC	4, 1301	01149	00004
09190		DC	4, 1401	01153	00004
09200		DC	4, 1501	01157	00004
10010		DC	4, 1901	01161	00004
10020		DC	4, 2101	01165	00004
10030		DC	4, 2102	01169	00004
10040		DEND	OICT	00006	

SYMBOL TABLE

SRTYPE 07597 MAXMAJ 00215R ADSPOT 00140R DICT 00006R MAJOR 00217R
 MATCH 00054R MJRT 00951R NXTRY 00190R RTYPE 07595 SPOT 00212R

01010* IBM 1620-1311 AD-APT.....
 01020*
 01030* INTRAN SUBPROGRAM DICT2
 01040* THIS SUBPROGRAM LOOKS UP MINOR MODIFIER WORDS
 01050* IN THE AD-APT DICTIONARY
 01060* LINKAGE IS BTM MONITR,ANNNO
 01070* BTM DICT2,PLACE
 01080* PLACE IS THE ADDRESS OF THE WORD TO BE LOOKED UP
 01090*
 01100 DC 6,0 0005 00006
 01110 DICT TFM SPOT,,9, INITIALIZE NUMBER OF TRIFS COUNTER 00006 J6 00212 00-00
 01120 CF SRTYPE-1 00018 33 07596 00000
 01130 TFM MATCH+6,MAJOR+10,, INITIALIZE TO COMPARE FIRST SYSTEM WORD 00030 J0 00060 -C227
 01140 BV ++12 00042 M6 00054 01400
 01150 MATCH C 9999,DICT-1,11, COMPARE WORD WITH SYSTEM WORD 00054 2M 09999 0C00M
 01160 BV ADSPOT 00066 M6 00140 01400
 01170 BNE ADSPOT 00078 M7 00140 01200
 01180* INDEX TO RECORD CORRESPONDING TO WORD FOUND
 01190 MM SPOT,4,10 00090 J3 00212 000-4
 01200 AM 99,MJRT 00102 1J 00099 -0951
 02010 TF SRTYPE,99,11, STORE RECORD IN COMPCN AREA 00114 26 07597 0009R
 02020 SF SRTYPE-1 00126 32 07596 00000
 02030 BBZ ... RETURN TO CALLING PROGRAM 00138 42 00000 00000
 02040 ADSPOT AM SPOT,1,9, ADD 1 TO NUMBER OF TRIES 00140 J1 00212 00-01
 02050* CHECK FOR END OF DICTIONARY
 02060 C SPOT,MAXMAJ 00152 KM 00212 00215
 02070 BNH NXTRY 00164 M7 00190 01107
 02080 TFM SRTYPE,,8, SET COMMON STORAGE AREA TO ZERO 00176 16 07597 0-000
 02090 BBZ ... RETURN TO CALLING PROGRAM 00188 42 00000 00000
 02100 NXTRY AM MATCH+6,12,10, INCREMNT TO NEXT DICTIONARY WORD 00190 J1 00060 0G0J2
 02110 B MATCH-12,,, BRANCH TO COMPARE NEXT WORD 00202 M9 00042 00000
 02120 DORG *-3 00210
 02130* COMMON AREA WITH MAINLINE
 02140 SPOT DC 3,0 00212 00003
 02150 RTYPE DS ,07595 07595 00000
 02160 SRTYPE DS ,07597 07597 00000
 02170 MAXMAJ DC 3,60 00215 00003
 02180* DICTIONARY WORDS
 02190 MAJOR DAC 6,ATANGL 00217 00012
 02200 DAC 6,CENTER 00229 00012
 03010 DAC 1,X 00241 00002
 03020 DAC 5,CROSS 00243 00010
 03030 DAC 1,X 00253 00002

03040 DAC 5,INTOF 00255 00010
 03050 DAC 1,X 00265 00002
 03060 DAC 5,LARGE 00267 00010
 03070 DAC 2,XX 00277 00004
 03080 DAC 4,LEFT 00281 00008
 03090 DAC 6,LENGTH 00289 00012
 03100 DAC 1,X 00301 00002
 03110 DAC 5,MINUS 00303 00010
 03120 DAC 3,XXX 00313 00006
 03130 DAC 3,NOZ 00319 00006
 03140 DAC 6,PARLEL 00325 00012
 03150 DAC 6,PERPTD 00337 00012
 03160 DAC 2,XX 00349 00004
 03170 DAC 4,PLUS 00353 00008
 03180 DAC 6,RADIUS 00361 00012
 03190 DAC 1,X 00373 00002
 03200 DAC 5,RIGHT 00375 00010
 04010 DAC 1,X 00385 00002
 04020 DAC 5,SCALE 00387 00010
 04030 DAC 1,X 00397 00002
 04040 DAC 5,SMALL 00399 00010
 04050 DAC 1,X 00409 00002
 04060 DAC 5,TANTO 00411 00010
 04070 DAC 1,X 00421 00002
 04080 DAC 5,TIMES 00423 00010
 04090 DAC 6,TRANSL 00433 00012
 04100 DAC 2,XX 00445 00004
 04110 DAC 4,UNIT 00449 00008
 04120 DAC 6,XLARGE 00457 00012
 04130 DAC 6,XSMALL 00469 00012
 04140 DAC 6,XYPLAN 00481 00012
 04150 DAC 1,X 00493 00002
 04160 DAC 5,XYROT 00495 00010
 04170 DAC 6,YLARGE 00505 00012
 04180 DAC 6,YSMALL 00517 00012
 04190 DAC 6,ZLARGE 00529 00012
 04200 DAC 6,ZSMALL 00541 00012
 05010 DAC 6,RTHETA 00553 00012
 05020 DAC 6,INTERC 00565 00012
 05030 DAC 1,X 00577 00002
 05040 DAC 5,SLOPE 00579 00010
 05050 DAC 4,XXXX 00589 00008
 05060 DAC 2,IN 00597 00004
 05070 DAC 3,XXX 00601 00006
 05080 DAC 3,DUT 00607 00006
 05090 DAC 6,NOMORE 00613 00012
 05100 DAC 2,XX 00625 00004
 05110 DAC 4,CCLW 00629 00008
 05120 DAC 3,XXX 00637 00006
 05130 DAC 3,CLW 00643 00006
 05140 DAC 6,MEDIUM 00649 00012
 05150 DAC 2,XX 00661 00004
 05160 DAC 4,HIGH 00665 00008
 05170 DAC 3,XXX 00673 00006
 05180 DAC 3,LOW 00679 00006
 05190 DAC 4,XXXX 00685 00008
 05200 DAC 2,TD 00693 00004
 06010 DAC 4,XXXX 00697 00008
 06020 DAC 2,ON 00705 00004
 06030 DAC 3,XXX 00709 00006

06040	DAC	3,OFF	00715	00006
06050	DAC	2,XX	00721	00004
06060	DAC	4,PASY	00725	00008
06070	DAC	1,X	00733	00002
06080	DAC	5,FLOOD	00735	00010
06090	DAC	2,XX	00745	00004
06100	DAC	4,MIST	00749	00008
06110	DAC	3,XXX	00757	00006
06120	DAC	3,TAP	00763	00006
06130	DAC	6,SPLINE	00769	00012
06140	DAC	3,XXX	00781	00006
06150	DAC	3,ALL	00787	00006
06160	DAC	6,BENDIX	00793	00012
06170	DAC	2,XX	00805	00004
06180	DAC	4,BURG	00809	00008
06190	DAC	1,X	00817	00002
06200	DAC	5,CINCY	00819	00010
07010	DAC	6,CONCRD	00829	00012
07020	DAC	6,DVLEIG	00841	00012
07030	DAC	6,DYNPAT	00853	00012
07040	DAC	3,XXX	00865	00006
07050	DAC	3,ECS	00871	00006
07060	DAC	6,FOSDIK	00877	00012
07070	DAC	6,GECENT	00889	00012
07080	DAC	6,MILWAK	00901	00012
07090	DAC	6,PRATTM	00913	00012
07100	DAC	6,TRUTRA	00925	00012
07110	DAC	3,XXX	00937	00006
07120	DAC	3,TRM	00943	00006
07130*	RECORD TYPES CORRESPONDING TO DICTIONARY WORDS			
07140 MJRT	DC	4,301	00951	00004
07150	DC	4,302	00955	00004
07160	DC	4,303	00959	00004
07170	DC	4,305	00963	00004
07180	DC	4,307	00967	00004
07190	DC	4,308	00971	00004
07200	DC	4,309	00975	00004
08010	DC	4,310	00979	00004
08020	DC	4,316	00983	00004
08030	DC	4,317	00987	00004
08040	DC	4,318	00991	00004
08050	DC	4,319	00995	00004
08060	DC	4,323	00999	00004
08070	DC	4,324	01003	00004
08080	DC	4,325	01007	00004
08090	DC	4,326	01011	00004
08100	DC	4,327	01015	00004
08110	DC	4,328	01019	00004
08120	DC	4,329	01023	00004
08130	DC	4,330	01027	00004
08140	DC	4,331	01031	00004
08150	DC	4,332	01035	00004
08160	DC	4,333	01039	00004
08170	DC	4,334	01043	00004
08180	DC	4,335	01047	00004
08190	DC	4,336	01051	00004
08200	DC	4,339	01055	00004
09010	DC	4,340	01059	00004
09020	DC	4,342	01063	00004
09030	DC	4,346	01067	00004

09040	DC	4,347	01071	00004
09050	DC	4,348	01075	00004
09060	DC	4,349	01079	00004
09070	DC	4,353	01083	00004
09080	DC	4,359	01087	00004
09090	DC	4,360	01091	00004
09100	DC	4,361	01095	00004
09110	DC	4,362	01099	00004
09120	DC	4,363	01103	00004
09130	DC	4,369	01107	00004
09140	DC	4,371	01111	00004
09150	DC	4,372	01115	00004
09160	DC	4,376	01119	00004
09170	DC	4,389	01123	00004
09180	DC	4,390	01127	00004
09190	DC	4,391	01131	00004
09200	DC	4,392	01135	00004
10010	DC	4,393	01139	00004
10020	DC	4,2001	01143	00004
10030	DC	4,2002	01147	00004
10040	DC	4,2003	01151	00004
10050	DC	4,2004	01155	00004
10060	DC	4,2005	01159	00004
10070	DC	4,2006	01163	00004
10080	DC	4,2007	01167	00004
10090	DC	4,2008	01171	00004
10100	DC	4,2009	01175	00004
10110	DC	4,2010	01179	00004
10120	DC	4,2011	01183	00004
10130	DC	4,2012	01187	00004
10140	DC	4,2013	01191	00004
10150	DEND	DICT	00006	

SYMBOL TABLE

SRATYPE 07597 MAXMAJ 00215R ADSPOT 00140R DICT 00006R MAJOR 00217R
 MATCH 00054R MJRT 00447R NXTRY 00190R RTYPE 07595 SPOT 00212R

01010* IBM 1620-1311 AD-APT.....
 01020*
 01030* INTRAN SUBPROGRAM DICT3
 01040* THIS SUBPROGRAM LOOKS UP FUNCTION COMPUTE WORDS
 01050* LINKAGE IS BTM MONITR,NNNO
 01060* BTM DICT3,PLACE
 01070* PLACE IS THE ADDRESS OF THE WORD TO BE LOOKED UP
 01080*
 01090 DC 6,0 00005 00006
 01100 DICT TFM SPOT,,9, INITIALIZE NUMBER OF TRIES MADE 00006 J6 00212 00-00
 01110 CF SRATYPE-1 00018 33 07596 00000
 01120 TFM MATCH+6,MAJOR+10,, INITIALIZE TO LOOK AT FIRST WORD 00030 J0 00060 -G227
 01130 BV **12 00042 M6 00054 01400
 01140 MATCH C 9999,DICT-1,11, COMPARE WITH SYSTEM WORD 00054 ZM 09999 0000N
 01150 BV ADSPOT 00066 M6 00140 01400
 01160 BNE ADSPOT 00078 M7 00140 01200
 01170* INDEX THE CORRECT RECORD TYPE
 01180 MM SPOT,4,10 00090 J3 00212 000-4
 01190 AM 99,MJRT 00102 1J 00099 -0447
 01200 TF SRATYPE,99,11, STORE CORRESPONDING RECORD IN COMMON ARE 00114 26 07597 0009R
 02010 SF SRATYPE-1 00126 32 07596 00000
 02020 BB2 ... RETURN TO CALLING PROGRAM 00138 42 00000 00000
 02030 ADSPOT AM SPOT,1,9, INCREMENT NUMBER OF TRIES MADE 00140 J1 00212 00-01
 02040* CHECK TO SEE IF ENTIRE DICTIONARY HAS BEEN SCANNED
 02050 C SPOT,MAXMAJ 00152 KM 00212 00215
 02060 BNH NXTRY 00164 M7 00190 01100
 02070 TFM SRATYPE,,8, SET COMMON AREA TO ZEROS 00176 16 07597 0-000
 02080 BB2 ... RETURN TO CALLING PROGRAM 00188 42 00000 00000
 02090* INCREMENT AND CHECK NEXT DICTIONARY WORD
 02100 NXTRY AM MATCH+6,12,10, INCREMENT TO NEXT WORD 00190 J1 00060 000J2
 02110 B MATCH-12,, BRANCH TO COMPARE NEXT WORD 00202 M9 00042 00000
 02120 DORG *-3 00210
 02130* COMMON AREA WITH MAINLINE
 02140 SPOT DC 3,0 00212 00003
 02150 RTYPE DS ,07595 07595 00000
 02160 SRATYPE DS ,07597 07597 00000
 02170 MAXMAJ DC 3,18 00215 00003
 02180* DICTIONARY WORDS
 02190 MAJOR DAC 1,X 00217 00002
 02200 DAC 5,SQRTF 00219 00010
 03010 DAC 2,XX 00229 00004
 03020 DAC 4,SINF 00233 00008
 03030 DAC 2,XX 00241 00004

03040 DAC 4,COSF 00245 00008
 03050 DAC 1,X 00253 00002
 03060 DAC 5,ATANF 00255 00010
 03070 DAC 2,XX 00265 00004
 03080 DAC 4,ABSF 00269 00008
 03090 DAC 1,X 00277 00002
 03100 DAC 5,LNTHF 00279 00010
 03110 DAC 2,XX 00289 00004
 03120 DAC 4,LOGF 00293 00008
 03130 DAC 2,XX 00301 00004
 03140 DAC 4,EXPF 00305 00008
 03150 DAC 2,XX 00313 00004
 03160 DAC 4,TANF 00317 00008
 03170 DAC 4,XXXX 00325 00008
 03180 DAC 2,IF 00333 00004
 03190 DAC 2,XX 00337 00004
 03200 DAC 4,SQRT 00341 00008
 04010 DAC 3,XXX 00349 00006
 04020 DAC 3,SIN 00355 00006
 04030 DAC 3,XXX 00361 00006
 04040 DAC 3,COS 00367 00006
 04050 DAC 2,XX 00373 00004
 04060 DAC 4,ATAN 00377 00008
 04070 DAC 3,XXX 00385 00006
 04080 DAC 3,ABS 00391 00006
 04090 DAC 2,XX 00397 00004
 04100 DAC 4,LNTH 00401 00008
 04110 DAC 3,XXX 00409 00006
 04120 DAC 3,LOG 00415 00006
 04130 DAC 3,XXX 00421 00006
 04140 DAC 3,EXP 00427 00006
 04150 DAC 3,XXX 00433 00006
 04160 DAC 3,TAN 00439 00006
 04170* RECORD TYPES CORRESPONDING TO SYSTEM WORDS
 04180 MJRT DC 4,-901 00447 00004
 04190 DC 4,-902 00451 00004
 04200 DC 4,-903 00455 00004
 05010 DC 4,-904 00459 00004
 05020 DC 4,-905 00463 00004
 05030 DC 4,-906 00467 00004
 05040 DC 4,-907 00471 00004
 05050 DC 4,-908 00475 00004
 05060 DC 4,-909 00479 00004
 05070 DC 4,1901 00483 00004
 05080 DC 4,-901 00487 00004
 05090 DC 4,-902 00491 00004
 05100 DC 4,-903 00495 00004
 05110 DC 4,-904 00499 00004
 05120 DC 4,-905 00503 00004
 05130 DC 4,-906 00507 00004
 05140 DC 4,-907 00511 00004
 05150 DC 4,-908 00515 00004
 05160 DC 4,-909 00519 00004
 05170 DEND DICT 00006

SYMBOL TABLE

TYPERR 02416	TEMALS 07496	SETERR 00658R	RETURN 00274R	PRETEM 07732
NXTCHK 00342R	MONTR 02406	ILNEXT 07698	COMSCN 00737R	ALSCAN 00006R
ADAL 00678R	ALPHA 00574R	CHAR 00015R	CHK 07691	CMKE 01270R
CHKNO 01030R	CHK03 01146R	CHK2 00294R	CHK70 00870R	DECPT 01078R
DIGIT 00958R	EADD 01305R	EMOD 01414R	ERR 07682	ERRND 07707
ERROR 01620R	ERRT 00710R	ETYPE 01294R	EXIT 01510R	EXP 00098
FINK 01250R	FLAG 00466R	IND 07707	INIT 07976	IWP 00187R
LDG03 01170R	LDG70 00894R	MINUS 00374R	NEGE 01560R	NEGM 00926R
NDT70 00946R	ODD 00809R	OPS 00098R	PAREN 00118R	PLACE 07743
PLUS 00054R	POSE 01306R	PSM 00894R	REDPT 01114R	SAVER 00202R
SCAN 08852	SCHK3 00178R	SIGNE 01302R	SIGNM 00925R	SRT 01580R
STOP 07713	STRIP 00738R	TEMP 00039R	TRUNC 01600R	TSIGN 01512R
ZRO 01643R				

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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030*      INTRAN SUBPROGRAM ALSCAN
01040*      THE FUNCTION OF THIS SUBPROGRAM
01050*      IS TO SCAN THE ELEMENTS IN THE INPUT STATEMENT
01060*      AND COLLECT A SYMBOL, NUMBER, OR PUNCTUATION
01070*      LINKAGE IS          BTM MONTR,NNNO
01080*                        BTM ALCAN,PLACE
01090*      PLACE IS THE ADDRESS OF THE FIRST CHARACTER OF THE WORD
01100*
01110      DC      6,0                      00005 00006
01120 ALSCAN SF    *,,                      ALSCAN IS FLAGGED FOR THE FIRST WORD
                                           00006 L2 00006 00000
                                           00015 00000
01130 CHAR DS     ,*-2
01140      TFM   CHK,,10,                  INITIALIZE CHECK INDICATOR
                                           00018 16 07691 000-0
01150      TFM   CHAR,,10,                 INITIALIZE CHARACTER COUNT
                                           00030 J6 00015 000-0
                                           00039 00000
01160 TEMP DS     ,*-2
01170*      STORE FIRST CHARACTER
01180      TF     TEMP,ALSCAN-1,11
01190 PLUS CM     TEMP,10,10,              CHECK FOR PLUS SIGN
01200      BNE   MINUS                      00042 K0 00039 0000N
                                           00054 J4 00039 000J0
                                           00066 M7 00374 01200
02010*      CHECK FOR OPERATION OR SIGN
02020*      PRETEM HAS A FLAG IF IT IS A SIGN
02030      BNF   SCHK3,PRETEM              00078 M4 00178 07732
02040      B     CHK2,,,*                  FLOAT A NUMBER
                                           00090 M9 00294 00000
                                           00098
02050      DORG  *-3
02060 OPS  CF     PRETEM,,,*              RESET PRETEM SWITCH
02070      B     SCHK3,,,*                  BRANCH TO SPECIAL CHARACTER
                                           00098 33 07732 00000
                                           00110 M9 00178 00000
                                           00118
02080      DORG  *-3
02090 PAREN CM    TEMP,04,10,              CHECK FOR RIGHT PARENTHESIS
                                           00118 J4 00039 000-4
                                           00130 M6 00098 01200
02100      BE   OPS
02110      CM   TEMP,24,10,                CHECK FOR LEFT PARENTHESIS
                                           00142 J4 00039 000K4
                                           00154 M6 00098 01200
02120      BE   OPS
02130*      THE ELEMENT IS A SPECIAL CHARACTER NOT A LEFT OR RIGHT
02140*      PARENTHESIS
02150      SF   PRETEM,,,*                  SET PRETEM SWITCH
02160 SCHK3 TFM   CHK,3,10,                SET CHK=3 FOR SPECIAL CHARACTER
                                           00166 32 07732 00000

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02170 IWP DS     ,*-2
02180      AM   ALSCAN-1,2,10,             INCREMENT TO NEXT CHARACTER
                                           00178 16 07691 000-3
                                           00187 00000
02190 SAVER TF    ILNEXT,ALSCAN-1,11,      STORE NEXT CHARACTER IN ILNEXT
                                           00190 J1 00005 000-2
                                           00202 20 07698 0000N
02200*      IS THIS THE END OF THE STATEMENT
03010*      IF SO INDICATE BY SETTING A FLAG AT STOP
03020      CM   ILNEXT,22,10,              END OF STATEMENT IS INDICATED BY--
                                           00214 14 07698 000K2
                                           A 22 IN ILNEXT
03030*
03040      BNE  **24                          00226 M7 00250 01200
03050      SF   STOP,,,*                    FLAG AT STOP INDICATES END OF SCAN
                                           00238 32 07713 00000
03060      SM   ALSCAN-1,2,10,              DECREMENT TO ADDRESS OF ELEMENT
                                           00250 J2 00005 000-2
03070      TF   PLACE,ALSCAN-1,,            STORE THE ADDRESS OF THE ELEMENT
                                           00262 20 07743 00005
03080*      RETURN
03090 RETURN TF   TEMALS,ALSCAN-1
03100      B7   SCAN*12,,,*                  RETURN TO MAINLINE
                                           00274 20 07696 00005
                                           00286 49 08864 00000
03110 CHK2 TFM   CHK,2,10,                  SET CHK=2 FOR NUMBER
                                           00294 16 07691 000-2
03120*      BRANCH TO FLOAT THE NUMBER
03130      BTM  STRIP,ALSCAN-1
03140      BD   ERRT,IND-2,,,*              DIGIT IN IND INDICATES BAD NUMBER
                                           00306 JP 00738 -0005
                                           00318 M3 00710 07705
03150      TF   ILNEXT,ALSCAN-1,11,        STORE CHARACTER FOLLOWING NUMBER IN--
                                           00330 20 07698 0000N
03160*      ILNEXT
03170 NXTCHK CM   ILNEXT,24,10,             IS IT A LEGAL CHARACTER
                                           00342 14 07698 000K4
                                           00354 M7 00214 01100
03180      BNH  SAVER*12
03190      B7   ERRT,,,*                    ILLEGAL PUNCTUATION GO TO ERROR
                                           00366 M9 00710 00000
03200 MINUS CM    TEMP,20,10,              CHECK FOR MINUS SIGN
04010      BE   PLUS*24
04020      CM   TEMP,40,10,                SEPARATE ALPHA AND NUMERIC FROM PUNCT
                                           00374 J4 00039 000K0
                                           00386 M6 00078 01200
                                           00398 J4 00039 000M0
                                           00410 M6 00466 01100
04030      BH   FLAG
04040*      IT IS PUNCTUATION
04050*      CHECK IF ITS THE FIRST CHARACTER OF THE WORD
04060      BNF  RETURN-72,ALSCAN
04070      CM   TEMP,03,10,                IS IT A DECIMAL POINT
04080      BE   CHK2,,,*                    BRANCH TO FLOAT A NUMBER
                                           00446 M6 00294 01200
                                           00458 M9 00118 00000
                                           00466
04090      B     PAREN,,,*                  SET UP FOR SPECIAL CHARACTER
                                           00466
04100      DORG  *-3
04110*      IS IT THE FIRST CHARACTER OF THE WORD -- IF SI SKIP OVER
04120*      DETERMINATION OF TYPE
04130 FLAG BNF   ALPHA,ALSCAN
04140      CF   PRETEM,,,*                  ITS A SYMBOL OR NUMBER --CLEAR PRETEM
                                           00478 33 07732 00000
                                           00490 L3 00006 00000
04150      CF   ALSCAN,,,*                  CLEAR FIRST WORD FLAG
04160      TF   CHK,TEMP,,,*                TRANSFER 1ST DIGIT TO CHECK INDICATOR
                                           00502 20 07691 00039
                                           00514 15 07691 00000
04170      TDM  CHK,,,*
04180*      IS IT A NUMBER
04190      CM   CHK,70,10
04200      BE   CHK2,,,*                    BRANCH TO FLOAT NUMBER
                                           00526 14 07691 000P0

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05010      TFM  CHK,1,10,          SET CHK=1 FOR A SYMBOL          00538 M6 00294 01200
05020      B    ALPHA+36,,,        BRANCH TO COLLECT NEXT CHARACTER 00550 16 07691 000-1
05030 ALPHA SM  ALSCAN-1,1,10     00562 M9 00610 00000
05040      CF  ALSCAN-1,,6,        CLEAR THE FLAG FOR THIS CHARACTER 00574 J2 00005 000-1
05050      AM  ALSCAN-1,1,10     00586 L3 0000N 00000
05060      AM  CHAR,1,10,        INCREMENT CHARACTER COUNT       00598 J1 00005 000-1
05070*     SIX IS MAXIMUM NUMBERS OF CHAR 00610 J1 00015 000-1
05080      CM  CHAR,6,10         00622 J4 00015 000-6
05090      BNH ADAL              00634 M7 00678 01100
05100      TFM  PLACE,102,,      ERROR CONDITION                 00646 16 07743 -0102
05110 SETERR TFM  ERR,2,10       00658 16 07682 000-2
05120      B7  SCAN+12,,,        RETURN TO MAINLINE             00670 49 08864 00000
05130*     INCREMENT TO LOOK AT NEXT CHARACTER
05140 ADAL AM  ALSCAN-1,2,10     00678 J1 00005 000-2
05150      TF  TEMP,ALSCAN-1,11, STORE NEXT CHARACTER IN TEMP 00690 K0 00039 0000N
05160      B    MINUS+24         00702 M9 00398 00000
05170      DORG #-3             00710
05180 ERRRT TFM  PLACE,101,,     ERROR CONDITIC                 00710 16 07743 -0101
05190      B7  SETERR           00722 M9 00658 00000
05200      BB2                  00730 42 00000 00000
06010 COMSCN DC 6,0            00737 00006
06020*     IBM 1620-1311 ADAPT NUMERIC STRIP SUBROUTINE
06030*     RCS
06040*     LINKAGE - BTM STRIP,COMSCN
06050 STRIP TFL  EXP,ZRO,,      CLEAR FLOATING-POINT WORD      00738 00 00098 01643
06060      TDM  STRIP+19,,11     00750 J5 00757 0000-
06070      CF  LDG03+11         00762 L3 01181 00000
06080      TFM  CHKNO+18,DIGIT   00774 J0 01048 -0958
06090      TFM  DIGIT+18,EXP-9   00786 J6 00976 -0089
06100      CF  SIGNM,,,        ASSUME POSITIVE MANTISSA      00798 L3 00925 00000
06110      TF  ODD,COMSCN,11,    MOVE ADDRESS AT WHICH SCAN BEGINS 00810 K0 00809 0073P
06120      CM  ODD,20,610       00822 J4 0080R 000K0
06130      BE  NEGM,,,        BRANCH IF NEGATIVE MANTISSA    00834 M6 00926 01200
06140      CM  ODD,10,610       00846 J4 0080R 000J0
06150      BE  POSM,,,        BRANCH IF LEADING + SIGN      00858 M6 00894 01200
06160 CHK70 CM  ODD,70,610      00870 J4 0080R 000P0
06170      BNE NOT70,,,      BRANCH IF NOT LEADING ZERO    00882 M7 00946 01200
06180 LDG70 AM  ODD,2,10       00894 J1 00809 000-2
06190      SF  LDG03+11         00906 L2 01181 00000
06200      B    CHK70           00918 M9 00870 00000
07010      DORG #-4           00925
07020*     SIGNM DC 1,0         00925 00001
07040 NEGM SF  SIGNM,,,      LEADING - SIGN                 00926 L2 00925 00000
07050      B    LDG70           00938 M9 00894 00000
07060      DORG #-3           00946
07070*     NOT70 BL  CHK03,,,    BRANCH IF NGN-DIGIT          00946 M7 01146 01300
07090 DIGIT AM  EXP,1,10,      INCREMENT EXPONENT            00958 11 00098 C00-1
07100      TD  ,ODD,11,        STRIP ALPHA WORD              00970 2N 00000 0080R
07110      CM  DIGIT+18,EXP-2   00982 J4 00976 -0096
07120      BNL TRUNC,,,      BRANCH IF 8 SIGNIFICANT DIGITS STRIPPED 00994 M6 01600 01300
07130      AM  DIGIT+18,1,10    01006 J1 00976 000-1
07140      AM  ODD,2,10        01018 J1 00809 000-2
07150 CHKNO CM  ODD,70,610     01030 J4 0080R 000P0
07160      BNL ,,,          BRANCH IF DIGIT              01042 46 00000 01300
07170      CM  ODD,3,610      01054 J4 0080R 000-3
07180      BNE CHKE,,,      BRANCH IF NOT DECIMAL POINT  01066 M7 01270 01200
07190 DECP TFM  CHKNO+18,DIGIT+12 01078 J0 01048 -C970
07200      TF  REDPT+6,ODD     01090 K0 01120 00809
08010      AM  REDPT+6,2,10    01102 J1 01120 C00-2
08020 REDPT CM  9999,3,10     01114 14 99999 000-3
08030      BE  ERROR          01126 M6 01620 01200
08040      B    CHKNO-12     01138 M9 01018 00000
08050      DORG #-3         01146
08060*     CHK03 CM  ODD,3,610   01146 J4 0080R 000-3
08070      BNE EXIT-72,,,    BRANCH IF NOT DECIMAL POINT  01158 M7 01438 01200
08080      AM  ODD,2,10        01170 J5 00757 00000
08090 LDG03 TDM  STRIP+19      01182 J1 00809 000-2
08100      AM  ODD,2,10        01194 J4 0080R 000P0
08110      CM  ODD,70,610     01206 M7 01250 01200
08120      BNE FINK,,,      BRANCH IF NOT LEADING ZERO    01218 J5 00757 0000-
08130      TDM  STRIP+19,,11   01230 12 00098 000-1
08140      SM  EXP,1,10,      DECREMENT EXPONENT           01242 M9 01182 00000
08150      B    LDG03+12     01250
08160      DORG #-3         01250
08170*     FINK SM  ODD,2,10    01250 J2 00809 000-2
08180      B    DECP         01262 M9 01078 00000
08200      DORG #-3         01270
09010*     CHKE CM  ODD,45,610  01270 J4 0080R 000M5
09020      BNE EXIT-72,,,    BRANCH IF E TYPE NUMBER      01282 M7 01438 01200
09030      ASSUME POSITIVE EXPONENT ADDEND
09040 ETYPE CF  SIGNE,,910,    01294 L3 01302 00--0
09050      AM  ODD,2,10        01306 J1 00809 000-2
09060      CM  ODD,70,610     01318 J4 0080R 000P0
09070      BL  TSIGN,,,      BRANCH IF NON-DIGIT         01330 M7 01512 01300
09080      AM  ODD,2,10        01342 J1 00809 000-2
09090      TNS ODD,EADD,6,     STRIP EXPONENT ADDEND       01354 PK 0080R 01305
09100      CM  ODD,70,610     01366 J4 0080R 000P0
09110      BL  SRT,,,        BRANCH IF 1-DIGIT ADDEND    01378 M7 01580 01300
09120      AM  ODD,2,10        01390 J1 00809 000-2
09130      MF  EADD,SIGNE,,    SET SIGN EXPONENT ADDEND     01402 PJ 01305 01302
09140 ENDD  A    EXP,EADD,,    ADJUST EXPONENT             01414 ZJ 00098 01305
09150      BV  ERROR,,,      BRANCH IF NUMBER OUT OF RANGE 01426 M6 01620 01400
09160      MF  EXP-2,SIGNM,,    SET MANTISSA SIGN           01438 J7 00096 00925
09170      SF  EXP-9,,,      SET HIGH-ORDER FLAG         01450 32 00089 00000
09180      TF  COMSCN,ODD,6    01462 K0 0073P 00809
09190      BD  EXIT,EXP-9,,    BRANCH IF NUMBER IS NON-ZERO

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09200      TFM EXP,-99,10          01474 M3 01510 00089
10010      BNF ERROR,STRIP+19     01486 16 00098 00088
10020 EXIT BB                      01498 MM 01620 00757
10030      DORG *-9                01510 42 00000 00000
10040*
10050 TSIGN CM ODD,10,610          01512 J4 0080R 000J0
10060      BE POSE,,,              BRANCH IF POSITIVE EXPONENT ADDEND
                                       01524 M6 01306 01200
10070      CM ODD,20,610          01536 J4 0080R 000K0
10080      BNE ERROR,,,           BRANCH IF NOT - SIGN
10090 NEGE SF SIGNE,,,           SET SIGN EXPCNENT ADDEND
                                       01560 L2 01302 00000
                                       01572 M9 01306 00000
                                       01580
10100      B POSE
10110      DORG *-3
10120*
10130 SRT TF EADD,EADD-1          01580 K0 01305 01304
10140      B EMOO-12              01592 M9 01402 00000
10150      DORG *-3                01600
10160*
10170 TRUNC TFM DIGIT+18,CHK03-1  01600 J0 00976 -1145
10180      B CHKNO-12             01612 M9 01018 00000
10190      DORG *-3                01620
10200*
11010 ERROR TFM ERRNO,100,9      01620 16 07707 00J00
11020      BB ,, ,                EXIT
11030      DORG *-9
11040*
11050      DC 8,0                  01641 00008
11060 ZRO UC 2,0                  01643 00002
11070*
11080 ODD DS 5,STRIP+11,12*5     00809 00005
11090 POSM DS ,LDG70              00894 00000
11100 SIGNE DS ,ETYPE+8           01302 00000
11110 EADD DS 3,SIGNE+3           01305 00003
11120 POSE DS ,ETYPE+12           01306 00000
11130 EXP DS 10,98                00098 00010
11140* COMMON AREA WITH MAINLINE
11150 IND DS ,07707                07707 00000
11160 ERRNO DS ,IND                07707 00000
11170 SCAN DS ,08852              08852 00000
11180 ERR DS ,07682                07682 00000
11190 TYPERR DS ,2416              02416 00000
11200 PRETEM DS ,07732             07732 00000
12010 STOP DS ,07713               07713 00000
12020 PLACE DS ,07743              07743 00000
12030 CHK DS ,07691                07691 00000
12040 ILNEXT DS ,07698             07698 00000
12050 TEMALS DS ,07696              07696 00000
12060 INIT DS ,07976               07976 00000
12070 MONTR DS ,2406               02406 00000
12080      DEND ALSCAN             00006
  
```

SYMBOL TABLE

TYPERR 02416	SUBSCR 14306	SRTYPE 07597	SQUEEZ 14242	SKIPER 13862
RETURN 02411	REDUCE 14146	POSIMP 13862	MONTR 02406	ERR134 14430
ERR108 14062	ADD13 14378	DICT3 02416	EXP2 14410	FL22 07670
FUN 14086	NAT1 07661	NAT2 07666	PLL2 14206	RTYPE 07595
SET12 14182	SET4 14274	SYMB2 04301	SYMB3 04303	SYMB5 04315

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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030*      INTRAN SUBPROGRAM POSIMP
01040*      THE FUNCTION OF THIS SUBPROGRAM
01050*      IS TO COMPRESS THE STATEMENT IN WORDL
01060*      BY REPLACING A NEST WITH ITS EQUIVALENCE
01070*      LINKAGE IS
01080*      BT MONTR,DSALBL*5,6
01090*      B7 POSIMP,,6
01100      DORG 13862                13862
01110 POSIMP SM NAT1,20,10,        SET POINTER TO ADDRESS BEFORE LEFT PAREN
                                       13862 12 07661 000K8
01120      AM NAT2,27,10,          SET POINTERTO CHARACTER FOLLOWING RIGHT
                                       13874 11 07666 000K7
01130*      PAREN
01140      CM NAT1,-1,610,          CHECK FOR SUBSCRIPT OR FUNCTION
                                       13886 14 0766J 000-J
01150      BNE REDUCE              13898 47 14146 01200
01160      AM NAT1,12,10,          INCREMENT TO CHECK FOR FUNCTION WORD
                                       13910 11 07661 000J2
01170*      LOAD AND CALL DICT3 SUBPROGRAM TO CHECK FOR FUNCTION WORD
01180      BT MONTR,03050,67        13922 17 02400 -3050
01190      BT DICT3,NAT1,6          13934 27 02410 07661
01200      CM RTYPE,,10            13946 14 07595 000-0
02010      BE SUBSCR                13958 46 14306 01200
02020      CM RTYPE,9,10,          CHECK FOR FUNCTION---RTYPE=9
                                       13970 14 07595 000-9
02030      BE FUN                  13982 46 14086 01200
02040      CM RTYPE,19,10,          CHECK FOR IF---RTYPE=19
                                       13994 14 07595 000J9
                                       14006 47 14062 01200
02050      BNE ERR108
02060*      IGNORE IF AND PREPARE TO COMPRESS NEST
02070      SM NAT1,12,10
02080      TFM NAT1,1,610
02090      TFL SRTYPE,FL2Z
02100      BT REDUCE
02110*      LOAD AND CALL TYPERR SUBPROGRAM---ERROR 108
02120 ERR108 BT MONTR,03090,67     14062 17 02400 -3090
02130      BTM TYPERR,108,67       14074 17 02410 -0108
02140 FUN TF NAT1,SRTYPE,6,        SUBSTITUTE FUNCTION EQUIVALENCE
                                       14086 26 0766J 07597
                                       14098 06 07597 07670
02150      TFL SRTYPE,FL2Z          14110 15 14218 00000
02160      TOM PL12+12
02170      SM NAT1,12,10,          PREPARE TO COMPRESS STATEMENT
                                       14122 12 07661 000J2
02180      TFM NAT1,3,610,          SET TYPE=3 FOR A FUNCTION
                                       14134 16 0766J 000-3
02190*      COMPRESS A NEST IN WORDL
02200 REDUCE AM NAT1,14,10        14146 11 07661 000J4
03010*      IF A NUMBER WERE CALCULATED TYPE=02
  
```

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03020* OTHERWISE A NEST NAME IS STORED IN WORDL
03030 CM RTYPE,,10 14158 14 07595 000-0
03040 BNE SET4 14170 47 14274 01200
03050 SET12 TOM PL12*12 14182 15 14218 00000
03060 TF NAT1,SYMB3,6, SUBSTITUTE NUMBER CALCULATED IN COMPUT
14194 26 0766J 04303
03070 PL12 AM NAT1,12,10 14206 11 0766I 000J2
03080 TF NAT1,SYMB2,6, SUBSTITUTE NAME FOR GEOMETRIC NEST
14218 26 0766J 04301
03090 AM NAT1,1,10 14230 11 0766I 000-1
03100 SQUEEZ TR NAT1,NAT2,611, TRANSMIT RECORD TO COMPRESS NEST
14242 31 0766J 07660
03110 TFL SRTYPE,FL2Z 14254 06 07597 07670
03120 B RETURN,,6, RETURN TO CALLING PROGRAM
14266 49 0241J 00000
03130 DORG #-3 14274
03140 SET4 TFM NAT1,4,610 14274 16 0766J 000-4
03150 TOM PL12*12,2 14286 15 14218 00002
03160 B PL12 14298 49 14206 00000
03170 DORG #-3 14306
03180* SAVE THE SUBSCRIPT AND ELIMINAT(NEST) FROM WORDS LIST
03190 SUBSCR SM NAT1,12,10 14306 12 0766I 000J2
03200 TFM NAT1,,610 14318 16 0766J 000-0
04010 CM SYMB5,2,10 14330 14 04315 000-2
04020 BE EXP2 14342 46 14410 01200
04030 BH ERR134 14354 46 14430 01100
04040 TO NAT1,SYMB5-9,6 14366 25 0766J 04306
04050 ADD13 SF NAT1,,6 14378 32 0766J 00000
04060 AM NAT1,13,10 14390 11 0766I 000J3
04070 B7 SQUEEZ 14402 49 14242 00000
04080 EXP2 TF NAT1,SYMB5-8,6 14410 26 0766J 04307
04090 B7 ADD13 14422 49 14378 00000
04100 ERR134 BTM MONITR,03090,67 14430 17 02400 -3090
04110 BTM MONITR,134,67 14442 17 02400 -0134
04120* COMMON AREA WITH MAINLINE
04130*
04140 NAT1 DS ,07661 07661 00000
04150 NAT2 DS ,07666 07666 00000
04160 RTYPE DS ,07595 07595 00000
04170 SRTYPE DS ,07597 07597 00000
04180 FL2Z DS ,07670 07670 00000
04190 SYMB2 DS ,04301 04301 00000
04200 SYMB3 DS ,04303 04303 00000
05010 SYMB5 DS ,04315 04315 00000
05020 RETURN DS ,2411 02411 00000
05030 MONITR DS ,2406 02406 00000
05040 TYPERR DS ,2416 02416 00000
05050 DICT3 DS ,2416 02416 00000
05060 SKIPER DS ,POSIMP 13862 00000
05070 DEND ,POSIMP 13862
    
```

SYMBOL TABLE

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TYPERR 02416  TSAVE1 02456  SRTYPE 07597  SIMPLE 02416  RETURN 02411
POSTPR 14156  POSTPA 02416  MONITR 02406  MISCSA 14660  MAJMOD 14176
MACPIK 07719  MACHER 14512  MACDSA 14670  IGNORE 14116  IFJUMP 07745
FLZERO 07680  ERR123 14332  CALDSA 14680  ARGCSA 13866  ADD14 14036
ADD2 14016  AD2 14296  BRMAJ 14124  CAL 14236  CALC 13872
CALL 02416  CHKRT 14080  DICT 02416  DSAPP 14650  ERR 07682
ERT 14512  FUNC 14216  GOFMD 14356  IAT1 07731  IFS 14412
INIT 07976  ISIT1 13932  JHI 14492  JTD 14276  JUMP 14472
LPAR 10277  MAC 14256  MACRO 02416  MAJRT 14540  MCOUO 07717
MIST1 14512  NAT1 07661  NAT2 07666  NJUMP 07607  PHASE 14512
RTYPE 07595  SAVE 05187  SAVE1 08011  SFLAG 07769  SIMP 14104
TEMP 02451  WORDL 06091
    
```

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01010* IBM 1620-1311 AD-APT.....
01020* .....
01030* INTRAN SUBPROGRAM CALC
01040* THIS SUBPROGRAM SCANS THE SIMPLE STATEMENT IN THE WOEDL
01050* TABLE TO DETERMINE WHICH ROUTINE TO CALL TO PROCESS IT
01060* LINKAGE IS BT MONITR,DSALBL*5,6
01070* B7 CALC,,6
01080* DSALBL IS THE RETURN ADDRESS TO THE CALLING PROGRAM
01090* DSALBL*5 IS THE ADDRESS OF THE DIM NUMBER CORRESPONDING
01100* TO SUBPROGRAM CALC
01110* AND 1 DIGIT INDICATING THAT IT IS A NON-ERASABLE PROGRAM
01120*
01130 DORG 13862 13862
01140 ARGDSA DSA NAT1,NAT2 13866 00005 -7661
13871 00005 -7666
01150 CALC CM LPAR,,10, CHECK FOR CORRECT NUMBER OF PAREN
13872 14 10277 000-0
13884 47 14512 01200
13896 26 07731 07661
01160 BNE ERT
01170 TF IAT1,NAT1
01180* SET NAT2 BACK TO TYPE OF LAST WORD 13908 12 07666 000J4
01190 SM NAT2,14,10 13920 16 07595 000-0
01200 TFM RTYPE,,10
02010 ISIT1 CM IAT1,1,610, CHECK WORDL FOR A SYMBOL
13932 14 0773J 000-1
13944 47 14036 01200
02020 BNE ADD14
02030 AM IAT1,12,10, INCREMENT TO SYMBOL NAME
13956 11 07731 000J2
02040* LOAD AND CALL DICT1 SUBPROGRAM
02050* LOOK UP SYMBOL IN DICTIONARY
02060 BTM MONITR,03030,67 13968 17 02400 -3030
02070 BT DICT,IAT1,6 13980 27 02410 07731
02080* WAS IT FOUND----IF SO BRANCH TO BRMAJ
02090 CM RTYPE,,10 13992 14 07595 000-0
02100 BNE BRMAJ 14004 47 14124 01200
02110* LOOP BACK TO NEXT WORD
02120 ADD2 AM IAT1,2,10 14016 11 07731 000-2
02130 B ISIT1 14028 49 13932 00000
02140 DORG #-3 14036
02150 ADD14 CM IAT1,22,610, CHECK FOR END OF STATEMENT
14036 14 0773J 000K2
14048 46 14080 01200
02160 BE CHKRT
02170 AM IAT1,14,10, INCREMENT TO NEXT WORD IN WORDL
14060 11 07731 000J4
    
```


07070	WORDL	DS	,06091	06091	00000
07080	NJUMP	DS	,07607	07607	00000
07090	MCOU	DS	,07717	07717	00000
07100	ERR	DS	,07682	07682	00000
07110	SAVE	DS	,05187	05187	00000
07120	SFLAG	DS	,07769	07769	00000
07130	TSAVE1	DS	,02456	02456	00000
07140	SAVE1	DS	,08011	08011	00000
07150	PHASE	DS	,ERT	14512	00000
07160	HACMER	DS	,ERT	14512	00000
07170	MIST1	DS	,ERT	14512	00000
07180	FLZERO	DS	,07680	07680	00000
07190	TEMP	DS	,02451	02451	00000
07200	LPAR	DS	,10277	10277	00000
08010	IGNORE	DS	,SIMP+12	14116	00000
08020	HACPIK	DS	,07719	07719	00000
08030	DEND	CALC		13872	

SYMBOL TABLE

TYPERR	00006R	MONITR	02406	MAPENT	13238	HACPIK	07719	ERROUT	00102R
ERRMES	00299R	ENDMAN	13900	CALLX	09892	CLEAR	00054R	CTR	00015R
ERNF	00387R	ERR	07682	HI	00434	IND	07707	INIT	07976
MOVE	00042R	NE	00030	NNE	00008	SEQNO	07656	SET9	00278R
SSNF	00361R								

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01010*
01020*      IBM 1620-1311 AD-APT.....
01030*      -----
01040*      INTRAN SUBPROGRAM TYPERR
01050*      THE FUNCTION OF THIS SUBPROGRAM IS TO TYPE AN ERROR MESSAGE
01060*      LINKAGE IS          BTM MONITR,ANNNO
01070*                        BTM TYPERR,CCCCC
01080*                        CCCCC IS THE ERROR CODE
01090*
01100*      DC      6,0          00005 00006
01110*      CLEAR OUT THE MONITR NON-ERASABLE TABLE
01120*      SO THAT RESTART MAY BE EFFECTED
01130* TYPERR TFM CTR,NNE,10          00006 J6 00015 000-8
01140* CTR DS ,*-2          00015 00000
01150* AM MOVE+11,MONITR          00018 K6 00053 02406
01160* AM MOVE+11,11,10          00030 J1 00053 000J1
01170* MOVE TF CLEAR+6,9999          00042 K6 00060 09999
01180* CLEAR TFM 9999,,711          00054 L6 09999 -C00-
01190* AM CLEAR+6,20,10          00066 J1 00060 0C0K0
01200* SM CTR,1,10          00078 J2 00015 000-1
02010* BNZ CLEAR          00090 M7 00054 01200
02020*      TRANSMIT THE SOURCE STATEMENT NUMBER IN ERROR TO THE ERROR
02030*      MESSAGE
02040* ERROUT TNF SSNF,SEQNO          00102 P3 00361 07656
02050* SF TYPERR-3          00114 L2 00003 00000
02060*      TRANSMIT THE ERROR NUMBER TO THE ERROR MESSAGE
02070* TNF ERNF,TYPERR-1          00126 PL 00387 00005
02080* RCTY          00138 34 00000 00102
02090*      TYPE THE ERROR MESSAGE
02100* WATY ERRMES          00150 L9 00299 00100
02110* RCTY          00162 34 00000 00102
02120* TDM IND-2          00174 15 07705 00000
02130* TFM ERR,,10          00186 16 07682 000-0
02140* TFM HACPIK,,10,          CLEAR MACRO PICK INDICATOR
                                00198 16 07719 000-0
02150* AM CLEAR+6,NE=20-3          00210 J1 00060 -0597
02160* TF HI,CLEAR+6          00222 20 00434 00060
02170*      TEST SENSE SWITCH 3 TO SEE IF INTERVENTION IS DESIRED
02180* BNC3 SET9          00234 M7 00278 00300
02190* H          00246 48 00000 00000
02200* BNC3 SET9          00258 M7 00278 00300
03010* B7 INIT          00270 49 07976 0C000
03020* SET9 TDM CALLX+1,9,11,          SET INDICATOR TO CALL EXIT
                                00278 15 09893 0000R
03030*      TO CALL EXIT INSTEAD OF THE NEXT SUBSYST
03040* B7 INIT          00290 49 07976 0C000
03050* ERRMES DAC 49,, SOURCE STATEMENT NO.          ... ERROR          00299 00098
                                00361 00000
03060* SSNF DS ,ERRMES+32*2-2          00387 00000
03070* ERNF DS ,SSNF+13*2

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03080	NE	DS	,30	00030	00000
03090	NNE	DS	2,8	00008	00002
03100*			COMMON AREA WITH THE MAINLINE		
03110	SEQNO	DS	,07656	07656	00000
03120	INIT	DS	,07976	07976	00000
03130	MAPENT	DS	,13238	13238	00000
03140	ENDMAN	DS	,13900	13900	00000
03150	CALLX	DS	,09892	09892	00000
03160	HI	DS	,434	00434	00000
03170	ERR	DS	,07682	07682	00000
03180	IND	DS	,07707	07707	00000
03190	MONTR	DS	,02406	02406	00000
03200	MACPIK	DS	,07719	07719	00000
04010		DEND	TYPERR	00006	

SYMBOL TABLE

VECTOR	02416	VECSUR	15854	VECDSA	16385	TYPERR	02416	TSTZRO	16206
TSTRAD	16174	TRNEST	14628	TDATA7	03382	TDATA6	03372	TDATA5	03362
TDATA4	03352	TDATA3	03350	TDATA2	03348	TDATA1	03336	TABDSA	14445
TARCYL	02416	STORAD	14168	SRTYPE	07597	SIMPLE	13872	SETDAT	14580
SETAPE	15396	SAVNST	14156	RETURN	02411	RESCOM	16250	PRTPUN	15376
PROJECT	15672	PRECAL	14872	POSNST	14496	POSNBR	14344	POKDSA	16425
POIDSA	16355	POCKET	02416	PLADSA	16435	OUTFIL	16010	OUTDSA	16455
NSTFLG	07746	NEQUAL	07733	MONTR	02406	MAXNST	14147	MATRIX	02416
MATDSA	16395	LINDSA	16365	LCTAPE	07708	GDFILE	15072	GCONIC	02416
FM2665	02416	ELLIPS	02416	ELDSA	16415	DIFCOD	16226	CONDSA	16405
COMPUT	02416	COMDSA	16335	CIRDSA	16375	CIRCLE	02416	CANOUT	02416
CALF	14892	CAN	15974	CGCTD	16285	CHKF	15144	CIR	15798
CODE	07715	CODIT	14904	COMP	15428	CDMP2	14004	CONIC	15914
CLTC2	15748	DESI	15216	DICT	02416	DICT2	02416	ELLIP	15934
ERR	07682	ERR1	15308	ER103	14544	ER104	15468	ER112	15308
ER113	16154	ER144	14276	ER316	16186	FILE	02416	FILE1	02416
FILE2	02416	FILE3	02416	FLDSA	16345	FN63	15544	FORM	07712
FOUND	07628	GEONT	15328	GOERR	16154	HERE1	14963	H2DSA	15771
IAT1	07731	IAT2	07627	ID	14389	ID3	14380	INIT	07976
LIN	15648	LINE	02416	LINER	15704	MAT	15874	MCT	07876
NAMST	14088	NEST	02532	NT	07874	PLA	15778	PLANE	02416
POCK	15954	POI	15488	POINT	02416	RTYPE	07595	SAVE	13979
SETEQ	13980	SETID	14676	SETUP	16094	SSS1	14180	SVN24	14192
SYMB1	04289	SYMB2	04301	SYMB3	04303	SYMB4	04305	SYMB5	04315
SYMB6	04325	SYMB7	04335	SYMOD	14708	TAB	15894	TAKE2	15012
TAT1	13991	TOATA	03333	TFILE	14451	TNEST	07738	TR	14915
TREC	16106	T2	14203	UNDEF	15308	UPI	15048	UP2	14296
VARB	15640	MERM	14568	WFILE	07747	ZSURF	02416		

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01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAM SUBPROGRAM SIMPLE
01040*      THIS SUBPROGRAM PERFORMS AN OPERATION
01050*      INDICATED WITHIN A NEST
01060*      THIS OPERATION MAY BE TO COMPUTE SOME
01070*      ALGEBRAIC OR GEOMETRIC DEFINITION
01080*      AND TO STORE THE RESULT
01090*      LINKAGE IS
01100*      BT MONTR,DSALBL+5,6
01110*      BT SIMPLE,SDSA+10,6
01120*      SDSA IS THE ADDRESS OF THE FIRST ELEMENT
01130*      IN THE NEST
01140*      AND DSALBL IS THE ADDRESS OF THE LAST
01150*      ELEMENT IN THE NEST
01160*      DORG 13862                                13862
01170*      DC 10,0                                  13871 00010
01180*      SIMPLE TF COMP2*6,SIMPLE-6,11          13872 26 14010 13860
01190*      TFM ERR,,10,                            INITIALIZE ERROR POSITION
01200*      TF IAT1,SIMPLE-6,11,                    13884 16 07682 000-0
02010*      TF IAT2,SIMPLE-1,11,                    13896 26 07731 13860
02020*      TFM STORAD+11,NEST,,                   13908 26 07627 1387J
02030*      TFM NT,,8,                              INITIALIZE TOATA TABLE POINTER

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06200 BT CODIT 14884 49 14904 00000
07010 CALF TFL SRTYPE,SAVE,, RESTORE SRTYPE 14892 06 07597 13979
07020 CODIT CF TR 14904 33 14915 00000
07030 TR DS ,* 14915 00000
07040 TOM CODE,,11 14916 15 07715 0000-
07050* SET UP ARGUMENTS TO FILE SUBPROGRAM
07060 TFM FLDSA,TDATA 14928 16 16345 -3333
07070 TF FLDSA+5,TATI 14940 26 16350 13991
07080 CF FLDSA+1 14952 33 16346 C0000
07090 HERE1 DS ,* 14963 00000
07100 A FLDSA,NT 14964 21 16345 07874
07110 TD T2,FLDSA 14976 25 14203 16345
07120 CM T2,,10 14988 14 14203 000-0
07130 BE GOF1LE 15000 46 15072 01200
07140 TAKE2 SM T2,2,10 15012 12 14203 000-2
07150 BE GOF1LE 15024 46 15072 01200
07160 BNL TAKE2 15036 46 15012 01300
07170 UP1 AM FLDSA,1,10 15048 11 16345 000-1
07180 SF TR 15068 32 14915 00000
07190* LOAD AND CALL FILE SUBPROGRAM
07200 GOF1LE BTM MONITR,03210,67 15072 17 02400 -3210
08010 BT FILE3,FLDSA+5,6 15084 27 02410 16350
08020 BNF CHKFL,TR 15096 44 15144 14915
08030 TF HERE1,FLDSA 15108 26 14963 16345
08040 SM FLDSA,1,10 15120 12 16345 000-1
08050 TR FLDSA,HERE1,611 15132 31 1634N 1496L
08060* FILE WILL BRING A SYMBOL OR SYM NUMBER INTO TDATA
08070* IF IT WAS NOT FOUND IT WAS UNDEFINED
08080 CHKF BNF UNDEF,FOUND 15144 44 15308 07628
08090 TFM DESI+6,TDATA 15156 16 15222 -3333
08100 A DESI+6,NT 15168 21 15222 07874
08110 AM DESI+6,3,10 15180 11 15222 000-3
08120 A NT,DESI+6,11, UPDATE NT 15192 21 07874 1522K
08130 AM DESI+6,16,10 15204 11 15222 000J6
08140 DESI CM 9999,,10, IS IT A SCALAR QUANTITY 15216 14 09999 C00-0
08150 BH SETID 15228 46 14676 01100
08160 BL ERR1 15240 47 15308 01300
08170 AM DESI+6,10,10 15252 11 15222 000J0
08180* REPLACE THE NAME IN WORDL WITH THE SCALA
08190 TFL TAT1,DESI+6,611 15264 06 1399J 1522K
08200 SM TAT1,12,10 15276 12 13991 000J2
09010 TFM TAT1,2,610, SET TYPE = 2 FOR A NUMBER 15288 16 1399J 000-2
09020 B ID3 15300 49 14380 00000
09030 DORG *-3 15308
09040 TFM WERM+11,112,9, SET ERROR NO.=112 15308 16 14579 00J12
09050 GEOMT CM WERM-12 15320 49 14556 00000
09060 BE CMP 15340 46 15428 01200
09070 CM RTYPE,,10, CHECK FOR COMPUT NEST 15352 14 07595 000-0
09080 BNE SETAPE 15364 47 15396 01200
09090 BT MONITR,OUTDSA+5,6 15376 27 02400 14460
09100 BT CANOUT,,6 15388 49 02410 00000
09120* INDEX TO CALL SUBPROGRAM FOR VARIOUS
09130* GEOMETRY TYPES
09140 SETAPE MM SRTYPE,-5,9 15396 13 07597 00-0N
09150 SM 99,CGOTO-5 15408 12 00099 J6280
09160 B 99,,6 15420 49 0009R 00000
09170 DORG *-3 15428

09180* LOAD AND CALL CCMPT SUBPROGRAM
09190 COMP BT MONITR,COMDSA+5,6 15428 27 02400 16340
09200 B COMPUT,,6 15440 49 02410 00000
10010 DORG *-3 15448
10020 BD ER104,ERR 15448 43 15468 07682
10030 B7 CAN 15460 49 15974 00000
10040 ER104 TFM WERM+11,104,9, SET ERROR NO.=104 15468 16 14579 00J04
10050 B7 WERM-12 15480 49 14556 00000
10060 POI CM FORM,63,8, CHECK FOR SIMPLE DEFINITION 15488 14 07712 0-063
10070 TFM VARB+6,CAN 15500 16 15646 J5974
10080 BE FM63 15512 46 15544 01200
10090* LOAD AND CALL POINT SUBPROGRAM
10100 BT MONITR,POIDSA+5,6 15524 27 02400 16360
10110 B7 POINT,,6 15536 49 02410 00000
10120* PROCESS SIMPLE DEFINITION
10130 FM63 TFM SYMB1,51,8 15544 16 04289 0-051
10140 TOM SYMB7+1 15556 15 04336 00000
10150 DC 1,,* 15567 00001
10160 AM IAT1,12,10 15568 11 07731 000J2
10170 TFL SYMB5,IAT1,11 15580 06 04315 0773J
10180 AM IAT1,14,10 15592 11 07731 000J4
10190 TFL SYMB6,IAT1,11 15604 06 04325 0773J
10200 AM IAT1,14,10 15616 11 07731 000J4
10210 TFL SYMB7,IAT1,11 15628 06 04335 0773J
10220 VARB B7 15640 49 00000 00000
10230 LIN CM RTYPE,15,10, CHECK FOR ZSURF 15648 14 07595 000J5
10240 BNE LINER 15660 47 15704 01200
10250* LOAD AND CALL ZSURF SUBPROGRAM
10260 PRJECT BTM MONITR,03150,67 15672 17 02400 -3150
10270 BTM ZSURF,,610 15684 17 02410 000-0
10280 B7 CAN 15696 49 15974 00000
10290* CHECK FOR LINE TANGENT TO TWO CIRCLES
11000 LINER CM FORM,2665,8 15704 14 07712 0K665
11010 BE C1TC2 15716 46 15748 01200
11020* LOAD AND CALL LINE SUBPROGRAM
11030 BT MONITR,LINDSA+5,6 15728 27 02400 16370
11040 B7 LINE,,6 15740 49 02410 00000
11050* LOAD AND CALL FM2665 SUBPROGRAM
11060 C1TC2 BT MONITR,H2DSA+5,6 15748 27 02400 15776
11070 B7 FM2665,,6 15760 49 02410 00000
11080 H2DSA DSA CAN 15771 00005 J5974
11090 DSC 5,03341 15772 00005
11100* LOAD AND CALL PLANE SUBPROGRAM
12010 PLA BT MONITR,PLADSA+5,6 15778 27 02400 16440
12020 B PLANE,,6 15790 49 02410 00000
12030 DORG *-3 15798
12040 CIR CM FORM,63,8, CHECK FORSIMPLE CIRCLE DEFINITION 15798 14 07712 0-063
12050 TFM VARB+6,TSTRAD 15810 16 15646 J6174
12060 BE FM63 15822 46 15544 01200
12070* LOAD AND CALL CIRCLE SUBPROGRAM
12080 BT MONITR,CIRD+5,6 15834 27 02400 16380
12090 B CIRCLE,,6 15846 49 02410 00000
12100 DORG *-3 15854
12110* LOAD AND CALL VECTOR SUBPROGRAM
12120 VECBUR BT MONITR,VECD+5,6 15854 27 02400 16390
12130 B VECTOR,,6 15868 49 02410 00000
12140 DORG *-3 15874
12150* LOAD AND CALL MATRIX SUBPROGRAM

12160 MAT BT MONITR,MATDSA+5,6 15874 27 02400 16400
12170 BT MATRIX,,6 15886 49 02410 00000
12180* LOAD AND CALL TABCYL SUBPROGRAM
12190 TAB BT MONITR,TABDSA+5,6 15894 27 02400 16450
12200 BT TABCYL,,6 15906 49 02410 00000
13010* LOAD AND CALL GCCNIC SUBPROGRAM
13020 CONIC BT MONITR,CONDOSA+5,6 15914 27 02400 16410
13030 BT GCONIC,,6 15926 49 02410 00000
13040* LOAD AND CALL ELLIPS SUBPROGRAM
13050 ELLIP BT MONITR,ELLOSA+5,6 15934 27 02400 16420
13060 BT ELLIPS,,6 15946 49 02410 00000
13070* LOAD AND CALL POCKET SUBPROGRAM
13080 POCK BT MONITR,POKDSA+5,6 15954 27 02400 16430
13090 BT POCKET,,6 15966 49 02410 00000
13100* CHECK FOR A PREVIOUS EQUAL SIGN
13110 CAN BNF UTFIL+24,NEQUAL 15974 44 16034 07733
13120 CM RTYPE,,10, CHECK FOR A COMPUTE NEST
13130 BE DIFCOD 15986 14 07595 000-0
13140* LOAD AND CALL FILE SUBPROGRAM
13150 UTFIL BTM MONITR,03200,67 16010 17 02400 -3200
13160 BTM FILE2,SYMB1,67 16022 17 02410 -4289
13170 CM RTYPE,,10, CHECK FOR COMPUTE NEST 16034 14 07595 000-0
13180 BE RESCOM 16046 46 16250 01200
13190* CHECK FOR PREVIOUS EQUAL SIGN
13200 BNF SETUP,NEQUAL 16058 44 16094 07733
14010* THE SYMBOL HAS ALREADY BEEN STORED IN THE CANONICAL FORM
14020* TABLE ---NOW GIVE IT A NEST ADDRESS
14030 A STORAD+11,TNEST 16070 21 14179 07738
14040 TF SYMB2,STORAD+11 16082 26 04301 14179
14050* STORE SYMBOL AND DATA IN PROPER PLACE IN NEST TABLE
14060 SETUP TF TREC+6,STORAD+11 16094 26 16112 14179
14070 TREC TR 9999,SYMB1-3,6 16106 31 0999R 04286
14080 A TNEST,SYMB1,, UPDATE POINTER IN NEST TABLE
14090 C TNEST,MAXNST 16118 21 07738 04289
14100 BL RETURN,,6 16130 24 07738 14147
14110 ER113 TFM WERM+11,113,9, SET ERROR NO.=113 16142 47 0241J 01300
14120 BT WERM-12 16154 16 14579 00J13
14130 TSTRAD BNF TSTZRO,SYMB7-2,, BRANCH IF RADIUS IS NON-NEGATIVE 16166 49 14556 00000
14140 ER316 TFM WERM+11,316,9, SET ERROR NO.=316 16174 44 16206 04333
14150 BT WERM-12 16186 16 14579 00L16
14160 TSTZRO BD CAN,SYMB7-9,, BRANCH IF RADIUS IS NON-ZERO 16198 49 14556 00000
14170 BT ER316 16206 43 15974 04326
14180 DIFCOD BTM MONITR,03190,67 16218 49 16186 00000
14190 BTM FILE1,SYMB1,67 16226 17 02400 -3190
14200* COMPUT LEFT ANSWER IN SYMB5 16238 17 02410 -4289
15010 RESCOM TFL SYMB2,SYMB5 16250 06 04301 04315
15020 TFM SYMB3,2,10 16262 16 04303 000-2
15030* RETURN TO CALLING PROGRAM
15040 B RETURN,,6 16274 49 0241J 00000
15050 DORG 0-4 16281 16 16285 00005 J5648
15060 CGOTO DSA LIN,CIR,CONIC,TAB,VECSUR,ELLIP 16290 00005 J5798
16295 00005 J5914
16300 00005 J5894
16305 00005 J5854
16310 00005 J5934

15070 DSA MAT,PLA,POI,POCK 16315 00005 J5874
16320 00005 J5778
16325 00005 J5488
16330 00005 J5954
16335 00005 J5448
15080 COMDSA DSA COMP+20 16336 00005
15090 DSC 5,03111 16345 00005 -9999
15100 FLDSA DSA 9999,TAT1 16350 00005 J3991
15110 POINT DS ,2416 02416 00000
15120 POIDSA DSA CAN 16355 00005 J5974
15130 DSC 5,03251 16356 00005
15140 LINE DS ,2416 02416 00000
15150 LINDSA DSA CAN 16365 00005 J5974
15160 DSC 5,03301 16366 00005
15170 CIRCLE DS ,2416 02416 00000
15180 CIRDSA DSA TSTRAD 16375 00005 J6174
15190 MATRIX DS ,2416 02416 00000
15200 DSC 5,03371 16376 00005
16010 VECTOR DS ,2416 02416 00000
16020 VECDSA DSA CAN 16385 00005 J5974
16030 DSC 5,03461 16386 00005
16040 MATDSA DSA CAN 16395 00005 J5974
16050 DSC 5,03481 16396 00005
16060 GCONIC DS ,2416 02416 00000
16070 COMDSA DSA CAN 16405 00005 J5974
16080 DSC 5,03521 16406 00005
16090 ELLIPS DS ,2416 02416 00000
16100 ELLOSA DSA CAN 16415 00005 J5974
16110 DSC 5,03531 16416 00005
16120 POCKET DS ,2416 02416 00000
16130 POKDSA DSA CAN 16425 00005 J5974
16140 DSC 5,03541 16426 00005
16150 PLANE DS ,2416 02416 00000
16160 PLADSA DSA CAN 16435 00005 J5974
16170 DSC 5,03441 16436 00005
16180 TABCYL DS ,2416 02416 00000
16190 TABDSA DSA CAN 16445 00005 J5974
16200 DSC 5,03501 16446 00005
17010 CANOUT DS ,2416 02416 00000
17020 OUTDSA DSA RESCOM+24 16455 00005 J6274
17030 DSC 5,03981 16456 00005
17040* COMMON WITH MAINLINE
17050 SYMB1 DS ,04289 04289 00000
17060 SYMB2 DS ,04301 04301 00000
17070 SYMB3 DS ,04303 04303 00000
17080 SYMB4 DS ,04305 04305 00000
17090 SYMB5 DS ,04315 04315 00000
17100 ERR DS ,07682 07682 00000
17110 IAT1 DS ,07731 07731 00000
17120 IAT2 DS ,07627 07627 00000
17130 FORM DS ,07712 07712 00000
17140 TDATA DS ,03333 03333 00000
17150 TDATA1 DS ,03336 03336 00000
17160 TDATA2 DS ,03348 03348 00000
17170 TDATA3 DS ,03350 03350 00000
17180 TDATA4 DS ,03352 03352 00000
17190 TDATA5 DS ,03362 03362 00000
17200 TDATA6 DS ,03372 03372 00000
18010 TDATA7 DS ,03382 03382 00000
18020 CODE DS ,07715 07715 00000

18030	NSTFLG	DS	,07746	07746	00000
18040	RTYPE	DS	,07595	07595	00000
18050	SRTYPE	DS	,07597	07597	00000
18060	ERR1	DS	,ER112	15308	00000
18070	UNDEF	DS	,ER112	15308	00000
18080	GOERR	DS	,ER113	16154	00000
18090	FOUND	DS	,07628	07628	00000
18100	NEST	DS	,02532	02532	00000
18110	INIT	DS	,07976	07976	00000
18120	WFILE	DS	,07747	07747	00000
18130	NEQUAL	DS	,07733	07733	00000
18140	TNEST	DS	,07738	07738	00000
18150	LCTAPE	DS	,07708	07708	00000
18160	MONITR	DS	,2406	02406	00000
18170	DICT	DS	,2416	02416	00000
18180	TYPERR	DS	,2416	02416	00000
18190	FILE	DS	,2416	02416	00000
18200	COMPUT	DS	,2416	02416	00000
19010	RETURN	DS	,2411	02411	00000
19020	ZSURF	DS	,2416	02416	00000
19030	NT	DS	,07874	07874	00000
19040	MCT	DS	,07876	07876	00000
19050	SYMB6	DS	,04325	04325	00000
19060	SYMB7	DS	,04335	04335	00000
19070	FILE1	DS	,2416	02416	00000
19080	FILE2	DS	,2416	02416	00000
19090	FILE3	DS	,2416	02416	00000
19100	DICT2	DS	,2416	02416	00000
19110	FM2665	DS	,2416	02416	00000
19120	DEND	SIMPLE		13872	

SYMBOL TABLE

180/PI	18543	TYPERR	02416	TVALUE	18503	TTSYSM	16546	TDATA7	03382
TDATA6	03372	TDATA5	03362	TDATA4	03352	TDATA3	03350	TDATA2	03348
TDATA1	03356	TANSA	17641	RETURN	02411	RADIAN	16238	PHINUS	17170
PI/180	18533	NOTDUN	16670	MONITR	02406	FUNCHK	17338	EXPFUN	18338
ERR116	17996	ERRFLG	18370	COMPUT	16462	CHKEXP	17864	BRLOP2	17182
BRLOP1	16970	BPUNCT	16706	ANOTZ	17984	ATANF	02416	BABS	17696
BATAN	17652	BGOS	17592	BEXP	17796	BLNTH	17716	BLOG	18270
BOUT	18470	BSIN	17548	BSORT	17480	BTAN	18226	CHKD	17820
COMT	18020	COSF	02421	CPEND	18402	CPNUM	16590	CT	17805
ERR	07682	EXPF	02416	FIX	18112	FLE49	18573	FLO	18583
FL1	18563	FTYPE	17433	FUNCT	16834	GOL	17516	GOZ	18306
IAT1	07731	IAT2	07627	IEND	16469	IFUN	16484	INIT	07976
IPOP	16470	LOGF	02416	LCP	16471	LSIGN	16482	MORD	17226
NEXT1	18148	NNOTZ	17920	NOP	16481	NOT1	17106	NPLUS	17964
PAST	16878	PDIV	16958	PPLUS	17150	SETOP	17026	SET1	17900
SINF	02416	SORTF	02416	SVLOP	17282	SX	18080	SYMB1	04289
SYMB5	04315	TAKE1	18172	TANF	02416	TANSA	18219	TDATA	03333
TEMP2	18513	TEMP3	18593	TLAST	16614	VALUE	18593	X	18503
O.O	18523								

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01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAN SUBPROGRAM COMPUT
01040*      THIS SUBPROGRAM COMPUTES AN ALGEBRAIC NEST OR
01050*      A FUNCTION
01060*      LINKAGE IS          BT MONITR,DSALBL+5,6
01070*                        B COMPUT
01080*
01090*
01100*      DORG 16462
01110*      COMPUT TFM ERR,,10 16462 16 07682 C00-0
01120*      TDM IEND,0         16474 15 16469 C0000
01130*      TDM LSIGN,-1     16486 15 16482 C000J
01140*      TDM LOP,-1       16498 15 16471 0000J
01150*      TDM IPOP,-0     16510 15 16470 00000
01160*      TFL TVALUE,0.0  16522 06 18503 18523
01170*      TFL VALUE,0.0   16534 06 18553 18523
01180*
01190*      TTSYSM CH IAT1,2,610, IAT2 IS INDICATOR OF POSITION IN WORD
                                CHECK THE ELEMENT TYPE
01200*      BE CPNUM,,,        NUMBER 16546 14 0773J C00-2
02010*      BH BPUNCT,,,      PUNCTUATION 16558 46 16590 01200
02020*      B CPEND-12       16570 46 16706 01100
02030*      DORG -3         16582 49 18390 00000
02040*      CPNUM AM IAT1,12,10, STEP INDICATOR TO GET NUMBER 16590
02050*      TFL TVALUE,IAT1,11, STORE THE NUMBER 16590 11 07731 C00J2
02060*      TDM IPOP,-1      TEST FOR LAST WORD 16602 06 18503 0773J
02070*      TDM IPOP,-1     16614 15 16470 0000J
02080*      C IAT1,IAT2     16626 24 07731 07627
02090*      BL NOTDUN       16638 47 16470 01300
02100*      LAST WORD SET END INDICATOR
02110*      TDM IEND,1      16650 15 16469 C0001
02120*      B BALOP2       16662 49 17182 00000
02130*      DORG -3         16670
02140*      NOT COMPLETE ** TEST IF NEXT

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02150* WORD IS PUNCTUATION
02160 NOTOUN AM IAT1,2,10 16670 11 07731 000-2
02170 CM IAT1,3,610 16682 14 0773J 000-3
02180 BNE/ TSTSYM+36,,, 16694 47 16582 01200
02190* ERROR CONDITCN
02200 BPUNCT AM IAT1,12,10 BRANCH ON PUNCTUATION OF THIS WORD
03010 CM IAT1,10,610, TEST + 16706 11 07731 000J2
03020 BE PPLUS 16718 14 0773J 000J0
03030 BL FUNCT 16730 46 17150 01200
03040 CM IAT1,14,610, TEST * 16742 47 16834 01300
03050 BE PAST 16754 14 0773J 000J4
03060 CM IAT1,20,610, TEST - 16766 46 16878 01200
03070 BE PMINUS 16778 14 0773J 000K0
03080 CM IAT1,21,610, TEST / 16790 46 17170 01200
03090 BE PDIV 16802 14 0773J 000K1
03100 B TSTSYM+36,,, ERROR CONDITION 16814 46 16958 01200
03110 DORG *-3 16826 49 16582 00000
03120 FUNCT TF IFUN,IAT1,11 16834 16834
03130 CM IFUN,10,10 16834 26 16484 0773J
03140 BH TSTSYM+36,,, ERROR CONDITION 16846 14 16484 000J0
03150 B FUNCHK 16858 46 16582 01100
03160 DORG *-3 16870 49 17338 C0000
03170 PAST TDM NOP,3 16878 15 16481 00003
03180 TFM IFUN,10,1011 16890 16 16484 000J-
03190 SM IAT1,14,10 16902 12 0773J 000J4
03200 CM IAT1,14,610, CHECK FOR ASTERISK--(EXPONENTIATION)
04010 BE FUNCHK-12,,, BRANCH TO FUNCTIONAL ROUTINES
04020 AM IAT1,14,10, INCREMENT TO NEXT WORD 16926 46 17326 01200
04030 B BRLOP1 16938 11 07731 000J4
04040 DORG *-3 16950 49 16970 C0000
04050 PDIV TDM NOP,9,, DIVIDE--SET NEW OPERATION
04060* /OR*...BRANCH ON LAST OPEATION 16958 15 16481 00009
04070 BRLOP1 BNF *-32,LOP 16970 44 17002 16471
04080 TFL TEMP2,TVALUE,, STORE PRESENT VALUE IN TEMP2
04090 B SETOP 16982 06 18513 18503
04100 DORG *-3 16994 49 17026 00000
04110 TD *-13,LOP,, SET FMUL OR FDIV 17002 25 17015 16471
04120 TFL TEMP2,TVALUE,, ALWAYS MODIFIED FOR FMUL OR FDIV
04130 SETOP TD LOP,NOP 17014 06 18513 18503
04140* IPOP USED AS INDICATOR FOR FIRST
04150* OPERATION AND ALSO CONSECUTIVE OPERATORS
04160* TEST ILLEGAL ALGEBRA
04170 BD NOT1,IPOP 17038 43 17106 16470
04180 CM IAT1,14,610, CHECK FOR ASTERISK-- MULTIPLICATION
04190 BE TSTSYM+36,,, ERROR CONDITION 17050 14 0773J 000J4
04200 CM IAT1,21,610, CHECK FOR SLASH--DIVIDE
05010 BNE NOT1+12 17062 46 16582 01200
05020 B TSTSYM+36,,, ERROR CONDITION 17074 14 0773J 000K1
05030 DORG *-3 17086 47 17118 01200
05040 NOT1 BNF TSTSYM+36,IPOP 17098 49 16582 00000
05050 TDM IPOP,1 17106 44 16582 16470
05060 AM IAT1,2,10, READY NEXT WORD 17118 15 16470 C0001
05070 B TSTSYM 17130 11 07731 000-2
17142 49 16546 00000

05080 DORG *-3 17150
05090* * OR - *** BRANCH ON LAST OPERATION
05100 PPLUS TDM NOP,-1 17150 15 16481 0000J
05110 B BRLOP2 17162 49 17182 00000
05120 DORG *-3 17170
05130 PMINUS TDM NOP,-2,, SUBTRACTION--NOP--2 17170 15 16481 0000K
05140 BRLOP2 BNF MORD,LOP 17182 44 17226 16471
05150 TD *-13,LOP,, SET FADD OR FSUB 17194 25 17207 16471
05160 TFL VALUE,TVALUE,, ALWAYS MODIFIED FOR FADD OR FSUB
05170 B SVLOP 17206 06 18553 18503
05180 DORG *-3 17218 49 17282 00000
05190 MORD TD *-13,LOP,, SET FMUL OR FDIV 17226 25 17239 16471
05200 TFL TEMP2,TVALUE,, ALWAYS MODIFIED FOR FMUL OR FDIV
06010 TFL TVALUE,TEMP2,, RESTORE TVALUE 17238 06 18513 18503
06020 TD LOP,LSIGN,, UPDATE SIGN 17250 06 18503 18513
06030 B BRLOP2 17262 25 16471 16482
06040 DORG *-3 17274 49 17182 00000
06050* SAVE LAST OPERATCN***** UPDATE SIGN 17282
06060 SVLOP TD LSIGN,NOP 17282 25 16482 16481
06070 TD LOP,NOP 17294 25 16471 16481
06080 BD CPEND,IEND,, TEST FOR END OF NEST 17306 43 18402 16469
06090 B SETOP+12 17318 49 17038 00000
06100 DORG *-3 17326
06110* FUNCTION OR *****PREPARE TO EXECUTE
06120 AM IAT1,14,10, INCREMENT TO NEXT WORD 17326 11 07731 000J4
06130 FUNCHK AM IAT1,2,10 17338 11 07731 000-2
06140 CM IAT1,2,610, CHECK THAT ARGUMENT IS A NUMBER
06150 BNE ERRFLG 17350 14 0773J 000-2
06160 AM IAT1,12,10 17362 47 18370 01200
06170 TFL X,IAT1,11, STORE THE ARGUMENT IN X 17374 11 07731 000J2
06180 MM IFUN,5,9, INDEX TO PROPER FUNCTION TYPE 17386 06 18503 0773J
06190 SM 99,*+18 17398 13 16484 00-05
06200 B 99,*+6 17410 12 00099 J7428
07010 DORG *-4 17422 49 0009R 00000
07020 FTYPE DSA BSQRT,BSIN,BCOS,BATAN,BABS,BLNTH,BLOG 17429
17433 00005 J7480
17438 00005 J7548
17443 00005 J7592
17448 00005 J7652
17453 00005 J7696
17458 00005 J7716
17463 00005 J8270
17468 00005 J8338
17473 00005 J8226
17478 00005 J7796
07030 DSA EXPFUN,BTAN,BEXP
07040* EVALUATE FUNCTION
07050* SQUARE ROOT
07060 BSQRT BNF GO1,X-2 ,, CHECK FOR NEGATIVE ARGUMENT
07070* LOAD AND CALL TYPERR SUBPROGRAM 17480 44 17516 18501
07080 BTM MONTR,03090,67 17492 17 02400 -3090
07090 BTM TYPERR,117,67 17504 17 02410 -0117
07100* LOAD AND CALL SQRTF SUBPROGRAM
07110 GO1 BTM MONTR,02000,67 17516 17 02400 -2000
07120 BTM SQRTF,X,67 17528 17 02410 J8503
07130 B TLAST 17540 49 16614 00000

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07140 DORG --3 17548
07150 LOAD AND CALL SINP SUBPROGRAM
07160 BSM BTM MONITR,02010,67 17548 17 02400 -2010
07170 FMUL X,PI/180, CHANGE ANGLE TO RADIAN
07180 BTM SINP,X,67 17560 03 18503 18533
07190 B TLAST 17572 17 02410 J8503
07200 DORG --3 17584 49 16614 00000
08010 DORG --3 17592
08020 BCOS BTM MONITR,02010,67 LOAD AND CALL COSF SUBPROGRAM
08030 FMUL X,PI/180, CHANGE ANGLE TO RADIAN 17592 17 02400 -2010
08040 BTM COSF,X,67 17604 03 18503 18533
08050 B TLAST 17616 17 0242J J8503
08060 DORG --4+5*3-11 17628 49 16614 00000
08070 NDP X,X 17639
08080 DORG --14 17640 41 18503 18503
08090 TANDSA DSA FL1 17637
08100 DORG ++5*3-4 17641 00005 J8563
08110 BATAN BTM MONITR,02020,67 17652
08120 BT ATANF,TANDSA*10,6 17652 17 02400 -2020
08130 FMUL X,180/PI,, CHANGE ANGLE TO RADIAN 17664 27 02410 17651
08140 B TLAST 17676 03 18503 18543
08150 DORG --3 17688 49 16614 00000
08160 ABSOLUTE FUNCTION... CLEAR FLAG 17696
08170 BABS CF X-2 17696 33 18501 00000
08180 B TLAST 17708 49 16614 00000
08190 DORG --3 17716
08200 COMPUTE LENGTH FUNCTION OF VECTOR
09010 BLNTH FMUL TDATA5,TDATA5 17716 03 03362 03362
09020 TFL X,TDATA5 17728 06 18503 03362
09030 FMUL TDATA6,TDATA6 17740 03 03372 03372
09040 FADD X,TDATA6 17752 01 18503 03372
09050 FMUL TDATA7,TDATA7 17764 03 03382 03382
09060 FADD X,TDATA7 17776 01 18503 03382
09070 B BSQRT 17788 49 17480 00000
09080 DORG --3 17796
09090 EXPONENTIAL FUNCTION...
09100 CHECK FOR FIX OR FLOATING
09110 BEXP TFM CT,8,10 17796 16 17805 000-8
09120 CT DS ,=-2 17805 00000
09130 TFM CHKD+11,TVALUE-2 17808 16 17831 J8501
09140 CMKD BD CKEXP,9999 17820 43 17864 09999
09150 SM CT,1,10 17832 12 17805 000-1
09160 SM CHKD+11,1,10 17844 12 17831 000-1
09170 BT CHKO 17856 49 17820 00000
09180 CMKEXP C CT,TVALUE 17864 24 17805 18503
09190 BZ FIX 17876 46 18112 01200
09200 FLOATING EXPONENT
10010 BD NNOTZ,TVALUE-9,, CHECK FOR ZERO EXPONENT
10020 SET1 TFL X,FL1,, A**0= 1 17888 43 17920 18494
10030 BT TLAST 17900 06 18503 18563
10040 NNOTZ BD ANOTZ,TEMP2-9 17912 49 16614 00000
10050 BNF NPLUS,TVALUE-2 17920 43 17984 18504
10060 TFL X,FLE49 17932 44 17964 18501
10070 BT TLAST 17944 06 18503 18573
10080 NPLUS TFL X,FLO,, 0**N= 0 17956 49 16614 00000
10090 BT TLAST 17964 06 18503 18583
17976 49 16614 00000

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10100 ANOTZ BNF CONT,TEMP2-2 17984 44 18020 18511
10110 LOAD AND CALL TYPERR SUBPROGRAM
10120 ERR16 BTM MONITR,03090,67 17996 17 02400 -3090
10130 BTM TYPERR,116,67 18008 17 02410 -0116
10140 LOAD AND CALL LOGF SUBPROGRAM
10150 CONT BTM MONITR,02040,67 18020 17 02400 -2040
10160 BTM LOGF,TEMP2,67 18032 17 02410 J8513
10170 FMUL TEMP2,TVALUE 18044 03 18513 18503
10180 LOAD AND CALL EXPF SUBPROGRAM
10190 BTM MONITR,02030,67 18056 17 02400 -2030
10200 BTM EXPF,TEMP2,67 18068 17 02410 J8513
11010 SX TFL X,TEMP2 18080 06 18503 18513
11020 TDM LOP,-1 18092 15 16471 0000J
11030 BT TLAST 18104 49 16614 00000
11040 FIXED EXPONENT
11050 FIX BNF NEXT1,TVALUE-2 18112 44 18148 18501
11060 LOAD AND CALL TYPERR SUBPROGRAM
11070 BTM MONITR,03090,67 18124 17 02400 -3090
11080 BTM TYPERR,115,67 18136 17 02410 -0115
11090 PERFORM FIXED MULTIPLY
11100 NEXT1 TFL X,TVALUE 18148 06 18503 18503
11110 TFL TEMP3,TEMP2 18160 06 18593 18513
11120 TAKE1 FSUB X,FL1 18172 02 18503 18563
11130 CHECK IF DONE
11140 BZ SX 18184 46 18080 01200
11150 FMUL TEMP2,TEMP3 18196 03 18513 18593
11160 BT TAKE1 18208 49 18172 00000
11170 TANSAs DSA RADIAN+24 18219 00005 J8262
11180 DSC 5,02211 18220 00005
11190 LOAD TANF SUBPROGRAM
12010 BTAN BT MONITR,TANSA*5,6 18226 27 02400 18224
12010 RADIAN FMUL X,PI/180,, CHANGE ANGLE TO RADIAN 18238 03 18503 18533
12020 CALL TANF SUBPROGRAM
12030 BTM TANF,X,67 18250 17 02410 J8503
12040 BT TLAST 18262 49 16614 00000
12050 BLOG BNF GO2,X-2,, CHECK FOR NEGATIVE ARGUMENT 18270 44 18306 18501
12060 CALL AND LOAD TYPERR SUBPROGRAM
12070 BTM MONITR,03090,67 18282 17 02400 -3090
12080 BTM TYPERR,118,67 18294 17 02410 -0118
12090 GO2 BTM MONITR,02040,67 18306 17 02400 -2040
12100 BTM LOGF,X,67 18318 17 02410 J8503
12110 BT TLAST 18330 49 16614 00000
12120 LOAD AND CALL EXPF SUBPROGRAM
12130 EXPFUN BTM MONITR,02030,67 18338 17 02400 -2030
12140 BTM EXPF,X,67 18350 17 02410 J8503
12150 BT TLAST 18362 49 16614 00000
12160 ERRFLG TDM ERR,-1 18370 15 07682 0000J
12170 B CPEND 18382 49 18402 00000
12180 DORG --3 18390
12190 TDM ERR,1 18390 15 07682 00001
12200 CPEND TFL SYMBS,VALUE,, STORE COMPUTED VALUE IN SYMBS 18402 06 04315 18553
13010 TFM SYMBS,31,8, SET RECORD LENGTH IN SYMBS 18414 16 04289 0-031
13020 TDM SYMBS+1 18426 15 04316 00000
13030 DC 1,, 18437 00001
13040 RETURN TO CALLING PROGRAM
13050 BV BOUT 18438 46 18470 01400

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07100      AM  TEMPAD,20,10          15792 26 15075 0773J
07110      TFM TR31+6,TDATA4-9,,    INITIALIZE TDATA STACK 15804 11 15075 000K0
07120      A   TR31+6,NPW,,          INCREMENT TO NEXT AVAILABLE LOCATION 15816 16 15846 -3343
                                     15828 21 15846 07622
07130 TR31  TR   9999,TEMPAD,11,,    STORE THE PARAMETERS IN THE TDATA STACK 15840 31 09999 1507N
                                     15852 12 15075 000J7
07140      SM  TEMPAD,17,10          15864 21 07622 1507N
07150      A   NPW,TEMPAD,11,,      UPDATE THE NPW FIELD 15876 12 07622 000L1
07160      SM  NPW,31,10            15888 11 15075 000J6
07170      AM  TEMPAD,18,10          15900 26 03351 1507N
07180      TF  NSRF,TEMPAD,11,,    SET THE SURFACE TYPE 15912 49 15736 00000
07190      B   ZADD                  15920
07200      DORG  =-3                15924 00005 -4286
08010 FILDSA DSA SYMB1-3,9999      15929 00005 -9999

08020*     SYMBOL...LOOK IN CANON TABLE
08030 FILTER TF FILDSA+5,IAT1      15930 26 15929 07731
08040      CF  FILDSA+1              15942 33 15925 00000
08050*     LOAD AND CALL THE FILE3 SUBPROGRAM
08060      BTM MONITR,03210,67      15954 17 02400 -3210
08070      BT  FILE3,FILDSA+5,6     15966 27 02410 15929
08080      BNF UNDEF,FOUND,,        NO FLAG INDICATES AN UNDEFINED SYMBOL
                                     15978 44 17318 07628
08090      TF  NSRF,SYMB4,,          SET THE SURFACE TYPE 15990 26 03351 04305
08100      CM  NSRF,,10              16002 14 03351 C00-0
08110      BL  BRBAK                 16014 47 17262 01300
08120 TOAT  TFM  **30,TDATA4-9,,    INITIALIZE TO TDATA STACK 16026 16 16056 -3343
08130      A   **18,NPW,,            INCREMENT TO NEXT OPEN BLOCK 16038 21 16056 07622
08140      TR  9999,SYMB5-9,,       STORE THE PARAMETERS IN THE TDATA STACK 16050 31 09999 04306
08150      A   NPW,SYMB1,,          UPDATE THE CHARACTER COUNT 16062 21 07622 04289
08160      SM  NPW,31,10            16074 12 07622 000L1
08170      B   ZADD                  16086 49 15736 00000
08180      DORG  =-3                16094
08190 COUT  CM  NSRF,4,10,CHECK VALID SURFACE 16094 14 03351 C00-4
08200      BM  TYPILL                 16106 46 16178 01100
09010      BTM MONITR,03130,67      16118 17 02400 -3130
09020      BTM OUTPUT,TDATA5-9,67   16130 17 02410 -3353
09030      C   IAT1,NAT2,,          CHECK FOR END OF STATEMENT
                                     16142 24 07731 07666
09040      BM  BRBAK                 16154 46 17262 01100
09050      BNE GOOF                  16166 47 16202 01200
09060*     LOAD AND CALL TYPERR SUBPROGRAM
09070 TYPILL BTM MONITR,03090,67    16178 17 02400 -3090
09080      BTM TYPERR,132,67        16190 17 02410 -0132
09090*     GO OR OFFSET STATEMENT
09100 GOOF  TFM  NSRT,3,8,,          SET THE SUBRECORD TYPE TO 3 16202 16 03349 0-003
09110      SF  LCTAPE,,              ARELEM MUST BE CALLED 16214 32 07708 C0000
09120      TFM NPW,10,8,,           SET THE CHARACTER COUNT TO TEN 16226 16 07622 0-010
09130      CM  IAT1,2,610,,         CHECK TYPE OF NEXT ELEMENT 16238 14 0773J C00-2
09140      BE  TYPILL                 16250 46 16178 01200
09150      BM  NESTED                 16262 46 15780 01100
09160*     SYMBOL...LOOK UP IN DICTIONARY

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09170      AM  IAT1,12,10            16274 11 07731 000J2
09180*     LOAD AND CALL DICTZ SUBPROGRAM
09190      BTM MONITR,03040,67      16286 17 02400 -3040
09200      BT  DICTZ,IAT1,6         16298 27 02410 07731
10010      CM  RTYPE,,10,,          IF NOT FOUND LOOK IN CANON TABLE
                                     16310 14 07595 000-0
10020      BE  FILTER                 16322 46 15930 01200
10030      CM  SRTYPE,27,10,,        CHECK FOR TANTO MODIFIER 16334 14 07597 000K7
10040      BL  TYPILL                 16346 47 16178 01300
10050      BM  C69                    16358 46 16390 01100
10060      TFM INSRT,6,8,,          SAVE 6 IN INSRT 16370 16 15027 0-006
10070      B   B720                   16382 49 16538 C0000
10080      DORG  =-3                16390
10090 C69  CM  SRTYPE,69,10,,        CHECK FOR TO MODIFIER 16390 14 07597 00009
10100      BL  TYPILL                 16402 47 16178 01300
10110      BM  C71                    16414 46 16446 01100
10120      TFM INSRT,3,8,,          SAVE 3 IN INSRT 16426 16 15027 0-003
10130      B   B720                   16438 49 16538 C0000
10140      DORG  =-3                16446
10150 C71  CM  SRTYPE,71,10,,        CHECK FOR OM MODIFIER 16446 14 07597 000P1
10160      BL  TYPILL                 16458 47 16178 01300
10170      BM  C76                    16470 46 16502 01100
10180      TFM INSRT,5,8,,          SAVE 5 IN INSRT 16482 16 15027 0-005
10190      B   B720                   16494 49 16538 C0000
10200      DORG  =-3                16502
101010 C76 CM  SRTYPE,76,10,,        CHECK FOR PAST MODIFIER 16502 14 07597 000P6
10200      BNE TYPILL                 16514 47 16178 01200
10300      TFM INSRT,4,8,,          SAVE 4 IN INSRT 16526 16 15027 0-004
10400 B720 AM  IAT1,2,10,,          INCREMENT TO NEXT PARAMETER 16538 11 07731 000-2
10500      CM  IAT1,2,610,,          CHECK ELEMENT TYPE 16550 14 0773J 000-2
10600      BL  CS                      16562 47 16702 01300
10700      BE  SETDAT                 16574 46 16618 01200
10800      CM  IAT1,4,610,,          CHECK FOR NEST TYPE 16586 14 0773J 000-4
10900      BNE TYPILL                 16598 47 16178 01200
11000      BT  CS                      16610 49 16702 00000
11100 SETDAT AM  IAT1,12,10,,        INCREMENT TO PARAMETER WORD 16618 11 07731 000J2
11120      TFL TDATA5,IAT1,11,,     STORE PARAMETER WORD IN TDATA5 16630 06 03362 0773J
11130      AM  IAT1,16,10,,          SKIP PAST INTOF 16642 11 07731 000J6
11140 NRT6  TFM  NRT,6,8,,          SET RTYPE TO 6 16654 16 03345 0-006
11150      TFM  NSRF,,10,,          SET SURFACE TYPE TO ZERO 16666 16 03351 000-0
11160*     LOAD AND CALL OUTPUT SUBPROGRAM
11170      BTM MONITR,03130,67      16678 17 02400 -3130
11180      BTM OUTPUT,TDATA5-9,67   16690 17 02410 -3353
11190*     CHECK SURFACE RECORD
11200 CS   TFM  NRT,3,8,,          SET RECORD TYPE TO 3 16702 16 03345 0-003
12010      TF  NSRT,INSRT,,          RESTORE THE SUBRECORD TYPE 16714 26 03349 15027
12020      CM  IAT1,2,610,,          CHECK NEXT ELEMENT TYPE 16726 14 0773J 000-2
12030      BE  TYPILL                 16738 46 16178 01200
12040      BM  NESTED                 16750 46 15780 01100
12050*     SYMBOL...LOOK IT UP IN CANON TABLE
12060      AM  IAT1,12,10            16762 11 07731 000J2
12070      BT  FILTER                 16774 49 15930 00000

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12080* ALL THE DATA HAS BEEN ACCUMULATED
12090 ALD0AT CM NRT,5,8, CHECK FOR A RECORD TYPE 3
12100 BE FRGO 16782 14 03345 0-005
12110 BL OUT2 16794 46 16962 01200
12120 CM NSRT,11,8 16804 47 17190 01300
12130 BL OUT2 16818 14 03349 0-011
12140 BM BRBAK 16830 47 17190 01200
12150 CM NRT,8,8 16842 46 17262 04100
12160 BNE TYPILL 16854 14 03345 0-008
12170* 16866 47 16176 01200
12180 TFM NSRT,1,8, PART SURFACE (PSIS)
SET SUBRECORD TYPE TO 1 16878 16 03349 0-001
12190 TFM NRT,3,8, SET RECORD TYPE TO 3 16890 16 03345 0-003
12200 CM NSRF,8,10, CHECK FOR PLANE SURFACE
13010 BNE ERR120 16902 14 03381 000-8
13020 BD OUT2,TDATA7-9,, CHECK FOR ZERO C COEFFICIENT 16914 47 16938 01200
13030* 16926 43 17190 03373
LOAD AND CALL TYPERR SUBPROGRAM
13040 ERR120 BTM MONITR,03090,67 16938 17 02400 -3090
13050 BTM TYPERR,120,67 16950 17 02410 -0120
13060* FROM,GOTO,GOODTA,INDIRP,INDIRV
CHECK FOR PROPER NUMBER OF PARAMETERS
13070 FRGO CM NPH,30,8, 16962 14 07622 0-030
13080 BE OUT2 16974 46 17190 01200
13090 BM FEEDER 16986 46 17022 01100
13100* LOAD AND CALL THE TYPERR SUBPROGRAM
13110 BTM MONITR,03090,67 16998 17 02400 -3090
13120 BTM TYPERR,130,67 17010 17 02410 -0130
13130* OUTPUT FEEDRATE BEFORE GO TO
SAVE THE SUBRECORD TYPE IN INSRT
13140 FEEDER TF INSRT,NSRT,, 17022 26 15027 03349
13150 TFM NRT,2,8, SET THE RECORD TYPE TO 2 17034 16 03345 0-002
13160 TFM NSRT,1009,8, SET UP FEEDRATE RECORD .. NSRT=1009 17046 16 03349 0J009
13170 TFM NPH,10,8, ONE PARAMETER WORD 17058 16 07622 0-010
13180* SAVE THE FIRST TWO PARAMETERS
13190 TFL TEMP1,TDATA5 17070 06 17431 03362
13200 TFL TEMP2,TDATA6 17082 06 17441 03372
14010 TFL TDATA5,TDATA8,, PUT THE FEEDRATE IN THE FIRST BLOCK 17094 06 03362 03392
14020* LOAD AND CALL THE OUTPUT SUBPROGRAM
14030 BTM MONITR,03130,67 17106 17 02400 -3130
14040 BTM OUTPUT,TDATA5-9,67 17118 17 02410 -3353
14050 TFM NRT,5,8, SET THE RECORD TYPE EQUAL TO 5 17130 14 03345 0-005
14060 TF NSRT,INSRT,, RESTORE THE SUBRECORD TYPE 17142 26 03349 15027
14070 TFM NPH,30,8, THREE PARAMETER WORDS 17154 14 07622 0-030
14080* RESTORE THE FIRST TWO PARAMETERS
14090 TFL TDATA5,TEMP1 17166 06 03362 17431
14100 TFL TDATA6,TEMP2 17178 06 03372 17441
14110* LCAD AND CALL THE OUTPUT SUBPROGRAM
14120 OUT2 CM NSRT,1038,8 17190 14 03349 0J038
14130 BNE OUT3 17202 47 17238 01200
14140 CM NSRF,7,10 17214 14 03351 000-7
14150 BNE NOMORE,,, BRANCH IF ELEMENT IS NOT A MATRIX 17226 47 17270 01200

14160 OUT3 BTM MONITR,03130,67 17238 17 02400 -3130
14170 BTM OUTPUT,TDATA5-9,67 17250 17 02410 -3353
14180 BRBAK B RETURN,,6, RETURN TO CALLING PROGRAM 17262 49 0241J 00000
14190 DORG =-3 17270
14200 NOMORE CM TDATA5-8,53,10 17270 14 03354 0CON3
15010 BE OUT3,,, BRANCH IF TRACUT/NOMORE 17282 46 17238 01200
15020* 17282 46 17238 01200
15030 ER121 BTM MONITR,03090,67, CALL TYPERR SUBPROGRAM VIA MONITR 17294 17 02400 -3090
15040 BTM TYPERR,121,69, WRITE ERROR MESSAGE... EXIT 17306 17 02410 00J21
15050* LOAD AND CALL THE TYPERR SUBPROGRAM
15060* UNDEFINED SYMBOL
15070 UNDEF BTM MONITR,03090,67 17318 17 02400 -3090
15080 BTM TYPERR,131,67 17330 17 02410 -0131
15090 INDEX DSA MIST2,BRBAK,PRAMT,MIST2,MMOD4,PRAMT,PRAMT,OUTER,OUTER
17346 00005 J7318
17351 00005 J7262
17356 00005 J5344
17361 00005 J7318
17366 00005 J5120
17371 00005 J5344
17376 00005 J5344
17381 00005 J5248
17386 00005 J5248

15100 DC 8,10000000 17394 00008
15110 FLONE DC 2,1 17396 00002
15120 DC 8,0 17404 00008
15130 FLZERO DC 2,0 17406 00002
15140 TENPO DS 5 17411 00005
15150 DC 8,50000000 17419 00008
15160 HALF1 DC 2,00 17421 00002
15170* COMMON AREA WITH MAINLINE
15180 FILE3 DS ,2416 02416 00000
15190 OUTPUT DS ,2416 02416 00000
15200 TYPERR DS ,2416 02416 00000
16010 FILE DS ,2416 02416 00000
16020 DICT DS ,2416 02416 00000
16030 MONITR DS ,2406 02406 00000
16040 RETURN DS ,2411 02411 00000
16050 TDATA DS ,03333 03333 00000
16060 NRT DS ,03345 03345 00000
16070 NSRT DS ,03349 03349 00000
16080 NSRF DS ,03351 03351 00000
16090 RTYPE DS ,07595 07595 00000
16100 SRTYPE DS ,07597 07597 00000
16110 LCTAPE DS ,07708 07708 00000
16120 IAT1 DS ,07731 07731 00000
16130 NAT2 DS ,07666 07666 00000
16140 POUND DS ,07628 07628 00000
16150 SYMB1 DS ,04289 04289 00000
16160 SYMB4 DS ,04305 04305 00000
16170 SYMB5 DS ,04315 04315 00000
16180 CODE DS ,07715 07715 00000
16190 NPH DS ,07622 07622 00000
16200 IMIT DS ,07976 07976 00000
17010 FL22 DS ,07670 07670 00000
17020 TDATA4 DS ,03352 03352 00000

17030	TDATA5	DS	,03362	03362	00000
17040	TDATA6	DS	,03372	03372	00000
17050	TDATA7	DS	,03382	03382	00000
17060	TDATA8	DS	,03392	03392	00000
17070	TEMP1	DS	10	17431	00010
17080	TEMP2	DS	10	17441	00010
17090	MIST2	DS	,UNDEF	17318	00000
17100	DICT2	DS	,2416	02416	00000
17110	DEND	POSTPA		14696	

SYMBOL TABLE

TYPERR	02416	TEST10	00532R	TDATA5	03362	SRTYPE	07597	SETSEC	00282R
SETOUT	00222R	PUTSEC	00692R	PUTDSK	00689R	PUTCOM	00676R	PUTDDA	00684R
PUTCOR	00697R	OUTPUT	00006R	OUTCOM	00666R	MONITR	02406	INDAT4	07409
ENDSEC	03399	BAKER	00518R	CALLX	09892	CHK14	00450R	DIGIT	08007
EXMES	00609R	INIT	07976	NFLW	03329	NO	02461	NPM	07622
NRT	03345	NSEC	03327	NSRF	03351	NSRT	03349	PUTIT	00378R
RECNO	07640	RNO	03341	RTYPE	07595	SENO	07656	SETG	00306R
SSNO	03337	TDATA	03333	TFLW	00015R	TMARK	00270R	TREC	00576R
TSECT	00138R	WREX	00486R						

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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030*      INTRAN SUBPROGRAM OUTPUT
01040*      THIS SUBPROGRAM OUTPUTS ONE RECORD IN AD-APT FORMAT
01050*      LINKAGE IS          BTM MONITR,NNNO
01060*                        BTM OUTPUT,TDATA5-9
01070*                        TDATA5-9 IS THE ADDRESS OF THE FIRST
01080*                        WORD OF THE RECORD TO BE OUTPUT
01090*
01100      DC      6,7          00005 00006
01110 OUTPUT SF      NPW-2     00006 32 07620 00000
01120 TFLW  DS      ,*-2     00015 00000
01130      TR      PUTDDA+1,OUTCON-4,,INITIALIZE OUTPUT CDA 00018 LJ 00685 00662
01140      TDM      NSRF+1     00030 15 03352 00000
01150      DC      1,*,*     00041 00001
01160      TF      SSNO,SENO,,  SETUP OUTPUT SEQUENCE NO.
                                00042 26 03337 07656
01170      TF      RNO,RECNO,,  SETUP OUTPUT RECORD NUMBER
                                00054 26 03341 07640
01180      TFM      NSEC,,10,   INITIALIZE SECTOR COUNT
                                00066 16 03327 000-0
01190      TF      NFLW,NPM-1,,  STORE NO. FLOATING POINT WORDS
                                00078 26 03329 07621
01200      CF      NPW-2     00090 33 07620 00000
02010      TF      TFLW,NFLW   00102 R6 00019 03329
02020      SM      TFLW,7,10,   YES FOR MORE THAN ONE SECTOR
                                00114 J2 00015 000-7
02030      BH      TEST10     00126 R6 00532 01100
02040 TSECT TF      PUTSEC,NSEC,, SETUP SECTOR COUNT IN DDA
                                00138 R6 00692 03327
                                00150 L3 00691 00000
                                00162 J1 00692 00-01
02050      CF      PUTSEC-1    00174 14 03349 0J045
02060      AM      PUTSEC,1,9   00186 R6 00576 01200
02070      CM      NSRT,1045,8,  CHECK FOR PARTNO RECORD
                                00198 14 03349 0J046
                                00210 R6 00576 01200
02080      BE      TREC        00222 14 07622 0-000
02090      CM      NSRT,1046,8,  CHECK FOR INSERT RECORD
                                00234 R6 00282 01200
02100      BE      TREC        00246 R0 00276 00005
02110 SETOUT CM      NPW,,8,    CHECK FOR NO FLOATING POINT WORDS
                                00258 K1 00276 07622
                                00270 15 09999 00000
02120      BE      SETSEC     00270 15 09999 00000
02130*      CALCULATE POSITION OF TERMINATING RECORD MARK
02140      TF      TMARK+8,OUTPUT-1
02150      A      TMARK+8,NPW
02160*      SET RECORD MARK
02170 TMARK TDM      9999

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02180	DC	1,*,*	00281	00001
02190*	CALCULATE POSITION OF GROUP MARK			
02200	SETSEC	TFM SETG*6,NSEC-1*100	00282	J6 00312 -3426
03010	A	SETG*4,NSEC	00294	K1 00310 03327
03020*	SET GROUP MARK			
03030	SETG	TDM 9999	00306	15 09999 00000
03040	DGM	*	00317	00001
03050*	CALCULATE NEXT OUTPUT SECTOR ADDRESS			
03060	A	PUTDSK,NO	00318	K1 00689 02461
03070	CM	PUTDSK,ENDSEC,, CHECK TO SEE IF OUTPUT AREA EXCEEDED	00330	J4 00689 -3399
			00342	M7 00378 01300
03080	BL	PUTIT		
03090*	LOAD AND CALL SUBPROGRAM TYPERR			
03100	BTM	MONTR,03090,67	00354	17 02400 -3090
03110	BTM	TYPERR,142,67	00366	17 02410 -0142
03120*	OUTPUT ONE RECORD IN AD-APT FORMAT			
03130	PUTIT	PUT PUTDDH,ABC	00378	10 00565 -0401
			00390	4R 00520 -0676
03140	AM	RECNO,1,8, INCREMENT RECORD NUMBER	00402	11 07640 0-001
03150	A	NO,NSEC,, INCREMENT SECTOR COUNT		
			00414	21 02461 03327
03160	AM	NO,1,10	00426	11 02461 000-1
03170	TDM	SETG*6,,6, CLEAR GROUP MARK	00438	J5 0031K 00000
03180	CHK14	CM NRT,14,8, CHECK FOR FINI	00450	14 03345 0-014
03190	BNE	BAKER	00462	M7 00518 01200
03200	BNF	BAKER,CALLX*1,, CHECK IF NON RECOVERABLE ERROR OCCURED	00474	M4 00518 09893
04010*	WRITE MESSAGE-- AD-APT EXECUTION INHIBITED			
04020	WREX	RCTY	00486	34 00000 00102
04030	WATY	EXMES	00498	L9 00609 00100
04040	B7	BAKER	00510	M9 00518 00000
04050	BAKER	BV **12	00518	M6 00530 01400
04060*	RETURN TO CALLING PROGRAM			
04070	BB2		00530	42 00000 00000
04080*	THIS LOOP CALCULATES THE NUMBER OF SECTORS MORE THAN ONE			
04090*	TO BE OUTPUT			
04100	TEST10	AM NSEC,1,10	00532	11 03327 000-1
04110	SM	TFLW,10,10	00544	J2 00015 000J0
04120	BNH	TSECT	00556	M7 00138 01100
04130	B	TEST10	00568	M9 00532 00000
04140	DORG	**3	00576	
04150*	TRANSMIT THE PARTNO OR INSERT RECORD TO THE TDATA TABLE			
04160	TREC	TFM OUTPUT-1,TDATA5-9	00576	J6 00005 -3353
04170	TR	TDATA5-9,INDAT4-1	00588	31 03353 07408
04180	B7	SETOUT	00600	M9 00222 00000
04190	EXMES	DAC 27,AD-APT EXECUTION INHIBITED*	00609	00054
04200	OUTCOM	DC 5,02000	00666	00005
05010	DC	3,0	00669	00003
05020	DSA	NSEC-1	00674	00005 -3326
05030	DC	1,*	00675	00001
05040*	OUTPUT CONTROL FIELDS			
05050	PUTDDH	DDW ,PUTDDA,,N,A	00676	00002 20
			00678	00005 -0684
			00683	00001 1
05060	PUTDDA	DDA ,,PUTDSK,PUTSEC,PUTCOR	00684	00006 0-0689
			00690	00003 092
			00693	00005 -0697
			00698	00001
05070	DC	1,*	00699	00000
05080	PUTDSK	DS ,PUTDDA*5		

05090	PUTSEC	DS ,PUTDDA*8	00692	00000
05100	PUTCOR	DS ,PUTDDA*13	00697	00000
05110*	COMMON AREA WITH MAINLINE			
05120	TDATA	DS ,03333	03333	00000
05130	NSEC	DS ,TDATA*6	03327	00000
05140	NFLW	DS ,TDATA*6	03329	00000
05150	RNO	DS ,TDATA*8	03341	00000
05160	SSNO	DS ,TDATA*4	03337	00000
05170	TDATA5	DS ,03362	03362	00000
05180	INIT	DS ,07976	07976	00000
05190	NRT	DS ,TDATA*12	03345	00000
05200	NSRT	DS ,TDATA*16	03349	00000
06010	NSRF	DS ,TDATA*18	03351	00000
06020	RECNO	DS ,07640	07640	00000
06030	NPM	DS ,07622	07622	00000
06040	RTYPE	DS ,07595	07595	00000
06050	SRTYPE	DS ,07597	07597	00000
06060	SEQNO	DS ,07656	07656	00000
06070	INDAT4	DS ,07409	07409	00000
06080	ENDSEC	DS ,3399	03399	00000
06090	NO	DS ,02461	02461	00000
06100	TYPERR	DS ,02416	02416	00000
06110	MONTR	DS ,02406	02406	00000
06120	DIGIT	DS ,08007	08007	00000
06130	CALLX	DS ,09892	09892	00000
06140	END OUTPUT		00004	00000

SYMBOL TABLE

ZSURFZ 02521	ZSURFY 02511	ZSURFX 02501	ZSURFD 02531	PRJCT 00052R
FLZERO 00159R	FINDZ 00002R	STEMP 00169R	SYMB5 04315	SYMB6 04325
SYMB7 04335				


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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030*      INTRAN SUBPROGRAM FINDZ
01040*      THIS PROGRAM PROJECTS A POINT DEFINED BY X+Y
01050*      TO A PLANE PREVIOUSLY DEFINED BY A ZSURF STATEMENT
01060*      LINKAGE IS          BTM MONITR,NNNNO
01070*                        BTM FINDZ,,10
01080*
01090*      DC      2,0                      00001 00002
01100*      FINDZ  TFL  STEMP,ZSURFZ,,      STORE Z COEFFICIENT 00002 -6 00169 02521
01110*      FSUB  STEMP,FLZERO,,          TEST IF Z COEFFICIENT IS ZERO
01120*      BNZ   PRJCT                      00014 -K 00169 00159
01130*      TFL  SYMB7,FLZERO,,          SET Z OF POINT TO ZERO 00026 M7 00052 01200
01140*      RETURN TO CALLING PROGRAM      00038 00 04335 00159
01150*      BBZ                               00050 42 00000 00000
01160*      CALCULATE Z FROM GENERAL PLANE EQUATION
01170*                        Z=(D-AX-BY)/Z
01180*      PRJCT TFL  SYMB7,ZSURFD          00052 06 04335 02531
01190*      TFL  STEMP,SYMB5              00064 -6 00169 04315
01200*      FMUL  STEMP,ZSURFX            00076 -3 00169 02501
02010*      FSUB  SYMB7,STEMP             00088 0K 04335 00169
02020*      TFL  STEMP,SYMB6             00100 -6 00169 04325
02030*      FMUL  STEMP,ZSURFY            00112 -3 00169 02511
02040*      FSUB  SYMB7,STEMP             00124 0K 04335 00169
02050*      FDIV  SYMB7,ZSURFZ            00136 09 04335 02521
02060*      RETURN TO CALLING PROGRAM
02070*      BB                               00148 42 00000 00000
02080*      DORG  #-9                      00150
02090*      DC      8,0                    00157 00008
02100*      FLZERO DC  2,-99                00159 00002
02110*      STEMP  DC  10,0                 00169 00010
02120*      COMMON AREA WITH MAINLINE
02130*      SYMB5  DS  ,04315                04315 00000
02140*      SYMB6  DS  ,04325                04325 00000
02150*      SYMB7  DS  ,04335                04335 00000
02160*      ZSURFX DS  ,02501                02501 00000
02170*      ZSURFY DS  ,02511                02511 00000
02180*      ZSURFZ DS  ,02521                02521 00000
02190*      ZSURFD DS  ,02531                02531 00000
02200*      DEND  FINDZ                      00002

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SYMBOL TABLE

ZSURFZ 02521	ZSURFY 02511	ZSURFX 02501	ZSURFD 02531	TYPERR 02416
TDATA8 03392	TDATA7 03382	TDATA6 03372	TDATA5 03362	TDATA4 03352
RETURN 02411	MONITR 02406	CALERR 00050R	CNOTZ 00270R	FORM 07712
FORMA 00074R	FORMB 00178R	GCNOW 00122R	IAT1 07731	INIT 07976
ZSURF 00002R				

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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030*      INTRAN SUBPROGRAM ZSURF
01040*      THIS PROGRAM SETS THE COEFFICIENTS OF A PLANE ONTO
01050*      WHICH A POINT DEFINED BY X+Y WILL BE PROJECTED
01060*      THE COEFFICIENTS A,B,C,D OF THE EQUATION AX+BY+CZ=D
01070*      ARE SET IN ZSURFX,ZSURFY,ZSURFZ,ZSURFD RESPECTIVELY
01080*      LINKAGE IS          BTM MONITR,NNNNO
01090*                        BTM ZSURF,,10
01100*
01110*      DC      2,0                      00001 00002
01120*      CHECK FORM FOR TYPE OF ZSURF DEFINITION
01130*      ZSURF  CM  FORM,1,8                00002 14 07712 0-001
01140*      BE  FORMA                          00014 M6 00074 01200
01150*      CM  FORM,255,8                    00026 14 07712 0-255
01160*      BE  FORMB                          00038 M6 00178 01200
01170*      LOAD AND CALL TYPERR SUBPROGRAM
01180*      BTM  MONITR,03090,67                00050 17 02400 -3090
01190*      BTM  TYPERR,120,67                 00062 17 02410 -0120
01200*      PLANE DEFINED BY NESTED PLANE DEFINITION
02010*      FORMA  CM  TDATA4,8,10            00074 14 03352 000-8
02020*      BE  GONOW                          00086 M6 00127 01200
02030*      BTM  MONITR,03090,67                00098 17 02400 -3090
02040*      BTM  TYPERR,301,67                 00110 17 02410 -0301
02050*      GONOW  TFL  ZSURFX,TDATA5,,        STORE X COEFFICIENT 00122 06 02501 03362
02060*      TFL  ZSURFY,TDATA6,,            STORE Y COEFFICIENT 00134 06 02511 03372
02070*      TFL  ZSURFZ,TDATA7,,            STORE Z COEFFICIENT 00146 06 02521 03382
02080*      TFL  ZSURFD,TDATA8,,            STORE CONSTANT TERM 00158 06 02531 03392
02090*      RETURN TO CALLING PROGRAM
02100*      B7  RETURN,,6                      00170 49 0241J 00000
02110*      PLANE DEFINED BY COEFFICIENTS OF PLANE EQUATION
02120*      FORMB  AM  IAT1,12,10              00178 11 07731 000J2
02130*      TFL  ZSURFX,IAT1,11,            STORE X COEFFICIENT 00190 06 02501 0773J
02140*      AM  IAT1,14,10                    00202 11 07731 000J4
02150*      TFL  ZSURFY,IAT1,11,            STORE Y COEFFICIENT 00214 06 02511 0773J
02160*      AM  IAT1,14,10                    00226 11 07731 000J4
02170*      TFL  ZSURFZ,IAT1,11,            STORE Z COEFFICIENT 00238 06 02521 0773J
02180*      BD  CNOTZ,ZSURFZ-9,,            CHECK FOR ZERO C COEFFICIENT
02190*      B7  CALERR                          00250 M3 00270 02512
02200*      CNOTZ AM  IAT1,14,10              00262 M9 00050 00000
03010*      TFL  ZSURFD,IAT1,11,            STORE CONSTANT TERM 00270 11 07731 000J4
03020*      RETURN TO CALLING PROGRAM
03030*      DC      2,49                      00295 00002
03040*      DSA  -RETURN                       00300 00005 -241J
03050*      COMMON AREA WITH MAINLINE
03060*      FORM  DS  ,07712                    07712 00000
03070*      TDATA4 DS  ,03352                    03352 00000
03080*      TDATA5 DS  ,03362                    03362 00000
03090*      TDATA6 DS  ,03372                    03372 00000

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03100	TDATA7	DS	,03382	03382	00000
03110	TDATA8	DS	,03392	03392	00000
03120	ZSURFX	DS	,02501	02501	00000
03130	ZSURFY	DS	,02511	02511	00000
03140	ZSURFZ	DS	,02521	02521	00000
03150	ZSURFD	DS	,02531	02531	00000
03160	IAT1	DS	,07731	07731	00000
03170	TYPERR	DS	,2416	02416	00000
03180	MONITR	DS	,2406	02406	00000
03190	RETURN	DS	,2411	02411	00000
03200	INIT	DS	,07976	07976	00000
04010	DEND	ZSURF		00002	

SYMBOL TABLE

VARDON	00856R	TYPERR	02416	SAYSUB	00108R	SAYNAM	00120R	RETURN	02411
NXTVAR	00156R	MONITR	02406	MACSAV	07721	GETVAR	00264R	FLZERO	00932R
ADDTM	00600R	CODE	07715	FILE	02416	FILE2	02416	IAT1	07731
INIT	07976	MACRO	00000R	NAT2	07666	NUMB	00660R	PUNC	00528R
SNUMB	00732R	SSYMB	00824R	STORE	00336R	SYMB	00432R	SYMB1	04289
SYMB2	04301	SYMB3	04303	SYMB4	04305	TRANS	00792R	TWELV	00946R
VARCT	00934R								

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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030*      INTRAN SUBPROGRAM MACRO
01040*      THIS PROGRAM HANDLES STORING THE FIRST PART OF A MACRO
01050*      AND SETS AN INDICATOR TO SAVE THE STATEMENTS FOLLOWING
01060*      UNTIL TERMAC
01070*      LINKAGE IS          BT MONITR,DSALBL*5,6
01080*                        B7 MACRO,,6
01090*
01100 MACRO  TFM  STORE+6,SYMB4,,      INITIALIZE MACRO VARIABLE SCAN
                                           00000 J6 00342 -4305
01110      TFM  SYMB1,21,8,          INITIALIZE MACRO LENGTH
                                           00012 16 04289 0-021
01120      TFM  SYMB4,5,10,          SET MACRO INDICATOR
                                           00024 16 04305 000-5
01130      TFM  VARCT,,10,          INITIALIZE VARIABLE COUNT
                                           00036 J6 00934 000-0
01140      SM  IAT1,40,10,          INDEX TO MACRO NAME
                                           00048 12 07731 000M0
01150      CM  IAT1,1,610,          CHECK FOR VALID NAME
                                           00060 14 0773J 000-1
01160      BE  SAYSUB
                                           00072 M6 00108 01200
01170*      LOAD AND CALL TYPERR SUBPROGRAM
01180      BTM  MONITR,03090,67      00084 17 02400 -3090
01190      BTM  TYPERR,126,67      00096 17 02410 -0126
01200 SAYSUB TF  SYMB3,IAT1,11,      SAVE THE SUBSCRIPT
                                           00108 26 04303 0773J
02010 SAYNAM AM IAT1,12,10          00120 11 07731 000J2
02020      TF  SYMB2,IAT1,11,      SAVE THE MACRO NAME
                                           00132 26 04301 0773J
02030      AM  IAT1,30,10,          INDEX TO FIRST VARIABLE
                                           00144 11 07731 000L0
                                           00156 11 07731 000J4
02040 NXTVAR AM  IAT1,14,10
02050      C   IAT1,NAT2,,          CHECK FOR END OF VARIABLE LIST
                                           00168 24 07731 07666
                                           00180 M6 00856 01100
02060      BH  VARDON
02070      CM  IAT1,1,610,          CHECK FOR LEGAL VARIABLE
                                           00192 14 0773J 000-1
                                           00204 M6 00264 01200
02080      BE  GETVAR
02090      CM  IAT1,22,610          00216 14 0773J 060K2
02100      BE  VARDON
                                           00228 M6 00856 01200
02110*      LOAD AND CALL TYPERR SUBPROGRAM
02120      BTM  MONITR,03090,67      00240 17 02400 -3090
02130      BTM  TYPERR,125,67      00252 17 02410 -0125
02140 GETVAR AM  SYMB1,28,8,          INCREMENT LENGTH OF MACRO
                                           00264 11 04289 0-028
02150      AM  STORE+6,2,10,          INCREMENT TO NEXT MACSUB POSITION
                                           00276 J1 00342 000-2
                                           00288 J6 0034K 000-1
02160      TFM  STORE+6,1,610,      TYPE=01
                                           00300 J1 00342 000J2
02170      AM  STORE+6,12,10
02180      AM  IAT1,12,10
02190      TF  STORE+6,TWELV,6
02200 STORE  TF  9999,IAT1,11,      STORE THE VARIABLE NAME
                                           00312 11 07731 000J2
                                           00324 K0 0034K 00946

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03010	AM	STORE+6,2,10,	INCREMENT TO NEXT FIELD IN MACSUR	00336	26	09999	0773J
03020	AM	IAT1,2,10		00348	J1	00342	000-2
03030	CM	IAT1,2,610		00360	11	07731	000-2
03040	BL	SYMB		00372	14	0773J	CO0-2
03050	BH	PUNC		00384	M7	00432	01300
03060*		LOAD AND CALL TYPERR SUBPROGRAM		00396	M6	00528	01100
03070	BTM	MONITR,03090,67		00408	17	02400	-3090
03080	BTM	TYPERR,125,67		00420	17	02410	-0125
03090	SYMB	TFM STORE+6,2,610		00432	J6	0034K	000-2
03100	AM	STORE+6,12,10		00444	J1	00342	000J2
03110	TFL	STORE+6,FLZERO,6,	STORE ZERO FOR NORMAL VALUE	00456	-0	0034K	00932
03120	AM	VARCT,1,10,	INCREMENT VARIABLE COUNT	00468	J1	00934	000-1
03130	CM	VARCT,6,10,	CHECK FOR TOO MANY VARIABLES	00480	J4	00934	CO0-6
03140	BNH	NXTVAR+12		00492	M7	00168	01100
03150*		LOAD AND CALL TYPERR SUBPROGRAM					
03160	BTM	MONITR,03090,67		00504	17	02400	-3090
03170	BTM	TYPERR,127,67		00516	17	02410	-0127
03180	PUNC	CM IAT1,3,610		00528	14	0773J	000-3
03190	BE	ADDTM		00540	M6	00600	01200
03200	CM	IAT1,22,610,	CHECK FOR END OF MACRO				
04010	BE	SYMB		00552	14	0773J	000K2
04020*		LOAD AND CALL TYPERR SUBPROGRAM		00564	M6	00432	01200
04030	BTM	MONITR,03090,67		00576	17	02400	-3090
04040	BTM	TYPERR,128,67		00588	17	02410	-0128
04050	ADDTM	AM IAT1,12,10		00600	11	07731	000J2
04060	CM	IAT1,33,610,	CHECK FOR EQUAL SIGN	00612	14	0773J	000L3
04070	BE	NUMB		00624	M6	00660	01200
04080*		LOAD AND CALL TYPERR SUBPROGRAM					
04090	BTM	MONITR,03090,67		00636	17	02400	-3090
04100	BTM	TYPERR,128,67		00648	17	02410	-0128
04110	NUMB	AM IAT1,2,10		00660	11	07731	CO0-2
04120	CM	IAT1,2,610,	CHECK FOR NUMBER OR SYMBOL				
04130	BE	SNUMB		00672	14	0773J	000-2
04140	BL	SSYMB		00684	M6	00732	01200
04150*		LOAD AND CALL TYPERR SUBPROGRAM		00696	M7	00824	01300
04160	BTM	MONITR,03090,67		00708	17	02400	-3090
04170	BTM	TYPERR,128,67		00720	17	02410	-0128
04180	SNUMB	TF STORE+6,IAT1,611,	STORE THE NUMBER OR SYMBOL				
04190	TDM	TRANS		00732	K6	0034K	0773J
04200	AM	STORE+6,12,10		00744	J5	00792	00000
05010	AM	IAT1,12,10		00756	J1	00342	000J2
05020	TF	STORE+6,THELV,6		00768	11	07731	000J2
05030	TRANS	TFL STORE+6,IAT1,611,	STORE THE NUMBER OR SYMBOL	00780	K0	0034K	00946
05040	AM	IAT1,2,10,	INCREMENT TO NEXT VARIABLE NAME	00792	-6	0034K	0773J
05050	B7	NXTVAR+12		00804	11	07731	000-2
05060	SSYMB	TDM TRANS,2		00816	M9	00168	00000
05070	TF	STORE+6,IAT1,611		00824	J5	00792	00002
05080	B7	SNUMB+24		00836	K6	0034K	0773J
05090	VARDOM	AM STORE+6,1,10		00848	M9	00756	00000
05100	TDM	STORE+6,,6,	SET RECORD MARK AT END OF MACRO	00856	J1	00342	000-1
				00868	J5	0034K	00000
05110	DC	1,*,*		00879		00001	
05120*		LOAD AND CALL FILE SUBPROGRAM TO STORE MACRO					
05130	BTM	MONITR,03200,67		00880	17	02400	-3200
05140	BTM	FILE2,SYMB1,67		00892	17	02410	-4289
05150	TFM	MACSAV,1,10,	SET MACSAV SWITCH	00904	16	07721	000-1
05160	B7	RETURN,*,*,	RETURN TO CALLING PROGRAM				
05170	DC	8,0		00916	49	0241J	00000
05180	FLZERO	DC 2,-99		00930		00008	
05190	VARCT	DS 2		00932		00002	
05200	THELV	DC 12,0		00934		00002	
06010*		COMMON AREA WITH MAINLINE		00946		00012	
06020	CODE	DS ,07715		07715		00000	
06030	SYMB1	DS ,04289		04289		00000	
06040	SYMB2	DS ,04301		04301		00000	
06050	SYMB3	DS ,04303		04303		00000	
06060	SYMB4	DS ,04305		04305		00000	
06070	MONITR	DS ,02406		02406		00000	
06080	RETURN	DS ,02411		02411		00000	
06090	FILE2	DS ,2416		02416		00000	
06100	TYPERR	DS ,02416		02416		00000	
06110	FILE	DS ,02416		02416		00000	
06120	IAT1	DS ,07731		07731		00000	
06130	NAT2	DS ,07666		07666		00000	
06140	INIT	DS ,07976		07976		00000	
06150	MACSAV	DS ,07721		07721		00000	
06160	DEND	MACRO		00000			


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05110*          MODIFY OP CODE TO TFL
05120 NUMB TDM INTO,,          00782 J5 00806 0C000
05130        AM TAT1,12,10     00794 J1 00942 000J2
05140 INTO TFL SEVAR+11,TAT1,611, STORE THE SYMBOL OR NUMBER
                                00806 -0 0050R 0094K

05150*          INCREMNET TO NEXT WORDS
05160        AM SEVAR+11,14,10  00818 J1 00509 000J4
05170        AM TAT1,2,10      00830 J1 00942 000-2
05180        B7 ENDER          00842 M9 00354 0C000

05190*          MODIFY OP CODE TO TF
05200 SYMB TDM INTO,2         00850 J5 00806 00002
06010        B7 NUMB+12,,,     BRANCH TO STORE SYMBOL OR NUMBER
                                00862 M9 00794 00000
06020 OUT AM MACPIK,1,10,     INCREMENT MACRO NEST INDICATOR
                                00870 11 07719 000-1

06030*          RETURN TO CALLING PROGRAM
06040        B7 RETURN,,,6     00882 49 0241J 00000
06050*          LOAD AND CALL TYPERR SUBPROGRAM
06060 ERROR BTH MONITR,03090,67 00890 17 02400 -3090
06070        BTH TYPERR,137,67 00902 17 02410 -0137
06080*          LOAD AND CALL TYPERR SUBPROGRAM
06090 ERRDR1 BTH MONITR,03090,67 00914 17 02400 -3090
06100        BTH TYPERR,138,67 00926 17 02410 -0138
06110 TAT1 DS 5              00942 00005

06120*          COMMON AREA WITH MAINLINE
06130 MACSUB DS ,05188        05188 00000
06140 MACS1 DS ,MACSUB+3     05191 00000
06150 SAVE1 DS ,08011        08011 00000
06160 SAVE2 DS ,08047        08047 00000
06170 SAVE3 DS ,08071        08071 00000
06180 INIT DS ,07976         07976 00000
06190 CODE DS ,07715         07715 00000
06200 FOUND DS ,07628        07628 00000
07010 SAVE DS ,05187         05187 00000
07020 NAT2 DS ,07666         07666 00000
07030 MACPIK DS ,07719       07719 00000
07040 TYPERR DS ,02416       02416 00000
07050 MONITR DS ,02406       02406 00000
07060 RETURN DS ,02411       02411 00000
07070 MACS4 DS ,MACSUB+19    05207 00000
07080 ENDVAR DS 5            00947 00005
07090 IAT1 DS ,07731         07731 00000
07100 FILE DS ,02416         02416 00000
07110 FILE3 DS ,2416         02416 00000
07120        DEND CALL        00010
    
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SYMBOL TABLE

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TEMPNO 00478R  TEMPAD 00483R  REPLAC 00000R  MACSUB 05188  CHKTYP 00048R
AGAIN 00448R   CHKEQ 00140R  COMP2 00184R  ENDER 00468R  EQUAL 00312R
HIT 00232R    INIT2 10268  ITS1 00116R  MACS1 05191  MACS4 05207
SETOP 00396R  SUZIE 00360R  SYMB 00428R  WCRDL 06091
    
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01010*          IBM 1620-1311 AD-APT.....
01020*          .....
01030*          INTRAN SUBPROGRAM REPLAC
01040*          THIS SUBPROGRAM SEARCHES THE STATEMENTS
01050*          IN A CALLED MACRO FOR VARIABLES AND REPLACES
01060*          THESE WITH THE VALUES INDICATED BY
01070*          THE CALL OR NORMAL VALUES INDICATED BY
01080*          THE MACRO DEFINITION
01090*          THE ELEMENTS OF THE STATEMENT ARE IN WORDL
01100*          AND THE CALLED OR NORMAL VALUES ARE IN THE MACSUB TABLE
01110*          LINKAGE IS          BTH MONITR,NNNNO
01120*          B REPLAC
01130*
01140 REPLAC TFM CHKTYP+6,WORDL,, INITIALIZE TO FIRST WORD IN WORDLIST TA
                                00000 J6 00054 -6091
01150        TF TEMPNO,MACS1,, STORE MACRO LENGTH          00012 K6 00478 05191
01160*          CALCULATE ADDRESS OF LAST POSITION
01170        TFM TEMPAD,MACSUB 00024 J6 00483 -5188
01180        A TEMPAD,MACS1    00036 K1 00483 05191
01190 CHKTYP CM 9999,22,10,    CHECK FOR END OF MACRO
                                00048 14 09999 000K2
02010        BE ENDER          00060 M6 00468 01200
02010        CM CHKTYP+6,1,610, CHECK FOR SYMBOL          00072 J4 0005M 000-1
02020        BE ITS1          00084 M6 00116 01200
02030        AM CHKTYP+6,14,10, INGRMNET TO NEXT WORD IN WORDLIST
                                00094 J1 00054 000J4
02040        B7 CHKTYP,,,     BRANCH TO CHECK FOR SYMBOL
                                00108 M9 00048 00000
02050 ITS1 AM CHKTYP+6,12,10, INCREMENT TO SYMBOL NAME
                                00116 J1 00054 000J2
02060        TFM CHKEQ+11,MACS4+14,, INITIALIZE TO FIRST VARIABLE IN MACSUB
                                00128 J6 00151 -5221
02070 CHKEQ CM TEMPAD,9999,, CHECK FOR END OF MACSUB TABLE
                                00140 J4 00483 -9999
02080        BNL COMP2        00152 M6 00184 01300
02090*          END OF MACSUB TABLE SKIP TO NEXT WORD
02100        AM CHKTYP+6,2,10  00164 J1 00054 0C0-2
02110        B7 CHKTYP        00176 M9 00048 0C000
02120 COMP2 BV **12          00184 M6 00196 01400
02130        C CHKEQ+11,CHKTYP+6,611, COMPARE SYMBOL NAMES
                                00196 KM 0015J 0005M
02140        BV AGAIN          00208 M6 00448 01400
02150        BNE AGAIN        00220 M7 00448 01200
02160*          INDEX TO SUBSCRIPT
02170 HIT SM CHKEQ+11,12,10  00232 J2 00151 000J2
02180        SM CHKTYP+6,12,10 00244 J2 00054 000J2
02190        C CHKTYP+6,CHKEQ+11,611,COMPARE SUBSCRIPTS 00256 KM 0005M 0015J
02200        BE EQUAL          00268 M6 00312 01200
03010*          INCREMENT TO NEXT WORD IN MACSUB
03020        AM CHKEQ+11,12,10 00280 J1 00151 000J2
03030        AM CHKTYP+6,12,10 00292 J1 00054 000J2
    
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03040 B7 AGAIN 00304 M9 00448 00000
03050 EQUAL AM CHKEQ+11,14,10 00312 J1 00151 000J4
03060 CM CHKEQ+11,2,610, CHECK VALUE--NUMBER OR SYMBOL 00324 J4 0015J 000-2
03070 BL SYMB 00336 M7 00428 01300
03080+ SET OP CODE TO TFL
03090 TDM SETOP 00348 J5 00396 00000
03100 SUZIE TF CHKTYP+6,CHKEQ+11,611, REPLACE THE VALUE IN THE WORDLIST 00360 KD 0005M 0015J
03110 AM CHKEQ+11,12,10 00372 J1 00151 000J2
03120 AM CHKTYP+6,12,10 00384 J1 00054 000J2
03130 SETOP TFL CHKTYP+6,CHKEQ+11,611 00396 -0 0005M 0015J
03140 AM CHKTYP+6,2,10, INCREMENT TO NEXT WORD IN WORDLIST 00408 J1 00054 000-2
03150 B7 CHKTYP 00420 M9 00048 00000
03160+ SET OP CODE TO TF
03170 SYMB TDM SETOP,2 00428 J5 00396 00002
03180 B7 SUZIE,,, BRANCH TO STORE VALUE 00440 M9 00360 00000
03190 AGAIN AM CHKEQ+11,28,10, INCREMENT TO NEXT WORD IN MACSUB TABLE 00448 J1 00151 000K8
03200 B7 CHKEQ 00460 M9 00140 00000
04010+ COMMON AREA WITH MAINLINE
04020 ENDER B7 INITZ 00468 49 10268 00000
04030 INITZ DS ,10268 10268 00000
04040 WORDL DS ,06091 06091 00000
04050 TEMPNO DS 4 00478 00004
04060 TEMPAD DS 5 00483 00005
04070 MACSUB DS ,05188 05188 00000
04080 MACS1 DS ,MACSUB+3 05191 00000
04090 MACS4 DS ,MACSUB+19 05207 00000
04100 DEND REPLAC 00000

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SYMBOL TABLE

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TYPERR 02416 TSTUFF 07881 TEMPNO 02119R TABOUT 07770 TABCOR 01284R
PUTOUT 00280R OUTSEC 02034R OUTDSK 02031R OUTCOR 02039R ODXSEC 02098R
ODXDSK 02095R ODXCOR 02103R NOWRIT 07890 MONITR 02406 INDEKA 02066R
HBFOND 00074R ENDCAN 01799 DEXSEC 02074R DEXDSK 02071R DEXCOR 02079R
CODEMO 00632R CHKSUB 01176R BACKTO 00624R BACKAG 00054R ADDT 00336R
ADD12 01064R ADD4 00968R CLOUT 00848R CODEZ 00034R CODE1 00076R
COMP4 00932R DEX 07883 ENDEX 01999 FILE 00010R FOUND 07628
HIT 01256R INA 02050R INCOR 02063R INDSK 02055R INSEC 02058R
INW 02041R NFLAG 00248R NOGET 07893 NO2 08059 NO3 07898
NO4 07901 NTIM 00149R ODEXA 02090R ODEXM 02081R OUTA 02026R
OUTW 02017R PIN 07391 PUTD 00552R RET 01276R SETGM 00160R
SETIM 00752R SKIP 01084R STUFF 00360R SUB2 01224R SVDSK 02109R
TABIN 01316R TDEX 07386 TENZ 02129R TFILE 02114R

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01010+ IBM 1620-1311 AD-APT.....
01020+ .....
01030+ INTRAN SUBPROGRAM FILE1
01040+ THIS IS THE SUBPROGRAM THAT STORES OR REPLACES A SCALAR ELEM
01050+ LINKAGE IS BTM MONITR,NNNNO
01060+ BTM FILE1,NAME
01070+ NAME IS THE ADDRESS OF THE SYMBOLIC NAME TO BE
01080+ STORED OR REPLACED
01090+
01100 DC 10,0 00009 00010
01110 FILE CF FOUND 00010 33 07628 00000
01120 SF FILE-5 00022 L2 00005 00000
01130 CODEZ AM FILE-1,12,10 00034 J1 00009 000J2
01140+ BRANCH TO CODEMO TO SEE IF THE SCALAR
01150+ NAME HAS BEEN PREVIOUSLY DEFINED
01160 B CODEMO 00046 M9 00632 00000
01170 DORG 3 00054
01180 BACKAG SM FILE-1,12,10 00054 J2 00009 000J2
01190+ BRANCH TO CODE1 TO STORE OR REPLACE THE
01200+ SCALAR
02010 B CODE1 00066 M9 00076 00000
02020 DORG 3 00074
02030+ RETURN TO CALLING PROGRAM
02040 HBFOND BB 00074 42 00000 00000
02050 DORG 9 00076
02060+ CODE1....STORE OR REPLACE A SCALAR
02070 CODE1 TF TEMPNO,FILE-1,11, STORE THE LENGTH IN TEMPNO 00076 KD 02119 0000R
02080 SM FILE-1,3,10 00088 J2 00009 000-3
02090 TF TFILE,FILE-1 00100 KD 02114 00009
02100 TF OUTCOR,TFILE,, SET THE CORE ADDRESS FIELD 00112 KD 02039 02114
02110 AM TEMPNO,100,8, TEMPNO = TEMPNO + 100 00124 J1 02119 0-100
02120+ COMPUTE POSITION OF GROUP MARK
02130 TF SETGM+6,FILE-1 00136 KD 00166 00009
02140 A SETGM+4,TEMPNO-2 00148 KJ 00164 02117
02150+ SET GROUP MARK
02160 SETGM TDM 9999, 00160 13 09999 00000
02170 DGM 0 00171 00001
02180 NTIM DS ,0-2 00169 00000
02190 TF OUTSEC,TEMPNO-2,, SET THE SECTOR LENGTH FIELD 00172 KD 02034 02117

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02200 CF OUTSEC-1 00184 L3 02033 00000
03010 TFM OUTDSK,,, INITIALIZE THE SECTOR ADDRESS FIELD 00196 J6 02031 -0000
03020 A OUTDSK,NO2,, OUTDSK = OUTDSK +NO2 00208 K1 02031 08059
03030 CM OUTDSK,EMDCAN,, CHECK FOR TABLE OVERFLOW 00220 J4 02031 -1799
03040 BL NFLAG 00232 M7 00268 01300
03050* .....TABLE OVERFLOW
03060* LOAD AND CALL TYPERR SUBPROGRAM
03070 BTM MONITR,03090,67 00244 L7 02400 -3090
03080 BTM TYPERR,143,67 00256 L7 02410 -0143
03090 NFLAG TF OUTDSK,INDSK,, OUTDSK = INDSK 00268 K0 02031 02055
03100* STORE OR REPLACE THE RECORD
03110 PUTOUT PUT OUTW,RBC 00280 L0 00565 -0303
03120 TDM SETGM*6,,6, CLEAR GROUP MARK 00292 4R 00520 -2017
03130* CHECK TO SEE IF THIS IS A NEW SYMBOL 00304 J5 00160 00000
03140* ..IF NOT DO NOT CREATE ENTRY IN INDEX
03150 BNF ADDT,FOUND 00316 M4 00336 07628
03160 B7 HBFOND 00328 M9 00074 00000
03170 ADDT A NO2,TEMPNO-2,, UPDATE NO2 00336 J2 08059 02117
03180 AM TFILE,17,10 00348 J1 02114 000J7
03190 STUFF TFL TSTUFF,TFILE,611, STORE THE SYMBOL NAME AND SUBSCRIPT 00360 00 0788J 0211M
03200 AM TSTUFF,2,10 00372 L1 07881 C00-2
04010 TF TSTUFF,TEMPNO-2,6, STORE THE SECTOR LENGTH 00384 20 0788J 02117
04020 AM TSTUFF,14,10, INCREMENT TO NEXT ENTRY IN TABLE 00396 L1 07881 000J4
04030 AM TDEX,1,10, UPDATE TOTAL NO. ENTRIES 00408 L1 07386 000-1
04040 AM DEX,1,10, UPDATE NO. ENTRIES IN BUFFER 00420 L1 07883 000-1
04050 CM DEX,6,10, CHECK FOR FULL BUFFER 00432 L4 07883 000-6
04060 BNE BACKTO 00444 M7 00624 01200
04070* BUFFER FULL...PREPARE TO OUTPUT TO FILE
04080 TFM ODXDSK,01800,, INITIALIZE SECTOR ADDRESS 00456 J6 02095 -1800
04090 TFM ODXSEC,1,9, INITIALIZE SECTOR COUNT 00468 J6 02098 00-01
04100 TFM ODXCOR,TABOUT,, INITIALIZE CORE ADDRESS 00480 J6 02103 -7770
04110 A ODXDSK,NO3,, ODXDSK = ODXDSK + NO3 00492 K1 02095 07898
04120* CHECK FOR TABLE OVERFLOW
04130 CM ODXDSK,ENDEX 00504 J4 02095 -1999
04140 BL PUTD 00516 M7 00552 01300
04150* TABLE OVERFLOW
04160* LOAD AND CALL TYPERR SUBPROGRAM
04170 BTM MONITR,03090,67 00528 L7 02400 -3090
04180 BTM TYPERR,139,67 00540 L7 02410 -0139
04190* CUTPUT INDEX BUFFER TO FILE
04200 PUTD PUT ODEXW,RBC 00552 L0 00565 -0575
05010 AM NOWRIT,1,9, NOWRIT = NOWRIT + 1 00564 4R 00520 -2081
05020 AM NO3,1,10, NO3 = NO3 + 1 00576 L1 07890 00-01
05030 TFM DEX,,10, DEX = 0 00588 L1 07898 000-1
05040 TFM TSTUFF,TABOUT+13 00600 L6 07883 000-0
05050 BACKTO B7 HBFOND 00612 L6 07881 -7783
05060 CODEMO TFM NTIM,,10 00624 M9 00074 00000
05070 TFM NO4,,10, NO4 = 0 00632 J6 00169 C00-0

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05080 TFM INDSK,,, INDSK = 0 00656 J6 02055 -C000
05090 TFM NOGET,,9, NOGET = 0 00668 L6 07893 00-00
05100 TF TFILE,FILE-1 00680 K0 02114 00009
05110 TFM PIN,, 00692 L6 07391 -0000
05120 C PIN,TDEX,, CHECK FOR END OF SYMBOL NAMES 00704 24 07391 07386
05130 BE RET 00716 M6 01276 01200
05140 C NOGET,NOWRIT,, CHECK NO. OF GETS = NO. WRITES 00728 24 07893 07890
05150 BE TABCOR 00740 M6 01284 01200
05160* INITIALIZE COMPARING ADDRESS
05170 SETIM TFM COMP4*6,TABIN*11 00752 J0 00938 -1327
05180 TFM NTIM,,10, NTIM = 0 00764 J6 00169 000-0
05190 TFM DEXDSK,01800,, INITIALIZE SECTOR ADDRESS 00776 J6 02071 -1800
05200 TFM DEXSEC,7,9, SECTOR COUNT = 7 00788 J6 02074 00-07
06010 TFM DEXCOR,TABIN,, INITIALIZE CORE ADDRESS 00800 J0 02079 -1316
06020 A DEXDSK,NO4,, DEXDSK = DEXDSK + NO4 00812 K1 02071 07901
06030 TFM CLOUT*6,TABIN-1 00824 J0 00854 -1315
06040 AM CLOUT*6,10,10 00836 J1 00854 000J0
06050 CLOUT TF 9999,TENZ 00848 20 09999 02129
06060 CM CLOUT*6,TABIN*699 00860 JF 00854 -2015
06070 BNE CLOUT-12 00872 M7 00836 01200
06080* BRING INDEX TABLE INTO TABIN
06090 SK INDEXA 00884 L4 02066 00701
06100 RDN INDEXA 00896 L6 02066 00702
06110 AM NO4,7,10, NO4 = NO4 +7 00908 L1 07901 000-7
06120 BV **12 00920 M6 00932 01400
06130 COMP4 C 9999,TFILE,11, COMPARE SYMBOL NAME 00932 2M 09999 0211M
06140 BV ADD4 00944 M6 00968 01400
06150 BE CHKSUB 00956 M6 01176 01200
06160 ADD4 AM COMP4*6,4,10,, INCREMENT TO SECTOR LENGTH FIELD 00968 J1 00938 000-4
06170 A INDSK,COMP4*6,11, INDSK = INDSK + SECTOR LENGTH 00980 KJ 02055 00930
06180 AM PIN,1,10, PIN = PIN + 1 00992 L1 07391 000-1
06190 C PIN,TDEX,, CHECK FOR END OF TABLE 01004 24 07391 07386
06200 BE RET 01016 M6 01276 01200
07010 AM NTIM,1,10, NTIM = NTIM +1 01028 J1 00169 000-1
07020 CM NTIM,6,10, CHECK IF SKIPPING TO BE PERFORMED 01040 J4 00169 000-6
07030 BE SKIP 01052 M6 01084 01200
07040 ADD12 AM COMP4*6,12,10, INCREMENT TO NEXT SYMBOL NAME 01064 J1 00938 000J2
07050 B7 COMP4-12 01076 M9 00920 00000
07060 SKIP AM NOGET,1,10, NOGET = NOGET + 1 01084 L1 07893 000-1
07070 C NOGET,NOWRIT,, CHECK IF NO. GETS = NO. WRITES 01096 24 07893 07890
07080 BE TABCOR 01108 M6 01284 01200
07090 CM COMP4*6,TABIN*695,,CHECK FOR END OF TABIN TABLE 01120 JM 00938 -2011
07100 BE SETIM 01132 M6 00752 01200
07110 AM COMP4*6,4,10 01144 J1 00938 000-4
07120 TFM NTIM,,10, NTIM = 0 01156 J6 00169 000-0
07130 B7 ADD12 01168 M9 01064 00000
07140 CHKSUB AM COMP4*6,2,10 01176 J1 00938 000-2
07150 AM TFILE,2,10 01188 J1 02114 000-2
07160 C TFILE,COMP4*6,611, CHECK SUBSCRIPT 01200 KM 0211M 00930
07170 BE MIT 01212 M6 01256 01260

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07180 SUB2 SM COMP4+6,2,10
07190 SM TF FILE,2,10
07200 B ADD4
08010 DORG ←-3
08020*
08030 MIT SF FOUND
08040 B BACKAG
08050 DORG ←-3
08060 RET B7 BACKAG
08070*
08080*
08090 TABCOR TFM COMP4+6,TABOUT+11
08100 TFM NTIM,10
08110 B7 COMP4-12
08120 DC 1,0
08130 TABIN DC 1,0
08140 DC 50,0
08150 DC 50,0
08160 DC 50,0
08170 DC 50,0
08180 DC 50,0
08190 DC 50,0
08200 DC 50,0
09010 DC 50,0
09020 DC 50,0
09030 DC 50,0
09040 DC 50,0
09050 DC 50,0
09060 DC 50,0
09070 DC 49,0
09080 DGM
09090 OUTW DDM ,OUTA,,N,A

09100 OUTA DDA ,0,0,0,0

09110 DC 1,*
09120 OUTDSK DS ,OUTA+5
09130 OUTSEC DS ,OUTA+8
09140 OUTCOR DS ,OUTA+13
09150*
09160 INW DDM ,INA,,N,A

09170 INA DDA ,,INDSK,INSEC,INCOR

09180 DC 1,*
09190 INDSK DC 5,0,INA+5
09200 INSEC DC 3,0,INA+8
10010 INCOR DC 5,0,INA+13
10020*
10030 INDEXA DDA ,,DEXDSK,DEXSEC,DEXCOR

10040 DC 1,*
10050 DEXDSK DS ,INDEXA+5
10060 DEXSEC DS ,INDEXA+8
10070 DEXCOR DS ,INDEXA+13

10080*
10090 ODEXW DDM ,ODEXA,,N,A

10100 ODEXA DDA ,,ODXDSK,ODXSEC,ODXCOR

10110 DC 1,*
10120 ODXDSK DS ,ODEXA+5
10130 ODXSEC DS ,ODEXA+8
10140 ODXCOR DS ,ODEXA+13
10150 SVDSK DC 5,0
10160 TF FILE DC 5,0
10170 TEMPNO DC 5,0
10180 TENZ DC 10,0
10190*
10200 FOUND DS ,07628
11010 TABOUT DS ,07770
11020 TSTUFF DS ,07881
11030 DEX DS ,07883
11040 TDEX DS ,07386
11050 PIN DS ,07391
11060 NOWRIT DS ,07890
11070 NOGET DS ,07893
11080 MQ2 DS ,8059
11090 MQ3 DS ,07898
11100 MQ4 DS ,07901
11110 ENDCAM DS ,1799
11120 MONITR DS ,02406
11130 TYPERR DS ,02416
11140 ENDFX DS ,1999
11150 DEND FILE

01224 J2 00938 C00-2
01236 J2 02114 000-2
01248 M9 00968 00000
01254
01256 32 07628 00000
01268 M9 00054 00000
01276
01276 M9 00054 00000
INITIALIZE COMPARE ADDRESS TO 1ST ENTRY
IN BUFFER
01284 J6 00938 -7781
01296 J6 00169 000-0
01308 M9 00920 00000
01315 00001
01316 00001
01366 00050
01416 00050
01466 00050
01516 00050
01566 00050
01616 00050
01666 00050
01716 00050
01766 00050
01816 00050
01866 00050
01916 00050
01966 00050
02015 00049
02016 00001
02017 00002 20
02019 00005 -2026
02024 00001 '
02026 00006 0-0000
02032 00003 -00
02035 00005 -0000
02040 00001
02031 00000
02034 00000
02039 00000

02041 00002 20
02043 00005 -2050
02048 00001 '
02050 00006 0-2055
02056 00003 -58
02059 00005 -2063
02064 00001
02055 00005
02058 00003
02063 00005

02066 00006 0-2071
02072 00003 -74
02075 00005 -2079
02080 00001
02071 00000
02074 00000
02079 00000

02081 00002 20
02083 00005 -2090
02088 00001 '
02090 00006 0-2095
02096 00003 -98
02099 00005 -2103
02104 00001
02095 00000
02098 00000
02103 00000
02109 00005
02114 00005
02119 00005
02129 00010

COMMON AREA WITH MAINLINE
07628 00000
07770 00000
07881 00000
07883 00000
07386 00000
07391 00000
07890 00000
07893 00000
08059 00000
07898 00000
07901 00000
01799 00000
02406 00000
02416 00000
01999 00000
00010

```

SYMBOL TABLE

TYPERR 02416	TSTUFF 07881	TEMPNO 00599R	TABOUT 07770	PUTOUT 00222R
OUTSEC 00564R	OUTDSK 00561R	OUTCOR 00569R	ODXSEC 00588R	ODXDSK 00565R
ODXCOR 00593R	NOWRIT 07890	MONITR 02406	ENDCAN 01799	BACKTO 00546R
ADDY 00246R	BB1 00546R	CODE1 00030R	DEX 07883	ENDEX 01999
FILE 00006R	FOUND 07628	NOGET 07893	NO2 08059	NO3 07898
NO4 07901	ODEXA 00580R	ODEXW 00571R	OUTA 00556R	OUTW 00548R
PIN 07391	PUTD 00474R	SETGM 00114R	STUFF 00282R	SVDSK 00604R
TDEX 07386	TFILE 00609R			

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01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAN SUBPROGRAM FILE2
01040*      THIS SUBPROGRAM STORES A GEOMETRIC CANONICAL FORM
01050*      A MACRO, OR A SCALAR ELEMENT
01060*      LINKAGE IS          BTM MONITR,NNNO
01070*                        BTM FILE2,NAME
01080*      NAME IS THE ADDRESS OF THE CHARACTER LENGTH PORTION
01090*      OF THE RECORD TO BE STORED
01100*
01110      DC      6,0          00005 00006
01120 FILE  CF      FOUND      00006 33 07628 00000
01130      SF      FILE-5      00018 L2 00001 00000
01140 CODE1 TF      TEMPNO,FILE-1,11, STORE THE RECORD LENGTH IN TEMPNO
                                00030 KO 00599 0000M
01150      SM      FILE-1,3,10  00042 J2 00005 000-3
01160      TF      TFILE,FILE-1 00054 KO 00609 00005
01170      TF      OUTCOR,TFILE,, STORE FIRST CHAR IN CORE IN OUTCOR
                                00066 KO 00569 00609
01180      AM      TEMPNO,100,8,  TEMPNO = TEMPNO + 100 00078 J1 00599 0-100
01190*      COMPUT ADDRESS OF GROUP MARK
01200      TF      SETGM+6,FILE-1 00090 KO 00120 00005
02010      A      SETGM+4,TEMPNO-2 00102 KJ 00118 00597
02020*      SET GROUP MARK
02030 SETGM TDM      9999,          00114 15 09999 00000
02040      DGM      *          00125 00001
02050      TF      OUTSEC,TEMPNO-2,, SET UP SECTOR COUNT FIELD
                                00126 KO 00564 00597
02060      CF      OUTSEC-1        00138 L3 00563 00000
02070      TFM     OUTDSK,,,        OUTDSK = 0        00150 J6 00561 -0000
02080      A      OUTDSK,NO2,,      OUTDSK = OUTDSK + NO2 00162 K1 00561 08059
02090      CM      OUTDSK,ENDCAN,,   CHECK FOR END OF CANON TABLE
                                00174 J4 00561 -1799
02100      BL      PUTOUT          00186 M7 00222 01300
02110*      ....TABLE OVERFLOW
02120*      LOAD AND CALL TYPERR SUBPROGRAM
02130      BTM     MONITR,03090,67  00198 17 02400 -3090
02140      BTM     TYPERR,143,67    00210 17 02410 -0143
02150*      STORE A CANONICAL FORM IN CANON TABLE
02160 PUTOUT PUT      OUTW,RBC      00222 10 00565 -0245
                                00234 4R 00520 -0548
02170 ADDY  A      NO2,TEMPNO-2,,   UPDATE NO2      00246 2J 08059 00597
02180      TDM     SETGM+6,,6,      CLEAR GROUP MARK 00258 J5 0012- 00000
02190      AM      TFILE,17,10      00270 J1 00609 000J7
02200*      PREPARE TO MAKE AN ENTRY IN INDEX TABLE
03010 STUFF TFL     TSTUFF,TFILE,611, STORE THE SYMBOL NAME AND SUBSCRIPT
                                00282 00 0788J 0060R
    
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03020      AM      TSTUFF,2,10        00294 11 07881 000-2
03030      TF      TSTUFF,TEMPNO-2,6, STORE THE NO OF SECTORS
                                00306 20 0788J 00597
03040      AM      TSTUFF,14,10,     INCREMENT TO NEXT POSITION IN TABLE
                                00318 11 07881 000J4
03050      AM      TDEX,1,10,        UPDATE TOTAL NUMBER OF ENTRIES
                                00330 11 07386 000-1
03060      AM      DEX,1,10,         UPDATE NO. PRESENTLY IN BUFFER
                                00342 11 07883 000-1
03070      CM      DEX,6,10,         CHECK TO SEE IF BUFFER IS FULL
                                00354 14 07883 000-6
03080      BNE     BACKTO            00366 M7 00546 01200
03090*      PREPARE TO OUPUT BUFFER TO FILE
03100      TFM     ODXDSK,01800,,    SECTOR = 01800  00378 J6 00585 -1800
03110      TFM     ODXSEC,1,9,       SECTOR COUNT = 1  00390 J6 00588 00-01
03120      TFM     ODXCOR,TABOUT,,  CORE ADDRESS = TABOUT 00402 J6 00593 -7770
03130      A      ODXDSK,NO3,,      ODXDSK = ODXDSK + NO3 00414 K1 00585 07898
03140      CM      ODXDSK,ENDEX,,    CHECK FOR TABLE OVERFLOW
                                00426 J4 00585 -1999
                                00438 M7 00474 01300
03150      BL      PUTD              00450 17 02400 -3090
03160*      ....TABLE OVERFLOW
03170*      LOAD AND CALL TYPERR SUBPROGRAM
03180      BTM     MONITR,03090,67  00462 17 02410 -0139
03190      BTM     TYPERR,139,67
03200*      OUTPUT BUFFER TO FILE
04010 PUTD  PUT      ODEXW,RBC      00474 10 00565 -0497
                                00486 4R 00520 -0571
04020      AM      NOWRIT,1,9,       NOWRIT = NOWRIT + 1  00498 11 07890 00-01
04030      AM      NO3,1,10,         NO3 = NO3 + 1      00510 11 07898 000-1
04040      TFM     DEX,,10,          DEX = 0          00522 16 07883 000-0
04050      TFM     TSTUFF,TABOUT+13 00534 16 07881 -7783
04060*      RETURN TO CALLING PROGRAM
04070 BB1  BB          00546 42 00000 00000
04080      DORG   -9          00548
04090 OUTW  ODW      ,OUTA,,N,A      00548 00002 20
                                00550 00005 -0556
                                00555 00001 *
                                00556 00006 0-0000
04100 OUTA  DDA      ,0,0,0,0        00562 00003 -00
                                00565 00005 -0000
                                00570 00001
04110      DC      1, *          00561 00000
04120 OUTDSK DS      ,OUTA+5        00564 00000
04130 OUTSEC DS      ,OUTA+8        00569 00000
04140 OUTCOR DS      ,OUTA+13       00571 00002 20
04150 ODEXW DDM      ,ODEXA,,N,A    00573 00005 -0580
                                00578 00001 *
04160 ODEXA DDA      ,,ODXDSK,ODXSEC,ODXCOR 00580 00006 0-0585
                                00586 00003 N88
                                00589 00005 -0593
                                00594 00001
04170      DC      1, *          00585 00000
04180 ODXDSK DS      ,ODEXA+5      00588 00000
04190 ODXSEC DS      ,ODEXA+8      00593 00000
04200 ODXCOR DS      ,ODEXA+13     07628 00000
05010 FOUND  DS      ,07628        00599 00005
05020 TEMPNO DC      5,0          00604 00005
05030 SVDSK  DC      5,0          00609 00005
05040 TFILE  DC      5,0
05050 BACKTO DS     ,BB1          00546 00000
05060*
    
```

05070	TABOUT	DS	,07770	07770	00000
05080	TSTUFF	DS	,07881	07881	00000
05090	DEX	DS	,07883	07883	00000
05100	PIM	DS	,07391	07391	00000
05110	TDEX	DS	,07386	07386	00000
05120	NOWRIT	DS	,07890	07890	00000
05130	NOGET	DS	,07893	07893	00000
05140	NO2	DS	,08059	08059	00000
05150	NO3	DS	,07898	07898	00000
05160	NO4	DS	,07901	07901	00000
05170	ENDCAN	DS	,1799	01799	00000
05180	MONITR	DS	,02406	02406	00000
05190	TYPERR	DS	,02416	02416	00000
05200	ENDEX	DS	,1999	01999	00000
06010	DEND	FILE		00006	

SYMBOL TABLE

TYPERR	02416	TSTUFF	07881	TSAVE1	02456	TEMPNO	01632R	TABOUT	07770
TABCOR	00854R	NOWRIT	07890	MONITR	02406	INDEXA	01612R	ENDCAN	01799
DEXSEC	01620R	DEXDSK	01617R	DEXCOR	01625R	CODEMO	00034R	CHKSUB	00578R
ADD12	00466R	ADD2	00670R	ADD4	00370R	802	00852R	BRBAK	00838R
CLOUT	00250R	COMP4	00334R	CORE	01627R	DEX	07883	ENDEX	01999
FILE	00010R	FOUND	07628	HIT	00658R	INA	01596R	INCOR	01609R
INDSK	01601R	INSEC	01604R	INW	01507R	NOGET	07893	NO2	08059
NO3	07898	NO4	07901	NTIM	01644R	PIN	07391	RET	00840R
SAVE	05187	SAVE1	08011	SAVE2	08047	SAVE3	08071	SETIM	00154R
SKIP	00486R	SUB2	00626R	SVDSK	01637R	TABIN	00886R	TDEX	07386
TENZ	01654R	TFILE	01642R						

```

01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAN SUBPROGRAM FILE3
01040*      THIS SUBPROGRAM SEARCHES THE INDEX TABLE FOR A GEOMETRIC
01050*      CANONICAL FORM, A SCALAR ELEMENT, OR A MACRO DEFINITION
01060*      AND BRINGS THE CORRESPONDING RECORD INTO THE CORE POSITION
01070*      SPECIFIED
01080*      LINKAGE IS
01090*           BTM MONITR,NNNNO
01100*           BT FILE3,DSALBL+5,6
01110*      DSALBL IS THE ADDRESS IN CORE THAT THE RECORD IS TO BE
01120*      BROUGHT INTO
01130*      DSALBL+5 IS THE ADDRESS OF THE SYMBOLIC NAME CALLED FOR
01140*      DC      10,0
01150*      FILE  CF      FOUND
01160*      SF      FILE-5
01170*      INITIALIZE
01180*      CODEMO TFM  NO4,,10
01190*      TFM  NTIM,,10
01200*      TFM  INDSK,,
02010*      TFM  NOGET,,9
02020*      TF   TFILE,FILE-1
02030*      TFM  PIN,,
02040*      C     PIN,TDEX,,      CHECK FOR END OF INDEX TABLE
02050*      BE  RET
02060*      C     NOGET,NOWRIT,,   CHECK THAT NUMBER OF GETS = NUMBER
02070*      WRITES
02080*      BE  TABCOR
02090*      PREPARE TO BRING INDEX TABLE INTO TABIN
02100*      SETIM TFM  COMP+6,TABIN+11,, INITIALIZE COMPARING ADDRESS TO FIRST
02110*      ENTRY IN TABIN TABLE
02120*      TFM  NTIM,,10,      NTIM = 0
02130*      TFM  DEXDSK,01800,, INITIALIZE SECTOR ADDRESS
02140*      TFM  DEXSEC,7,9,      SECTOR COUNT = 7
02150*      TFM  DEXCOR,TABIN,,   CORE ADDRESS = TABIN
02160*      A     DEXDSK,NO4,,     DEXDSK = DEXDSK + NO4
02170*      CLEAR OUT TABIN TABLE
02180*      TFM  CLOUT+6,TABIN-1
02190*      AM  CLOUT+6,10,10
02200*      CLOUT TF  9999,TENZ
00009 00010
00010 33 07628 00000
00022 L2 00005 00000
00034 16 07901 000-0
00046 J6 01644 000-0
00058 J6 01601 -0000
00070 16 07893 00-00
00082 K0 01642 00009
00094 16 07391 -0000
00106 24 07391 07386
00118 M6 00840 01200
00130 24 07893 07890
00142 M6 00854 01200
00154 J0 00340 -0897
00166 J6 01644 000-0
00178 J6 01617 -1800
00190 J6 01620 00-07
00202 J0 01625 -0886
00214 K1 01617 07901
00226 J0 00256 -0885
00238 J1 00256 000J0
00250 20 09999 01654

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03010 CM CLOUT+6,TABIN+699 00262 JN 00256 -1585
03020 BNE CLOUT-12 00274 M7 00238 01200
03030+ BRING INDEX TABLE INTO TABIN
03040 SK INDEXA 00286 L4 01612 00701
03050 ROM INDEXA 00298 L6 01612 00702
03060 AM NO4,7,10, UPDATE NO4 00310 L1 07901 000-7
03070 BV **12 00322 M6 00334 01400
03080 COMP4 C 9999,TFILE,11, COMPARE SYMBOL NAME 00334 M2 09999 0164K
03090 BV ADD4 00346 M6 00370 01400
03100 BE CHKSUB 00358 M6 00578 01200
03110 ADD4 AM COMP4+6,4,10, INCREMENT TO SECTOR LENGTH FIELD
03120 A INDSK,COMP4+6,11, UPDATE INDSK 00370 J1 00340 000-4
03130 AM PIN,1,10, PIN = PIN + 1 00382 KJ 01601 0034-
03140 C PIN,TDEX,, END OF TABLE 00394 L1 07391 000-1
03150 BE RET 00406 M4 07391 07386
03160 AM NTIM,1,10, NTIM = NTIM + 1 00418 M6 00840 01200
03170 CM NTIM,6,10, CHECK IF SKIP MUST BE PERFORMED 00430 J1 01644 000-1
03180 BE SKIP 00442 J4 01644 000-6
03190 ADD12 AM COMP4+6,12,10, INCREMENT TO NEXT SYMBOL NAME 00454 M6 00486 01200
03200 B7 COMP4-12 00466 J1 00340 000J2
04010 SKIP AM NOGET,1,10, NOGET = NOGET + 1 00478 M9 00322 00000
04020 C NOGET,NOWRIT,, CHECK THAT NO GETS = NO WRITES 00486 L1 07893 000-1
04030 BE TABCOR 00498 M4 07893 07890
04040 CM COMP4+6,TABIN+695,,CHECK FOR END OF TABIN TABLE 00510 M6 00854 01200
04050 BE SETIM 00522 JN 00340 -1581
04060 AM COMP4+6,4,10 00534 M6 00154 01200
04070 TFM NTIM,,10, NTIM = 0 00546 J1 00340 000-4
04080 R7 ADD12 00558 J6 01644 000-0
04090+ PREPARE TO CHECK SUBSCRIPTS 00570 M9 00466 00000
04100 CHKSUB AM COMP4+6,2,10, 00578 J1 00340 000-2
04110 SM TFILE,12,10 00590 J2 01642 000J2
04120 C TFILE,COMP4+6,6,11, C+ECK FOR EQUAL SUBSCRIPTS
04130 BE HIT 00602 KM 0164K 0034-
04140 SUB2 SM COMP4+6,2,10, UNEQUAL....RETURN TO CHECK NEXT SYMBOL 00614 M6 00658 01200
04150 AM TFILE,12,10 00626 J2 00340 000-2
04160 B ADD4 00638 J1 01642 000J2
04170 DORG **3 00650 M9 00370 00000
04180+ SYMBOL AND SUBSCRIPT HAVE BEEN FOUND 00658
04190 HIT SF FOUND 00658 J2 07628 00000
04200 ADD2 AM COMP4+6,2,10, INCREMENT TO SECTOR LENGTH FIELD 00670 J1 00340 000-2
05010 TF INSEC,COMP4+6,11, TRANSFER SECTOR LENGTH TO INSEC 00682 KO 01604 0034-
05020 CF INSEC-1 00694 L3 01603 00000
05030 TF INCOR,FILE-6,, TRANSFER CORE POSITION TO INCOR 00706 KO 01609 00004
05040 A FILE-8,COMP4+6,11, COMPUTE GROUP MARK POSITION 00718 KJ 00002 0034-
05050 TDM FILE-6,,6, SET GROUP MARK 00730 J5 0000M 00000
05060 DGM * 00741 00001
05070+ BRING CANONICAL FORM INTO MEMORY 00742 L0 00565 -0765
05080 GET INW,RBC 00754 M4 00566 -1587

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05090 TDM FILE-6,,6, CLEAR GROUP MARK 00766 J5 0000M 00000
05100 BNF BRBAK,SAVE,, CHECK TO SEE IF SECTOR ADDRESS MUST BE 00778 M4 00838 05187
05110+ SAVED
05120 CF SAVE 00790 J3 05187 00000
05130 A INDSK,INSEC,, UPDATE INDSK 00802 KJ 01601 01604
05140 TF SAVE1,INDSK,, SAVE SECTOR ADDRESS 00814 M2 08011 01601
05150 TF TSAVE1,SAVE1,, SAVE SECTOR ADDRESS 00826 M2 02456 08011
05160+ RETURN TO CALLING PROGRAM
05170 BRBAK B82 00838 M2 00000 00000
05180 RET NOP 00840 M1 00000 00000
05190+ RETURN TO CALLING PROGRAM
05200 B82 B82 00852 M2 00000 00000
06010+ PREPARE TO CHECK SYMBOLS IN BUFFER
06020 TABCOR TFM COMP4+6,TABOUT+11 00854 J6 00340 -7781
06030 TFM NTIM,,10 00866 J6 01644 000-0
06040 B7 COMP4-12 00878 M9 00322 00000
06050 DC 1,0 00885 00001
06060 TABIN DC 1,0 00886 00001
06070 DC 50,0 00936 00050
06080 DC 50,0 00986 00050
06090 DC 50,0 01036 00050
06100 DC 50,0 01086 00050
06110 DC 50,0 01136 00050
06120 DC 50,0 01186 00050
06130 DC 50,0 01236 00050
06140 DC 50,0 01286 00050
06150 DC 50,0 01336 00050
06160 DC 50,0 01386 00050
06170 DC 50,0 01436 00050
06180 DC 50,0 01486 00050
06190 DC 50,0 01536 00050
06200 DC 49,0 01585 00049
07010 DGM 01586 00001
07020+
07030 INW DDW ,INA,,N,A 01587 00002 20
07040 INA DDA ,,INDSK,INSEC,INCOR 01589 00005 -1596
07050 DC 1, 01594 00001 '
07060 INDSK DC 5,0,INA+5 01596 00006 0-1601
07070 INSEC DC 3,0,INA+8 01602 00003 004
07080 INCOR DC 5,0,INA+13 01605 00005 -1609
07090+ 01610 00001
07100 INDEXA DDA ,,DEXDSK,DEXSEC,DEXCOR 01611 00005
07110 DC 1, 01612 00006 0-1617
07120 DEXDSK DS ,INDEXA+5 01618 00003 020
07130 DEXSEC DS ,INDEXA+8 01621 00005 -1625
07140 DEXCOR DS ,INDEXA+13 01626 00001
07150+ 01617 00000
07160 CORE DS 1 01620 00000
07170 TEMPNO DC 5,0 01625 00000
07180 SVOSK DC 5,0 01627 00001
07190 TFILE DC 5,0 01632 00005
07200 NTIM DC 2,0 01637 00005
07210 TENZ DC 10,0 01642 00005
07220 01644 00002
07230 01654 00010

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08020*			COMMON AREA WITH MAINLINE		
08030	FOUND	DS	,07628	07628	00000
08040	TAGOUT	DS	,07770	07770	00000
08050	SAVE	DS	,05187	05187	00000
08060	SAVE1	DS	,08011	08011	00000
08070	SAVE2	DS	,08047	08047	00000
08080	SAVE3	DS	,08071	08071	00000
08090	TSTUFF	DS	,07881	07881	00000
08100	DEX	DS	,07883	07883	00000
08110	PIN	DS	,07391	07391	00000
08120	TDEX	DS	,07386	07386	00000
08130	NDRIT	DS	,07890	07890	00000
08140	NOGET	DS	,07893	07893	00000
08150	NO2	DS	,8059	08059	00000
08160	NO3	DS	,07898	07898	00000
08170	NO4	DS	,07901	07901	00000
08180	TSAVE1	DS	,02456	02456	00000
08190	ENDCAN	DS	,1799	01799	00000
08200	MONITR	DS	,02406	02406	00000
09010	TYPERR	DS	,02416	02416	00000
09020	ENDEX	DS	,1999	01999	00000
09030	DEND	FILE		00010	

SYMBOL TABLE

MINSEC	00120R	MINDSK	00117R	MINDW	00103R	MINDDA	00112R	MINCOR	00125R
INDAT1	07395	CODEM1	00000R	BMAIN	10004	GETIT	00048R	SAVE1	08011

01010*			IBM 1620-1311 AD-APT.....		
01020*				
01030*			INTRAN SUBPROGRAM FILE4		
01040*			THIS SUBPROGRAM BRINGS PART OF A MACRO INTO THE INPUT AREA		
01050*			LINKAGE IS	BTM	MONITR,NNNO
01060*				B	FILE4
01070*					
01080	CODEM1	TF	MINDSK,SAVE1,,	SET UP SECTOR ADDRESS IN DDA	
					00000 K6 00117 08011
01090	TFM	MINCOR,INDAT1-3,,	SET UP CORE ADDRESS IN	DDA	
					00012 J6 00125 -7392
01100	TFM	MINSEC,2,9,	SET UP SECTOR COUNT IN	DDA	
					00024 J6 00120 00-02
01110*			SET GROUP MARK		
01120	TDM	INDAT1+197			00036 15 07592 00000
01130	DGM	*			00047 00001
01140*			BRING MACRO STATEMENT INTO	INPUT AREA	
01150	GETIT	GET	MINDW		00048 10 00565 -0071
					00060 4R 00566 -0103
01160*			CLEAR OUT GROUP MARK		
01170	TDM	INDAT1+197			00072 15 07592 00000
01180	AM	SAVE1,2,10			00084 11 08011 000-2
01190*			RETURN TO MAINLINE		
01200	B7	BMAIN			00096 49 10004 00000
02010	MINDW	DDW	,MINDDA,,R,A		00103 00002 K0
					00105 00005 -0112
					00110 00001
					00112 00006 0-0117
					00118 00003 J17
					00121 00005 -0125
					00126 00001
					00117 00000
					00120 00000
					00125 00000
02020	MINDDA	DDA	,,MINDSK,MINDSK,MINCOR		
02030	DC	1,*			
02040	MINDSK	DS	,MINDDA+5		
02050	MINSEC	DS	,MINDDA+8		
02060	MINCOR	DS	,MINDDA+13		
02070*			COMMON AREA WITH MAINLINE		
02080	SAVE1	DS	,08011	08011	00000
02090	INDAT1	DS	,07395	07395	00000
02100	BMAIN	DS	,10004	10004	00000
02110	DEND	CODEM1		00000	

SYMBOL TABLE

RESTD2 00092R RESTD1 00066R OUTPUT 00376R ITDUMP 00000R ALFRM 00473R
 COUNT 00116R MESS 00391R NMOD 00009R POSN 00248R TREC 00188R

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01010*          IBN 1620-1311 AD-APT SUBPROGRAM FOR INTRAN
01020*          EXECUTION-INTERRUPT MODE MEMORY TO FILE DUMP
01030*
01040*          LINKAGE IS      07  ITDUMP,,6
01050*
01060*          SUBPROGRAM ENTRY
01070 ITDUMP TFM NMOD,,10,          CLEAR MEMORY MODULE COUNT
                                00000 J6 00009 000-0
                                00012 J6 00381 -3400
01080          TFM OUTPUT+5,03400
01090          TFM OUTPUT+13,,,          INITIALIZE MEMORY ADDRESS
                                00024 J6 00389 -0000
                                00036 J6 00194 -000J
01100          TFM TREC+6,-1          CLEAR POSITION 00000
                                00048 15 00000 00000
01110          TOM 0,,          COUNT
                                00060 M9 00116 00000
01120          B7 COUNT
01130 RESTD1 TOM TREC+6,,6,          RESTORE POSITION NMOD=20000-1
                                00068 J5 0019M 00000
                                00080 J2 00194 J9999
01140          SM TREC+6,19999
01150 RESTD2 TOM TREC+6,,6,          RESTORE POSITION NMOD=20000-20000
                                00092 J5 0019M 00000
                                00104 J1 00194 J9999
01160          AM TREC+6,19999          NMOD = NMOD + 1
                                00116 J1 00009 000-1
01170 COUNT AM NMOD,1,10,
01180          AM TREC+6,1,10
                                00128 J1 00194 000-1
01190          CF TREC+6
                                00140 L3 00194 00000
01200          TD RESTD2+11,TREC+6,11,SAVE POSITION NMOD=20000-20000
                                00152 KN 00103 0019M
                                00164 J1 00194 J9999
02010          AM TREC+6,19999
02020          TD RESTD1+11,TREC+6,11,SAVE POSITION NMOD=20000-1
                                00176 KN 00079 0019M
                                00188 3J 00000 00472
02030 TREC TR ,ALFRM-1
02040          BNR RESTD1,,,          BRANCH IF NO RM IN POSITION 00000
                                00200 M5 00068 00000
02050          TD TREC+6,RESTD1+11,6,RESTORE POSITION NMOD=20000-1
                                00212 KN 0019M 00079
                                00224 J2 00194 J9999
02060          SM TREC+6,19999
02070          TD TREC+6,RESTD2+11,6,RESTORE POSITION NMOD=20000-20000
                                00236 KN 0019M 00103
02080 POSN SK OUTPUT,,,          POSITION ARM FOR DISK WRITE
                                00248 L4 00376 00701
02090          WDM OUTPUT,,,          DUMP 20K TO DISK (200 SECTORS)
                                00260 L8 00376 00702
                                00272 J1 00379 000-2
02100          AM OUTPUT+3,2,10,          MODIFY SECTOR ADDRESS
                                00284 J1 00386 000K0
02110          AM OUTPUT+10,20,10,          MODIFY MEMORY ADDRESS
                                00296 J2 00009 000-1
02120          SM NMOD,1,10
02130          BNZ POSN,,,          BRANCH IF DUMP NOT COMPLETE
                                00308 M7 00248 01200
02140*
02150          RCTY
                                00320 34 00000 C0102
02160          RCTY
                                00332 34 00000 C0102
02170          WATY MESS
                                00344 L9 00391 00100
02180          H
                                00356 48 00000 00000
02190          CALL EXIT
                                00368 49 00796 00000
02200*
03010 OUTPUT DDA ,0,03400,200,0          00376 00006 0-3400
    
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                                00382 00003 K00
                                00385 00005 -0000
03020 MESS DAC 42,, AD-APT INTRAN EXECUTION INTERRUPTED **
                                00391 00084
03030*
03040 NMOD DS 2,ITDUMP+9          00009 00002
03050 ALFRM DS 2,MESS+41*2          00473 00002
03060          DEND ITDUMP          00000
    
```

SYMBOL TABLE

9RCYL3 00519	9RCYL2 00517	9RCYL1 00515	9RCYL0 00513	9CCYL3 02117
9CCYL2 02115	9CCYL1 02113	9CCYL0 02111	MONITR 02406	ITLOAD 13900
INPUT3 14292	INPUT2 14278	INPUT1 14264	DELDIM 00000	ALFRM 14381
CLMAP 14032	COUNT 13912	INIT 07976	MESS 14307	MOD 14104
NMOD 13921	POSN1 13960	POSN2 14152	POSN3 14184	TREC 13936

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01010*          IBM 1620-1311 AD-APT PROGRAM FOR INTRAN
01020*          EXECUTION-REINSTATE MODE FILE TO MEMORY DUMP
01030*
01040          DORG 13900
01050 ITLOAD TDM 0,0,,          CLEAR POSITICN 00000 13900 15 00000 00000
01060 COUNT AM NMOD,1,810,      NMOD=NMOD+1          13912 11 13921 0-0-1
01070          AM TREC+6,20000    13924 11 13942 K0000
01080 TREC TR -1,ALFRM-1,2      13936 31 -000J 14380
01090          BNR COUNT,,,       BRANCH IF NO RM IN POSITION 00000
                                         13948 45 13912 00000

01100*
01110 POSN1 SK INPUT1,,,        POSITION ARM TO CYLINDER 00
                                         13960 34 14264 00701
01120          RON INPUT1,,,      LOAD CORE POSITIONS 00000 THRU 13899
                                         13972 36 14264 00702
01130          RON INPUT2,,,      LOAD CORE POSITIONS 14400 THRU 19999
                                         13984 36 14278 00702
01140          TF CLMAP+6,MONITR  13996 26 14038 02406
01150          AM CLMAP+6,11,10   14008 11 14038 000J1
01160          SF CLMAP+6         14020 32 14038 00000
01170 CLMAP TFM 9999,,711       14032 16 09999 -000-
01180          TF ++35,MONITR     14044 26 14079 02406
01190          AM ++23,11,10     14056 11 14079 000J1
01200          TF ++30,9999       14068 26 14098 09999
02010          AM ++17,2,10       14080 11 14097 000-2
02020          TFM 9999,,711     14092 16 09999 -000-
02030 MOD AM INPUT3+4,20,10,    MODIFY SECTOR ADDRESS 14104 11 14296 000K0
02040          AM INPUT3+10,20,10,  MODIFY MEMORY ADDRESS 14116 11 14302 000K0
02050          SM NMOD,1,10,      NMOD+NMOD-1        14128 12 13921 000-1
02060          BZ POSN3,,,        BRANCH IF MEMORY FULLY REINSTATED
                                         14140 46 14184 01200

02070*
02080 POSN2 SK INPUT3,,,        POSITION ARM FOR DISK READ
                                         14152 34 14292 00701
02090          RON INPUT3,,,      LOAD 20K TO MEMORY (200 SECTORS)
                                         14164 36 14292 00702
02100          B MOD              14176 49 14104 00000
02110          DORG #-3          14184
02120*
02130 POSN3 MM 9CCYL0,20,10     14184 13 02111 000K0
02140          TF INPUT3+4,99     14196 26 14296 00099
02150          SK INPUT3,,,       REPOSITION ARM TO CYLINDER AT DUMP TIME
                                         14208 34 14292 00701
02160          RCTY              14220 34 00000 00102
02170          RCTY              14232 34 00000 00102
02180          WATY MESS          14244 39 14307 00100
02190          B INIT            14256 49 07976 00000
02200          DORG #-3          14264
03010*
03020 INPUT1 DDA ,0,3400,139,0  14264 00006 0-3400

                                         14270 00003 J39
                                         14273 00005 -0000
03030 INPUT2 DDA ,0,3544,56,14400 14278 00006 0-3544
                                         14284 00003 -56
                                         14287 00005 J4400
03040 INPUT3 DDA ,0,3400,200,0  14292 00006 0-3400
                                         14298 00003 K00
                                         14301 00005 -0000

03050 MESS DAC 38,,* AD-APT INTRAN EXECUTION RESUMED *** 14307 00076
03060*
03070 NMOD DS 2,COUNT+9          13921 00002
03080 ALFRM DS 2,MESS+37*2      14381 00002
03090 INIT DS ,07976           07976 00000
03100 MONITR DS ,02406          02406 00000
03110          DEND ITLOAD       13900

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SYMBOL TABLE

TYPERR 02416	TDATA6 03372	TDATA5 03362	TDATA4 03352	SIRSIR 16896
RTHETA 02416	RETURN 02411	NXTFOR 16676	MCNTR 02406	LN/CON 02416
LINLIN 02416	LINCIR 02416	LEVEL1 16804	LCCNDS 16939	INTLIN 16980
FLZERO 07680	ERR301 16780	DIM205 17028	CIRCON 02416	CIRCIR 02416
CHKCIR 16872	CENTC1 17088	CATANG 17224	CALCON 16916	AFORM 16756
CCDSA 16507	FINDZ 02416	FORM 07712	IAT1 07731	INIT 07976
LINC 02416	LINKD 16497	LITAB 17353	LLDSA 16467	LIC1 16852
MAYZ 17244	ONCIR 16517	PONT 16524	POLAR 16956	RING 02416
RTDSA 16949	SYMB1 04289	SYMB5 04315	SYMB6 04325	SYMB7 04335
TDATA 03333	XY 16748	XYZ 17144		

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01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAN SUBPROGRAM POINT
01040*      LINKAGE IS      BT  MONITR,DSALBL+5
01050*                        8  POINT
01060*      THE FOLLOWING POINT DEFINITIONS ARE ALLOWED
01070*
01080*      POINT/X,Y      FORM=15
01090*      POINT/X,Y,Z    FORM=63
01100*      POINT/INTOF,L1,L2
01110*      POINT/XLARGE,INTOF,L1,C1      FORM=165
01120*      POINT/XLARGE,INTOF,C1,C2      FORM=165
01130*      POINT/C1,ATANGL,A            FORM=27
01140*      POINT/CENTER,C1      FORM=9
01150*      POINT/RTHETA,XYPLAN,R,A      FORM=175
01160*
01170*      DORG 16462                                16462
01180*      DC 30,0                                    16491 00030
01190*      DORG --29+5*6-6                        16486
01200*      NOP SYMB6,0                              16486 41 04325 00000
02010*      DORG --21                                16476
02020*      NOP TDATA+80,SYMB5                      16476 41 03413 04315
02030*      DORG --21                                16466
02040*      NOP TDATA6,TDATA+70                    16466 41 03372 03403
02050*      DORG --14                                16463
02060*      LLOSA DSA TDATA5                        16467 00005 -3362
02070*      DORG ++5*6-4                            16493
02080*
02090*      LINKD DSA MAYZ                            16497 00005 J7244
02100*      DSC 5,03291                              16498 00005
02110*      CCDSA DSA MAYZ                            16507 00005 J7244
02120*      DSC 5,03271                              16508 00005
02130*      ONCIR DSA MAYZ                            16517 00005 J7244
02140*      DSC 5,03281                              16518 00005
02150*      POINT TFM SYMB1,51,8,      SET SYMB1 TO 51 FOR POINT RECORD
                                                16524 16 04289 0-051
02160*      TFL SYMB7,FLZERO,,      SET SYMB7 TO ZERO
                                                16536 06 04335 07680
02170*      TDM SYMB7+1              16548 15 04336 0C000
02180*      DC 1,*,*                  16559 00001
02190*      AM IAT1,12,10,      INCREMENT TO 1ST ELEMENT
                                                16560 11 07731 000J2
02200*      CF XYZ                    16572 33 17144 00000
03010*      CM FORM,175,8,      CHECK FOR FORM 175
                                                16584 14 07712 0-175
03020*      BE POLAR                16596 46 16956 01200
03030*      CM FORM,165,8,      CHECK FOR FORM 165
                                                16608 14 07712 0-165

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03040*      BE LEVEL1                    16620 46 16804 01200
03050*      CM FORM,63,8,      CHECK FOR FORM 63
                                                16632 14 07712 0-063
03060*      BNE NXTFOR                16644 47 16676 01200
03070*      SF XYZ                    16656 32 17144 0C000
03080*      B7 XYZ                    16668 49 17144 00000
03090*      NXTFOR CM FORM,37,8,      CHECK FOR FORM 37
                                                16676 14 07712 0-037
03100*      BE INTLIN                16688 46 16980 01200
03110*      CM FORM,27,8,      CHECK FOR FORM 27
                                                16700 14 07712 0-027
03120*      BE CATANG                16712 46 17224 01200
03130*      CM FORM,15,8,      CHECK FOR FORM 15
                                                16724 14 07712 0-015
03140*      BNE AFORM                16736 47 16756 01200
03150*      XY B7 XYZ                16748 49 17144 00000
03160*      AFORM CM FORM,9,8,      CHECK FOR FORM 9
                                                16756 14 07712 0-009
03170*      BE CENTC1                16768 46 17088 01200
03180*      LOAD AND CALL TYPERR SUBPROGRAM
03190*      ERR301 BT MONITR,03090,67 16780 17 02400 -3090
03200*      BTM TYPERR,301,67         16792 17 02410 -0301
04010*      LEVEL1 CM                16804 14 03352 000-1
                                                16816 47 16872 01200
04020*      BNE CHKCIR                16828 14 03393 000-3
04030*      CM TDATA4+41,3,10        16840 46 16916 01200
04040*      BE CALCON
04050*      INTERSECTION OF LINE AND CIRCLE
04060*      LOAD AND CALL LINC SUBPROGRAM
04070*      LIC1 BT MONITR,LINKD+5,6 16852 27 02400 16502
04080*      B7 LINC,,6               16864 49 02410 00000
04090*      CHKCIR CM TDATA4,2,10,   CHECK 1ST SURFACE FOR CIRCLE
                                                16872 14 03352 000-2
                                                16884 47 16780 01200
04100*      BNE ERR301
04110*      INTERSECTION OF TWO CIRCLES
04120*      LOAD AND CALL RING SUBPROGRAM
04130*      SIRSIR BT MONITR,CCDSA+5,6 16896 27 02400 16512
04140*      B7 RING,,6               16908 49 02410 00000
04150*      CALCON BT MONITR,LCCNDS+5,6 16916 27 02400 16944
04160*      B7 LN/CON,,6            16928 49 02410 00000
04170*      LCCNDS DSA MAYZ          16939 00005 J7244
04180*      DSC 5,03551              16940 00005
04190*      RTDSA DSA MAYZ          16949 00005 J7244
04200*      DSC 5,03261              16950 00005
05010*      POLAR COORDINATES
05020*      LOAD AND CALL RTHETA SUBPROGRAM
05030*      POLAR BT MONITR,RTDSA+5,6 16956 27 02400 16954
05040*      BTM RTHETA,,610         16968 17 02410 000-0
05050*      INTERSECTION OF TWO LINES
05060*      LOAD AND CALL LINLIN SUBPROGRAM
05070*      CHECK THAT BOTH ELEMENTS ARE LINES
05080*      INTLIN CM TDATA4,1,10    16980 14 03352 000-1
05090*      BNE ERR301              16992 47 16780 01200
05100*      CM TDATA4+41,1,10       17004 14 03393 000-1
05110*      BNE ERR301              17016 47 16780 01200
05120*      DIM205 BTM MONITR,02050,67 17028 17 02400 -2050
05130*      BT LINLIN,LLOSA+25,6    17040 27 02410 16492
05140*      BNR MAYZ,SYMB5,,      RECORD MARK INDICATES LINES ARE PARALLEL
                                                17052 45 17244 04315
05150*      LOAD AND CALL TYPERR SUBPROGRAM
05160*      BTM MONITR,03090,67      17064 17 02400 -3090
05170*      BTM TYPERR,306,67       17076 17 02410 -0306
05180*      POINT/CENTER,CIRCLE
05190*      CHECK THAT ELEMENT IS A CIRCLE
05200*      CENTC1 CM TDATA4,2,10    17088 14 03352 000-2

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06010	BNE	ERR301		17100 47 16780 01200
06020	TFL	SYMB5,TDATA5,,	STORE M OF CENTER IN SYMB5	17112 06 04315 03362
06030	TFL	SYMB6,TDATA6,,	STORE N OF CENTER IN SYMB6	17124 06 04325 03372
06040	B7	MAYZ,,,	BRANCH TO CHECK FOR Z COORDINATE	17136 49 17244 00000
06050	XVZ	YFL SYMB5,IAT1,11,	STORE X IN SYMB5	17144 06 04315 0773J
06060	AM	IAT1,14,10,	INCREMENT TO NEXT ELEMENT	17156 11 07731 000J4
06070	TFL	SYMB6,IAT1,11,	STORE Y COORDINATE IN SYMB6	17168 06 04325 0773J
06080	BNF	MAYZ,XVZ,,	CHECK IF Z COORDINATE WAS SPECIFIED	17180 44 17244 17144
06090	AM	IAT1,14,10,	INCREMENT TO NEXT ELEMENT	17192 11 07731 000J4
06100	TFL	SYMB7,IAT1,11,	STORE Z COORDINATE IN SYMB7	17204 06 04335 0773J
06110*			RETURN TO CALLING PROGRAM	
06120	B7	RETURN,,6		17216 49 0241J 00000
06130*			POINT/CIRCLE,ATANGL,ANGLE	
06140*			LOAD AND CALL CIRCON SUBPROGRAM	
06150	CATANG	B7 MONITR,ONCIR+5,6		17224 27 02400 16522
06160	B7	CIRCON,,6		17236 49 0241Q 00000
06170*			LOAD AND CALL MAYZ SUBPROGRAM	
06180*			TO CHECK FOR PREVIOUS ZSURF DEFINITION	
06190*			AND TO SUPPLY Z COORDINATE	
06200	MAYZ	BTM MONITR,03140,67		17244 17 02400 -3140
07010	BTM	FINDZ,,610		17256 17 02410 000-0
07020	DSC	2,49		17268 00002
07030	DSA	-RETURN		17274 00005 -241J
07040*			RETURN TO CALLING PROGRAM	
07050	DS	78,,	FILL LAST SECTOR	17352 00078
07060	FLZERO	DS +,7680		07680 00000
07070	MONITR	DS +,02406		02406 00000
07080	RETURN	DS +,02411		02411 00000
07090	ATHETA	DS +,02416		02416 00000
07100	LINC	DS +,02416		02416 00000
07110	LINCIR	DS +,02416		02416 00000
07120	CIRCON	DS +,02416		02416 00000
07130	TYPERR	DS +,02416		02416 00000
07140	RING	DS +,02416		02416 00000
07150	CIRCIR	DS +,02416		02416 00000
07160	LINLIN	DS +,02416		02416 00000
07170	LITAB	DD +,02416		17353 00002 02
				17355 00005 -2416
				17360 00001
07180	FINDZ	DS +,02416		02416 00000
07190	SYMB1	DS +,04289		04289 00000
07200	SYMB5	DS +,04315		04315 00000
08010	SYMB6	DS +,04325		04325 00000
08020	SYMB7	DS +,04335		04335 00000
08030	IAT1	DS +,07731		07731 00000
08040	TDATA	DS +,03333		03333 00000
08050	TDATA4	DS +,03352		03352 00000
08060	TDATA5	DS +,03362		03362 00000
08070	TDATA6	DS +,03372		03372 00000
08080	FORM	DS +,07712		07712 00000
08090	LN/COM	DS +,2416		02416 00000
08100	INIT	DS +,07976		07976 00000

08110 DEND POINT

16524

SYMBOL TABLE

RTHETA 17362 RETURN 02411 PI/180 17498 MONITR 02406 COSF 02421
IAT1 07731 SINP 02416 X 04315 Y 04325

01010* IBM 1620-1311 AD-APT DEFPRE SUBPROGRAM FOR DETERMINING
01020* A POINT DEFINED BY A STATEMENT OF THE FORM....
01030* RCS
01040* PT1=POINT/RTHETA,XYPLAN,R,THETA
01050*
01060* *NAME RTHETA... NON-ERASABLE DEFPRE SUBPROGRAM
01070* *ID NUMBER 0326*DELOIM
01080* *STORE CORE IMAGE
01090* LINKAGE - B RTHETA,,6
01100*
01110* DORG 17362 17362
01120* SUBPROGRAM ENTRY
01130* RTHETA AM IAT1,28+14,10 17362 11 07731 000H2
01140* TFL X,PI/180 17374 06 04315 17498
01150* FMUL X,IAT1,11, THETA IN RADIANS 17386 03 04315 0773J
01160* TFL Y,X,, THETA IN RADIANS 17398 06 04325 04315
01170* BTM MONITR,02010,67, CALL SINP-COSF SUBROUTINE VIA MONITR
17410 17 02400 -2010
01180* BTM SINP,Y,67, Y=SINP(THETA) 17422 17 02410 -4325
01190* BTM COSF,X,67, X=COSF(THETA) 17434 17 0242J -4315
01200* SM IAT1,14,10 17446 12 07731 000J4
02010* FMUL X,IAT1,11, X=R*COSF(THETA) 17458 03 04315 0773J
02020* FMUL Y,IAT1,11, Y=R*SINP(THETA) 17470 03 04325 0773J
02030* B RETURN,,6, RETURN TO MONITR 17482 49 0241J 00000
02040* DORG =-4 17489
02050*
02060* DC 8,17453292 17496 00008
02070* PI/180 DC 2,-1 17498 00002
02080*
02090* DS 62,, FILL LAST SECTOR 17560 00062
02100* IAT1 DS ,7731 07731 00000
02110* X DS ,4315 04315 00000
02120* Y DS ,X+10 04325 00000
02130* MONITR DS ,2406 02406 00000
02140* SINP DS ,2416 02416 00000
02150* COSF DS ,2421 02421 00000
02160* RETURN DS ,2411 02411 00000
02170* DEND RTHETA 17362

SYMBOL TABLE

TYPERR 02416 TDATA7 03382 TDATA6 03372 TDATA5 03362 TDATA4 03352
RETURN 02411 MONITR 02406 ERR307 18088 ERR301 17636 DSA207 17417
DIM207 17504 CIRDSA 17367 CIRCIR 02416 DIG2 18020 FLAG 00079
IAT1 07731 INIT 07976 ITSX1 17980 ITSY1 17800 MAXIF 02416
RING 17456 SYMB5 04315 SYMB6 04325 TDATA 03333 TEMP 18121
XBDSA 17427 XBIG 17660 XLIT 17820 X1 18131 X2 18151
YBDSA 17443 YBIG 17840 YLIT 18000 Y1 18141 Y2 18161
LINT 18056 ZINT 17540

01010* IBM 1620-1311 AD-APT.....
01020*
01030* INTRAN SUBPROGRAM RING
01040* LINKAGE IS BT MONITR,DSALBL*5
01050* B RING
01060* THIS SUBPROGRAM CONTROLS FINDING
01070* THE INTERSECTION OF TWO CIRCLES
01080*
01090* DORG 17362 17362
01100* DC 50,0 17411 00050
01110* DORG =-49+5*10-6 17406
01120* NOP Y2,0 17406 41 18161 00000
01130* DORG =-21 17396
01140* NOP Y1,X2 17396 41 18141 18151
01150* DORG =-21 17386
01160* NOP TDATA+100,X1 17386 41 03433 18131
01170* DORG =-21 17376
01180* NOP TDATA+80,TDATA+90 17376 41 03413 03423
01190* DORG =-21 17366
01200* NOP TDATA6,TDATA7 17366 41 03372 03382
02010* DORG =-14 17363
02020* CIRDSA DSA TDATA5 17367 00005 -3362
02030* DORG =+5*10-4 17413
02040* DSA DIM207+24 17417 00005 J7528
02050* DSC 5,02071 17418 00005
02060* DORG DSA207+5*5*3-11 17426
02070* NOP X1,SYMB5 17426 41 18131 04315
02080* DORG =-14 17423
02090* XBDSA DSA X2 17427 00005 J8151
02100* DORG =+5*3-4 17438
02110* DSC 1,7 17438 00001
02120* DORG =+5*3-11 17442
02130* NOP Y1,SYMB6 17442 41 18141 04325
02140* DORG =-14 17439
02150* YBDSA DSA Y2 17443 00005 J8161
02160* DORG =+5*3-4 17454
02170* DSC 1,7 17454 00001
02180* CHECK THAT ELEMENTS ARE 2 CIRCLES
02190* RING CM TDATA4,2,10 17456 14 03352 000-2
02200* BNE ERR301 17468 47 17636 01200
03010* CM TDATA4+51,2,10 17480 14 03403 000-2
03020* BNE ERR301 17492 47 17636 01200
03030* LOAD AND CALL CIRCIR SUBPROGRAM
03040* TO FIND THE INTERSECTION OF 2 CIRCLES
03050* DIM207 BT MONITR,DSA207+5,6 17504 27 02400 17422
03060* BT CIRCIR,CIRDSA+45,6 17516 27 02410 17412
03070* BNR DIG2,FLAG,, RECORD MARK INDICATES 2 INTERSECTIONS

03080 2INT CM IAT1,31,610, CHECK FOR XLARGE 17528 45 18020 00079
03090 BE XBIG 17540 14 0773J 000L1
03100 CM IAT1,32,610, CHECK FOR X SMALL 17552 46 17660 01200
03110 BE XLIT 17564 14 0773J 000L2
03120 CM IAT1,35,610, CHECK FOR YLARGE 17576 46 17820 01200
03130 BE YBIG 17588 14 0773J 000L5
03140 CM IAT1,36,610, CHECK FOR YSMALL 17600 46 17840 01200
03150 BE YLIT 17612 14 0773J 000L6
03160* 17624 46 18000 01200
03170 ERR301 BTM MONITR,03090,67 LOAD AND CALL TYPERR SUBPROGRAM 17636 17 02400 -3090
03180 BTM TYPERR,301,67 17648 17 02410 -0301
03190* MODIFIER X LARGE...CHOOSE POINT
03200 XBIG TOM XBDSA+11,7 17660 15 17438 00007
04010* CHECK THAT X1 DOES NOT EQUAL X2
04020 TFL TEMP,X1 17672 06 18121 18131
04030 FSUB TEMP,X2 17684 02 18121 18151
04040 BZ ERR307 17696 46 18088 01200
04050* LOAD AND CALL MAXIF SUBPROGRAM
04060* TO CHOOSE THE LARGER OR SMALLER
04070* OF 2 SCALARS
04080 BTM MONITR,02130,67 17708 17 02400 -2130
04090 BT MAXIF,XBDSA+11,6 17720 27 02410 17438
04100* SYMB5 CONTAINS ANSWER
04110 TFL TEMP,SYMB5 17732 06 18121 04315
04120 FSUB TEMP,X1,, CHECK TO SEE IF X1 IS THE ANSWER 17744 02 18121 18131
04130 BZ ITSY1 17756 46 17800 01200
04140* X2 IS THE PROPER VALUE
04150 TFL SYMB5,X2,, SYMB5 = X2 17768 06 04315 18151
04160 TFL SYMB6,Y2,, SYMB6 = Y2 17780 06 04325 18161
04170* RETURN TO CALLING PROGRAM
04180 B7 RETURN,,6 17792 49 0241J 00000
04190 ITSY1 TFL SYMB6,Y1,, SYMB6 = Y1 17800 06 04325 18161
04200* RETURN TO CALLING PROGRAM
05010 B7 RETURN,,6 17812 49 0241J 00000
05020* XSMALL MODIFIER... SET DIGIT TO PICK
05030* SMALL X
05040 XLIT TOM XBDSA+11,6 17820 15 17438 00006
05050 B7 XBIG+12 17832 49 17672 00000
05060* YLARGE MODIFIER.. SET DIGIT TO PICK
05070* LARGE Y
05080 YBIG TOM YBDSA+11,7 17840 15 17454 00007
05090* CHECK IF Y1=Y2...ERROR
05100 TFL TEMP,Y1 17852 06 18121 18141
05110 FSUB TEMP,Y2 17864 02 18121 18161
05120 BZ ERR307 17876 46 18088 01200
05130* LOAD AND CALL MAXIF SUBPROGRAM
05140* TO PICK THE LARGER OR SMALLER OF 2 SCALAR
05150 BTM MONITR,02130,67 17888 17 02400 -2130
05160 BT MAXIF,YBDSA+11,6 17900 27 02410 17454
05170* ANSWER IS IN SYMB6
05180* CHECK TO SEE IF Y1 IS THE ANSWER
05190 TFL TEMP,SYMB6 17912 06 18121 04325
05200 FSUB TEMP,Y1 17924 02 18121 18141
06010 BZ ITSX1 17936 46 17980 01200
06020 TFL SYMB5,X2,, Y2... SET SYMB6=X2 17948 06 04315 18151
06030 TFL SYMB6,Y2,, SYMB6=Y2 17960 06 04325 18161
06040* RETURN TO CALLING PROGRAM
06050 B7 RETURN,,6 17972 49 0241J 00000

06060 ITSX1 TFL SYMB5,X1,, Y1...SYMB5=X1 17980 06 04315 18131
06070* RETURN TO CALLING PROGRAM
06080 B7 RETURN,,6 17992 49 0241J 00000
06090* YSMALL..SET DIGIT TO PICK
06100 YLIT TOM YBDSA+11,6 18000 15 17454 00006
06110 B7 YBIG+12 18012 49 17852 00000
06120 DIG2 BD IINT,FLAG,, DIGIT INDICATES 1 INTERSECTION 18020 43 18056 00079
06130* NO INTERSECTION
06140* LOAD AND CALL TYPERR SUBPROGRAM
06150 BTM MONITR,03090,67 18032 17 02400 -3090
06160 BTM TYPERR,319,67 18044 17 02410 -0319
06170* ... 1 INTERSECTION
06180 IINT TFL SYMB5,X1,, SYMB5=X1 18056 06 04315 18131
06190 TFL SYMB6,Y1,, SYMB6=Y1 18068 06 04325 18141
06200* RETURN TO CALLING PROGRAM
07010 B7 RETURN,,6 18080 49 0241J 00000
07020 ERR307 BTM MONITR,03090,67 18088 17 02400 -3090
07030 BTM TYPERR,307,67 18100 17 02410 -0307
07040 TEMP DS 10 18121 00010
07050 DC 8,0 18129 00008
07060 X1 DC 2,0 18131 00002
07070 DC 8,0 18139 00008
07080 Y1 DC 2,0 18141 00002
07090 DC 8,0 18149 00008
07100 X2 DC 2,0 18151 00002
07110 DC 8,0 18159 00008
07120 Y2 DC 2,0 18161 00002
07130* COMMON AREA WITH PAINLINE
07140 TDATA DS ,03333 03333 00000
07150 TDATA4 DS ,03352 03352 00000
07160 TDATA5 DS ,03362 03362 00000
07170 TDATA6 DS ,03372 03372 00000
07180 TDATA7 DS ,03382 03382 00000
07190 IAT1 DS ,07731 07731 00000
07200 SYMB5 DS ,04315 04315 00000
08010 SYMB6 DS ,04325 04325 00000
08020 INIT DS ,07976 07976 00000
08030 FLAG DS ,79 00079 00000
08040 RETURN DS ,02411 02411 00000
08050 MONITR DS ,02406 02406 00000
08060 TYPERR DS ,2416 02416 00000
08070 MAXIF DS ,02416 02416 00000
08080 CIRCIR DS ,2416 02416 00000
08090 DEND RING 17456

SYMBOL TABLE

TYPERR 02416	TDATA4 03352	RETURN 02411	PI/180 17559	MONITR 02406
CIRCON 17362	COSF 02421	ER301 17526	H 03362	IAT1 07731
K 03372	R 03382	SINF 02416	X 04315	Y 04325

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01010*      IBM 1620-1311 AD-APT DEFPRE SUBPROGRAM FOR DETERMINING
01020*      A POINT DEFINED BY A STATEMENT OF THE FORM....
01030*
01040*      PT1=POINT/C1,ATANGL,THETA
01050*
01060*      *NAME CIRCON... NON-ERASABLE DEFPRE SUBPROGRAM
01070*      *ID NUMBER 0328*DELDIM
01080*      *STORE CORE IMAGE
01090*      LINKAGE - B CIRCON,,6
01100*
01110      DORG 17362
01120*      SUBPROGRAM ENTRY
01130 CIRCON CM TDATA4,2,10      17362 14 03352 C00-2
01140      BNE ER301,,,          BRANCH IF ELEMENT IS NOT A CIRCLE
                                17374 47 17526 01200
01150*
01160      AM IAT1,28,10          17386 11 07731 0C0K8
01170      TFL X,PI/180          17398 06 04315 17559
01180      FMUL X,IAT1,11,      THETA IN RADIANS
01190      TFL Y,X,,            THETA IN RADIANS
01200      BTM MONITR,02010,67, CALL SINF-COSF SUBROUTINE VIA MONITR
                                17434 17 02400 -2010
02010      BTM SINF,Y,67,        Y=SINF(THETA)
02020      BTM COSF,X,67,        X=COSF(THETA)
02030      FMUL X,R,,            X=R*COSF(THETA)
02040      FADD X,H,,            X=H+R*COSF(THETA)
02050      FMUL Y,R,,            Y=R*SINF(THETA)
02060      FADD Y,K,,            Y=K+R*SINF(THETA)
02070      B RETURN,,6,         RETURN TO MCNITR
02080      DORG 0-3             17518 49 0241J 00000
02090*
02100 ER301 BTM MONITR,03090,67, CALL TYPERR SUBPROGRAM VIA MONITR
                                17526 17 02400 -3090
02110      BTM TYPERR,301,69,    WRITE ERROR MESSAGE... EXIT
                                17538 17 02410 00L01
02120*
02130      DC 8,17453292        17557 00008
02140 PI/180 DC 2,-1           17559 00002
02150*
02160      DS 2,,              FILL LAST SECTOR
02170 TDATA4 DS ,3352          17561 00002
02180 IAT1 DS ,7731            03352 00000
02190 X DS ,4315               07731 00000
02200 Y DS ,4315               04315 00000
02210 H DS ,4315               04325 00000
02220 K DS ,4315               03362 00000
02230 M DS ,3372               03372 00000
02240 R DS ,3382               03382 00000
02250 MONITR DS ,2406          02406 00000
02260 RETURN DS ,2411          02411 00000
02270 SINF DS ,2416            02416 00000
02280 COSF DS ,2421            02421 00000
02290 TYPERR DS ,2416          02416 00000

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03090 DEND CIRCON

17362

TYPERR 02416	TDATA6 03372	TDATA5 03362	TDATA4 03352	RETURN 02411
MONTR 02406	LINCIR 02416	ERR307 18082	ERR301 17630	DSA206 17366
DIM206 17498	DIG2 18014	FLAG 00079	IAT1 07731	INIT 07976
ITSX1 17974	ITSY1 17794	LCDSA 17409	LINC 17450	MAXIF 02416
SYMB5 04315	SYMB6 04325	TDATA 03333	TEMP 18155	XBDSA 17377
XBIG 17654	XLIT 17814	X1 18115	X2 18125	YBDSA 17393
YBIG 17834	YLIT 17994	Y1 18135	Y2 18145	ZINT 18050
ZINT 17534				

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01010*      IBM 1620-1311 AD-APT.....
01020*      *****
01030*      INTRAN SUBPROGRAM LINC
01040*      THIS ROUTINE CONTROLS FINDING THE INTERSECTION
01050*      OF A LINE AND CIRCLE DEFINED BY
01060*      POINT/XLARGE,INTOP,L1,C1
01070*      LINKAGE IS          BT MONTR,DSALBL+5
01080*                        B LINC
01090*
01100      DORG 17362
01110 DSA206 DSA DIM206+24          17362
01120      DSC 5,02061          17366 00005 J7522
01130      DORG DSA206+5*3-11    17375
01140      NDP X1,SYMB5          17376 41 18115 04315
01150      DORG +-14            17373
01160 XBDSA DSA X2              17377 00005 J8125
01170      DORG +-5*3-4        17388
01180      DSC 1,7              17388 00001
01190      DORG +-5*3-11      17392
01200      NDP Y1,SYMB6        17392 41 18135 04325
02010      DORG +-14          17389
02020 YBDSA DSA Y2              17393 00005 J8145
02030      DORG +-5*3-4        17404
02040      DSC 1,7              17404 00001
02050      DORG +-5*9-11      17438
02060      NDP X2,Y2          17438 41 18125 18145
02070      DORG +-21          17428
02080      NDP X1,Y1          17428 41 18115 18135
02090      DORG +-21          17418
02100      NDP TDATA+80,TDATA+90 17418 41 03413 03423
02110      DORG +-21          17408
02120      NDP TDATA6,TDATA+70 17408 41 03372 03403
02130      DORG +-14          17405
02140 LCDSA DSA TDATA5         17409 00005 -3362
02150      DORG +-5*9-4        17450
02160*
02170 LINC CM TDATA+,1,10      CHECK THAT ELEMENTS ARE LINE AND CIRCLE
02180      BNE ERR301          17450 14 03352 000-1
02190      CM TDATA4+,1,2,10   17462 47 17630 01200
02200      BNE ERR301          17474 14 03393 000-2
03010*
03020 DIM206 BT MONTR,DSA206+5,6 DETERMINE INTERSECTION OF LINE AND CIRCLE
03030      BT LINCIR,LCDSA+40,6 17498 27 02400 17371
03040      BNR DIG2,FLAG,,     RECORD MARK INDICATES 2 INTERSECTIONS
03050 ZINT CM IAT1,31,610,     CHECK FOR XLARGE          17522 45 18014 00079
03060      BE XBIG             17534 14 0773J COOL1
                                17546 46 17654 01200

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03070      CM IAT1,32,610,     CHECK FOR XSMALL          17558 14 0773J 000L2
03080      BE XLIT             17570 46 17814 01200
03090      CM IAT1,35,610,     CHECK FOR YLARGE          17582 14 0773J COOL5
03100      BE YBIG             17594 46 17834 01200
03110      CM IAT1,36,610,     CHECK FOR YSMALL          17606 14 0773J 000L6
03120      BE YLIT             17618 46 17994 01200
03130*
03140 ERR301 BTM MONTR,03090,67 17630 17 02400 -3090
03150      BTM TYPERR,301,67   17642 17 02410 -0301
03160*
03170 XBIG TOM XBDSA+11,7     XLARGE..SET DIGIT TO PICK LARGE X
                                17654 15 17388 0C007
03180*
03190      TFL TEMP,X1         17666 06 18155 18115
03200      FSUB TEMP,X2       17678 02 18155 18125
04010      BZ ERR307          17690 46 18082 01200
04020*
04030*
04040      BTM MONTR,02130,67 17702 17 02400 -2130
04050      BT MAXIF,XBDSA+11,6 17714 27 02410 17388
04060*
04070      TFL TEMP,SYMB5     ANSWER IS IN SYMB5          17726 06 18155 04315
04080*
04090      FSUB TEMP,X1       17738 02 18155 18115
04100      BZ ITSX1           17750 46 17794 01200
04110      TFL SYMB5,X2,,     X2....SYMB5=X2          17762 06 04315 18125
04120      TFL SYMB6,Y2,,     X2....SYMB6=Y2          17774 06 04325 18145
04130*
04140      B7 RETURN,,6       17786 49 0241J 00000
04150 ITSX1 TFL SYMB6,Y1,,     X1....SYMB6=Y1          17794 06 04325 18135
04160*
04170      B7 RETURN,,6       17806 49 0241J 00000
04180*
04190 XLIT TOM XBDSA+11,6     XSMALL .. SET DIGIT TO PICK SMALL X
04200      B7 XBIG+12         17814 15 17388 00006
                                17826 49 17666 0C000
05010*
05020 YBIG TOM YBDSA+11,7     YLARGE .. SET DIGIT TO PICK LARGE Y
                                17834 15 17404 00007
05030*
05040      TFL TEMP,Y1         17846 06 18155 18135
05050      FSUB TEMP,Y2       17858 02 18155 18145
05060      BZ ERR307          17870 46 18082 01200
05070*
05080*
05090*
05100      BTM MONTR,02130,67 17882 17 02400 -2130
05110      BT MAXIF,YBDSA+11,6 17894 27 02410 17404
05120*
05130      TFL TEMP,SYMB6     ANSWER IS IN SYMB6          17906 06 18155 04325
05140*
05150      FSUB TEMP,Y1       17918 02 18155 18135
05160      BZ ITSX1           17930 46 17974 01200
05170      TFL SYMB5,X2,,     Y2.....SYMB5=X2          17942 06 04315 18125
05180      TFL SYMB6,Y2,,     SYMB6=Y2          17954 06 04325 18145
05190*
05200      B7 RETURN,,6       17966 49 0241J 00000
06010 ITSX1 TFL SYMB5,X1,,     Y1....SYMB5=X1          17974 06 04315 18115
06020*
06030      B7 RETURN,,6       17986 49 0241J 00000
06040*
06050 YLIT TOM YBDSA+11,6     YSMALL....SET DIGIT TO PICK SMALL Y
06060      B7 YBIG+12         17994 15 17404 00006
                                18006 49 17846 00000

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06070 DIG2 80 LINT,FLAG,, DIGIT INDICATES 1 INTERSECTION
                                18014 43 18050 00079
06080* NO INTERSECTION
06090* LGAD AND CALL TYPERR SUBPROGRAM
06100 BTM MONITR,03090,67 18026 17 02400 -3090
06110 BTM TYPERR,319,67 18038 17 02410 -0319
06120* ..... 1 INTERSECTION
06130 LINT TFL SYMB5,X1,, SYMB5=X1 18050 06 04315 18115
06140 TFL SYMB6,Y1,, SYMB6=Y1 18062 06 04325 18135
06150* RETURN TO CALLING PROGRAM
06160 B7 RETURN,,6 18074 49 0241J 00000
06170* LGAD AND CALL TYPERR SUBPROGRAM
06180 ERR307 BTM MONITR,03090,67 18082 17 02400 -3090
06190 BTM TYPERR,307,67 18094 17 02410 -0307
06200 DC 8,0 18113 00008
07010 X1 DC 2,0 18115 00002
07020 DC 8,0 18123 00008
07030 XB DE 2,0 18126 00002
07040 DC 8,0 18133 00008
07050 Y1 DC 2,0 18135 00002
07060 DC 8,0 18143 00008
07070 Y2 DC 2,0 18145 00002
07080 TEMP DS 10 18155 00010
07090 DS 6,, 18161 00006
                                FILL LAST SECTOR
                                COMMON AREA WITH MAINLINE
07100* 02406 00000
07110 MONITR DS ,02406 02406 00000
07120 RETURN DS ,02411 02411 00000
07130 LINCIR DS ,02416 02416 00000
07140 MAXIF DS ,02416 02416 00000
07150 TYPERR DS ,02416 02416 00000
07160 TDATA DS ,03333 03333 00000
07170 TDATA4 DS ,03352 03352 00000
07180 TDATA5 DS ,03362 03362 00000
07190 TDATA6 DS ,03372 03372 00000
07200 FLAG DS ,79 00079 00000
08010 INIT DS ,07976 07976 00000
08020 SYMB5 DS ,04315 04315 00000
08030 SYMB6 DS ,04325 04325 00000
08040 IAT1 DS ,07731 07731 00000
08050 DEND LINC 17450
    
```

SYMBOL TABLE

XYZXYZ 16846	TYPERR 02416	TDATA6 03372	TDATA5 03362	TDATA4 03352
TABPEP 16958	RETURN 02411	PITCON 17086	PERPAR 17218	MONITR 02406
LTPTAB 02416	LTNPRC 02416	LPTCON 02416	LMODSA 16665	LCNON1 02416
CYLD5A 17263	ATANF 02416	CIRK 17198	CCNK 17178	COSF 02421
C30N 17273	ER301 16822	FM105 02416	FCRM 07712	GCON0 17283
GOCAN 16786	HIDSA 17333	IAT1 07731	LINE 16462	LMOD2 02416
LMOD3 02416	MOD3D 17253	OKPT 17130	PTROK 16982	PIPT1 17054
PIP2 16902	PITC1 17106	PIT1 17054	RETRN 16810	SETX2 16750
SYMB1 04289	SYMB5 04315	SYMB6 04325	TANF 02416	TDATA 03333
XYDSA 16675	XYXY 16702	X1 17298	X2 17318	Y1 17308
Y2 17328				

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01010* IBM 1620-1311 AD-APT.....
01020* .....
01030* INTRAN SUBPROGRAM LINE
01040* LINKAGE IS BT MONITR,DSALBL*5
01050* B LINE
01060* THE FOLLOWING LINE DEFINITIONS ARE ALLOWED
01070*
01080* LINE/X,Y,Z,X,Y,Z FORM=4095
01090* LINE/X,Y,X,Y FORM=255
01100* LINE/PT1,PT2 FORM=5
01110* LINE/PT1,RIGHT,TANTO,C1 FORM=105
01120* LINE/RIGHT,TANTO,C1,RIGHT,TANTO,C2 FORM=2665
01130* LINE/PT1,ATANGL,A FORM=27
01140* LINE/PT1,PARLEL,L1 FORM=25
01150* LINE/PT1,PERPTO,L1 FORM=25
01160* LINE/PARLEL,L1,XLARGE,D FORM=155
01170* LINE/SLOPE,M,INTERC,B FORM=187
01180* LINE/PT1,ATANGL,A,L1 FORM=175
01190* LINE/PT1,TANTO,TAB1 FORM=25
01200* LINE/PT1,PERPTO,TAB1 FORM=25
02010*
02020* DORG 16462 16462
02030* LINE AM IAT1,12,10, INCREMENT TO FIRST ELEMENT
02040* TOM SYMB6*1 16462 11 07731 000J2
02050* DC 1,,* 16474 15 04326 00000
02060* TFM SYMB1,41,8, SET SYMB1 TO LENGTH OF LINE RECORD 16485 00001
02070* CM FORM,4095,8, CHECK FOR FORM 4095 16486 16 04289 0-041
02080* BE XYZXYZ 16498 14 07712 0P095
02090* CM FORM,255,8, CHECK FOR FORM 255 16510 46 16846 01200
02100* BE XYXY 16522 14 07712 0-255
02110* CM FORM,155,8, CHECK FOR FORM 155 16534 46 16702 01200
02120* BE PERPAR*12 16546 14 07712 0-155
02130* CM FORM,105,8, CHECK FOR FORM 105 16558 46 17230 01200
02140* BE PITC1 16570 14 07712 0-105
02150* CM FORM,25,8, CHECK FOR FORM 25 16582 46 17106 01200
02160* BE TABPEP 16594 14 07712 0-025
02170* CM FORM,5,8, CHECK FOR FORM 5 16606 46 16958 01200
02180* BE PIP2 16618 14 07712 0-005
02190* NOT ONE OF THE FORMS HANDLED IN THIS
02200* SUBPROGRAM
03010* LOAD AND CALL LMODZ SUBPROGRAM
03020* BT MONITR,LMODSA*5,6 16630 46 16902 01200
    
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03030      BT      LMOD2,,6                16654 49 02410 00000
03040 LMODSA DSA  RETRN                   16665 00005 J6810
03050      DSC     5,03311                 16666 00005
03060      DORG   LMODSA+5+5+6-6          16694
03070      NOP     SYMB6,0                 16694 41 04325 00000
03080      DORG   +-21                    16684
03090      NOP     Y2,SYMB5               16684 41 17328 04315
03100      DORG   +-21                    16674
03110      NOP     Y1,X2                  16674 41 17308 17318
03120      DORG   +-14                    16671
03130 XYDSA  DSA  X1                      16675 00005 J7298
03140      DORG   **5+6-4                 16701
03150*
03160 XYXY  TFL  X1,IAT1,11,             POINT DEFINED BY X AND Y COORDINATES
                                STORE X1 IN X1 16702 06 17298 0773J
03170      AM     IAT1,14,10,             INCREMENT TO NEXT ELEMENT
                                16714 11 07731 000J4
03180      TPL  Y1,IAT1,11,             STORE Y1 IN Y1 16726 06 17308 0773J
03190      AM     IAT1,14,10,             INCREMENT TO NEXT ELEMENT
                                16738 11 07731 000J4
03200 SETX2 TFL  X2,IAT1,11,             STORE X2 IN X2 16750 06 17318 0773J
04010      AM     IAT1,14,10,             INCREMENT TO NEXT ELEMENT
                                16762 11 07731 000J4
04020      TFL  Y2,IAT1,11,             STORE Y2 IN Y2 16774 06 17328 0773J
04030*      LOAD AND CALL LCCN1 SUBPROGRAM
04040*      TO PROJECT LINE THROUGH 2 POINTS
04050 GOCAN  BTM  MONITR,02120,67        16786 17 02400 -2120
04060      BT     LCNOM1,XYDSA+25,6      16798 27 02410 16700
04070 RETRN  BNR  RETURN,SYMB5,6,        RETURN TO CALLING PROGRAM
                                16810 45 0241J 04315
04080*
04090*      IF POINTS ARE NOT COINCIDENT
04100 ER301 BTM  MONITR,03090,67        LOAD AND CALL TYPERR SUBPROGRAM
                                16822 17 02400 -3090
04110      BTM  TYPERR,301,67           16834 17 02410 -0301
04120 XYZXYZ TFL  X1,IAT1,11,             STORE X1 IN X1 16846 06 17298 0773J
04130      AM     IAT1,14,10,             INCREMENT TO NEXT ELEMENT
                                16858 11 07731 000J4
04140      TFL  Y1,IAT1,11,             STORE Y1 IN Y1 16870 06 17308 0773J
04150      AM     IAT1,28,10,             SKIP OVER 2 COORDINATE 16882 11 07731 000K8
04160      BT     SETX2                   16894 49 16750 00000
04170 P1P2  TFL  X1,TDATA5,,             STORE X1 IN X1 16902 06 17298 03362
04180      TFL  Y1,TDATA6,,             STORE Y1 IN Y1 16914 06 17308 03372
04190      TFL  X2,TDATA+80,,           STORE X2 IN X2 16926 06 17318 03413
04200      TFL  Y2,TDATA+90,,           STORE Y2 IN Y2 16938 06 17328 03423
05010      BT     GOCAN                   16950 49 16786 00000
05020 TABPEP CM  TDATA4,9,10,           CHECK 1ST ELEMENT --POINT
                                16958 14 03352 000-9
05030      BNE  ER301                     16970 47 16822 01200
05040 PTROK  CM  TDATA4+51,1,10,         CHECK 2ND SURFACE --LINE
                                16982 14 03403 000-1
05050      BE   PERPAR                     16994 46 17218 01200
05060      CM  TDATA4+51,3,10,           CHECK 2ND SURFACE FOR CONIC
                                17006 14 03403 000-3
05070      BE   PITCON                     17018 46 17086 01200
05080      CM  TDATA4+51,4,10,           CHECK 2ND SURFACE--TABCVL
                                17030 14 03403 000-4
05090      BNE  ER301                     17042 47 16822 01200
05100 PIPT1 AM  IAT1,14,10              17054 11 07731 000J4
05110      BT     MONITR,CYLDSA+5,6      17066 27 02400 17268
05120      BT     LTPTAB,,6              17078 49 02410 00000
05130 PITCON BT  MONITR,C3ON+5,5        17086 27 02400 17278

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05140      BT     LPTCON,,6                17098 49 02410 00000
05150 PITC1  CM  TDATA4,9,10,           CHECK 1ST SURFACE --POINT
                                17106 14 03352 000-9
05160      BNE  ER301                     17118 47 16822 01200
05170 DKPT  CM  TDATA4+51,2,10,         CHECK 2ND SURFACE CIRCLE
                                17130 14 03403 000-2
05180      BE   CIRK                       17142 46 17198 01200
05190      CM  TDATA4+51,3,10,           CHECK 2ND SURFACE CCNIC
                                17154 14 03403 000-3
05200      BNE  ER301                     17166 47 16822 01200
06010 CONK  BT  MONITR,GCOND+5,6        17178 27 02400 17288
06020      BT     LTNPRC,,6              17190 49 02410 00000
06030 CIRK  BT  MONITR,H1DSA+5,6        17198 27 02400 17338
06040      BT     FM105,,6               17210 49 02410 00000
06050 PERPAR AM  IAT1,14,10              17218 11 07731 000J4
06060      BT     MONITR,MOD3D+5,6      17230 27 02400 17258
06070      BT     LMOD3,,6              17242 49 02410 00000
06080 MOD3D DSA  RETRN                   17253 00005 J6810
06090      DSC     5,03321                 17254 00005
06100 CYLDSA DSA  RETRN                   17263 00005 J6810
06110      DSC     5,03511                 17264 00005
06120 C3ON  DSA  RETRN                   17273 00005 J6810
06130      DSC     5,3571                  17274 00005
06140 GCOND DSA  RETRN                   17283 00005 J6810
06150      DSC     5,03561                 17284 00005
06160      DC     8,0                      17296 00008
06170 X1    DC     2,0                      17298 00002
06180      DC     8,0                      17306 00008
06190 Y1    DC     2,0                      17308 00002
06200      DC     8,0                      17316 00008
07010 X2    DC     2,0                      17318 00002
07020      DC     8,0                      17326 00008
07030 Y2    DC     2,0                      17328 00002
07040 H1DSA DSA  RETRN                   17333 00005 J6810
07050      DSC     5,03331                 17334 00005
07060      DS     22,,                     17360 00022
07070*
07080 TDATA5 DS  ,03362                   03362 00000
07090 TDATA6 DS  ,03372                   03372 00000
07100 TANF  DS  ,02416                   02416 00000
07110 ATANF DS  ,02416                   02416 00000
07120 COSF  DS  ,02421                   02421 00000
07130 IAT1  DS  ,07731                   07731 00000
07140 SYMB1 DS  ,04209                   04209 00000
07150 SYMB5 DS  ,04315                   04315 00000
07160 SYMB6 DS  ,04325                   04325 00000
07170 MONITR DS ,02406                   02406 00000
07180 RETURN DS ,02411                   02411 00000
07190 LCNOM1 DS ,02416                   02416 00000
07200 TYPERR DS ,02416                   02416 00000
08010 FORM  DS  ,07712                   07712 00000
08020 TDATA  DS  ,03333                   03333 00000
08030 LMOD2  DS  ,02416                   02416 00000
08040 LMOD3  DS  ,02416                   02416 00000
08050 PITTI  D   ,PIPT1                   17054 00000
08060 LTPTAB D   ,2416                   02416 00000
08070 LPTCON DS  ,2416                   02416 00000
08080 TDATA4 DS  ,3352                   03352 00000
08090 LTNPRC DS  ,2416                   02416 00000
08100 FM105 DS  ,2416                   02416 00000

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SYMBOL TABLE

TYPERR	Q2416	TDATA6	03372	TDATA5	03362	TANFDS	17635	TANDSA	17625
RETURN	Q2411	PI/180	18096	MLE48	18066	MCNITR	02406	ATANL1	17642
A	18106	ATANG	17458	FLE49	18136	FLMUL	17578	FL1	18046
FORM	07712	FTAN	17714	GOGO	17994	GOTAN	17506	IAT1	07731
INTO	17542	LMOD2	17362	MAB	17934	MULX	17890	M1	18116
RAD	17702	SETS5	17830	SYMB5	04315	SYMB6	04325	TANF	02416
TDATA	03333	TEMP	18126	TNUMB	18056	VERT	17786	X1	18076
Y1	18086								

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01010+      IBM 1620-1311 AD-APT.....
01020+      *****
01030+      INTRAN SUBPROGRAM LMOD2
01040+      THIS SUBPROGRAM HANDLES THREE LINE DEFINITIONS
01050+      L2=LINE/PT1,ATANGL,A,L1
01060+      L3=LINE/SLOPE,1,ATANGL,5
01070+      LINKAGE IS      BT MONITR,DSALBL+5
01080+                        B LMOD2
01090+
01100      DORG 17362
01110 LMOD2 CM FORM,27,8,      CHECK FOR FORM 27      17362 14 07712 0-027
01120      BE ATANG      17374 46 17458 01200
01130      CM FORM,109,8,      CHECK FOR FORM 109      17386 14 07712 0-109
01140      BE ATANL1      17398 46 17642 01200
01150      CM FORM,187,8,      CHECK FOR FORM 187      17410 14 07712 0-187
01160      BE MAB      17422 46 17934 01200
01170+      LOAD AND CALL TYPERR SUBPROGRAM
01180      BTM MONITR,03090,67      17434 17 02400 -3090
01190      BTM TYPERR,301,67      17446 17 02410 -0301
01200+      LINE/CIRCLE,ATANGL,ANGLE
02010 ATANG TFL X1,TDATA5,,      STORE X COORDINATE      17458 06 18076 03362
02020      TFL Y1,TDATA6,,      STORE Y COORDINATE      17470 06 18086 03372
02030      AM IAT1,28,10,      INCREMENT TO ANGLE      17482 11 07731 000K8
02040      TFL TNUMB,IAT1,11,      STORE THE ANGLE IN TNUMB      17494 06 18056 0773J
02050+      LOAD THE TANF SUBPROGRAM
02060 GOTAN BT MONITR,TANDSA+5,6      17506 27 02400 17630
02070      FMUL TNUMB,PI/180,,      CHANGE THE ANGLE TO RADIAN      17518 03 18056 18096
02080+      CALL THE TANF SUBPROGRAM
02090      BTM TANF,TNUMB,67      17530 17 02410 J8056
02100 INTO CM TNUMB,5,10      17542 14 18056 000-5
02110      BNN VERT,,      BRANCH IF SLOPE INFINITE BY DEFINITION      17554 46 17786 01300
02120      TFL SYMB5,TNUMB,,      STORE THE SLOPE IN SYMB5      17566 06 04315 18056
02130 FLMUL FMUL X1,SYMB5      17578 03 18076 04315
02140      FSUB Y1,X1      17590 02 18086 18076
02150      TFL SYMB6,Y1,,      SYMB6 = Y-SYMB5*X      17602 06 04325 18086
02160+      RETURN TO CALLING PROGRAM
02170      B7 RETURN,,6      17614 49 0241J 00000
02180 TANDSA DSA INTO      17625 00005 J7542
02190      DSC 5,02211      17626 00005
02200 TANFDS DSA FTAN+2,      17635 00005 J7738
03010      DSC 5,02211      17636 00005
03020+      LINE/POINT,ATANGL,LINE
03030 ATANL1 TFL X1,TDATA5,,      STORE X1 IN X1      17642 06 18076 03362
03040      TFL Y1,TDATA6,,      STORE Y1 IN Y1      17654 06 18086 03372

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03090 AM IAT1,28,10, INCREMENT TO ANGLE 17666 11 07731 000K8
03080 TFL A,IAT1,11, STORE THE ANGLE IN A 17678 06 18106 0773J
03070 TFL M1,TDATA+80,, STORE THE SLOPE OF THE LINE IN M1 17690 06 18116 03413
03080 RAD FMUL A,PI/180,, CHANGE THE ANGLE TO RADIANS 17702 03 18106 18096
03090* LOAD AND CALL THE TANF SUBPROGRAM
03100 FTAN BT MONITR,TANFDS+5,6 17714 27 02400 17640
03110 BTM TANF,A,67 17726 17 02410 J8106
03120 FMUL M1,A,, M1 = M1*A 17738 03 18116 18106
03130 TFL TEMP,FL1,, TEMP = -1 17750 06 18126 18046
03140 FSUB TEMP,M1,, TEST FOR SLOPE OF -1 17762 02 18126 18116
03150 BNZ SETS 17774 47 17830 01200
03160 VERT TFL SYMB5,FLE49,, SET SLOPE TO 1.0E48 17786 06 04315 18136
03170 TFL SYMB6,M1.E48 17798 06 04325 18066
03180 FMUL SYMB6,X1,, SYMB6=-1.0E48*X1 17810 03 04325 18076
03190 B7 RETURN,,6 17822 49 0241J 00000
03200 RETS TFL SYMB5,TDATA+80,, SYMB5 = SYMB5+SLOPE OF LINE 17834 06 04315 18106
04010 FADD SYMB5,TDATA+80,, SYMB5 = SYMB5+SLOPE OF LINE 17846 01 04315 03413
04020 FDIV SYMB5,TEMP,, SYMB5 = SYMB5/TEMP 17854 09 04315 18126
04030 CM SYMB5,5,10 17866 14 04315 000-5
04040 BNH VERT,, BRANCH IF SLOPE INFINITE BY DEFINITION 17878 46 17786 01300
04050 MULX FMUL X1,SYMB5,, X1 = X1*SYMB5 17890 03 18076 04315
04060 FSUB Y1,X1,, Y1 = Y1-X1 17902 02 18086 18076
04070 TFL SYMB6,Y1,, SYMB6 = Y1 17914 06 04325 18086
04080* RETURN TO CALLING PROGRAM
04090 B7 RETURN,,6 17926 49 0241J 00000
04100* LINE/SLOPE,SLOPE,INTERC,INTERCEPT
04110 MAB AM IAT1,14,10 17934 11 07731 000J4
04120 C IAT1,FLE49,6, CHECK FOR VERTICAL LINE 17946 24 0773J 18136
04130 BNH GOGO 17958 47 17994 01100
04140* LOAD AND CALL TYPERR SUBPROGRAM
04150 BTM MONITR,03090,67 17970 17 02400 -3090
04160 BTM TYPERR,326,67 17982 17 02410 -0326
04170 GOGO TFL SYMB5,IAT1,11, STORE THE SLOPE IN SYMB5 17994 06 04315 0773J
04180 AM IAT1,28,10 18006 11 07731 000K8
04190 TFL SYMB6,IAT1,11, STORE THE INTERCEPT IN SYMB6 18018 06 04325 0773J
04200* RETURN TO CALLING PROGRAM
05010 B7 RETURN,,6 18030 49 0241J 00000
05020 DC 8,10000000 18044 00008
05030 FL1 DC 2,1 18046 00002
05040 TNUMB DS 10 18056 00010
05050 DC 8,-10000000 18064 00008
05060 M1.E48 DC 2,49 18066 00002
05070 X1 DS 10 18076 00010
05080 Y1 DS 10 18086 00010
05090 DC 8,17453292 18094 00008
05100 PI/180 DC 2,-1 18096 00002
05110 A DS 10 18106 00010
05120 M1 DS 10 18116 00010
05130 TEMP DS 10 18126 00010
05140 DC 8,10000000 18134 00008
05150 FLE49 DC 2,49 18136 00002
05160 DS 24,, 18160 00024
05170* FILL LAST SECTOR
COMMON AREA WITH MAINLINE

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05180 IAT1 DS ,07731 07731 00000
05190 SYMB5 DS ,04315 04315 00000
05200 SYMB6 DS ,04325 04325 00000
06010 RETURN DS ,02411 02411 00000
06020 TDATA DS ,03333 03333 00000
06030 TDATA5 DS ,03362 03362 00000
06040 TDATA6 DS ,03372 03372 00000
06050 MONITR DS ,02406 02406 00000
06060 TYPERR DS ,02416 02416 00000
06070 TANF DS ,02416 02416 00000
06080 FORM DS ,07712 07712 00000
06090 DEND LMOD2 17362

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SYMBOL TABLE

TYPERR 02416	TDATA6 03372	TDATA5 03362	RETURN 02411	PIPALI 17410
MONITR 02406	HORIZ2 18258	FLZERO 07680	ADD 18102	CHKA 18326
CHKXS 18122	DISTD 17766	ERR 18234	ER310 17838	FLE49 18460
FL1 18410	FORM 07712	HORIZ 17734	IAT1 07731	LMOD3 17362
M1 18430	PIPL1 17526	SCALC 17934	SET55 17658	SORTF 02416
SUBT 18158	SYMB5 04315	SYMB6 04325	TDATA 03333	TEMP 18420
VERT 17714	VERT2 18178	X2 18390	Y2 18400	

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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030*      INTRAN SUBPROGRAM LMOD3
01040*      THIS PROGRAM HANDLES 3 LINE DEFINITIONS
01050*      L1=LINE/PT1,PARLEL,L2
01060*      L1=LINE/PARLEL,L2,XLARGE,D
01070*      L3=LINE/PT1,PERPTD,L1
01080*      LINKAGE IS      BT MONITR,DSALBL+5
01090*      B      LMOD3
01100*
01110      DORG 17362
01120 LMOD3 CM FORM,155,8,      CHECK FOR FORM 155      17362 14 07712 0-155
01130      BE DISTD
01140      CM IAT1,17,610,      CHECK FOR PARLEL MODIFIER      17374 46 17766 01200
01150      BNE PIPL1 .
01160*      LINE/POINT,PARLEL,LINE
01170 PIPALI TFL X2,TDATA5,,      STORE X COORD OF POINT IN X2      17410 06 18390 03362
01180      TFL Y2,TDATA6,,      STORE Y COORD OF POINT IN Y2      17422 06 18400 03372
01190      TFL SYMB5,TDATA+80,,      STORE SLOPE OF LINE IN SYMB5      17434 06 04315 03413
01200      CM SYMB5,49,10
02010      BN **24,,      BRANCH IF LINE IS NOT VERTICAL      17446 14 04315 000M9
02020      FSUB Y2,Y2,,      SET Y2=0.0      17458 47 17482 01300
02030      FMUL X2,SYMB5
02040      FSUB Y2,X2
02050      TFL SYMB6,Y2,,      SYMB6 = Y2-SYMB5*X2      17470 02 18400 18400
02060*      RETURN TO CALLING PROGRAM
02070      B7 RETURN,,6
02080*      LINE/POINT,PERPTD,LINE
02090 PIPLI TFL X2,TDATA5,,      STORE X COORD OF POINT IN X2      17482 03 18390 04315
02100      TFL Y2,TDATA6,,      STORE Y COORD OF POINT IN Y2      17494 02 18400 18390
02110      TFL TEMP,TDATA+80,,      STORE SLOPE OF LINE IN TEMP      17506 06 04325 18400
02120      FSUB TEMP,FLZERO,,      CHECK FOR ZERO SLOPE
02130      BZ HORIZ
02140      TFL TEMP,TDATA+80,,      RESTORE SLOPE OF LINE IN TEMP      17518 49 0241J 00000
02150      FSUB TEMP,FLE49,,      CHECK FOR VERTICAL LINE
02160      BZ VERT
02170      TFL TEMP,FL1,,      TEMP = 1
02180      SF TEMP-2,,      TEMP = -1

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02190      FDIV TEMP,TDATA+80,,      TEMP = -1/SLOPE      17550 06 18420 03413
02200 SET55 TFL SYMB5,TEMP,,      SYMB5 = TEMP      17658 06 04315 18420
03010      FMUL TEMP,X2
03020      FSUB Y2,TEMP
03030      TFL SYMB6,Y2,,      SYMB6 = Y2-SYMB5*X2      17670 03 18420 18390
03040*      RETURN TO CALLING PROGRAM
03050      B7 RETURN,,6
03060*      LINE IS PERPTD VERTICAL LINE... SLOPE=0
03070 VERT TFL TEMP,FLZERO
03080      B7 SET55
03090*      LINE IS PERPTD HORIZONTAL LINE
03100*      SLOPE = 1*10**48
03110 HORIZ TFL TEMP,FLE49
03120      FSUB Y2,Y2,,      SET Y2=0.0      17706 49 0241J 00000
03130      B7 SET55
03140*      LINE/PARLEL,LINE,MODIFIER,DISTANCE
03150 DISTD TFL SYMB5,TDATA5
03160      TFL SYMB6,TDATA6,,      SYMB6 = INTERCEPT OF LINE      17758 49 17658 00000
03170      AM IAT1,42,10,      INCREMENT TO DISTANCE      17766 06 04315 03362
03180      TF **35,IAT1
03190      SM **23,2,10
03200      BNF **36,,      BRANCH IF D IS NON-NEGATIVE      17778 06 04325 03372
04010*      17790 11 07731 000M2
04020 ER310 BTM MONITR,03090,67,      CALL TYPERR SUBPROGRAM VIA MONITR      17802 26 17837 07731
04030      BTM TYPERR,310,69,      WRITE ERROR MESSAGE... EXIT      17814 12 17837 000-2
04040      TFL X2,TDATA5,,      STORE SLOPE OF LINE IN X2      17826 44 17862 00000
04050      FSUB X2,FLE49,,      CHECK FOR VERTICAL LINE
04060      BZ VERT2
04070      TFL X2,TDATA5,,      RESTORE SLOPE IN X2
04080      FSUB X2,FLZERO,,      CHECK FOR HORIZONTAL LINE
04090      BZ HORIZ2
04100 SCALC TFL X2,TDATA5,,      RESTORE SLOPE IN X2
04110      FMUL X2,X2,,      X2 = X2**2
04120      FADD X2,FL1,,      X2 = X2+1
04130*      LOAD AND CALL SORTF SUBPROGRAM
04140      BTM MONITR,02000,67
04150      BTM SORTF,X2,67,,      X2 = SORTF(X2)
04160      FMUL X2,IAT1,11,      X2 = X2*D
04170      SM IAT1,14,10,      DECREMENT TO MODIFIER
04180      CM IAT1,35,610,      CHECK FOR YLARGE
04190      BE ADD
04200      CM IAT1,36,610,      CHECK FOR YSMALL
05010      BE SUBT
05020      CM IAT1,31,610,      CHECK FOR XLARGE
05030      BNE CHKXS
05040      BNF SUBT,TDATA5-2,,      CHECK FOR NEGATIVE SLOPE
05050 ADD      FADD SYMB6,X2,,      SYMB6 = SYMB6*X2
05060*      RETURN TO CALLING PROGRAM
05070      B7 RETURN,,6
05080 CHKXS CM IAT1,32,610,      CHECK FOR XSMALL
05090      BNE ERR
05100      WNF ADD,TDATA5-2,,      CHECK FOR NEGATIVE SLOPE

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05110	SUBT	FSUB	SYMB6,X2,,	SYMB6 = SYMB6-X2	16146 44 18102 03360
05120*				RETURN TO CALLING PROGRAM	18158 02 04325 18390
05130	B7	RETURN,,6			18170 49 0241J 00000
05140	VERT2	SM	IAT1,14,10,	DECREMENT TO MODIFIER	18178 12 07731 000J4
05150	CM	IAT1,33,610,			18190 14 0773J 000L3
05160	BNL	ERR			18202 46 18234 01300
05170	AM	IAT1,14,10,		INCREMENT TO DISTANCE	18214 11 07731 000J4
05180	B7	SCALC			18226 49 17934 00000
05190*				LOAD AND CALL TYPERR SUBPROGRAM	
05200	ERR	BTM	MONITR,03090,67		18234 17 02400 -3090
06010	BTM	TYPERR,307,67			18246 17 02410 -0307
06020	MONI22	SM	IAT1,14,10,	DECREMENT TO MODIFIER	18258 12 07731 000J4
06030	CM	IAT1,33,610,		CHECK FOR YLARGE	18270 14 0773J 000L5
06040	BNE	CHKA			18282 47 18326 01200
06050	AM	IAT1,14,10,		INCREMENT TO DISTANCE	18294 11 07731 000J4
06060	FADD	SYMB6,IAT1,11,		SYMB6 = SYMB6+D	18306 01 04325 0773J
06070*				RETURN TO CALLING PROGRAM	
06080	B7	RETURN,,6			18318 49 0241J 00000
06090	CHKA	CM	IAT1,36,610,	CHECK FOR YSMALL	18326 14 0773J 000L6
06100	BNE	ERR			18338 47 18234 01200
06110	AM	IAT1,14,10,		INCREMENT TO DISTANCE	18350 11 07731 000J4
06120	FSUB	SYMB6,IAT1,11,		SYMB6 = SYMB6+D	18362 02 04325 0773J
06130*				RETURN TO CALLING PROGRAM	
06140	B7	RETURN,,6			18374 49 0241J 00000
06150	X2	DS	10		18390 00010
06160	Y2	DS	10		18400 00010
06170	DC	8,10000000			18408 00008
06180	FL1	DC	2,1		18410 00002
06190	TEMP	DS	10		18420 00010
06200	M1	DS	10		18430 00010
07010	DS	20,,			18450 00020
07020*				FILL LAST SECTOR COMMON AREA WITH MAINLINE	
07030	MONITR	DS	,02406		02406 00000
07040	RETURN	DS	,02411		02411 00000
07050	TYPERR	DS	,02416		02416 00000
07060	FORM	DS	,07712		07712 00000
07070	IAT1	DS	,07731		07731 00000
07080	TDATA5	DS	,03362		03362 00000
07090	TDATA6	DS	,03372		03372 00000
07100	TDATA	DS	,03333		03333 00000
07110	SYMB5	DS	,04315		04315 00000
07120	SYMB6	DS	,04325		04325 00000
07130	DC	8,10000000			18458 00008
07140	FLE49	DC	2,49		18460 00002
07150	FLZER0	DS	,7680		07680 00000
07160	SQRTF	DS	,02416		02416 00000
07170	DEND	LMOD3			17362

SYMBOL TABLE

ZUNEEK	18058	TYPERR	02416	SELECT	18310	RETURN	02411	PTSLCT	02416
MONITR	02406	LCNON1	02416	AMN2HG	00028	AMINRB	00038	A	18601
ARG	18505	B	18611	B=0.0	18166	BNOTZ	18378	C	18621
CODE	18449	CON1	00079	DSA1	18403	DSA2	18455	ER301	17422
FM105	17362	FOFYF	18506	H	03413	HB	18631	IAT1	07731
K	03423	KSQ	00069	LEFT	17458	NOT2	18482	R	03433
RADCL	00079	RIGHT	17458	ROOT	00079	RSQ	00069	SMA	00048
SMB	00038	SMB	00028	SQRTF	02416	SYMB5	04315	SYMB6	04325
TANTO	17518	TEMP	00069	WERM	17446	XM	18631	XM1	18631
XM2	18651	XN	03362	YM	18641	YM1	18641	YM2	18661
YN	03372								

01010* IBM 1620-1311 AD-APT DEFPRE SUBPROGRAM FOR DETERMINING
 01020* A LINE DEFINED BY A STATEMENT OF THE FORM.... RCS
 01030*
 01040* LINI=LINE/PT1,RIGHT,TANTO,CIRCL1
 01050* LINI=LINE/PT1,LEFT,TANTO,CIRCL1
 01060*
 01070* *NAME FM105... NON-ERASABLE DEFPRE SUBPROGRAM
 01080* *ID NUMBER 0333*DELDIM
 01090* *STORE CORE IMAGE
 01100* LINKAGE - B FM105,,6
 01110*
 01120* DORG 17362 17362
 01130* SUBPROGRAM ENTRY
 01140 FM105 AM IAT1,14,10 17362 11 07731 000J4
 01150 CM IAT1,24,610 17374 14 0773J 000K4
 01160 BE RIGHT,,, BRANCH IF MODIFIER IS RIGHT 17386 46 17458 01200
 01170*
 01180 CM IAT1,8,610 17398 14 0773J 000-8
 01190 BE LEFT,,, BRANCH IF MODIFIER IS LEFT 17410 46 17458 01200
 01200*
 02010 ER301 TFM WERM+11,301,9, SET ERROR NO.=301 17422 16 17457 00L01
 02020 BTM MONITR,03090,67, CALL TYPERR SUBPROGRAM VIA MONITR 17434 17 02400 -3090
 02030 WERM BTM TYPERR,,6, WRITE ERROR MESSAGE 17446 17 02410 00000
 02040 RIGHT SM IAT1,1,10 17458 12 07731 000-1
 02050 TD CODE,IAT1,11, SET MODIFIER CODE FOR PTSLCT SUBPROGRAM 17470 25 18449 0773J
 02060 AM IAT1,1+14,10 17482 11 07731 000J5
 02070 CM IAT1,27,610 17494 14 0773J 000K7
 02080 BNE ER301,,, BRANCH IF MODIFIER IS NOT TANTO 17506 47 17422 01200
 02090*
 02100 TANTO TFM WERM+11,313,9, SET ERROR NO.=313 17518 16 17457 00L13
 02110 BTM MONITR,02000,67, CALL SQRTF SUBROUTINE VIA MONITR 17530 17 02400 -2000
 02120 TFL COM1,H, H=2 17542 06 00079 03413
 02130 FMUL COM1,H,, H=2 17554 03 00079 03413
 02140 TFL KSQ,K, K=2 17566 06 00069 03423
 02150 FMUL RSQ,K,, H=2 17578 03 00069 03423
 02160 FADD COM1,KSQ,, H=2+K=2 17590 01 00079 00069
 02170 TFL RSQ,R, R=2 17602 06 00069 03433
 02180 FMUL RSQ,R,, R=2 17614 03 00069 03433

08070	FDIV	ARG,8,6	18566	09	1850N	18611
08080	BV	**12,...	TURN OFF OVERFLOW INDICATOR			
08090	BB	...	18578	46	18590	01400
08100	DORG	*-9	EXIT			
08110*			18590	42	00000	00000
08120	A	DC 10,0	18592			
08130	B	DC 10,0	18601	00010		
08140	C	DC 10,0	18611	00010		
08150	XM1	DC 10,0	18621	00010		
08160	YM1	DC 10,0	18631	00010		
08170	XM2	DC 10,0	18641	00010		
08180	YM2	DC 10,0	18651	00010		
08190*			18661	00010		
08200	IAT1	DS ,7731	07731	00000		
09010	LEFT	DS ,RIGHT	17458	00000		
09020	MONTR	DS ,2406	02406	00000		
09030	TYPERR	DS ,2416	02416	00000		
09040	CON1	DS 10,79	00079	00010		
09050	XN	DS ,3333+29	03362	00000		
09060	YN	DS ,XN+10	03372	00000		
09070	H	DS ,YN+12+29	03413	00000		
09080	K	DS ,H+10	03423	00000		
09090	R	DS ,K+10	03433	00000		
09100	KSQ	DS 10,CON1-10	00069	00010		
09110	RSQ	DS ,KSQ	00069	00000		
09120	TEMP	DS ,RSQ	00069	00000		
09130	SMA	DS 10,48	00048	00010		
09140	SMB	DS 10,38	00038	00010		
09150	SMC	DS 10,28	00028	00010		
09160	HB	DS ,XM1	18631	00000		
09170	AMINHB	DS ,SMB	00038	00000		
09180	AMN2HB	DS ,SMC	00028	00000		
09190	RADCL	DS ,CON1	00079	00000		
09200	RODT	DS ,RADCL	00079	00000		
10010	PTSLECT	DS ,2416	02416	00000		
10020	LCNON1	DS ,2416	02416	00000		
10030	SQRTF	DS ,2416	02416	00000		
10040	RETURN	DS ,2411	02411	00000		
10050	SYMB5	DS ,4315	04315	00000		
10060	SYMB6	DS ,SYMB5+10	04325	00000		
10070	XM	DS ,XM1	18631	00000		
10080	YM	DS ,YM1	18641	00000		
10090	OEND	FM105	17362			

TYPERR 02416	TDATA6 03372	TDATA5 03362	TDATA4 03352	RETURN 02411
MONITR 02406	MDFONE 16509	LINKDT 16502	FM2665 16598	ERRDR3 16554
ERRDR1 16530	DSADST 16467	CHECK 16742	DIST 16497	DISTF 02416
DSA1 16514	DSA2 16524	DSTCK 16597	EQUAL 02416	EXIT 16862
IAT1 07731	SAME 16874	TOLER 16587	UNEQL 02416	

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01010*
01020*   LINE DEFPRE FORM 2665(TANGENT TO TWO CIRCLES)
01030*   LINKAGE - B   FM2665
01040*   FM2665 IS EQUIVALENT TO -2416
01050*   CALLS TYPERR, DISTF, UNEQL, AND EQUAL
01060*
01070     DORG 16462           16462
01080     DC 25,0             16486 00025
01090     DORG 0-24+5-11     16476
01100     NOP TDATA6+51,DIST 16476 41 03423 16497
01110     DORG 0-21          16466
01120     NOP TDATA6,TDATA5+51 16466 41 03372 03413
01130     DORG 0-14          16463
01140     DSADST DSA TDATA5   16467 00005 -3362
01150     DORG ++5-5-4       16488
01160     DIST DC 10,0        16497 00010
01170     LINKDT DSA CHECK    16502 00005 J6742
01180     DSC 5,2101         16503 00005
01190     MDFONE DC 2,0       16509 00002
01200     DSA1 DSA EXIT       16514 00005 J6862
02010     DSC 5,03351         16515 00005
02020     DSA2 DSA EXIT       16524 00005 J6862
02030     DSC 5,03361         16525 00005
02040*
02050     ERRDR1 BTM MONITR,03090,67 16530 17 02400 -3090
02060     BTM TYPERR,301,67, INCORRECT STATEMENT 16542 17 02410 -0301
02070     ERRDR3 BTM MONITR,03090,67 16554 17 02400 -3090
02080     BTM TYPERR,315,67, CONCENTRIC CIRCLES 16566 17 02410 -0315
02090     DC 8,10000000
02100     TOLER DC 2,-2
02110     DSTCK DS 10
02120*
02130*   PROGRAM ENTRY
02140     FM2665 CM TDATA4,2,10, CHECK FOR FIRST CIRCLE 16598 14 03352 000-2
02150     BNE ERROR1 16610 47 16530 01200
02160     CM TDATA4+51,2,10, CHECK FOR SECOND CIRCLE 16622 14 03403 000-2
02170     BNE ERROR1 16634 47 16530 01200
02180     AM IAT1,26,10 16646 11 07731 000K6
02190     CM IAT1,27,610, CHECK FOR FIRST TANTO MODIFIER 16658 14 0773J 000K7
02200     BNE ERROR1 16670 47 16530 01200
03010     AM IAT1,42,, 16682 11 07731 -0042
03020     CM IAT1,27,610, CHECK FOR SECOND TANTO MODIFIER 16694 14 0773J 000K7
03030     BNE ERROR1 16706 47 16530 01200
03040     BT MONITR,LINKDT+5,6, 16718 27 02400 16507
03050     BT DISTF,DSADST+20,6, OBTAIN DISTANCE BETWEEN CIRCLE CENTERS 16730 27 02410 16487
03060     CHECK TFL DSTCK,DIST,, CHECK FOR CONCENTRIC CIRCLES 16742 06 16597 16497
03070     FSUB DSTCK,TOLER 16754 02 16597 16587
03080     BNH ERRDR3 16766 47 16554 01100
03090     SH IAT1,56 16778 12 07731 -0056
03100     TF MDFONE,IAT1,11, STORE FIRST MODIFIER 16790 26 16509 0773J
03110     AM IAT1,42 16802 11 07731 -0042
03120     C IAT1,MDFONE,6, ARE MODIFIERS SAME OR DIFFERENT 16814 24 0773J 16509
03130     BE SAME 16826 46 16874 01200
03140     BT MONITR,DSA1+5,6, 16838 27 02400 16519
03150     BTM UNEQL,DIST,6, GET 615 TO PROCESS STATEMENT 16850 17 02410 16497
03160     EXIT B RETURN,,6, MODIFIERS. 16862 49 0241J 00000
03170     SAME BT MONITR,DSA2+5,6, 16874 27 02400 16529
03180     BTM EQUAL,DIST,6 16886 17 02410 16497
03190*
03200     DS 64,, FILL LAST SECTOR 16961 00064
04010*   THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM
04020     IAT1 DS 0,7731 07731 00000
04030     TDATA4 DS 0,3352 03352 00000
04040     TDATA5 DS 0,3362 03362 00000
04050     TDATA6 DS 0,3372 03372 00000
04060     MONITR DS 0,2406 02406 00000
04070     RETURN DS 0,2411 02411 00000
04080     TYPERR DS 0,2416 02416 00000
04090     DISTF DS 0,2416 02416 00000
04100     UNEQL DS 0,2416 02416 00000
04110     EQUAL DS 0,2416 02416 00000
04120*
04130     DEND FM2665 16598

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SYMBOL TABLE

TYPERR 02416	TDATA7 03382	TDATA6 03372	TDATA5 03362	RETURN 02411
RCDMRK 17761	PTSLOT 02416	MONTR 02406	MODIF1 17488	LINKCR 17755
LCNON1 02416	INTERC 17660	FILSYM 17596	ERRR4 17810	ERRR2 17786
ERRR1 17762	DSASLT 17019	DSALN1 17071	DSACIR 16967	CIRCIR 02416
CHECK 17428	CODE1 17065	DIST 17103	GETPT 17548	IAT1 07731
L 17660	RIGHT 17834	S 17750	SLOPE 17750	SQRTF 02416
SYMB1 04289	SYMB5 04315	SYMB6 04325	UNEQL 17104	XA 17670
XB 17690	XP 17730	XPICK 17710	YA 17680	YB 17700
YP 17740	YPICK 17720			

01010*
 01020* LINE DEFPRE FORM 2665 SUBPROGRAM(WHEN MODIFIERS ARE UNEQUAL)
 01030* LINKAGE - BT UNEQL,DIST,6
 01040* UNEQL IS EQUIVALENT TO -2416
 01050* CALLS TYPERR, SQRTF, CIRCIR, PTSLOT, AND LCNON1
 01060*
 01070 DORG 16962 16962
 01080*
 01090 DC 50,0 17011 00050
 01100 DORG *-49+5*10-6 17006
 01110 NOP YB,0 17006 41 17700 00000
 01120 DORG *-21 16996
 01130 NOP YA, XB 16996 41 17680 17690
 01140 DORG *-21 16986
 01150 NOP L, XA 16986 41 17660 17670
 01160 DORG *-21 16976
 01170 NOP XP, YP 16976 41 17730 17740
 01180 DORG *-21 16966
 01190 NOP TDATA6+51, TDATA7+51 16966 41 03423 03433
 01200 DORG *-14 16963
 02010 DSACIR DSA TDATA5+51 16967 00005 -3413
 02020 DORG *+5*10-4+5*10-6 17057
 02030 NOP YPICK,0 17058 41 17720 00000
 02040 DORG *-21 17048
 02050 NOP TDATA6+51, XPICK 17048 41 03423 17710
 02060 DORG *-21 17038
 02070 NOP YP, TDATA5+51 17038 41 17740 03413
 02080 DORG *-21 17028
 02090 NOP YB, XP 17028 41 17700 17730
 02100 DORG *-21 17018
 02110 NOP YA, XB 17018 41 17680 17690
 02120 DORG *-14 17015
 02130 DSASLT DSA XA 17019 00005 J7670
 02140 DORG *+5*10-4 17065
 02150 CODE1 OSC 1,0 17065 00001
 02160 DORG *+5*6-6 17089
 02170 NOP INTERC,0 17090 41 17660 00000
 02180 DORG *-21 17080
 02190 NOP YPICK, SLOPE 17080 41 17720 17750
 02200 DORG *-21 17070
 03010 NOP YP, XPICK 17070 41 17740 17710
 03020 DORG *-14 17067
 03030 DSALN1 DSA XP 17071 00005 J7730
 03040 DORG *+5*6-4 17097
 03050*
 03060* PROGRAM ENTRY

03070 DS 2 17098 00002
 03080 DIST DC 5,0 17103 00005
 03090 UNEQL TFL L, TDATA7,, PUT R1 IN L 17104 06 17660 03382
 03100 FADD L, TDATA7+51,, L=R2+R1 17116 01 17660 03433
 03110 TFL S, TDATA7 17128 06 17750 03382
 03120 FMUL S, DIST, 11, S=R1(DIST) 17140 03 17750 1710L
 03130 FOIV S, L,, S=R7(DIST)/R2+R1 17152 09 17750 17660
 03140 BV ERROR4 17164 46 17810 01400
 03150 TFL XP, TDATA5+51 17176 06 17730 03413
 03160 FSUB XP, TDATA5,, XP=(H2-H1) 17188 02 17730 03362
 03170 FMUL XP, S 17200 03 17730 17750
 03180 FOIV XP, DIST, 11, XP=(H2-H1)/DIST 17212 09 17730 1710L
 03190 FADD XP, TDATA5,, XP=H1+(H2-H1)/DIST 17224 01 17730 03362
 03200 TFL YP, TDATA6+51 17236 06 17740 03423
 04010 FSUB YP, TDATA6,, XP=(K2-K1) 17248 02 17740 03372
 04020 FMUL YP, S 17260 03 17740 17750
 04030 FOIV YP, DIST, 11 17272 09 17740 1710L
 04040 FADD YP, TDATA6,, Y=K1+(K2-K1)/DIST 17284 01 17740 03372
 04050 TFL L, DIST, 11 17296 06 17660 1710L
 04060 FSUB L, S,, L=SPRIME=DIST-S 17308 02 17660 17750
 04070 FMUL L, L,, L=SPRIME**2 17320 03 17660 17660
 04080 TFL S, TDATA7+51 17332 06 17750 03433
 04090 FMUL S, S,, S=R2**2 17344 03 17750 17750
 04100 FSUB L, S,, L=SPRIME**2-R2**2 17356 02 17660 17750
 04110 BNH ERROR2 17368 47 17786 01100
 04120 BTM MONTR, 2000, 67 17380 17 02400 -2000
 04130 BTM SQRTF, L, 67, L=SQRTF(SPRIME**2-R2**2) 17392 17 02410 J7660
 04140 BT MONTR, LINKCR+5, 6 17404 27 02400 17760
 04150 BT CIRCIR, DSACIR+45, 6, GET POINT A AND B 17416 27 02410 17012
 04160 CHECK BNR ERROR4, 79 17428 45 17810 00079
 04170 CM IAT1, 24, 610, CHECK FOR RIGHT MODIFIER 17440 14 0773J 000K4
 04180 BE RIGHT 17452 46 17834 01200
 04190 CM IAT1, 8, 610, CHECK FOR LEFT MODIFIER 17464 14 0773J 000-8
 04200 BNE ERROR1 17476 47 17762 01200
 05010 MODIF1 SM IAT1, 42, 10, 17488 12 0773J 000M2
 05020 CM IAT1, 24, 610, 17500 14 0773J 000K4
 05030 BE GETPT 17512 46 17548 01200
 05040 CM IAT1, 8, 610, 17524 14 0773J 000-8
 05050 BNE ERROR1 17536 47 17762 01200
 05060 GETPT BTM MONTR, 03600, 67 17548 17 02400 -3600
 05070 BT PTSLOT, DSASLT+46, 6, PICK POINT ON CIRCLE TWO 17560 27 02410 17065
 05080 BTM MONTR, 2120, 67 17572 17 02400 -2120
 05090 BT LCNON1, DSALN1+25, 6, GET SLOPE AND INTERCEPT OF DESIRED LINE 17584 27 02410 17096
 05100 FILSYM TFM SYMB1, 41, 8, LINE 17596 16 04289 0-041
 05110 TFL SYMB5, SLOPE,, FILL IN SYMBOL TABLE 17608 06 04315 17750
 05120 TFL SYMB6, INTERC 17620 06 04325 17660
 05130 TD SYMB6+1, RCDMRK 17632 25 04326 17761
 05140 BT RETURN,, 17644 49 0241J 00000
 05150*
 05160 L DC 10,0 17660 00010
 05170 XA DC 10,0 17670 00010
 05180 YA DC 10,0 17680 00010
 05190 XB DC 10,0 17690 00010
 05200 YB DC 10,0 17700 00010
 06010 XPICK DC 10,0 17710 00010

06020	YPICK	DC	10,0		17720	00010
06030	XP	DC	10,0		17730	00010
06040	YP	DC	10,0		17740	00010
06050	S	DC	10,0		17750	00010
06060	SLOPE	DS	0,S		17750	00000
06070	INTERC	DS	0,L		17660	00000
06080	LNCKR	DSA	CHECK		17755	00005 J7428
06090	DSC		5,2071		17756	00005
06100	RCDMRK	DC	1,,		17761	00001
06110*						
06120	ERROR1	BTM	MONITR,03090,67		17762	17 02400 -3090
06130	BTM	TYPERR,301,67,		INCORRECT STATEMENT	17774	17 02410 -0301
06140	ERROR2	BTM	MONITR,03090,67		17786	17 02400 -3090
06150	BTM	TYPERR,314,67,		GIVEN CIRCLES INTERSECT		
					17798	17 02410 -0314
06160	ERROR4	BTM	MONITR,03090,67		17810	17 02400 -3090
06170	BTM	TYPERR,316,67,		ERRONEOUS DATA	17822	17 02410 -0316
06180	RIGHT	TDM	CODE1,1,,			
				PUT DIGIT ONE IN CODE1 FOR RIGHT		
					17834	15 17065 00001
06190	B7	MODIFL,.,.,		MODIFIER.	17846	49 17488 00000
06200*						
07010	DS	8,,		FILL LAST SECTOR	17860	00008
07020*	THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM					
07030	IAT1	DS	0,7731		07731	00000
07040	SYMB1	DS	0,4289		04289	00000
07050	SYMB5	DS	0,4315		04315	00000
07060	SYMB6	DS	0,4325		04325	00000
07070	TDATA5	DS	0,3362		03362	00000
07080	TDATA6	DS	0,3372		03372	00000
07090	TDATA7	DS	0,3382		03382	00000
07100	MONITR	DS	0,2406		02406	00000
07110	RETURN	DS	0,2411		02411	00000
07120	TYPERR	DS	0,2416		02416	00000
07130	SQRTF	DS	0,2416		02416	00000
07140	CIRCIR	DS	0,2416		02416	00000
07150	PTSLECT	DS	0,2416		02416	00000
07160	LCNON1	DS	0,2416		02416	00000
07170	DEND	UNEQL			17104	

SYMBOL TABLE

TYPERR	02416	TKRGHT	17912	TDATA7	03382	TDATA6	03372	TDATA5	03362
SLT2ND	17642	SLTPT2	17117	SLTPT1	17438	RETURN	02411	RCDMRK	17941
PTSLECT	02416	MONITR	02406	LNCKR2	17906	LINKLC	17935	LINCIR	02416
LCNON1	02416	INTERC	17951	GETPT2	17726	GETPT1	17498	FILSYM	17774
ERROR4	17878	ERROR2	17854	ERROR1	17830	DSASLT	17019	DSALR2	17201
DSALN2	17169	DSALNC	17071	DSACIR	16967	CIRCIR	02416	BR1	18041
CODE1	17065	CODE2	17163	DIST	17233	EQUAL	17234	IAT1	07731
L	17951	MR2	17961	S	18051	SLOPE	17961	SQRTF	02416
SYMB1	04289	SYMB5	04315	SYMB6	04325	XA	17961	XB	17981
XPICK	18001	XPIC1	18021	XPIC2	18001	YA	17971	YB	17991
YPICK	18011	YPIC1	18031	YPIC2	18011				

01010*
01020* LINE DEFPRE FORM 2665 SUBPROGRAM(WHEN MODIFIERS ARE EQUAL)
01030* LINKAGE - BT EQUAL,DIST,6
01040* EQUAL IS EQUIVALENT TO -2416
01050* CALLS TYPERR, SQRTF, CIRCIR, PTSLECT, LCNON1, AND LINCIR.
01060*
01070 DORG 16962 16962
01080 DC 50,0 17011 00050
01090 DORG 0-49+5*10-6 17006
01100 NOP YB,0 17006 41 17991 00000
01110 DORG 0-21 16996
01120 NOP YA,XB 16996 41 17971 17981
01130 DORG 0-21 16986
01140 NOP L,XA 16986 41 17951 17961
01150 DORG 0-21 16976
01160 NOP TDATA5,TDATA6 16976 41 03362 03372
01170 DORG 0-21 16966
01180 NOP TDATA6+51,TDATA7+51 16966 41 03423 03433
01190 DORG 0-14 16963
01200 DSACIR DSA TDATA5+51 16967 00005 -3413
02010 DORG 0+5*10-4+5*10-6 17057
02020 NOP YPICK,0 17058 41 18011 00000
02030 DORG 0-21 17048
02040 NOP TDATA6+51,XPICK 17048 41 03423 18001
02050 DORG 0-21 17038
02060 NOP TDATA6,TDATA5+51 17038 41 03372 03413
02070 DORG 0-21 17028
02080 NOP YB,TDATAS 17028 41 17991 03362
02090 DORG 0-21 17018
02100 NOP YA,XB 17018 41 17971 17981
02110 DORG 0-14 17015
02120 DSASLT DSA XA 17019 00005 J7961
02130 DORG 0+5*10-4 17065
02140 CODE1 DSC 1,0 17065 00001
02150 DORG 0+5*9-11 17099
02160 NOP XB,YB 17100 41 17981 17991
02170 DORG 0-21 17090
02180 NOP XA,YA 17090 41 17961 17971
02190 DORG 0-21 17080
02200 NOP TDATA6,TDATA7 17080 41 03372 03382
03010 DORG 0-21 17070
03020 DORG BR1,TDATAS 17070 41 18041 03362
03030 DORG 0-14 17067
03040 DSALNC DSA MR2 17071 00005 J7961

03050	DDRG	++5*9-4+5*10-6	17156		
03060	NOP	YPICK,0	17156	41	18011 00000
03070	DDRG	--21	17146		
03080	NOP	TDATA6,XPICK	17146	41	03372 18001
03090	DDRG	--21	17136		
03100	NOP	YPICK,TDATAS	17136	41	18011 03362
03110	DDRG	--21	17126		
03120	NOP	YB,XPICK	17126	41	17991 18001
03130	DDRG	--21	17116		
03140	NOP	YA,XB	17116	41	17971 17981
03150	DDRG	--14	17113		
03160	SLTPT2	DSA KA	17117	00005	J7961
03170	DDRG	++5*10-4	17163		
03180	CODE2	DSC 1,0	17163	00001	
03190	DDRG	++5*6-6	17187		
03200	NOP	INTERC,0	17188	41	17991 00000
04010	DDRG	--21	17178		
04020	NOP	YPIC2,SLOPE	17178	41	18011 17961
04030	DDRG	--21	17168		
04040	NOP	YPIC1,XPIC2	17168	41	18031 18001
04050	DDRG	--14	17165		
04060	DSALN2	DSA XPIC1	17169	00005	J8021
04070	DDRG	++5*6-4+5*6-6	17219		
04080	NOP	INTERC,0	17220	41	17951 00000
04090	DDRG	--21	17210		
04100	NOP	YPICK,SLOPE	17210	41	18011 17961
04110	DDRG	--21	17200		
04120	NOP	TDATA6+51,XPICK	17200	41	03423 18001
04130	DDRG	--14	17197		
04140	DSALR2	DSA TDATA5+51	17201	00005	-3413
04150	DDRG	++5*6-4	17227		

04160*					
04170*		PROGRAM ENTRY			
04180*		SOLUTION FOLLOWS FOR WHEN MODIFIERS ARE EQUAL			
04190	DS	Z	17228	00002	
04200	DIST	DC 5,0	17233	00005	
05010	EQUAL	TFL S,DIST,11	17234	06	18051 1723L
05020		TFL L,TDATA7+51	17246	06	17951 03433
05030	FSUB	L,TDATA7,, L=R2-R1	17258	02	17951 03382
05040	FMUL	L,L,, L=(R2-R1)**2	17270	03	17951 17951
05050	FMUL	S,S	17282	03	18051 18051
05060	FSUB	S,L,, S=DIST**2-(R2-R1)**2	17294	02	18051 17951
05070	BNM	ERROR2,,, GEOMETRIC AMBIGUITY	17306	47	17854 01100
05080	BTM	MONITR,2000,67	17318	17	02400 -2000
05090	BTM	SQRTF,S,67, S=SQRTF(DIST**2-(R2-R1)**2)	17330	17	02410 J8051
05100	FMUL	S,S	17342	03	18051 18051
05110	TFL	L,S,, L=S**2	17354	06	17951 18051
05120	TFL	DIST,TDATA7,6	17366	06	1723L 03382
05130	FMUL	DIST,DIST,611, DIST=R1**2	17378	03	1723L 1723L
05140	FADD	L,DIST,11	17390	01	17951 1723L
05150	BTM	SQRTF,L,67, L=SQRTF(S**2+R1**2)	17402	17	02410 J7951
05160	BT	MONITR,LNCKR2+5,6	17414	27	02400 17911
05170	BT	CIRCIR,DSACIR+45,6, OBTAIN POINTS A AND B ON C2	17426	27	02410 17012
05180	SLTPT1	BNR ERROR4,79	17438	45	17878 00079
05190	CM	IAT1,24,610, CHECK FOR RIGHT MODIFIER	17450	14	0773J 000K4
05200	BE	TKRGHT	17462	46	17912 01200
06010	CM	IAT1,8,610, CHECK FOR LEFT MODIFIER			

06020	BNE	ERROR1	17474	14	0773J 000-8
06030	BTM	MONITR,03600,67	17486	47	17830 01200
06040	BT	PTSLCT,DSASLT+46,6, PICK POINT A OR B ON C2	17498	17	02400 -3600
06050	TFL	XPIC1,XPICK,, STORE X AND Y COORDINATES	17510	27	02410 17065
06060	TFL	YPIC1,YPICK,, IN XPIC1 AND YPIC1	17522	06	18021 18001
06070	BTM	MONITR,2120,67	17534	06	18031 18011
06080	BT	LCNON1,DSALR2+25,6, GET SLOPE AND INTERCEPT OF LINER2	17546	17	02400 -2120
06090	TFL	S,SLOPE	17558	27	02410 17226
06100	FMUL	S,TDATAS,, S=MR2(H1)	17570	06	18051 17961
06110	TFL	BR1,TDATA6	17582	03	18051 03362
06120	FSUB	BR1,S,, BR1=K1-MR2(H1)	17594	06	18041 03372
06130	BT	MONITR,LINKLC+5,6	17606	02	18041 18051
06140	BT	LINCIR,DSALNC+40,6, GET POINT A AND B ON C1	17618	27	02400 17940
06150	SLT2ND	BNR ERROR4,79	17630	27	02410 17111
06160	SM	IAT1,42	17642	45	17878 00079
06170	CM	IAT1,24,610, CHECK FOR RIGHT MODIFIER	17654	12	07731 -0042
06180	BE	GETPT2	17666	14	0773J 000K4
06190	CM	IAT1,8,610, CHECK FOR LEFT MODIFIER	17678	46	17726 01200
06200	BNE	ERROR1	17690	14	0773J 000-8
07010	TDM	CODE2,1,, PUT DIGIT ONE IN CODE2 FOR LEFT	17702	47	17830 01200
07020	GETPT2	BTM MONITR,03600,67	17714	15	17163 00001
07030	BT	PTSLCT,SLTPT2+46,6, PICK POINT A OR B ON C1	17726	17	02400 -3600
07040	BTM	MONITR,2120,67	17738	27	02410 17163
07050	BT	LCNON1,DSALN2+25,6, GET SLOPE AND INTERCEPT OF DESIRED	17750	17	02400 -2120
07060	FILSYM	TFM SYMB1,41,8,	17762	27	02410 17194
07070	TFL	SYMB5,SLOPE,, FILL IN SYMBOL TABLE	17774	14	04289 0-041
07080	TFL	SYMB6,INTERC	17786	06	04315 17961
07090	TD	SYMB6+1,RCDMRK	17798	06	04325 17951
07100	BT	RETURN,,8, EXIT PROGRAM	17810	25	04326 17941
07110*			17822	49	0241J 00000
07120	ERROR1	BTM MONITR,03090,67	17830	17	02400 -3090
07130	BTM	TYPERR,301,67, INCORRECT STATEMENT	17842	17	02410 -0301
07140	ERROR2	BTM MONITR,03090,67	17854	17	02400 -3090
07150	BTM	TYPERR,314,67,	17866	17	02410 -0314
07160	ERROR4	BTM MONITR,03090,67	17878	17	02400 -3090
07170	BTM	TYPERR,316,67, ERRONEOUS DATA	17890	17	02410 -0316
07180*					
07190	LNCKR2	DSA SLTPT1	17906	00005	J7438
07200	DSC	S,2071	17907	00005	
08010	TKRGHT	TDM CODE1,1,, PUT DIGIT ONE IN CODE1 FOR RIGHT	17912	15	17065 00001
08020	BT	GETPT1,,, MODIFIER	17924	49	17498 00000
08030	LINKLC	DSA SLT2ND	17935	00005	J7642
08040	DSC	S,2061	17936	00005	
08050	RCDMRK	DC 1,0	17941	00001	
08060	L	DC 10,0	17951	00010	
08070	YA	DC 10,0	17961	00010	
08080	YA	DC 10,0	17971	00010	
08090	YA	DC 10,0	17981	00010	
08100	YA	DC 10,0	17991	00010	

08110	XPICK	DC	10,0		18001	00010
08120	YPICK	DC	10,0		18011	00010
08130	SLOPE	DS	0,XA		17961	00000
08140	INTERC	DS	0,L		17951	00000
08150	XPIC1	DC	10,0		18021	00010
08160	YPIC1	DC	10,0		18031	00010
08170	XPIC2	DS	0,XPICK		18001	00000
08180	YPIC2	DS	0,YPICK		18011	00000
08190	MR2	DS	0,SLOPE		17961	00000
08200	BR1	DC	10,0		18041	00010
09010	S	DC	10,0		18051	00010
09020*						
09030	DS	10,,	FILL LAST SECTOR		18061	00010
09040*	THESE	ARE	EQUATES FOR AREAS IN COMMON WITH SYSTEM			
09050	IAT1	DS	0,7731		07731	00000
09060	SYMB1	DS	0,4289		04289	00000
09070	SYMB5	DS	0,4315		04315	00000
09080	SYMB6	DS	0,4325		04325	00000
09090	TDATA5	DS	0,3362		03362	00000
09100	TDATA6	DS	0,3372		03372	00000
09110	TDATA7	DS	0,3382		03382	00000
09120	MONITR	DS	0,2406		02406	00000
09130	RETURN	DS	0,2411		02411	00000
09140	TYPERR	DS	0,2416		02416	00000
09150	SQRTF	DS	0,2416		02416	00000
09160	CIRCIR	DS	0,2416		02416	00000
09170	PTSLCT	DS	0,2416		02416	00000
09180	LCNON1	DS	0,2416		02416	00000
09190	LINCIR	DS	0,2416		02416	00000
09200*						
10010	DEND	EQUAL			17234	

SYMBOL TABLE

TYPERR	02416	TDATA6	03372	TDATA5	03362	TDATA4	03352	STORXY	16914
RETURN	02411	RCDMRK	17261	PACKGE	16962	MONITR	02406	GET617	16794
GET603	16774	GET153	16814	GETTAN	16754	CUMBAK	16986	CIRCLE	16462
DSA1	17149	DSA2	17159	DSA3	17169	DSA4	17179	DSA5	17189
DSA6	17199	ERROR	16654	FM155	16994	FM255	16834	FM63	16878
FORM	07712	GET21	16678	IAT1	07731	SYMB1	04289	SYMB5	04315
SYMB6	04325	SYMB7	04335	TANTO	16698				

01010*
01020* CIRCLE DEFPRE SUBPROGRAM MAINLINE
01030* LINKAGE - BT MONITR,DSALBL+5
01040* B CIRCLE
01050* DSALBL IS ADDRESS OF RETURN
01060* DSALBL+4 IS ADDRESS OF DIM NO.
01070* DSALBL+5 IS ADDRESS OF ERASABILITY INDICATOR
01080* CIRCLE IS EQUIVALENT TO -2416
01090* CALLS TYPERR

01100	DORG	16462		16462					
01110	CIRCLE	CM	FORM,255,8,	DETERMINE		16462	14	07712	0-255
01120		BE	FM255			16474	46	16834	01200
01130		CM	FORM,63,8,	WHICH		16486	14	07712	0-063
01140		BE	FM63			16498	46	16878	01200
01150		CM	FORM,155,8,	FORM AND		16510	14	07712	0-155
01160		BE	FM155			16522	46	16994	01200
01170		CM	FORM,21,8,	BRANCH TO		16534	14	07712	0-021
01180		BE	GET21			16546	46	16678	01200
01190		CM	FORM,2459,8,	OR CALL					
01200		BE	TANTO			16558	14	07712	0K459
02010		CM	FORM,2603,8,	APPROPRIATE		16570	46	16698	01200
02020		BE	GET603			16582	14	07712	0K603
02030		CM	FORM,617,8,	ROUTINE		16594	46	16774	01200
02040		BE	GET617			16606	14	07712	0-617
02050		CM	FORM,153,8			16618	46	16794	01200
02060		BE	GET153			16630	14	07712	0-153
02070	ERROR	BTM	-MONITR,03090			16642	46	16814	01200
02080		BTM	-TYPERR,301,,	TYPE ERROR MESSAGE 301		16654	17	02400	-3090
02090	GET21	BT	-MONITR,DSA1+5			16666	17	02410	-0301
02100		BT	-2416			16678	27	02400	17154
02110	TANTO	AM	IAT1,12,10			16690	49	02410	00000
02120		CM	-IAT1,27,10,	THERE ARE TWO FORM 1639 STATEMENTS SO		16698	11	07731	000J2
02130		BE	GETTAN,,,	DETERMINE WHICH ROUTINE TO CALL BY		16710	14	0773J	000K7
02140		BT	-MONITR,DSA2+5,,	CHECKING FIRST ELEMENT FOR TANTO		16722	46	16754	01200
02150		BT	-2416			16734	27	02400	17164
02160	GETTAN	BT	-MONITR,DSA3+5,,	CALL		16746	49	02410	00000
02170		BT	-2416			16754	27	02400	17174
02180	GET603	BT	-MONITR,DSA4+5,,	APPROPRIATE		16766	49	02410	00000
02190		BT	-2416			16774	27	02400	17184
02200	GET617	BT	-MONITR,DSA5+5,,	ROUTINE		16786	49	02410	00000
03010		BT	-2416			16794	27	02400	17194
						16806	49	02410	00000

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03020 GET153 BT -MONTR,DSA4+S,, FROM FILE
03030 BT -2416 16814 27 02400 17204
03040* X, Y, Z, AND R GIVEN 16826 49 02410 00000
03050 FM255 AM IAT1,54,10, SET IAT1 TO RADIUS 16834 11 07731 000N4
03060 TFL SYMB7,-IAT1,, GET RADIUS 16846 06 04335 0773J
03070 SM IAT1,54,10 16858 12 07731 000N4
03080 BT STORXY 16870 49 16914 00000
03090* CANONICAL FORM
03100 FM63 AM IAT1,40,10, SET T IAT1 TO RADIUS 16878 11 07731 000M0
03110 TFL SYMB7,-IAT1,, GET RADIUS 16890 06 04335 0773J
03120 SM IAT1,40,10 16902 12 07731 000M0
03130 STORXY AM IAT1,12,10, GET X COORDINATE 16914 11 07731 000J2
03140 TFL SYMB5,-IAT1 16926 06 04315 0773J
03150 AM IAT1,14,10, GET Y COORDINATE 16938 11 07731 000J4
03160 TFL SYMB6=-IAT1 16950 06 04335 0773J
03170 PACKAGE FFM SYMB1,51,8, PACKAGE UP SYMB TABLE 16962 16 04289 0-091
03180 TD SYMB7+1,RCDMRK 16974 25 04336 17261
03190 CUMBAK BT -RETURN,,, EXIT PROGRAM 16986 49 0241J 00000
03200*
04010* CENTER POINT AND RADIUS GIVEN
04020 FM155 CM TDATA4,9,10, CHECK FOR POINT AS CENTER 16994 14 03352 000-9
04030 BNE ERROR 17006 47 16654 01200
04040 AM IAT1,12 17018 11 07731 -0012
04050 CM IAT1,2,610, CHECK FOR CENTER MODIFIER 17030 14 0773J 000-2
04060 BNE ERROR 17042 47 16654 01200
04070 AM IAT1,28 17054 11 07731 -0028
04080 CM IAT1,23,610, CHECK FOR RADIUS MODIFIER 17066 14 0773J 000K3
04090 BNE ERROR 17078 47 16654 01200
04100 AM IAT1,14,10, GET RADIUS 17090 11 07731 000J4
04110 TFL SYMB7,-IAT1 17102 06 04335 0773J
04120 TFL SYMB5,TDATA5,, GET COORDINATES OF CENTER 17114 06 04315 03362
04130 TFL SYMB6,TDATA6 17126 06 04325 03372
04140 BT PACKAGE 17138 49 16962 00000
04150*
04160 DSA1 DSA CUMBAK 17149 00005 J6986
04170 DSC 5,03381 17150 00005
04180 DSA2 DSA CUMBAK 17159 00005 J6986
04190 DSC 5,03401 17160 00005
04200 DSA3 DSA CUMBAK 17169 00005 J6986
05010 DSC 5,03391 17170 00005
05020 DSA4 DSA CUMBAK 17179 00005 J6986
05030 DSC 5,03411 17180 00005
05040 DSA5 DSA CUMBAK 17189 00005 J6986
05050 DSC 5,03421 17190 00005
05060 DSA6 DSA CUMBAK 17199 00005 J6986
05070 DSC 5,03431 17200 00005
05080*
05090 DS 56,, FILL LAST SECTOR 17260 00054
05100* THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM
05110 FORM DS 0,7712 07712 00000
05120 IAT1 DS 0,7731 07731 00000
05130 SYMB1 DS 0,4289 04289 00000
05140 SYMB5 DS 0,4315 04315 00000
05150 SYMB6 DS 0,4325 04325 00000
05160 SYMB7 DS 0,4335 04335 00000

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05170 MONTR DS 0,2406 02406 00000
05180 RETURN DS 0,2411 02411 00000
05190 TDATA4 DS 0,3352 03352 00000
05200 TDATA5 DS 0,3362 03362 00000
06010 TDATA6 DS 0,3372 03372 00000
06020 TYPERR DS 0,2416 02416 00000
06030*
06040 RCDMRK DC 1, 17261 00001
06050 DEND CIRCLE 16462

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SYMBOL TABLE

TYPERR 02416	TDATA6 03372	TDATA5 03362	TDATA4 03352	SQUARE 18470
SECOND 18150	SBRCT 17826	RZER02 18061	RZER01 18035	RETURN 02411
RCDMRK 18511	PT2PT3 18009	PT1PT3 17983	PT1PT2 17957	POINTS 17754
MONITR 02406	LESSR 18370	HOWCUM 18322	FINNSH 18206	ERR0R3 18298
ERR0R2 18274	ERR0R1 18250	CORCT 18182	CIRCIR 02416	A 18350
B 18360	CC 18370	DCRCR 18103	DISTA 18400	DISTB 18410
DISTC 18420	DISTF 02416	DSA16 18475	DSA17 18485	DSA18 18495
DSA19 18505	DSA20 18087	DSA7 18375	DSA8 18385	FM21 17262
FOUR 18450	GETB 17802	HALF 18440	IAT1 07731	MINIF 02416
OK 17742	PRDD 18460	R 18460	S 18430	SMINA 18400
SMINB 18410	SMINC 18420	SQRTF 02416	STORA 17358	STORB 17394
STORC 17430	SYMB1 04289	SYMB5 04315	SYMB6 04325	SYMB7 04335
XLSAV 18470	X2SAV 18350	Y1SAV 18430	Y2SAV 18360	

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01010*
01020*      CIRCLE DEFPRE FORM 21(THREE POINTS) ROUTINE
01030*      LINKAGE - BT MONITR,DSALBL+5
01040*      B FM21
01050*      DSALBL IS ADDRESS OF RETURN
01060*      DSALBL+4 IS ADDRESS OF DIM NO.
01070*      DSALBL+5 IS ADDRESS OF ERASABILITY INDICATOR
01080*      FM21 IS EQUIVALENT TO -2416
01090*      CALLS TYPERR, DISTF, SQRTF, + CIRCIR, + MINIF
01100*
01110      DORG 17262
01120 FM21 CM TDATA4+9,10, CHECK FOR 1ST POINT 17262
01130      BNE ERROR3 17274 47 18298 01200
01140 CM TDATA4+51,9,10, 2ND POINT 17286 14 03403 000-9
01150      BNE ERROR3 17298 47 18298 01200
01160 CM TDATA4+102,9,10, 3RD POINT 17310 14 03454 000-9
01170      BNE ERROR3 17322 47 18298 01200
01180 BT -MONITR,DSA7+5
01190 BT -DISTF,PT1PT2+20,, CALCULATE A 17334 27 02400 18380
01200 STORA TFL A,DISTA 17346 27 02410 17977
02010 BT -MONITR,DSA16+5 17358 06 18350 18400
02020 BT -DISTF,PT2PT3+20,, CALCULATE B 17370 27 02400 18480
02030 STORB TFL B,DISTB 17382 27 02410 18029
02040 BT -MONITR,DSA17+5 17394 06 18360 18410
02050 BT -DISTF,PT1PT3+20,, CALCULATE C 17406 27 02400 18490
02060 STORC TFL CC,DISTC 17418 27 02410 18003
02070 TFL S,A,, ADD A+B+C 17430 06 18370 18420
02080 FADD S,B 17442 06 18430 18350
02090 FADD S,CC 17454 01 18430 18360
02100 FMUL S,HALF,, S=1/2(A+B+C) 17466 01 18430 18370
02110 TFL PRDD,A,, MULT A*B=C 17478 03 18430 18440
02120 FMUL PRDD,B
02130 FMUL PRDD,CC,, PRDD=A*B*C 17490 06 18460 18350
02140 TFL SMINA,S 17502 03 18460 18360
02150 TFL SMINB,S 17514 03 18460 18370
02160 TFL SMINC,S 17526 06 18400 18430
02170 FSUB SMINA,A,, S-A 17538 06 18410 18430
02180 FSUB SMINB,B,, S-B 17550 06 18420 18430
02190 FSUB SMINC,CC,, S-C 17562 02 18400 18350
02200 TFL SQUARE,S 17574 02 18410 18360
03010 FMUL SQUARE,SMINA 17586 02 18420 18370
03020 FMUL SQUARE,SMINB 17598 06 18470 18430
03030 17610 03 18470 18400
03040 17622 03 18470 18410

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03030 FMUL SQUARE,SMINC,, SQUARE=S(S-A)(S-B)(S-C) 17634 03 18470 18420
03040 BTM -MONITR,02000 17646 17 02400 -2000
03050 BTM -SORTF,SQUARE,,TAKE SQUARE ROOT OF SQUARE 17658 17 02410 18470
03060 FMUL SQUARE,FOUR,, MULT BY 4 17670 03 18470 18450
03070 BV *+12 17682 46 17694 01400
03080 BVX *+12 17694 46 17706 01500
03090 FDIV PRDD,SQUARE,, R=A*B/C/4SQRT(S(S-A)(S-B)(S-C) 17706 09 18460 18470
03100 BV ERROR1,,, INDICATES DIVISION BY ZERO 17718 46 18250 01400
03110 BVX ERROR1,,, DIVISOR APPROACHING ZERO 17730 46 18290 01500
03120 OK BT -MONITR,DSA8+5 17742 27 02400 18390
03130 POINTS BT -CIRCIR,DCRCR+5,,OBTAIN INTERSECTIONS OF CIRCLES W/ RADIUS=R 17754 27 02410 18148
03140 BNR HOWCUM,79,, THERE ARE NOT TWO INTERSECTIONS 17766 45 18322 00079
03150 BT MONITR,DSA18+5,6, 17778 27 02400 18500
03160 BT DISTF,RZER01+20,6, OBTAIN DISTANCE A 17790 27 02410 18055
03170 GETB BT MONITR,DSA19+5,6, 17802 27 02400 18510
03180 BT DISTF,RZER02+20,6, OBTAIN DISTANCE B 17814 27 02410 18081
03190 SBRCT FSUB DISTA,R,, SUBTRACT RADIUS FROM BOTH DISTANCES 17826 02 18400 18460
03200 BZ CORCT 17838 46 18182 01200
04010 FSUB DISTB,R 17850 02 18410 18460
04020 BZ SECOND 17862 46 18150 01200
04030 CF DISTA-2,,, MAKE RESIDUALS ABSOLUTE 17874 33 18398 00000
04040 CF DISTB-2 17886 33 18408 00000
04050 BTM MONITR,2130,67 17898 17 02400 -2130
04060 BT MINIF,OSA20+11,6, DETERMINE LESSER DISTANCE 17910 27 02410 18098
04070 FSUB LESSER,DISTA,, IS IT DISTA(FROM FIRST INTERSECTION) 17922 02 18370 18400
04080 BZ CORCT,,, YES, TAKE FIRST SET OF COORDINATES 17934 46 18182 01200
04090 BT SECOND,,, NO, TAKE SECCND COORDINATES 17946 49 18150 00000
04100*
04110 DORG *+5-11 17966
04120 NOP TDATA4+51,DISTA 17966 41 03423 18400
04130 DORG *-21 17956
04140 NOP TDATA6,TDATA5+51 17956 41 03372 03413
04150 DORG *-14 17953
04160 PT1PT2 DSA TDATA5 17957 00005 -3342
04170 DORG *+5-4+5-11 17992
04180 NOP TDATA6+102,DISTC 17992 41 03474 18420
04190 DORG *-21 17982
04200 NOP TDATA6,TDATA5+102 17982 41 03372 03464
05010 DORG *-14 17979
05020 PT1PT3 DSA TDATA5 17983 00005 -3342
05030 DORG *+5-4+5-11 18018
05040 NOP TDATA6+102,DISTB 18018 41 03474 18410
05050 DORG *-21 18008
05060 NOP TDATA6+51,TDATA5+102 18008 41 03423 03464
05070 DORG *-14 18005
05080 PT2PT3 DSA TDATA5+51 18009 00005 -3413
05090 DORG *+5-4+5-11 18044
05100 NOP TDATA6+102,DISTA 18044 41 03474 18400
05110 DORG *-21 18034

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05120      NOP  Y1SAV,TDATA5+102      18034 41 18430 03464
05130      DORG  --14                  18031
05140      RZER01 DSA  X1SAV           18035 00005 J8470
05150      DORG  ++5*5-4+5*5-11      18070
05160      NOP  TDATA6+102,DISTB     18070 41 03474 18410
05170      DORG  --21                  18060
05180      NOP  Y2SAV,TDATA5+102     18060 41 18360 03464
05190      DORG  --14                  18057
05200      RZER02 DSA  X2SAV           18061 00005 J8350
06010      DORG  ++5*5-4+5*3-11      18086
06020      NOP  DISTB,LESSER         18086 41 18410 18370
06030      DORG  --14                  18083
06040      DSA20 DSA  DISTA           18087 00005 J8400
06050      DORG  ++5*3-4              18098
06060      DSC  1,6                    18098 00001
06070      DORG  ++5*10-6             18142
06080      NOP  Y2SAV,0              18142 41 18360 00000
06090      DORG  --21                  18132
06100      NOP  Y1SAV,X2SAV          18132 41 18430 18350
06110      DORG  --21                  18122
06120      NOP  R,X1SAV              18122 41 18460 18470
06130      DORG  --21                  18112
06140      NOP  TDATA5+51,TDATA6+51  18112 41 03413 03423
06150      DORG  --21                  18102
06160      NOP  TDATA6,R             18102 41 03372 18460
06170      DORG  --14                  18099
06180      DCRGR DSA  TDATA5         18103 00005 -3362
06190      DORG  ++5*10-4            18149
06200*
07010 SECOND TFL  SYMB5,X2SAV,,      USE OTHER INTERSECTION FOR H,K
                                18150 06 04315 18350
07020      TFL  SYMB6,Y2SAV,,        18162 06 04325 18360
07030      B7  FINNSH                 18174 49 18206 00000
07040 CORECT TFL  SYMB5,X1SAV,,      POINT ASSUMED IS H,K
                                18182 06 04315 18470
07050      TFL  SYMB6,Y1SAV          18194 06 04325 18430
07060 FINNSH TFL  SYMB7,R            18206 06 04335 18460
07070      TFM  SYMB1,51,8           18218 16 04289 0-051
07080      TD  SYMB7+1,RCOMRK        18230 25 04336 18511
07090      B7  -RETURN,,,            EXIT PROGRAM
                                18242 49 0241J 00000
07100*
07110 ERROR1 BTM  -MONITR,03090      18250 17 02400 -3090
07120      BTM  -TYPERR,302,,        3 POINTS LIE ON ONE LINE
                                18262 17 02410 -0302
07130 ERROR2 BTM  -MONITR,03090      18274 17 02400 -3090
07140      BTM  -TYPERR,303,,        CALCULATED RADIUS IS WRONG
                                18286 17 02410 -0303
07150 ERROR3 BTM  -MONITR,03090      18298 17 02400 -3090
07160      BTM  TYPERR,301,67,       INCORRECT STATEMENT
                                18310 17 02410 -0301
07170 MONCUM BD  CORECT,,,          CHECK FOR JUST ONE INTERSECTION
                                18322 43 18182 00000
                                18334 49 18274 00000
07180      B7  ERROR2
07190*
07200 A      DS  10                   18350 00010
08010 B      DS  10                   18360 00010
08020 CC     DS  10                   18370 00010
08030 DSA7   DSA  STORA               18375 00005 J7358
08040      DSC  5,2101                18376 00005
08050 DSA8   DSA  POINTS+12          18385 00005 J7766
08060      DSC  5,02071                18386 00005
08070 DISTA  DS  10                   18400 00010
08080 DISTB  DS  10                   18410 00010
08090 DISTC  DS  10                   18420 00010

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08100 $      DS  10                   18430 00010
08110      DC  8,50000000             18438 00008
08120 HALF   OC  2,0                  18440 00002
08130      DC  8,40000000             18448 00008
08140 FOUR    DC  2,1                  18450 00002
08150 PROD    DS  10                   18460 00010
08160 SMINA   DS  0,DISTA              18400 00000
08170 SMINB   DS  0,DISTB              18410 00000
08180 SMINC   DS  0,DISTC              18420 00000
08190 SQUARE  DS  10                   18470 00010
08200 R       DS  0,PROD               18460 00000
09010 X1SAV   DS  0,SQUARE             18470 00000
09020 Y1SAV   DS  0,5                  18430 00000
09030 X2SAV   DS  0,A                  18350 00000
09040 Y2SAV   DS  0,B                  18360 00000
09050 LESSER  DS  0,CC                 18370 00000
09060 DSA16   DSA  STORB               18475 00005 J7394
09070      DSC  5,2101                18476 00005
09080 DSA17   DSA  STORC               18405 00005 J7430
09090      DSC  5,2101                18486 00005
09100 DSA18   DSA  GETB                 18495 00005 J7802
09110      DSC  5,02101                18496 00005
09120 DSA19   DSA  SBTRCT              18505 00005 J7824
09130      DSC  5,02101                18506 00005
09140 RCOMRK  DC  1,                  18511 00001
09150*
09160      DS  50,,                   FILL LAST SECTOR
09170* THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM
09180 IAT1    DS  0,7731                07731 00000
09190 SYMB1   DS  0,4289                04289 00000
09200 SYMB5   DS  0,4315                04315 00000
10010 SYMB6   DS  0,4325                04325 00000
10020 SYMB7   DS  0,4335                04335 00000
10030 MONITR  DS  0,2406                02406 00000
10040 RETURN  DS  0,2411                02411 00000
10050 TDATA4  DS  0,3352                03352 00000
10060 TDATA5  DS  0,3362                03362 00000
10070 TDATA6  DS  0,3372                03372 00000
10080 TYPERR  DS  0,2416                02416 00000
10090 DISTP   DS  0,2416                02416 00000
10100 SORTP   DS  0,2416                02416 00000
10110 CIRCIR  DS  0,2416                02416 00000
10120 MINIF   DS  0,2416                02416 00000
10130*
10140      DEND PH21                    17262

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05120	BZ	EROR10		18206	02	18401	18451
05130	BRNCH2	NOP	SECCND,01100,, USE SECCND INTERSECTION IF	18218	46	18322	01200
							BRANCH TAKEN
				18230	41	18162	01160
05140	B7	BRNCH1+12,,	TAKE FIRST INTERSECTION				
05150	WHAT	SM	IAT1,+2,10, IAT1 IS NOW IAT1+40	18242	49	18082	00000
05160	BD	BD	BRNCH1+12,79,, THERE WAS ONLY ONE INTERSECTION	18250	12	07731	000M2
				18262	43	18082	00079
05170	ERROR9	BTM	-MONITR,03090	18274	17	02400	-3090
05180		BTM	-TYPERR,308,,	18286	17	02410	-0308
05190	ERROR8	BTM	-MONITR,03090	18298	17	02400	-3090
05200		BTM	-TYPERR,301	18310	17	02410	-0301
06010	EROR10	BTM	-MONITR,03090	18322	17	02400	-3090
06020		BTM	-TYPERR,307	18334	17	02410	-0307
06030*							
06040		DORG	++5-9-11	18379			
06050		NOP	XINT2,YINT2	18380	41	18461	18471
06060		DORG	--21	18370			
06070		NOP	XINT1,YINT1	18370	41	18441	18451
06080		DORG	--21	18360			
06090		NOP	TDATA6+41,RZERO	18360	41	03413	18421
06100		DORG	--21	18350			
06110		NOP	B2,TDATAS+41	18350	41	18431	03403
06120		DORG	--14	18347			
06130	DSA12	DSA	TDATAS	18351	00005	-3362	
06140		DORG	++5-9-4	18392			
06150*							
06160	C	DS	10	18401	00010		
06170	MX	DS	10	18411	00010		
06180	RZERO	DS	10	18421	00010		
06190	B2	DS	10	18431	00010		
06200	XINT1	DS	10	18441	00010		
07010	YINT1	DS	10	18451	00010		
07020	XINT2	DS	10	18461	00010		
07030	YINT2	DS	10	18471	00010		
07040	DSA13	DSA	GETPTS+12	18476	00005	J7826	
07050		DSC	5,02061	18477	00005		
07060	DSA14	DSA	CALC2	18486	00005	J7766	
07070		DSC	5,03491	18487	00005		
07080		DC	8,10000000	18499	00008		
07090	1.0E+8	DC	2,49	18501	00002		
07100		DC	8,-10000000	18509	00008		
07110	M1.E+8	DC	2,49	18511	00002		
07120		DC	8,-10000000	18519	00008		
07130	MIN1.0	DC	2,1	18521	00002		
07140		DC	8,10000000	18529	00008		
07150	ONE	DC	2,1	18531	00002		
07160	RCDMRK	DC	1,1	18532	00001		
07170*							
07180		DS	28,,	18560	00028		
07190*	THESE ARE		EQUATES FOR AREAS IN COMMON WITH SYSTEM				
07200	IAT1	DS	0,7731	07731	00000		
08010	SYMB1	DS	0,4289	04289	00000		
08020	SYMB5	DS	0,4315	04315	00000		
08030	SYMB6	DS	0,4325	04325	00000		
08040	SYMB7	DS	0,4335	04335	00000		
08050	MONITR	DS	0,2406	02406	00000		
08060	RETURN	DS	0,2411	02411	00000		
08070	TDATA4	DS	0,3352	03352	00000		

08080	TDATAS	DS	0,3362	03362	00000		
08090	TDATA6	DS	0,3372	03372	00000		
08100	TYPERR	DS	0,2416	02416	00000		
08110	SQRTP	DS	0,2416	02416	00000		
08120	LINCIR	DS	0,2416	02416	00000		
08130	ONLINE	DS	0,2416	02416	00000		
08140*							
08150	DEND	PNTANT		17262			

SYMBOL TABLE

YCOORD 18584	XCOORD 18574	TYPERR 02416	TDATA6 03372	TDATA5 03362
TDATA4 03352	SMNEG2 17966	RETURN 02411	RCDMRK 18585	NOYMD2 18390
NOYMD1 18322	NOXMD2 18242	NOXMD1 18174	MONTR 02406	LINLIN 02416
LGNEG2 17946	FM2459 17262	ERROR7 18470	ERROR6 17718	COMPLT 18094
CENTER 18034	BPLUSC 17806	BPLSC2 18010	BMINC2 17978	BMINC 17774
B1 18534	B2 18544	C1 18554	C2 18564	DSAIL 18499
IAT1 07731	LGNEG 17742	LOGIC 17610	M1 18534	M2 18544
NEXT 17830	ONE 18595	SMNEG 17762	SQRTF 02416	SYMB1 04289
SYMB5 04315	SYMB6 04325	SYMB7 04335		

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01010*
01020*      CIRCLE DEFPRE FORM 2459(TANTO TWO LINES WITH GIVEN RADIUS)
01030*      LINKAGE - B FM2459
01040*      FM2459 IS EQUIVALENT TO -2416
01050*      CALLS TYPERR, SQRTF, + LINLIN
01060*
01070      DORG 17262
01080 FM2459 CM TDATA4,1,10,      CHECK FOR FIRST LINE      17262 14 03352 000-1
01090      BNE ERROR6      17274 47 17718 01200
01100      CM TDATA4+41,1,10,    CHECK FOR SECOND LINE      17286 14 03393 000-1
01110      BNE ERPOR6      17298 47 17718 01200
01120      AM IAT1,56,,          SET POINTER TO RADIUS      17310 11 07731 -0056
01130      CM IAT1,23,610,      CHECK FOR RADIUS MODIFIER
                                     17322 14 0773J 000K3
01140      BNE ERROR6      17334 47 17718 01200
01150      TFL C1,TDATA5,,      GET SLOPE OF LINE 1      17346 06 18554 03362
01160      FMUL C1,C1,,          M1**2      17358 03 18554 18554
01170      FADD C1,ONE,,        1+M1**2      17370 01 18554 18595
01180      BTM -MONITR,2000     17382 17 02400 -2000
01190      BTM -SQRTF,C1,,      SQRT(1+M1**2)      17394 17 02410 J8554
01200      AM IAT1,14,10,      IATIIS NOW IAT1+82      17406 11 07731 000J4
02010      FMUL C1,-IAT1,,      R =SQRT(1+M1**2)=C1      17418 03 18554 0773J
02020      TFL C2,TDATA5+41,,  GET SLOPE OF LINE 2      17430 06 18564 03403
02030      FMUL C2,C2,,          M2**2      17442 03 18564 18564
02040      FADD C2,ONE,,        1+M2**2      17454 01 18564 18595
02050      BTM -SQRTF,C2,,      SQRT(1+M2**2)      17466 17 02410 J8564
02060      FMUL C2,-IAT1,,      R=SQRTF(1+M2**2)=C2      17478 03 18564 0773J
02070      TFL M1,C1,,          PUT C1 AND C2 IN WORK AREA
                                     17490 06 18534 18554
02080      TFL M2,C2,,          FOR SUBTRACTION CHECK      17502 06 18544 18564
02090      FSUB M1,IAT1,11,      17514 02 18534 0773J
02100      BZ NOXMD1      17526 46 18174 01200
02110      FSUB M2,IAT1,11,      17538 02 18544 0773J
02120      BZ NOXMD2,,          CHECK FOR C1 OR C2 EQUAL TO RADIUS
                                     17550 46 18242 01200
02130      CM TDATA5,49,10     17562 14 03362 000M9
02140      BE NOYMD1      17574 46 18322 01200
02150      CM TDATA5+41,49,10  17586 14 03403 000M9
02160      BE NOYMD2,,          CHECK FOR M1 OR M2 EQUAL TO INFINITY
02170 LOGIC SM IAT1,70,10,      IATIIS NOW IAT1+12      17598 46 18390 01200
02180      CM -IAT1,35,10,      IS MODIFIER YLARGE      17610 12 07731 000P0
02190      BE BPLUSC      17622 14 0773J 000L5
02200      CM -IAT1,31,10,      XLARGE      17634 46 17806 01200
03010      BE LGNEG      17646 14 0773J 000L1
03020      CM -IAT1,32,10,      XSMALL      17658 46 17742 01200
03030      CM -IAT1,32,10,      XSMALL      17670 14 0773J 000L2

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03030      BE SMNEG      17682 46 17762 01200
03040      CM -IAT1,36,10,      YSMALL      17694 14 0773J 000L6
03050      BE BMINC      17706 46 17774 01200
03060 ERROR6 BTM -MONITR,03090  17718 17 02400 -3090
03070      BTM -TYPERR,301      17730 17 02410 -0301
03080 LGNEG BNF BMINC,TDATA5-2,, B+C IF SLOPE NEGATIVE 17742 44 17774 03360
03090      B7 BPLUSC      17754 49 17806 00000
03100 SMNEG BNF BPLUSC,TDATA5-2,, B-C IF SLOPE NEGATIVE 17762 44 17806 03360
03110 BMINC TFL B1,TDATA6,,    GET B OF L1      17774 06 18534 03372
03120      FSUB B1,C1,,        B1 IS B1-C1      17786 02 18534 18554
03130      B7 NEXT      17798 49 17830 00000
03140 BPLUSC TFL B1,TDATA6,,    GET B OF L1      17806 06 18534 03372
03150      FADD B1,C1,,        B1 IS B+C1      17818 01 18534 18554
03160 NEXT AM IAT1,28,10,      IAT1 IS NOW IAT1+40     17830 11 07731 000K8
03170      CM -IAT1,35,10,      IS SECOND MODIFIER YLARGE
                                     17842 14 0773J 000L5
03180      BE BPLSC2      17854 46 18010 01200
03190      CM -IAT1,31,10,      XLARGE      17866 14 0773J 000L1
03200      BE LGNEG2      17878 46 17946 01200
04010      CM -IAT1,32,10,      XSMALL      17890 14 0773J 000L2
04020      BE SMNEG2      17902 46 17966 01200
04030      CM -IAT1,36,10,      YSMALL      17914 14 0773J 000L6
04040      BE BMINC2      17926 46 17978 01200
04050      B7 ERROR6      17938 49 17718 00000
04060 LGNEG2 BNF BMINC2,TDATA5+41-2,, B+C IF SLOPE IS NEGATIVE
                                     17946 44 17978 03401
04070      B7 BPLSC2      17958 49 18010 00000
04080 SMNEG2 BNF BPLSC2,TDATA5+41-2,, B-C IF SLOPE IS NEGATIVE
                                     17966 44 18010 03401
04090 BMINC2 TFL B22,TDATA6+41,, GET B OF L2      17978 06 18544 03413
04100      FSUB B22,C2,,        B22 IS B-C2      17990 02 18544 18564
04110      B7 CENTER      18002 49 18034 00000
04120 BPLSC2 TFL B22,TDATA6+41,, GET B OF L2      18010 06 18544 03413
04130      FADD B22,C2,,        B22 IS B+C2      18022 01 18544 18564
04140 CENTER BTM -MONITR,2050,, OBTAIN CENTER USING LINLIN ROUTINE
                                     18034 17 02400 -2050
04150      BT -LINLIN,DSAIL+25  18046 27 02410 18524
04160      BNR COMPLT,XCOORD,,  NO INTERSECTION IF RECORD MARK PRESENT
04170      BTM -MONITR,03090  18058 45 18094 18574
04180      BTM -TYPERR,304      18070 17 02400 -3090
04190 COMPLT BTM SYMB5,XCOORD,, COMPLETE SYMB TABLE      18082 17 02410 -0306
04200      TFL SYMB6,YCOORD      18094 06 04315 18574
05010      AM IAT1,42,10,      IAT1 IS NOW IAT1+82     18106 06 04325 18584
05020      TFL SYMB7,-IAT1      18118 11 07731 000M2
05030      TFM SYMB1,51,8      18130 06 04335 0773J
05040      TD SYMB7+1,RCDMRK    18142 16 04289 0-051
05050      B7 -RETURN,,          EXIT PROGRAM      18154 25 04336 18585
05060*
05070 NOXMD1 SM IAT1,70,10,      IAT1 IS NOW IAT1+12     18166 12 07731 000P0
05080      CM -IAT1,31,10,      CHECK FOR X MODIFIERS   18186 14 0773J 000L1
05090      BE ERROR7      18198 46 18470 01200
05100      CM -IAT1,32,10,      18210 14 0773J 000L2
05110      BE ERROR7      18222 46 18470 01200
05120      B7 LOGIC+12      18234 49 17622 00000
05130 NOXMD2 SM IAT1,42,10,      IAT1 IS NOW IAT1+40     18242 12 07731 000M2
05140      CM -IAT1,31,10,      CHECK FOR X MODIFIERS   18254 14 0773J 000L1
05150      BE ERROR7      18266 46 18470 01200
05160      CM -IAT1,32,10,      18278 14 0773J 000L2
05170      BE ERROR7      18290 46 18470 01200

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SYMBOL TABLE

TYPERR 02416	TDATA7 03382	TDATA6 03372	TDATA5 03362	TDATA4 03352
RETURN 02411	RCDMRK 17838	RADIUS 17797	PTPTCR 17701	MGNITR 02406
MINMAX 17727	ERROR5 17764	ERROR4 17740	CALC 17466	0 17817
DISTF 02416	DSA10 17802	FM617 17262	IAT1 07731	JAMIT 17598
MAXIF 02416	MINIF 02416	ONLY1 17654	ROME 17827	RTWO 17837
SYMB1 04289	SYMB5 04315	SYMB6 04325	SYMB7 04335	ZERO 17846

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01010*
01020*   CIRCLE DEFPRE FORM 617(CENTER + TANTO A CIRCLE) ROUTINE
01030*   LINKAGE - B FM617
01040*   FM617 IS EQUIVALENT TO -2416
01050*   CALLS TYPERR, DISTF, MINIF OR MAXIF
01060*
01070   DORG 17262                                17262
01080 FM617 CM  TDATA4,9,10,      CHECK FOR POINT      17262 14 03352 000-9
01090   BNE ERROR4                                17274 47 17740 01200
01100   CM  TDATA4+51,2,10,    CHECK FOR CIRCLE      17286 14 03403 000-2
01110   BNE ERROR4                                17298 47 17740 01200
01120   AM  IAT1,12            17310 11 07731 -0012
01130   CM  IAT1,2,610,      CHECK FOR CENTER MODIFIER
                                17322 14 0773J 000-2
01140   BNE ERROR4                                17334 47 17740 01200
01150   AM  IAT1,42            17346 11 07731 -0042
01160   CM  IAT1,27,610,    CHECK FOR TANTO MODIFIER
                                17358 14 0773J 000K7
01170   BNE ERROR4                                17370 47 17740 01200
01180   SM  IAT1,14            17382 12 07731 -0014
01190   CM  IAT1,26,610,    CHECK FOR SMALL MODIFIER
                                17394 14 0773J 000K6
01200   BE  ++36                                17406 46 17442 01200
02010   CM  IAT1,7,610,    CHECK FOR LARGE MODIFIER
                                17418 14 0773J 000-7
02020   BNE ERROR4                                17430 47 17740 01200
02030   BT  -MONITR,DSA10+5
02040   BT  -DISTF,PTPTCR+20,,  OBTAIN DISTANCE D      17442 27 02400 17807
02050   CALC TFL  RONE,D,,      PUT DISTANCE D IN RONE  17454 27 02410 17721
02060   TFL  RTWO,D,,      AND RTWO      17466 06 17827 17817
02070   FSUB RONE,TDATA7+51,,  R1 IS D-R      17478 06 17837 17817
02080   FADD RTWO,TDATA7+51,,  R2 IS D+R      17490 02 17827 03433
02090   CF  RONE-2            17502 01 17837 03433
02100   C  RONE-2,ZERO,,      IS POINT ON CIRCLE      17514 33 17825 00000
02110   BE  ONLY1,,,          BRANCH IF ONLY ONE SOLUTION
                                17526 24 17825 17846
                                17538 46 17654 01200
02120   TD  MINMAX+11,IAT1,11
02130   BTM -MONITR,2130,,    TO TAKE DESIRED RADIUS
                                17550 25 17738 0773J
                                17562 17 02400 -2130
02140   BT  -MINIF,MINMAX+11,, SELECT RADIUS      17574 27 02410 17738
02150   TFL SYMB7,RADIUS,,    FILL IN SYMBOL TABLE  17586 06 04335 17797
02160   JAMIT TFL  SYMB5,TDATA5
02170   TFL  SYMB6,TDATA6      17598 06 04315 03362
02180   TFM  SYMB1,51,8        17610 06 04325 03372
02190   TD  SYMB7+1,RCDMRK
02200   BT  -RETURN,,,        17622 16 04289 0-051
                                17634 25 04336 17838
03010*
03020 ONLY1 CM  -IAT1,26,10,    SMALL MODIFIER IS ERROR
                                17646 49 0241J 00000
                                17654 14 0773J 000K6

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03030   BE  ERROR5                                17666 46 17764 01200
03040   TFL SYMB7,RTWO,,      USE D+R FOR RADIUS    17678 06 04335 17837
03050   BT  JAMIT                                17690 49 17598 00000
03060*
03070   DORG ++5+5-11          17710
03080   NOP  TDATA6+51,D      17710 41 03423 17817
03090   DORG -21              17700
03100   NOP  TDATA6,TDATA5+51 17700 41 03372 03413
03110   DORG -14              17697
03120   PTPTCR DSA  TDATA5      17701 00005 -3362
03130   DORG ++5+5+4+5+3-11  17726
03140   NOP  RTWO,RADIUS      17726 41 17837 17797
03150   DORG -14              17723
03160   MINMAX DSA  RONE        17727 00005 J7827
03170   DORG ++5+3-4          17738
03180   DSC  1,0              17738 00001
03190*
03200 ERROR4 BTM -MONITR,03090 17740 17 02400 -3090
04010   BTM  -TYPERR,301,,    INCORRECT STATEMENT  17752 17 02410 -0301
04020 ERROR5 BTM -MONITR,03090 17764 17 02400 -3090
04030   BTM  -TYPERR,305,,    SMALL MODIFIER AMBIGUOUS
                                17776 17 02410 -0305
04040*
04050 RADIUS DS  10            17797 00010
04060 DSA10 DSA  CALC          17802 00005 J7466
04070   DSC  5,02101          17803 00005
04080 D DS  10                17817 00010
04090 RONE DS  10             17827 00010
04100 RTWO DS  10             17837 00010
04110 RCDMRK DC  1,0          17838 00001
04120 ZERO DC  8,0           17846 00008
04130*
04140   DS  14,,              17860 00014
04150* THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM
04160 IAT1 DS  0,7731          07731 00000
04170 SYMB1 DS  0,4289          04289 00000
04180 SYMB5 DS  0,4315          04315 00000
04190 SYMB6 DS  0,4325          04325 00000
04200 SYMB7 DS  0,4335          04335 00000
05010 MONITR DS  0,2406          02406 00000
05020 RETURN DS  0,2411          02411 00000
05030 TDATA4 DS  0,3352          03352 00000
05040 TDATA5 DS  0,3362          03362 00000
05050 TDATA6 DS  0,3372          03372 00000
05060 TDATA7 DS  0,3382          03382 00000
05070 TYPERR DS  0,2416          02416 00000
05080 DISTF DS  0,2416          02416 00000
05090 MAXIF DS  0,2416          02416 00000
05100 MINIF DS  0,2416          02416 00000
05110*
05120   DEND FM617            17262

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SYMBOL TABLE

TYPERR 02416	TDATA6 03372	TDATA5 03362	TDATA4 03352	RETURN 02411
RCDMRK 17666	PTPTLN 17557	NORMLN 02416	MONITR 02406	ERROR3 17578
EROR12 17602	DNRMLN 17525	CHECK 17430	DISTF 02416	DSAVE 17665
DSA9 17630	FM153 17262	IAT1 07731	SYMB1 04289	SYMB5 04315
SYMB6 04325	SYMB7 04335	XSAVE 17645	YSAVE 17655	ZERO 17674

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01010*
01020*      CIRCLE DEFPRE FORM 153(CENTER + TANTO A LINE) ROUTINE
01030*      LINKAGE - B      FM153
01040*      FM153 IS EQUIVALENT TO -2416
01050*      CALLS TYPERR, NORMLN, + DISTF
01060*
01070      DORG 17262
01080 FM153 CM TDATA4+51,1,10 , CHECK FOR LINE      17262
01090      BNE EROR12      17274 14 03403 000-1
01100      CM TDATA4,9,10, CHECK FOR POINT      17286 14 03352 000-9
01110      BNE EROR12      17298 47 17602 01200
01120      AM IAT1,12      17310 11 07731 -0012
01130      CM IAT1,2,610, CHECK FOR CENTER MODIFIER      17322 14 0773J 000-2
01140      BNE EROR12      17334 47 17602 01200
01150      AM IAT1,28      17346 11 07731 -0028
01160      CM IAT1,27,610, CHECK FOR TANTO MODIFEIR      17358 14 0773J 000K7
01170      BNE EROR12      17370 47 17602 01200
01180      BTM -MONITR,02140      17382 17 02400 -2140
01190      BT -NORMLN,DNRMLN+25,, GET POINT OF TANGENCY ON LINE      17394 27 02410 17550
01200      BT -MONITR,DSA9+5      17406 27 02400 17635
02010      BT -DISTF,PTPTLN+20,, GET DISTANCE BETWEEN POINTS      17418 27 02410 17577
02020 CHECK C DSAVE-2,ZERO,, DOES POINT LIE ON LINE      17430 24 17663 17674
02030      BE ERROR3      17442 46 17578 01200
02040      TFL SYMB5,TDATA5,, FILL IN SYMBOL TABLE      17454 06 04315 03362
02050      TFL SYMB6,TDATA6      17466 06 04325 03372
02060      TFL SYMB7,DSAVE      17478 06 04335 17665
02070      TFM SYMB1,51,8      17490 16 04289 0-051
02080      TD SYMB7+1,RCDMRK      17502 25 04336 17666
02090      BT -RETURN,,, EXIT PROGRAM      17514 49 0241J 00000
02100*
02110      DORG ++5*6-6      17544
02120      NOP YSAVE,0      17544 41 17655 00000
02130      DORG *-21      17534
02140      NOP TDATA6+51,XSAVE      17534 41 03423 17645
02150      DORG *-21      17524
02160      NOP TDATA6,TDATA5+51      17524 41 03372 03413
02170      DORG *-14      17521
02180 DNRMLN DSA TDATA5      17525 00005 -3362
02190      DORG ++5*6-4+5*5-11      17565
02200      NOP YSAVE,DSAVE      17566 41 17655 17665
03010      DORG *-21      17556
03020      NOP TDATA6,XSAVE      17556 41 03372 17645
03030      DORG *-14      17553
03040 PTPTLN DSA TDATA5      17557 00005 -3362
03050      DORG ++5*5-4      17578
03060*

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03070 ERROR3 BTM -MONITR,03090      17578 17 02400 -3090
03080      BTM -TYPERR,304,, PT LIES ON LINE      17590 17 02410 -0304
03090 EROR12 BTM -MONITR,03090      17602 17 02400 -3090
03100      BTM -TYPERR,301,, INCORRECT STATEMENT      17614 17 02410 -0301
03110*
03120 DSA9 DSA CHECK      17630 00005 J7430
03130      DSC 5,02101      17631 00005
03140 XSAVE DS 10      17645 00010
03150 YSAVE DS 10      17655 00010
03160 DSAVE DS 10      17665 00010
03170 RCDMRK DC 1,'      17666 00001
03180 ZERO DC 8,0      17674 00008
03190*
03200      DS 86,, FILL LAST SECTOR      17760 00086
04010* THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM
04020 IAT1 DS 0,7731      07731 00000
04030 SYMB1 DS 0,4289      04289 00000
04040 SYMB5 DS 0,4315      04315 00000
04050 SYMB6 DS 0,4325      04325 00000
04060 SYMB7 DS 0,4335      04335 00000
04070 MONITR DS 0,2406      02406 00000
04080 RETURN DS 0,2411      02411 00000
04090 TDATA4 DS 0,3352      03352 00000
04100 TDATA5 DS 0,3362      03362 00000
04110 TDATA6 DS 0,3372      03372 00000
04120 TYPERR DS 0,2416      02416 00000
04130 DISTF DS 0,2416      02416 00000
04140 NORMLN DS 0,2416      02416 00000
04150*
04160      DEND FM153      17262

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SYMDOL TABLE

WKAREA 17998	TYPERR 02416	TDATA8 03392	TDATA7 03362	TDATA6 03372
TDATA5 03362	TOATA4 03352	RETURN 02411	RCDNRK 18029	MONITR 02406
MINI.0 18028	FILLIN 18882	ERROR4 17566	ERROR3 17834	ERROR2 16382
CHEKCS 17810	CHEKCL 17766	CHEKBS 17722	CHEKBL 17678	CHEKAS 17634
CHEKAL 17590	A 17958	ABCD 17923	AXA 17998	B 17968
BXB 18008	C 17978	CALCK 16702	CANON 16606	CHECK 17402
CXC 18018	DD 17988	DGNEG 17878	DGPOS 17890	DSA1 18034
FM155 17222	FM25 16962	FORM 07712	IAT1 07731	NEXT 16534
PLANE 16462	SQRTF 02416	SYMB1 04289	SYMB5 04315	SYMB6 04325
SYMB7 04335	SYMB8 04345	ZERO 07680		

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01010*      PLANE DEFPRE SUBPROGRAM-MAINLINE,FORM 25(PERPENDICULAR TO
01020*      A VECTOR,THRU A PT)AND FORM 155(PARRALLEL TO PLANE1)
01030*      LINKAGE - B PLANE
01040*      PLANE IS EQUIVALENT TO -2416
01050*      CALLS TYPERR, SQRTF
01060*
01070*
01080      DDRC 16462
01090 PLANE CM FORN,255,8, DETERMINE 16462
01100      BE CANON 16474 46 16606 01200
01110 CM FORN,21,8, WHICH 16486 14 07712 0-021
01120 BNE NEXT 16498 47 16534 01200
01130 BT MONITR,DSA1+5,6, FORM 16510 27 02400 16039
01140 BT 2416,ABCD+15,6 16522 27 02410 17938
01150 NEXT CM FORN,25,8, IT 16534 14 07712 0-025
01160 BE FM25 16546 46 16962 01200
01170 CM FORN,155,8, IS 16558 14 07712 0-155
01180 BE FM155 16570 46 17222 01200
01190 ERROR2 BTM -MONITR,03090 16582 17 02400 -3090
01200 BTM TYPERR,301,67, INCORRECT STATEMENT 16594 17 02410 -0301
02010*      CANONICAL FORM
02020 CANON AM IAT1,12,10 16606 11 07731 000J2
02030 TFL A,IAT1,11, GET A 16618 06 17958 0773J
02040 AM IAT1,14,10, IAT1+26 16630 11 07731 000J4
02050 TFL B,IAT1,11, GET B 16642 06 17968 0773J
02060 AM IAT1,14,10, IAT1+40 16654 11 07731 000J4
02070 TFL C,IAT1,11, GET C 16666 06 17978 0773J
02080 AM IAT1,14,10, IAT1+54 16678 11 07731 000J4
02090 TFL DD,IAT1,11, GET D 16690 06 17988 0773J
02100 CALCK TFL AXA,A 16702 06 17998 17958
02110 FMUL AXA,AXA,, A**2 16714 03 17998 17998
02120 TFL BXB,B 16726 06 18008 17968
02130 FMUL BXB,BXB,, B**2 16738 03 18008 18008
02140 TFL CXC,C 16750 06 18018 17978
02150 FMUL CXC,CXC,, C**2 16762 03 18018 18018
02160 FADD AXA,BXB 16774 01 17998 18008
02170 FADD AXA,CXC,, A**2+B**2+C**2=AXA 16786 01 17998 18018
02180 BZ ERROR4 16798 46 17566 01200
02190 BTM MONITR,2000,67 16810 17 02400 -2000
02200 BTM SQRTF,AXA,67, SQRTF(A**2+B**2+C**2)=AXA=NORMALIZE CONSTANT
16822 17 02410 J7998
03010      FDIV A,AXA,, NORMALIZE A, B, C, AND D
16834 09 17958 17998
03020      FDIV B,AXA 16846 09 17968 17998
03030      FDIV C,AXA 16858 09 17978 17998
03040      FDIV DD,AXA 16870 09 17988 17998
03050 FILLIN TFM SYMB1,61,8, FILL IN SYMBOL TABLE 16882 16 04289 0-061
03060 TFL SYMB5,A 16894 06 04315 17958
03070 TFL SYMB6,B 16906 06 04325 17968
03080 TFL SYMB7,C 16918 06 04335 17978
03090 TFL SYMB8,DD 16930 06 04345 17988
03100 TD SYMB8+1,RCDNRK 16942 25 04346 18029
03110 BT RETURN,,6, EXIT PROGRAM 16954 49 0241J 00000
03120*      THRU A PT, PERPTO A VECTOR
03130 FM25 CM TDATA4,9,10, CHECK FOR POINT 16962 14 03352 000-9
03140 BNE ERROR2 16974 47 16582 01200
03150 AM IAT1,26 16986 11 07731 -0026
03160 CM IAT1,18,610, CHECK FOR PERPTO 16998 14 0773J 000J8
03170 BNE ERROR2 17010 47 16582 01200
03180 CM TDATA4+51,5,10, CHECK FOR VECTOR 17022 14 03403 000-5
03190 BNE ERROR2 17034 47 16582 01200
03200 TFL A,TDATA5+51,, GET A 17046 06 17958 03413
04010 TFL B,TDATA6+51,, B 17058 06 17968 03423
04020 TFL C,TDATA7+51,, C 17070 06 17978 03433
04030 TFL WKAREA,A 17082 06 17998 17958
04040 FMUL WKAREA,TDATA5 17094 03 17998 03362
04050 TFL DD,ZERO,, SET DD TO ZERO 17106 06 17988 07660
04060 PSUB DD,WKAREA,, DD--AX1 17118 02 17988 17998
04070 TFL WKAREA,B 17130 06 17998 17968
04080 FMUL WKAREA,TDATA6 17142 03 17998 03372
04090 PSUB DD,WKAREA,, DD--AX1-BY1 17154 02 17988 17998
04100 TFL WKAREA,C 17166 06 17998 17978
04110 FMUL WKAREA,TDATA7 17178 03 17998 03382
04120 PSUB DD,WKAREA,, DD--AX1-BY1-CZ1--(AX1+BY1+CZ1) 17190 02 17988 17998
04130 FMUL DD,MINI.0 17202 03 17988 18028
04140 BT CALCK 17214 49 16702 00000
04150*      PARRALLEL TO PLANE 1
04160 FM155 CM TDATA4,8,10 17222 14 03352 000-8
04170 BNE ERROR2 17234 47 16582 01200
04180 AM IAT1,12 17246 11 07731 -0012
04190 CM IAT1,17,610, CHECK FOR PARLEL 17258 14 0773J 000J7
04200 BNE ERROR2 17270 47 16582 01200
05010 TFL A,TDATA5,, GET A1,B1,C1 + D1 17282 06 17958 03362
05020 TFL B,TDATA6 17294 06 17968 03372
05030 TFL C,TDATA7 17306 06 17978 03382
05040 TFL DD,TDATA8 17318 06 17988 03392
05050 AM IAT1,42,10 17330 11 07731 000M2
05060 TFL WKAREA,IAT1,11, GET DG 17342 06 17998 0773J
05070 BNF CHECK,WKAREA-2,, CHECK FOR NEGATIVE NUMBER 17354 44 17402 17996
05080 BTM -MONITR,03090 17366 17 02400 -3090
05090 BTM TYPERR,310,67, DISTANCE IS NEGATIVE 17378 17 02410 -0310
05100 CF WKAREA-2,,, MAKE DG POSITIVE 17390 33 17996 00000
05110 CHECK SM IAT1,14,10, IAT1 IS IAT1+40 NOW 17402 12 07731 000J4
05120 CM IAT1,31,610, IS MODIFIER XLARGE 17414 14 0773J 000L1
05130 BE CHEKAL 17426 46 17590 01200
05140 CM IAT1,32,610, XSMALL 17438 14 0773J 000L2
05150 BE CHEKAS 17450 46 17634 01200
05160 CM IAT1,35,610, YLARGE 17462 14 0773J 000L5
05170 BE CHEKBL 17474 46 17678 01200
05180 CM IAT1,36,610, YSMALL 17486 14 0773J 000L6
05190 BE CHEKBS 17498 46 17722 01200
05200 CM IAT1,39,610, ZLARGE 17510 14 0773J 000L9
06010 BE CHEKCL 17522 46 17766 01200

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06020	CM	IAT1,40,610,	ZSMALL	17534 14 0773J 000H0
06030	BE	CHEKCS		17546 46 17810 01200
06040	B7	ERROR2		17558 49 16582 00000
06050	ERROR4 BTM	-MONITR,03090		17566 17 02400 -3090
06060	BTM	TYPERR,312,67,	PLANE OR VECTOR IMPROPERLY DEFINED	17578 17 02410 -0312
06070*				
06080	CHEKAL C	A-2,ZERO-2		17590 24 17956 07678
06090	BE	ERROR3		17602 46 17854 01200
06100	BNF	DGPOS,A-2,,	CCNDITION 1	17614 44 17890 17956
06110	B7	DGNEG,,,	CCNDITION 2	17626 49 17878 00000
06120	CHEKAS C	A-2,ZERO-2		17634 24 17956 07678
06130	BE	ERROR3		17646 46 17854 01200
06140	BNF	DGNEG,A-2,,	CCNDITION 4	17658 44 17878 17956
06150	B7	DGPOS,,,	CCNDITION 5	17670 49 17890 00000
06160	CHEKBL C	B-2,ZERO-2		17678 24 17966 07678
06170	BE	ERROR3		17690 46 17854 01200
06180	BNF	DGPOS,B-2,,	CCNDITION 6	17702 44 17890 17966
06190	B7	DGNEG,,,	CCNDITION 7	17714 49 17878 00000
06200	CHEKBS C	B-2,ZERO-2		17722 24 17966 07678
07010	BE	ERROR3		17734 46 17854 01200
07020	BNF	DGNEG,B-2,,	CCNDITION 9	17746 44 17878 17966
07030	B7	DGPOS,,,	CCNDITION 10	17758 49 17890 00000
07040	CHEKCL C	C-2,ZERO-2		17766 24 17976 07678
07050	BE	ERROR3		17778 46 17854 01200
07060	BNF	DGPOS,C-2,,	CCNDITION 11	17790 44 17890 17976
07070	B7	DGNEG,,,	CCNDITION 12	17802 49 17878 00000
07080	CHEKCS C	C-2,ZERO-2		17810 24 17976 07678
07090	BE	ERROR3		17822 46 17854 01200
07100	BNF	DGNEG,C-2,,	CCNDITION 14	17834 44 17878 17976
07110	B7	DGPOS,,,	CCNDITION 15	17846 49 17890 00000
07120*				
07130	ERROR3 BTM	-MONITR,03090		17854 17 02400 -3090
07140	BTM	TYPERR,311,67,	AMBIGUOUS MODIFIER	17866 17 02410 -0311
07150	DGNEG SF	WKAREA-2,,,	MAKE DG NEGATIVE	17878 32 17996 00000
07160	DGPOS FADD	DD,WKAREA,,	DD=02-01+DG	17890 01 17988 17998
07170	B7	FILLIN		17902 49 16882 00000
07180*				
07190	DORG	**5*6-6		17932
07200	NOP	DD,0		17932 41 17988 00000
08010	DORG	-21		17922
08020	NOP	B,C		17922 41 17968 17978
08030	DORG	-14		17916
08040	ABCD	DSA A		17923 00005 J7958
08050	DORG	**5*6-4		17949
08060*				
08070	A	DS 10		17958 00010
08080	B	DS 10		17968 00010
08090	C	DS 10		17978 00010
08100	DD	DS 10		17988 00010
08110	AXA	DS 10		17998 00010
08120	BXB	DS 10		18008 00010
08130	CXC	DS 10		18018 00010
08140	WKAREA	DS 0,AXA		17998 00000
08150	ZERO	DS ,7680		07680 00000
08160	DC	8,-10000000		18026 00008
08170	MINI.0	DC 2,1		18026 00002
08180	RCDMRK	DC 1,1		18029 00001
08190	DSA1	DSA CALCK		18034 00005 J6702
08200	DSC	S,03451		18035 00005

09010	DS	22,,	FILL LAST SECTOR	18061 00022
09020*				
09030* THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM				
09040	FORM	DS 0,7712		07712 00000
09050	IAT1	DS 0,7731		07731 00000
09060	SYMB1	DS 0,4289		04289 00000
09070	SYMB5	DS 0,4315		04315 00000
09080	SYMB6	DS 0,4325		04325 00000
09090	SYMB7	DS 0,4335		04335 00000
09100	SYMB8	DS 0,4345		04345 00000
09110	TDATA4	DS 0,3352		03352 00000
09120	TDATA5	DS 0,3362		03362 00000
09130	TDATA6	DS 0,3372		03372 00000
09140	TDATA7	DS 0,3382		03382 00000
09150	TDATA8	DS 0,3392		03392 00000
09160	MONITR	DS 0,2406		02406 00000
09170	RETURN	DS 0,2411		02411 00000
09180	TYPERR	DS 0,2416		02416 00000
09190	SQRTF	DS 0,2416		02416 00000
09200*				
10010	DEND	PLANE		16462

SYMBOL TABLE

WORKAR 18848	TYPERR 02416	TDATA7 03352	TDATA6 03372	TDATA5 03362
TDATA4 03352	RETURN 02411	PLFMZ1 18002	MONITR 02406	ERROR2 18558
ERRDR1 18534	DXDYDZ 18778	AADD 18066	A1 18778	A2 18768
A3 18798	BADD 18071	B1 18008	B2 18818	B3 18828
CAOD 18076	CALCD 18582	D 18788	DADD 18081	DX 18838
DY 18848	DZ 18858	FLM1 18878	ZERO 07680	

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01010*
01020* PLANE DEFPRE FORM 21(THREE POINTS) ROUTINE
01030* LINKAGE BTM PLFMZ1,NORMAL
01040* PLFM42 IS EQUIVALENT TO -2416
01050* NORMAL IS RETURN ADDRESS
01060* CALLS TYPERR
01070*
01080 DORG 18062 18062
01090 DADD DC 20,0 18081 00020
01100 CADD DS 0,DADD-5 18076 00000
01110 BADD DS 0,DADD-10 18071 00000
01120 AADD DS 0,DADD-15 18066 00000
01130 PLFMZ1 CM TDATA4,9,10, CHECK FOR POINTS IN TDATA TABLE
                                18082 14 03352 000-9
                                18094 47 18558 01200
01140 BNE ERROR2 18106 14 03403 000-9
01150 CM TDATA4+51,9,10 18118 47 18558 01200
01160 BNE ERROR2 18130 14 03454 000-9
01170 CM TDATA4+102,9,10 18142 47 18558 01200
01180 BNE ERROR2 18154 06 18778 03413
01190 TFL A1,TDATA5+51 18166 02 18778 03362
01200 FSUB A1,TDATA5,, A1=X2-X1 18178 06 18788 03423
02010 TFL A2,TDATA6+51 18190 02 18788 03372
02020 FSUB A2,TDATA6,, A2=Y2-Y1 18202 06 18798 03433
02030 TFL A3,TDATA7+51 18214 02 18798 03382
02040 FSUB A3,TDATA7,, A3=Z2-Z1 18226 06 18808 03464
02050 TFL B1,TDATA5+102 18238 02 18808 03362
02060 FSUB B1,TDATA5,, B1=X3-X1 18250 06 18818 03474
02070 TFL B2,TDATA6+102 18262 02 18818 03372
02080 FSUB B2,TDATA6,, B2=Y3-Y1 18274 06 18828 03484
02090 TFL B3,TDATA7+102 18286 02 18828 03382
02100 FSUB B3,TDATA7,, B3=Z3-Z1 18298 06 18838 18788
02110 TFL DX,A2 18310 03 18838 18828
02120 FMUL DX,B3 18322 06 18868 18798
02130 TFL WORKAR,A3 18334 03 18868 18818
02140 FMUL WORKAR,B2 18346 02 18838 18868
02150 FSUB DX,WORKAR,, DX=A2XB3-A3XB2 18358 06 18848 18798
02160 TFL DY,A3 18370 03 18848 18808
02170 FMUL DY,B1 18382 06 18868 18778
02180 TFL WORKAR,A1 18394 03 18868 18828
02190 FMUL WORKAR,B3 18406 02 18848 18868
02200 FSUB DY,WORKAR,, DY=A3XB1-A1XB3 18418 06 18858 18778
03010 TFL DZ,A1 18430 03 18858 18818
03020 FMUL DZ,B2 18442 06 18868 18788
03030 TFL WORKAR,A2 18454 03 18868 18808
03040 FMUL WORKAR,B1 18466 02 18858 18868
03050 FSUB DZ,WORKAR,, DZ=A1XB2-A2XB1 18478 06 18778 18838
03060 TFL DXDYDZ,DX 18490 01 18778 18848
03070 FADD DXDYDZ,DY 18502 01 18778 18858
03080 FADD DXDYDZ,DZ

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03090 BZ ERROR1,,, DX+DY+DZ =00 18514 46 18534 01200
03100 B7 CALCD 18526 49 18582 00000
03110 ERROR1 BTM MONITR,03090,67 18534 17 02400 -3090
03120 BTM TYPERR,302,67, THREE POINTS ARE COLINEAR 18546 17 02410 -0302
03130 ERROR2 BTM -MONITR,03090 18558 17 02400 -3090
03140 BTM TYPERR,301,67, INCORRECT STATEMENT 18570 17 02410 -0301
03150 CALCD TFL WORKAR,DX 18582 06 18868 18838
03160 FMUL WORKAR,TDATA5 18594 03 18868 03362
03170 TFL 0,ZERO,, SET D TO ZERO 18606 06 18788 07680
03180 FSUB 0,WORKAR,, D=-AX1 18618 02 18788 18868
03190 TFL WORKAR,DY 18630 06 18868 18848
03200 FMUL WORKAR,TDATA6 18642 03 18868 03372
04010 FSUB 0,WORKAR,, D=-AX1-BY1 18654 02 18788 18868
04020 TFL WORKAR,DZ 18666 06 18868 18858
04030 FMUL WORKAR,TDATA7 18678 03 18868 03382
04040 FSUB 0,WORKAR,, D=-AX1-BY1-CZ1--(AX1+BY1+CZ1) 18690 02 18788 18868
04050 TFL AADD,DX,6, PUT DX, DY, DZ, AND D 18702 06 18060 18838
04060 TFL BADD,DY,6, IN A, B, C, AND D 18714 06 18070 18848
04070 TFL CADD,DZ,6, RESPECTIVELY 18726 06 18070 18858
04080 FMUL 0,FLM1 18738 03 18788 18878
04090 TFL DADD,D,6 18750 06 18080 18788
04100 B7 RETURN,,6, EXIT PROGRAM 18762 49 02410 00000
04110*
04120 A1 DS 10 18778 00010
04130 A2 DS 10 18788 00010
04140 A3 DS 10 18798 00010
04150 B1 DS 10 18808 00010
04160 B2 DS 10 18818 00010
04170 B3 DS 10 18828 00010
04180 DX DS 10 18838 00010
04190 DY DS 10 18848 00010
04200 DZ DS 10 18858 00010
05010 DXDYDZ DS 0,A1 18778 00000
05020 D DS 0,A2 18788 00000
05030 ZERO DS ,7680 07680 00000
05040 WORKAR DS 10 18868 00010
05050 DC 8,-10000000 18876 00008
05060 FLM1 DC 2,1 18878 00002
05070*
05080 DS 82,, FILL LAST SECTOR 18960 00082
05090* THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM
05100 TYPERR DS 0,2416 02416 00000
05110 TDATA4 DS 0,3352 03352 00000
05120 TDATA5 DS 0,3362 03362 00000
05130 TDATA6 DS 0,3372 03372 00000
05140 TDATA7 DS 0,3382 03382 00000
05150 MONITR DS 0,2406 02406 00000
05160 RETURN DS 0,2411 02411 00000
05170*
05180 DEND,PLFMZ1 18082

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SYMBOL TABLE

VECTOR 16462	TYPERR 02416	TDATA7 03382	TDAY6 03372	TDATA5 03362
TDATA4 03352	RETURN 02411	RCDMRK 17801	MONTR 02406	FM4095 16814
FILSYM 16746	ERRDR1 16650	BRANCH 16806	CONST 17821	COSF 02421
DSAL 17806	DX 17831	DY 17841	DZ 17851	FM187 17518
FMS 16966	FM57 17366	FM63 16674	FM9 17094	FORM 07712
IAT1 07731	P1180 17861	SINF 02416	SQRTF 02416	SYMB1 04289
SYMB5 04315	SYMB6 04325	SYMB7 04335	ZERO 07680	

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01010*
01020* VECTOR DEFPRE SUBPROGRAM INCLUDING FM63(CANONICAL FORM).
01030* FM187IS LENGTH AT ANGLE A).
01040* LINKAGE - B VECTOR
01050* VECTOR IS EQUIVALENT TO -2416
01060* CALLS TYPERR, SQRTF, SINF AND COSF
01070*
01080 DORG 16462 16462
01090 VECTOR CM FORM,63,8, DETERMINE 16462 14 07712 0-063
01100 BE FM63 16474 46 16674 01200
01110 CM FORM,4095,8, STATEMENT 16486 14 07712 0M095
01120 BE FM4095 16498 46 16814 01200
01130 CM FORM,5,8, FORMAT 16510 14 07712 0-005
01140 BE FM5 16522 46 16966 01200
01150 CM FORM,9,8, AND BRANCH TO
16534 14 07712 0-009
16546 46 17094 01200
01160 BE FM9
01170 CM FORM,57,8, OR CALL
16558 14 07712 0-057
16570 46 17366 01200
01180 BE FM57
01190 CM FORM,187,8, APPROPRIATE
16582 14 07712 0-187
16594 46 17518 01200
01200 BE FM187
02010 CM FORM,25,8, ROUTINE
16606 14 07712 0-025
16618 46 16650 01200
02020 BNE ERROR1
02030 BT MONTR,DSAL+5,6, CALL FM25 FROM FILE 16630 27 02400 17811
02040 BT -2416 16642 49 02410 00000
02050 ERROR1 BTM -MONTR,03090 16650 17 02400 -3090
02060 BTM TYPERR,301,68, 16662 17 02410 0-301
02070* CANONICAL FORM
02080 FM63 AM IAT1,12,10, PULL X, Y, AND Z 16674 11 07731 000J2
02090 TFL DX,IAT1,11 16686 06 17831 0773J
02100 AM IAT1,14,10, FROM WORD LIST TABLE 16698 11 07731 000J4
02110 TFL DY,IAT1,11 16710 06 17841 0773J
02120 AM IAT1,14,10 16722 11 07731 000J4
02130 TFL DZ,IAT1,11 16734 06 17851 0773J
02140 FILSYM TFL SYMB5,DX,, PUT DATA IN SYMBOL TABLE 16746 06 04315 17831
02150 TFL SYMB6,DY 16758 06 04325 17841
02160 TFL SYMB7,DZ 16770 06 04335 17851
02170 TFM SYMB1,51,8 16782 16 04289 0-051
02180 TD SYMB7+1,RCDMRK 16794 25 04336 17801
02190 BRANCH BT RETURN,,6, EXIT PROGRAM 16806 49 0241J 00000
02200* COORDINATES OF TWO POINTS GIVEN
03010 FM4095 AM IAT1,82,10, PULL COORDINATES FROM WORD LIST
16814 11 07731 00002
16826 06 17851 0773J
03020 TFL DZ,IAT1,11 16838 12 07731 000J4
03030 SM IAT1,14,10

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03040 TFL DY,IAT1,11 16850 06 17841 0773J
03050 SM IAT1,14,10 16862 12 07731 000J4
03060 TFL DX,IAT1,11 16874 06 17831 0773J
03070 SM IAT1,14,10 16886 12 07731 000J4
03080 FSUB DZ,IAT1,11, AND SUBTRACT FIRST FROM SECOND
16898 02 17851 0773J
16910 12 07731 000J4
03090 SM IAT1,14,10
03100 FSUB DY,IAT1,11 16922 02 17841 0773J
03110 SM IAT1,14,10 16934 12 07731 000J4
03120 FSUB DX,IAT1,11 16946 02 17831 0773J
03130 BT FILSYM 16958 49 16746 00000
03140* TWO POINTS GIVEN
03150 FMS CM TDATA4,9,10, CHECK FOR POINT 16966 14 03352 000-9
03160 BNE ERROR1 16978 47 16650 01200
03170 CM TDATA4+51,9,10, CHECK FOR 2ND POINT 16990 14 03403 000-9
03180 BNE ERROR1 17002 47 16650 01200
03190 TFL DX,TDATA5+51,, GET COORDINATES OF POINT 2 17014 06 17831 03413
03200 TFL DY,TDATA6+51 17026 06 17841 03423
04010 TFL DZ,TDATA7+51 17038 06 17851 03433
04020 FSUB DX,TDATA5,, AND SUBTRACT COORDINATES OF POINT 1
17050 02 17831 03362
17062 02 17841 03372
04030 FSUB DY,TDATA6 17074 02 17851 03382
04040 FSUB DZ,TDATA7 17086 49 16746 00000
04050 BT FILSYM
04060* UNIT VECTOR DESIRED
04070 FM9 CM TDATA4,5,10, CHECK FOR VECTOR 17094 14 03352 000-5
04080 BNE ERROR1 17106 47 16650 01200
04090 AM IAT1,12 17118 11 07731 -0012
04100 CM IAT1,30,610, CHECK FOR UNIT 17130 14 0773J 000L0
04110 BNE ERROR1 17142 47 16650 01200
04120 TFL DX,TDATA5,, GET DIRECTOIN NUMBERS 17154 06 17831 03362
04130 TFL DY,TDATA6 17166 06 17841 03372
04140 TFL DZ,TDATA7 17178 06 17851 03382
04150 FMUL DX,DX,, DX=DX**2 17190 03 17831 17831
04160 FMUL DY,DY,, DY=DY**2 17202 03 17841 17841
04170 FMUL DZ,DZ,, DZ=DZ**2 17214 03 17851 17851
04180 FADD DX,DY, DX=DX**2+DY**2+DZ**2 17226 01 17831 17841
04190 FADD DX,DZ,, 17238 01 17831 17851
04200 BTM MONTR,2000,67 SQRTF(DX**2+DY**2+DZ**2) 17250 17 02400 -2000
05010 BTM SQRTF,DX,67, 17262 17 02410 J7831
05020 TFL CONST,DX,, GSTORE NORMALIZING CONSTANT
17274 06 17821 17831
17286 06 17831 03362
05030 TFL DX,TDATA5,, GET DIRECTOIN NUMBERS 17298 06 17841 03372
05040 TFL DY,TDATA6 17310 06 17851 03382
05050 TFL DZ,TDATA7 17322 09 17831 17821
05060 FDIV DX,CONST,, NORMALIZE DX, DY, AND DZ 17334 09 17841 17821
05070 FDIV DY,CONST 17346 09 17851 17821
05080 FDIV DZ,CONST 17358 49 16746 00000
05090 BT FILSYM
05100* SCALAR TIMES A VECTOR
05110 FM57 CM TDATA4,5,10, CHECK FOR VECTOR 17366 14 03352 000-5
05120 BNE ERROR1 17378 47 16650 01200
05130 AM IAT1,26,, 17390 11 07731 -0026
05140 CM IAT1,28,610, CHECK FOR TIMES 17402 14 0773J 000K8
05150 BNE ERROR1 17414 47 16650 01200
05160 TFL DX,TDATA5,, GET DX,DY, AND DZ 17426 06 17831 03362
05170 TFL DY,TDATA6 17438 06 17841 03372
05180 TFL DZ,TDATA7 17450 06 17851 03382
05190 SM IAT1,14,10, POSITION IAT1 AT 5 17462 12 07731 000J4
05200 FMUL DX,IAT1,11, DX(I)=DX 17474 03 17831 0773J

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06010 FMUL DY,IAT1,11, DYV1(S)=DY 17486 03 17841 0773J
06020 FMUL DZ,IAT1,11, DZV1(S)=DZ 17498 03 17851 0773J
06030 B7 FILSYM 17510 49 16746 00000
06040* LENGTH AND ANGLE GIVEN
06050 FM187 AM IAT1,12,, 17518 11 07731 -0012
06060 CM IAT1,9,610, CHECK FOR LENGTH 17530 14 0773J 000-9
06070 BNE ERROR1 17542 47 16650 01200
06080 AM IAT1,28 17554 11 07731 -0028
06090 CM IAT1,1,610, CHECK FOR ATANGL 17566 14 0773J 000-1
06100 BNE ERROR1 17578 47 16650 01200
06110 AM IAT1,14,10 17590 11 07731 000J4
06120 TFL DX,IAT1,11, PUT ANGLE IN DX AND DY 17602 06 17831 0773J
06130 TFL DY,IAT1,11 17614 06 17841 0773J
06140 FMUL DX,PI180,, CONVERT ANGLE IN DEGREES TO RADIANS 17626 03 17831 17861
06150 FMUL DY,PI180,, BY MULT. BY PI/180 17638 03 17841 17861
06160 BTM MONITR,2010,67 17650 17 02400 -2010
06170 BTM SINFDY,67, DY=SINF(A) 17662 17 02410 J7841
06180 BTM COSFDX,67, DX=COSF(A) 17674 17 0242J J7831
06190 SM IAT1,28,10 17686 12 07731 000K8
06200 FMUL DX,IAT1,11, DX=(S)COSF(A) 17698 03 17831 0773J
07010 FMUL DY,IAT1,11, DY=(S)SINF(A) 17710 03 17841 0773J
07020 TFL DZ,ZERO 17722 06 17851 07680
07030 B7 FILSYM 17734 49 16746 00000
07040*
07050 DS 60,, FILL LAST SECTOR 17800 00060
07060* THESE ARE EQUATES FOR AREAS IN COMMON WITH SYSTEM
07070 FORM DS 0,7712 07712 00000
07080 IAT1 DS 0,7731 07731 00000
07090 SYMB1 DS 0,4289 04289 00000
07100 SYMB5 DS 0,4315 04315 00000
07110 SYMB6 DS 0,4325 04325 00000
07120 SYMB7 DS 0,4335 04335 00000
07130 TDATA4 DS 0,3352 03352 00000
07140 TDATA5 DS 0,3362 03362 00000
07150 TDATA6 DS 0,3372 03372 00000
07160 TDATA7 DS 0,3382 03382 00000
07170 MONITR DS 0,2406 02406 00000
07180 RETURN DS 0,2411 02411 00000
07190 TYPERR DS 0,2416 02416 00000
07200 SQRTF DS 0,2416 02416 00000
08010 SINFDY DS 0,2416 02416 00000
08020 COSFDX DS 0,2421 02421 00000
08030*
08040 RCDMRK DC 1, 17801 00001
08050 DSA1 DSA BRANCH 17806 00005 J6806
08060 DSC 5,03471 17807 00005
08070 CONST DS 10 17821 00010
08080 DX DS 10 17831 00010
08090 DY DS 10 17841 00010
08100 DZ DS 10 17851 00010
08110 ZERO DS ,7680 07680 00000
08120 DC 8,17453292 17859 00008
08130 PI180 DC 2,-1 17861 00002
08140 DEND VECTOR 16462

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SYMBOL TABLE

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TYPERR 02416 TDATA7 03382 TDATA6 03372 TDATA5 03362 TDATA4 03352
RETURN 02411 RCDMRK 16521 MONITR 02406 FILSYM 18090 CROSS 18238
DX 18531 DY 18541 DZ 18551 ERROR 17994 FM25 17862
IAT1 07731 MINUS 18158 PLUS 18018 SYMB1 04289 SYMB5 04315
SYMB6 04325 SYMB7 04335 MKAR 18561

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01010*
01020* VECTOR DEFPRE FORM 25 (VICROSSV2,V1MINUSV2, OR V1PLUSV2)
01030* LINKAGE - B FM25
01040* FM25 IS EQUIVALENT TO -2416
01050* CALLS TYPERR
01060*
01070*
01080 DORG 17862
01090 FM25 CM TDATA4,5,10, CHECK FOR VECTOR 17862 14 03352 000-5
01100 BNE ERROR 17874 47 17994 01200
01110 CM TDATA4+51,5,10, CHECK FOR 2ND VECTOR 17886 14 03403 000-5
01120 BNE ERROR 17898 47 17994 01200
01130 AM IAT1,26,10 17910 11 07731 000K6
01140 CM IAT1,19,610, CHECK 17922 14 0773J 000J9
01150 BE PLUS 17934 46 18018 01200
01160 CM IAT1,10,610, MODIFIERS 17946 14 0773J 000J0
01170 BE MINUS 17958 46 18158 01200
01180 CM IAT1,03,610 17970 14 0773J 000-3
01190 BE CROSS 17982 46 18238 01200
01200 ERROR BTM -MONITR,03090 17994 17 02400 -3090
02010 BTM TYPERR,301,67, INCORRECT STATEMENT 18006 17 02410 -0301
02020 PLUS TFL DX,TDATAS 18018 06 18531 03362
02030 FADD DX,TDATAS+51,, DX=DXV1+DXV2 18030 01 18531 03413
02040 TFL DY,TDATA6 18042 06 18541 03372
02050 FADD DY,TDATA6+51,, DY=DYV1+DYV2 18054 01 18541 03423
02060 TFL DZ,TDATA7 18066 06 18551 03382
02070 FADD DZ,TDATA7+51,, DZ=DZV1+DZV2 18078 01 18551 03433
02080 FILSYM TFL SYMB5,DX,, PUT DATA IN SYMBOL TABLE 18090 06 04315 18531

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02090 TFL SYMB6,DY 18102 06 04325 18541
02100 TFL SYMB7,DZ 18114 06 04335 18551
02110 TFM SYMB1,51,8 18126 16 04289 0-051
02120 TD SYMB7+1,RCDMRK 18138 25 04336 18521
02130 B7 RETURN,,6, EXIT PROGRAM 18150 49 0241J 00000
02140*
02150 MINUS TFL DX,TDATAS 18158 06 18531 03362
02160 FSUB DX,TDATAS+51,, DX=DXV1-DXV2 18170 02 18531 03413
02170 TFL DY,TDATA6 18182 06 18541 03372
02180 FSUB DY,TDATA6+51,, DY=DYV1-DYV2 18194 02 18541 03423
02190 TFL DZ,TDATA7 18206 06 18551 03382
02200 FSUB DZ,TDATA7+51,, DZ=DZV1-DZV2 18218 02 18551 03433
03010 B7 FILSYM 18230 49 18090 00000
03020*
03030 CROSS TFL DX,TDATA6 18238 06 18531 03372
03040 FMUL DX,TDATA7+51 18250 03 18531 03433
03050 TFL MKAR,TDATA6+51 18262 06 18541 03423
03060 FMUL MKAR,TDATA7 18274 03 18541 03382
03070 FSUB DX,MKAR,, DX=DYV1(DZV2)-DYV2(DZV1) 18286 02 18531 18561
03080 TFL DY,TDATA7 18298 06 10541 83302
03090 FMUL DY,TDATAS+51 18310 03 18541 03413

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03100 TFL WKAR,TDATA7*51 18322 06 18561 03433
03110 FMUL WKAR,TDATA5 18334 03 18561 03362
03120 FSUB DY,WKAR,, DY=DZV1(DXV2)-DZV2(DXV1) 18346 02 18541 18561
03130 TFL DZ,TDATA5 18358 06 18551 03362
03140 FMUL DZ,TDATA6*51 18370 03 18551 03423
03150 TFL WKAR,TDATA5*51 18382 06 18561 03413
03160 FMUL WKAR,TDATA6 18394 03 18561 03372
03170 FSUB DZ,WKAR,, DZ=DXV1(DYV2)-DXV2(DYV1) 18406 02 18551 18561
03180 B7 FILSYM 18418 49 18090 00000
03190*
03200 DS 96,, FILL LAST SECTOR 18520 00096
04010* THESE ARE EQUATES FOR AREAS COMMON WITH SYSTEM
04020 IAT1 DS 0,7731 07731 00000
04030 SYMB1 DS 0,4289 04289 00000
04040 SYMB5 DS 0,4315 04315 00000
04050 SYMB6 DS 0,4325 04325 00000
04060 SYMB7 DS 0,4335 04335 00000
04070 TDATA4 DS 0,3352 03352 00000
04080 TDATA5 DS 0,3362 03362 00000
04090 TDATA6 DS 0,3372 03372 00000
04100 TDATA7 DS 0,3382 03382 00000
04110 MONITR DS 0,2406 02406 00000
04120 RETURN DS 0,2411 02411 00000
04130 TYPERR DS 0,2416 02416 00000
04140*
04150 RCDMRK DC 1,1 18521 00001
04160 DX DS 10 18531 00010
04170 DY DS 10 18541 00010
04180 DZ DS 10 18551 00010
04190 WKAR DS 10 18561 00010
04200 DEND FM25 17862

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SYMBOL TABLE

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TYPERR 02416 TDAT16 03472 TDAT15 03462 TDAT14 03452 TDAT13 03442
TDAT12 03432 TDAT11 03422 TDAT10 03412 TDATA9 03402 TDATAB 03392
TDATA7 03382 TDATA6 03372 TDATA5 03362 SYMB16 04425 SYMB15 04415
SYMB14 04405 SYMB13 04395 SYMB12 04385 SYMB11 04375 SYMB10 04365
ROTRN 17146 RETURN 02411 RCDMRK 17509 RADIAN 17541 NEGONE 17561
MONITR 02406 MATRIX 16462 FM7215 16582 FM3007 17310 FINNSH 16702
ERRDR1 16558 COSINE 17551 COMMON 16902 COSF 02421 CTR 17531
FM11 16958 FM191 16734 FORM 07712 IAT1 07731 LIKE 16878
LOOP 16618 ONE 17529 PI180 17519 SINE 17541 SINP 02416
SYMB1 04289 SYMB5 04315 SYMB6 04325 SYMB7 04335 SYMB8 04345
SYMB9 04355 XYROT 17110 ZERO 07680

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01010* MATRIX DEFPRE SUBPROGRAM INCLUDING FM7215(CANONICAL FORM)
01020* FM191(TRANSLATION), FM11(ROTATION), FM3007(TRANSL AND
01030* ROT), FM11(SCALE).
01040* LINKAGE - B MATRIX
01050* MATRIX IS EQUIVALENT TO -2416
01060* CALLS TYPERR, SINP, AND COSF
01070*
01080*
01090 DORG 16462 16462
01100 MATRIX CM FORM,7215,8, DETERMINE 16462 14 07712 0P215
01110 BE FM7215 16474 46 16582 01200
01120 CM FORM,191,8, FORM 16486 14 07712 0-191
01130 BE FM191 16498 46 16734 01200
01140 CM FORM,11,8, AND BRANCH 16510 14 07712 0-011
01150 BE FM11 16522 46 16958 01200
01160 CM FORM,3007,8, TO ROUTINE 16534 14 07712 0L007
01170 BE FM3007 16546 46 17310 01200
01180 ERROR1 BTM MONITR,03090,67 INCORRECT STATEMENT 16558 17 02400 -3090
01190 BTM TYPERR,301,67, INCORRECT STATEMENT 16570 17 02410 -0301
01200* CANONICAL FORM - TWELVE PARAMETERS GIVEN
02010 FM7215 AM IAT1,12,, SET IAT1 TO A1 16582 11 07731 -0012
02020 TFM CTR,10 16594 16 17531 000-0
02030 TFL SYMB5,IAT1,11, PUT A1 IN SYMB5 16606 06 04315 0773J
02040 LOOP AM IAT1,14,, SET IAT1 TO NEXT PARAMETER 16618 11 07731 -0014
02050 TFL SYMB6,IAT1,11, PUT PARAMETER IN SYMBOL TABLE 16630 06 04325 0773J
02060 AM LOOP*18,10,, MODIFY LAST INSTRUCTION TO TRANSMIT NEXT
02070 AM CTR,1,10, PARAMETER. KEEP COUNT. 16642 11 16636 -0010
02080 CM CTR,11,10, HAVE ALL TWELVE PARAMETERS BEEN TRANSMITTEDO
02090 BE FINNSH,,, YES - GO ON 16666 14 17531 000J1
02100 BL LOOP,,, NO - LOOP 16678 46 16702 01200
02110 FINNSH TFM SYMB1,141,8, RECORD LENGTH IN SYMB1 16690 47 16618 01300
02120 TD SYMB16*1,RCDMRK,, PLACE RECORDMARK AT END 16702 16 04289 0-141
02130 B7 RETURN,,6, EXIT PROGRAM 16714 25 04426 17509
02140* TRANSLATION FORM GIVING DX,DY, AND DZ 16726 49 0241J 00000
02150 FM191 AM IAT1,12,, 16734 11 07731 -0012
02160 CM IAT1,29,610, CHECK FOR MODIFIER TRANSL 16746 14 0773J 000K9
02170 ONE ERROR1 16758 47 16558 01200
02180 TFL SYMB5,ONE,, PUT ONE IN 16770 06 04315 17529
02190 AM IAT1,14,, 16782 11 07731 -0014
02200 TFL SYMB8,IAT1,11, SYMB5, 10, AND 15 16794 06 04345 0773J

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03010 TFL SYMB10,ONE,, 16806 06 04365 17529
03020 AM IAT1,14,, AND DX, DY, AND DZ 16818 11 07731 -0014
03030 TFL SYMB12,IAT1,11, 16830 06 04385 0773J
03040 TFL SYMB15,ONE,, IN SYMB8, 12, AND 16 16842 06 04415 17529
03050 AM IAT1,14,, 16854 11 07731 -0014
03060 TFL SYMB16,IAT1,11, RESPECTIVELY. 16866 06 04425 0773J
03070 LIKE TFL SYMB6,ZERO,, FM191 AND FM11(SCALE) PUT ZERO 16878 06 04325 07680
03080 TFL SYMB9,ZERO,, IN SYMB6 AND 9 16890 06 04355 07680
03090 COMMON TFL SYMB7,ZERO,, ALL FORMS PUT ZERO IN 16902 06 04335 07680
03100 TFL SYMB11,ZERO,, 16914 06 04375 07680
03110 TFL SYMB13,ZERO,, SYMB7, 11, 13, AND 14. 16926 06 04395 07680
03120 TFL SYMB14,ZERO,, 16938 06 04405 07680
03130 B7 FINNSH 16950 49 16702 00000
03140* FORM 11 CAN BE ONE OF TWO STATEMENTS. IT IS DETERMINED BY
03150* CHECKING FIRST ELEMENT.
03160 FM11 AM IAT1,12,, 16958 11 07731 -0012
03170 CM IAT1,34,610, IS MODIFIER XYROT 16970 14 0773J 000L4
03180 BE XYROT 16982 46 17110 01200
03190 CM IAT1,25,610, IS MODIFIER SCALE 16994 14 0773J 000K5
03200 BNE ERROR1,,, INCORRECT STATEMENT 17006 47 16558 01200
04010* FORM 11, SCALE MODIFIER
04020 AM IAT1,14,, 17018 11 07731 -0014
04030 TFL SYMB5,IAT1,11, PUT SCALE FACTOR 17030 06 04315 0773J
04040 TFL SYMB10,IAT1,11 17042 06 04365 0773J
04050 TFL SYMB15,IAT1,11, IN SYMB5, 10, AND 15 17054 06 04415 0773J
04060 TFL SYMB8,ZERO,, 17066 06 04345 07680
04070 TFL SYMB12,ZERO,, AND ZERO IN SYMB8, 12, AND 16 17078 06 04385 07680
04080 TFL SYMB16,ZERO,, 17090 06 04425 07680
04090 B7 LIKE,,, OTHER AREAS ARE FILLED 17102 49 16878 00000
04100* FORM 11, XYROT MODIFIER
04110 XYROT TFL SYMB8,ZERO,, PUT ZERO IN SYMB8, 12, AND 16. 17110 06 04345 07680
04120 TFL SYMB12,ZERO,, 17122 06 04385 07680
04130 TFL SYMB16,ZERO,, 17134 06 04425 07680
04140 ROTTRN TFL SYMB15,ONE,, IN COMMON WITH FM3007 PUT ONE IN SYMB15, 17146 06 04415 17529
04150 AM IAT1,14,, 17158 11 07731 -0014
04160 TFL RADIAN,IAT1,11, 17170 06 17541 0773J
04170 FMUL RADIAN,PI180,, CCNVERT ANGLE TO RADIAN, 17182 03 17541 17519
04180 TFL COSINE,RADIAN,, 17194 06 17551 17541
04190 BTM MONITR,2010,67, GET SIN-COS ROUTINE THRU MONITR, 17206 17 02400 -2010
04200 BTM COSF,COSINE,67, AND OBTAIN SINE AND 17218 17 0242J J7551
05010 BTM SINP,SINE,67, COSINE OF ANGLE. 17230 17 02410 J7541
05020 TFL SYMB5,COSINE,, PUT COSINE IN SYMB5 AND 10, 17242 06 04315 17551
05030 TFL SYMB6,SINE,, SINE IN SYMB6, 17254 06 04325 17541
05040 TFL SYMB10,COSINE,, 17266 06 04365 17551
05050 FMUL SINE,NEGONE,, 17278 03 17541 17561
05060 TFL SYMB9,SINE,, AND NEGATIVE SINE IN SYMB9 17290 06 04355 17541
05070 B7 COMMON,,, 17302 49 16902 00000
05080* FORM 3007, XYROT ANGLE GIVEN WITH TRANSLATION VALUES OF DX,DY,
05090* AND DZ
05100 FM3007 AM IAT1,12,, 17310 11 07731 -0012

05110 CM IAT1,34,610, CHECK STATEMENT FOR XYROT 17322 14 0773J 000L4
05120 BNE ERROR1 17334 47 16558 01200
05130 AM IAT1,28,, 17346 11 07731 -0028
05140 CM IAT1,29,610, AND TRANSL MODIFIERS. 17358 14 0773J 000K9
05150 BNE ERROR1 17370 47 16558 01200
05160 AM IAT1,14,, 17382 11 07731 -0014
05170 TFL SYMB8,IAT1,11, PUT DX IN SYMB8, 17394 06 04345 0773J
05180 AM IAT1,14,, 17406 11 07731 -0014
05190 TFL SYMB12,IAT1,11, DY IN SYMB12 AND 17418 06 04385 0773J
05200 AM IAT1,14,, DZ IN SYMB16. 17430 11 07731 -0014
06010 TFL SYMB16,IAT1,11, 17442 06 04425 0773J
06020 SM IAT1,70,, SET IAT1 BACK TO IAT1+12 17454 12 07731 -0070
06030 B7 ROTTRN,,, FILL OTHER AREAS 17466 49 17146 00000
06040 DS 36,, FILL LAST SECTOR 17508 00036
06050* THESE ARE EQUATES FOR ABSOLUTE AREAS COMMON WITH INTRAN
06060 FORM DS 0,7712 07712 00000
06070 IAT1 DS 0,7731 07731 00000
06080 MONITR DS 0,2406 02406 00000
06090 RETURN DS 0,2411 02411 00000
06100 TYPERR DS 0,2416 02416 00000
06110 SINP DS 0,2416 02416 00000
06120 COSF DS 0,2421 02421 00000
06130 SYMB1 DS 0,4289 04289 00000
06140 SYMB5 DS 0,4315 04315 00000
06150 SYMB6 DS 0,4325 04325 00000
06160 SYMB7 DS 0,4335 04335 00000
06170 SYMB8 DS 0,4345 04345 00000
06180 SYMB9 DS 0,4355 04355 00000
06190 SYMB10 DS 0,4365 04365 00000
06200 SYMB11 DS 0,4375 04375 00000
07010 SYMB12 DS 0,4305 04305 00000
07020 SYMB13 DS 0,4395 04395 00000
07030 SYMB14 DS 0,4405 04405 00000
07040 SYMB15 DS 0,4415 04415 00000
07050 SYMB16 DS 0,4425 04425 00000
07060 TDATA5 DS 0,3362 03362 00000
07070 TDATA6 DS 0,3372 03372 00000
07080 TDATA7 DS 0,3382 03382 00000
07090 TDATA8 DS 0,3392 03392 00000
07100 TDATA9 DS 0,3402 03402 00000
07110 TDAY10 DS 0,3412 03412 00000
07120 TDAY11 DS 0,3422 03422 00000
07130 TDAY12 DS 0,3432 03432 00000
07140 TDAY13 DS 0,3442 03442 00000
07150 TDAY14 DS 0,3452 03452 00000
07160 TDAY15 DS 0,3462 03462 00000
07170 TDAY16 DS 0,3472 03472 00000
07180* CONSTANTS AND AREAS USED IN PROGRAM
07190 RCDWRK DC 1, 17509 00001
07200 DC 8,17453292 17517 00008
08010 PI180 DC 2,-1 17519 00002
08020 ZERO DS 7680 07680 00000
08030 DC 8,10000000 17527 00008
08040 ONE DC 2,1 17529 00002
08050 CTR DC 2,0 17531 00002
08060 RADIAN DS 10 17541 00010
08070 COSINE DS 10 17551 00010
08080 SINE DS 0,RADIAN 17561 00000
08090 DC 8,-10000000 17559 00008
08100 NEGONE DC 2,-1 17561 00002

SYMBOL TABLE

WLNEXT 16714	TYPERR 02416	TSTLOC 18132	TSTDAT 18108	TSCON2 18107
TSCON1 18105	TSARAY 18105	TDNEXT 16654	TDATA5 03362	TDATA4 03352
TABCYL 16462	SZZERO 17106	STRATE 17686	STORE2 18764	STORE1 18670
STEPWL 19093	STEPID 19082	STCON2 18763	STCCN1 18669	SPLINE 19101
SPLCHK 18066	SETSYM 17850	SETLST 17790	SECCN2 18337	SECON1 18335
RPKEEP 19075	RPCALC 18561	ROTANG 16762	RETURN 02411	OUTADD 18421
NUMPTS 16532	NOZSPL 18021	MONITR 02406	MINI_0 19111	LOCTST 17522
LASTUV 18446	LASTIN 18514	INFSLP 19161	IATADD 18349	GOBACK 18666
ERPROG 18864	CHKZRO 18630	CHKPTS 18196	CHKINF 17294	CHKDIG 18195
CALTAN 17174	A 18914	AGAIN 17642	ALPHN 19075	ATANF 02416
B 18924	C 18934	COSF 02421	DSAT1 17921	DSAT2 17928
DSAT3 17935	DSAT4 17951	DSAT5 17967	DSAT6 17983	DSAT7 17999
DSAT8 18014	ER317 18832	ER318 18852	EXIT 17910	IAT1 07731
IGT 16529	INARG 18629	INIT 07976	IPT 16520	IXY 16517
LAST1 18128	LOC1 18899	LOC2 18904	MCT 07876	NOZ 19099
PCOS 19055	PHI 18944	PHIP 19045	PI 19151	PSIN 19065
PTCHK 16566	PTSOK 16942	ROTP 18542	RPX 18551	RPY 18556
SC 19045	SETUV 18338	SINF 02416	ST1 16510	ST2 16522
ST3 16534	ST4 16558	ST5 18410	ST6 18120	SUB1 18331
SUB2 18547	SUB3 18625	SYMB1 04289	SYMB5 04315	S1 19025
S2 19035	TANF 02416	TCCNS 19084	TSTWD 18022	TWIND 16542
UC 19065	UPCOM 17570	U2 18955	U3 18975	VC 19075
V2 18965	V3 18985	WCONS 19095	WDL1 16666	WDL2 17558
WDL3 17826	WORK1 19055	WORK2 19065	WORK3 19075	XP2 18995
XP3 19005	YP3 19015	O.0 07680	O.5 19121	L.0 19131
Z.0 19141				

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01010= IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
01020= COEFFICIENTS OF CUBIC EQUATIONS FOR
01030= TABULATED CYLINDERS (V=AU**3+BU**2+CU+D)
01040=
01050= *NAME TABCYL... NON-ERASABLE DEFPRE SUBPROGRAM
01060= *ID NUMBER 0350+DELDIM
01070= *STORE CORE IMAGE
01080= LINKAGE - B TABCYL,,6
01090=
01100=.....
01110= TABCYL PROCESSES AD-APT STATEMENTS OF THE FORM.....
01120= (1) TABCYL/NOZ,SPLINE,X1,Y1,X2,Y2,...,XN,YN
01130= (2) TABCYL/NOZ,SPLINE,PT1,PT2,...,PTN
01140= WHERE X1,Y1 ARE COORDINATES OF POINTS AND PT1 ARE
01150= SYMBOL NAMES FOR POINTS.....N IS GREATER THAN OR
01160= EQUAL TO 3 AND LESS THAN OR EQUAL TO 15
01170=
01180= TABCYL OUTPUT FORMAT.....STORED IN SYMB ARRAY
01190= NO. OF CHAR,NAME,SUB,TYPE,X1,Y1,A1,B1,C1,ALPHA1,...,
01200= X(N-1),Y(N-1),A(N-1),B(N-1),C(N-1),ALPHA(N-1),XN,YN
02010=.....
02020=
02030= DORG 16462 16462
02040= SUBPROGRAM ENTRY
02050=
02060 TABCYL TF IATADD,IAT1,, STORE STARTING ADDRESS OF WORD LIST
02070 BTM TSTWD,,10. TEST WORD 1 OF TABCYL STATEMENT (NOZ)
16462 26 18349 07731
16474 17 18022 000-0

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02080 BTM TSTWD,1,10, TEST WORD 2 OF TABCYL STATEMENT (SPLINE)
                                16488 17 18022 000-1
02090 YF TWIND,IATADD,11, SET INDICATOR (01=TDATA,02=WORDL)
                                16498 26 16542 1834R
02100 ST1 TDM IX,Y,0,, INITIALIZE LAST INTERVAL INDICATOR
                                16510 15 16517 00000
02110 ST2 TDM IGT,0,, INITIALIZE FIRST INTERVAL INDICATOR
                                16522 15 16529 00000
02120 ST3 YFM IPT,3,9, INITIALIZE POINT COUNT TO 3
                                16534 16 16520 00-03
02130 TFM OUTADD,SYMB5,, SET SYMB5 ADDRESS FOR OUTPUT STORAGE
                                16546 16 18421 -4315
02140 ST4 CM TWIND,2,10, TEST LOCATION OF INPUT DATA
                                16558 14 16542 000-2
02150 BE WDL1,,, WORDL (X-Y COORDINATES)
                                16570 46 16666 01200
02160 BH ER317,,, INVALID TABCYL STATEMENT
                                16582 46 18832 01100
02170+ FIND COEFFICIENTS OF FIRST, TRANSLATE AXIS TO FIRST AND
02180+ ROTATE SUCH THAT THE AXIS FOR THE INDEPENDENT VARIABLE
02190+ PASSES THRU THE SECOND POINT
02200+
03010+
03020+ TDATA INPUT DATA
03030 TFM TSTLOC*6,TDATA4,, SET ADDRESS FOR VALIDITY TEST
                                16594 16 18138 -3352
03040 BTFL TSTDAT,TCONS*2,, TEST TDATA ARRAY
                                16606 07 18108 19086
03050 BTM CHKPTS,,10, TEST AND SET NO. OF PTS INPUT TO TABCYL
                                16618 17 18196 000-0
03060 TFM LOC1,TDATA5,, INITIALIZE TDATA X1 ADDRESS
                                16630 16 18899 -3362
03070 TFM LOC2,TDATA5*51,, INITIALIZE TDATA X2 ADDRESS
                                16642 16 18904 -3413
03080 TONEXT BT SETUV,DSAT1*2,, SET U-V COORDINATES FOR TDATA INPUT
                                16654 27 18338 17923
03090+
03100+ WORDL INPUT DATA
03110 WDL1 TF TSTLOC*6,IATADD,, SET ADDRESS FOR VALIDITY TEST
                                16666 26 18138 18349
03120 BTFL TSTDAT,WCONS*2,, TEST WORDL ARRAY
                                16678 07 18108 19097
03130 BTM CHKPTS,1,10, TEST AND SET NO. OF PTS INPUT TO TABCYL
                                16690 17 18196 000-1
03140 AM IATADD,12,10, INITIALIZE WORDL X1 ADDRESS
                                16702 11 18349 000J2
03150 WLNEXT TF LOC1,IATADD
                                16714 26 18899 18349
03160 AM IATADD,28,10, INITIALIZE WORDL X2 ADDRESS
                                16726 11 18349 000K8
03170 TF LOC2,IATADD
                                16738 26 18904 18349
03180 BT SETUV,DSAT2*2,, SET U-V COORDINATES FOR WORDL INPUT
                                16750 27 18338 17930
03190+
03200+ CALCULATE ROTATION ANGLE....PHI....
04010 ROTANG BTM MONITR,02020,67, CALL ATANF SUBROUTINE VIA MONITR
                                16762 17 02400 -2020
04020 BT ATANF,DSAT3*10,6, PHI=ATANF(V2/U2)
                                16774 27 02410 17945
04030 TFL PSIN,PHI
                                16786 06 19065 18944
04040 BTM MONITR,02010,67, CALL SINFCOSF SUBROUTINE VIA MONITR
                                16798 17 02400 -2010
04050 BTM SINFCOSF,PSIN,67, PSIN=SINFCOSF(PHI)
                                16810 17 02410 19065
04060 TFL PCOS,PHI
                                16822 06 19055 18944

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04070 BTM COSFCOSF,PCOS,67, PCOS=COSFCOSF(PHI)
                                16834 17 0242J 19055
04080 BT ROTPT,DSAT4*10,, CALCULATE POINTS
                                16846 27 18562 17961
04090 BT ROTPT,DSAT5*10,, RELATIVE TO LOCAL
                                16858 27 18562 17977
04100 FMUL U3,MIN1,0,, ROTATED COORDINATE
                                16870 03 18975 19111
04110 BT ROTPT,DSAT6*10,, SYSTEM
                                16882 27 18562 17993
04120+
04130+ CALCULATE CENTER OF CIRCLE PASSING THRU THE POINTS
04140 TFL UC,XP2
                                16894 06 19065 18995
04150 FMUL UC,0.5
                                16906 03 19065 19121
04160+
04170+ TEST 3 POINTS IN A STRAIGHT LINE
04180 CM YP3,-5,10, TEST ROTATED POINT LESS THAN .000001
                                16918 14 19015 000-N
04190 BL STRATE,,, 3 POINTS IN A STRAIGHT LINE
                                16930 47 17686 01300
04200 PYSOK TFL VC,YP3,, VC=YP3
                                16942 06 19075 19015
05010 FMUL VC,VC,, VC=YP3**2
                                16954 03 19075 19075
05020 TFL WORK1,XP3,, WORK1=XP3
                                16966 06 19055 19005
05030 FSUB WORK1,XP2,, WORK1=XP3-XP2
                                16978 02 19055 18995
05040 FMUL WORK1,XP3,, WORK1=XP3(XP3-XP2)
                                16990 03 19055 19005
05050 FADD VC,WORK1,, VC=YP3**2+XP3**2-XP3*XP2
                                17002 01 19075 19055
05060 TFL WORK1,YP3,, WORK1=YP3
                                17014 06 19055 19015
05070 FMUL WORK1,2,0,, WORK1=2.0*YP3
                                17026 03 19055 19141
05080 FDIV VC,WORK1,, VC=(YP3**2+XP3**2-XP3*XP2)/(2.0*YP3)
                                17038 09 19075 19055
05090 BD S2ZERO,IXY,, TEST LAST INTERVAL X-Y
                                17050 43 17106 16517
05100 TFL S2,XP2,, CALCULATE SLOPE OF THE CIRCLE AT
                                17062 06 19035 18995
                                THE SECOND POINT
                                17074 02 19035 19065
05110 FSUB S2,UC,, S2=(XP2-UC)/VC
                                17086 09 19035 19075
05120 FDIV S2,VC,, S2=(XP2-UC)/VC
                                17098 49 17118 00000
05130 BT S2ZERO*12
                                17106 06 19035 07680
05140 S2ZERO TFL S2,0,0,, SET SLOPE AT SECOND POINT=0.0
                                17118 43 17174 16529
05150 BD CALTAN,IGT,, TEST FIRST INTERVAL IGT (GET TANGENT)
                                17130 06 19025 19065
05160 TFL S1,UC,, CALCULATE SLOPE OF THE CIRCLE AT
                                17142 03 19025 19111
                                THE FIRST POINT
                                17154 09 19025 19075
05170 FMUL S1,MIN1,0,, S1=-UC/VC
                                17166 49 17294 00000
05180 FDIV S1,VC,, S1=-UC/VC
                                17174 06 19065 1842J
05190 BT CHKINF
                                17186 11 18421 000J0
05200+
06010+ CALCULATE TANGENT OF ROTATION ANGLE AND ROTATE THE SLOPE OF
06020+ THE CUBIC IN THE PREVIOUS INTERVAL INTO THE NEW SYSTEM
06030 CALTAN TFL PHIP,OUTADD,11, SAVE PHIP(I-1)....PHIP=SVHB(I-1)
                                17198 17 02400 -2020
06040 AM OUTADD,10,10, STEP OUTPUT ADDRESS FOR K(I)
                                17210 27 02410 18009
06050 BTM MONITR,02020,67, CALL ATANF SUBROUTINE VIA MONITR
                                17222 01 19075 19065
06060 BT ATANF,DSAT7*10,6, ALPHP=ATANF(ISC/L,0)
                                17234 01 19075 19151
06070 FADD ALPHP,PHIP,, ALPHP=ATANF(ISC/L,0)+PHIP
                                17246 02 19075 18944
06080 FADD ALPHP,PI,, ALPHP=ATANF(ISC/L,0)+PHIP+PI
06090 FSUB ALPHP,PHI,, ALPHP=ATANF(ISC/L,0)+PHIP+PI-PHI
06100+

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06110*      CALCULATE NEW SLOPE
06120      TFL S1,ALPHP                      17258 06 19025 19075
06130      BT  MONITR,DSAT8+5,6,,          CALL TANF SUBROUTINE VIA MONITR
                                           17270 27 02400 18019
06140      BTM TANF,S1,67,,                S1=TANF(ALPHP)
06150      CHKINF TFL WORK1,S1,,           TEST FOR INFINITE SLOPE
                                           17282 17 02410 J9025
                                           17294 06 19055 19025
06160      FSUB WORK1,INFLP
06170      BL  ++24
06180      TFL S1,INFLP,,                 SET SLOPE INFINITE (S1=1.0E+48)
                                           17306 02 19055 19161
                                           17318 47 17342 01300
                                           17330 06 19025 19161

06190*
06200*      CALCULATE COEFFICIENTS OF THE CUBIC
07010      TFL WORK1,XP2,,                WORK1=XP2
07020      FMUL WORK1,WORK1,,             WORK1=XP2**2
07030      TFL A,S1,,                     A=S1
07040      FADD A,S2,,                     A=S1+S2
07050      FDIV A,WORK1,,                 A=(S1+S2)/XP2**2
07060      BTM CHKZRO,A,,                 CHECK A COEFF APPROXIMATELY ZERO
                                           17402 17 18630 J8914
07070      TFL B,S1,,                     B=S1
07080      FMUL B,2.0,,                   B=2.0*S1
07090      FADD B,S2,,                     B=2.0*S1+S2
07100      FMUL B,MINI.0,,                B=-(2.0*S1+S2)
07110      FDIV B,XP2,,                   B=-(2.0*S1+S2)/XP2
07120      BTM CHKZRO,B,,                 CHECK B COEFF APPROXIMATELY ZERO
                                           17426 03 18924 19141
                                           17438 01 18924 19035
                                           17450 03 18924 19111
                                           17462 09 18924 18995
07130      TFL C,S1,,                     C=S1
07140      BTM CHKZRO,C,,                 CHECK C COEFF APPROXIMATELY ZERO
                                           17474 17 18630 J8924
                                           17498 17 18630 J8934
07150      TFL SC,S2,,                     SC=S2
07160      LOCTST CM TWIND,2,10,,         TEST LOCATION OF INPUT DATA
                                           17510 06 19045 19035
07170      BE  WDL2,,                     WORDL (X-Y COORDINATES)
                                           17522 14 16542 000-2
                                           17534 46 17558 01200

07180*
07190*      STORE THE POINTS,COEFFICIENTS AND ANGLES
07200      BTM STORE1,10,10,,             STORE TDATA DATA (STEPPING CONSTANT=10)
                                           17546 17 18670 000J0
08010      WDL2 BTM STORE1,14,10,,         STORE WORDL DATA (STEPPING CONSTANT=14)
                                           17558 17 18670 000J4

08020*
08030*      COEFFICIENTS NOW STORED....TEST FOR MORE PROCESSING
08040      UPDCM AM LOC1,4,10,,           LOC1 SET TO X(I+1) ADDRESS FOR TDATA
08050*      LOC2 SET TO X(I+2) ADDRESS FOR TDATA
08060*      TDM IGT,1,,                   SET GT INDICATOR FOR NOT FIRST INTERVAL
08070*      C  IPT,NUMPTS,,               TEST ALL POINTS ON TABCYL PROCESSED
                                           17582 15 16529 00001
                                           17594 24 16520 16532
08080      BL  AGAIN,,                   MORE POINTS TO PROCESS
                                           17606 47 17642 01300
08100      BH  SETLST,,                  ALL POINTS PROCESSED
08110      TDM IXY,1,,                   SET LAST INTERVAL X-Y INDICATOR
                                           17618 46 17790 01100
                                           17630 15 16517 00001
08120      AGAIN AM IPT,1,10,,           STEP POINT COUNTER
08130      CM  TWIND,2,10,,             TEST LOCATION OF INPUT DATA
                                           17642 11 16520 000-1
                                           17654 14 16542 000-2
08140      BE  WDLNEXT,,                WORDL (X-Y COORDINATES)
                                           17666 46 16714 01200

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08150      B7  TDNEXT,,                  TDATA (POINTS)
08160*
08170*      THREE POINTS IN A STRAIGHT LINE
08180      STRATE BD SZZERO,IGT,,        TEST GT INDICATOR FOR FIRST INTERVAL
                                           17678 49 16654 00000
                                           17686 43 17106 16529
08190      TFL A,0.0,,                   SET A,B AND C
08200      TFL B,0.0,,                   COEFFICIENTS
09010      TFL C,0.0,,                   =0.0
09020      TFL S1,0.0,,                  SET SLOPES
09030      TFL S2,0.0,,                  TO
09040      TFL SC,0.0,,                  ZERO
09050      TFL VC,INFLP,,                VC=1.0E+48 (INFINITE SLOPE)
                                           17734 06 19025 07680
                                           17758 06 19045 07680
09060      B7  LOCTST,,                  TEST LOCATION OF INPUT DATA
                                           17770 06 19075 19161
09070      SETLST CM TWIND,2,10,,        TEST LOCATION OF INPUT DATA
                                           17782 49 17522 00000
09080      BE  WDL3,,                     WORDL (X-Y COORDINATES)
                                           17790 14 16542 000-2
                                           17802 46 17826 01200

09090*
09100*      STORE X(N) AND Y(N) COORDINATES
09110      BTM STORE2,10,10,,            STORE X(N),Y(N) TDATA (STEPPING CON=10)
                                           17814 17 18764 000J0
09120      WDL3 SM LOC1,27,10,,          STORE X(N),Y(N) WORDL (STEPPING CON=14)
09130      BTM STORE2,14,10,,
                                           17826 12 18899 000K7
                                           17838 17 18764 000J4
09140      SETSYM AM OUTADD,1,10,,       SET RECORD MARK AT END OF SYMB ARRAY
09150      TDM OUTADD,,0,,
                                           17850 11 18421 000-1
                                           17862 15 1842J 00000
09160      DC  1,,*
09170      SM  OUTADD,SYMB1-4,,         SET NUMBER OF CHARACTERS IN SYMB ARRAY
                                           17873 00001
                                           17874 12 18421 -4285
09180      SF  OUTADD-3
09190      TF  SYMB1,OUTADD
09200      EXIT B7 RETURN,,6,,          RETURN TO MAINLINE PROGRAM
                                           17886 32 18418 00000
                                           17898 26 04289 18421
                                           17910 49 0241J 00000

10010*
10020*      DSA ARGUMENT ADDRESSES AND CONSTANTS
10030      DSAT1 DSA STEPTD
00000 17921 00005 J9082
10040      DSA DSC 2,51
00000 17922 00002
10050      DSAT2 DSA STEPML
00000 17928 00005 J9093
10060      DSA DSC 2,28
00000 17929 00002
10070      DORG DSA DSA2+2+5*3-11
00000 17934
10080      NOP V2,PHI
00000 17934 41 18965 18944
10090      DORG --14
00000 17931
10100      DSAT3 DSA U2
00000 17935 00005 J8955
10110      DORG ++5*3-4+5*3-11
00000 17950
10120      NOP V2,XP2
00000 17950 41 18965 18995
10130      DORG --14
00000 17947
10140      DSAT4 DSA U2
00000 17951 00005 J8955
10150      DORG ++5*3-4+5*3-11
00000 17966
10160      NOP V3,XP3
00000 17966 41 18985 19005
10170      DORG --14
00000 17963
10180      DSAT5 DSA U3
00000 17967 00005 J8975
10190      DORG ++5*3-4+5*3-11
00000 17982
10200      NOP U3,VP3
00000 17982 41 18975 19015
10210      DORG --14
00000 17979
10220      DSAT6 DSA V3
00000 17983 00005 J8985
10230      DORG ++5*3-4+5*3-11
00000 17998
10240      NOP SC,ALPHP
00000 17998 41 19045 19075

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11050 DCRG --14 17995
11060 DSAT7 DSA 1.0 17999 00005 J9131
11070 DCRG ++5-3-4 18010
11080 DSAT8 DSA CHKIMP 18014 00005 J7294
11090 OSC 5,02211 18015 00005
11100*
11110*
11120* TEST VALIDITY AND CORRECTNESS OF WORDS 1 AND 2 IN
11130* TABCYL STATEMENT
11140 NOZSPL DAS 1,, TEST WORD FOR VALIDITY (0=NOZ,1=SPLINE)
18021 00002
11150 TSTND AM IATADD,12,10 18022 11 18349 000J2
11160 BD SPLCHK,NOZSPL 18034 43 18066 18021
11170 C IATADD,NOZ,6, TEST WORD 1 (NOZ) 18046 24 1834R 19099
11180 B7 SPLCHK+12 18058 49 18078 00000
11190 SPLCHK C IATADD,SPLINE,6, TEST WORD 2 (SPLINE) 18066 24 1834R 19101
11200 BNE ER317,,, TABCYL STATEMENT 18078 47 18832 01200
12010 AM IATADD,2,10 18090 11 18349 000-2
12020 B82 ... BRANCH BACK 18102 42 00000 00000
12030*
12040* TEST VALIDITY AND CORRECTNESS OF ENTIRE TABCYL STATEMENT
12050 TSARAY DAS 2,, TEST ARRAY FOR VALIDITY (TDATA OR WORDL)
18105 00004
12060 TSCON1 DS 2,TSARAY, STEPPING CONSTANT (51=TDATA,14=WORDL)
18105 00002
12070 TSCON2 DS 2,TSARAY+2, TYPE CONSTANT (09=TDATA,02=WORDL)
18107 00002
12080 TSTDAT TF LAST1,MCT,, SET NUMBER OF ELEMENTS TO RIGHT OF /
18108 26 18128 07876
12090 ST6 SM LAST1,2,10 18120 12 18128 000-2
12100 TSTLOC C ,TSCON2,, TEST VALID TYPE 18132 24 00000 18107
12110 BNE ER317,,, INVALID TABCYL STATEMENT
18144 47 18832 01200
12120 A TSTLOC+6,TSCON1,, STEP TEST LOCATION 18156 21 18138 18105
12130 SM LAST1,1,10, TEST ENTIRE STATEMENT PROCESSED
18168 12 18128 000-1
12140 BNE TSTLOC 18180 47 18132 01200
12150 B82 ... BRANCH BACK 18192 42 00000 00000
12160*
12170* TEST VALIDITY (NUMBER OF POINTS) INPUT TO TABCYL
12180* CALCULATE NUMBER OF POINTS INPUT TO TABCYL
12190 CHKDIG DAS 1,, INPUT DIGIT (0=TDATA,1=WORDL)
18195 00002
12200 CHKPTS TF PTCHK,MCT,, SET NUMBER OF ELEMENTS TO RIGHT OF /
18196 26 16566 07876
13010 SM PTCHK,2,10 18208 12 16566 000-2
13020 BD ++24,CHKDIG 18220 43 18244 18195
13030 A PTCHK,PTCHK 18232 21 16566 16566
13040 MM PTCHK,5,10, TEST FOR EVEN NUMBER OF COORDINATES
18244 13 16566 000-5
13050 TF NUMPTS,98,, SET NUMBER OF POINTS INPUT TO TABCYL
18256 26 16532 00098
13060 BD ER318,99,, ODD NUMBER OF COORDINATES
18268 43 18852 00099
13070 CM 98,3,9 18280 14 00098 00-03
13080 BL ER318,,, LESS THAN 3 POINTS INPUT
18292 47 18852 01300
13090 CM 98,15,9 18304 14 00098 00-15
13100 BH ER318,,, GREATER THAN 15 POINTS INPUT
18316 46 18852 01100

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13110 B82 ... BRANCH BACK 18328 42 00000 00000
13120*
13130* SET U-V COORDINATES FOR TDATA OR WORDL INPUT DATA
13140 SUB1 DAS 4 18331 00008
13150 SECON1 DS 5,SUB1+4, TDATA OR WORDL STEPPING CONSTANT
18335 00005
13160 SECON2 DS 2,SUB1+6, TDATA OR WORDL STEPPING CONSTANT
18337 00002
13170 SETUV -CF LOC2-4,,, SET UP LOCATION ADDRESSES FOR STEPPING
18338 33 18900 00000
13180 TFL U2,LOC2,11, U2=X(I+1) 18350 06 18955 1890M
13190 FSUB U2,LOC1,11, U2=X(I+1)-X(I) 18362 02 18955 1889R
13200 A LOC2,SECON1,11, SET Y(I) AND Y(I+1) ADDRESSES
18374 21 18904 1833N
14010 TFL V2,LOC2,11, V2=Y(I+1) 18386 06 18965 1890M
14020 FSUB V2,LOC1,11, V2=Y(I+1)-Y(I) 18398 02 18965 1889R
14030 ST5 SF SECON2-1 18410 32 18336 00000
14040 BD LASTIN,IXY,,, TEST LAST INTERVAL X-Y
18422 43 18514 16517
14050 A LOC2,SECON2,, SET Y(I+2) ADDRESS 18434 21 18904 18337
14060 LASTUV TFL V3,LOC2,11, V3=Y(I+2) OR Y(I-1) 18446 06 18985 1890M
14070 FSUB V3,LOC1,11, V3=(Y(I+2) OR Y(I-1))-Y(I)
18458 02 18985 1889R
14080 S LOC2,SECON1,11, SET X(I) AND X(I+2) OR X(I-1) ADDRESSES
18470 22 18904 1833N
14090 TFL U3,LOC2,11, U3=X(I+2) OR X(I-1) 18482 06 18975 1890M
14100 FSUB U3,LOC1,11, U3=(X(I+2) OR X(I-1))-X(I)
18494 02 18975 1889R
14110 B7 ROTANG,,, CALCULATE ROTATION ANGLE
18506 49 16762 00000
14120 LASTIN S LOC2,SECON2,, SET Y(I) ADDRESS 18514 22 18904 18337
14130 S LOC2,SECON2,, SET Y(I-1) ADDRESS 18526 22 18904 18337
14140 B7 LASTUV,,, LAST INTERVAL CALCULATION
18538 49 18446 00000
14150*
14160* CALCULATE POINTS RELATIVE TO LOCAL ROTATED COORD SYSTEM
14170 SUB2 DAS 8 18547 00016
14180 RPX DS 5,SUB2+4, X COORDINATE ADDRESS 18551 00005
14190 RPY DS 5,SUB2+9, Y COORDINATE ADDRESS 18554 00005
14200 RPCALC DS 5,SUB2+14, CALCULATED POINT ADDRESS
18561 00005
15010 ROTPT TFL RPKEEP,RPX,11, RPKEEP=X 18562 06 19075 1855J
15020 FMUL RPKEEP,PCOS,, RPKEEP=X*COSF(PHI) 18574 03 19075 19055
15030 TFL RPCALC,RPY,611, RPCALC=Y 18586 06 1856J 18550
15040 FMUL RPCALC,PSIN,6, RPCALC=Y*SINF(PHI) 18598 03 1856J 19065
15050 FMAD RPCALC,RPKEEP,6, RPCALC=X*COSF(PHI)+Y*SINF(PHI)
18610 01 1856J 19075
15060 B82 ... BRANCH BACK 18622 42 00000 00000
15070*
15080* CHECK INPUT ARGUMENT APPROXIMATELY ZERO
15090* SET INPUT ARGUMENT LESS THAN 10**-5 TO 0.0
15100 SUB3 DAS 3 18625 00006
15110 INARG DS 5,SUB3+4, INPUT ARGUMENT ADDRESS
18629 00005
15120 CHNZRO CM INARG,-4,610, TEST INPUT ARGUMENT LESS THAN 10**-5
18630 14 1862R 000-M
15130 BNL COSACK,,, INPUT ARGUMENT IS OK 18642 46 18666 01300
15140 TFL INARG,0.0,0, SET INPUT ARGUMENT=0.0
18654 06 1862R 07660
15150 COSACK B82 ... BRANCH BACK 18666 42 00000 00000

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15160*
15170* STORE THE POINTS, COEFFICIENTS AND ANGLES
15180 STCON1 DAS 1,, STEPPING CONSTANT (10=TDATA, 14=WORDL)
18669 00002
15190 STORE1 TFL OUTADD, LOCL, 611, SYMB(I)=X(I) 18670 06 1842J 1889R
15200 A LOCL, STCON1 18682 21 18899 18669
16010 AM OUTADD, 10, 10 18694 11 18421 000J0
16020 TFL OUTADD, LOCL, 611, SYMB(I+1)=Y(I) 18706 06 1842J 1889R
16030 AM OUTADD, 1, 10, SYMB(I+2)=A(I), SYMB(I+3)=B(I),
18718 11 18421 000-1
16040 TR OUTADD, A-9, 6, SYMB(I+4)=C(I), SYMB(I+5)=PHI(I)
18730 31 1842J 18905
16050 AM OUTADD, 39, 10, STEP OUTPUT ADDRESS FOR PHI(I)
18742 11 18421 000L9
16060 B7 UPCOM 18754 49 17570 00000
16070*
16080* STORE X(N) AND Y(N) COORDINATES
16090 STCON2 DAS 1,, STEPPING CONSTANT (10=TDATA, 14=WORDL)
18763 00002
16100 STORE2 AM OUTADD, 10, 10, SET OUTPUT ADDRESS FOR X(N)
18764 11 18421 000J0
16110 TFL OUTADD, LOCL, 611, SYMB(N-1)=X(N) 18776 06 1842J 1889R
16120 A LOCL, STCON2 18788 21 18899 18763
16130 AM OUTADD, 10, 10, SET OUTPUT ADDRESS FOR Y(N)
18800 11 18421 000J0
16140 TFL OUTADD, LOCL, 611, SYMB(N)=Y(N) 18812 06 1842J 1889R
16150 B7 SETSYM 18824 49 17850 00000
16160*
16170* ERROR CONDITION-INVALID OR INCORRECT TABCYL STATEMENT
16180* ERROR CONDITION-INVALID NUMBER OF POINTS INPUT TO TABCYL
16190 ER317 TFM ERPROC+23, 317,, INVALID OR INCORRECT TABCYL STATEMENT
18832 16 18887 -0317
16200 B7 ERPROC 18844 49 18864 00000
17010 ER318 TFM ERPROC+23, 318,, INVALID NUMBER OF POINTS
18852 16 18887 -0318
17020 ERPROC BTM MONITR, 03090, 67, CALL TYPERR SUBPROGRAM VIA MONITR
18864 17 02400 -3090
17030 BTM TYPERR,, 6, TYPE ERROR MESSAGE 18876 17 02410 00000
17040 B7 INIT,,, RETURN TO MAINLINE PROGRAM
18888 49 07976 00000
17050*
17060*
17070* STORAGE
17080 IXY DS 1, ST1+7, LAST INTERVAL X-Y INDICATOR
16517 00001
17090 IGT DS 1, ST2+7, FIRST INTERVAL GT INDICATOR
16529 00001
17100 TWIND DS 2, ST3+8, TDATA OR WORDL INPUT INDICATOR
16542 00002
17110 PTCNK DS 2, ST4+8, POINT CHECK STORAGE 16566 00002
17120 IPT DS 3, ST1+10, POINT COUNT STORAGE 16520 00003
17130 NUMPTS DS 3, ST2+10, NUMBER OF POINTS INPUT TO TABCYL
16532 00003
17140 IATADD DS 5, SETUV+11, CURRENT WORKING ADDRESS
18349 00005
17150 OUTADD DS 5, ST5+11, CURRENT OUTPUT ADDRESS
18421 00005
17160 LAST1 DS 2, ST6+8, NUMBER OF ELEMENTS COUNTER
18128 00002
17170 LOCL DS 5,, TDATA OR WORDL X(I) ADDRESS
18899 00005
17180 LOC2 DS 5, LOCL+5, TDATA OR WORDL X(I+1) ADDRESS
18904 00005
17190 DORG LOCL+6 18905
17200 A DS 10,, A COEFFICIENT 18914 00010
18010 B DS 10, A+10, B COEFFICIENT 18924 00010
18020 C DS 10, A+20, C COEFFICIENT 18934 00010
18030 PHI DS 10, A+30, ANGLE PHI (ALPHA) 18944 00010
18040 DC 1,, A+31, RECORD MARK 18945 00001
18050 DORG A+32 18946
18060 U2 DS 10,, U-V COORDINATES 18955 00010
18070 V2 DS 10,, FOR TRANSLATED 18965 00010
18080 U3 DS 10,, AND ROTATED 18975 00010
18090 V3 DS 10,, X-Y COORDINATES
18985 00010
18100 XP2 DS 10,, POINTS RELATIVE TO 18995 00010
18110 XP3 DS 10,, ROTATED LOCAL 19005 00010
18120 YP3 DS 10,, COORDINATE SYSTEM 19015 00010
18130 S1 DS 10,, POINT 19025 00010
18140 S2 DS 10,, SLOPE 19035 00010
18150 SC DS 10,, STORAGE 19045 00010
18160 WORK1 DS 10,, WORKING STORAGE 19055 00010
18170 WORK2 DS 10,, WORKING STORAGE 19065 00010
18180 WORK3 DS 10,, WORKING STORAGE 19075 00010
18190 PCOS DS 10, WORK1, COSF(ROTATION ANGLE) 19055 00010
18200 PSIN DS 10, WORK2, SINF(ROTATION ANGLE) 19065 00010
19010 RPKEEP DS 10, WORK3, ROTPY WORKING STORAGE 19075 00010
19020 UC DS 10, WORK2, U-V COORDINATE OF 19065 00010
19030 VC DS 10, WORK3, CENTER OF CIRCLE 19075 00010
19040 PHIP DS 10, WORK2, PREVIOUS ROTATION ANGLE
19065 00010
19050 ALPHP DS 10, WORK3, PRESENT ROTATION ANGLE
19075 00010
19060 MONITR DS ,2406, MONITOR ADDRESS 02406 00000
19070 SINP DS ,2416, SINE ADDRESS 02416 00000
19080 COSF DS ,2421, COSINE ADDRESS 02421 00000
19090 TANF DS ,2416, TANGENT ADDRESS 02416 00000
19100 ATANF DS ,2416, ARCTANGENT ADDRESS 02416 00000
19110 TYPERR DS ,2416, TYPE ERROR ADDRESS 02416 00000
19120 INIT DS ,7976, INITIALIZATION ADDRESS
07976 00000
19130 RETURN DS ,2411, RETURN ADDRESS 02411 00000
19140 MCT DS ,7876, NUMBER OF ELEMENTS TO RIGHT OF /
07876 00000
19150 IAT1 DS ,7731, WORD LIST STARTING ADDRESS
07731 00000
19160 SYMB1 DS ,4289, SYMB ARRAY ADDRESS 04289 00000
19170 SYMB5 DS ,4315, SYMB ARRAY ADDRESS 04315 00000
19180 TDATA4 DS ,3352, TDATA ARRAY ADDRESS 03352 00000
19190 TDATA5 DS ,3362, TDATA ARRAY ADDRESS 03362 00000
19200 O.O DS ,7680,, FLOATING POINT ZERO 07680 00000
20010*
20020* CONSTANTS
20030 STEPTD DC 7, 1000010,, STEPPING CONSTANT FOR TDATA INPUT
19082 00007
19084 00004
20040 TCONS DVLC ,2, 51, 2, 09 STEPPING CONSTANT FOR WORDL INPUT
19093 00007
19095 00004
20060 WCONS DVLC ,2, 14, 2, 02 CODE FOR NZ
19099 00002
20070 NZ DC 2, 16,,

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20000 SPLINE DC 2,92,, CODE FOR SPLINE 19101 00002
20090 DC 8,-10000000 19109 00008
20100 MINI.0 DC 2,1,, MINUS FLOATING POINT ONE 19111 00002
20110 DC 8,50000000 19119 00008
20120 0.5 DC 2,0,, FLOATING POINT ONE-HALF 19121 00002
20130 DC 8,10000000 19129 00008
20140 1.0 DC 2,1,, FLOATING POINT ONE 19131 00002
20150 DC 8,20000000 19139 00008
20160 2.0 DC 2,1,, FLOATING POINT TWO 19141 00002
20170 DC 8,31415926 19149 00008
20180 PI DC 2,1,, FLOATING POINT VALUE OF PI 19151 00002
20190 DC 8,10000000 19159 00008
20200 INFSLP DC 2,49,, FLOATING POINT VALUE OF INFINITE SLOPE 19161 00002
21010*
21020*.....
21030 DEND TABCYL 16462

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SYMBOL TABLE

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1.0E48 18158 TYPERR 02416 TDATA6 03372 TDATA5 03362 RETURN 02411
PERPTO 17958 NVERTL 12030 NTLAST 18086 MONITR 02406 MINI.0 16170
LTPTAB 17362 LOC5LP 17802 LASTPT 17410 CN1020 18148 ATANF 02416
COMPX 17446 COM60 16142 DISTF 02416 DSA1 18193 DSA2 18203
DSA3 18229 DSA4 18255 DSA5 18270 DTDS 02416 ER301 17934
ER321 17538 IAT1 07731 LAST 17586 MOD 17886 MST 04315
MKY 04315 S 18168 SCALC 17682 SYMB6 04325 TANF 02416
TANTO 18006 TDATA 03333 TEMP 00079 TLAST 17562 VERTL 18106
X 18168 Y 18168 0.0 07680 1.0 18188

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01010* IBM 1620-1311 AD-APT DEFPRE SUBPROGRAM FOR DETERMINING
01020* A LINE DEFINED BY A STATEMENT OF THE FORM.... RCS
01030*
01040* LIN1=LINE/PT1,TANTO,TAB1
01050* LIN1=LINE/PT1,PERPTO,TAB1
01060*
01070* *NAME LTPTAB... NON-ERASABLE DEFPRE SUBPROGRAM
01080* *ID NUMBER 0351+DELDIM
01090* *STORE CORE IMAGE
01100* LINKAGE - B LTPTAB,,6
01110*
01120 DORG 17362 17362
01130* SUBPROGRAM ENTRY
01140 LTPTAB TFM LASTPT+11,TDATA+51 17362 16 17421 -3384
01150 A LASTPT+11,TDATA+54,,END OF TABCYL RECORD IN TDATA TABLE 17374 21 17421 03307
01160 TFM COMPX+11,TDATA*20 17386 16 17457 -3353
01170 AM COMPX+10,6.10 17398 11 17456 000-6
01180 LASTPT CM COMPX+11 17410 14 17457 -0000
01190 BH ER321,,, BRANCH IF PT1 IS NOT IN TABCYL ARRAY 17422 46 17538 01100
01200*
02010 TFL X,TDATA5 17434 06 18168 03362
02020 COMPX FSUB X,,, COMPARE X AND X(I) 17446 02 18168 00000
02030 BNE LASTPT-12 17458 47 17398 01200
02040*
02050 AM COMPX+10,1.10 17470 11 17456 000-1
02060 TFL Y,TDATA6 17482 06 18168 03372
02070 FSUB Y,COMPX+11,11, COMPARE Y AND Y(I) 17494 02 18168 1745P
02080 BE TLAST 17506 46 17562 01200
02090*
02100 AM COMPX+10,5.10 17518 11 17456 000-5
02110 B LASTPT 17530 49 17410 00000
02120 DORG =-3 17538
02130*
02140 ER321 BTM MONITR,03090,67, CALL TYPERR SUBPROGRAM VIA MONITR 17538 17 02400 -3090
02150 BTM TYPERR,321,69 17550 17 02410 00L21
02160 TLAST AM COMPX+11,1.10 17562 11 17457 000-1
02170 BBR NTLAST,COMPX+11,11, BRANCH IF POINT IS NOT AT END OF TABCYL 17574 45 18036 1745P
02180*
02190 LAST SM COMPX+11,71.10, ADDRESS OF X(I-1) 17586 12 17457 000P1
02200 TP DSA2,COMPX+11 17598 26 18203 17457
03010 TP DSA2+9,DSA2 17610 26 18208 18203
03020 AM DSA2+4,1.10, ADDRESS OF Y(I-1) 17622 11 18207 000-1

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03030	CF	DSA2=1	17634 33 18204 00000
03040	TF	DSA2+15,DSA2+5	17646 26 18218 18208
03050	A	DSA2+4,CON60	17658 21 18207 18142
03060	BT	MONITR,DSA1+5,6,	CALL DISTF SUBPROGRAM VIA MONITR
03070	SCALC	BT DISTF,DSA2+20,6,	17670 27 02400 18198 CALCULATE DISTANCE FROM P(I-1) TO P(I)
03080	AM	COMPX+10,2,10,	17682 27 02410 18223 ADDRESS OF A-COEFFICIENT
03090	TF	DSA3+5,COMPX+11	17694 11 17456 000-2
03100	TF	DSA3+10,DSA3+5	17706 26 18234 17457
03110	TF	DSA3+15,DSA3+5	17718 26 18239 18234
03120	CF	DSA3+11	17730 26 18244 18234
03130	A	DSA3+14,CN1020	17742 33 18240 00000
03140	CF	DSA3+1	17754 21 18243 18148
03150	CF	DSA3+6	17766 33 18230 00000
03160	BTM	MONITR,02510,67,	17778 33 18235 00000 CALL DTDS SUBPROGRAM VIA MONITR
03170	LOCSLP	BT DTDS,DSA3+20,6,	17790 17 02400 -2510 CALCULATE SLOPE OF TABCYL IN LOCAL SYST.
03180	BTM	MONITR,02020,67,	17802 27 02410 18249 CALL ATANF SUBROUTINE VIA MONITR
03190	BT	ATANF,DSA4+10,6,	17814 17 02400 -2020 MXY=ATANF(MST)
03200	AM	DSA3+4,3,10,	17826 27 02410 18265 ADDRESS OF ALPHA
04010	FAOD	MXY,DSA3+5,11,	17838 11 18233 000-3 MXY=ATANF(MST)+ALPHA
04020	BT	MONITR,DSA5+5,6,	17850 01 04315 1823M CALL TANF SUBPROGRAM VIA MONITR
04030	BTM	TANF,MXY,67,	17862 27 02400 18275 MXY=TANF(ATANF(MST)+ALPHA)
04040	MOD	CM IAT1,27,610	17874 17 02410 -4315
04050	BE	TANTO,,,	17886 14 0773J 000K7 BRANCH IF MODIFIER IS TANTO
04060*			17898 46 18006 01200
04070	CM	IAT1,18,610	17910 14 0773J 000J8
04080	BE	PERPTO,,,	17922 46 17958 01200 BRANCH IF MODIFIER IS PERPTO
04090*			
04100	ER301	BTM MONITR,03090,67,	17934 17 02400 -3090 CALL TYPERR SUBPROGRAM VIA MONITR
04110	BTM	TYPERR,301,69	17946 17 02410 00L01
04120	PERPTO	TFL TEMP,MIN1.0	17958 06 00079 18178
04130	FDIV	TEMP,MXY,,	-1.0/MXY 17970 09 00079 04315
04140	TFL	MXY,TEMP	17982 06 04315 00079
04150	BV	VERTL,,,	BRANCH IF SLOPE IS 0.0 17994 46 18106 01400
04160*			
04170	TANTO	CM MXY,5,10	18006 14 04315 000-5
04180	BVM	VERTL,,,	BRANCH IF SLOPE INFINITE BY DEFINITION 18018 46 18106 01300
04190*			
04200	NVERTL	TFL SYMB6,TDATA6	18030 06 04325 03372
05010	TFL	TEMP,MXY	18042 06 00079 04315
05020	FMUL	TEMP,TDATA5,,	MXY*X 18054 03 00079 03362
05030	FSUB	SYMB6,TEMP,,	SYMB6=MXY*X 18066 02 04325 00079
05040	B	RETURN,,6,	RETURN TO MONITR 18078 49 0241J 00000
05050	DORG	=-3	18086
05060*			
05070	NLAST	AM COMPX+11,9,10,	ADDRESS OF A-COEFFICIENT 18086 11 17457 000-9
05080	B	SCALC+24	18098 49 17706 00000

05090	DORG	=-3	18106
05100*			
05110	VERTL	TFL MXY,1.0E48,,	MXY=1.0E48 18106 06 04315 18158
05120	TFL	SYMB6,0.0	18118 06 04325 07680
05130	B	NVERTL+12	18130 49 18042 00000
05140	DORG	=-4	18137
05150*			
05160	CON60	DC 6,600006	18142 00006
05170	CN1020	DC 6,100002	18148 00006
05180	DC	8,10000000	18156 00008
05190	1.0E48	DC 2,49	18158 00002
05200	X	DC 10,0	18168 00010
06010	DC	8,-10000000	18176 00008
06020	MIN1.0	DC 2,1	18178 00002
06030	DC	8,10000000	18186 00008
06040	1.0	DC 2,1	18188 00002
06050	DSA1	DSA SCALC+12	18193 00005 J7694
06060	DSC	5,02101	18194 00005
06070	DDRG	DSA1+5+5+5-11	18212
06080	NOP	0,5	18212 41 00000 18168
06090	DDRG	=-21	18202
06100	NOP	0,0	18202 41 00000 00000
06110	DDRG	=-14	18199
06120	DSA2	DSA 0	18203 00005 -0000
06130	DDRG	=+5+5-4+5+5-11	18238
06140	NOP	0,MST	18238 41 00000 04315
06150	DDRG	=-21	18228
06160	NOP	0,0	18228 41 00000 00000
06170	DDRG	=-14	18225
06180	DSA3	DSA 5	18229 00005 J8168
06190	DDRG	=+5+5-4+5+3-11	18254
06200	NOP	MST,MXY	18254 41 04315 04315
07010	DDRG	=-14	18251
07020	DSA4	DSA 1.0	18255 00005 J8188
07030	DDRG	=+5+3-4	18266
07040	DSA5	DSA MOD	18270 00005 J7886
07050	DSC	5,02211	18271 00005
07060	DS	86,,	FILL LAST SECTOR 18361 00086
07070*			
07080	TDATA	DS ,3333	03333 00000
07090	Y	DS ,X	18168 00000
07100	TDATA5	DS ,3362	03362 00000
07110	TDATA6	DS ,3372	03372 00000
07120	MONITR	DS ,2406	02406 00000
07130	TYPERR	DS ,2416	02416 00000
07140	DISTF	DS ,2416	02416 00000
07150	DTDS	DS ,2416	02416 00000
07160	ATANF	DS ,2416	02416 00000
07170	MXY	DS ,4315	04315 00000
07180	TANF	DS ,2416	02416 00000
07190	IAT1	DS ,7731	07731 00000
07200	TEMP	DS 10,79	00079 00010
08010	SYMB6	DS ,4325	04325 00000
08020	RETURN	DS ,2411	02411 00000
08030	HST	DS ,MXY	04315 00000
08040	S	DS ,X	18168 00000
08050	0.0	DS ,7660	07660 00000
08060	DEND	LTPTAB	17362

SYMBOL TABLE

TYPERR 02416	SYMB10 04365	RETURN 02411	MONITR 02406	GCNIC 16462
FLZERO 07680	ERROR 16893	FORM 07712	IAT1 07731	RIGHT 16922
SETD 16590	SETC 16650	SETD 16710	SETE 16770	SETF 16830
START 16530	SYMB1 04289	SYMB5 04315	SYMB6 04325	SYMB7 04335
SYMB8 04345	SYMB9 04355			

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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030*      INTRAN SUBPROGRAM GCNIC
01040*      THE FUNCTION OF THIS SUBPROGRAM
01050*      IS TO PROCESS A CONIC SURFACE
01060*      DEFINED BY THE COEFFICIENTS
01070*      OF THE GENERAL CONIC EQUATION
01080*      GCNIC/A,B,C,D,E,F
01090*
01100      DORG 16462                                16462
01110 GCNIC SF RIGHT                                16462 32 16922 00000
01120      B7 START-24                                16474 49 16506 00000
01130      CM FORM,4095,8                            16482 14 07712 00095
01140      BE START                                  16494 46 16530 01200
01150*      LOAD AND CALL TYPERR SUBPROGRAM
01160      BTM MONITR,03090,67                        16506 17 02400 -3090
01170      BTM TYPERR,301,69                          16518 17 02410 00L01
01180 START AM IAT1,12,10,                          INCREMENT TO FIRST COEFFICIENT
01190      TFL SYMB5,IAT1,11,                        STORE A COEFFICIENT 16530 11 07731 000J2
01200      FSUB IAT1,FLZERO,6,                      CHECK FOR ZERO COEFFICIENTS
02010      BZ SETB                                    16554 02 0773J 07680
02020      SF RIGHT,,,                               INDICATES AT LEAST 1 NON-ZERO COEFFICIENT
02030 SETB AM IAT1,14,10,                          INCREMENT TO NEXT COEFFICIENT
02040      TFL SYMB6,IAT1,11,                        STORE B COEFFICIENT 16590 11 07731 000J4
02050      FSUB IAT1,FLZERO,6,                      CHECK FOR ZERO COEFFICIENT
02060      BZ SETC                                    16602 06 04325 0773J
02070      SF RIGHT,,,                               INDICATES AT LEAST 1 NON-ZERO COEFFICIENT
02080 SETC AM IAT1,14,10,                          INCREMENT TO NEXT COEFFICIENT
02090      TFL SYMB7,IAT1,11,                        STORE C COEFFICIENT 16614 02 0773J 07660
02100      FSUB IAT1,FLZERO,6,                      CHECK FOR ZERO COEFFICIENT
02110      BZ SETD                                    16626 46 16650 01200
02120      SF RIGHT,,,                               INDICATES AT LEAST 1 NON-ZERO COEFFICIENT
02130 SETD AM IAT1,14,10,                          INCREMENT TO NEXT COEFFICIENT
02140      TFL SYMB8,IAT1,11,                        STORE D COEFFICIENT 16638 32 16922 00000
02150      FSUB IAT1,FLZERO,6,                      CHECK FOR ZERO COEFFICIENT
02160      BZ SETE                                    16650 11 07731 000J4
02170      SF RIGHT,,,                               INDICATES AT LEAST 1 NON-ZERO COEFFICIENT
02180 SETE AM IAT1,14,10,                          INCREMENT TO NEXT COEFFICIENT
02190      TFL SYMB9,IAT1,11,                        STORE E COEFFICIENT 16662 06 04335 0773J
02200      FSUB IAT1,FLZERO,6,                      CHECK FOR ZERO COEFFICIENT
03010      BZ SETF                                    16770 11 07731 000J4
03020      SF RIGHT,,,                               INDICATES AT LEAST 1 NON-ZERO COEFFICIENT
03030 SETF AM IAT1,14,10,                          INCREMENT TO NEXT COEFFICIENT
03040      BNF ERROR,RIGHT                            16794 02 0773J 07680
03050      TFL SYMB10,IAT1,11,                      STORE F COEFFICIENT 16806 46 16830 01200
03060      TFM SYMB1,81,8,                          SET RECORD LENGTH FOR CONIC
03070      TDM SYMB10+1                              16818 32 16922 00000
03080      DC 1,.,,                                  16830 11 07731 000J4
03090*      RETURN TO CALLING PROGRAM
03100      B7 RETURN,,6                              16842 44 16898 16922
03110 ERROR BTM MONITR,03090,67                    16854 06 04365 0773J
03120      BTM TYPERR,322,67                        16866 16 04289 0-081
03130 FLZERO DS ,7680                              16878 15 04366 00000
03140 RIGHT DS 1                                  16889 00001
03150      DS 38,,                                  16890 49 0241J 00000
03160 FORM DS ,07712                                16898 17 02400 -3090
03170 IAT1 DS ,07731                                16910 17 02410 -0322
03180 SYMB1 DS ,4289                                07680 00000
03190 SYMB5 DS ,04315                                16922 00001
03200 SYMB6 DS ,04325                                16960 00038
04010 SYMB7 DS ,04335                                07712 00000
04020 SYMB8 DS ,04345                                07731 00000
04030 SYMB9 DS ,04355                                04289 00000
04040 SYMB10 DS ,04365                              04315 00000
04050 MONITR DS ,02406                              04325 00000
04060 TYPERR DS ,02416                              04335 00000
04070 RETURN DS ,2411                              04345 00000
04080      DEND GCNIC                              04355 00000
                                                04365 00000
                                                02406 00000
                                                02416 00000
                                                02411 00000
                                                16462

```

SYMBOL TABLE

TYPERR 02416	TDATA6 03372	TDATA5 03362	SYMB10 04365	SNALSQ 17366
RETURN 02411	PI/180 17446	MONTR 02406	ELLIPS 16462	CSALSQ 17376
A 17326	B 17336	COSF 02421	CSAL 17396	FLM2 17436
FL2 17426	FORM 07712	H 17346	IAT1 07731	K 17356
SINF 02416	SNAL 17386	START 16518	SYMB1 04289	SYMB5 04315
SYMB6 04325	SYMB7 04335	SYMB8 04345	SYMB9 04355	TEMP1 17406
TEMP2 17416				

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01010• INTRAN SUBPROGRAM ELLIPS
01020• THE FUNCTION OF THIS SUBPROGRAM
01030• IS TO CALCULATE THE COEFFICIENTS
01040• OF THE GENERAL CONIC EQUATION
01050• FOR AN ELLIPSE DEFINED BY ITS CENTER
01060• LENGTH OF ITS MAJOR AXIS AND MINOR AXIS
01070• AND ANGLE THE MAJOR AXIS MAKES
01080• WITH THE X COORDINATE AXIS
01090• ELLIPS/(POINT),H,K,'
01100• ' WILL DENOTE THE ANGLE
01110•
01120 DORG 16462
01130 ELLIPS CM FORM,127,8, 16462 CHECK FOR CORRECT FORM NUMBER
                                16462 14 07712 0-127
01140 B7 START-24 16474 49 16494 00000
01150 BE START 16482 46 16518 01200
01160• CALL AND LOAD TYPERR SUBPROGRAM
01170 BTM MONTR,03090,67 16494 17 02400 -3090
01180 BTM TYPERR,301,67 16506 17 02410 -0301
01190 START AM IAT1,26,10' 16518 11 07731 000K6
01200 TFL A,IAT1,11, STORE LENGTH OF MAJOR AXIS
                                16530 06 17326 0773J
02010 AM IAT1,14,10 16542 11 07731 000J4
02020 TFL B,IAT1,11, STORE LENGTH OF MINOR AXIS
                                16554 06 17336 0773J
02030 AM IAT1,14,10 16566 11 07731 000J4
02040 TFL H,TDATA5,, STORE H OF CENTER 16578 06 17346 03362
02050 TFL K,TDATA6,, STORE K OF CENTER 16590 06 17356 03372
02060 FMUL A,A,, A=A**2 16602 03 17326 17326
02070 FMUL B,B,, B=B**2 16614 03 17336 17336
02080 FMUL IAT1,PI/180,6, CHANGE ANGLE TO RADIAN
                                16626 03 0773J 17446
02090 TFL SNALSQ,IAT1,11, SNALSQ= 16638 06 17366 0773J
02100 TFL CSALSQ,SNALSQ,, CSALSQ= 16650 06 17376 17366
02110• LOAD AND CALL SINF-COSF SUBPROGRAM
02120 BTM MONTR,02010,67 16662 17 02400 -2010
02130 BTM SINF,SNALSQ,6, SNALSQ=SINF(') 16674 17 02410 17366
02140 BTM COSF,CSALSQ,6, CSALSQ=COSF(') 16686 17 0242J 17376
02150 TFL SNAL,SNALSQ,, SNAL=SINF(') 16698 06 17386 17366
02160 TFL CSAL,CSALSQ,, CSAL=COSF(') 16710 06 17396 17376
02170 FMUL SNALSQ,SNALSQ,, SNALSQ=SINF(')**2 16722 03 17366 17366
02180 FMUL CSALSQ,CSALSQ,, CSALSQ=COSF(')**2 16734 03 17376 17376
02190 TFL TEMP1,A,, TEMP1=A**2 16746 06 17406 17326
02200 FMUL TEMP1,SNALSQ,, TEMP1=A**2*SIN(')**2 16758 03 17406 17366
03010 TFL TEMP2,B,, TEMP2=B**2 16770 06 17416 17336
03020 FMUL TEMP2,SNALSQ,, TEMP2=B**2*COSF(')**2 16782 03 17416 17376
03030 FADD TEMP1,TEMP2,, TEMP1=A**2*SINF(')**2+B**2*COSF(')**2
                                16794 01 17406 17416
    
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03040 TFL SYMB5,TEMP1,, SYMB5=TEMP1 16806 06 04315 17406
03050 TFL TEMP1,B,, TEMP1=B**2 16818 06 17406 17336
03060 FSUB TEMP1,A,, TEMP1=A**2-B**2 16830 02 17406 17326
03070 FMUL TEMP1,FL2,, TEMP1=2(A**2-B**2) 16842 03 17406 17426
03080 FMUL TEMP1,SNAL,, TEMP1=2(A**2-B**2)*SINF(')
                                16854 03 17406 17386
03090 FMUL TEMP1,CSAL,, TEMP1=2(A**2-B**2)*SINF(')*COSF(')
                                16866 03 17406 17396
03100 TFL SYMB6,TEMP1,, SYMB6=TEMP1 16878 06 04325 17406
03110 TFL TEMP1,A,, TEMP1=A**2 16890 06 17406 17326
03120 FMUL TEMP1,CSALSQ,, TEMP1=A**2*COSF(')**2 16902 03 17406 17376
03130 TFL TEMP2,B,, TEMP2=B**2 16914 06 17416 17336
03140 FMUL TEMP2,SNALSQ,, TEMP2=B**2*SINF(')**2 16926 03 17416 17366
03150 FADD TEMP1,TEMP2,, TEMP1=A**2*COSF(')**2+B**2*SINF(')**2
                                16938 01 17406 17416
03160 TFL SYMB7,TEMP1,, SYMB7=TEMP1 16950 06 04335 17406
03170 TFL TEMP1,A,, TEMP1=A**2 16962 06 17406 17326
03180 FMUL TEMP1,K,, TEMP1=A**2*K 16974 03 17406 17356
03190 FMUL TEMP1,SNAL,, TEMP1=A**2*K*SINF(') 16986 03 17406 17386
03200 TFL TEMP2,B,, TEMP2=B**2 16998 06 17416 17336
04010 FMUL TEMP2,H,, TEMP2=B**2*H 17010 03 17416 17346
04020 FMUL TEMP2,CSAL,, TEMP2=B**2*K*COSF(') 17022 03 17416 17396
04030 FADD TEMP1,TEMP2,, TEMP1=A**2*K+SINF(')**2+B**2*H+COSF(')**2
                                17034 01 17406 17416
04040 FADD TEMP1,TEMP2,, TEMP1=A**2*K+SINF(')**2+B**2*H+COSF(')**2
                                17046 01 17406 17416
04050 FMUL TEMP1,FLM2,, TEMP1=-2*TEMP1 17058 03 17406 17436
04060 TFL SYMB8,TEMP1,, SYMB8=TEMP1 17070 06 04345 17406
04070 TFL TEMP1,A,, TEMP1=A**2 17082 06 17406 17326
04080 FMUL TEMP1,K,, TEMP1=A**2*K 17094 03 17406 17356
04090 FMUL TEMP1,CSAL,, TEMP1=A**2*K*COSF(') 17106 03 17406 17396
04100 TFL TEMP2,B,, TEMP2=B**2 17118 06 17416 17336
04110 FMUL TEMP2,H,, TEMP2=B**2*H 17130 03 17416 17346
04120 FMUL TEMP2,SNAL,, TEMP2=B**2*H*SINF(') 17142 03 17416 17386
04130 FSUB TEMP1,TEMP2,, TEMP1=A**2*K+COSF(')**2-B**2*H+SINF(')**2
                                17154 02 17406 17416
04140 FMUL TEMP1,FLM2,, TEMP1=-2*TEMP1 17166 03 17406 17436
04150 TFL SYMB9,TEMP1,, SYMB9=TEMP1 17178 06 04355 17406
04160 FMUL K,K,, K=K**2 17190 03 17356 17356
04170 FMUL K,A,, K=K**2*A**2 17202 03 17356 17326
04180 FMUL H,H,, H=H**2 17214 03 17346 17346
04190 FMUL H,B,, H=H**2*B**2 17226 03 17346 17336
04200 FADD K,H,, K=K**2*A**2+B**2*H**2 17238 01 17356 17346
05010 FMUL A,B,, A=A**2*B**2 17250 03 17326 17336
05020 FSUB K,A,, K=K**2*A**2+H**2*B**2-A**2*B**2
                                17262 02 17356 17326
                                17274 06 04365 17356
05030 TFL SYMB10,K,, SYMB10=K
05040 TFM SYMB10,81,8, SET RECORD LENGTH FOR ELLIPSE
                                17286 16 04289 0-081
                                17298 15 04366 00000
                                17309 00001
05050 TDM SYMB10+1
05060 DC 1,'.'
05070 B7 RETURN,,6
                                17310 49 0241J 00000
05080 A DS 10
                                17326 00010
05090 B DS 10
                                17336 00010
05100 H DS 10
                                17346 00010
05110 K DS 10
                                17356 00010
05120 SNALSQ DS 10
                                17366 00010
05130 CSALSQ DS 10
                                17376 00010
05140 SNAL DS 10
                                17386 00010
05150 CSAL DS 10
                                17396 00010
05160 TEMP1 DS 10
                                17406 00010
    
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05170	TEMP2	DS	10	17416	00010
05180		DC	0,20000000	17424	00008
05190	FL2	DC	2,1	17426	00002
05200		DC	0,-20000000	17434	00008
06010	FLM2	DC	2,1	17436	00002
06020		DC	0,17453292	17444	00008
06030	PI/100	DC	2,-1	17446	00002
06040		DS	14,,	17460	00014
06050	FORM	DS	,7712	07712	00000
06060	IAT1	DS	,7731	07731	00000
06070	YDATA5	DS	,3362	03362	00000
06080	YDATA6	DS	,3372	03372	00000
06090	SYMB1	DS	,4289	04289	00000
06100	SYMB5	DS	,4315	04315	00000
06110	SYMB6	DS	,4325	04325	00000
06120	SYMB7	DS	,4335	04335	00000
06130	SYMB8	DS	,4345	04345	00000
06140	SYMB9	DS	,4355	04355	00000
06150	SYMB10	DS	,4365	04365	00000
06160	SINF	DS	,2416	02416	00000
06170	COSF	DS	,2421	02421	00000
06180	MONITR	DS	,2406	02406	00000
06190	TYPERR	DS	,2416	02416	00000
06200	RETURN	DS	,2411	02411	00000
07010		DEND	ELLIPS	16462	

FILL LAST SECTOR

SYMBOL TABLE

TYPERR 02416	POCKET 16462	MONITR 02406
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01010*	IBM 1620-1311 AD-APT DEFPRE SUBPROGRAM FOR PROCESSING	
01020*	A STATEMENT OF THE FORM....	
01030*		RCS
01040*	POCKET/A,B,....	...N
01050*		
01060*	*NAME POCKET... NON-ERASABLE DEFPRE SUBPROGRAM	
01070*	*ID NUMBER 0354*DELDIM	
01080*	*STORE CORE IMAGE	
01090*	LINKAGE - B POCKET,,6	
01100*		
01110	DRG 16462	16462
01120	POCKET BTM MONITR,03090,67,	CALL TYPERR SUBPROGRAM VIA MONITR
		16462 17 02400 -3090
01130	BTM TYPERR,301,69,	WRITE ERROR MESSAGE... EXIT
		16474 17 02410 00L01
01140*		
01150	MONITR DS ,2406	02406 00000
01160	TYPERR DS ,2416	02416 00000
01170	DEND POCKET	16462

SYMBOL TABLE

TYPERR 02416	RETURN 02411	NOTAMB 17690	MONITR 02406	MODIFY 17534
LN/CON 17450	LINCON 02416	FORMTB 17610	A 03403	B 03413
BL 03372	C 03423	COMP 17570	COMPL 00079	D 03433
DSA1 17366	DSA2 17377	DSA3 17437	E 03443	ER301 17770
ER307 17790	ER323 17406	F 03453	FLAG 00079	IAT1 07731
ML 03362	MAXIF 02416	SYMB5 04315	SYMB6 04325	TEMP 00048
WERM 17510	X2 17874	Y2 17684	ZINT 17606	

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01010*          IBM 1620-1311 AD-APT DEFPRE SUBPROGRAM FOR DETERMINING
01020*          A POINT DEFINED BY A STATEMENT OF THE FORM....
01030*
01040*          PT1=POINT/XSMALL,INTOF,L1,GCON1
01050*          PT1=POINT/XLARGE,INTOF,L1,GCON1
01060*          PT1=POINT/YSMALL,INTOF,L1,GCON1
01070*          PT1=POINT/YLARGE,INTOF,L1,GCON1
01080*
01090*          *NAME LN/CON... NON-ERASABLE DEFPRE SUBPROGRAM
01100*          *ID NUMBER 0355*DELDIM
01110*          *STORE CORE IMAGE
01120*          LINKAGE = B LN/CON,,6
01130*
01140*          DORG 17362
01150*
01160 DSA1 DSA LN/CON+24
01170 DSC 5,02091
01180 DORG DSA1+5+5*12-6
01190 NOP Y2,0
01200 DORG --21
02010 NOP SYMB6,X2
02020 DORG --21
02030 NOP F,SYMB5
02040 DORG --21
02050 NOP E,D
02060 DORG --21
02070 NOP A,C
02080 DORG --21
02090 NOP BL,8
02100 DORG --14
02110 DSA2 DSA ML
02120 DORG ++5*12-4+5*3-11-2
02130 NOP O,COMPL
02140 DORG --14
02150 DSA3 DSA 0
02160 DORG ++5*3-4
02170 DSC 1,0
02180*
02190*          SUBPROGRAM ENTRY
02200 LN/CON BT MONITR,DSA1+5,6, CALL LINCON SUBPROGRAM VIA MONITR
03010 BT LINCON,DSA2+55,6, DETERMINE INTERSECTIONS LINE AND CONIC
03020 BD MODIFY-12,FLAG,, BRANCH IF INTERSECTION EXISTS
03030*
03040 ER323 TFM WERM+11,323,9, SET ERROR NO.=323
03050 BTM MONITR,03090,67, CALL TYPERR SUBPROGRAM VIA MONITR
03060 WERM BTM TYPERR,,6, WRITE ERROR MESSAGE
03070 TFM COMP+11,FORMTB-13
03080 MODIFY AM COMP+11,14,10
03090 CM COMP+11,FORMTB+1+4*14
03100 BNL ER301,,, BRANCH IF FORM NO. NOT IN FORM TABLE
03110*
03120 COMP C IAT1,,6
03130 BNE MODIFY,,, BRANCH IF FORM NO. NOT LOCATED
03140*
03150 BNR RETURN,FLAG,6, BRANCH IF ONE INTERSECTION EXISTS
03160*
03170 ZINT AM COMP+10,1,10
03180 TF DSA3+5,COMP+11,11, SET SELECTIVE ELEMENT ADDRESSES
03190 AM COMP+11,1,10
03200 TD DSA3+11,COMP+11,11, SET CONTROL DIGIT FOR SELECT SUBPROGRAM
04010 TFL TEMP,DSA3,11
04020 FSUB TEMP,DSA3+5,11
04030 BE ER307,,, BRANCH IF MODIFIER IS NOT DEFINITIVE
04040*
04050 NOTAMB BTM MONITR,02130,67, CALL MINIF-MAXIF SUBPROGRAM VIA MONITR
04060 BT MXXIF,DSA3+11,6, SELECT COMPARATIVE ELEMENT
04070 FSUB COMPL,DSA3,11
04080 BE RETURN,,6, BRANCH IF RESULT IN SYMB5 AND SYMB6
04090*
04100 TFL SYMB5,X2,, MOVE RESULT TO OUTPUT
04110 TFL SYMB6,Y2
04120 B RETURN,,6, RETURN TO MONITR
04130 DORG --3
04140*
04150 ER301 TFM WERM+11,301,9, SET ERROR NO.=301
04160 B WERM-12
04170 DORG --3
04180*
04190 ER307 TFM WERM+11,307,9, SET ERROR NO.=307
04200 B WERM-12
05010 DORG --3
05020*
05030 FORMTB NOP SYMB5,X2,2
05040 DC 2,31,--10
05050 DSC 1,7
05060 NOP SYMB5,X2,2
05070 DC 2,32,--10
05080 DSC 1,6
05090 NOP SYMB6,Y2,2
05100 DC 2,35,--10
05110 DSC 1,7
05120 NOP SYMB6,Y2,2
05130 DC 2,36,--10
05140 DSC 1,6
05150 X2 DC 10,0

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05160 Y2	DC	10,0		17884 00010
05170	DS	76,,	FILL LAST SECTOR	17960 00076
05180*				
05190 ML	DS	,3333+29		03362 00000
05200 BL	DS	,ML+10		03372 00000
06010 B	DS	,8L+41		03413 00000
06020 A	DS	,8-10		03403 00000
06030 C	DS	,8+10		03423 00000
06040 E	DS	,C+20		03443 00000
06050 D	DS	,C+10		03433 00000
06060 F	DS	,E+10		03453 00000
06070 SYMB5	DS	,4315		04315 00000
06080 SYMB6	DS	,SYMB5+10		04325 00000
06090 COMPL	DS	10,79		00079 00010
06100 MONITR	DS	,2406		02406 00000
06110 LINCON	DS	,2416		02416 00000
06120 FLAG	DS	,79		00079 00000
06130 TYPERR	DS	,2416		02416 00000
06140 IATI	DS	,7731		07731 00000
06150 RETURN	DS	,2411		02411 00000
06160 TEMP	DS	10,48		00048 00010
06170 MXXIF	DS	,2416		02416 00000
06180	DEND	LN/CON		17450

SYMBOL TABLE

1.0E48 18276	TYPERR	02416	TWOTAN	17780	TANCON	02416	RETURN	02411
PTSLCT 02416	POINTNR	18147	NVERTL	18064	MGNITR	02406	MINI.0	18266
LPTCON 17576	LINLIN	02416	LCNONI	02416	MORIZL	18238	A	03413
B 03423	B2	18396	B3	18356	B4	18376	C	03433
COMT 17884	D	03443	DSA1	17366	DSA2	17377	DSA3	17437
DSA4 17489	DSAS	17519	DSA6	17549	E	03453	ER301	17636
F 03463	FABR	18124	FLAG	00079	IATI	07731	LEFT	17672
MN 17991	M2	18386	M3	18346	M3SLP	18040	M4	18366
M4SLP 18186	PERPF	17992	RIGHT	17672	SYMB5	04315	SYMB6	04325
TANTO 17732	TEMP	00079	VERTL	18218	WERP	17660	XBIS	18326
XE 03362	X1	18286	X2	18304	YBIS	18336	YE	03372
Y1 18296	Y2	18316	O.0	07680				

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01010*      IBM 1620-1311 AD-APT DEFPRE SUBPROGRAM FOR DETERMINING
01020*      A LINE DEFINED BY A STATEMENT OF THE FORM....
01030*
01040*      LINI=LINE/PTI,RIGHT,TANTO,GCONI
01050*      LINI=LINE/PTI,LEFT,TANTO,GCONI
01060*
01070*      *NAME LPTCON... NON-ERASABLE DEFPRE SUBPROGRAM
01080*      *ID NUMBER 0356+DELDIM
01090*      *STORE CORE IMAGE
01100*      LINKAGE - B LPTCON,,6
01110*
01120      DORG 17362
01130 DSA1 DSA TANTO+24
01140 DSC 5,02651
01150 DORG DSA1*5+5*12-6
01160 MCP Y2,0
01170 DORG *-21
01180 MCP V1,X2
01190 DORG *-21
01200 MCP F,X1
02010 DORG *-21
02020 MCP D,E
02030 DORG *-21
02040 MCP B,C
02050 DORG *-21
02060 MCP YE,A
02070 DORG *-14
02080 DSA2 DSA XE
02090 DORG **5*12-4+5*18-6-2
02100 MCP V1,0
02110 DORG *-21
02120 MCP YBIS,X1
02130 DORG *-21
02140 MCP YE,XBIS
02150 DORG *-21
02160 MCP Y2,XE
02170 DORG *-21
02180 MCP V1,X2
02190 DORG *-14
02200 DSA3 DSA X1
03010 DORG **5*10-4
03020 DSC 1,0
03030 DORG **5*6-6
17362
17366 80005 J7756
17367 00005
17425
17424 41 18316 00000
17416
17416 41 18296 18306
17406
17406 41 03463 18286
17396
17396 41 03443 03453
17386
17386 41 03423 03433
17376
17376 41 03372 03413
17373
17377 00005 -3362
17475
17476 41 18296 00000
17466
17466 41 18336 18286
17456
17456 41 03372 18326
17446
17446 41 18316 03362
17436
17436 41 18296 18306
17433
17437 00005 J8286
17403
17403 00001
17507

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03040      NOP      YBIS,0      :7508 41 18336 00000
03050      DORG     @-21      17498
03060      NOP      B4,XBIS    17498 41 18376 18326
03070      DORG     @-21      17488
03080      NOP      B3,M4     17488 41 18356 18366
03090      DORG     @-14      17485
03100 DSA4    DSA      M3      17489 00005 J8346
03110      DORG     ++5@6-4+5@6-6-2 17537
03120      NOP      SYMB6,0   17538 41 04325 00000
03130      DORG     @-21      17528
03140      NOP      Y1,SYMB5  17528 41 18296 04315
03150      DORG     @-21      17518
03160      NOP      VE,X1     17518 41 03372 18286
03170      DORG     @-14      17515
03180 DSA5    DSA      XE      17519 00005 -3362
03190      DORG     ++5@6-4+5@6-6-2 17567
03200      NOP      B2,0      17568 41 18396 00000
04010      DORG     @-21      17558
04020      NOP      Y2,M2     17558 41 18316 18386
04030      DORG     @-21      17548
04040      NOP      VE,X2     17548 41 03372 18306
04050      DORG     @-14      17545
04060 DSA6    DSA      XE      17549 00005 -3362
04070      DORG     ++5@6-4      17575
04080*
04090*                SUBPROGRAM ENTRY

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```

04100 LPTCOM AM  IAT1,14,10    17576 11 07731 000J4
04110      CM      IAT1,24,610  17588 14 0773J 000K4
04120      BE      RIGHT,,,      BRANCH IF MODIFIER IS RIGHT      17600 46 17672 01200

04130*
04140      CM      IAT1,8,610    17612 14 0773J 000-8
04150      BE      LEFT,,,      BRANCH IF MODIFIER IS LEFT      17624 46 17672 01200

04160*
04170 ER301  TFM     WERN+11,301,9,   SET ERROR NO.=301      17636 16 17671 00L01
04180      BTM     MONITR,03090,67,   CALL TYPERR SUBPROGRAM VIA MONITR 17648 17 02400 -3090

04190 WERM   BTM     TYPERR,,6,       WRITE ERROR MESSAGE   17660 17 02410 00000
04200 RIGHT  SM      IAT1,1,10       17672 12 07731 000-1
05010      TD      DSA3+5@9+1,IAT1,11, SET MODIFIER CODE FOR PYSLCT SUBPROGRAM 17684 25 17483 0773J

05020      AM      IAT1,1+14,10      17696 11 07731 000J5
05030      CM      IAT1,27,610      17708 14 0773J 000K7
05040      BNE    ER301,,,      BRANCH IF MODIFIER IS NOT TANTO 17720 47 17636 01200

05050*
05060 TANTO  BT      MONITR,DSA1+5,6,   CALL TANCON SUBPROGRAM VIA MONITR 17732 27 02400 17371
05070      BT      TANCON,DSA2+55,6,   CALCULATE TANGENT POINTS ON CONIC 17744 27 02410 17432

05080      TFM     WERN+11,324,9,   SET ERROR NO.=324     17756 16 17671 00L24
05090      BNR     WERN-12,FLAG,,     BRANCH IF TWO POINTS DO NOT EXIST 17768 45 17648 00079

05100*
05110 TWOTAN BTM     MONITR,02120,67,   CALL LCON1 SUBPROGRAM VIA MONITR 17780 17 02400 -2120
05120      BT      LCON1,DSA5+25,6,   DETERMINE EQ. OF LINE THRU PE AND P1 17792 27 02410 17544
05130      BT      LCON1,DSA6+25,6,   DETERMINE EQ. OF LINE THRU PE AND P2

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17804 27 02410 17574
05140      BTM     PERPF,DSA4,711,     DETERMINE EQ. OF PERPENDICULAR LINE 17816 17 17992 J748K
05150      BTM     PERPF,DSA4+10,711,   DETERMINE EQ. OF PERPENDICULAR LINE 17828 17 17992 J749R
05160      BTM     MONITR,02050,67,     CALL LINLIN SUBPROGRAM VIA MONITR 17840 17 02400 -2050
05170      BT      LINLIN,DSA4+25,6,     CALCULATE POINT ON BISECTOR LINE 17852 27 02410 17514
05180      BNR     CONT,XBIS,,         BRANCH IF POINT IS DEFINED      17864 45 17884 18326

05190*
05200      B       WERN-12              17876 49 17648 00000
06010      DORG     @-3              17884
06020*
06030 CONT  BTM     MONITR,03600,67,     CALL PYSLCT SUBPROGRAM VIA MONITR 17884 17 02400 -3600
06040      BT      PYSLCT,DSA3+46,6,     SELECT POINT P1 OR P2 PER MODIFIER 17896 27 02410 17483
06050      FSUB    X1,X2              17908 02 18286 18306
06060      BNE    RETURN,,6,         BRANCH IF POINT P1 SELECTED     17920 47 0241J 01200

06070*
06080      FSUB    Y1,Y2              17932 02 18296 18316
06090      BNE    RETURN,,6,         BRANCH IF POINT P1 SELECTED     17944 47 0241J 01200

06100*
06110      TFL     SYMB5,M2,,         MOVE RESULT TO OUTPUT AREA     17956 06 04315 18386
06120      TFL     SYMB6,B2          17968 06 04325 18396
06130      B       RETURN,,6,         RETURN TO MONITR               17980 49 0241J 00000
06140*
06150*                SUBROUTINE FOR DETERMINING THE SLOPE AND
06160*                Y-INTERCEPT OF A LINE PERPENDICULAR TO
06170*                A GIVEN LINE AT A GIVEN POINT
06180 HN     DS      S,,              17991 00005
06190 PERPF  TFL     HN,MIN1.0,6       17992 06 1799J 18266
06200      TDM     FABR+10,3,11        18004 15 18134 0000L
07010      CM      HN,DSA4,711        18016 14 1799J 1748R
07020      BNE    *+SLP,,,          BRANCH IF ARGUMENT IS NOT M3    18028 47 18186 01200

07030*
07040 *3SLP  FDIV    HN,SYMB5,6,       HN=-1.0/SYMB5          18040 09 1799J 04315
07050      BV     VERTL,,,          BRANCH IF SYMB5 IS 0.0        18052 46 18218 01400

07060*
07070 NVERTL CH  HN,-49,610          18064 14 1799J 000MR
07080      BNP     MORTZL,,,          BRANCH IF LINE IS HORIZONTAL    18076 47 18238 01100

07090*
07100      TFL     TEMP,MN,11          18088 06 00079 1799J
07110      SM      MN,S,10,          INDIRECT ADDRESS OF CORRESPONDING INTERC 18100 12 17991 000-5
07120      YF     POINTR,MN          18112 26 18147 17991
07130 FABR   SM      POINTR,S,10,     INDIRECT ADDRESS OF CORRESPONDING POINT 18124 12 18147 000-5
07140      FMUL   TEMP,,             MN*XM                    18136 03 00079 00000
07150      SM      POINTR,S,10       18148 12 18147 000-5
07160      TFL     MN,POINTR,611     18160 06 1799J 1814P
07170      FSUB    MN,TEMP,6,         BN=YM-MN*XM            18172 02 1799J 00079

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```

07100 00 0000 0000 0000 0000 0000 0000 0000 0000
07100 0000 0000 0000 0000 0000 0000 0000 0000 0000
07300 0000 0000 0000 0000 0000 0000 0000 0000 0000
08020 M4SLP TOM FABR=10.5,11 MN=-1.0/M2 10186 15 18134 0000N
08020 FDIV MN,M2,6. 18190 09 1799J 18336
08030 B M3SLP+12 10210 49 18052 00000
08040 0000 0000 0000 0000 0000 0000 0000 0000 0000
08050 0000 0000 0000 0000 0000 0000 0000 0000 0000
08060 VERTL TPL MN,1.0E48,6. SET MN=1.0E48 18218 06 1799J 18276
08070 B NVERTL+24 18230 49 18088 00000
08080 0000 0000 0000 0000 0000 0000 0000 0000 0000
08090 0000 0000 0000 0000 0000 0000 0000 0000 0000
08100 HORIZL TPL MN,0.0,6. SET MN=0.0 18230 06 1799J 07680
08110 B NVERTL+24 18230 49 18088 00000
08120 0000 0000 0000 0000 0000 0000 0000 0000 0000
08130 0000 0000 0000 0000 0000 0000 0000 0000 0000
08140 0000 0000 0000 0000 0000 0000 0000 0000 0000
08150 MINI.0 DC 2,1 18264 00000
08160 0000 0000 0000 0000 0000 0000 0000 0000 0000
08170 1.0E48 DC 2,49 18276 00000
08180 X1 DC 10,0 18286 00010
08190 Y1 DC 10,0 18296 00010
08200 X2 DC 10,0 18306 00010
09010 Y2 DC 10,0 18316 00010
09020 X3IS DC 10,0 18326 00010
09030 Y3IS DC 10,0 18336 00010
09040 M3 DC 10,0 18346 00010
09050 B3 DC 10,0 18356 00010
09060 M4 DC 10,0 18366 00010
09070 B4 DC 10,0 18376 00010
09080 M2 DC 10,0 18386 00010
09090 B2 DC 10,0 18396 00010
09100 0000 0000 0000 0000 0000 0000 0000 0000 0000
09110 0000 0000 0000 0000 0000 0000 0000 0000 0000
09120 XE DS ,9335+29 03362 00000
09130 YE DS ,HE+10 03372 00000
09140 A DS ,VE+L2+29 03413 00000
09150 B DS ,A+10 03423 00000
09160 C DS ,D+10 03433 00000
09170 D DS ,C+10 03443 00000
09180 E DS ,D+10 03453 00000
09190 F DS ,E+10 03463 00000
09200 SYMB5 DS ,4315 04315 00000
10010 SYMB6 DS ,SYMB5+10 04325 00000
10020 LEFT DS ,RIGHT 17672 00000
10030 IAT1 DS ,7731 07731 00000
10040 MONITR DS ,2406 02406 00000
10050 TYPERR DS ,2416 02416 00000
10060 TANCON DS ,2416 02416 00000
10070 LCNON1 DS ,2416 02416 00000
10080 LTNLIM DS ,2416 02416 00000
10090 PTSLCT DS ,2416 02416 00000
10100 RETURN DS ,2411 02411 00000
10110 POINTR DS ,FABR+23 18147 00000
10120 TEMP DS ,10,79 00079 00010
10130 FLAG DS ,79 00079 00000
10140 0.0 DS ,7680 07680 00000
10150 DEND LPTCOM 17576

```

FILL LAST SECTOR

SYMBOL TABLE

```

1.0E48 17707 TYPERR,02416 RETURN 02411 PERPTO 17544 NVERTL 17580
MONITR 02406 MINI.0 17697 LTNPRC 17404 HORIZL 17644 A 03413
B 03423 C 03433 D 03443 DSA1 17367 DYDX 02416
E 03453 ERJ01 17664 IAT1 07731 MOD18 17520 SYMB5 04315
SYMB6 04325 TANTO 17484 TEMP 00079 VERTL 17624 X1 03362
YC 03372 0.0 07680

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01010 01020 01030 01040 01050 01060 01070 01080 01090 01100
01110 01120 01130 01140 01150 01160 01170 01180 01190 01200
02010 02020 02030 02040 02050 02060 02070 02080 02090 02100
02110 02120 02130 02140 02150 02160 02170 02180 02190 02200
03010 03020 03030 03040 03050

```

IBM 1620-1311 AD-APT DEFPRE SUBPROGRAM FOR DETERMINING
A LINE DEFINED BY A STATEMENT OF THE FORM.... ACS

```

LIN1=LINE/PTI,PERPTO,GCON1
LIN1=LINE/PTI,TANTO,GCON1
*NAME LTNPRC... NON-ERASABLE DEFPRE SUBPROGRAM
*ID NUMBER 0357*DELDIM
*STORE CORE IMAGE
LINKAGE - B LTNPRC,,6

```

```

01110 DORG 17362 17362
01120 DC 40,0 17401 00040
01130 DORG 0-39,500-6 17396
01140 NOP SYMB5,0 17396 41 04315 00000
01150 DORG 0-21 17386
01160 NOP E,B 17386 41 03453 03443
01170 DORG 0-21 17376
01180 NOP A,C 17376 41 03413 03433
01190 DORG 0-21 17366
01200 NOP YC,B 17366 41 03372 03423
02010 DORG 0-14 17363
02020 DSA1 DSA XC 17567 00005 -3362
02030 DORG 0+9,8-4 17403
02040
02050
02060
02070 LTNPRC STM MONITR,62080,67. CALL DYDX SUSPROGRAM VIA MONITR 17404 17 02400 -2080
02080 BT DYDX,DSA1+99,6. CALCULATE SLOPE OF CONIC AT GIVEN POINT 17416 27 02610 17402
02090 AM IAT1,10,10 17428 11 07731 000J4
02100 CH IAT1,27,610 17440 14 0773J 000K7
02110 SNE MOD18,... BRANCH IF MODIFIER IS NOT TANTO 17452 47 17520 01200
02120
02130 TANTO TPL SYMB6,YC 17464 06 04325 03372
02140 TPL TEMP,XC 17476 06 00079 03362
02150 PULL TEMP,SYMB6,, SYMB6=XC 17488 03 00079 04315
02160 FEUB SYMB6,TEMP,, SYMB6=YC-SYMB6*XC 17500 02 04325 00079
02170 B RETURN,,6. RETURN TO MONITR 17512 49 0241J 00000
02180 DORG 0-3 17520
02190
02200 MOD18 CH IAT1,10,610 17520 14 0773J 000J8
03010 SNE ERJ01,... BRANCH IF MODIFIER IS NOT PERPTO 17532 47 17664 01200
03020
03030 PERPTO TPL TEMP,MINI.0 17544 06 00079 17697
03040 FDIV TEMP,SYMB5,, -1.0/SYMB5 17556 09 00079 04315
03050 BV VERTL,... BRANCH IF SYMB5 IS 0.0

```

```

17568 46 17624 01400
03070 NVERTL CM TEMP,-49,10 17580 14 00079 000MR
03080 BNP HORIZL,,, BRANCH IF LINE IS HORIZONTAL
17592 47 17644 01100
03090*
03100 TFL SYMBS,TEMP 17604 06 04315 00079
03110 B TANTO 17616 49 17464 00000
03120 DORG --3 17624
03130*
03140 VERTL TFL SYMBS,1.0E48,, SET SYMBS=1.0E48 17624 06 04315 17707
03150 B TANTO 17636 49 17464 00000
03160 DORG --3 17644
03170*
03180 HORIZL TFL SYMBS,0.0,, SET SYMBS=0.0 17644 06 04315 07680
03190 B TANTO 17656 49 17464 00000
03200 DORG --3 17664
04010*
04020 ER301 BTM MONITR,03090,67, CALL TYPERR SUBPROGRAM VIA MONITR
17664 17 02400 -3090
04030 BTM TYPERR,301,69, WRITE ERROR MESSAGE 17676 17 02410 00L01
04040*
04050 DC 8,-10000000 17695 00008
04060 MIN1.0 DC 2,1 17697 00002
04070 DC 8,10000000 17705 00008
04080 1.0E48 DC 2,49 17707 00002
04090 DS 54,, FILL LAST SECTOR 17761 00054
04100*
04110 XC DS ,3333+29 03362 00000
04120 YC DS ,XC+10 03372 00000
04130 A DS ,YC+12+29 03413 00000
04140 B DS ,A+10 03423 00000
04150 C DS ,B+10 03433 00000
04160 D DS ,C+10 03443 00000
04170 E DS ,D+10 03453 00000
04180 SYMBS DS ,4315 04315 00000
04190 SYMBS DS ,SYMBS*10 04325 00000
04200 MONITR DS ,2406 02406 00000
05010 PYDX DS ,2416 02416 00000
05020 IAT1 DS ,7731 07731 00000
05030 TEMP DS ,10,79 00079 00010
05040 RETURN DS ,2411 02411 00000
05050 TYPERR DS ,2416 02416 00000
05060 0.0 DS ,7680 07680 00000
05070 DEND LTNPRC 17404

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SYMBOL TABLE

```

YCOORD 00050R XCOORD 00045R RETURN 02411 PTSLCT 00052R POINTB 00234R
POINTA 00208R CAXAD 00288R CODE 00051R NEG 00196R PDS 00260R
XA 00005R XAXC 00288R XB 00015R XC 00025R XD 00035R
XDYA 00308R YA 00010R YAYC 00298R YB 00020R YC 00030R
YD 00040R YDYA 00298R

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01010*
01020* BASED ON WHETHER IT IS LEFT OR RIGHT AS VIEWED FROM A
01030* THIRD POINT C LOOKING TOWARD POINT D
01040* LINKAGE - BT PTSLCT,DSALBL+46
01050*
01060* DSALBL IS ADDRESS OF POINT A X COORDINATE
01070* DSALBL+5 IS ADDRESS OF POINT A Y COORDINATE
01080* DSALBL+10 IS ADDRESS OF POINT B X COORDINATE
01090* DSALBL+15 IS ADDRESS OF POINT B Y COORDINATE
01100* DSALBL+20 IS ADDRESS OF POINT C X COORDINATE
01110* DSALBL+25 IS ADDRESS OF POINT C Y COORDINATE
01120* DSALBL+30 IS ADDRESS OF POINT D X COORDINATE
01130* DSALBL+35 IS ADDRESS OF POINT D Y COORDINATE
01140* DSALBL+40 IS ADDRESS OF X COORDINATE SELECTED
01150* DSALBL+45 IS ADDRESS OF Y COORDINATE SELECTED
01160* DSALBL+46 IS MODIFIER CODE - 2 IS RIGHT, 0 IS LEFT
01170* THIS PROGRAM IS ERASEABLE
01180*
01190* DS 1,, START DC IN ODD POSITION SO THERE IS NO GAP AFTER CODE
00000 00001
01200 DC 50,0 00050 00050
02010 CODE DSC 1,0 00051 00001
02020 XA DS 0,CODE-46 00005 00000
02030 YA DS 0,CODE-41 00010 00000
02040 XB DS 0,CODE-36 00015 00000
02050 YB DS 0,CODE-31 00020 00000
02060 XC DS 0,CODE-26 00025 00000
02070 YC DS 0,CODE-21 00030 00000
02080 XD DS 0,CODE-16 00035 00000
02090 YD DS 0,CODE-11 00040 00000
02100 XCOORD DS 0,CODE-6 00045 00000
02110 YCOORD DS 0,CODE-1 00050 00000
02120*
02130* PROGRAM ENTRY
02140 PTSLCT TFL XAXC,XA,11, CALCULATE CROSS PRODUCT OF VECTOR CA
00052 -0 00288 0000N
02150 FSUB XAXC,XC,11, TIMES AD. 00064 -K 00288 0002N
02160 TFL YDYA,YD,11, 00076 -0 00298 0004-
02170 FSUB YDYA,YA,11, YD-YA 00088 -K 00298 0001-
02180 FNUL XAXC,YDYA,, (XA-XC)(YD-YA) 00100 -L 00288 00298
02190 TFL XDXA,XD,11, XD-XA 00112 -0 00308 0003N
02200 FSUB XDXA,XA,11, YA-YC 00124 -K 00308 0000N
03010 TFL YAYC,YA,11, (XD-XA)(YA-YC) 00136 -0 00298 0001-
03020 FSUB YAYC,YC,11, (XA-XC)(YD-YA)-(XD-XA)(YA-YC) 00148 -K 00298 0003-
03030 FNUL XDXA,YAYC,, (XA-XC)(YD-YA)-(XD-XA)(YA-YC) 00160 -L 00308 00298
03040 FSUB CAXAD,XDXA,, 00172 -K 00288 00308
03050 BNF PDS,CAXAD-2,, IS RESULT POSITIVE 00184 -M 00260 00284
03060 NEG BD POINTB,CODE,, WHAT IS MODIFIER CODE 00196 -M 00234 00051
03070 POINTA TFL XCOORD,XA,611, PICK POINT A 00208 -0 0004N 0000N

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03080	TFL	YCOORD,VA,611		00220	-0	0005-	0001-
03090	DB2			00232	42	0000	00000
03100	POINTB	TFL XCOORD,XB,611,	PICK POINT B	00234	-0	0004M	0001M
03110	TFL	YCOORD,YB,611		00246	-0	0005-	0002-
03120	BB2			00258	42	0000	00000
03130	POS	BD POINTA,CODE,,	WHAT IS MODIFIER CODE	00260	ML	00208	00051
03140	BT	POINTS,,,	PICK POINT B IF POINT A NOT TAKEN	00272	M9	00234	00000
				00288		00010	
03150	XAXC	DC 10,0		00298		00010	
03160	YDYA	DC 10,0		00308		00010	
03170	XDXA	DC 10,0		00298		00000	
03180	YAYC	DS 0,YDYA		00288		00000	
03190	CAXAD	DS 0,XAXC		02411		00000	
03200	RETURN	DS 0,2411		00052			
04010	DEND	PYSLCT					

SYMBOL TABLE

9RCYLO 00513	TOTCYL 02434	OUTPUT 02640	MOVDAT 02402	CYLCT 02436
ENDAD 02655	INPUT 02626	ISEEK 02462	STORE 02426	

```

01010*          IBM 1620-1311 AD-APT PROGRAM FOR MOVING
01020*          FILE DATA IN PREPARATION FOR EXECUTION
01030*          OF THE POSTPROCESSOR
01040*
01050*          *ID NUMBER 0397
01060*          *STORE CORE IMAGE
01070*          LINKAGE - CALL LINK,MOVDAT
01080*
01090*.....
01100*          *
01110*          POSTPROCESSOR INPUT FROM INTRAN-DATA AT CYL(10-16)
01120*          POSTPROCESSOR INPUT FROM ARELEM-DATA AT CYL(17-23)
01130*          *
01140*          SET INPUT FOR INTRAN OR ARELEM AND MOVE DATA TO CYL(2-8)
01150*          *
01160*          CALL EXIT (POSTPROCESSOR EXECUTION UNDER MONITOR 1 CONTROL)
01170*          *
01180*.....
01190*
01200          DORG 2402          PROGRAM ENTRY          02402
02010*
02020 MOVDAT TF INPUT+3,9RCYLO,, SET INPUT FOR INTRAN OR ARELEM
02030          A INPUT+3,INPUT+3,, 9RCYLO=10(INTRAN) 02402 26 02629 00513
02040 STORE CF INPUT+2,,, 9RCYLO=17(ARELEM) 02414 21 02629 02629
02050          TFM TOTCYL,7,10, SET TOTAL NUMBER OF CYLINDERS TO R/W
02060          TFM CYLCT,2,10, SET CYLINDER COUNT FOR 2 R/W PER CYL
02070*          INPUT/OUTPUT CORE STORAGE...100 SECTORS (10000-19999)...
02080 ISEEK SK INPUT,,, SET DISK ARM FOR INPUT
02090          RDM INPUT,,, READ DISK/NO MLRC (100 SECTORS)
02100          SK OUTPUT,,, SET DISK ARM FOR OUTPUT
02110          WDM OUTPUT,,, WRITE DISK/NO MLRC (100 SECTORS)
02120          AM INPUT+5,100,9, INCREMENT INPUT SECTOR ADDRESS
02130          AM OUTPUT+5,100,9, INCREMENT OUTPUT SECTOR ADDRESS
02140          SM CYLCT,1,10, DECREMENT CYLINDER COUNT
02150          BNE ISEEK
02160          SM TOTCYL,1,10, DECREMENT TOTAL CYLINDERS (1 CYL MOVED)
02170          BNE ISEEK-12
02180*          ALL DATA MOVED.....7 CYLINDERS OF DATA
02190          RCTY
02200          RCTY
02010          WATY END:D,,, END OF AD-APT EXECUTION MESSAGE

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03020*      PREPARE FOR POSTPROCESSOR EXECUTION
03030      CALL EXIT,,,      RETURN CONTROL TO MONITOR 1
                                02618 49 00796 00000
03040 TOTCYL DS 2,STORE+8,      TOTAL NUMBER OF CYLINDERS TO R/W
                                02434 00002
03050 CYLCT DS 2,STORE+10,      CYLINDER COUNT (2 R/W PER CYLINDER)
                                02436 00002
03060 INPUT DDA ,0,0,100,10000
                                02626 00006 0-0000
                                02632 00003 J00
                                02635 00005 J0000
03070 OUTPUT DDA ,0,00400,100,10000
                                02640 00006 0-0400
                                02646 00003 J00
                                02649 00005 J0000
                                02655 00048
03080 ENDAO DAC 24,END OF AD-APT EXECUTION*
03090 9RYCLO DS ,513,      ADDRESS OF CYL NUMBER FOR INPUT DATA
                                00513 00000
03100      DEND MOVDAT      02462
    
```

SYMBOL TABLE

WRITE1 17966	TYPERR 02416	TEMPND 19575	TABOUT 07770	TABCOR 18482
SRTYPE 07597	SETPIN 16794	SETEMP 17106	RETURN 02411	PUNCH2 17530
PUNCH1 17506	ONEFRM 16582	NOWRIT 07690	MONITR 02406	INDEXA 19544
GETINM 17070	GETDEX 18962	DEXSEC 19552	DEADSK 19549	DEXCOR 19557
CHKFLG 17310	CHKEND 18390	CANOUT 16462	ALLFRM 16606	ADDPIN 18298
ADD1 17358	ADD5 16618	CHKR 17370	CLOUT 16630	COMP4 16998
FDRM 07712	HEAD1 18711	HEAD2 18873	HEAD3 19035	INA 19528
INCOR 19541	INDSK 19533	INSEC 19536	INN 19520	NGGET 07893
ND4 07901	NTIM 19577	ONE 19578	OUT 17986	OUT1 19361
OUT2 18238	OUT3 19199	PIN 07391	PINZ 16774	PUNCH 16702
RET 18690	SEE9 17190	SETGN 17058	SETIM 16890	SETIN 17566
SETP 17634	SETP2 17750	STYPE 17474	SUBA 18022	SUB8 18102
SUB2 17866	SYMB1 04289	SYMG2 04301	SYMB3 04303	SYMB4 04305
SYND5 04315	S6 17554	TABIN 03334	TDATA 03333	TDEX 07386
TEMP 19583	TFILL 17286	TOUT 19579	TRY10 18158	TRY20 18078
TW9 19570	TYPE 18514	WRITE 17886		

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01010*      IBM 1620-1311 AD-APT.....
01020*      .....
01030      DORG 16462      16462
01040 CANOUT CF TOUT      16462 33 19579 00000
01050      CF ONE      16474 33 19578 00000
01060      CM FORM,3,8      16486 14 07712 0-003
01070      BE ONEFRM      16498 46 16582 01200
01080      CM FORM,2,8      16510 14 07712 0-002
01090      BE ALLFRM      16522 46 16606 01200
01100      CM FORM,1,8      16534 14 07712 0-001
01110      BE ONEFRM      16546 46 16582 01200
01120      BTM MONITR,03090,67      16558 17 02400 -3090
01130      BTM TYPERR,301,67      16570 17 02410 -0301
01140 ONEFRM TR SYMB1-3,TDATA      16582 31 04286 03333
01150      SF ONE      16594 32 19578 00000
01160 ALLFRM TFM CLOUT+6,TABIN-5      16606 16 16636 -3329
01170 ADD5 AM CLOUT+6,5,10      16618 11 16636 000-5
01180 CLOUT TFM 9999,,      16630 16 09999 -0000
01190      CM CLOUT+6,TABIN+700      16642 14 16636 -4034
01200      BNE ADD5      16654 47 16618 01200
02010      TDM TABIN+700      16666 15 04034 00000
02020      DGM *      16677 00001
02030      CM SRTYPE,1,10      16678 14 07597 000-1
02040      BE TYPE      16690 46 18514 01200
02050 PUNCH WACD HEAD1      16702 39 18711 00400
02060      WACD HEAD2      16714 39 18873 00400
02070      WACD HEAD3      16726 39 18873 00400
02080      WACD HEAD2      16738 39 18873 00400
02090      WACD HEAD3      16750 39 19035 00400
02100      WACD HEAD2      16762 39 18873 00400
02110 PINZ BNF SETPIN,ONE      16774 44 16794 19578
02120      B7 SETEMP      16786 49 17106 00000
02130 SETPIN TFM PIN,,      16794 16 07391 -0000
02140      TFM INDSK,,      16806 16 19533 -0000
02150      TFM ND4,,10      16818 16 07901 000-0
02160      TFM NGGET,,9      16830 16 07893 00-00
02170      C PIN,TDEX      16842 24 07391 07386
02180      BE RET      16854 46 18690 01200
02190      C NGGET,NOWRIT      16866 24 07893 07890
    
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14110	NO4	DS	,07901
14120	NOGET	DS	,07893
14130	TDEX	DS	,07386
14140	NOWR17	DS	,07890
14150	SYMB1	DS	,04289
14160	SYMB2	DS	,04301
14170	SYMB3	DS	,04303
14180	SYMB4	DS	,04305
14190	SYMB5	DS	,04315
14200	TABOUT	DS	,07770
15010	MONITR	DS	,2406
15020	TYPERR	DS	,2416
15030	RETURN	DS	,2411
15040	DEND	CANDUT	

07901	00000
07893	00000
07386	00000
07890	00000
04289	00000
04301	00000
04303	00000
04305	00000
04315	00000
07770	00000
02406	00000
02416	00000
02411	00000
16462	

SYMBOL TABLE

ZCOORD 06819	YCOORD 06809	XCOORD 06799	TSTREC 03178	STORE1 04231
SRTYPE 03643	SIXIND 03978	SIGNIT 05204	SECTOR 06518	SECTNO 04266
RESTOR 04030	PNORDS 03308	PRETST 06824	NUMMRK 06858	NRSAVE 04216
MESSER 07453	MESSAG 04235	LISTAD 02402	INSPAR 03364	FILEIN 06835
ERROR4 05450	ERROR3 05438	ERROR2 05426	ERROR1 05414	ERPROC 05464
ENDALL 04186	DUMMY1 04627	CUTLOC 04820	COORDS 06973	CONVER 06789
CHKREC 02726	CARDNO 04253	ALPNUM 03914	ALPMRK 06687	ACOM 04724
AGAIN 04844	ALPHA 04628	ALSET 05216	AMOV 04664	BLANK 06737
CARD1 06524	CARD2 06685	CHKSW 03722	CLEAR 06918	DATA 04274
DIGIT 03977	DISKR 06844	DSKIN 02618	ENDIN 02830	EQUIV 03980
ERNUM 05463	EVEN 05545	FIRST 02806	FIX 04988	GONPW 03878
HIGH 05334	HILO 05370	INDIC 02918	INIT1 02534	INPUT 05544
LDM 05302	MAX 07013	MESS1 07033	MESS2 07195	MESS3 07357
MIN 06993	MOVE 04868	MVREC 04450	NPW 05547	NR 05559
NRIN 04160	NRT 05563	NRT2 03252	NRT3 03516	NRT5 03572
NRT6 04074	NSECT 05545	NSRF 05569	NSRT 05567	NSRT1 03670
NSRT2 03678	NSRT3 03686	NSRT4 03766	NSRT5 03810	NSRT6 03810
NSS 05555	NTY 04462	OUT1 06445	OUT2 06527	OUT3 06688
OVER1 05104	OVER2 05136	PSPN 04522	PSP1 03448	P1 02450
P2 02486	P3 03074	P6 03986	PT 04166	READ 02678
READN 02838	RTYPE 03225	SETEY 06771	SETUP 04402	SIGN1 05168
SPACE 04130	ST1 03974	ST2 04154	ST3 04210	ST4 04248
STS 04260	TEST 06834	TYPE 04236	VGM 02874	ZEROS 06866
0.0 06868				

AD-APT POSTPROCESSOR FOR LISTING THE OUTPUT OF
THE IBM 1620/1311 AD-APT NUMERICAL CONTROL PROCESSOR

01010*				
01020*				
01030*				
01040	DORG 2402			02402
01050*		PROGRAM ENTRY		
01060*		OUTPUT TITLE AND HEADINGS		
01070	LISTAD BNCL P1,,,	TEST PROGRAM SWITCH 1 (ON=TYPE)		
01080	BTM TYPE+12,100,,	2 CARRIAGE RETURNS	02402 47 02450 00100	
01090	BTM TYPE,MESS1,,	TYPE TITLE AND 2 CARRIAGE RETURNS	02414 17 04248 -0100	
01100	RCTY		02426 17 04236 -7033	
01110 P1	WACD MESS1,,,	PUNCH TITLE	02438 34 00000 00102	
01120	BNCL P2		02450 39 07033 00400	
01130	BTM TYPE,MESS2,,	TYPE HEADINGS AND 2 CARRIAGE RETURNS	02462 47 02486 00100	
01140 P2	WNCD BLANK-49,,,		02474 17 04236 -7195	
01150	WNCD BLANK-49	PUNCH BLANKS	02486 38 06688 00400	
01160	WACD MESS2,,		02498 38 06688 00400	
01170	WNCD BLANK-49	PUNCH HEADINGS	02510 39 07195 00400	
01180*	INITIALIZATION		02522 38 06688 00400	
01190 INIT1	TFM CARDNO,1,8,	INITIALIZE CARD SEQUENCE NUMBER	02534 16 04253 0-001	
01200	TFM SECTNO,400,,	INITIALIZE STARTING SECTOR NUMBER	02546 16 04266 -0400	
02010	TFM DISKR+5,400,,	INITIALIZE ODA STARTING SECTOR	02558 16 06849 -0400	
02020	TFM NRIN,,8,	INITIALIZE INPUT RECORD NUMBER	02570 16 04160 0-000	
02030	TFL XCOORD,0.0,,	INITIALIZE X-COORDINATE	02582 06 06799 06868	

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02040 TFL YCOORD,0,0,, INITIALIZE Y-COORDINATE 02594 06 06809 06868
02050 TFL ZCOORD,0,0,, INITIALIZE Z-COORDINATE 02606 06 06819 06868
02060 INPUT
02070 DSKIN TOM CMKREC-11,3,, SET VARIABLE OP CODE TO BD (43) 02618 15 02715 00003
02080 TFM VGM+6,INPUT+100,, SET GROUP MARK ADDRESS 02630 16 02880 -5644
02090 TDM VGM+6,,6, SET GROUP MARK FOR 1 SECTOR READ 02642 15 02880- 00000
02100 DGM * 02653 00001
02110 TFM DISKR+13,INPUT,, SET CORE ADDRESS FOR 1 SECTOR READ 02654 16 06857 -5544
02120 TDM DISKR+8,1,, SET SECTOR COUNT FOR 1 SECTOR READ 02666 15 06852 00001
02130 READ GET FILEIN, READ N SECTORS OF AD-APT RECORD 02678 10 00565 -2701
02140 A DISKR+5,DISKR+8,, READY SECTOR ADDRESS FOR NEXT READ 02690 49 00566 -6835
02150 NOP READN,INPUT+1,, VARIABLE OP CODE (NOP OR BD) 02702 21 06849 06852
02160 CMKREC CM NRIN,,8, CHECK 02714 41 02838 05545
02170 BE FIRST,,, INPUT 02726 14 04160 0-000
02180 TF NRSAVE,NR,, RECORD 02738 46 02806 01200
02190 S NRSAVE,NRIN,, SEQUENCE 02750 26 04216 05559
02200 SM NRSAVE,1,10, NUMBER 02762 22 04216 04160
03010 BE FIRST 02774 12 04216 000-1
03020 B7 ERROR1,,, RECORD OUT OF SEQUENCE ** ERROR 1 ** 02786 46 02806 01200
03030 FIRST TF NRIN,NR,, SAVE CURRENT INPUT RECORD NUMBER 02798 49 05414 00000
03040 TDM VGM+6,,6, CLEAR GROUP MARK 02806 26 04160 05559
03050 ENDIN B7 INDIC,,, END OF INPUT OPERATION 02818 15 02880- 00000
03060 READN TDM CMKREC-11,1,, SET VARIABLE OP CODE TO NOP (41) 02830 49 02918 00000
03070 TDM INPUT+100,,, CLEAR PREVIOUS GROUP MARK 02838 15 02715 00001
03080 A VGM+4,INPUT+1,, UPDATE NUMBER OF SECTORS 02850 15 05644 00000
03090 VGM TDM ... SET GROUP MARK FOR N SECTOR READ 02862 21 02878 05545
03100 DGM * 02874 15 00000 00000
03110 TFM DISKR+13,INPUT+100,, SET CORE ADDRESS FOR N SECTOR READ 02885 00001
03120 TD DISKR+8,INPUT+1,, SET SECTOR COUNT FOR N SECTOR READ 02886 16 06857 -5644
03130 B7 READ 02898 25 06852 05545
03140 OUTPUT 1 - INDICATOR 02910 49 02678 00000
03150 INDIC TR OUT1,INPUT,, SET UP INDICATOR PORTION OF RECORD 02918 31 06445 05544
03160 TF CARD1,CARDNO 02930 26 06524 04253
03170 TF SECTOR,SECTNO 02942 26 06518 04266
03180 BNC1 P3 02954 47 03074 00100
03190 TR 19973,INPUT,, SET UP TYPEWRITER OUTPUT 02966 31 19973 05544
03200 ONTY 19973,,, TYPE INDICATOR PORTION OF RECORD 02978 35 19973 00100

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04010 TBTY ... TAB SET AT COLUMN 70 02990 34 00000 00108
04020 TDM SECTOR+1,,, SET RECORD MARK 03002 15 06519 00000
04030 DC 1,,* TYPE SECTOR NUMBER 03013 00001
04040 WNTY SECTOR-4,,, RESTORE NUMERIC BLANK 03014 38 06514 00100
04050 TD SECTOR+1,BLANK,, TAB SET AT COLUMN 77 03026 25 06519 06737
04060 TBTY ... TYPE CARD NUMBER 03038 34 00000 00108
04070 WNTY CARD1-3,,, 03050 38 06521 00100
04080 RCTY 03062 34 00000 00102
04090 P3 WNCD OUT1,,, PUNCH INDICATOR PORTION OF RECORD 03074 38 06445 00400
04100 AM CARDNO,1,10, STEP CARD NUMBER 03086 11 04253 000-1
04110 AM SECTNO,1,10, STEP SECTOR NUMBER 03098 11 04266 000-1
04120 A SECTNO,NSECT 03110 21 04266 05545
04130 OUTPUT 2 - DATA
04140 TEST INPUT RECORD TYPES
04150 CM NRT,6,8, TEST RECORD TYPE GREATER THAN 6 03122 14 05563 0-006
04160 BNM TSTREC 03134 47 03178 01100
04170 CM NRT,14,8, TEST FINI RECORD 03146 14 05563 0-014
04180 BNE ERROR2,,, ILLEGAL RECORD TYPE ** ERROR 2 ** 03158 47 05426 01200
04190 B7 SPACE 03170 49 04130 00000
04200 TSTREC NM NRT,-5,10, CALCULATE 03178 13 05563 000-N
05010 BZ ERROR2 03190 46 05426 01200
05020 SM 99,RTYPE-5,, RECORD TYPE 03202 12 00099 -3220
05030 B7 99,,6, BRANCH ADDRESS 03214 49 0009R 00000
05040 RTYPE DSA ERROR2,NRT2,NRT3,ERROR2,NRT3,NRT6 03225 00005 -5424
03230 00005 -3252
03235 00005 -3516
03240 00005 -5424
03245 00005 -3572
03250 00005 -4074
05050 RECORD TYPE 2 - AUXILIARY FUNCTIONS AND PARAMETERS
05060 NATZ CM NPM,6,10, TEST NUMBER OF PARAMETER WORDS 03252 14 05547 000-6
05070 BH PHORDS,,, NPM GREATER THAN 6 03264 46 03308 01100
05080 CM NPM,,10 03276 14 05547 000-0
05090 BE SPACE,,, NPM=0 (NO ASSOCIATED DATA OUTPUT) 03288 46 04130 01200
05100 B7 DATA,,, NPM LESS THAN 7 03300 49 04274 00000
05110 PHORDS CM NSRT,1045,8, TEST PARTNO RECORD SUB-TYPE 03308 14 05567 03045
05120 BE INSPAR 03320 46 03364 01200
05130 CM NSRT,1046,8, TEST INSERT RECORD SUB-TYPE 03332 14 05567 03044
05140 BE INSPAR 03344 46 03364 01200
05150 B7 DATA,,, NPM GREATER THAN 6 03356 49 04274 00000
05160 PART NUMBER OR INSERT RECORD
05170 INSPAR TR OUT2-1,INPUT+27,, MOVE OUTPUT (DATA RECORD) 03364 31 06526 05571
05180 BNC1 PSP1 03376 47 03448 00100
05190 TFM OUT2+14,,10, SET ALPHA RECORD MARK 03388 16 06471 000-0
05200 DC 1,,* 03399 00001
06010 WATY OUT2,,, TYPE PARTNO OR INSERT (DATA RECORD) 03400 39 06527 00100
06020 TBTY ... TAB SET AT COLUMN 77 03412 34 00000 00108
06030 WNTY CARDNO-3,,, TYPE CARD NUMBER (DATA RECORD) 03424 38 04250 00100
06040 RCTY 03436 34 00000 00102
06050 PSP1 TF OUT2+130,ZEROS 03448 26 06677 06866

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06060 TNF CARD2,CARDNO 03460 73 06685 04253
06070 TDM CARD2-7,5,, FLAG LEADING DIGIT OF CARD NUMBER
                                03472 15 06678 00005
06080 WACD OUT2,,, PUNCH PARTNO OR INSERT (DATA RECORD)
                                03484 39 06527 00400
06090 AM CARDNO,1,10, STEP CARD NUMBER 03496 11 04253 000-1
06100 B7 SPACE 03508 49 04130 00000
06110 RECORD TYPE 3 - DRIVING SURFACE OR PART SURFACE
06120 LINE(NSRF=1,NPW=2) CIRCLE(NSRF=2,NPW=3)
06130 CONIC(NSRF=3,NPW=6) TABCYL(NSRF=4,NPW=(14-86))
06140 PLANE(NSRF=8,NPW=4)
06150 NRT3 CM NSRF,4,10, TEST TABCYL DS 03516 14 05569 000-4
06160 BNM DATA,,, NPW ASSOCIATED WITH SPECIFIC DS
                                03528 47 04274 01100
06170 CM NSRF,8,10, TEST PLANE PART SURFACE
06180 BNE ERROR4,,, ILLEGAL SURFACE TYPE ** ERROR 4 **
                                03552 47 05450 01200
06190 B7 DATA,,, NPW ASSOCIATED WITH SPECIFIC DS
                                03564 49 04274 00000
06200 RECORD TYPE 5 - MOTION
07010 INDIR(NSRT=1) INDIR(NSRT=2) FROM(NSRT=3)
07020 GODLTA(NSRT=4) GOTO(NSRT=5 OR 6)
07030 NRT5 CM NSRT,6,8, TEST RECORD SUB-TYPE GREATER THAN 6
                                03572 14 05567 0-006
07040 BH ERROR3,,, ILLEGAL RECORD SUB-TYPE ** ERROR 3 **
                                03584 46 05438 01100
07050 MM NSRT,-5,10, CALCULATE 03596 13 05567 000-N
07060 BZ ERROR3 03608 46 05438 01200
07070 SM 99,SRTYPE-5,, RECORD SUB-TYPE 03620 12 00099 -3638
07080 B7 99,,8,, BRANCH ADDRESS 03632 49 0009R 00000
07090 SRTYPE DSA NSRT1,NSRT2,NSRT3,NSRT4,NSRT5,NSRT6
                                03643 00005 -3670
                                03648 00005 -3678
                                03653 00005 -3686
                                03658 00005 -3766
                                03663 00005 -3810
                                03668 00005 -3810
07100 INDIRP
07110 NSRT1 B7 DATA,,, BYPASS ALPHA CONVERSION OF COORDINATE
                                03670 49 04274 00000
07120 INDIRV
07130 NSRT2 B7 DATA,,, BYPASS ALPHA CONVERSION OF COORDINATE
                                03678 49 04274 00000
07140 FROM
07150 NSRT3 TR XCOORD-9,INPUT+27,, SET FROM/POINT COORDINATES
                                03686 31 06790 05571
07160 BTM ALPHA,,10, CONVERT NUMERIC DATA TO ALPHA OUTPUT
                                03698 17 04628 000-0
07170 TFM OUT2+60,,10, SET ALPHA RECORD MARK 03710 16 06587 000-0
07180 DC 1,,* 03721 00001
07190 CHKSW BNCL P6 03722 47 03986 00100
07200 TR 19969,INPUT+27,, SET UP TYPEWRITER OUTPUT
                                03734 31 19969 05571
08010 DNTY 19969,,, TYPE DATA COORDINATES (NUMERIC)
                                03746 35 19969 00100
                                03758 49 03914 00000
08020 B7 ALPNUM
08030 GODLTA
08040 NSRT4 FADD XCOORD,INPUT+36,, UPDATE X-COORDINATE 03766 01 06799 05580
08050 FADD YCOORD,INPUT+48,, UPDATE Y-COORDINATE 03778 01 06809 05590
08060 FADD ZCOORD,INPUT+58,, UPDATE Z-COORDINATE 03790 01 06819 05600
08070 B7 NSRT3*12 03802 49 03698 00000
08080 GOTO....(NORMAL NSRT=5) (CONTINUATION NSRT=6)
08090 NSRT5 TD DIGIT,INPUT+57,, SAVE LEADING DIGIT OF 4TH PARAMETER
                                03810 25 03977 05601
08100 TDM INPUT+57,,, SET RECORD MARK 03822 15 05601 00000
08110 DC 1,,* 03833 00001
08120 TR XCOORD-9,INPUT+27,, SET GOTO/POINT COORDINATES
                                03834 31 06790 05571
08130 BTM ALPHA,,10, CONVERT NUMERIC DATA TO ALPHA OUTPUT
                                03846 17 04628 000-0
08140 BNR GONPW,OUT2+60,, TEST NPW=3 03858 45 03878 06587
08150 B7 CHKSW,,, LAST THREE PARAMETER WORDS
                                03870 49 03722 00000
                                03878 47 03986 00100
08160 GONPW BNCL P6 TYPE DATA COORDINATES (NUMERIC)
08170 WNTY INPUT+27,,, 03890 38 05571 00100
                                03902 34 00000 00101
08180 SPTY,,, SPACE TYPEWRITER 03914 16 06667 000-0
08190 ALPNUM TFM OUT2+140,,10, SET ALPHA RECORD MARK 03925 00001
08200 DC 1,,*
09010 WATY OUT2+62,,, TYPE X,Y,Z COORDS (CUTTER LOCATION)
                                03926 39 06589 00100
                                03938 16 06667 000-0
                                03950 34 00000 00108
09020 TFM OUT2+140,,10, RESTORE ALPHA BLANKS 03962 38 04250 00100
09030 TBTY 03974 34 00000 00102
09040 WNTY CARDNO-3,,, TYPE CARD NUMBER 03986 39 06527 00400
09050 ST1 RCTY,,, P FIELD STORAGE 03998 11 04253 000-1
09060 P6 WACD OUT2,,, PUNCH DATA RECORD 04010 45 04030 06587
09070 AM CARDNO,1,10, STEP CARD NUMBER 04022 49 04130 00000
09080 BNR RESTOR,OUT2+60,, TEST NPW=3
09090 B7 SPACE
09100 RESTOR TD INPUT+57,DIGIT,, RESTORE LEADING DIGIT OF 4TH PARAMETER
                                04030 25 05601 03977
                                04042 31 05571 05601
09110 TR INPUT+27,INPUT+57,, SHIFT DATA RECORD 04054 12 05547 000-3
09120 SM NPW,3,10, DECREMENT NPW 04066 49 03810 00000
09130 B7 NSRT5
09140 RECORD TYPE 6 - TOLERANCE AND CUTTER PARAMETERS
09150 INTOL(NSRT=4) OUTTOL(NSRT=5) CUTTER(NSRT=6)
09160 NRT6 CM NSRT,4,8, TEST INTOL,OUTTOL AND CUTTER
                                04074 14 05567 0-004
                                04086 47 05438 01300
                                04098 14 05567 0-006
09170 BL ERROR3,,, RECORD SUB-TYPES 04110 47 04274 01100
09180 CM NSRT,6,8
09190 BNM DATA,,, LEGAL RECORD SUB-TYPE ** ERROR 3 **
09200 B7 ERROR3,,, ILLEGAL RECORD SUB-TYPE
                                04122 49 05438 00000
10010 OUTPUT 3 - SPACER
10020 SPACE BD ENDALL,NRT-1,, TEST FINI RECORD 04130 43 04186 05562
10030 BNCL P7 04142 47 04166 00100
10040 ST2 RCTY,,, P FIELD STORAGE 04154 34 00000 00102
10050 P7 WACD OUT3,,, PUNCH SPACER 04166 38 06688 00400
10060 B7 OSKIN,,, PREPARE FOR NEXT AD-APT RECORD
                                04178 49 02618 00000
10070 END OF AD-APT POSTPROCESSOR EXECUTION
10080 ENDALL BTM TYPE+12,100,, 2 CARRIAGE RETURNS 04186 17 04248 -0100
10090 WATY MESS3 04198 39 07357 00100
10100 ST3 RCTY,,, P FIELD STORAGE 04210 34 00000 00102
10110 RETURN CONTROL TO MONITOR 1
10120
10130 CALL EXIT,,, ALL AD-APT OUTPUT PROCESSED
                                04222 49 00796 00000
10140
10150 TYPE ALPHA MESSAGE AND TWO CARRIAGE RETURNS

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15050 DNF ALSET,TEST-2,, TEST NEGATIVE NUMBER 05180 44 05216 06832
15060 TDM COORDS+17,7,, CLEAR NEGATIVE ALPHA DIGIT 05192 15 06990 00007
15070 SIGNIT TFM ,20,10, SET SIGN MINUS 05204 16 00000 000K0
15080 ALSET TF ,,, MOVE CONVERTED DATA 05216 26 00000 00000
15090 AM MOVE+11,10,, STEP NUMERIC COORD ADDRESS 05228 11 04879 -0010
15100 AM ALSET+6,24,, STEP ALPHA COORD ADDRESS 05240 11 05222 -0024
15110 CM MOVE+11,XCOORD+30,, TEST ALL COORDINATES PROCESSED 05252 14 04879 -6829
15120 ONE AGAIN 05264 47 04844 01200
15130 TNF CARD2,CARDNO,, SET UP CARD NUMBER 05276 73 06685 04253
15140 TDM CARD2-7,5,, FLAG LEADING DIGIT OF CARD NUMBER 05288 15 06678 00005
15190 082 ,,, BRANCH BACK 05300 42 00000 00000
15160 HIN OR MAX ALLOWABLE OUTPUT VALUES EXCEEDED
15170 LOW FSUB TEST,0.0,, TEST COORDINATE=0.0 05302 02 06834 06868
15180 BZ ALSET 05314 46 05216 01200
15190 BT HIGH+12,, LESS THAN HIN VALUE (SET TO 0.00000) 05326 49 05346 00000
15200 HIGH TFM ALSET+11,MAX+10,, MORE THAN MAX VALUE (SET TO 999.99999) 05334 16 05227 -7031
16010 TF MILO+6,ALSET+6,, SET ADDRESS FOR * 05346 26 05376 05222
16020 AM MILO+6,2 05358 11 05376 -0002
16030 MILO TFM ,14,10, MOVE * FOR HIN OR MAX OUTPUT VALUE 05370 16 00000 000J4
16040 CM TEST,,10, TEST PROPER CHARACTERISTIC RETURN 05382 14 06834 000-0
16050 BH OVER2+12,, MAX 05394 46 05148 01100
16060 BT SIGNL,, MIN 05406 49 05168 00000
16070 ERROR CONDITIONS
16080 ERROR1 BTM ERPROC,1,10, RECORD OUT OF SEQUENCE 05414 17 05464 000-1
16090 ERROR2 BTM ERPROC,2,10, ILLEGAL RECORD TYPE 05426 17 05464 000-2
16100 ERROR3 BTM ERPROC,3,10, ILLEGAL RECORD SUB-TYPE 05438 17 05464 000-3
16110 ERROR4 BTM ERPROC,4,10, ILLEGAL SURFACE TYPE 05450 17 05464 000-4
16120 TYPE ERROR NUMBER AND SOURCE SEQUENCE NUMBER
16130 ERNUM DAS 1, ERROR NUMBER 05464 25 07471 05463
16140 ERPROC TD MESSER+10,ERNUM,, SET ERROR NUMBER IN MESSAGE 05476 73 07527 05555
16190 TNF MESSER+74,NSS,, SET SOURCE STATEMENT NUMBER IN MESSAGE 05488 34 00000 00102
16160 RCTY 05500 39 07453 00100
16170 WATY MESSER,, TYPE ERROR MESSAGE 05512 34 00000 00102
16180 RCTY 05524 48 00000 00000
16190 H ,, DEPRESS START KEY TO CONTINUE PROCESSING 05536 49 04130 00000
16200 BT SPACE,, IGNORE DATA PORTION OF RECORD 05545 00002
17010 INPUT AREA 05544 00000
17020 EVEN DAS 1 05544 00000
17030 INPUT DS ,EVEN-1, 1311 DISK FILE INPUT AREA 06444 00900
17040 DS 900,INPUT+900
17050 NUMERIC CARD AND TYPEWRITER OUTPUT FOR OUT1 06445
17060 DORG INPUT+901 06445 00080
17070 OUT1 DSS 80,, OUTPUT 06513 00042
17080 DNB 42,OUT1+68, STORAGE

17090 SECTOR DS 5,OUT1+73, FOR INDICATOR 06518 00005
17100 DNB 2,OUT1+75, PORTION OF 06520 00002
17110 CARD1 DS 4,OUT1+79, AD-APT RECORD 06524 00004
17120 DC 1,,OUT1+80 06525 00001
17130 ALPHA CARD OUTPUT FOR OUT2
17140 MIXED ALPHA AND NUMERIC TYPEWRITER OUTPUT FOR OUT2
17150 DORG OUT1+81 06526
17160 OUT2 DAS 80,, OUTPUT STORAGE 06527 00160
17170 CARD2 DS 8,OUT2+158, DATA PORTION OF 06685 00008
17180 ALPMRK DAC 1,,OUT2+160, AD-APT RECORD 06687 00002
17190 80 COLUMNS OF NUMERIC BLANKS
17200 DORG OUT2+161 06688
18010 BLANK DNB 50 06737 00050
18020 DNB 30,BLANK+30 06767 00030
18030 DC 1,,BLANK+31 06768 00001
18040 NUMERIC CARD OUTPUT FOR OUT3
18050 OUT3 DS ,BLANK+49, OUTPUT STORAGE FOR SPACER 06688 00000
18060 STORAGE
18070 NSECT DS ,INPUT+1, NUMBER OF SECTORS PER RECORD (ADD 1) 05545 00000
18080 NPW DS ,INPUT+3, NUMBER OF PARAMETER WORDS 05547 00000
18090 NSS DS ,INPUT+11, SOURCE SEQUENCE NUMBER 05555 00000
18100 NR DS ,INPUT+15, INPUT RECORD NUMBER 05559 00000
18110 NRT DS ,INPUT+19, RECORD TYPE 05563 00000
18120 NSRT DS ,INPUT+23, RECORD SUB-TYPE 05567 00000
18130 NSRF DS ,INPUT+25, SURFACE TYPE 05569 00000
18140 NSRT6 DS ,NSRT5, DUMMY LABEL (SAME FUNCTION) 03810 00000
18150 DIGIT DS 1,ST1+3, SAVE DIGIT 03977 00001
18160 SIXIND DS 1,ST1+4, NPW INDICATOR (BASED ON VALUE OF 6) 03978 00001
18170 EQUIV DS 2,ST1+4, EQUIVALENT NPW STORAGE 03980 00002
18180 NRIN DS 4,ST2+6, CURRENT VALUE OF RECORD NUMBER 04160 00004
18190 MRSAVE DS 4,ST3+6, SAVE RECORD NUMBER 04216 00004
18200 CARDNO DS 4,ST4+5, CARD NUMBER 04253 00004
19010 DC 1,,ST4+6 04254 00001
19020 SECTNO DS 5,ST5+6, SECTOR NUMBER 04264 00003
19030 DORG BLANK+32 06769
19040 SETEV DAS 10 06771 00020
19050 CONVER DS ,SETEV+10, ALPHA CONVERSION STORAGE 06789 00000
19060 DORG SETEV+10 06790
19070 XCOORD DS 10,, X-COORDINATE 06799 00010
19080 YCOORD DS 10,YCOORD+10, Y-COORDINATE 06809 00010
19090 ZCOORD DS 10,ZCOORD+10, Z-COORDINATE 06819 00010
19100 DS 1,ZCOORD+1, RECORD MARK STORAGE 06820 00001
19110 DORG ZCOORD+2 06821
19120 PRETST DC 4,0 06824 00004
19130 TEST DS 10,PRETST+10, TEST CUTTER LOCATION VALUE 06834 00010
19140 1311 DISK FILE ADDRESSES
19150 DORG PRETST+11 06835
19160 FILEIN DSW ,013NR,,A 06835 00002 20
06837 00003 -6004
06842 00001

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19170 DISKR DDA 0.0,0.0 06844 00006 0-0000
                                06850 00003 -00
                                06853 00005 -0000
                                06858 00001
19180 MUMHRX DC 1, 06844 00008
19190 CONSTANTYS 06844 00002
19200 ZEROS DC 0,0 06844 00008
20010 0.0 DC 2,-99,ZEROS+2, FLOATING POINT ZERO 06844 00002
20020 DORG ZEROS+3 06849
20030 CLEAR DC 50.0,, ONE HUNDRED AND ONE ZEROS 06918 00050
20040 DC 50.0,CLEAR+50 06968 00050
20050 DC 2.,CLEAR+52 06970 00002
20060 DORG CLEAR+53 06971
20070 COORDS DAC 10, 0.00000,, ALPHA COORDINATE WORKING STORAGE 06973 00020
20080 MIN DAC 10, 0.00000,, LESS THAN 0.00001 06993 00020
20090 MAX DAC 10, 999.99999,, GREATER THAN 999.99999 07013 00020
20100 OUTPUT MESSAGES
20110 MESS1 DAC 50, .....IBM 1620/1311 AD-APT NUMERICAL CONTROL 07033 00100
20120 DAC 31, PROCESSOR OUTPUT..... *,MESS1+100 07133 00062
20130 DORG MESS1+161 07196
20140 MESS2 DAC 50, AD-APT RECORD X-COORD Y-C 07195 00100
20150 DAC 31,COORD Z-COORD SECTOR IDNO',MESS2+100 07295 00062
20160 DORG MESS2+161 07336
20170 MESS3 DAC 40,.....END OF AD-APT POSTPROCESSOR EXECUTION..... 07337 00096
20180 MESS4 DAC 42,, ERROR 0 SOURCE STATEMENT 00000000 07453 00004
20190 END OF AD-APT POSTPROCESSOR CODE 02402
20200 DEND LISTAD
    
```

SYMBOL TABLE

```

ARGADD 00005R ARG 00079 CNTR 00101R CONT 00200R EVEN 00056R
FLCON 00303R INDX 00190R NZARG 00032R ODD 00088R REG 00057R
SFLAG 00316R SHIFT 00104R SLT 00340R SORTF 00006R TERM 00384R
    
```

```

01010 IBM 1620-1311 AD-APT FLOATING SQUARE ROOT SUBROUTINE RCS
01020
01030 *NAME SORTFA ... ERASABLE SYSTEM SUBROUTINE
01040 *IU NUMBER 0200+DELDIM
01050 *ASSEMBLE RELOCATABLE
01060 *STORE RELOADABLE
01070 LINKAGE - 8TH SORTF.ADDARG,67
01080 ADDARG IS THE ADDRESS OF THE ARGUMENT AND RESULT
01090 IT IS ASSUMED THAT THE ARGUMENT IS NON-NEGATIVE
01100 CORE POSITIONS 00049-00099 USED FOR TEMP. STORAGE
01110 METHOD... ODD INTEGER (8-DIGIT MANTISSA)
01120
01130 ARGADD DC 6.0,, LOCATION OF ADDRESS OF CALLING ARGUMENT 00005 00006
01140 SUBROUTINE ENTRY
01150 SORTF TFL ARG,ARGADD,13, MOVE ARGUMENT 00006 00 00079 00000
01160 BD NZARG,ARG-9,, BRANCH IF ARGUMENT IS NON-ZERO 00016 M3 00032 00070
01170
01180 BR ... EXIT 00030 42 00000 00000
01190 DORG 0-9 00032
01200
02010 NZARG MH ARG,50,10 00032 13 00079 00000
02020 BD ODD,98,, BRANCH IF ODD-NUMBERED CHARACTERISTIC 00044 M3 00000 00098
02030
02040 EVEN TFM ARG-10,,9, CLEAR FLAGS ARG-10 AND ARG-11 00036 16 00069 00-00
02050 TFM INDX,ARG-10 00048 J6 00190 -0061
02060 B ODD+40 00080 M9 00136 00000
02070 DORG 0-3 00080
02080
02090 ODD CP ARG-9 00088 33 00070 00000
02100 TCM ARG-10,,11 00100 19 00069 0000-
02110 TFM INDX,ARG-10 00112 J6 00190 -0060
02120 AN 99,50,10, ROUND RESULT EXPONENT 00124 11 00099 00000
02130 WF 97,99,, SET PROPER SIGN 00136 71 00097 00099
02140 TFM SFLAG+6,ARG-10 00140 J6 00322 -0061
02150 TFM SLT+6,REG-8 00160 J6 00344 -0059
02160 TFM CNTG,0,10 00172 J6 00101 000-0
02170 SHIFT FSL ,ARG-8,, EXPAND MANTISSA 00184 05 00000 00077
02180 AN INDX,1,10 00196 J1 00190 000-1
02190 TFM REG+8,FLCON 00208 00 00099 00303
02200 AN REG,2,10 00220 11 00097 000-2
02210 B INDX,REG,6 00232 42 0019- 00057
02220 OMM 0-20 00244 06 00220 01300
02230
02240 SH CNTG,1,10 00256 J2 00191 000-1
02250 OZ TERM 00268 06 00300 01300
02260
02270 B INDX,REG,0 00280 41 0019- 00057
02280 CP INDX,100,00010 00292 13 0019- 0-0-0
    
```


03090	AM	INDX,2,10			00304	J1	00190	000-2
03100	SFLAG	SF			00316	32	00000	00000
03110	AM	*-6,1,10			00328	J1	00322	000-1
03120	SLT	FSL	,REG		00340	05	00000	00057
03130	SM	*-6,1,10			00352	J2	00346	000-1
03140	SM	REG,9,10			00364	L2	00057	000-9
03150	B	SHIFT+48			00376	M9	00232	00000
03160	DORG	*-3			00384			
03170*								
03180	TERM	TF	ARG,97,,	MOVE RESULT EXPONENT	00384	26	00079	00097
03190	MM	REG,5,10			00396	13	00057	000-5
03200	SF	91			00408	32	00091	00000
04010	TF	ARG-2,98,,		MOVE RESULT MANTISSA	00420	26	00077	00098
04020	TFL	ARGADD,ARG,6,		RETURN RESULT	00432	-6	0000N	00079
04030	DSC	2,42,,		EXIT	00444		00002	
04040*								
04050	ARG	DS	20,79		00079	00020		
04060	REG	DS	9,57		00057	00009		
04070	CNTR	DS	2,SHIFT-3		00181	00002		
04080	INDX	DS	,SHIFT+6		00190	00000		
04090	PLCON	DS	4,CONT+21		00303	00004		
04100	DEND	SQRTF			00006			

SYMBOL TABLE

SUB2PI	00130R	ARGADD	00009R	ADD2PI	00114R	COSF	00078R	C1	00439R
C3	00491R	C5	00463R	C7	00475R	C9	00487R	EXIT	00378R
PI	00463R	SIGNA	00055	SINF	00006R	SRT	00394R	THETA	00079
THOPI	00427R	X	00079	XSQ	00067	0.5PI	00391R	Z/PI	00415R

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01010*          IBM 1620-1311 AD-APT FLOATING SINE-COSINE SUBROUTINE
01020*
01030*          *NAME SINF... ERASABLE SYSTEM SUBROUTINE
01040*          *ID NUMBER 0201*DELDIM
01050*          *ASSEMBLE RELOCATABLE
01060*          *STORE RELOADABLE
01070*          LINKAGE - BTM SINF,ADDARG,67
01080*          BTM COSF,ADDARG,67
01090*          ADDARG IS THE ADDRESS OF THE ARGUMENT AND RESULT
01100*          THE RANGE OF THE ARGUMENT IS UNRESTRICTED
01110*          CORE POSITIONS 0004-00099 USED FOR TEMP. STORAGE
01120*          METHDD.. HASTINGS APPROXIMATION (9-DIGIT MANTISSA)
01130*
01140 ARGADD DC 6,0,,          LOCATION OF ADDRESS OF CALLING ARGUMENT
                                00005 00006
01150*          SINF SUBROUTINE ENTRY
01160 SINF TFL THETA,0.5PI,,    PI/2.0          00006 00 00079 00391
01170 TFL XSO,ARGADD,11,,     MOVE ARG TO XSO 00018 00 00067 00000
01180 FSL XSO-11,XSO-2,,      FABRICATE 10-DIGIT MANTISSA
                                00030 05 00056 00065
01190 FSUB THETA,XSO,,        THETA=PI/2.0-ARG 00042 02 00079 00067
01200 TF COSF-1,ARGADD       00054 00 00077 00005
02010 B **36                  00066 09 00102 00000
02020*          COSF SUBROUTINE ENTRY
02030 COSF TFL THETA,-1,11,,   MOVE ARG TO THETA 00078 00 00079 00079
02040 FSL THETA-11,THETA-2,,   FABRICATE 10-DIGIT MANTISSA
                                00090 05 00068 00077
02050 BNF SUB2PI,THETA-2,,    BRANCH IF THETA IS NON-NEGATIVE
                                00102 06 00138 00077
02060*
02070 ADD2PI FADD THETA,THOPI,, THETA=THETA+2.0*PI 00114 0J 00079 00427
02080 BNF ADD2PI,,,          BRANCH IF THETA IS NON-POSITIVE
                                00126 07 00114 01100
02090*
02100 SUB2PI FSUB THETA,THOPI,, THETA=THETA-2.0*PI 00138 0K 00079 00427
02110 BNN SUB2PI,,,          BRANCH IF THETA IS NON-NEGATIVE
                                00150 06 00138 01300
02120*
02130 FADD THETA,PI,,          THETA=THETA+PI 00162 0J 00079 00403
02140 SF THETA-2,,           THETA=-ABS(THETA) 00174 3Z 00077 00000
02150 FADD THETA,0.5PI,,     THETA=THETA+PI/2.0 00186 0J 00079 00391
02160 FMUL X,2/PI,,          X=(2.0*THETA)/PI 00198 0L 00079 00415
02170 TFL XSO,X              00210 06 00067 00079
02180 FMUL XSO,X,,          X**2 00222 03 00067 00079
02190 TFL SIGMA,XSO,,       MOVE X**2 00234 06 00055 00067
02200 FMUL SIGMA,C9          00246 0L 00055 00487
03010 FADD SIGMA,C7          00258 0J 00055 00475
03020 FMUL SIGMA,XSQ        00270 03 00055 00067
03030 FADD SIGMA,C5          00282 0J 00055 00463
03040 FMUL SIGMA,XSQ        00294 03 00055 00067
03050 FADD SIGMA,C3          00306 0J 00055 00451

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03060 FMUL SIGMA,XSQ          00318 03 00055 00067
03070 FADD SIGMA,C1          00330 0J 00055 00439
03080 FMUL SIGMA,X,,        SUMMATION (I=0,N) 00342 03 00055 00079
03090 SRT FSR SIGMA-2,SIGMA-6,, SHIFT TO 8-DIGIT MANTISSA
                                00354 08 00053 00051
03100 TFL COSF-1,SIGMA,6,,   RETURN RESULT 00366 -6 00079 00055
03110 EXIT BB ,,           00378 4Z 00000 00000
03120 DORG #-9             00380
03130*
03140 DC 10,1570796327      00389 00010
03150 0.5PI DC 2,1         00391 00002
03160 DC 10,3141592637     00401 00010
03170 PI DC 2,1           00403 00002
03180 DC 10,6366197757    00413 00010
03190 Z/PI DC 2,0         00415 00002
03200 DC 10,6283185274    00425 00010
04010 THOPI DC 2,1        00427 00002
04020 DC 10,-1570796318   00437 00010
04030 C1 DC 2,1           00439 00002
04040 DC 10,6459637111    00449 00010
04050 C3 DC 2,0           00451 00002
04060 DC 10,-7960967928   00461 00010
04070 C5 DC 2,-1          00463 00002
04080 DC 10,4673765570    00473 00010
04090 C7 DC 2,-2          00475 00002
04100 DC 10,-1514841900   00485 00010
04110 C9 DC 2,-3          00487 00002
04120*
04130 THETA DS 12,79       00079 00012
04140 X DS ,THETA         00079 00000
04150 XSO DS 12,67        00067 00012
04160 SIGMA DS 12,55      00055 00012
04170 BEND SINF           00006

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05140 C1	DC	2,0	00572 00002
05150	DC	10,-3332985605	00582 00010
05160 C3	DC	2,0	00584 00002
05170	DC	10,1994653599	00594 00010
05180 C5	DC	2,0	00596 00002
05190	DC	10,-1390833351	00606 00010
05200 C7	DC	2,0	00608 00002
06010	DC	10,9642004410	00618 00010
06020 C9	DC	2,-1	00620 00002
06030	DC	10,-5590988610	00630 00010
06040 C11	DC	2,-1	00632 00002
06050	DC	10,2186122880	00642 00010
06060 C13	DC	2,-1	00644 00002
06070	DC	10,-4054058000	00646 00010
06080 C15	DC	2,-2	00656 00002
06090	DC	10,3141592637	00666 00010
06100 PI	DC	2,1	00668 00002
06110	DC	10,0	00678 00010
06120 ZRD	DC	2,-99	00680 00002
06130	DC	10,1000000000	00690 00010
06140 ONE	DC	2,1	00692 00002
06150	DC	8,47123890	00700 00008
06160 1.SPI	DC	2,1	00702 00002
06170	DC	8,15707963	00710 00008
06180 0.5PI	DC	2,1	00712 00002
06190	DC	10,6283185274	00722 00010
06200 2.OPI	DC	2,1	00724 00002
07010	DC	10,7853981684	00734 00010
07020 0.25PI	DC	2,0	00736 00002
07030*			
07040 X	DS	12,79	00079 00012
07050 Y	DS	12,67	00067 00012
07060 ARTR	DS	12,55	00055 00012
07070 OMEGA	DS	12,43	00043 00012
07080 SIGMA	DS	,Y	00067 00000
07090 XPLUS1	DS	12,31	00031 00012
07100 XMIN1	DS	,ARTR	00055 00000
07110 QUO	DS	,XMIN1	00055 00000
07120 QUOSQ	DS	,X	00079 00000
07130 CNTR	DS	2,NZER0X-1	00087 00002
07140	END	ATANF	00016

SYMBOL TABLE

LOG10E 00767R	FLINFM 00755R	ARGMOD 00360R	ARGADD 00005R	ARG	00079
A0 00651R	A1 00663R	A2 00675R	A3 00637R	A4	00699R
A5 00711R	A6 00723R	A7 00735R	BRNOP 00298R	CNTR	00533R
EXIT 00334R	EXP 00273R	EXPF 00006R	EXPOL 00404R	EXPOZ	00560R
NEGX 00054R	NORM 00476R	OVFLD 00600R	POSX 00170R	TERM	00202R
UNFLD 00626R	Z	00067	0.0 00745R	1.0 00651R	

IBM 1620-1311 AD-APT FLOATING EXPONENTIAL SUBROUTINE
RCS

*NAME EXPPFA... ERASABLE SYSTEM SUBROUTINE
*ID NUMBER 0203*DELDIM
*ASSEMBLE RELOCATABLE
*STORE RELOADABLE
LINKAGE - BTM EXPF,ADDARG,67
ADDARG IS THE ADDRESS OF THE ARGUMENT AND RESULT
THE RANGE OF THE ARGUMENT IS UNRESTRICTED
CORE POSITIONS 00056-00099 USED FOR TEMP. STORAGE
METHOD... HASTINGS APPROXIMATION (8-DIGIT MANTISSA)

01130 ARGADD DC 6,0,, LOCATION OF ADDRESS OF CALLING ARGUMENT
00005 00006

SUBROUTINE ENTRY

01140 EXPF TPL ARG,ARGADD,11, MOVE ARGUMENT 00006 00 00079 0000H
01160 FSL ARG-11,ARG-2,, FABRICATE 10-DIGIT MANTISSA
00018 05 00068 00077

01170 FMUL ARG,LOG10E,, ARG*(LN 10.0) 00030 0L 00079 00767
01180 BNF POSX,ARG-2,, BRANCH IF ARGUMENT IS NEG-NEGATIVE
00042 M4 00170 00077

01190*
01200 NEGX YDN BRNOP*1,9,, SET 49 OP-CODE (8) 00054 J5 00209 00009
02010 CF ARG-2,, ARG=ABS(ARG) 00086 J3 00077 00000
02020 CM ARG,,10 00078 14 00079 000-0
02030 YFM EXP,,10, CLEAR EXPONENT MODIFIER
00090 J6 00273 000-0

02040 BM ARGMOD,,, BRANCH IF EXPONENT EXCEEDS 00
00102 M6 00368 01100

02050*
02060 TPL Z,ARG,, Z=ARG 00114 06 00067 00079
02070 FMUL Z,07,, Z*(17) 00120 0L 00067 00739

02080*
02090 YFM TERM*11,46 00138 J0 00213 -0723
02100 YFM CNTR,7,10 00150 J6 00533 000-7
02110 S TERM 00162 M9 00302 00000
02120 DCRG 0-3 00170

02130*
02140 POSX YDN BRNOP*1,1,11 00170 J5 00309 0000J
02150 S NEGX*24 00182 M9 00378 00000
02160 DCRG 0-3 00190

02170*
02180 FMUL Z,ARG 00190 03 00067 00079
02190 YFM FADD Z 00202 01 00067 00000
02200 SM 0-1,12,10 00214 J2 00213 0000J
03010 SM CNTR,1,10 00226 J2 00533 0000J
03020 BNZ TERM-13 00238 M7 00190 01200

03030*
03040 FMUL Z,Z 00250 03 00067 00067

03050	AM	Z,,,	E**ARG	00262 11 00067 -0000
03060	BV	OVFLO,,,	BRANCH IF RESULT OUT OF RANGE	00274 M6 00600 01400
03070*				
03080	TFL	ARG,2		00286 06 00079 00067
03090	BRNOP	NOP EXIT+2,,,	BRANCH IF ARGUMENT WAS NEGATIVE	00298 M1 00336 00000
03100	FSR	ARG-2,ARG-4,,	SHIFT TO 8-DIGIT MANTISSA	00310 08 00077 00075
03110	TFL	ARGADD,ARG,6,,	RETURN RESULT	00322 -6 0000M 00079
03120	EXIT	BB ,,,	EXIT	00334 42 00000 00000
03130	DORG	=-9		00336
03140*				
03150	TFL	ARG,1.0	E**(-ARG)	00336 00 00079 00651
03160	FDIV	ARG,2,,		00348 09 00079 00067
03170	B	EXIT-24		00360 M9 00310 00000
03180	DORG	=-3		00368
03190*				
03200	ARGMOD	CM ARG,2,10		00368 14 00079 000-2
04010	BH	OVFLO,,,	BRANCH IF ARGUMENT OUT OF RANGE	00380 M6 00600 01100
04020*				
04030	BE	EXP02,,,	BRANCH IF EXPONENT IS 02	00392 M6 00568 01200
04040*				
04050	EXP01	TD EXP,ARG-11		00404 K5 00273 00068
04060	CF	EXP		00416 L3 00273 00000
04070	FSL	ARG-12,ARG-2,,	ELIMINATE INTEGER PORTION OF MANTISSA	00428 05 00067 00077
04080	SF	ARG-11		00440 32 00068 00000
04090	TFM	ARG,,10,	ASSUME NO LEADING ZEROS IN DECIMAL	00452 16 00079 000-0
04100	TFM	CNTR,8,10		00464 J6 00533 000-8
04110	NORM	BD NEGX+60,ARG-11,,	BRANCH IF NON-ZERO DIGIT	00476 M3 00114 00068
04120*				
04130	SF	ARG-10		00488 32 00069 00000
04140	FSL	ARG-11,ARG-2	DECREMENT EXPONENT	00500 05 00068 00077
04150	SM	ARG,1,10,		00512 L2 00079 000-1
04160	SM	CNTR,1,10		00524 J2 00533 000-1
04170	BNZ	NORM		00536 M7 00476 01200
04180*				
04190	TFL	Z,1.0,,	ARGUMENT IS AN INTEGER	00548 00 00067 00651
04200	B	TERM+60		00560 M9 00262 00000
05010	DORG	=-3		00568
05020*				
05030	EXP02	TF EXP,ARG-10	ELIMINATE INTEGER PORTION OF MANTISSA	00568 K6 00273 00069
05040	FSL	ARG-13,ARG-2,,		00580 05 00066 00077
05050	B	EXP01+36		00592 M9 00440 00000
05060	DORG	=-3		00600
05070*				
05080	QVFO	BNF UNFLO,BRNOP+1		00600 MM 00626 00299
05090	TFL	ARGADD,FLINFN,6	EXIT	00612 -0 0000M 00755
05100	BB	,,,		00624 42 00000 00000
05110	DORG	=-9		00626
05120*				
05130	UNFLO	TFL ARGADD,0.0,6	EXIT	00626 -0 0000M 00745
05140	BB	,,,		00638 42 00000 00000

05150	DORG	=-9	00640
05160*			
05170	DC	10,1000000000	00649 00010
05180	A0	DC 2,1	00651 00002
05190	DC	10,1151292776	00661 00010
05200	A1	DC 2,1	00663 00002
06010	DC	10,6627308843	00673 00010
06020	A2	DC 2,0	00675 00002
06030	DC	10,2543935748	00685 00010
06040	A3	DC 2,0	00687 00002
06050	DC	10,7295173666	00697 00010
06060	A4	DC 2,-1	00699 00002
06070	DC	10,1742111988	00709 00010
06080	A5	DC 2,-1	00711 00002
06090	DC	10,2554917940	00721 00010
06100	A6	DC 2,-2	00723 00002
06110	DC	10,9326426700	00733 00010
06120	A7	DC 2,-3	00735 00002
06130	DC	8,0	00743 00008
06140	0.0	DC 2,-99	00745 00002
06150	DC	8,99999999	00753 00008
06160	FLINFN	DC 2,99	00755 00002
06170	DC	10,4342944819	00765 00010
06180	LOG10E	DC 2,0	00767 00002
06190*			
06200	1.0	DS ,A0	00651 00000
07010	ARG	DS 14,79	00079 00014
07020	EXP	DS 2,TERM+71	00273 00002
07030	Z	DS 12,67	00067 00012
07040	CNTR	DS 2,NORM+57	00533 00002
07050	DEND	EXPF	00006

SYMBOL TABLE

XPLUS1	00079	LOGO.0	00042R	ARGADD	00005R	ARG	00079	CNTR	00297R
C1	00599R	C11	00619R	C13	00631R	C3	00571R	C5	00583R
C7	00599R	C9	00607R	EXP	00005R	LOGAX	00420R	LOGF	00006R
LOGX	00336R	LOGO	00675R	LOG1	00487R	LOG10	00535R	LOG2	00690R
LOGA	00511R	LOG8	00323R	NZARG	00056R	SIGMA	00055	SRT	00440R
TERM	00276R	XMIN1	00067	Z	00067	ZSQ	00079	I.0	00347R

01010* IBM 1620-1311 AD-APT FLOATING NAT. LOGARITHM SUBROUTINE
 01020* RCS
 01030* *NAME LOGFA... ERASABLE SYSTEM SUBROUTINE
 01040* *ID NUMBER 0204*DELDIN
 01050* *ASSEMBLE RELOCATABLE
 01060* *STORE RELOADABLE
 01070* LINKAGE = BTM LOGF,ADDARG,67
 01080* ADDARG IS THE ADDRESS OF THE ARGUMENT AND RESULT
 01090* IT IS ASSUMED THAT THE ARGUMENT IS NON-NEGATIVE
 01100* CODE POSITIONS 00044-00099 USED FOR TEMP. STORAGE
 01110* METHOD.. TRUNCATED IMP. SERIES (8-DIGIT MANTISSA)
 01120*
 01130 ARGADD DC 6,0,, LOCATION OF ADDRESS OF CALLING ARGUMENT
 00005 00006
 01140* SUBROUTINE ENTRY
 01150 LOGF TFL ARG,ARGADD,11, MOVE ARGUMENT 00006 00 00079 0000N
 01160 TFM ARG,,10, REDUCE RANGE OF ARGUMENT
 00018 16 00079 000-0
 01170 BD NZARG,ARG-9,, BRANCH IF ARGUMENT IS NON-ZERO
 00030 M3 00056 00070
 01180*
 01190 LOGO.0 TFL ARGADD,LOGO,6, SET RESULT TO - INFINITY
 00042 -0 0000N 00475
 01200 BB ... EXIT 00054 42 00000 00000
 02010 DORG -9 00056
 02020*
 02030 NZARG FSL ARG-11,ARG-2,, FABRICATE 10-DIGIT MANTISSA
 00056 05 00068 00077
 02040 TFM LOGX+11,LOG1 00068 J0 00347 -0487
 02050 CM ARG-10,50,10 00080 14 00069 000N0
 02060 BML **44,,, BRANCH IF LEADING DIGIT EXCEEDS 4
 00092 M6 00136 01300
 02070*
 02080 A ARG-2,ARG-2,, DOUBLE REDUCED ARGUMENT
 00104 21 00077 00077
 02090 AM LOGX+11,12,10 00116 J1 00347 000J2
 02100 B NZARG+24 00128 M9 00080 00000
 02110 DORG -9 00136
 02120*
 02130 TFL XMIN1,ARG 00136 06 00067 00079
 02140 FSUB XMIN1,I.0,, X-1.0 00148 0K 00067 00547
 02150 FADD XPLUS1,I.0,, X+1.0 00160 0J 00079 00547
 02160 FDIV XMIN1,XPLUS1,, (X-1.0)/(X+1.0) 00172 09 00067 00079
 02170 TFL ZSQ,Z Z*Z 00184 06 00079 00067
 02180 FMUL ZSQ,Z,, Z**2 00196 03 00079 00067
 02190 TFL SIGMA,ZSQ LOG(X)=LOG(X)+LOG(N) 00208 06 00055 00079
 02200 FMUL SIGMA,C13,, C(I13)=Z**2 00220 0L 00055 00631
 03010 TFM TERM+11,C11 00232 J0 00287 -0619
 03020 TFM CNTR,6,10 00244 J6 00297 000-6

03030 B TERM 00256 M9 00276 00000
 03040 DORG -9 00264
 03050*
 03060 FMUL SIGMA,ZSQ 00264 03 00055 00079
 03070 TERM FADD SIGMA 00276 01 00055 00000
 03080 SM -1,12,10 00288 J2 00287 000J2
 03090 SM CNTR,1,10 00300 J2 00297 000-1
 03100 BNZ TERM-12 00312 M7 00264 01200
 03110*
 03120 FMUL SIGMA,Z,, LOG(X)=X, N=1,2,4,8 00324 03 00059 00067
 03130 LOGX FSUB SIGMA,,, LOG(X)=LOG(X)-LOG(N) 00336 02 00055 00000
 03140*
 03140 TDM LOGAX+1,1,, ASSUME POSITIVE EXPONENT 00340 J5 00421 00001
 03150 BNF LOGAX-24,EXP,11, BRANCH IF EXPONENT IS NON-NEGATIVE
 00360 M4 00396 0000N
 03160*
 03170 CF EXP,,6 00372 L3 0000N 00000
 03180 TDM LOGAX+1,2 00384 J5 00421 00002
 03190 SM EXP,1,610 00396 J2 0000N 000-1
 03200 BN SRT 00408 M7 00440 01300
 04010*
 04020 LOGAX FADD SIGMA,LOG10,, LOG(ARG) 00420 0J 00055 00535
 04030 B -9-36 00432 M9 00396 00000
 04040 DORG -9 00440
 04050*
 04060 SRT FSR SIGMA-2,SIGMA-4,, SHIFT TO 8-DIGIT MANTISSA
 00440 08 00059 00051
 04070 TFL ARGADD,SIGMA,6, RETURN RESULT 00452 -6 00059 00059
 04080 BB ... EXIT 00464 42 00000 00000
 04090 DORG -9 00466
 04100*
 04110 DC 0,-999999999 00473 00000
 04120 LOGO DC 2,99 00475 00002
 04130 DC 10,0 00485 00010
 04140 LOG1 DC 2,-99 00487 00002
 04150 DC 10,6931471635 00497 00010
 04160 LOG2 DC 2,0 00499 00002
 04170 DC 10,1384294361 00509 00010
 04180 LOG4 DC 2,1 00511 00002
 04190 DC 10,2079441542 00521 00010
 04200 LOG8 DC 2,1 00523 00002
 05010 DC 10,2302588093 00533 00010
 05020 LOG10 DC 2,1 00535 00002
 05030 DC 10,1000000000 00545 00010
 05040 I.0 DC 2,1 00547 00002
 05050 DC 10,2000000000 00557 00010
 05060 C1 DC 2,1 00559 00002
 05070 DC 10,6666666666 00569 00010
 05080 C3 DC 2,0 00571 00002
 05090 DC 10,4000000000 00581 00010
 05100 CS DC 2,0 00583 00002
 05110 DC 10,2097142857 00593 00010
 05120 C7 DC 2,0 00595 00002
 05130 DC 10,2222222222 00603 00010
 05140 C9 DC 2,0 00607 00002
 05150 DC 10,1010101010 00617 00010
 05160 C11 DC 2,0 00619 00002
 05170 DC 10,1538461538 00629 00010
 05180 C13 DC 2,0 00631 00002

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05190*
05200 ARG DS 12,79
06010 EXP DS 2,ARGADD
06020 XMIN1 DS 12,67
06030 XPLUS1 DS ,ARG
06040 Z DS ,XMIN1
06050 ZSQ DS ,XPLUS1
06060 SIGMA DS 12,55
06070 CNTR DS 2,TEAR+21
06080 DEND LOOP
00079 00012
00005 00002
00067 00012
00079 00000
00067 00000
00079 00000
00055 00012
00297 00002
00006
    
```

SYMBOL TABLE

```

PARLEL 00214R M2ADDR 00014R M1ADDR 00004R LINLIN 00030R B2ADDR 00019R
B1ADDR 00009R ADDCOM 00024R FIOFX 00162R F2OFX 00188R XADDR 00024R
YADDR 00029R
    
```

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01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING
01020* THE INTERSECTION OF TWO LINES
01030*
01040* *NAME LINLIN... ERASABLE SYSTEM SUBPROGRAM RCS
01050* *ID NUMBER 0205+DELDIM
01060* *ASSEMBLE RELOCATABLE
01070* *STORE RELOADABLE
01080* LINKAGE - BT LINLIN,DSALBL+25,6
01090* DSALBL IS ADDRESS OF SLOPE (LINE 1)
01100* DSALBL+5 IS ADDRESS OF Y-INTERCEPT (LINE 1)
01110* DSALBL+10 IS ADDRESS OF SLOPE (LINE 2)
01120* DSALBL+15 IS ADDRESS OF Y-INTERCEPT (LINE 2)
01130* DSALBL+20 IS ADDRESS OF X-COORDINATE OF RESULT
01140* DSALBL+25 IS ADDRESS OF Y-COORDINATE OF RESULT
01150*
01160* NO INTERSECT. INDICATED BY RM IN DSALBL+20 ADDRESS
01170*
01180 ADDCOM DC 25,0 00024 00025
01190 M1ADDR DS 5,ADDCOM-20, ADDRESS OF SLOPE (LINE 1)
0200 B1ADDR DS 5,M1ADDR+5, 00004 00005
ADDRESS OF Y-INTERCEPT (LINE 1)
02010 M2ADDR DS 5,B1ADDR+5, 00009 00005
ADDRESS OF SLOPE (LINE 2)
02020 B2ADDR DS 5,M2ADDR+5, 00014 00005
ADDRESS OF Y-INTERCEPT (LINE 2)
02030 XADDR DS 5,B2ADDR+5, 00019 00005
ADDRESS OF X-COORDINATE
02040 YADDR DC 5,0,, 00024 00005
ADDRESS OF Y-COORDINATE
02050*
02060* SUBPROGRAM ENTRY
02070 LINLIN TFL XADDR,B1ADDR,611, X=01
02080 FSUB XADDR,B2ADDR,611, X=01-B2
02090 TFL YADDR,M2ADDR,611, Y=M2
02100 FSUB YADDR,M1ADDR,611, Y=M2-M1
02110 BZ PARLEL... BRANCH IF NO INTERSECTION EXISTS
00078 M6 00214 01200
02120*
02130 FDIY XADDR,YADDR,611, X=(01-B2)/(M2-M1)
02140 TFL YADDR,XADDR,611, Y=X
02150 CH M2ADDR,49,610
02160 BNL FIOFX... BRANCH IF LINE2 IS VERTICAL
00126 M6 00162 01300
02170*
02180 CH M1ADDR,49,610
02190 BNL F2OFX... BRANCH IF LINE1 IS VERTICAL
00138 J4 0000N 0000N
00190 M6 00188 01300
02200*
03010 FIOFX FMUL YADDR,M1ADDR,611, Y=M1*X
03020 FADD YADDR,B1ADDR,611, Y=M1*X+B1
03030 BR ... EXIT
00162 -L 0002R 0000N
00174 -J 0002R 0000R
00186 42 00000 00000
    
```

```

03040      DORG --9                      00188
03050*
03060 F20FX FMUL YADDR,H2ADDR,611,      Y=M2*X      00188 -L 0002R 0001M
03070      FADD YADDR,B2ADDR,611,      Y=M2*X+B2   00200 -J 0002R 0001R
03080      BB      :;:                  EXIT        00212 42 00000 00000
03090      DORG --9                      00214
03100*
03110 PARLEL TDM XADDR,,6,             SET RM... LINES ARE PARALLEL
                                           00214 J5 0002M 00000
03120      DC 1,,*
03130      DSC 2,42,,                  EXIT
03140      DEND LINLIN
                                           00225 00001
                                           00226 00002
                                           00030
    
```

SYMBOL TABLE

Y2ADDR 00045R	Y1ADDR 00035R	X2ADDR 00040R	X1ADDR 00030R	TRANSF 00664R
SINGAM 00841R	RETURN 02411	ONEINT 00640R	NORMLN 02416	MONITR 02406
LINCIR 00046R	COSGAM 00831R	ADDCON 00045R	BADDR 00010R	C 00881R
CSQ 00871R	DISTF 02416	DSA1 00279R	DSA2 00309R	DSA3 00319R
FLAG 00079	HADDR 00015R	KADDR 00020R	MADDR 00005R	MXY 00841R
NDT2 00576R	RADDR 00025R	ROOT 00376R	RTARG 00861R	SET2 00460R
SI 00663R	SIGNC 00340R	SQRTF 02416	S1 00861R	S2 00891R
TEMP 00079	TRANI 00332R	XC 00861R	XI 00901R	YC 00871R
YC=K 00608R	YI 00911R	1.0 00831R		

```

01010*      IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING
01020*      THE INTERSECTIONS OF A LINE AND A CIRCLE
01030*
01040*      *NAME LINCIR... NON-ERASABLE SYSTEM SUBPROGRAM
01050*      *ID NUMBER 0206*DELDIM
01060*      *ASSEMBLE RELOCATABLE
01070*      *STORE RELOADABLE
01080*      LINKAGE - BY LINCIR,DSALBL+40,6
01090*      DSALBL IS ADDRESS OF SLOPE OF LINE
01100*      DSALBL+5 IS ADDRESS OF Y-INTERCEPT OF LINE
01110*      DSALBL+10 IS ADDRESS OF X-COORDINATE CIRCLE CENTER
01120*      DSALBL+15 IS ADDRESS OF Y-COORDINATE CIRCLE CENTER
01130*      DSALBL+20 IS ADDRESS OF RADIUS
01140*      DSALBL+25 IS ADDRESS OF X-COORDINATE (POINT 1)
01150*      DSALBL+30 IS ADDRESS OF Y-COORDINATE (POINT 1)
01160*      DSALBL+35 IS ADDRESS OF X-COORDINATE (POINT 2)
01170*      DSALBL+40 IS ADDRESS OF Y-COORDINATE (POINT 2)
01180*
01190*      NO INTERSECTION INDICATED BY 0 IN 00079
01200*      ONE INTERSECTION INDICATED BY 1 IN 00079
02010*      TWO INTERSECTIONS INDICATED BY RM IN 00079
02020*
    
```

```

02030 ADDCON DC 46,0                      00045 00046
02040 HADDR DS 5,ADDCON+40,             ADDRESS OF SLOPE (LINE)
                                           00005 00005
02050 BADDR DS 5,HADDR+5,              ADDRESS OF Y-INTERCEPT (LINE)
                                           00010 00005
02060 HADDR DS 5,BADDR+5,              ADDRESS OF X-COORDINATE OF CENTER (CIRC)
                                           00015 00005
02070 KADDR DS 5,HADDR+5,              ADDRESS OF Y-COORDINATE OF CENTER (CIRC)
                                           00020 00005
02080 RADDR DS 5,HADDR+5,              ADDRESS OF RADIUS (CIRCLE)
                                           00025 00005
02090 X1ADDR DS 5,RADDR+5,             ADDRESS OF X-COORDINATE (POINT 1)
                                           00030 00005
02100 Y1ADDR DS 5,X1ADDR+5,           ADDRESS OF Y-COORDINATE (POINT 1)
                                           00035 00005
02110 X2ADDR DS 5,Y1ADDR+5,           ADDRESS OF X-COORDINATE (POINT 2)
                                           00040 00005
02120 Y2ADDR DS 5,X2ADDR+5,           ADDRESS OF Y-COORDINATE (POINT 2)
                                           00045 00005
02130*
02140*      SUBPROGRAM ENTRY
02150 LINCIR SF HADDR+4                  00046 L2 00001 00000
02160      TF DSALBL+15,BADDR,,        SET SUBPROGRAM CALLING ARGUMENTS
                                           00058 MD 00294 00010
    
```


06010*					
08020	MONTR DS	,2406		02406	00000
08030	NORMLN DS	,2416		02416	00000
08040	DISTF DS	,2416		02416	00000
08050	SINGAM DS	,MXY		00841	00000
08060	TEMP DS	10,79		00079	00010
08070	RTARG DS	,XC		00861	00000
08080	CSQ DS	,YC		00871	00000
08090	SQRTF DS	,2416		02416	00000
08100	S1 DS	,RTARG		00861	00000
08110	FLAG DS	1,79		00079	00001
08120	RETURN DS	,2411		02411	00000
08130	DEND LINCIR			00046	

SYMBOL TABLE

Y2ADDR 00049R	Y1ADDR 00039R	X2ADDR 00044R	X1ADDR 00034R	TWOINT 00494R
SINGAM 00024R	R2ADDR 00029R	R1ADDR 00014R	RETURN 02411	MONTR 02406
K2ADDR 00024R	K1ADDR 00009R	H2ADDR 00019R	H1ADDR 00004R	DELTA 00024R
DELTAH 00048	COSGAM 00048	CIRCIR 00050R	ADDCON 00049R	COINC 00598R
EXIT 00610R	FLAG 00079	FLAG1 00458R	FLAG2 00578R	H2S 00028
H2SSO 00038	R2 00018	S 00038	SQRTF 02416	SSO 00028
T 00018	TCOSG 00048	TEMP 00079	TSING 00024R	

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING
 01020* THE INTERSECTION OF TWO CIRCLES
 01030*
 01040* *NAME CIRCIR... NON-ERASABLE SYSTEM SUBPROGRAM
 01050* *ID NUMBER 0207*DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOCATABLE
 01080* LINKAGE - BT CIRCIR,DSALBL+45,6
 01090* DSALBL IS ADDRESS OF X-COORD. CENTER (CIRCLE 1)
 01100* DSALBL+5 IS ADDRESS OF Y-COORD. CENTER (CIRCLE 1)
 01110* DSALBL+10 IS ADDRESS OF RADIUS (CIRCLE 1)
 01120* DSALBL+15 IS ADDRESS OF X-COORD. CENTER (CIRCLE 2)
 01130* DSALBL+20 IS ADDRESS OF Y-COORD. CENTER (CIRCLE 2)
 01140* DSALBL+25 IS ADDRESS OF RADIUS (CIRCLE 2)
 01150* DSALBL+30 IS ADDRESS OF X-COORDINATE (POINT 1)
 01160* DSALBL+35 IS ADDRESS OF Y-COORDINATE (POINT 1)
 01170* DSALBL+40 IS ADDRESS OF X-COORDINATE (POINT 2)
 01180* DSALBL+45 IS ADDRESS OF Y-COORDINATE (POINT 2)
 01190*
 01200* NO INTERSECTION INDICATED BY 0 IN 00079
 02010* ONE INTERSECTION INDICATED BY 1 IN 00079
 02020* TWO INTERSECTIONS INDICATED BY RM IN 00079
 02030*
 02040 ADDCON DC 50,0 00049 00050
 02050 H1ADDR DS 5,ADDCON+45, ADDR. OF X-COMPONENT OF CENTER (CIRC 1)
 02060 K1ADDR DS 5,H1ADDR+5, ADDR. OF Y-COMPONENT OF CENTER (CIRC 1)
 02070 R1ADDR DS 5,K1ADDR+5, ADDRESS OF RADIUS (CIRCLE 1)
 02080 H2ADDR DS 5,R1ADDR+5, ADDR. OF X-COORDINATE OF CENTER (CIRC 2)
 02090 K2ADDR DS 5,H2ADDR+5, ADDR. OF Y-COORDINATE OF CENTER (CIRC 2)
 02100 R2ADDR DS 5,K2ADDR+5, ADDRESS OF RADIUS (CIRCLE 2)
 02110 X1ADDR DS 5,R2ADDR+5, ADDRESS OF X-COORDINATE (POINT 1)
 02120 Y1ADDR DS 5,X1ADDR+5, ADDRESS OF Y-COORDINATE (POINT 1)
 02130 X2ADDR DS 5,Y1ADDR+5, ADDRESS OF X-COORDINATE (POINT 2)
 02140 Y2ADDR DS 5,X2ADDR+5, ADDRESS OF Y-COORDINATE (POINT 2)
 02150*
 02160* SUBPROGRAM ENTRY
 02170 CIRCIR BTH MONTR,02000,67, CALL SQRTF SUBROUTINE VIA MONTR
 00050 17 02400 -2000

SYMBOL TABLE

MIN2.0 00279R FLINFN 00289R ADDCON 00039R AADDR 00019R BADDR 00014R
 CADDR 00024R DADDR 00034R DX 00029R DYDX 00040R DYDXA 00039R
 EADDR 00029R INFIN 00236R TEMP1 00029R TEMP2 00019R XADDR 00004R
 YADDR 00009R

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING SLOPE
 01020* OF A GENERAL CONIC AT ANY POINT ON THE CONIC
 01030* RCS
 01040* *NAME DYDX... ERASABLE SYSTEM SUBPROGRAM
 01050* *IO NUMBER 0208+DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BT DYDX,DSALBL+35,6
 01090* DSALBL IS ADDRESS OF X-COORDINATE OF POINT
 01100* DSALBL+5 IS ADDRESS OF Y-COORDINATE OF POINT
 01110* DSALBL+10 IS ADDRESS OF B-COEFFICIENT OF CONIC
 01120* DSALBL+15 IS ADDRESS OF A-COEFFICIENT OF CONIC
 01130* DSALBL+20 IS ADDRESS OF C-COEFFICIENT OF CONIC
 01140* DSALBL+25 IS ADDRESS OF E-COEFFICIENT OF CONIC
 01150* DSALBL+30 IS ADDRESS OF D-COEFFICIENT OF CONIC
 01160* DSALBL+35 IS ADDRESS OF THE SLOPE OF THE CONIC
 01170*
 01180 ADDCON DC 40,0 00039 00040
 01190 XADDR DS 5,ADDCON-35, ADDRESS OF X-COORDINATE OF POINT
 00004 00005
 01200 YADDR DS 5,XADDR+5, ADDRESS OF Y-COORDINATE OF POINT
 00009 00009
 02010 BADDR DS 5,YADDR+5, ADDRESS OF B-COEFFICIENT (CONIC)
 00014 00005
 02020 AADDR DS 5,BADDR+5, ADDRESS OF A-COEFFICIENT (CONIC)
 00019 00005
 02030 CADDR DS 5,AADDR+5, ADDRESS OF C-COEFFICIENT (CONIC)
 00024 00005
 02040 EADDR DS 5,CADDR+5, ADDRESS OF E-COEFFICIENT (CONIC)
 00029 00005
 02050 DADDR DS 5,EADDR+5, ADDRESS OF D-COEFFICIENT (CONIC)
 00034 00005
 02060 DYDXA DS 5,*, ADDRESS OF DY/DX 00039 00005
 02070*
 02080* SUBPROGRAM ENTRY
 02090 DYDX TFL DYDXA,CADDR,611 00040 -O 0003R 0002M
 02100 FMUL DYDXA,YADDR,611, C*Y 00052 -L 0003R 0000R
 02110 FADD DYDXA,DYDXA,611, 2.0*C*Y 00064 -J 0003R 0003R
 02120 FADD DYDXA,EADDR,611, 2.0*C*Y+E 00076 -J 0003R 0002R
 02130 TFL TEMP1,BADDR,11 00088 -O 00029 0001M
 02140 FMUL TEMP1,XADDR,11, B*X 00100 -L 00029 0000M
 02150 FADD DX,DYDXA,11, DX=2.0*C*Y+B*X+E 00112 -J 00029 0003R
 02160 TFL DYDXA,AADDR,611 00124 -O 0003R 0001R
 02170 FMUL DYDXA,XADDR,611, A*X 00136 -L 0003R 0000M
 02180 FMUL DYDXA,MIN2.0,6, -2.0*A*X 00148 -L 0003R 00279
 02190 TFL TEMP2,BADDR,11 00160 -D 00019 0001M
 02200 FMUL TEMP2,YADDR,11, B*Y 00172 -L 00019 0000R
 03010 FSUB DYDXA,TEMP2,6, -2.0*A*X-B*Y 00184 -K 0003R 00019
 03020 FSUB DYDXA,DADDR,611, DY=-2.0*A*X-B*Y-D 00196 -K 0003R 0003M
 03030 FDIV DYDXA,DX,6, DY/DX 00208 -R 0003R 00029
 03040 BV INFIN,,, BRANCH IF DX IS 0.0 00220 M6 00256 01400

03050* CM DYDXA,5,610 00232 J4 0003R 000-5
 03060 BN INFIN+12,,, BRANCH IF SLOPE FINITE BY DEFINITION
 00244 M7 00268 01300
 03080* SET RESULT TO 1.0E48
 03090 INFIN TFL DYDXA,FLINFN,6, 00256 -O 0003R 00289
 03100 BB ... EXIT 00268 42 00000 00000
 03110 DORG -9 00270
 03120*
 03130 DC 8,-20000000 00277 00008
 03140 MIN2.0 DC 2,1 00279 00002
 03150 DC 8,10000000 00287 00008
 03160 FLINFN DC 2,49 00289 00002
 03170*
 03180 TEMP1 DS 10,EADDR 00029 00010
 03190 DX DS ,TEMP1 00029 00000
 03200 TEMP2 DS 10,AADDR 00019 00010
 04010 DEND DYDX 00040

10110	DORG	←-4	01435
10120*			
10130	DC	8,-20000000	01442 00008
10140	MIN2-0	DC 2,1	01444 00002
10150	DC	8,40000000	01452 00008
10160	4-0	DC 2,1	01454 00002
10170	DC	8,50000000	01462 00008
10180	0-5	DC 2,0	01464 00002
10190*			
10200	ROOT	DS ,X1ADDR	00044 00000
11010	FLAG	DS 1,79	00079 00001
11020	TEMP	DS 10,79	00079 00010
11030	SQRTF	DS ,2416	02416 00000
11040	MONITR	DS ,2406	02406 00000
11050	RETURN	DS ,2411	02411 00000
11060	DEND	LINCON	00060

SYMBOL TABLE

Y2ADDR 00020R	Y1ADDR 00010R	X2ADDR 00015R	X1ADDR 00005R	RETURN 02411
MONITR 02406	DELYSQ 00079	DELXSQ 00025R	DELTAY 00079	DELTAX 00025R
ADDCON 00025R	DISTA 00025R	DISTF 00026R	EXIT 00134R	SQRTF 02416

IBM 1620-1311 AD-APT DISTANCE FUNCTION SUBPROGRAM RCS

*NAME DISTF... NON-ERASABLE SYSTEM SUBPROGRAM
 *ID NUMBER 0210+DELDIM
 *ASSEMBLE RELOCATABLE
 *STORE RELOADABLE

LINKAGE - BT DISTF,DSALBL+20,6
 DSALBL IS ADDRESS OF X-COORDINATE (POINT 1)
 DSALBL+5 IS ADDRESS OF Y-COORDINATE (POINT 1)
 DSALBL+10 IS ADDRESS OF X-COORDINATE (POINT 2)
 DSALBL+15 IS ADDRESS OF Y-COORDINATE (POINT 2)
 DSALBL+20 IS ADDRESS OF DISTANCE BETWEEN POINTS

01010*			
01020*			
01030*			
01040*			
01050*			
01060*			
01070*			
01080*			
01090*			
01100*			
01110*			
01120*			
01130*			
01140	ADDCON	DC 26,0	00025 00026
01150	X1ADDR	DS 5,ADDCON-20,	ADDRESS OF X-COORDINATE (POINT 1) 00005 00005
01160	Y1ADDR	DS 5,X1ADDR+5,	ADDRESS OF Y-COORDINATE (POINT 1) 00010 00005
01170	X2ADDR	DS 5,Y1ADDR+5,	ADDRESS OF X-COORDINATE (POINT 2) 00015 00005
01180	Y2ADDR	DS 5,X2ADDR+5,	ADDRESS OF Y-COORDINATE (POINT 2) 00020 00005
01190	DISTA	DS 5,Y2ADDR+5,	ADDRESS OF DISTANCE BETWEEN POINTS 00025 00005
01200*			
02010*			
02020	DISTF	TFL DELTAX,X2ADDR,611	00026 -D 0002N 0001N
02030	FSUB	DELTAX,X1ADDR,611, X2-X1	00038 -K 0002N 0000N
02040	FMUL	DELXSQ,DELTAX,611, (X2-X1)**2	00050 -L 0002N 0002N
02050	BTM	MONITR,02000,67,	CALL SQRTF SUBROUTINE VIA MONITR
02060	TFL	DELTAY,Y2ADDR,11	00062 17 02400 -2000
02070	FSUB	DELTAY,Y1ADDR,11, Y2-Y1	00074 00 00079 0002-
02080	FMUL	DELYSQ,DELTAY,, (Y2-Y1)**2	00086 0K 00079 0001-
02090	FADD	DELXSQ,DELYSQ,6, (X2-X1)**2+(Y2-Y1)**2	00098 03 00079 00079
02100	BTM	SQRTF,DELXSQ,6711, DIST=SQRTF((X2-X1)**2+(Y2-Y1)**2)	00110 -1 0002N 00079
02110	EXIT	DSC 2,49,,	00122 1P 02410 -002N
02120	DSA	-RETURN	00134 00002
02130*			
02140	DELTAX	DS ,DISTA	00140 00005 -241J
02150	DELXSQ	DS ,DELTAX	00025 00000
02160	DELTAY	DS 10,79	00025 00000
02170	DELYSQ	DS ,DELTAY	00079 00010
02180	SQRTF	DS ,2416	00079 00000
02190	MONITR	DS ,2406	02416 00000
02200	RETURN	DS ,2411	02406 00000
03010	DEND	DISTF	02411 00000

SYMBOL TABLE

UYCOMP 00019R	UXCOMP 00014R	RETURN 02411	MONITR 02406	ADDCOM 00019R
EXIT 00152R	SQRTF 02416	UNITY 00020R	XCOMP 00004R	YSQ 00079
YCOMP 00009R	YSQ 00069	Z 00079		

01010+ IBM 1620-1311 AD-APT UNIT VECTOR SUBPROGRAM
 01020+ RCS
 01030+ *NAME UNITY... NON-ERASABLE SYSTEM SUBPROGRAM
 01040+ *ID NUMBER 0211+DELDIM
 01050+ *ASSEMBLE RELOCATABLE
 01060+ *STORE RELOADABLE
 01070+ LINKAGE - BT UNITY,DSALBL+15,6
 01080+ DSALBL IS ADDRESS OF X-COMPONENT OF VECTOR
 01090+ DSALBL+5 IS ADDRESS OF Y-COMPONENT OF VECTOR
 01100+ DSALBL+10 IS ADDRESS OF X-COMPONENT OF UNIT VECTOR
 01110+ DSALBL+15 IS ADDRESS OF Y-COMPONENT OF UNIT VECTOR
 01120+ IT IS ASSUMED THAT THE VECTOR IS NOT ZERO
 01130+
 01140 ADDCOM DC 20,0 00019 00020
 01150 XCOMP DS 5,ADDCOM-15, ADDRESS OF X-COMPONENT OF VECTOR 00004 00005
 01160 YCOMP DS 5,XCOMP+5, ADDRESS OF Y-COMPONENT OF VECTOR 00009 00005
 01170 UXCOMP DS 5,YCOMP+5, ADDRESS OF X-COMPONENT OF UNIT VECTOR 00014 00005
 01180 UYCOMP DS 5,UXCOMP+5, ADDRESS OF Y-COMPONENT OF UNIT VECTOR 00019 00005
 01190+
 01200+ SUBPROGRAM ENTRY
 02010 UNITY TFL UXCOMP,XCOMP,611 00020 -0 0001M 0000M
 02020 BTM MONITR,02000,67, CALL SQRTF SUBROUTINE VIA MONITR 00032 17 02400 -2000
 02030 TFL XSQ,XCOMP,11 00044 00 00079 0000M
 02040 FMUL XSQ,YSQ,, XCOMP+2 00056 03 00079 00079
 02050 TFL YSQ,YCOMP,11 00068 00 00069 0000R
 02060 FMUL YSQ,YSQ,, YCOMP+2 00080 03 00069 00069
 02070 FADD XSQ,YSQ,, XCOMP+2+YCOMP+2 00092 01 00079 00069
 02080 BTM SQRTF,Z,67, Z=SQRTFIXCOMP+2+YCOMP+2 00104 17 02410 -0079
 02090 FDIV UXCOMP,Z,6, UX=XCOMP/Z 00116 -9 0001M 00079
 02100 TFL UYCOMP,YCOMP,611 00128 -0 0001R 0000R
 02110 FDIV UYCOMP,Z,6, UY=YCOMP/Z 00140 -9 0001R 00079
 02120 EXIT DSC Z,49,, RETURN TO MONITR 00152 00002
 02130 BTM -RETURN 00158 00005 -241J
 02140+
 02150 XSQ DS 10,79 00079 00010
 02160 YSQ DS 10,69 00069 00010
 02170 Z DS ,XSQ 00079 00000
 02180 SQRTF DS ,2416 02416 00000
 02190 MONITR DS ,2406 02406 00000
 02200 RETURN DS ,2411 02411 00000
 03010 DEND UNITY 00020

SYMBOL TABLE

1.0E48 00281R	Y2ADDR 00019R	Y1ADDR 00009R	X2ADDR 00014R	X1ADDR 00004R
M1.E48 00291R	MOVEX2 00078R	LCNON1 00030R	ENFLAG 00200R	DELTAY 00024R
DELTAX 00029R	ADDCOM 00029R	BADDR 00029R	COINC 00258R	EXIT 00198R
FLAG 00024R	MADDR 00024R	NVERT 00150R	SLOPE 00114R	TEMP 00079
VERT 00220R				

01010+ IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING
 01020+ THE SLOPE AND Y-INTERCEPT OF A LINE DEFINED BY
 01030+ TWO UNIQUE POINTS
 01040+ RCS
 01050+ *NAME LCNOM1... ERASABLE SYSTEM SUBPROGRAM
 01060+ *ID NUMBER 0212+DELDIM
 01070+ *ASSEMBLE RELOCATABLE
 01080+ *STORE RELOADABLE
 01090+ LINKAGE - BT LCNOM1,DSALBL+25,6
 01100+ DSALBL IS ADDRESS OF X-COORDINATE (POINT 1)
 01110+ DSALBL+5 IS ADDRESS OF Y-COORDINATE (POINT 1)
 01120+ DSALBL+10 IS ADDRESS OF X-COORDINATE (POINT 2)
 01130+ DSALBL+15 IS ADDRESS OF Y-COORDINATE (POINT 2)
 01140+ DSALBL+20 IS ADDRESS OF SLOPE OF LINE
 01150+ DSALBL+25 IS ADDRESS OF Y-INTERCEPT OF LINE
 01160+
 01170+ COINCIDENT PTS. INDICATED BY RM IN DSALBL+20 ADDR.
 01180+
 01190 ADDCOM DC 30,0 00029 00030
 01200 X1ADDR DS 5,ADDCOM-25, ADDRESS OF X-COORDINATE (POINT 1) 00004 00005
 02010 Y1ADDR DS 5,X1ADDR+5, ADDRESS OF Y-COORDINATE (POINT 1) 00009 00005
 02020 X2ADDR DS 5,Y1ADDR+5, ADDRESS OF X-COORDINATE (POINT 2) 00014 00005
 02030 Y2ADDR DS 5,X2ADDR+5, ADDRESS OF Y-COORDINATE (POINT 2) 00019 00005
 02040 MADDR DS 5,Y2ADDR+5, ADDRESS OF SLOPE 00024 00005
 02050 BADDR DS 5,, ADDRESS OF Y-INTERCEPT 00029 00005
 02060+
 02070+ SUBPROGRAM ENTRY
 02080 LCNOM1 TFL DELTAY,Y2ADDR,611 00038 -0 0002M 0001R
 02090 PSUB DELTAY,Y1ADDR,611, Y2-Y1 00042 -K 0002M 0000R
 02100 SZ ERFLAG,,, BRANCH IF Y2=Y1 00054 M6 00280 01200
 02110+
 02120 TFM SLOPE-6,VERT,, SET SWITCH INDICATING INEQUALITY 00066 J0 00108 -0220
 02130 MOVEX2 TFL DELTAX,X2ADDR,611 00078 -0 0002M 0001M
 02140 PSUB DELTAX,X1ADDR,611, X2-X1 00090 -K 0002M 0000M
 02150 SZ,,, BRANCH IF X2=X1 00102 46 00060 01200
 02160+
 02170 SLOPE FDIV DELTAY,DELTAX,611, M=(Y2-Y1)/(X2-X1) 00114 -R 0002M 0002R
 02180 CM MADDR,S,610 00126 J4 0002M 000-5
 02190 BNM VERT,,, BRANCH IF SLOPE INFINITE BY DEFINITION 00138 M6 00280 01300
 02200+
 03010 NVERT TFL BADDR,Y1ADDR,611 00150 -0 0002R 0000R
 03020 TFL TEMP,MADDR,11 00162 00 00079 0002M
 03030 FMUL TEMP,X1ADDR,11, M=X1 00174 0L 00079 0000M


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03040      FSUB BADDR,TEMP,6,      B=YI-M=EI      00186 -2 0002R 0007R
03050 EXIT  BB ...                EXIT            00198 42 00000 00000
03060      DORG 6-9                00200
03070*
03080 ERFLAG TFM SLOPE=6,COINC,,   SET SWITCH INDICATING EQUALITY
                                00200 JO 00108 -0258
03090      0 MOVEX2                00212 M9 00078 00000
03100      DORG 6-3                00220
03110*
03120 VEAT  TFL MADDR,1.0E48,6,    SET M=1.0E48    '00220 -0 0002M 00281
03130      TFL BADDR,M1.E48,6      00232 -0 0002R 00291
03140      FMUL BADDR,K2ADDR,611,  B=-1.0E48*K2   00244 -L 0002R 0001M
03150      BB ...                EXIT            00256 42 00000 00000
03160      DORG 6-9                00258
03170*
03180 GOING TDM FLAG,,6,          SET RM... POINTS ARE COINCIDENT
                                00258 IS 0000M 00000
03190      DC 1.,.                00269 00001
03200      BB ...                EXIT            00270 42 00000 00000
04010      DORG 6-9                00272
04020*
04030      DC 8.10000000           00279 00008
04040 1.0E48 DC 2.49              00281 00002
04050      DC 8.-10000000         00289 00008
04060 M1.E48 DC 2.49              00291 00002
04070*
04080 DELTAY DS ,MADDR            00024 00000
04090 DELTAX DS ,BADDR            00029 00000
04100 TEMP DS 10.79              00079 00010
04110 FLAG DS 1,DELTAY            00024 00001
04120      DEND LCNOM1             00030
    
```

SYMBOL TABLE

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SCELM2 00009R  SCELM1 00004R  OPCODE 00015R  MAXIF 00016R  MINIF 00016R
MOVI 00078R    MOV2 00064R    SCFUN 00014R  TEST 00052R
    
```

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01010*      IBM 1620-1311 AD-APT FUNCTION SUBPROGRAM FOR SELECTING
01020*      THE SMALLER OR LARGER OF TWO FLOATING-POINT SCALARS
01030*      RCS
01040*      *NAME SELECT... ERASABLE SYSTEM SUBPROGRAM
01050*      *ID NUMBER 0213*DELDIM
01060*      *ASSEMBLE RELOCATABLE
01070*      *STORE RELOADABLE
01080*      LINKAGE - BT MINIF,DSALBL+11,6
01090*      BT MAXIF,DSALBL+11,6
01100*      DSALBL IS ADDRESS OF SCALAR ELEMENT 1
01110*      DSALBL+5 IS ADDRESS OF SCALAR ELEMENT 2
01120*      DSALBL+10 IS ADDRESS OF SCALAR FUNCTION
01130*      DSALBL+11 IS OP-CODE DIGIT... 6 (MINIF), 7 (MAXIF)
01140*
01150      DC 16.0                00015 00016
01160 SCELM1 DS 5,6-11,           ADDRESSES OF    00004 00005
01170 SCELM2 DS 5,6-6,           SCALAR ELEMENTS
01180 SCFUN DS 5,6-1,            ADDRESS OF SCALAR FUNCTION
                                00014 00005
01190 OPCODE DS 1.,.            LOW-ORDER OP-CODE DIGIT
                                00015 00001
01200*
02010*      SUBPROGRAM ENTRY
02020 MINIF TD TEST+1,OPCODE,,    SET 46 (B1) OR 47 (BNI) OP CODES
                                00016 M9 00053 00015
                                00028 -0 0001M 0000R
02030      TFL SCFUN,SCELM2,611   00040 -K 0001M 0000M
02040      FSUB SCFUN,SCELM1,611, SCELM2-SCELM1
02050 TEST  NOP MOV1,1300,,      (VARIABLE OP CODE) 00052 M1 00078 01300
02060*
02070 MOV2  TFL SCFUN,SCELM2,611  00064 -0 0001M 0000R
02080      BB ...                EXIT            00076 42 00000 00000
02090      DORG 6-9                00078
02100*
02110 MOVI  TFL SCFUN,SCELM1,611  00078 -0 0001M 0000M
02120      OSC 2,42,,            EXIT            00090 00002
02130*
02140 MAXIF DS ,MINIF            00016 00000
02150      DEND MINIF             00016
    
```

SYMBOL TABLE

NORMLN	00030R	MINI.0	00235R	ADCCON	00029R	B	00019R	M	00014R
NVERT	00066R	VERT	00188R	XN	00024R	XO	00004R	YN	00029R
YO	00009R								

IBM 1620-1311 AD-APT SUBPROGRAM FOR PROJECTING A POINT TO A GIVEN LINE, NORMAL TO THE LINE

RCS

*NAME NORMLN... ERASABLE SYSTEM SUBPROGRAM
 *ID NUMBER 0214+DELDIM
 *ASSEMBLE RELOCATABLE
 *STORE RELOADABLE

LINKAGE - BT NORMLN,DSALBL+25,6
 DSALBL IS ADDRESS OF X-COORDINATE OF EXTERNAL PT
 DSALBL+5 IS ADDRESS OF Y-COORDINATE OF EXTERNAL PT
 DSALBL+10 IS ADDRESS OF SLOPE OF LINE
 DSALBL+15 IS ADDRESS OF Y-INTERCEPT OF LINE
 DSALBL+20 IS ADDRESS OF X-COORDINATE OF PT ON LINE
 DSALBL+25 IS ADDRESS OF Y-COORDINATE OF PT ON LINE

01160	ADCCON	DC	30,0				00029	00030
01170	XO	DS	5,ADCCON-25,	ADDRESSES OF X AND Y-COORDINATES OF			00004	00005
01180	YO	DS	5,XO+5,	POINT EXTERNAL TO LINE			00009	00005
01190	M	DS	5,YO+5,	ADDRESS OF SLOPE			00014	00005
01200	B	DS	5,M+5,	ADDRESS OF Y-INTERCEPT			00019	00005
02010	XN	DS	5,B+5,	ADDRESSES OF X AND Y-COORDINATES OF			00024	00005
02020	YN	DS	5,XN+5,	POINT ON THE LINE			00029	00005
02030								
02040				SUBPROGRAM ENTRY				
02050	NORMLN	TFL	YN,YO,611				00030	-D 0002R 0000R
02060	CM	M,49,610					00042	J4 0001M 000M9
02070	BNN	VERT,..		BRANCH IF LINE IS VERTICAL			00054	M6 00188 01300
02080								
02090	NVERT	FSUB	YN,B,611,	YO-B			00066	-K 0002R 0001R
02100		FMUL	YN,M,611,	M=(YO-B)			00078	-L 0002R 0001M
02110		FADD	YN,XO,611,	XO+M*(YO-B)			00090	-J 0002R 0000M
02120		TFL	XN,M,611				00102	-O 0002M 0001M
02130		FMUL	XN,M,611,	M**2			00114	-L 0002M 0001M
02140		FSUB	XN,MINI.0,6,	M**2+1.0			00126	-K 0002M 00235
02150		FDIV	YN,XN,611				00138	-R 0002R 0002M
02160		TFL	XN,YN,611,	XN=((YO-B)*M+XO)/(M**2+1.0)			00150	-D 0002M 0002R
02170		FMUL	YN,M,611,	M*XN			00162	-L 0002R 0001M
02180		FADD	YN,B,611,	YN=M*XN+B			00174	-J 0002R 0001R
02190		BB	...	EXIT			00186	42 00000 00000
02200		DORG	4-9				00188	
03010								
03020	VERT	TFL	XN,B,611				00188	-O 0002M 0001R
03030		FDIV	XN,M,611,	B/M			00200	-R 0002M 0001M
03040		FMUL	XN,MINI.0,6,	-B/M			00212	-L 0002M 00235
03050		BB	...	EXIT			00224	42 00000 00000
03060		DORG	4-9				00226	

03070								
03080	DC	8,-10000000					00233	00008
03090	MINI.0	DC	2,1				00235	00002
03100	DEND	NORMLN					00030	

SYMBOL TABLE

RETURN 02411	NORMCR 00036R	MONITR 02406	ADDCON 00035R	DSA1 00223R
DSA2 00233R	FLAG 00079	RAD 00025R	SETRM 00200R	UNITR 00096R
UNITY 02416	URX 00278R	URY 00288R	XCOMP 00258R	XE 00005R
XH 00015R	XN 00030R	YCOMP 00268R	YE 00010R	YK 00020R
YN 00035R				

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01010*      IBM 1620-1311 AD-APT SUBPROGRAM FOR PROJECTING A POINT
01020*      TO A GIVEN CIRCLE, NORMAL TO THE CIRCLE
01030*
01040*      *NAME NORMCR... NON-ERASABLE ARELEM SUBPROGRAM          RCS
01050*      *ID NUMBER 0215+DELDIR
01060*      *ASSEMBLE RELOCATABLE
01070*      *STORE RELOADABLE
01080*      LINKAGE = BT NORMCR,DSALBL+30,6
01090*      DSALBL IS ADDRESS OF X-COORDINATE OF EXTERNAL PT
01100*      DSALBL+5 IS ADDRESS OF Y-COORDINATE OF EXTERNAL PT
01110*      DSALBL+10 IS ADDRESS OF X-COORDINATE OF CENTER
01120*      DSALBL+15 IS ADDRESS OF Y-COORDINATE OF CENTER
01130*      DSALBL+20 IS ADDRESS OF RADIUS
01140*      DSALBL+25 IS ADDRESS OF X-COORDINATE OF PT ON CIRC
01150*      DSALBL+30 IS ADDRESS OF Y-COORDINATE OF PT ON CIRC
01160*
01170*      RM IN 00079 DENOTES EXTERNAL PT. AND CENTER COINC.
01180*
01190 ADDCON DC 36,0                                00035 00036
01200 XE DS 5,ADDCON-30,                            ADDRESSES OF X AND Y-COORDINATES OF
01210 YE DS 5,XE+5,                                  POINT EXTERNAL TO CIRCLE (POINT PE)
01220 XH DS 5,YE+5,                                  ADDRESSES OF X AND Y-COORDINATES OF
01230 YK DS 5,XH+5,                                  CENTER OF CIRCLE (POINT PC)
01240 RAD DS 5,YK+5,                                  ADDRESS OF RADIUS
01250 XN DS 5,RAD+5,                                  ADDRESSES OF X AND Y-COORDINATES OF
01260 YN DS 5,XN+5,                                  POINT ON THE CIRCLE
01270*
01280*      SUBPROGRAM ENTRY
01290 NORMCR TFL XCOMP,XE,11                          00036 -0 00258 0000N
01300 FSUB XCOMP,XH,11,                               XCOMP=XE-XH
01310 TFL YCOMP,YE,11,                               00048 -K 00258 0001N
01320 FSUB YCOMP,YK,11,                               YCOMP=YE-YK
01330 BT MONITR,DSA1+5,6,                            CALL UNITY SUBPROGRAM VIA MONITR
01340*      00084 2P 02400 00228
01350 UNITR BT UNITY,DSA2+15,6,                       CALCULATE UNIT RADIAL VECTOR
01360*      00096 2P 02410 00248
01370 BV SETRM,,,                                    BRANCH IF EXTERNAL POINT AND CENTER
01380*      00108 M6 00200 01400
01390*      OF CIRCLE ARE IDENTICAL POINTS
01400 FMUL URX,RAD,11,                                URX=RAD
01410 FMUL URY,RAD,11,                                URY=RAD
01420 TFL XN,XH,611,                                 00120 -L 00278 0002N
01430 TFL YN,YK,611,                                 00132 -L 00288 0002N
01440 FADD XN,URX,6,                                  XN=XH+URX=RAD
01450 FADD YN,URY,6,                                  YN=YK+URY=RAD
01460*      00156 -0 0003N 0002-
01470*      00168 -J 0003- 00278
01480*      00180 -J 0003N 00288
01490*
01500*
01510*
01520*
01530*
01540*
01550*
01560*
01570*
01580*
01590*
01600*
01610*
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01660*
01670*
01680*
01690*
01700*
01710*
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01800*
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01980*
01990*
02000*
02010*
02020*
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02990*
03000*
03010*
03020*
03030*
03040*
03050*
03060*
03070*
03080*
03090*
03100*
03110 DSA1 DSA UNITR+12
03120 DSC 5,02111
03130 DORG DSA1+5+5+4-6
03140 NOP URY,0
03150 DORG *-21
03160 NOP YCOMP,URX
03170 DORG *-14
03180 DSA2 DSA XCOMP
03190 DORG +5+4-4
03200*
04010 XCOMP DC 10,0
04020 YCOMP DC 10,0
04030 URX DC 10,0
04040 URY DC 10,0
04050*
04060 MONITR DS ,2406
04070 UNITY DS ,2416
04080 RETURN DS ,2411
04090 FLAG DS ,79
04100 DEND NORMCR

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SYMBOL TABLE

5EMIN6 01030R	L.OE48 06085	SELECT 00706R	RETURN 02411	PE=PN1 00326R
NORMLN 02416	NORMCN 00050R	MONITR 02406	LINCOM 02416	LCNON1 02416
CMPARE 00766R	ADDCOM 00049R	ACCM 00019R	BCCN 00014R	BORTH 00940R
BTAN 00940R	CCON 00024R	CCNY 02411	DCCN 00034R	DISTF 02416
DIST1 00960R	DIST2 00940R	DSAL 00337R	DSAL0 00584R	DSAL1 00594R
DSAL2 00604R	DSA2 00377R	DSA3 00407R	DSA4 00437R	DSA5 00497R
DSA6 00523R	DSAB 00549R	DSAB 00574R	DYDX 02416	ECON 00029R
FCON 00039R	FLAG 00079	ITER 00814R	LDEF 00610R	MORTH 00940R
MOV1 00858R	MOV2 00718R	MTAN 00960R	NOINT 00902R	SLOPE 00194R
SO 00930R	S1 00960R	TEMP 00950R	TEST1 00890R	XE 00004R
XNO 00044R	XN1 00970R	X1 00990R	X2 01010R	YCEPT 00242R
YE 00009R	YNO 00049R	YNI 00980R	Y1 01000R	Y2 01020R
ZINT 00658R				

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01010*          IBM 1620-1311 AD-APT SUBPROGRAM FOR PROJECTING A POINT
01020*          TO A GIVEN GENERAL CONIC, NORMAL TO THE CONIC
01030*
01040*          *NAME NORMCN... NON-ERASABLE ARELEM SUBPROGRAM
01050*          *ID NUMBER 0216+DELDIM
01060*          *ASSEMBLE RELOCATABLE
01070*          *STORE RELOADABLE
01080*          LINKAGE - BT NORMCN,DSALBL+45,6
01090*          DSALBL IS ADDRESS OF X-COORDINATE OF EXTERNAL PT
01100*          DSALBL+5 IS ADDRESS OF Y-COORDINATE OF EXTERNAL PT
01110*          DSALBL+10 IS ADDRESS OF B-COEFFICIENT OF CONIC
01120*          DSALBL+15 IS ADDRESS OF A-COEFFICIENT OF CONIC
01130*          DSALBL+20 IS ADDRESS OF C-COEFFICIENT OF CONIC
01140*          DSALBL+25 IS ADDRESS OF E-COEFFICIENT OF CONIC
01150*          DSALBL+30 IS ADDRESS OF D-COEFFICIENT OF CONIC
01160*          DSALBL+35 IS ADDRESS OF F-COEFFICIENT OF CONIC
01170*          DSALBL+40 IS ADDRESS OF X-COORDINATE PT ON CONIC
01180*          DSALBL+45 IS ADDRESS OF Y-COORDINATE PT ON CONIC
01190*
01200 ADDCOM DC 50,0 00049 00050
02010 XE DS 5,ADDCOM-45, ADDRESSES OF X AND Y-COORDINATES OF
02020 YE DS 5,XE+5, POINT EXTERNAL TO CONIC (POINT PE)
02030 BCON DS 5,YE+5, ADDRESS OF B-COEFFICIENT (CONIC)
02040 ACON DS 5,BCON+5, ADDRESS OF A-COEFFICIENT (CONIC)
02050 CCON DS 5,ACON+5, ADDRESS OF C-COEFFICIENT (CONIC)
02060 ECON DS 5,CCON+5, ADDRESS OF E-COEFFICIENT (CONIC)
02070 DCON DS 5,ECON+5, ADDRESS OF D-COEFFICIENT (CONIC)
02080 FCON DS 5,DCON+5, ADDRESS OF F-COEFFICIENT (CONIC)
02090 XNO DS 5,FCON+5, ADDRESSES OF X AND Y-COORDINATES OF
02100 YNO DS 5,XNO+5, POINT ON THE CONIC (POINT PNO)
02110*          **IT IS ASSUMED THAT POINT PNO CONSTITUTES A GOOD GUESS**
02120*

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02130*          SUBPROGRAM ENTRY
02140 NORMCN TFL 50,L.OE48 00050 -6 00930 06085
02150 TF DSA2+5,YE,, SET DSA ADDRESSES AS REQUIRED
02160 TF DSA3+5,YE 00062 K0 00382 00009
02170 SF XNO-4 00074 K0 00412 00009
02180 TF DSA1+5,YNO 00086 L2 00040 00000
02190 SF BCON-4 00098 K0 00342 00049
02200 TF DSA1+30,DCON 00110 L2 00010 00000
03010 CF DSA1+6 00122 K0 00367 00034
03020 TF DSA4+35,FCON 00134 L3 00343 00000
03030 CF DSA4+6 00146 K0 00472 00039
03040 TF DSA8+5,YNO 00158 L3 00443 00000
03050 BTM MONITR,02080,67, CALL DYDX SUBPROGRAM VIA MONITR
03060 SLOPE BT DYDX,DSAL+35,6, CALCULATE SLOPE OF CONIC AT POINT PNO
03070 TFL BTAN,YNO,11 00182 L7 02400 -2080
03080 TFL TEMP,MTAN 00194 2P 02410 00372
03090 FMUL TEMP,XNO,11 00206 -0 00940 0004R
03100 YCEPT FSUB BTAN,TEMP,, BTAN=YNO-MTAN*XNO 00218 -0 00950 00960
03110 BTM MONITR,02140,67, CALL NORMLN SUBPROGRAM VIA MONITR
03120 BT NORMLN,DSA2+25,6, PROJECT POINT PE TO TANGENT LINE (PN1)
03130 BTM MONITR,02120,67, CALL LCNON1 SUBPROGRAM VIA MONITR
03140 BT LCNON1,DSA3+25,6, DEFINE LINE PASSING THRU PTS. PE AND PN1
03150 TO FLAG,MORTH 00230 -L 00950 0004M
03160 BNR LDEF,FLAG,, BRANCH IF LINE DEFINABLE
03170*          00242 -K 00940 00950
03180 PE=PN1 B RETURN,,6, RETURN... GUESS VALUE INACCURATE
03190 DORG 6-4+5+8-6-1 00254 L7 02400 -2140
03200*          00266 2P 02410 00402
04010 NOP MTAN,0 00278 L7 02400 -2120
04020 DORG 6-21 00290 2P 02410 00432
04030 NOP 0,0 00302 2N 00079 00960
04040 DORG 6-21 00314 M5 00610 00079
04050 NOP 0,0 00316 M1 00960 00000
04060 DORG 6-21 00316 M1 00960 00000
04070 NOP 0,0 00316 M1 00960 00000
04080 DORG 6-14 00316 M1 00960 00000
04090 DSA1 DSA 0 00316 M1 00960 00000
04100 DORG 6+5+8-4+9+6-6-1 00316 M1 00960 00000
04110 NOP YNI,0 00316 M1 00960 00000
04120 DORG 6-21 00316 M1 00960 00000
04130 NOP BTAN,XN1 00316 M1 00960 00000
04140 DORG 6-21 00316 M1 00960 00000
04150 NOP 0,MTAN 00316 M1 00960 00000
04160 DORG 6-14 00316 M1 00960 00000
04170 DSA2 DSA 0 00316 M1 00960 00000
04180 DORG 6+5+6-4+5+6-6-1 00316 M1 00960 00000
04190 NOP BORTH,0 00316 M1 00960 00000
04200 DORG 6-21 00316 M1 00960 00000
05010 NOP YNI,MORTH 00316 M1 00960 00000
05020 DORG 6-21 00316 M1 00960 00000
05030 NOP 0,XN1 00316 M1 00960 00000

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05040	DORG	=-14	00403	
05050	DSA3	DSA 0	00407 00005 -0000	
05060	DORG	++5+6-4+5+12-6-1	00486	
05070	NOP	Y2,0	00486 M1 01020 00000	
05080	DORG	=-21	00476	
05090	NOP	Y1,X2	00476 MJ 01000 01010	
05100	DORG	=-21	00466	
05110	NOP	0,X1	00466 4J 00000 00990	
05120	DORG	=-21	00456	
05130	NOP	0,0	00456 41 00000 00000	
05140	DORG	=-21	00446	
05150	NOP	0,0	00446 41 00000 00000	
05160	DORG	=-21	00436	
05170	NOP	BORTH,0	00436 M1 00940 00000	
05180	DORG	=-14	00433	
05190	DSA4	DSA MORTH	00437 00005 -0960	
05200	DORG	++5+12-4+5+9-11-1	00306	
06010	NOP	Y1,DIST1	00306 MJ 01000 00960	
06020	DORG	=-21	00496	
06030	NOP	YN1,X1	00496 MJ 00980 00990	
06040	DORG	=-14	00493	
06050	DSA5	DSA XN1	00497 00005 -0970	
06060	DORG	++5+5-4+5+9-11	00532	
06070	NOP	Y2,DIST2	00532 MJ 01020 00940	
06080	DORG	=-21	00522	
06090	NOP	YN1,X2	00522 MJ 00980 01010	
06100	DORG	=-14	00519	
06110	DSA6	DSA XN1	00523 00005 -0970	
06120	DORG	++5+5-4+5+9-11	00558	
06130	NOP	YN1,S1	00558 MJ 00980 00960	
06140	DORG	=-21	00548	
06150	NOP	0,XN1	00548 4J 00000 00970	
06160	DORG	=-14	00545	
06170	DSA8	DSA 0	00549 00005 -0000	
06180	DORG	++5+5-4	00570	
06190	DSA9	DSA ZINT-24	00574 00005 -0634	
06200	DSC	5,02091	00575 00005	
07010	DSA10	DSA ZINT+12	00584 00005 -0670	
07020	DSC	5,02101	00585 00005	
07030	DSA11	DSA SELECT-12	00594 00005 -0694	
07040	DSC	5,02101	00595 00005	
07050	DSA12	DSA CMPARE	00604 00005 -0766	
07060	DSC	5,02101	00605 00005	
07070*				
07080	LNDEF	BT MONITR,DSA9+5,6,	CALL LINCON SUBPROGRAM VIA MONITR	
			00610 2P 02400 00579	
07090	BT	LINCON,DSA4+55,6,	DETERMINE INTERSECTION OF LINE AND CONIC	
			00622 2P 02410 00492	
07100	BNR	TEST1,FLAG,,	BRANCH IF 2 INTERSECTIONS DO NOT EXIST	
			00634 M5 00890 00079	
07110*				
07120	BT	MONITR,DSA10+5,6,	CALL DISTF SUBPROGRAM VIA MONITR	
			00646 2P 02400 00589	
07130	ZINT	BT DISTF,DSA5+20,6,	CALCULATE DIST. BETWEEN PTS. PN1 AND P1	
			00658 2P 02410 00517	
07140	BT	MONITR,DSA11+5,6,	CALL DISTF SUBPROGRAM VIA MONITR	
			00670 2P 02400 00599	
07150	BT	DISTF,DSA6+20,6,	CALCULATE DIST. BETWEEN PTS. PN1 AND P2	
			00682 2P 02410 00543	
07160	FSUB	DIST1,DIST2	00694 -K 00960 00940	

07170	SELECT	BNP	MOV1,,,	BRANCH IF POINT P1 IS CLOSER	00706 M7 00858 01100
07180*					
07190	MOV2	TFL	XN1,X2,,	POINT P2 IS CLOSER	00718 -0 00970 01010
07200		TFL	YN1,Y2		00730 -0 00980 01020
08010	BT	MONITR,DSA12+5,6,		CALL DISTF SUBPROGRAM VIA MONITR	
					00742 2P 02400 00609
08020	BT	DISTF,DSA8+20,6,		CALCULATE DIST. BETWEEN PTS. PN1 AND PN0	
					00754 2P 02410 00569
08030	CMPARE	FSUB	SO,S1,,	SO=SO-S1	00766 -K 00930 00960
08040		CF	SO-2,,,	ABSF(SO-S1)	00778 L3 00928 00000
08050		FSUB	SO,SEM16		00790 -K 00930 01030
08060		RNP	CONV,,6,	BRANCH IF SEM16 EXCEEDS ABSF(SO-S1)	
					00802 47 0241J 01100
08070*					
08080	ITER	TFL	SO,S1,,	SO=S1	00814 -0 00930 00960
08090		TFL	XN0,XN1,6,	XN0=XN1	00826 -0 0004M 00970
08100		TFL	YN0,YN1,6,	YN0=YN1	00838 -0 0004M 00980
08110		B	SLOPE-12		00850 M9 00182 00000
08120		DORG	=-3		00858
08130*					
08140	NOV1	TFL	XN1,X1,,	POINT P1 IS CLOSER	00858 -0 00970 00990
08150		TFL	YN1,Y1		00870 -0 00980 01000
08160		B	CMPARE-24		00882 M9 00742 00000
08170		DORG	=-3		00890
08180*					
08190	TEST1	BD	MOV1,FLAG,,	BRANCH IF 1 INTERSECTION EXISTS	
					00890 M3 00858 00079
08200*					
09010	NOINT	TDM	FLAG,,,	SET RM	00902 15 00079 00000
09020		DC	1,,0		00913 00001
09030		B	RETURN,,6,	RETURN... GUESS VALUE INACCURATE	
					00914 49 0241J 00000
09040		DORG	=-4		00921
09050*					
09060	SO	DC	10,0		00930 00010
09070	BTAN	DC	10,0		00940 00010
09080	TEMP	DC	10,0		00950 00010
09090	MORTH	DC	10,0		00960 00010
09100	XN1	DC	10,0		00970 00010
09110	YN1	DC	10,0		00980 00010
09120	X1	DC	10,0		00990 00010
09130	Y1	DC	10,0		01000 00010
09140	X2	DC	10,0		01010 00010
09150	Y2	DC	10,0		01020 00010
09160		DC	8,50000000		01028 00508
09170	SEM16	DC	2,-5		01030 00002
09180*					
09190	1.0E48	DS	,6085		06085 00000
09200	DYDX	DS	,2416		02416 00000
10010	NORMLN	DS	,2416		02416 00000
10020	LCNOM1	DS	,2416		02416 00000
10030	FLAG	DS	1,79		00079 00001
10040	BTAN	DS	,MORTH		00960 00000
10050	BORTH	DS	,BTAN		00940 00000
10060	DIST1	DS	,MORTH		00960 00000
10070	DIST2	DS	,BORTH		00940 00000
10080	S1	DS	,DIST1		00960 00000
10090	LINCON	DS	,2416		02416 00000
10100	DISTF	DS	,2416		02416 00000

10110 CONV DS ,2411
 10120 MONITR DS ,2406
 10130 RETURN DS ,2411
 10140 DEMO NORMCN

02411 00000
 02406 00000
 02411 00000
 00050

SYMBOL TABLE

3ROOTS 00392R	2XROOT 01820R	ZUNEEK 01178R	2ROOTS 01210R	T3CALC 00704R
T2CALC 00716R	T1CALC 00728R	T-FOFS 00800R	S2CALC 01190R	S1CALC 01636R
RETURN 02411	REFADD 00830R	MONITR 02406	MINI.0 01740R	MINO.5 01780R
LNCUBE 00056R	CUBRTF 01264R	ADDCON 00049R	A=0 01380R	ACUBE 00015R
ANOTZ 00128R	ARG 01258R	ATANF 02416	A3/27 01830R	B=0 01692R
BCUBE 00020R	BNOTZ 01416R	BSQ/4 01810R	BST 00010R	CAPA 01830R
CAPB 01820R	CORTA 01026R	CBRTB 01062R	CCUBE 00025R	CMINM 01790R
COSF 02421	DSA1 00763R	DSA2 00779R	DSA3 00789R	EXADD 01263R
EXPF 02416	FLAG 00019	FLAGT 00403R	FLAGO 01544R	HP/EZ 00898R
LOGF 02416	MST 00005R	NGTO 01532R	NVERT 00978R	P 01800R
P/3 01800R	PHI 01810R	PHI/3 01810R	Q 01790R	Q/2 01790R
Q/3 01820R	R 01810R	R/2 01810R	SI 00799R	SIGN 01358R
SIGNF 01348R	SMA/3 01820R	SMB/2 01790R	SQRTA 01810R	SQRTF 02416
S1 00030R	S2 00040R	S3 00050R	TEMP 01830R	TEMPF 01840R
T1 00035R	T2 00045R	T3 00055R	VERT 00934R	O.5 01760R
1/3 01750R	LINT 01158R	1REAL 01524R	1RDOT 00910R	2INT 01134R
2P1/3 01770R	2REAL 01564R	2XB 01800R	3INT 00692R	4XB 01840R

01010+ IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING
 01020+ THE INTERSECTIONS OF A LINE AND A CUBIC
 01030+
 01040+ *NAME LNCUBE... NON-ERASABLE SYSTEM SUBPROGRAM RCS
 01050+ *ID NUMBER 0217+DELDIM
 01060+ *ASSEMBLE RELOCATABLE
 01070+ *STORE RELOADABLE
 01080+ LINKAGE - BT LNCUBE,DSALBL+50,6
 01090+ DSALBL IS ADDRESS OF SLOPE OF LINE (S-T SYSTEM)
 01100+ DSALBL+5 IS ADDRESS T-INTERCEPT LINE (S-T SYSTEM)
 01110+ DSALBL+10 IS ADDRESS OF A-COEFFICIENT (CUBIC)
 01120+ DSALBL+15 IS ADDRESS OF B-COEFFICIENT (CUBIC)
 01130+ DSALBL+20 IS ADDRESS OF C-COEFFICIENT (CUBIC)
 01140+ DSALBL+25 IS ADDRESS OF S-COORDINATE (POINT 1)
 01150+ DSALBL+30 IS ADDRESS OF T-COORDINATE (POINT 1)
 01160+ DSALBL+35 IS ADDRESS OF S-COORDINATE (POINT 2)
 01170+ DSALBL+40 IS ADDRESS OF T-COORDINATE (POINT 2)
 01180+ DSALBL+45 IS ADDRESS OF S-COORDINATE (POINT 3)
 01190+ DSALBL+50 IS ADDRESS OF T-COORDINATE (POINT 3)
 01200+
 02010+ *NUMBER OF INTERSECTIONS INDICATED BY 2-DIGIT
 02020+ FIELD IN CORE POSITIONS 00018-00019
 02030+
 02040 ADDCON DC 50,0 00049 00050
 02050 DS 6,0 00055 00006
 02060 MST DS 5,ADDCON-44, ADDRESSES OF SLOPE AND T-INTERCEPT
 00005 00005
 02070 BST DS 5,MST+5, OF LINE (LOCAL S-T REFERENCE SYSTEM)
 00010 00005
 02080 ACUBE DS 5,BST+5, ADDRESSES OF A-COEFFICIENT (CUBIC)
 00015 00005
 02090 BCUBE DS 5,ACUBE+5, ADDRESSES OF B-COEFFICIENT (CUBIC)
 00020 00005
 02100 CCUBE DS 5,BCUBE+5, ADDRESSES OF C-COEFFICIENT (CUBIC)
 00025 00005
 02110 S1 DS 5,CCUBE+5, ADDRESS OF S-COORDINATE (POINT 1)
 00030 00005
 02120 T1 DS 5,S1+5, ADDRESS OF T-COORDINATE (POINT 1)

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00035 00005
02130 S2 DS 5,T1+5, ADDRESS OF S-COORDINATE (POINT 2)
00040 00005
02140 T2 DS 5,S2+5, ADDRESS OF T-COORDINATE (POINT 2)
00045 00005
02150 S3 DS 5,T2+5, ADDRESS OF S-COORDINATE (POINT 3)
00050 00005
02160 T3 DS 5,S3+5, ADDRESS OF T-COORDINATE (POINT 3)
00055 00005
02170*
02180* SUBPROGRAM ENTRY
02190 LNCUBE TFM FLAGT,1,10, ASSUME ONE INTERSECTION EXISTS
00056 J6 00403 000-1
02200 TFL CMINH,CCUBE,11 CMINH=C-MST 00068 -D 01790 0002N
03010 FSUB CMINH,MST,11, 00080 -K 01790 0000N
03020 TFL P,BCUBE,11, 00092 -D 01800 0002-
03030 FDIV P,ACUBE,11, P=B/A 00104 -R 01800 0001N
03040 BV A=0,,, BRANCH IF A-COEFFICIENT IS ZERO
00116 M6 01380 01400
88888*
03060 ANOTZ FDIV CMINH,ACUBE,11, Q=CMINH/A 00128 -R 01790 0001N
03070 TFL R,BST,11 00140 -D 01810 0001-
03080 FDIV R,ACUBE,11, R=BST/A 00152 -R 01810 0001N
03090 FMUL R,MINI,0,,, R=-BST/A 00164 -L 01810 01740
03100 TFL Q/3,0 00176 -D 01820 01790
03110 FMUL Q/3,1/3,,, Q/3.0 00188 -L 01820 01750
03120 FMUL P,1/3,,, P/3.0 00200 -L 01800 01750
03130 TFL TEMP,P/3 00212 -D 01830 01800
03140 FMUL TEMP,P/3,,, P**2/9.0 00224 -L 01830 01800
03150 FSUB Q/3,TEMP,,, SMA/3=Q/3.0-P**2/9.0 00236 -K 01820 01830
03160 FMUL Q,0.5, Q/2.0 00248 -L 01790 01760
03170 FSUB Q/2,TEMP,,, Q/2.0-P**2/9.0
03180 FMUL Q/2,P/3,,, P/3.0=(Q/2.0-P**2/9.0) 00272 -L 01790 01800
03190 FMUL R,0.5, R/2.0 00284 -L 01810 01760
03200 FSUB Q/2,R/2,,, SMB/2=P/3.0*(Q/2.0-P**2/9.0)-R/2.0
00296 -K 01790 01810
04010 TFL BSQ/4,SMB/2 00308 -D 01810 01790
04020 FMUL BSQ/4,SMB/2,,, SMB**2/4.0 00320 -L 01810 01790
04030 TFL A3/27,SMA/3 00332 -D 01830 01820
04040 FMUL A3/27,SMA/3,,, SMA**2/9.0 00344 -L 01830 01820
04050 FMUL A3/27,SMA/3,,, SMA**3/27.0 00356 -L 01830 01820
04060 FADD BSQ/4,A3/27,,, SORTA=SMB**2/4.0*SMA**3/27.0
00368 -J 01810 01830
04070 BNN HP/EZ,,, BRANCH IF RESULT NOT NEGATIVE
00380 M6 00898 01300
04080*
04090 3ROOTS CF SORTA-2,,, ABSF(SORTA) 00392 L3 01808 00000
04100 BTM MONITR,02000,67, CALL SORTF SUBROUTINE VIA MONITR
00404 I7 02400 -2000
04110 BTM SORTF,SORTA,67, SORTF(ABSF(SORTA)) 00416 IP 02410 -1810
04120 BTM MONITR,02020,67, CALL ATANF SUBROUTINE VIA MONITR
00428 I7 02400 -2020
04130 BT ATANF,DSA1+10.6, CALCULATE PHI 00440 2P 02410 00773
04140 FMUL PHI,1/3,,, PHI/3.0 00452 -L 01810 01750
04150 CF SMA/3,,, ABSF(SMA/3) 00464 L3 01820 00000
04160 BTM MONITR,02000,67, CALL SORTF SUBROUTINE VIA MONITR
00476 I7 02400 -2000
04170 BTM SORTF,SMA/3,67, SORTF(ABSF(SMA/3)) 00488 IP 02410 -1820
04180 FADD 2XROOT,SMA/3,,, 2.0*SORTF(ABSF(SMA/3))
00500 -J 01820 01820
04190 TFL S1,PHI/3,6 00512 -D 0003- 01810
04200 BTM MONITR,02010,67, CALL SINFCOSF SUBROUTINE VIA MONITR
00524 I7 02400 -2010
05010 BTM COSF,S1,6711, COSF(PHI/3.0) 00536 IP 0242J -003-
05020 FMUL S1,2XROOT,6, 2.0*SORTF(ABSF(SMA/3))*COSF(PHI/3.0)
00548 -L 0003- 01820
05030 FSUB S1,P/3,6, S1 00560 -K 0003- 01800
05040 FADD PHI/3,2PI/3,, PHI/3.0+2.0*PI/3.0 00572 -J 01810 01770
05050 TFL S2,PHI/3,6 00584 -D 0004- 01810
05060 BTM COSF,S2,6711, COSF(PHI/3.0+2.0*PI/3.0)
00596 IP 0242J -004-
05070 FMUL S2,2XROOT,6, 2.0*SORTF(ABSF(SMA/3))*COSF(PHI/3.0+2.0*PI/3.0)
00608 -L 0004- 01820
05080 FSUB S2,P/3,6, S2 00620 -K 0004- 01800
05090 FADD PHI/3,2PI/3,, PHI/3.0+4.0*PI/3.0 00632 -J 01810 01770
05100 BTM COSF,PHI/3,67, COSF(PHI/3.0+4.0*PI/3.0)
00644 IP 0242J -1810
05110 TFL S3,PHI/3,6 00656 -D 0005- 01810
05120 FMUL S3,2XROOT,6, 2.0*SORTF(ABSF(SMA/3))*COSF(PHI/3.0+4.0*PI/3.0)
00668 -L 0005- 01820
05130 FSUB S3,P/3,6, S3 00680 -K 0005- 01800
05140 3INT TDM FLAGT,3,,, THREE UNIQUE INTERSECTIONS EXIST
00692 J5 00403 00003
05150 T3CALC BTM T=FOFS,S3,711, T3=S3*(S3*(A+S3*B)+C) 00704 JP 00800 -005-
05160 T2CALC BTM T=FOFS,S2,711, T2=S2*(S2*(A+S2*B)+C) 00716 JP 00800 -004-
05170 T1CALC BTM T=FOFS,S1,711, T1=S1*(S1*(A+S1*B)+C) 00728 JP 00800 -003-
05180 TF FLAG,FLAGT,,, MOVE NUMBER OF INTERSECTIONS
00740 20 00019 00403
05190 B RETURN,,6, RETURN TO MONITR 00752 49 0241J 00000
05200 DORG --4+5*3-11-1 00762
06010*
06020 NOP SORTA,PHI 00762 MJ 01810 01810
06030 DORG --14 00759
06040 DSA1 DSA SMB/2 00763 00005 -1790
06050 DORG --5*3-4+5*2-6 00778
06060 NOP CBRTA+12,0 00778 M1 01038 00000
06070 DORG --14 00775
06080 DSA2 DSA CAPA 00779 00005 -1830
06090 DORG --5*2-4+5*2-6-1 00788
06100 NOP CBRTB+12,0 00788 M1 01074 00000
06110 DORG --14 00785
06120 DSA3 DSA CAPB 00789 00005 -1820
06130 DORG --5*2-4 00795
06140*
06150 S1 DS 5,,, NEGATIVE ADDRESS OF S1
00799 00005
06160 T=FOFS TF --30,--1 00800 K0 00830 00799
06170 SM --18,5,10 00812 J2 00830 000-5
06180 TFL ,ACUBE,11, TI=A 00824 00 00000 0001N
06190 REFADD DS --5, NEGATIVE ADDRESS OF TI
00830 00000
06200 FMUL REFADD,S1,611, TI=A*S1 00836 -L 0083- 0079R
07010 FADD REFADD,BCUBE,611, TI=A*S1+B 00848 -J 0083- 0002-
07020 FMUL REFADD,S1,611, TI=S1*(A+S1+B) 00860 -L 0083- 0079R
07030 FADD REFADD,CCUBE,611, TI=S1*(A+S1+B)+C 00872 -J 0083- 0002N
07040 FMUL REFADD,S1,611, TI=S1*(S1*(A+S1+B)+C) 00884 -L 0083- 0079R
07050 BB ... EXIT 00896 42 00000 00000
07060 DORG --9 00898
07070*

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07080 MP/EZ BZ 2ROOTS,,, BRANCH IF RESULT IS ZERO
07090* 00898 M6 01210 01200
07100 1ROOT CM MST,49,610
07110 BN NVERT,,, BRANCH IF LINE IS NOT VERTICAL
00910 J4 0000N 000M9
00922 M7 00978 01300
07120*
07130 VERT TFL S1,BST,611, S1=BST 00934 -0 0003- 0001-
07140 FMUL S1,MIN1.0,6, S1=-BST 00946 -L 0003- 01740
07150 FDIV S1,MST,611, S1=-BST/MST 00958 -R 0003- 0000N
07160 B TICALC 00970 M9 00728 00000
07170 DORG =-3 00978
07180*
07190 NVERT BTM MONITR,02000,67, CALL SQRTF SUBROUTINE VIA MONITR
00978 17 02400 -2000
07200 BTM SQRTF,SQRTA,67, SQRTF(SQRTA) 00990 1P 02410 -1810
08010 TFL CAPA,SQRTA 01002 -0 01830 01810
08020 FADD CAPA,SMB/2,, CAPA=SMB/2+SQRTA 01014 -J 01830 01790
08030 GBRTA BT CUBRTF,DSAB*9,, CAPA=(SMB/2+SQRTA)**1.0/3.0
01026 KP 01264 00784
01038 -0 01820 01790
08040 TFL CAPB,SMB/2 CAPB=SMB/2-SQRTA 01050 -K 01820 01810
08050 FSUB CAPB,SQRTA,, CAPB=(SMB/2-SQRTA)**1.0/3.0
08060 CBRTB BT CUBRTF,DSAB*9,, 01062 KP 01264 00794
01074 -0 0003- 01830
08070 TFL S1,CAPA,6 01086 -J 0003- 01820
08080 FADD S1,CAPB,6 S1=CAPA+CAPB-P 01098 -K 0003- 01800
08090 FSUB S1,P,6, 01110 J4 00403 000-1
08100 CM FLAGT,1,10 BRANCH IF ONE INTERSECTION EXISTS
08110 BE TICALC,,, 01122 M6 00728 01200
08120*
08130 ZINT FMUL CAPA,CAPB,, CAPA*CAPB 01134 -L 01830 01820
08140 BP ZUNEEK,,, BRANCH IF RESULT IS POSITIVE
01146 M6 01178 01100
08150*
08160 IINT TDM FLAGT,1,, ONE INTERSECTION EXISTS
01158 J5 00403 00001
08170 B TICALC 01170 M9 00728 00000
08180 DORG =-3 01178
08190*
08200 ZUNEEK TFL S2,S1,611, S2=S1 01178 -0 0004- 0003-
09010 SZCALC FMUL S2,MIN0.5,6, S2=-S1/2.0 01190 -L 0004- 01780
09020 B TZCALC 01202 M9 00716 00000
09030 DORG =-3 01210
09040*
09050 ZROOTS CM MST,49,610 BRANCH IF LINE IS VERTICAL
09060 BNN VERT,,, 01210 J4 0000N 000M9
01222 M6 00934 01300
09070*
09080 TDM FLAGT,2,, TWO INTERSECTIONS EXIST
01234 J5 00403 00002
09090 B NVERT 01246 M9 00978 00000
09100 DORG **6 01263
09110*
09120 CUBRTF TFL TEMPF,ARG,11 01264 -0 01840 01250
09130*
09140 ARG DS 5,CUBRTF-6 01258 00005
09150 EXADD DS 5,ARG+5 01263 00005
09160*
09170 MF SIGN,TEMPF-2 01276 PJ 01358 01838

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09180 BTM MONITR,02040,67, CALL LOGF SUBROUTINE VIA MONITR
01288 17 02400 -2040
09190 BTM LOGF,TEMPF,67, LOGF(ABS(F(ARG))) 01300 1P 02410 -1840
09200 FMUL TEMPF,1/3,, LOGF(ABS(F(ARG)))/3.0 01312 -L 01840 01750
10010 BTM MONITR,02030,67, CALL EXPF SUBROUTINE VIA MONITR
01324 17 02400 -2030
10020 BTM EXPF,TEMPF,67, EXPF(LOGF(ABS(F(ARG)))/3.0)
01336 1P 02410 -1840
10030 SIGNF MF TEMPF-2,SIGN 01348 PJ 01838 01358
10040 TFL ARG,TEMPF,6 01360 -0 01250 01840
10050 B EXADD,,6, EXIT 01372 M9 0126L 00000
10060 DORG =-3 01380
10070*
10080 A=0 TFL 2XB,BCUBE,11 01380 -0 01800 0002-
10090 FADD 2XB,2XB,, 2.0*B 01392 -J 01800 01800
10100 BZ B=0,,, BRANCH IF B IS ZERO 01404 M6 01692 01200
10110*
10120 BN0TZ TFL TEMP,CMINM 01416 -0 01830 01790
10130 FMUL TEMP,CMINM,, (C-MST)**2 01428 -L 01830 01790
10140 TFL TEMPF,2XB, 01440 -0 01840 01800
10150 FADD TEMPF,2XB,, 4.0*B 01452 -J 01840 01800
10160 FMUL 4XB,BST,11, 4.0*B*BST 01464 -L 01840 0001-
10170 FADD TEMP,4XB,, (C-MST)**2+4.0*B*BST 01476 -J 01830 01840
10180 FMUL CMINM,MIN1.0,, -CMINM 01488 -L 01790 01740
10190 FDIV CMINM,2XB,, -CMINM/2.0/B 01500 -R 01790 01800
10200 BD N0TO,TEMP-9,, BRANCH IF NOT ONE INTERSECTION EXISTS
01512 ML 01932 01821
11010*
11020 IREAL B SICALC 01524 M9 01636 00000
11030 DORG =-3 01532
11040*
11050 N0TO BNF 2REAL,TEMP-2,, BRANCH IF TWO INTERSECTIONS EXIST
01532 MM 01564 01828
11060*
11070 FLAGO TFM FLAG,,10, NO INTERSECTION EXISTS
01544 16 00019 000-0
11080 B RETURN,,6, RETURN TO MONITR 01556 49 0241J 00000
11090 DORG =-3 01564
11100*
11110 2REAL BTM MONITR,02000,67, CALL SQRTF SUBROUTINE VIA MONITR
01564 17 02400 -2000
11120 BTM SQRTF,TEMP,67, SQRTF((C-MST)**2+4.0*B*BST)**.5=ROOT
01576 1P 02410 -1830
11130 FDIV TEMP,2XB,, ROOT/(2.0*B) 01588 -R 01830 01800
11140 TFL S2,CMINM,6, S2=C-MST 01600 -0 0004- 01790
11150 FADD S2,TEMP,6, S2=C-MST+ROOT 01612 -J 0004- 01830
11160 TOM FLAGT,2,, TWO INTERSECTIONS EXIST
01624 J5 00403 00002
11170 SICALC FSUB CMINM,TEMP,, C-MST-ROOT 01636 -K 01790 01830
11180 TFL S1,CMINM,6, S1=C-MST-ROOT 01648 -0 0003- 01790
11190 CM FLAGT,2,10 01660 J4 00403 000-2
11200 BE TZCALC,,, BRANCH IF TWO INTERSECTIONS EXIST
01672 M6 00716 01200
12010*
12020 B TICALC 01684 M9 00728 00000
12030 DORG =-3 01692
12040*
12050 B=0 BD **20,CMINM-9,, BRANCH IF (C-MST) IS NOT ZERO
01692 ML 01712 01781
12060*

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12070	B	FLAGO		01704 M9 01544 00000
12080	DORG	--3		01712
12090*				
12100	TFL	S1,8ST,611		01712 -0 0003- 0001-
12110	B	VERT*24		01724 M9 00958 00000
12120	DORG	--4		01731
12130*				
12140	DC	8,-10000000		01738 00008
12150	MINI.LO DC	2,1		01740 00002
12160	DC	8,33333333		01748 00008
12170	1/3	DC	2,0	01750 00002
12180	DC	8,50000000		01758 00008
12190	0.5	DC	2,0	01760 00002
12200	DC	8,20943951		01768 00008
13010	2P1/3	DC	2,1	01770 00002
13020	DC	8,-50000000		01778 00008
13030	MIND.5	DC	2,0	01780 00002
13040	CMINM	DC	10,0	01790 00010
13050	P	DC	10,0	01800 00010
13060	R	DC	10,0	01810 00010
13070	Q/3	DC	10,0	01820 00010
13080	TEMP	DC	10,0	01830 00010
13090	TEMPF	DC	10,0	01840 00010
13100*				
13110	SIGN	DS	,SIGNF+10	01358 00000
13120	FLAG	DS	2,19	00019 00002
13130	FLAGT	DS	2,3ROOTS+11	00403 00002
13140	Q	DS	,CMINM	01790 00000
13150	P/3	DS	,P	01800 00000
13160	Q/2	DS	,Q	01790 00000
13170	R/2	DS	,R	01810 00000
13180	BSQ/4	DS	,R/2	01810 00000
13190	SMB/2	DS	,Q/2	01790 00000
13200	A3/27	DS	,TEMP	01830 00000
14010	SMA/3	DS	,Q/3	01820 00000
14020	SQRTA	DS	,BSQ/4	01810 00000
14030	SQRTF	DS	,2416	02416 00000
14040	ATANF	DS	,2416	02416 00000
14050	PHI	DS	,SQRTA	01810 00000
14060	2XROOT	DS	,SMA/3	01820 00000
14070	PHI/3	DS	,PHI	01810 00000
14080	COSF	DS	,2421	02421 00000
14090	LOGF	DS	,2416	02416 00000
14100	EXPF	DS	,2416	02416 00000
14110	2XB	DS	,P/3	01800 00000
14120	4XB	DS	,TEMPF	01840 00000
14130	CAPA	DS	,TEMP	01830 00000
14140	CAPB	DS	,2XROOT	01820 00000
14150	MONITR	DS	,2406	02406 00000
14160	RETURN	DS	,2411	02411 00000
14170	DEND	LNDCUBE		00056

SYMBOL TABLE

MINI.LO	06024	E	05954	F	05964	F=1.0	00136R	FISH	00002R
G02	06337	J	00001R	TL1	06145	TL1LT	00038R	TLION	00164R
TL1RT	00184R	TL2	06147	TL2ON	00150R	0.0	06034	1.0	06075

01010*
01020*
01030*
01040*
01050*
01060*
01070*
01080*
01090*
01100*
01110*
01120 J DC 2,0 00001 00002

IBM 1620-1311 AD-APT SUBPROGRAM FOR ESTABLISHING
THE DRIVE AND CHECK SURFACE OFFSET INDICATORS
BASED ON CONVENTIONAL MOTION AND THE CHECK SURFACE
MODIFIERS... TO, ON, PAST, TANTO

RCS

*NAME FISH... ERASABLE ARELEM SUBPROGRAM
*ID NUMBER 0218*DELDIM
*ASSEMBLE RELOCATABLE
*STORE RELOADABLE
LINKAGE - BT FISH,TL2,6

01130* SUBPROGRAM ENTRY
01140 FISH CM TL1,2,10 00002 14 06145 000-2
01150 BE TL1RT,.. BRANCH IF TOOL1 IS TLRGT 00014 M6 00184 01200

01160*
01170 BP TLION,.. BRANCH IF TOOL1 IS TLOM 00026 M6 00164 01100

01180*
01190 TL1LT TFL E,1,0,, SET E=1.0 00038 06 05954 06075
01200 CM TL2,3,10 00050 14 06147 000-3
02010 BE TL2ON,.. BRANCH IF TOOL2 IS TLOM 00062 M6 00150 01200

02020*
02030 S J,G02,, TL2-G02 00074 K2 00001 06337
02040 BZ F=1.0 00086 M6 00136 01200

02050*
02060 CM J,-2,10 00098 J4 00001 000-K
02070 BE F=1.0 00110 M6 00136 01200

02080*
02090 TFL F,MINI.LO,, SET PAST INDICATOR 00122 06 05964 06024
02100 BB ,, EXIT 00134 42 00000 00000
02110 DORG --9 00136
02120*

02130 F=1.0 TFL F,1,0,, SET TO INDICATOR 00136 06 05964 06075
02140 BB ,, EXIT 00148 42 00000 00000
02150 DORG --9 00150
02160*

02170 TL2ON TFL F,0,0,, SET ON INDICATOR 00150 06 05964 06034
02180 BB ,, EXIT 00162 42 00000 00000
02190 DORG --9 00164
02200*

03010 TLION TFL E,0,0,, SET E=0.0 00164 06 05954 06034
03020 B TL1LT*12 00176 M9 00050 00000
03030 DORG --3 00184
03040*

03050 TL1RT TFL E,MINI.LO,, SET E--1.0 00184 06 05954 06024
03060 DSC 2,49 00196 00002
03070 DEA TL1LT*12 00202 00003 -0090
03080*

03090 TLI DS ,6145 06003 00000

03100 TL2	DS	+6147	06147	00000
03110 G02	DS	+6337	06337	00000
03120 E	NS	+5954	05954	00000
03130 F	DS	+E+10	05964	00000
03140 0.0	DS	+6034	06034	00000
03150 1.0	DS	+0.0+41	06075	00000
03160 MINI.0	DS	+0.0-10	06024	00000
03170	DEND	FISH	00002	

SYMBOL TABLE

TOLCHK 12696	RETURN 02411	OFFSTD 12576	OFFCHK 12764	NORMLN 02416
MONITR 02406	LNSTR 12540	ERPROC 02416	EPSLON 06004	DEVIAT 12684
B1 03372	CRIT1 02488	CRIT2 02498	DISTF 02416	DSA1 12479
DSA2 12509	DSA3 12534	E 05954	ER200 12884	ER201 12860
EXIT 12756	FLW 02488	FLWST 03362	MODN 02508	M1 03362
RO 02508	TEMP 00079	TLRAD 05984	TOLI 05994	TOLD 06014
XN 02488	XO 05892	YN 02498	YO 05902	

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01010*          IBM 1620-1311 AD-APT SUBPROGRAM FOR VERIFYING
01020*          THE START-UP POSITION OF THE CUTTER
01030*          ON LINE DRIVE SURFACES
01040*
01050*          *NAME LNSTR... NON-ERASABLE ARELEM SUBPROGRAM
01060*          *ID NUMBER 0219*DELDIM
01070*          *STORE CORE IMAGE
01080*          LINKAGE - B LNSTR,,6
01090*
01100          DORG 12474
01110*          12474
01120          DC 30,0
01130          DORG 12474+5*6-6
01140          NOP YN,0
01150          DORG -21
01160          NOP B1,XN
01170          DORG -21
01180          NOP YO,M1
01190          DORG -14
01200 DSA1 DSA XO
02010          DORG **5*6-4+5*5-11-2
02020          NOP YN,MODN
02030          DORG -21
02040          NOP YO,XN
02050          DORG -14
02060 DSA2 DSA XO
02070          DORG **5*5-4
02080 DSA3 DSA OFFSTD*12
02090          DSC 9,02101
02100*
02110*          SUBPROGRAM ENTRY
02120 LNSTAT BTM MONITR,02140,67, CALL NORMLN SUBPROGRAM VIA MONITR
02130*          PROJECT CUTTER CENTER TO DS LINE, NORMAL TO LINE
02140          BT NORMLN,DSA1*25,6
02150          BT MONITR,DSA3*5,6, CALL DISTF SUBPROGRAM VIA MONITR
02160*          CALCULATE DISTANCE FROM CUTTER CENTER TO LINE
02170 OFFSTD BT DISTF,DSA2*20,6
02180          TFL CRIT1,TOLI
02190          FADD CRIT1,EPSLON
02200          SF CRIT1-2,,, CRIT1=-(TOLI+EPSLON)
03010          TFL CRIT2,TOLO
03020          FADD CRIT2,EPSLON,, CRIT2=TOLO+EPSLON
03030          TFL TEMP,E
03040          FMUL TEMP,TLRAD,, E=TLRAD
03050          CF TEMP-2,,, ABSF(E=TLRAD)
03060 DEVIAT FSUB MODN,TEMP,, MODN=DISPLACEMENT OF CUTTER PERIPHERY
          12503 00030
          12498
          12498 41 02498 00000
          12488
          12488 41 03372 02488
          12478
          12478 41 05902 03362
          12475
          12479 00005 -5892
          12517
          12518 41 02498 02508
          12508
          12508 41 05902 02488
          12505
          12509 00005 -5892
          12530
          12534 00005 J2588
          12535 00005
          12540 17 02400 -2140
          12592 27 02410 12504
          12564 27 02400 12539
          12576 27 02410 12529
          12588 06 02488 05994
          12600 01 02488 06004
          12612 32 02486 00000
          12624 06 02498 06014
          12636 01 02498 06004
          12648 06 00079 05954
          12660 03 00079 05984
          12672 33 00077 00000
          12684 02 02508 00079
    
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03070*
03080 TOLCHK FSUB CRIT1,MODN FROM DS LINE (IN DIRECTION OF CENTER) 12696 02 02488 02508
03090 BP ER200-12,,, BRANCH IF CUTTER NOT WITHIN TOLERANCE 12708 46 12872 01100

03100*
03110 FSUB CRIT2,MODN 12720 02 02498 02508
03120 BN ER200-12,,, BRANCH IF CUTTER NOT WITHIN TOLERANCE 12732 47 12872 01300

03130*
03140 BD OFFCHK,E-9,,, BRANCH IF TOOL IS TLLFT OR TLRGT 12744 43 12764 05945

03150*
03160 EXIT B RETURN,,,6, RETURN TO MONITR 12756 49 0241J 00000
03170 DDRG ←-3 12764

03180*
03190 OFFCHK TFL RO,YO 12764 06 02508 05902
03200 FSUB RO,B1,,, RO=Y0-B1 12776 02 02508 03372
04010 TFL TEMP,M1 12788 06 00079 03362
04020 FMUL TEMP,X0,,, M1=X0 12800 03 00079 05892
04030 FSUB RO,TEMP,,, RO=Y0-M1*X0-B1 12812 02 02508 00079
04040 FMUL RO,E,,, RO=E 12824 03 02508 05954
04050 BP RETURN,,,6, BRANCH IF CUTTER IS ON PROPER SIDE 12836 46 0241J 01100

04060*
04070 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR 12848 17 02400 -2250

04080 ER201 BTM ERPROC,20101,67, WRITE ERROR MESSAGE... SEARCH FOR END 12860 17 02410 K0101

04090 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR 12872 17 02400 -2250

04100 ER200 BTM ERPROC,20001,67, WRITE ERROR MESSAGE... SEARCH FOR END 12884 17 02410 K0001

04110*
04120 NORMLN DS ,2416 02416 00000
04130 DISTF DS ,2416 02416 00000
04140 FLW DS ,2488 02488 00000
04150 XM DS 10,FLW*0*10 02488 00010
04160 YM DS 10,XM*10 02498 00010
04170 TOLI DS ,5994 05994 00000
04180 TOLO DS ,6014 06014 00000
04190 EPSLON DS ,6004 06004 00000
04200 TEMP DS 10,79 00079 00010
05010 E DS ,5954 05954 00000
05020 TLRAD DS ,E*30 05984 00000
05030 MODM DS 10,YM*10 02508 00010
05040 RO DS 10,MODM 02508 00010
05050 XO DS ,5892 05892 00000
05060 YO DS ,X0*10 05902 00000
05070 M1 DS ,3362 03362 00000
05080 B1 DS ,M1*10 03372 00000
05090 CRIT1 DS 10,XM 02488 00010
05100 CRIT2 DS 10,YM 02498 00010
05110 ERPROC DS ,2416 02416 00000
05120 FLWST DS ,3362 03362 00000
05130 MONITR DS ,2406 02406 00000
05140 RETURN DS ,2411 02411 00000
05150 DEND LNSTRY 12540

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SYMBOL TABLE

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TOLCHK 13218 RETURN 02411 OFFSTD 13098 OFFCHK 13286 NORMCR 02416
MONITR 02406 ERPROC 02416 EPSLON 06004 DEVIAT 13206 CRSTRY 13062
CRIT1 02498 CRIT2 02518 DISTF 02416 DSA1 12985 DSA2 13021
DSA3 13046 DSA4 13056 E 05954 ER200 13466 ER201 13442
EXIT 13278 FLW 02488 FLWST 03362 M1 03362 K1 03372
MODM 02508 RO 02508 R1 03382 TEMP 00079 TLRAD 05984
TOLI 05994 TOLO 06014 XM 02488 XO 05892 YM 02498
YO 05902

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01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR VERIFYING
01020* THE START-UP POSITION OF THE CUTTER
01030* ON CIRCLE DRIVE SURFACES RCS
01040*
01050* *NAME CRSTRY... NON-ERASABLE ARELEM SUBPROGRAM
01060* *ID NUMBER 0220*DELDIM
01070* *STORE CORE IMAGE
01080* LINKAGE - B CRSTRY,,6
01090*
01100 DDRG 12980 12980
01110*
01120 DC 35,0 13014 00035
01130 DDRG 12980*5*7-11 13004
01140 NOP XM,YM 13004 41 02488 02498
01150 DDRG ←-21 12994
01160 NOP K1,R1 12994 41 03372 03382
01170 DDRG ←-21 12984
01180 NOP YO,M1 12984 41 05902 03362
01190 DDRG ←-14 12981
01200 DSA1 DSA X0 12985 00005 -5892
02010 DDRG ←5*7-4*5*5-11 13030
02020 NOP YM,MODM 13030 41 02498 02508
02030 DDRG ←-21 13020
02040 NOP YO,XM 13020 41 05902 02488
02050 DDRG ←-14 13017
02060 DSA2 DSA X0 13021 00005 -5892
02070 DDRG ←5*5-4 13042
02080 DSA3 DSA CRSTRY*24 13046 00005 J3086
02090 OSC 5,02151 13047 00005
02100 DSA4 DSA OFFSTD*12 13056 00005 J3110
02110 OSC 5,02101 13057 00005
02120*
02130* SUBPROGRAM ENTRY
02140 CASSTRY BT MONITR,DSA3*5,6, CALL NORMCR SUBPROGRAM VIA MONITR 13062 27 02400 13051
PROJECT CUTTER CENTER TO DS CIRCLE, NORMAL TO CIRCLE
02150* BT NORMCR,DSA1*30,6 13074 27 02410 13015
02160* BT MONITR,DSA4*5,6, CALL DISTF SUBPROGRAM VIA MONITR 13086 27 02400 13061
02170*
CALCULATE DISTANCE FROM CUTTER CENTER TO CIRCLE
02180* BT DISTF,DSA2*20,6 13098 27 02410 13041
02190 OFFSTD BT CRIT1,TOLI 13110 06 02498 05994
02200 TFL CRIT1,TOLI 13122 01 02498 06004
03010 FADD CRIT1,EPSLON CRIT1=-(TOLI+EPSLON) 13134 32 02498 00000
03020 SF CRIT1-2,,, 13146 06 02518 06014
03030 TFL CRIT2,TOLO CRIT2=TOLO+EPSLON 13158 01 02518 06004
03040 FADD CRIT2,EPSLON,, 13170 06 00079 05954
03050 TFL TEMP,E

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03060   FMUL TEMP,TLRAD,,      E*TLRAD           13182 03 00079 05984
03070   CF  TEMP-2,,,          ABSF(E*TLRAD)    13194 33 00077 00000
03080  DEVIAT FSUB MODN,TEMP,, MODN=DISPLACEMENT OF CUTTER PERIPHERY
                                      13206 02 02508 00079
03090*         FROM DS CIRCLE (1M DIRECTION OF CUTTER CENTER)
03100  TOLCHK FSUB CRIT1,MODN  13218 02 02498 02508
03110   BP  ER200-12,,,      BRANCH IF CUTTER NOT WITHIN TOLERANCE
                                      13230 46 13454 01100
03120*
03130   FSUB CRIT2,MODN      13242 02 02518 02508
03140   RN  ER200-12,,,      BRANCH IF CUTTER NOT WITHIN TOLERANCE
                                      13254 47 13454 01300
03150*
03160   BD  OFFCHK,E-9,,      BRANCH IF TOOL IS TLLFT OR TLRGT
                                      13266 43 13286 05945
03170*
03180  EXIT  B  RETURN,,6,,    RETURN TO MONITR    13278 49 0241J 00000
03190   DDRG =-3
03200*
04010  OFFCHK TFL RO,XO        13286 06 02508 05892
04020   FSUB RO,H1,,          XO-H1           13298 02 02508 03362
04030   FMUL RO,RO,,          (XO-H1)**2       13310 03 02508 02508
04040   TFL  TEMP,YO          YO-K1           13322 06 00079 05902
04050   FSUB TEMP,K1,,          (YO-K1)**2       13334 02 00079 03372
04060   FMUL TEMP,TEMP,,       (YO-K1)**2       13346 03 00079 00079
04070   FADD RO,TEMP,,          (XO-H1)**2+(YO-K1)**2 13358 01 02508 00079
04080   TFL  TEMP,R1          R1**2           13370 06 00079 03382
04090   FMUL TEMP,R1,,          R1**2           13382 03 00079 03382
04100   FSUB RO,TEMP,,          RO=(XO-H1)**2+(YO-K1)**2-R1**2
                                      13394 02 02508 00079
04110   FMUL RO,E,,            RO=E           13406 03 02508 05954
04120   BP  RETURN,,6,,      BRANCH IF CUTTER IS CN PROPER SIDE
                                      13418 46 0241J 01100
04130*
04140   BTM  MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
                                      13430 17 02400 -2250
04150  ER201 BTM  ERPROC,20102,67, WRITE ERROR MESSAGE... SEARCH FOR END
                                      13442 17 02410 K0102
04160   BTM  MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
                                      13454 17 02400 -2250
04170  ER200 BTM  ERPROC,20002,67, WRITE ERROR MESSAGE... SEARCH FOR END
                                      13466 17 02410 K0002
04180*
04190  FLWST DS   ,3362          03362 00000
04200  XO  DS   ,5892          05892 00000
05010  YO  DS   ,XO+10         05902 00000
05020  H1  DS   ,FLWST+0*10    03362 00000
05030  K1  DS   ,H1+10        03372 00000
05040  R1  DS   ,K1+10        03382 00000
05050  FLW DS   ,2488          02488 00000
05060  XN  DS   10,FLW+0*10    02488 00010
05070  YN  DS   10,XN+10      02498 00010
05080  MODN DS   10,YN+10     02508 00010
05090  NORPCR DS  ,2416        02416 00000
05100  ERPROC DS  ,2416        02416 00000
05110  DISTF DS  ,2416        02416 00000
05120  CRIT1 DS   ,YN          02498 00000
05130  CRIT2 DS   10,MODN*10   02518 00010
05140  TOLI DS   ,5994         05994 00000
05150  TOLO DS   ,6014         06014 00000

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05160  EPSLON DS  ,TOLI+10     06004 00000
05170  TEMP  DS   10,79        00079 00010
05180  E     DS   ,Y0+52       05954 00000
05190  TLRAD DS   ,E+30       05984 00000
05200  RO    DS   10,MODN      02508 00010
06010  MONITR DS  ,2406        02406 00000
06020  RETURN DS  ,2411        02411 00000
06030   DEND  CASTRT          13062

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SYMBOL TABLE

1.0E48 00114R RETURN 02411 MONITR 02406 COSINE 00043 COSPNZ 00066R
 ARGADD 00009A COSF 02421 COSFZ 00086R SINF 02416 TANF 00006R

01010* IBM 1620-1311 AD-APT FLOATING TANGENT SUBPROGRAM
 01020* RCS
 01030* *NAME TANF... NON-ERASABLE SYSTEM SUBPROGRAM
 01040* *ID NUMBER 0221*DELDIM
 01050* *ASSEMBLE RELOCATABLE
 01060* *STORE RELOADABLE
 01070* LINKAGE - BTM TANF,ADDARG,67
 01080* ADDARG IS THE ADDRESS OF THE ARGUMENT AND RESULT
 01090*
 01100 ARGADD DC 6,0,, ADDRESS OF ARGUMENT 00005 00006
 01110*
 01120* SUBPROGRAM ENTRY
 01130 TANF BTM MONITR,02010,67, CALL SINF-COSF SUBROUTINE VIA MONITR
 01140 TFL COSINE,ARGADD,11 00006 17 02400 -2010
 01150 BTM SINF,ARGADD,6711, CALCULATE SINF(ARG) 00018 00 00043 0000N
 01160 BTM COSF,COSINE,67, CALCULATE COSF(ARG) 00030 1P 02410 -000N
 01170 BZ COSFZ,,, BRANCH IF COSF(ARG)=0 00042 17 0242J -0043
 01180*
 01190 COSPNZ FDIV ARGADD,COSINE,6, TANF(ARG)=SINF(ARG)/COSF(ARG)
 00066 -9 0000N 00043
 01200 B RETURN,,, RETURN TO MONITR 00078 49 0241J 00000
 02010 DORG --3 00086
 02020*
 02030 COSFZ TFL ARGADD,1.0E48,6 00086 -0 0000N 00114
 02040 B RETURN,,, RETURN TO MONITR 00098 49 0241J 00000
 02050 DORG --4 00105
 02060*
 02070 DC 8.10000000 00112 00008
 02080 1.0E48 DC 2,99 00114 00002
 02090*
 02100 COSINE DS 10,43 00043 00010
 02110 SINF DS ,2416 02416 00000
 02120 COSF DS ,2421 02421 00000
 02130 MONITR DS ,2406 02406 00000
 02140 RETURN DS ,2411 02411 00000
 02150 DEND TANF 00006

SYMBOL TABLE

PSINCL 00100R MONITR 02406 ERPROC 02416 A=B=0 00062R C=0.0 00026R
 EXIT 00098R FLW 02488 PSA 05851 PSDEF 00038R PSSW 06150
 SPSIS 00002R Z 05840

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
 01020* A PART SURFACE RECORD
 01030* RCS
 01040* *NAME SPSIS... ERASABLE ARELEM SUBPROGRAM
 01050* *ID NUMBER 0222*DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BTM SPSIS,1,10
 01090*
 01100 DC 2,0,, DUMMY ARGUMENT 00001 00002
 01110*
 01120* SUBPROGRAM ENTRY
 01130 SPSIS BD PSDEF,FLW*2*10-9,, BRANCH IF C-COEFFICIENT IS NON-ZERO
 00002 M3 00038 02499
 01140*
 01150 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
 00014 17 02400 -2250
 01160 C=0.0 BTM ERPROC,20500,67, WRITE ERROR MESSAGE... SEARCH FOR END
 00026 17 02410 K0500
 01170 PSDEF BD PSINCL,FLW*0*10-9,, BRANCH IF A-COEFFICIENT IS NON-ZERO
 00038 M3 00100 02479
 01180*
 01190 BD PSINCL,FLW*1*10-9,, BRANCH IF B-COEFFICIENT IS NON-ZERO
 00050 M3 00100 02489
 01200*
 02010 A=B=0 TOM PSSW,,, SET HORIZONTAL PS INDICATOR
 00062 15 06150 00000
 02020 TFL Z,FLW*3*10 00074 06 05840 02518
 02030 FDIV Z,FLW*2*10,, Z=D/C (MODAL Z) 00086 09 05840 02508
 02040 EXIT BB ,, EXIT 00098 42 00000 00000
 02050 DORG --9 00100
 02060*
 02070 PSINCL TR PSA-9,FLW*0*10-9,, STORE PS PLANE COEFFICIENTS (TRANS. Z)
 00100 31 05842 02479
 02080 TOM PSSW,-1,, SET INCLINED PS INDICATOR
 00112 15 06150 0000J
 02090 DSC 2,42,, EXIT 00124 00002
 02100*
 02110 FLW DS ,2488 02488 00000
 02120 ERPROC DS ,2416 02416 00000
 02130 PSSW DS ,6150 06150 00000
 02140 Z DS ,5840 05840 00000
 02150 PSA DS ,5851 05851 00000
 02160 MONITR DS ,2406 02406 00000
 02170 DEND SPSIS 00002

SYMBOL TABLE

STOVFL 00128R MONITR 02406 ERPROC 02416 EXIT 00114R FLW 02488
 FLWST 03362 FXWST 05540 NPM 02455 NSECT 02453 STACK 00006R
 STFL 06163 STFX 06168 STKFL 00005R

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR STACKING
 01020* ARELEM INPUT RECORDS
 01030* RCS
 01040* *NAME STACK... ERASABLE ARELEM SUBPROGRAM
 01050* *ID NUMBER 0223*DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BT STACK,STFL
 01090*
 01100* BTM N 6,0 0005 0006
 01110*
 01120* SUBPROGRAM ENTRY
 01130 STACK CH STFX,FXWST-26*27*11 0006 14 06168 -5811
 01140 BNL STOVFL-12,,, BRANCH ON OVERFLOW OF FIXED-WORD STACK
 00018 M6 00116 01300
 01150*
 01160 TP **22,NPM 00030 K6 00052 02455
 01170 AM STFL,1,9,, ADDRESS IN FLWST OF NEXT RECORD
 00042 11 06163 00-01
 01180 CH STFL,FLWST-9*10*215*11 00054 14 06163 -3514
 01190 BNL STOVFL-12,,, BRANCH ON OVERFLOW OF FLOATING-WORD STACK
 00066 M6 00116 01300
 01200*
 02010 TR STFX,NSECT-1,6, STACK FIXED-WORD PORTION OF RECORD
 00078 31 06160 02452
 02020 TR STKFL,FLW*0*10-9,6, STACK FLOATING-WORD PORTION OF RECORD
 00090 L1 0000N 02479
 02030 AM STFX,27,10, ADDRESS IN FXWST OF NEXT RECORD
 00102 11 06168 000K7
 02040 EXIT BB,,, EXIT 00114 42 00000 00000
 02050 DORG 8-9 00116
 02060*
 02070 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
 00116 17 02400 -2250
 02080 STOVFL BTM ERPROC,20600,67, WRITE ERROR MESSAGE... SEARCH FOR END
 00128 17 02410 K0600
 02090*
 02100 STFX DS ,6168 06168 00000
 02110 FXWST DS ,5540 05540 00000
 02120 STFL DS ,6163 06163 00000
 02130 NPM DS ,2455 02455 00000
 02140 FLWST DS ,3362 03362 00000
 02150 NSECT DS ,2453 02453 00000
 02160 FLW DS ,2488 02488 00000
 02170 ERPROC DS ,2416 02416 00000
 02180 MONITR DS ,2406 02406 00000
 02190 DEND STACK 00006

SYMBOL TABLE

SEMINZ 06095 MONITR 02406 ERPROC 02416 EPSLON 06004 FLW 02488
 STOL 00006R STORE 00042R TOLI 05994 TOLN 00005R TOLD 06014

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
 01020* AN INTOL OR OUTTOL RECORD
 01030* RCS
 01040* *NAME STOL... ERASABLE ARELEM SUBPROGRAM
 01050* *ID NUMBER 0224*DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BTM STOL,TOLADD
 01090* TOLADD IS ADDRESS OF INSIDE OR OUTSIDE TOLERANCE
 01100*
 01110 TOLN DC 6,0,, ADDRESS OF TOLERANCE SPECIFIED
 00005 00006
 01120*
 01130* SUBPROGRAM ENTRY
 01140 STOL BNF STORE,FLW*0*10-2,, BRANCH IF PARAMETER IS POSITIVE
 00006 M4 00042 02488
 01150*
 01160 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
 00018 17 02400 -2250
 01170 BTM ERPROC,20701,67, WRITE ERROR MESSAGE... SEARCH FOR END
 00030 17 02410 K0701
 01180 STORE TFL TOLN,FLW*0*10,6, STORE TOLERANCE VALUE 00042 -4 0000N 02488
 01190 TFL EPSLON,TOLI 00054 06 06004 05994
 01200 FADD EPSLON,TOLD,, TOTAL TOLERANCE 00066 01 06004 06014
 02010 FRUL EPSLON,SEMINZ,, (AVG. TOLERANCE)/10.0 00078 03 06004 06095
 02020 DSC 2,42,, EXIT 00090 00002
 02030*
 02040 FLW DS ,2488 02488 00000
 02050 MONITR DS ,2406 02406 00000
 02060 ERPROC DS ,2416 02416 00000
 02070 EPSLON DS ,6004 06004 00000
 02080 TOLI DS ,5994 05994 00000
 02090 TOLD DS ,6014 06014 00000
 02100 SEMINZ DS ,6095 06095 00000
 02110 DEND STOL 00006

SYMBOL TABLE

SEARCH 00162R	RSETHI 00150R	MONITR 08562	ERPROC 00006R	ERMESS 00291R
ERCODE 00005R	CLEAR 00102R	CNTR 00099R	DSCIN 07727	END 07390
ERNF 00379R	ER203 08292	EXIT 00046R	FINI 08324	HI 00434
HIDSA 07875	NFINI 00234R	NNE 00007	NR 02467	NRT 02471
NSRT 02475	NSS 02463	RNIN 06139	SSNF 00353R	TYPE2 00258R

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01010*      IBM 1620-1311 AD-APT ERROR PROCESSING SUBPROGRAM
01020*
01030*      *NAME ERPROC... ERASABLE ARELEM SUBPROGRAM      RCS
01040*      *ID NUMBER 0225*DELDIM
01050*      *ASSEMBLE RELOCATABLE
01060*      *STORE RELOADABLE
01070*      LINKAGE - BTM ERPROC,ERRNO,67
01080*      ERRNO IS EQUIVALENT TO THE FOLLOWING...
01090*      DC 3,NNN,,      3-DIGIT ERROR NUMBER
01100*      DSC 1,M,,      CONTROL INDICATOR
01110*      (M-DIGIT... RETURN)
01120*      (M=0... SEARCH FOR END OR FINI RECORD)
01130*      DSC 1,1,,      1-DIGIT DEBUGGER AID
01140*
01150 ERCODE DC 6,0      00005 00006
01160*
01170*      SUBPROGRAM ENTRY
01180 ERPROC TNF SSNF,NSS,,      FILL STATEMENT NO. FIELD
                                00006 P3 00353 02463
01190      TNF ERNF,ERCODE-2,,      FILL ERROR NO. FIELD 00018 PL 00379 00003
01200      RCTY ,,,      RETURN TYPEWRITER CARRIAGE
                                00030 34 00000 00102
02010      RCTY ,,,      RETURN TYPEWRITER CARRIAGE
                                00042 34 00000 00102
02020      DC 2,42,0-6      00047 00002
02030 EXIT DS ,0-7      00046 00000
02040*
02050      WATY ERMESS,,      WRITE ERROR OR ALARM MESSAGE
                                00054 L9 00291 00100
02060      BD EXIT,ERCODE-1,,      EXIT IF DIAGNOSTIC COMMENT ONLY
                                00066 M6 00046 00004
02070*
02080      TF CLEAR+6,MONITR+11      00078 K6 00108 08573
02090      TFM CNTR,NNE-2,10      00090 J6 00099 000-5
02100 CLEAR TFM ,,711,      CLEAR MONITR MAP ENTRIES
                                00102 16 00000 -000-
02110      AM CLEAR+5,2,10      00114 J1 00107 000-2
02120      SM CNTR,1,10      00126 J2 00099 000-1
02130      BNZ CLEAR      00138 M7 00102 01200
02140*
02150 RSETHI TF HI,HIDSA,,      RESET HI INDICATOR 00150 26 00434 07875
02160 SEARCH BTM DSCIN,1,610,      READ ONE AD-APT RECORD FROM INTRAM
                                00162 17 0772P 000-1
02170      C NR,RNIN      00174 24 02467 06139
02180      BNE ER203,,      BRANCH IF RECORD OUT OF SEQUENCE
                                00186 47 08292 01200
02190*
02200      AM RNIN,1,10,      INCREMENT INPUT RECORD COUNTER
                                00198 11 06139 000-1
03010      CM NRT,14,8      00210 14 02471 0-014

03020      BE FINI+12,,      BRANCH IF FINI RECORD 00222 46 08336 01200
03030*
03040 NFINI CM NRT,2,8      00234 14 02471 0-002
03050      BNE SEARCH      00246 M7 00162 01200
03060*
03070 TYPE2 CM NSRT,1,8      00258 14 02475 0-001
03080      BNE SEARCH,,      BRANCH IF NOT AN END RECORD
                                00270 M7 00162 01200
03090*
03100      B END+12      00282 49 07402 00000
03110      DORG ==4      00289
03120*
03130 ERMESS DAC 49,, SOURCE STATEMENT NO.      ... ERROR ...
                                00291 00098
03140*
03150 CNTR DS 2,CLEAR-3      00099 00002
03160 SSNF DS ,ERMESS+32*2-2      00353 00000
03170 ERNF DS ,SSNF+13*2      00379 00000
03180 NSS DS ,2463      02463 00000
03190 DSCIN DS ,7727      07727 00000
03200 NRT DS ,2471      02471 00000
04010 FINI DS ,8324      08324 00000
04020 NSRT DS ,2475      02475 00000
04030 END DS ,7390      07390 00000
04040 NR DS ,2467      02467 00000
04050 HIDSA DS ,7875      07875 00000
04060 RNIN DS ,6139      06139 00000
04070 NNE DS 2,7      00007 00002
04080 ER203 DS ,8292      08292 00000
04090 MONITR DS ,8562      08562 00000
04100 HI DS ,434      00434 00000
04110      DEND ERPROC      00006

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04150 CF INDX,100,60910          00292 L3 0019- 0-J-0
04160 AM INDX,2,10              00304 J1 00190 000-2
04170 SFLAG SF                  00316 32 00000 00000
04180 AM *-6,1,10              00328 J1 00322 000-1
04190 SLT FSL ,REG             00340 05 00000 00057
04200 SM *-6,1,10              00352 J2 00346 000-1
05010 SM REG,9,10              00364 12 00057 000-9
05020 B SHIFT+48               00376 M9 00232 00000
05030 DORG *-3                 00384
05040*
05050 TEAM TF ARG,97,,         MOVE RESULT EXPONENT 00384 26 00079 00097
05060 MM REG,5,10              00396 13 00057 000-5
05070 SF 91                     00408 32 00091 00000
05080 TF ARG-2,98,,           MOVE RESULT MANTISSA 00420 26 00077 00098
05090 TFL ARGADD,ARG,6,,      RETURN RESULT         00432 -6 0000N 00079
05100 BB ,,                    EXIT                   00444 42 00000 00000
05110 DORG *-9                 00446
05120*
05130 ANQ BS 20,79             00879 00028
05140 REG BS 9,57             00887 00009
05150 CNTR DS 2,SHIFT-3       00181 00002
05160 INDX DS ,SHIFT+6        00190 00000
05170 FLCOM DS +,CONT+23     00303 00004
05180*
05190 HEAD A                    00000
05200* IBM 1620-1311 AD-APT FLOATING SINE-COSINE SUBROUTINE
06010*
06020* THE RANGE OF THE ARGUMENT IS UNRESTRICTED
06030* CORE POSITIONS 00044-00099 USED FOR TEMP. STORAGE
06040* METHOD.. HASTINGS APPROXIMATION (8-DIGIT MANTISSA)
06050*
06060 ARGCON DC 6,0,,         LOCATION OF ADDRESS OF CALLING ARGUMENT
                                00451 00006
06070* SINF SUBROUTINE SUBPROGRAM ENTRY
06080 SINF TFL THETA,0.5PI,,    PI/2.0          00452 00 00079 00838
06090 TFL XSQ,ARGCON,11,,      MOVE ARG TO XSQ     00464 00 00067 0045J
06100 FSL XSQ-11,XSQ-2,,       FABRICATE 10-DIGIT MANTISSA
                                00476 05 00056 00065
06110 FSUB THETA,XSQ,,         THETA=PI/2.0-ARG   00488 02 00079 00067
06120 TF COSF-1,ARGCON        00500 K0 00523 00451
06130 B **36                    00512 M9 00548 00000
06140* COSF SUBROUTINE SUBPROGRAM ENTRY
06150 COSF TFL THETA,-1,11,,   MOVE ARG TO THETA  00524 00 00079 0052L
06160 FSL THETA-11,THETA-2,,  FABRICATE 10-DIGIT MANTISSA
                                00536 05 00068 00077
06170 BNF SUB2PI,THETA-2,,    BRANCH IF THETA IS POSITIVE
                                00548 M4 00584 00077
06180*
06190 ADD2PI FADD THETA,THOPI,, THETA=THETA+2.0*PI 00560 0J 00079 00874
06200 BNP ADD2PI,,           BRANCH IF THETA IS NON-POSITIVE
                                00572 M7 00560 01100
07010*
07020 SUB2PI FSUB THETA,THOPI,, THETA=THETA-2.0*PI 00584 0K 00079 00874
07030 BNN SUB2PI,,         BRANCH IF THETA IS NON-NEGATIVE
                                00596 M6 00584 01300
07040*
07050 FADD THETA,PI,,         THETA=THETA+PI     00608 0J 00079 00850
07060 SF THETA-2,,           THETA=-ABSF(THETA) 00620 32 00077 00000
07070 FADD THETA,0.5PI,,     THETA=THETA+PI/2.0 00632 0J 00079 00838
07080 FMUL X,2/PI,,         X=(2.0*ARG)/PI     00644 0L 00079 00862

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07090 TFL XSQ,X                00656 06 00067 00079
07100 FMUL XSQ,X,,           X**2             00668 03 00067 00079
07110 TFL SIGMA,XSQ,,       MOVE X**2        00680 06 00055 00067
07120 FMUL SIGMA,C9         00692 0L 00055 00934
07130 FADD SIGMA,C7         00704 0J 00055 00922
07140 FMUL SIGMA,XSQ       00716 03 00055 00067
07150 FADD SIGMA,C5         00728 0J 00055 00910
07160 FMUL SIGMA,XSQ       00740 03 00055 00067
07170 FADD SIGMA,C3         00752 0J 00055 00898
07180 FMUL SIGMA,XSQ       00764 03 00055 00067
07190 FADD SIGMA,C1         00776 0J 00055 00886
07200 FMUL SIGMA,X,,       SUMMATION (I=0,N) 00788 03 00055 00079
08010 SRT FSR SIGMA-2,SIGMA-4,, SHIFT TO 8-DIGIT MANTISSA
                                00800 08 00053 00051
08020 TFL COSF-1,SIGMA,6,,   RETURN RESULT      00812 -6 0052L 00055
08030 EXIT BB ,,           EXIT                 00824 42 00000 00000
08040 DORG *-8               00827
08050*
08060 THETA DS 12,79          00079 00012
08070 X DS ,THETA            00079 00000
08080 XSQ DS 12,67           00067 00012
08090 SIGMA DS 12,55         00055 00012
08100 DC 10,1570796327      00836 00010
08110 0.5PI DC 2,1          00838 00002
08120 DC 10,3141592637     00848 00010
08130 PI DC 2,1             00850 00002
08140 DC 10,6366197757     00860 00010
08150 2/PI DC 2,0           00862 00002
08160 DC 10,6283185274     00872 00010
08170 THOPI DC 2,1          00874 00002
08180 DC 10,-1570796318    00884 00010
08190 C1 DC 2,1             00886 00002
08200 DC 10,6459637111     00896 00010
09010 C3 DC 2,0             00898 00002
09020 DC 10,-7968967928    00908 00010
09030 C5 DC 2,-1            00910 00002
09040 DC 10,4673765570     00920 00010
09050 C7 DC 2,-2            00922 00002
09060 DC 10,-1514841900    00932 00010
09070 C9 DC 2,-3            00934 00002
09080*
09090 HEAD B                    00000
09100* IBM 1620-1311 AD-APT FLOATING INVERSE TANGENT SUBROUTINE
09110*
09120* THE RANGE OF THE ARGUMENTS IS UNRESTRICTED
09130* CORE POSITIONS 00020-00099 USED FOR TEMP. STORAGE
09140* METHOD.. HASTINGS APPROXIMATION (8-DIGIT MANTISSA)
09150*
09160 ADDCON DC 15,0          00949 00015
09170 XADDR DS %,ADDCON-10,,  ADDRESS OF X-COMPONENT OF VECTOR
                                00939 00005
09180 YADDR DS %,ADDCON-9,,  ADDRESS OF Y-COMPONENT OF VECTOR
                                00944 00005
09190 THETA DS %,           ADDRESS OF RESULT     00949 00005
09200*
10010* ATAMP SUBROUTINE SUBPROGRAM ENTRY
10020 ATAMP TFL X,XADDR,11,,  MOVE X             00950 00 00079 0093R
10030 TFL Y,YADDR,11,,      MOVE Y             00962 00 00067 0094M
10040 TFL ARTR,Y,,         MOVE DIVIDEND     00974 06 00055 00067
10050 FDIV ARTR,X,,        ARTR=Y/X          00986 09 00055 00079

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10060	CF	ARTR-2,,,	ARTR=ABS(ARTR)	00998 33 00033 00000
10070	OV	ZEROX,,,	BRANCH IF X IS ZERO	01010 M6 01356 01400
10080				
10090	NZEROX	BNF POSX,X-2,,	BRANCH IF X IS POSITIVE	01022 M4 01428 00077
10100				
10110	NEGX	TFL OMEGA,PI,,	OMEGA=PI	01034 00 00043 01602
10120	BZ	SRT,,,	BRANCH IF Y IS ZERO	01046 M6 01330 01200
10130				
10140	BN	POS1,,,	BRANCH IF Y IS POSITIVE	01058 M7 01476 01300
10150				
10160	MEGY1	TDM SRT-11,1		01070 J5 01319 00001
10170	FSL	ARTR-11,ARTR-2,,	FABRICATE 10-DIGIT MANTISSA	01082 05 00044 00055
10180	ARCTAN	TFL XPLUS1,ARTR		01094 06 00031 00055
10190	FSUB	XMIN1,ONE,,	X-1.0	01106 0K 00055 01626
10200	FADD	XPLUS1,ONE,,	X+1.0	01118 0J 00031 01626
11010	FDTV	QUO,XPLUS1,,	(X-1.0)/(X+1.0)	01130 09 00055 00031
11020	TD	S+13,SRT-11		01142 KN 01195 01319
11030	FADD	OMEGA,0.25PI,,	OMEGA=OMEGA (*,-) PI/4.0	01154 0J 00043 01670
11040	TFL	SIGMA,QUO		01166 06 00067 00055
11050	FMUL	SIGMA,QUO		01178 03 00067 00055
11060	TFL	QUOSQ,SIGMA,,	((X-1.0)/(X+1.0))**2 = Z**2	01190 06 00079 00067
11070	FMUL	SIGMA,C15,,	C(15)=Z**2	01202 0L 00067 01590
11080	TFM	TERM+11,C13		01214 J0 01269 -1578
11090	TFM	CNTR,7,10		01226 J6 01021 000-7
11100	B	TERM		01238 M9 01298 00000
11110	DORG	**3		01246
11120				
11130	FMUL	SIGMA,QUOSQ		01246 03 00067 00079
11140	TEAM	FADD SIGMA		01258 01 00067 00000
11150	SM	**1,12,10		01270 J2 01269 000J2
11160	SM	CNTR,1,10		01282 J2 01021 000-1
11170	BNZ	TERM-12		01294 M7 01246 01200
11180				
11190	FMUL	SIGMA,QUO,,	SUMMATION (I=0,7)	01306 03 00067 00055
11200	FADD	OMEGA,SIGMA,,	OMEGA=OMEGA (*,-) SIGMA	01318 01 00043 00067
12010	SRT	FSR OMEGA-2,OMEGA-4,,	SHIFT TO 8-DIGIT MANTISSA	01330 08 00041 00039
12020	TFL	THETA,OMEGA,6,	RETURN RESULT	01342 -6 0094R 00043
12030	BB	...	EXIT	01354 42 00000 00000
12040	DORG	**9		01356
12050				
12060	ZEROX	BD NZEROY,Y-9,,	BRANCH IF Y IS NON-ZERO	01356 M3 01388 00058
12070				
12080	ZEROY	TFL OMEGA,ZRO,,	SET RESULT TO 0.0	01368 00 00043 01614
12090	B	SRT		01380 M9 01330 00000
12100	DORG	**3		01388
12110				
12120	NZEROY	BNF POSY2,Y-2,,	BRANCH IF Y IS POSITIVE	01388 M4 01414 00065
12130				
12140	MEGY2	TFL THETA,1.5PI,6,	SET RESULT TO 3.0*PI/2.0	01400 -0 0094R 01636
12150	BB	...	EXIT	01412 42 00000 00000

12160	DORG	**9		01414
12170				
12180	POSY2	TFL THETA,0.5PI,6,	SET RESULT TO PI/2.0	01414 -0 0094R 01646
12190	BB	...	EXIT	01426 42 00000 00000
12200	DORG	**9		01428
13010				
13020	POSX	TFL OMEGA,ZRO,,	SET RESULT TO 0.0	01428 00 00043 01614
13030	BZ	SRT,,,	RETURN IF Y IS ZERO	01440 M6 01330 01200
13040				
13050	BP	ARCTAN-24,,,	BRANCH IF Y IS POSITIVE	01452 M6 01070 01100
13060				
13070	MEGY3	TFL OMEGA,2.0PI,,	SET RESULT TO 2.0*PI	01464 00 00043 01658
13080	POSY1	TDM SRT-11,2		01476 J5 01319 00002
13090	B	ARCTAN-12		01488 M9 01082 00000
13100	DORG	**4		01495
13110				
13120	DC	10,9999993329		01504 00010
13130	C1	DC 2,0		01506 00002
13140	DC	10,-3332985605		01516 00010
13150	C3	DC 2,0		01518 00002
13160	DC	10,1994653599		01528 00010
13170	C5	DC 2,0		01530 00002
13180	DC	10,-1390853351		01540 00010
13190	C7	DC 2,0		01542 00002
13200	DC	10,9642004410		01552 00010
14010	C9	DC 2,-1		01554 00002
14020	DC	10,-5590988610		01564 00010
14030	C11	DC 2,-1		01566 00002
14040	DC	10,2186122880		01576 00010
14050	C13	DC 2,-1		01578 00002
14060	DC	10,-4054058000		01588 00010
14070	C15	DC 2,-2		01590 00002
14080	DC	10,3141592637		01600 00010
14090	PI	DC 2,1		01602 00002
14100	DC	10,0		01612 00010
14110	ZRO	DC 2,-99		01614 00002
14120	DC	10,10000000000		01624 00010
14130	ONE	DC 2,1		01626 00002
14140	DC	0,47123890		01634 00008
14150	1.5PI	DC 2,1		01636 00002
14160	DC	0,15707963		01644 00008
14170	0.5PI	DC 2,1		01646 00002
14180	DC	10,6283185274		01656 00010
14190	2.0PI	DC 2,1		01658 00002
14200	DC	10,7853981684		01668 00010
15010	0.25PI	DC 2,0		01670 00002
15020				
15030	X	DS 12,79		00079 00012
15040	Y	DS 12,67		00087 00012
15050	ARTR	DS 12,55		00095 00012
15060	OMEGA	DS 12,43		00043 00012
15070	SIGMA	DS ,Y		00067 00000
15080	XPLUS1	DS 12,31		00031 00012
15090	XMIN1	DS ,ARTR		00055 00000
15100	QUO	DS ,XMIN1		00079 00000
15110	QUOSQ	DS ,X		00079 00000
15120	CNTR	DS 2,NZEROX-1		01021 00002
15130				
15140	HEAD C			00000

15150* IBM 1620-1311 AD-APT FLOATING EXPONENTIAL SUBROUTINE
 15160*
 15170* THE RANGE OF THE ARGUMENT IS UNRESTRICTED
 15180* CORE POSITIONS 00056-00099 USED FOR TEMP. STORAGE
 15190* METHOD.. HASTINGS APPROXIMATION (8-DIGIT MANTISSA)
 15200*

16010 ARGMNT DC 5,0,, LOCATION OF ADDRESS OF CALLING ARGUMENT
 01675 00005

16020* EXPF SUBROUTINE SUBPROGRAM ENTRY
 16030 EXPF TFL ARG,ARGMNT,11, MOVE ARGUMENT 01676 00 00079 0167N
 16040 FSL ARG-11,ARG-2,, FABRICATE 10-DIGIT MANTISSA
 01688 05 00068 00077
 16050 FMUL ARG,LOG10E,, ARG/ILN 10.01 01700 0L 00079 02437
 16060 BNF POSX,ARG-2,, BRANCH IF ARGUMENT IS POSITIVE
 01712 M4 01840 00077

16070*
 16080 NEGX TDM BRNOP+1,9 01724 J5 01969 00009
 16090 CF ARG-2,, ARG=ABSFIARG 01736 33 00077 00000
 16100 CM ARG,,10 01748 14 00079 000-0
 16110 TFM EXP,,10, CLEAR EXPONENT MODIFIER
 01760 J6 01943 000-0
 16120 BH ARGMOD,, BRANCH IF EXPONENT EXCEEDS 00
 01772 M6 02038 01100

16130*
 16140 TFL Z,ARG,, Z=ARG 01784 06 00067 00079
 16150 FMUL Z,A7,, Z=A(7) 01796 0L 00067 02405
 16160 TFM TERM+11,A6 01808 J0 01883 -2393
 16170 TFM CNTR,7,10 01820 J6 02203 000-7
 16180 B TERM 01832 M9 01872 00000
 16190 DORG +-3 01840

16200*
 17010 POSX TDM BRNOP+1,1,11 01840 J5 01969 0000J
 17020 B NEGX+24 01852 M9 01748 00000
 17030 DORG +-3 01860

17040*
 17050 FMUL Z,ARG 01860 03 00067 00079
 17060 TERM FADD Z 01872 01 00067 00000
 17070 SM +-1,12,10 01884 J2 01883 000J2
 17080 SM CNTR,1,10 01896 J2 02203 000-1
 17090 BNZ TERM-12 01908 M7 01860 01200

17100*
 17110 FMUL Z,Z 01920 03 00067 00067
 17120 AM Z,, E**ARG 01932 11 00067 -0000
 17130 BV OVFLD,, BRANCH IF RESULT OUT OF RANGE
 01944 M6 02270 01400

17140*
 17150 TFL ARG,Z 01956 06 00079 00067
 17160 BRNOP NOP EXIT+2,, BRANCH IF ARGUMENT WAS NEGATIVE
 01968 M1 02006 00000

17170 FSR ARG-2,ARG-4,, SHIFT TO 8-DIGIT MANTISSA
 01980 08 00077 00075

17180 TFL ARGMNT,ARG,6, RETURN RESULT 01992 -6 0167N 00079
 17190 EXIT BB ,, EXIT 02004 42 00000 00000
 17200 DORG +-9 02006

18010*
 18020 TFL ARG,1,0 02006 00 00079 02321
 18030 FDIV ARG,Z,, E**(-ARG) 02018 09 00079 00067
 18040 B EXIT-24 02030 M9 01980 00000
 18050 DORG +-3 02038
 18060*

18070 ARGMOD CM ARG,2,10 02038 14 00079 000-2
 18080 BH OVFLD,, BRANCH IF ARGUMENT OUT OF RANGE
 02050 M6 02270 01100

18090*
 18100 BE EXP02,, BRANCH IF EXPONENT IS 02
 02062 M6 02238 01200

18110*
 18120 EXP01 TD EXP,ARG-11 02074 K5 01943 00068
 18130 CF EXP 02086 L3 01943 00000
 18140 FSL ARG-12,ARG-2,, ELIMINATE INTEGER PORTION OF MANTISSA
 02098 05 00067 00077
 18150 SF ARG-11 02110 32 00068 00000
 18160 TFM ARG,,10, ASSUME NO LEADING ZEROS IN DECIMAL
 02122 16 00079 000-0
 02134 J6 02203 000-8

18170 TFM CNTR,8,10
 18180 NORM BD NEGX+60,ARG-11,, BRANCH IF NON-ZERO DIGIT
 02146 M3 01784 00068

18190*
 18200 SF ARG-10 02158 32 00069 00000
 19010 FSL ARG-11,ARG-2 02170 05 00068 00077
 19020 SM ARG,1,10, DECREMENT EXPONENT 02182 12 00079 000-1
 19030 SM CNTR,1,10 02194 J2 02203 000-1
 19040 BNZ NORM 02206 M7 02146 01200

19050*
 19060 TFL Z,1,0,, ARGUMENT IS AN INTEGER
 02218 00 00067 02321
 02230 M9 01932 00000
 02238

19070 B TERM+60
 19080 DORG +-3
 19090*
 19100 EXP02 TFL EXP,ARG-10 02238 K6 01943 00069
 19110 FSL ARG-13,ARG-2,, ELIMINATE INTEGER PORTION OF MANTISSA
 02250 05 00066 00077
 02262 M9 02110 00000
 02270

19120 B EXP01+36
 19130 DORG +-3
 19140*
 19150 OVFLD BNF UNFLO,BRNOP+1 02270 M4 02296 01969
 19160 TFL ARGMNT,FLINFN,6 EXIT 02282 -0 0167N 02425
 19170 BB ,, EXIT 02294 42 00000 00000
 19180 DORG +-9 02296

19190*
 19200 UNFLO TFL ARGMNT,0,0,6 EXIT 02296 -0 0167N 02415
 20010 BB ,, EXIT 02308 42 00000 00000
 20020 DORG +-9 02310

20030*
 20040 DC 10,1000000000 02319 00010
 20050 A0 DC 2,1 02321 00002
 20060 DC 10,1151292776 02331 00010
 20070 A1 DC 2,1 02333 00002
 20080 DC 10,6627308043 02343 00010
 20090 A2 DC 2,0 02345 00002
 20100 DC 10,2543935748 02355 00010
 20110 A3 DC 2,0 02357 00002
 20120 DC 10,7295173666 02367 00010
 20130 A4 DC 2,-1 02369 00002
 20140 DC 10,1742111980 02379 00010
 20150 A5 DC 2,-1 02381 00002
 20160 DC 10,2554917960 02391 00010
 20170 A6 DC 2,-2 02393 00002
 20180 DC 10,9326426700 02403 00010
 20190 A7 DC 2,-3 02405 00002

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20200 DC 8,0 02413 00008
21010 0.0 DC 2,-99 02415 00002
21020 DC 8,99999999 02423 00008
21030 FLINFN DC 2,99 02425 00002
21040 DC 10,4342944819 02435 00010
21050 LOG10E DC 2,0 02437 00002
21060*
21070 1.0 DS ,A0 02321 00000
21080 ARG DS 14,79 00079 00014
21090 EXP DS 2,TERM+71 01943 00002
21100 Z DS 12,67 00067 00012
21110 CNTR DS 2,NORM+57 02203 00002
21120*
21130 HEAD D 00000
21140* IBM 1620-1311 AD-APT FLOATING NAT. LOGARITHM SUBROUTINE
21150*
21160* IT IS ASSUMED THAT THE ARGUMENT IS NON-NEGATIVE
21170* CORE POSITIONS 00044-00099 USED FOR TEMP. STORAGE
21180* METHOD... TRUNCATED INF. SERIES (8-DIGIT MANTISSA)
21190*
22000 ARGUMT DC 8,0,, LOCATION OF ADDRESS OF CALLING ARGUMENT
22010* LOGF SUBROUTINE SUBPROGRAM ENTRY 02443 00006
22020 LOGF TFL ARG,ARGUMT,11, MOVE ARGUMENT 02444 00 00079 0244L
22030 TFM ARG,,10, REDUCE RANGE OF ARGUMENT
22040 BD NZARG,ARG-9,, BRANCH IF ARGUMENT IS NON-ZERO 02456 16 00079 000-0
02468 M3 02494 00070
22050*
22060 LOGO.0 TFL ARGUMT,LOGO,6, SET RESULT TO - INFINITY 02480 -0 0244L 02913
22070 BB ,,, EXIT 02492 42 00000 00000
22080 DORG --9 02494
22090*
22100 NZARG FSL ARG-11,ARG-2,, FABRICATE 10-DIGIT MANTISSA
02494 05 00068 00077
22110 TFM LOGX+11,LOG1 02506 J0 02785 -2925
22120 CM ARG-10,50,10 02518 14 00069 00000
22130 BNL ++44,,, BRANCH IF LEADING DIGIT EXCEEDS 4 02530 M6 02574 01300
22140*
22150 A ARG-2,ARG-2,, DOUBLE REDUCED ARGUMENT
02542 21 00077 00077
22160 AM LOGX+11,12,10 02554 J1 02785 000J2
22170 B NZARG+24 02566 M9 02518 00000
22180 DORG --3 02574
22190*
22200 TFL XMIN1,ARG 02574 06 00067 00079
23010 FSUB XMIN1,1,0,, X-1.0 02586 0K 00067 02985
23020 FADD XPLONE,1,0,, X+1.0 02598 0J 00079 02985
23030 FDIV XMIN1,XPLONE,, (X-1.0)/(X+1.0) 02610 09 00067 00079
23040 TFL ZSQ,Z 02622 06 00079 00067
23050 FMUL ZSQ,Z,, Z**2 02634 03 00079 00067
23060 TFL SIGMA,ZSQ 02646 06 00055 00079
23070 FMUL SIGMA,C13,, C(13)=Z**2 02658 0L 00055 03069
23080 TFM TERM+11,C11 02670 J0 02725 -3057
23090 TFM CNTR,6,10 02682 J6 02735 000-6
23100 B TERM 02694 M9 02714 00000
23110 DORG --3 02702
23120*

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23130 FMUL SIGMA,ZSQ 02702 03 00055 00079
23140 TERM FADD SIGMA 02714 01 00055 00000
23150 SM --1,12,10 02726 J2 02725 000J2
23160 SM CNTR,1,10 02738 J2 02735 000-1
23170 BNZ TERM-12 02750 M7 02702 01200
23180*
23190 FMUL SIGMA,Z,, LOG(N=X), N=1,2,4,8 02762 03 00055 00067
23200 LOGX FSUB SIGMA,,, LOG(X)=LOG(N*X)-LOG(N) 02774 02 00055 00000
24010 TDM LOGAX+1,1,, ASSUME POSITIVE EXPONENT 02786 J5 02859 00001
24020 BNF LOGAX-24,EXP,11, BRANCH IF EXPONENT IS POSITIVE 02798 MM 02834 0244L
24030*
24040 CF EXP,,6 02810 L3 0244L 00000
24050 TDM LOGAX+1,2 02822 J5 02859 00002
24060 SM EXP,1,610 02834 J2 0244L 000-1
24070 BN SRT 02846 M7 02878 01300
24080*
24090 LOGAX FADD SIGMA,LOG10,, LOG(ARG) 02858 0J 00055 02973
24100 B --36 02870 M9 02834 00000
24110 DORG --3 02878
24120*
24130 SRT FSR SIGMA-2,SIGMA-4,, SHIFT TO 8-DIGIT MANTISSA 02878 08 00053 00051
02890 -6 0244L 00055
24140 TFL ARGUMT,SIGMA,6, RETURN RESULT 02902 42 00000 00000
24150 BB ,,, EXIT 02904
24160 DORG --9
24170*
24180 DC 8,-99999999 02911 00008
24190 LOG0 DC 2,99 02913 00002
24200 DC 10,0 02923 00010
25010 LOG1 DC 2,-99 02925 00002
25020 DC 10,6931471805 02935 00010
25030 LOG2 DC 2,0 02937 00002
25040 DC 10,1386294361 02947 00010
25050 LOG4 DC 2,1 02949 00002
25060 DC 10,2079441542 02959 00010
25070 LOG8 DC 2,1 02961 00002
25080 DC 10,2302585093 02971 00010
25090 LOG10 DC 2,1 02973 00002
25100 DC 10,1000000000 02983 00010
25110 1.0 DC 2,1 02985 00002
25120 DC 10,2000000000 02995 00010
25130 C1 DC 2,1 02997 00002
25140 DC 10,866666666666 03007 00010
25150 C3 DC 2,0 03009 00002
25160 DC 10,40000000000 03019 00010
25170 C5 DC 2,0 03021 00002
25180 DC 10,2857142857 03031 00010
25190 C7 DC 2,0 03033 00002
25200 DC 1,2222222222 03043 00010
26010 C9 DC 2,0 03045 00002
26020 DC 10,1818181818 03055 00010
26030 C11 DC 2,0 03057 00002
26040 DC 10,1538461538 03067 00010
26050 C13 DC 2,0 03069 00002
26060*
26070 ARG DS 12,79 00079 00012
26080 EXP DS 2,ARGUMT 02443 00002

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03020      BTM MONITR,02360,67, CALL DSCOUT SUBPROGRAM VIA MONITR
                                           11950 17 02400 -2360
03030      BTM DSCOUT,0,12,67, WRITE ONE AD-APT RECORD... BRANCH BACK
                                           11970 17 02410 J1982
03040      TFM KUT2,,10, SET CUTTING MODE INDICATORS AT DS AND CS
                                           11982 16 06149 000-0
03050      B RETURN,,6, RETURN TO MONITR
03060      DORG --3
03070*
03080 TRACUT BTM MONITR,02520,67, CALL STRACT SUBPROGRAM VIA MONITR
                                           12002 17 02400 -2520
03090      BT STRACT,DSA1+10,6, TRACUT GO TO POINT
03100      B FIX+24
03110      DORG --4
03120*
03130 IOGDM DC 4,8 12030 00004
03140 DC 4,8 12040 00004
03150 OC 3,1' 12043 00003
03160*
03170 KUT1 DS ,6148 06148 00000
03180 KUT2 DS ,KUT1+1 06149 00000
03190 NSRT DS ,2475 02475 00000
03200 RETURN DS ,2411 02411 00000
04010 DSSW DS ,6158 06158 00000
04020 FLW DS ,2488 02488 00000
04030 XO DS ,5892 05892 00000
04040 NPW DS ,2455 02455 00000
04050 NRT DS ,2471 02471 00000
04060 MONITR DS ,2406 02406 00000
04070 DSCOUT DS ,2416 02416 00000
04080 TRCTSW DS ,6153 06153 00000
04090 STRACT DS ,2416 02416 00000
04100 DEND SCUT 11796

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SYMBOL TABLE

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TRCTSW 06153 TRACUT 11952 STRACT 02416 RETURN 02411 MONITR 02406
ERPROC 02416 DSCOUT 02416 DSA1 11885 DSSW 06158 ER208 11896
ER209 11932 FLW 02488 FRMSW 06151 MOVE 11832 SFROM 11796
WERM 11920 XO 05892

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01010*      IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
01020*      A FROM RECORD
01030*      RCS
01040*      *NAME SFROM... NON-ERASABLE ARELEM SUBPROGRAM
01050*      *ID NUMBER 0220+DELDIM
01060*      *STORE CORE IMAGE
01070*      LINKAGE - B SFROM
01080*
01090      DORG 11796 SUBPROGRAM ENTRY 11796
01100*
01110 SFROM BMR ER208,DSSW,, BRANCH IF REVIEW MODE PREVAILS
                                           11796 45 11896 06158
01120*
01130      BD ER209,FRMSW,, BRANCH IF FROM STATEMENT IS REDUNDANT
                                           11808 43 11932 06151
01140*
01150      TDM FRMSW,1,11, SET SWITCH INDICATING FROM STATEMENT
                                           11820 15 06151 0000J
01160 MOVE TR XO-9,FLW+0+10-9,, STORE FROM POINT COORDINATES
                                           11832 31 05883 02479
01170      BMR TRACUT,TRCTSW,, BRANCH IF TRACUT MODE PREVAILS
                                           11844 45 11952 06153
01180*
01190      BTM MONITR,02360,67, CALL DSCOUT SUBPROGRAM VIA MONITR
                                           11856 17 02400 -2360
01200      BTM DSCOUT,RETURN,6711, WRITE ONE AD-APT RECORD... RETURN
                                           11868 17 02410 -241J
02010      DORG ++5-3-11+1 11884
02020      NOP FLW+1+10,FLW+2+10 11884 41 02498 02508
02030      DORG --14 11881
02040 DSA1 DSA FLW+0+10 11885 00005 -2488
02050      DORG ++5-3-4 11896
02060*
02070 ER208 TFM WERM+9,208,9 11896 16 11929 00K08
02080      BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
                                           11908 17 02400 -2250
02090 WERM BTM ERPROC,0,67, WRITE ERROR MESSAGE... SEARCH FOR END
                                           11920 17 02410 -0000
02100 ER209 TFM WERM+9,209,9 11932 16 11929 00K09
02110      B ER208+12 11944 49 11908 00000
02120      DORG --3 11952
02130*
02140 TRACUT BTM MONITR,02520,67, CALL STRACT SUBPROGRAM VIA MONITR
                                           11952 17 02400 -2520
02150      BT STRACT,DSA1+10,6, TRACUT FROM POINT
02160      DSC 2,49 11964 27 02410 11895
02170      DSA MOVE+24 11976 00002
02180*
02190 DSSW DS ,6158 06158 00000
02200 FRMSW DS ,6151 06151 00000
03010 XO DS ,5892 05892 00000

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03020	FLW	DS	,2488	02488	00000
03030	MONITR	DS	,2406	02406	00000
03040	DSCOUT	DS	,2416	02416	00000
03050	RETURN	DS	,2411	02411	00000
03060	ERPROC	DS	,2416	02416	00000
03070	STRACT	DS	,2416	02416	00000
03080	TACTSM	DS	,6153	06153	00000
03090	DEND	SFROM		11796	

SYMBOL TABLE

SINDRP	00000R	MONITR	02406	ERPROC	02416	DY=0.0	00092R	DX=0.0	00104R
DFREAD	06302	DSSW	06158	ER208	00112R	ER210	00148R	FLW	02488
FRMSW	06151	PDVSW	06152	STORE	00060R	WERM	00136R	XCOMP	00024R
XI	05923	XO	05892	YO	05902				

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01010*      IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
01020*      AN INDIRP RECORD
01030*
01040*      *NAME SINDRP... ERASABLE ARELEP SUBPROGRAM
01050*      *ID NUMBER 0229+DELDIM
01060*      *ASSEMBLE RELOCATABLE
01070*      *STORE RELOADABLE
01080*      LINKAGE - B SINDRP
01090*
01100*      SUBPROGRAM ENTRY
01110 SINDRP BMR ER208,DSSW,, BRANCH IF REVIEW MODE PREVAILS
                                00000 M5 00112 06158
01120*
01130      BNF ER210,FRMSW,, BRANCH IF NO PREVIOUS FROM STATEMENT
                                00012 M4 00148 06151
01140*
01150 XCOMP FSUB FLW+0*10,XO,, X-COMPONENT OF DIRECTION VECTOR
                                00024 02 02488 05892
01160      FSUB FLW+1*10,YO,, Y-COMPONENT OF DIRECTION VECTOR
                                00036 02 02498 05902
01170      BZ DY=0.0,,, BRANCH IF Y-COMPONENT IS ZERO
                                00048 M6 00092 01200
01180*
01190 STORE TR XI-9,FLW+0*10-9,, STORE X-Y COMPONENTS OF VECTOR
                                00060 31 05914 02479
01200      TDM PDVSW,1,11,, SET AIMING DIRECTION INDICATOR
                                00072 15 06152 0000J
                                00084 49 06302 00000
                                00092
02010      B DFREAD
02020      DORG *-3
02030*
02040 DY=0.0 BD STORE,FLW+0*10-9,, BRANCH IF X-COMPONENT IS NON-ZERO
                                00092 M3 00060 02479
02050*
02060 DX=0.0 B DFREAD
                                00104 49 06302 00000
02070      DORG *-3
                                00112
02080*
02090 ER208 TFM WERM+9,208,9
02100      BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
                                00124 17 02400 -2250
02110 WERM BTM ERPROC,1,67, WRITE ERROR MESSAGE... SEARCH FOR END
                                00136 17 02410 -0001
                                00148 J6 00145 00R10
                                00160 00002
                                00166 00005 -0124
02120 ER210 TFM WERM+9,210,9
02130      OSC 2,49
02140      DSA ER208+12
02150*
02160 DSSW DS ,6158
                                06158 00000
02170 FRMSW DS ,6151
                                06151 00000
02180 FLW DS ,2488
                                02488 00000
02190 XO DS ,5892
                                05892 00000
02200 YO DS ,XO+10
                                05902 00000
03010 XI DS ,5923
                                05923 00000

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03020 DFREAD DS ,6302
 03030 MONITR DS ,2406
 03040 ERPROC DS ,2416
 03050 PDVSW DS ,6152
 03060 DEND SINDRP

06302 00000
 02406 00000
 02416 00000
 06152 00000
 00000

SYMBOL TABLE

SINDRV 00000R MONITR 02406 ERPROC 02416 DFREAD 06302 DSSW 06158
 ER208 00076R FLW 02488 NXCMP 00024R NYCMP 00036R PDVSW 06152
 XCMP 00044R XI 05923 YCMP 00044R

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
 01020* AN INDIRV RECORD
 01030* RCS
 01040* *NAME SINDRV... ERASABLE ARELEM SUBPROGRAM
 01050* *ID NUMBER 0230+DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - B SINDRV
 01090*
 01100* SUBPROGRAM ENTRY
 01110 SINDRV BNR ER208,DSSW,, BRANCH IF REVIEW MODE PREVAILS
 00000 M5 00076 06158
 01120*
 01130 BD XCMP,FLW*0*10-9,, BRANCH IF X-COMPONENT IS NON-ZERO
 00012 M3 00044 02479
 01140*
 01150 NXCMP BD YCMP,FLW*1*10-9,, BRANCH IF Y-COMPONENT IS NON-ZERO
 00024 M3 00044 02489
 01160*
 01170 NYCMP B DFREAD 00036 49 06302 00000
 01180 DORG *-3 00044
 01190*
 01200 XCMP TR XI-9,FLW*0*10-9,, STORE X-Y-Z COMPONENTS OF VECTOR
 00044 31 05914 02479
 02010 TDM PDVSW,1,11, SET AIMING DIRECTION INDICATOR
 00056 15 06152 0000J
 02020 B DFREAD 00068 49 06302 00000
 02030 DORG *-3 00076
 02040*
 02050 ER208 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
 00076 17 02400 -2250
 02060 BTM ERPROC,20802,67, WRITE ERROR MESSAGE... SEARCH FOR END
 00088 17 02410 K0802
 02070*
 02080 DSSW DS ,6158 06158 00000
 02090 FLW DS ,2488 02488 00000
 02100 YCMP DS ,XCMP 00044 00000
 02110 DFREAD DS ,6302 06302 00000
 02120 XI DS ,5923 05923 00000
 02130 MONITR DS ,2406 02406 00000
 02140 ERPROC DS ,2416 02416 00000
 02150 PDVSW DS ,6152 06152 00000
 02160 DEND SINDRV 00000

SYMBOL TABLE

TRCTSW 06153	TRACUT 12004	SUPPRS 11868	STRACT 02416	SGDLTA 11796
RETURN 02411	MONITR 02406	ERPROC 02416	DSCOUT 02416	CTMOD 11832
DELX 11900	DELY 11900	DSA1 12183	DSA2 12199	DSSW 06158
ER208 11968	ER210 12210	FLW 02488	FRMSW 06151	KUT1 06148
NDELX 11880	NDELY 11892	PDVSW 06152	WERM 11992	XI 05923
XO 05892	YJ 05933	YO 05902	ZK 05943	ZO 05912

01010*	IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING			
01020*	A GODLTA RECORD			
01030*				RCS
01040*	*NAME SGDLTA... NON-ERASABLE ARELEM SUBPROGRAM			
01050*	*ID NUMBER 0231+DELDIM			
01060*	*STORE CORE IMAGE			
01070*	LINKAGE - B SGDLTA			
01080*				
01090	DORG 11796			11796
01100*		SUBPROGRAM ENTRY		
01110	SGDLTA BNR ER208,DSSW,,	BRANCH IF REVIEW MODE PREVAILS		
				11796 45 11968 06158
01120*				
01130	BNF ER210,FRMSW,,	BRANCH IF NO PREVIOUS FROM STATEMENT		
				11808 44 12210 06151
01140*				
01150	BD SUPPRS,KUT1,,	BRANCH IF DNTCUT MODE PREVAILS		
				11820 43 11868 06148
01160*				
01170	CTMOD BNR TRACUT,TRCTSW,,	BRANCH IF TRACUT MODE PREVAILS		
				11832 45 12004 06153
01180*				
01190	BTM MONITR,02360,67,	CALL DSCOUT SUBPROGRAM VIA MONITR		
				11844 17 02400 -2360
01200	BTM DSCOUT,++12,67,	WRITE ONE AD-APT RECORD... BRANCH BACK		
				11856 17 02410 J1868
02010	SUPPRS BD DELX,FLW+0*10-9,,	BRANCH IF DELTA X IS NON-ZERO		
				11868 43 11900 02479
02020*				
02030	NDELX BD DELY,FLW+1*10-9,,	BRANCH IF DELTA Y IS NON-ZERO		
				11880 43 11900 02489
02040*				
02050	NDELY B RETURN,,6,	RETURN TO MONITR		
02060	DORG --3			11892 49 0241J 00000
02070*				11900
02080	DELX TR XI-9,FLW+0*10-9,,	STORE X-Y-Z COMPONENTS OF VECTOR		
				11900 31 05914 02479
02090	TDM PDVSW,1,11,	SET AIMING DIRECTION INDICATOR		
				11912 15 06152 0000J
02100	FADD XO,XI,,	XO=XO+XI		11924 01 05892 05923
02110	FADD YO,YJ,,	YO=YO+YJ		11936 01 05902 05933
02120	FADD ZO,ZK,,	ZO=ZO+ZK		11948 01 05912 05943
02130	B RETURN,,6,	RETURN TO MONITR		11960 49 0241J 00000
02140*	DORG --3			11968
02150*				
02160	ER208 TFM WERM+9,208,9			11968 16 12001 00K08
02170	BTM MONITR,02250,67,	CALL ERPROC SUBPROGRAM VIA MONITR		
				11980 17 02400 -2250
02180	WERM BTM ERPROC,3,67,	WRITE ERROR MESSAGE... SEARCH FOR END		

02190	TRACUT TR FLW+3*10+1-9,FLW+0*10-9,,	SAVE DELTA VALUES		11992 17 02410 -0003
02200	FADD FLW+0*10,XO,,	XI=XO+DELTA X		12004 31 02510 02479
03010	FADD FLW+1*10,YO,,	YI=YO+DELTA Y		12016 01 02488 05892
03020	FADD FLW+2*10,ZO,,	ZI=ZO+DELTA Z		12028 01 02498 05902
03030	BTM MONITR,02520,67,	CALL STRACT SUBPROGRAM VIA MONITR		12040 01 02508 05912
				12052 17 02400 -2520
03040	BT STRACT,DSA1+10,6,	TRACUT POINT P1		12064 27 02410 12193
03050	TR FLW+6*10+2-9,XO-9			12076 31 02541 05883
03060	BT STRACT,DSA2+10,6,	TRACUT POINT P0		12088 27 02410 12209
03070	FSUB FLW+0*10,FLW+6*10+2,,	DELTA X		12100 02 02488 02550
03080	FSUB FLW+1*10,FLW+7*10+2,,	DELTA Y		12112 02 02498 02560
03090	FSUB FLW+2*10,FLW+8*10+2,,	DELTA Z		12124 02 02508 02570
03100	BTM MONITR,02360,67,	CALL DSCOUT SUBPROGRAM VIA MONITR		
				12136 17 02400 -2360
03110	BTM DSCOUT,++12,67,	WRITE ONE AD-APT RECORD... BRANCH BACK		
				12148 17 02410 J2160
03120	TR FLW+0*10-9,FLW+3*10+1-9,,	RESTORE DELTA VALUES		
				12160 31 02479 02510
03130	B SUPPRS			12172 49 11868 00000
-3140	DORG --4+5*3-11-2			12181
03150	NOP FLW+1*10,FLW+2*10			12182 41 02498 02508
03160	DORG --14			12179
03170	DSA1 DSA FLW+0*10			12183 00005 -2488
03180	DORG --5+3-4+5*3-11			12198
03190	NOP FLW+7*10+2,FLW+8*10+2			12198 41 02560 02570
03200	DORG --14			12195
04010	DSA2 DSA FLW+6*10+2			12199 00005 -2550
04020	DORG --5+3-4			12210
04030*				
04040	ER210 TFM WERM+9,210,9			12210 16 12001 00K10
04050	DSC 2,49			12222 00002
04060	DSA ER208+12			12228 00005 J1980
04070*				
04080	DSSW DS ,6158			06158 00000
04090	FRMSW DS ,6151			06151 00000
04100	KUT1 DS ,6148			06148 00000
04110	MONITR DS ,2406			02406 00000
04120	DSCOUT DS ,2416			02416 00000
04130	STRACT DS ,2416			02416 00000
04140	FLW DS ,2488			02488 00000
04150	DELY DS ,DELY			11900 00000
04160	RETURN DS ,2411			02411 00000
04170	XI DS ,5923			05923 00000
04180	XO DS ,5892			05892 00000
04190	YO DS ,XO+10			05902 00000
04200	ZO DS ,YO+10			05912 00000
05010	YJ DS ,XI+10			05933 00000
05020	ZK DS ,YJ+10			05943 00000
05030	ERPROC DS ,2416			02416 00000
05040	PDVSW DS ,6152			06152 00000
05050	TRCTSW DS ,6153			06153 00000
05060	DEND SGDLTA			11796

SYMBOL TABLE

TRCTSW 06153	TRACUT 11988	SUPPRS 11951	STRACT 02416	SGOTO/ 11796
RETURN 02411	MONITR 02406	ERPROC 02416	DSCOUT 02416	CTMOD 11916
DSA1 11957	DSSW 06158	ER208 12020	ER210 12056	FLW 02488
FRMSW 06151	KUT1 06148	NDELX 11980	NDELY 11968	PDVSW 06152
STORE 11868	WERM 12044	XI 05923	YO 05892	YO 05902

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01010*          IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
01020*          A GO TO/ RECORD
01030*
01040*          *NAME SGOTO/... NON-ERASABLE ARELEM SUBPROGRAM
01050*          *ID NUMBER 0232*DELDIM
01060*          *STORE CORE IMAGE
01070*          LINKAGE - B SGOTO/
01080*
01090          DORG 11796          SUBPROGRAM ENTRY          11796
01100*
01110 SGOTO/ BNR ER208,DSSW,,          BRANCH IF REVIEW MODE PREVAILS
01120*          11796 45 12020 06158
01130          BNF ER210,FRMSW,,          BRANCH IF NO PREVIOUS FROM STATEMENT
01140*          11808 44 12056 06151
01150          TR FLW+3*10-8,FLW+0*10-9,,          MOVE COORDINATES OF GO TO POINT
01160          FSUB FLW+3*10+1,XO,,          DELTA X          11820 31 02510 02479
01170          FSUB FLW+4*10+1,YO,,          DELTA Y          11832 02 02519 05892
01180          BZ NDELY,,,          BRANCH IF NO CHANGE IN Y          11844 02 02529 05902
01190*
01200 STORE TR XI-9,FLW+3*10-8,,          STORE X AND Y-COMPONENTS OF VECTOR
02010          TOM PDVSW,1,11,,          SET AIMING DIRECTION INDICATOR          11868 31 05914 02510
02020          TR XO-9,FLW+0*10-9,,          STORE X-Y-Z COORDINATES OF GO TO POINT
02030          BD SUPPRS,KUT1,6,,          BRANCH IF DNTCUT MODE PREVAILS
02040*          11880 15 06152 0000J
02050 CTMOD BNR TRACUT,TRCTSW,,          BRANCH IF TRACUT MODE PREVAILS
02060*          11892 31 05883 02479
02070          BTM MONITR,02360,67,,          CALL DSCOUT SUBPROGRAM VIA MONITR
02080          BTM DSCOUT,RETURN,6711,,          WRITE ONE AD-APT RECORD... RETURN
02090          DORG ++5*3-11+1          11904 43 1195J 06148
02100          NOP FLW+1*10,FLW+2*10          11916 45 11988 06153
02110          DORG #-14          11928 17 02400 -2360
02120 DSA1 DSA FLW+0*10          11940 17 02410 -241J
02130          DORG ++5*3-4          11956
02140*          11956 41 02498 02508
02150 NDELY BD STORE,FLW+3*10-8,,          BRANCH IF CHANGE IN X 11953
02160*          11957 00005 -2488
02170 NDELX B STORE+24          11968
02180          DORG #-3          11968 43 11868 02510
02190*          11980 49 11892 00000
          11988

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02200 TRACUT BTM MONITR,02520,67,,          CALL STRACT SUBPROGRAM VIA MONITR
03010          BT STRACT,DSA1+10,6,,          TRACUT GO TO POINT          11988 17 02400 -2520
03020          B CTMOD+12          12000 27 02410 11967
03030          DORG #-3          12012 49 11928 00000
03040*          12020
03050 ER208 TFM WERM+9,208,9          12020 16 12053 00K08
03060          BTM MONITR,02250,67,,          CALL ERPROC SUBPROGRAM VIA MONITR
03070 WERM BTM ERPROC,4,67,,          WRITE ERROR MESSAGE... SEARCH FOR END
03080 ER210 TFM WERM+9,210,9          12032 17 02400 -2250
03090          DSC 2,49          12044 17 02410 -0004
03100          DSA ER208+12          12056 16 12053 00K10
03110*          12068 00002
03120 DSSW DS ,6158          12074 00005 J2032
03130 FRMSW DS ,6151          06158 00000
03140 KUT1 DS ,6148          06151 00000
03150 MONITR DS ,2406          06148 00000
03160 DSCOUT DS ,2416          02406 00000
03170 FLW DS ,2488          02416 00000
03180 XO DS ,5892          02488 00000
03190 YO DS ,X0+10          05892 00000
03200 XI DS ,5923          05902 00000
04010 RETURN DS ,2411          05923 00000
04020 ERPROC DS ,2416          02411 00000
04030 PDVSW DS ,6152          02416 00000
04040 STRACT DS ,2416          06152 00000
04050 TRCTSW DS ,6153          02416 00000
04060 SUPPRS DS ,CTMOD+35          06153 00000
04070          DEMO SGOTO/          11951 00000
          11796

```

SYMBOL TABLE

RETURN 02411	MONITR 02406	LCNON1 02416	ERPROC 02416	B2 02498
DSA1 11861	DSSW 06158	ER208 11920	ER210 11900	ER211 11820
FLW 02488	FRMSW 06151	GOOK 11940	G01 06347	M2 02488
NPW 02455	PDVSW 06152	SGO/ 11796	TFROM 11888	TL1 06145
WERM 11844	XI 05923	XO 05892	XI 02509	YJ 05933
YO 05902	YI 02519			

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01010*          IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
01020*          A GO/ DR OFFSET RECORD
01030*
01040*          *NAME SGO/... NON-ERASABLE ARELEM SUBPROGRAM      RCS
01050*          *ID NUMBER 0233*DELDIM
01060*          *STORE CORE IMAGE
01070*          LINKAGE - B SGO/
01080*
01090          DORG 11796                                11796
01100*          SUBPROGRAM ENTRY
01110 SGO/ BNR ER208,DSSW,,          BRANCH IF REVIEW MODE PREVAILS
                                11796 45 11920 06158
01120*
01130          BD TFROM,PDVSW,,          BRANCH IF PREVIOUS AIMING DIRECTION
                                11808 43 11888 06152
01140*
01150 ER211 TFM WERM+9,211,9          11820 16 11853 00K11
01160          BTM MONITR,02250,67,    CALL ERPROC SUBPROGRAM VIA MONITR
                                11832 17 02400 -2250
01170 WERM BTM ERPROC,5,67,          WRITE ERROR MESSAGE... SEARCH FOR END
                                11844 17 02410 -0005
01180          DORG **5+6-6+1          11880
01190          NOP B2,0                11880 41 02498 00000
01200          DORG **21              11870
02010          NOP Y1,M2              11870 41 02519 02488
02020          DORG **21              11860
02030          NOP YO,X1              11860 41 05902 02509
02040          DORG **14              11857
02050 DSA1 DSA X0                    11861 00005 -5892
02060          DORG **5+6-4          11887
02070*
02080 TFROM BD GOOK,FRMSW,,          BRANCH IF PREVIOUS FROM STATEMENT
                                11888 43 11940 06151
02090*
02100 ER210 TFM WERM+9,210,9          11900 16 11853 00K10
02110          B WERM-12              11912 49 11832 00000
02120          DORG **3              11920
02130*
02140 ER208 TFM WERM+9,208,9          11920 16 11853 00K08
02150          B WERM-12              11932 49 11832 00000
02160          DORG **3,          CALCULATE EQUATION OF LINE THRU POINTS P0 AND P1
                                11940
02170 GOOK TR FLW+2+10-8,X0-9          11940 31 02500 05883
02180          FADD FLW+2+10+1,XI,,    X1=X0+XI          11952 01 02509 05923
02190          FADD FLW+3+10+1,YJ,,    Y1=Y0+YJ          11964 01 02519 05933
02200          BTM MONITR,02120,67,    CALL LCNON1 SUBPROGRAM VIA MONITR
                                11976 17 02400 -2120
03010          BT LCNON1,DSA1+25,6,    CALCULATE SLOPE AND Y-INTERCEPT
                                11988 27 02410 11886

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03020          TDM FLW+1+10+1,,,      SET RECORD MARK FOR STACKING TRANSM.
                                12000 15 02499 00000
03030          DC 1,,*                12011 00001
03040          TDM TL1,3,,            SET TOOL1 TO TLOM          12012 15 06145 00003
03050          TDM G01,3,,            SET G01 TO G0FWD          12024 15 06347 00003
03060          TDM NPW,2              12036 15 02455 00002
03070          DSC 2,49,,            RETURN TO MONITR          12048 00002
03080          DSA -RETURN            12054 00005 -241J
03090*
03100 DSSW DS ,6158                  06158 00000
03110 PDVSW DS ,6152                  06152 00000
03120 MONITR DS ,2406                  02406 00000
03130 ERPROC DS ,2416                  02416 00000
03140 XO DS ,5892                      05892 00000
03150 YO DS ,X0+10                    05902 00000
03160 FLW DS ,2488                      02488 00000
03170 X1 DS ,FLW+2+10+1              02509 00000
03180 Y1 DS ,X1+10                    02519 00000
03190 M2 DS ,FLW+0+10                02488 00000
03200 B2 DS ,M2+10                    02498 00000
04010 FRMSW DS ,6151                  06151 00000
04020 XI DS ,5923                      05923 00000
04030 YJ DS ,X1+10                    05933 00000
04040 LCNON1 DS ,2416                  02416 00000
04050 TL1 DS ,6145                     06145 00000
04060 G01 DS ,6347                     06347 00000
04070 NPW DS ,2455                     02455 00000
04080 RETURN DS ,2411                  02411 00000
04090          DEND SGO/              11796

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SYMBOL TABLE

MONITR 02406 ERPROC 02416 ARGV 06515 DSSW 06158 ER212 00126R
 GO2 06337 NSRT 02475 STPOT 00002R TAN 00076R TL1 06145
 TL2 06147

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
 01020* TO, PAST, ON AND TAN RECORDS
 01030* RCS
 01040* *NAME STPOT... ERASABLE ARELEM SUBPROGRAM
 01050* *ID NUMBER 0234+DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BTM STPOT,1,10
 01090*
 01100* DC 2,0,, DUMMY ARGUMENT 00001 00002
 01110*
 01120* SUBPROGRAM ENTRY
 01130* STPOT TDM DSSW,1,11, SET EXPLICIT CS MODE INDICATOR
 01140* CM NSRT,6,8 00002 15 06158 0000J
 01150* BE TAN,,, BRANCH IF TAN RECORD 00014 14 02475 0-006
 01160*
 01170* TD TL2,NSRT 00038 25 06147 02475
 01180* SM TL2,2,10, TOOL2=NSRT-2 00050 12 06147 000-2
 01190* TDM GO2,1,,, SET GO2 TO GOLFT 00062 15 06337 00001
 01200* BB,,, EXIT 00074 42 00000 00000
 02010* DORG *-9 00076
 02020*
 02030* TAN CM ARGV,27,10 00076 14 06515 000K7
 02040* BE ER212,,, BRANCH IF OFFSET/TAN SPECIFIED
 00088 M6 00126 01200
 02050*
 02060* TD TL2,TL1,, SET TOOL2 TO TOOL1 00100 25 06147 06145
 02070* TDM GO2,3,,, SET GO2 TO GOFWD 00112 15 06337 00003
 02080* BB,,, EXIT 00124 42 00000 00000
 02090* DORG *-9 00126
 02100*
 02110* ER212 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
 00126 17 02400 -2250
 02120* BTM ERPROC,21200,67, WRITE ERROR MESSAGE... SEARCH FOR END
 00138 17 02410 K1200
 02130*
 02140* DSSW DS ,6158 06158 00000
 02150* NSRT DS ,2475 02475 00000
 02160* TL2 DS ,6147 06147 00000
 02170* GO2 DS ,6337 06337 00000
 02180* TL1 DS ,6145 06145 00000
 02190* MONITR DS ,2406 02406 00000
 02200* ERPROC DS ,2416 02416 00000
 03010* ARGV DS ,6515 06515 00000
 03020* DEND STPOT 00002

SYMBOL TABLE

MONITR 02406 LOOPSW 06333 ERPROC 02416 EPSLON 06004 ELMNT 06493
 ER211 00154R ER213 00174R ER214 00026R ER226 00074R EXIT 00242R
 FLW 02488 FXWST 05540 GO2 06337 INISH 00194R NRT 02471
 NSRT 02475 NSS 02463 PDVSW 06152 START 00002R TLRAD 05984
 TL1 06145 TL2 06147 TPDV 00142R TTL1 00001R WERM 00050R
 ZRAD 00106R

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR TESTING THE VALIDITY
 01020* OF TOOL PARAMETERS AND MODIFIERS PRIOR TO EVALUATING
 01030* THE CUTTER LOCUS DURING A REVIEW MODE CALCULATION RCS
 01040* *NAME START... ERASABLE ARELEM SUBPROGRAM
 01050* *ID NUMBER 0235+DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BT START,TL1
 01090*
 01100*
 01110* TTL1 DC 2,0 00001 00002
 01120*
 01130* SUBPROGRAM ENTRY
 01140* START TF NSS,FXWST+0*27-15,, MOVE DS SOURCE STATEMENT NO. TO OUTPUT
 00002 26 02463 05525
 01150* BD WERM+12,TL1,, BRANCH IF TOOL1 SET OR SPECIFIED
 00014 M3 00062 06145
 01160*
 01170* ER214 TFM WERM+9,214,9 00026 J6 00059 00K14
 01180* BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
 00038 17 02400 -2250
 01190* WERM BTM ERPROC,1,67, WRITE ERROR MESSAGE... SEARCH FOR END
 00050 17 02410 -0001
 01200* BD ZRAD-12,EPSLON-9,, BRANCH IF INTOL AND OUTTOL NOT ZERO
 00062 M3 00094 05995
 02010*
 02020* ER226 TFM WERM+9,226,9 00074 J6 00059 00K26
 02030* B WERM-12 00086 M9 00038 00000
 02040* DORG *-3 00094
 02050*
 02060* BD TPDV,TLRAD-9,, BRANCH IF CUTTER RADIUS IS NON-ZERO
 00094 M3 00142 05975
 02070*
 02080* ZRAD A TTL1,TL2,, TL1+TL2 00106 K1 00001 06147
 02090* SM TTL1,6,10 00118 J2 00001 000-6
 02100* BNZ ER213,,, BRANCH IF TOOL1 AND TOOL2 ARE NOT TLOW
 00130 M7 00174 01200
 02110*
 02120* TPDV BD INISH,PDVSW,, BRANCH IF AIMING DIRECTION EXISTS
 00142 M3 00194 06152
 02130*
 02140* ER211 TFM WERM+9,211,9 00154 J6 00059 00K11
 02150* B WERM-12 00166 M9 00038 00000
 02160* DORG *-3 00174
 02170*
 02180* ER213 TFM WERM+9,213,9 00174 J6 00059 00K13
 02190* B WERM-12 00186 M9 00038 00000
 02200* DORG *-3 00194
 03010*

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03020 INISH TFM ELMNT,FLW+0=10-9,, INITIALIZE PTBUFR SUBPROGRAM
03030 TFM NRT,5,8 00194 16 06493 -2479
03040 TFM NSRT,5,8 00206 16 02471 0-005
03050 TDM LOOPSW,1,11, SET FIRST POINT INDICATOR 00218 16 02475 0-005
03060 EXIT DSC 2,42,, EXIT 00230 15 06333 0000J
03070* 00242 00002
03080 TL1 DS ,6145 06145 00000
03090 MONITR DS ,2406 02406 00000
03100 ERPROC DS ,2416 02416 00000
03110 TLRAD DS ,5984 05984 00000
03120 TL2 DS ,6147 06147 00000
03130 PDVSW DS ,6152 06152 00000
03140 GO2 DS ,6337 06337 00000
03150 ELMNT DS ,6493 06493 00000
03160 FLW DS ,2488 02488 00000
03170 LOOPSW DS ,GO2-4 06333 00000
03180 EPSLON DS ,6004 06004 00000
03190 NSS DS ,2463 02463 00000
03200 FXWST DS ,5540 05540 00000
04010 NRT DS ,2471 02471 00000
04020 NSRT DS ,2475 02475 00000
04030 DEND START 00002
    
```

SYMBOL TABLE

```

SETVGM 00134R SEARCH 00042R OUTPUT 00309R MONITR 02406 ERPROC 02416
DSCOUT 00006R DISCW 00318R ER218 00278R MOD 00066R NPW 02455
NR 02467 NSECT 02453 OUTSA 06573 RETRN 00005R RNDUT 06143
TABLE 00335R WRITE 00206R
    
```

```

01010* IBM 1620-1311 AD-APT DISC-FILE OUTPUT SUBPROGRAM RCS
01020*
01030* *NAME DSCOUT... ERASABLE ARELEM SUBPROGRAM
01040* *ID NUMBER 0236+DELDIM
01050* *ASSEMBLE RELOCATABLE
01060* *STORE RELOADABLE
01070* LINKAGE - BTM DSCOUT,RETADD
01080* RETADD IS ADDRESS OF NEXT INSTRUCTION
01090*
01100 RETRN DC 6,0 00005 00006
01110*
01120* SUBPROGRAM ENTRY
01130 DSCOUT TF NR,RNDUT,, SET OUTPUT RECORD NO. 00006 26 02467 06143
01140 AM RNDUT,1,10, INCREMENT OUTPUT RECORD COUNTER 00018 11 06143 000-1
01150 TFM SEARCH+6,TABLE-1,, SET NSECT (FUNCTION OF NPW) 00030 J0 00048 -0334
01160 SEARCH C ,NPW 00042 24 00000 02455
01170 BNL MOD+20 00054 M6 00086 01300
01180*
01190 MOD AM SEARCH+6,3,10 00066 J1 00048 000-3
01200 BT SEARCH 00078 M9 00042 00000
02010*
02020 AM SEARCH+6,1,10 00086 J1 00048 000-1
02030 TD NSECT,SEARCH+6,11 00098 2N 02453 0004Q
02040 TFM SETVGM+6,NSECT-1*100 00110 J6 00140 -2552
02050 A SETVGM+4,NSECT 00122 K1 00138 02453
02060 SETVGM TDM ,,, SET TERMINAL GROUP MARK 00134 15 00000 00000
02070 DGM * 00145 00001
02080 TD DISCW+8,NSECT 00146 K5 00326 02453
02090 AM DISCW+8,1,10, SET SECTOR COUNT FIELD 00158 J1 00326 000-1
02100 TF DISCW+5,OUTSA,, SET OUTPUT SECTOR ADDRESS 00170 K6 00323 06573
02110 SEEK OUTPUT,,, POSITION ARM TO OUTPUT CYLINDER 00182 10 00565 -0205
02120 WRITE PUT OUTPUT,RBC,, WRITE 1 AD-APT RECORD IN SCRATCH AREA 00194 4R 00554 -0309
02130 TDM SETVGM+6,,6, CLEAR GROUP MAR.. 00206 10 00565 -0229
02140 A OUTSA,DISCW+8,, ADJUST SECTOR ADDRESS FOR NEXT WRITE 00218 4R 00520 -0309
02150 CM OUTSA,4800,8 00230 J5 0014- 00000
02160 BN RETRN,,6, BRANCH IF OUTPUT DISC AREA AVAILABLE 00242 2J 06573 00326
02170* 00254 14 06573 0M800
02180 ER218 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR 00266 M7 0000N 01300
02190 *TM ERPROC,21890,67, WRITE ERROR MESSAGE... SEARCH FOR END 00278 17 02400 -2250
    
```

```

02200 CALL EXIT,,,
03010 OUTPUT DDW ,DISCH,,R,A
EXIT AD-APT SYSTEM
00290 17 02410 K1890
00302 49 00796 00000
00309 00002 KO
00311 00005 -0318
00316 00001 '
00318 00006 0-0000
00324 00003 -00
00327 00005 -2452
00332 00001
00335 00003
00338 00003
00341 00003
00344 00003
00347 00003
00350 00003
00353 00003
00356 00003
00359 00003

03030 DC 1,
03040 TABLE DC 3,70
03050 DC 3,171
03060 DC 3,272
03070 DC 3,373
03080 DC 3,474
03090 DC 3,575
03100 DC 3,676
03110 DC 3,777
03120 DC 3,878
03130
03140 NR DS ,2467
03150 RNDUT DS ,6143
03160 NPM DS ,2455
03170 NSECT DS ,2453
03180 OUTSA DS ,6573
03190 MONITR DS ,2406
03200 ERPROC DS ,2416
04010 DEND DSCOUT
02467 00000
06143 00000
02455 00000
02453 00000
06573 00000
02406 00000
02416 00000
00006

```

SYMBOL TABLE

9RCYL3 00519	9RCYL2 00517	9RCYL1 00515	9RCYL0 00513	9CCYL3 02117
9CCYL2 02115	9CCYL1 02113	9CCYL0 02111	SEMINS 06054	SEMINA 06044
SEMINS 06095	1.0E48 06085	TRMODE 07514	TRPDSW 07494	TRCTSW 06153
TRACUT 07458	SYMTAB 06582	STRADD 09536	STNTRY 09094	STKSET 06174
STACKR 06862	SQRTFN 02426	SPTST 10568	SUFFST 02416	SINDRV 02416
SINDRP 02416	SGOTO/ 02416	SGDLTA 02416	SETVGM 11696	SEQCHK 06314
SECNTR 11658	RSETHI 12164	REVPOD 07930	RETURN 09768	RETADD 08556
POINTR 08616	OUTTOL 07058	OFSDSA 08285	OFFSET 07534	NDO200 10580
NOLGAD 10708	MNEQVF 09712	MNEGDN 00223	NDSSET 06201	MCORES 08934
MONITR 08562	MINI.0 06024	MEMGAP 10772	MATRIX 08440	MAREPT 10810
LOOPSW 06333	LOMHIP 10204	LOLOAD 10084	LODMEM 11796	LAMLOP 10144
INDIRV 07310	INDIRP 07290	INCORE 10348	IMPLCS 08034	HILOAD 08886
GTODSA 07383	GDDLTA 07330	GOBACK 06938	GO/DSA 07569	GOLDSA 07353
FRMDSA 07283	EXPLCS 08218	ER208F 08400	ERROUT 02416	ERRDIM 02250
ERPROC 02416	ERASE1 09014	EPSLON 06004	ENTRY2 02421	ENTRY1 02416
ENDTAB 09596	ENDSET 06184	DUMPSW 06169	DSCOUT 02416	DNTCUT 07230
DINTAB 07906	DFREAD 06302	DELDIM 00000	CYLOVF 11740	CUTTER 07078
CUFMOD 07230	CUTDSA 07253	CMPARE 06506	CLENT1 10516	CLEAR2 10316
CLEAR1 10400	CALLNE 09336	BRMCOE 06818	ATANFN 02441	ARELEM 06206
AEDUMP 02416	ARG 06517	ARGT 06515	ARRQM 10690	BRGST 08022
CALL 08598	CDFUV 10636	CNTA 08583	COMP 09062	COSFM 02436
COSN 09156	COSZD 06105	CSELF 10248	CSURF 07760	CUT 07230
DIMNO 08560	DMPFL 08154	DMPFX 08142	DNCS 00201	DSDSA 07899
DSSW 06158	DSURF 07620	DUMP 08082	E 05954	ELMNT 06493
END 07390	ENDMP 08186	ENTRY 02136	ERAS 08561	ERASE 09244
ERDIM 09176	ERENT 10284	ER203 08292	ER207 07138	ER208 07426
EXIT 09900	EXPFN 02446	EXPL 07576	EXTNT 10120	F 05964
FINI 08324	FIT 10016	FLW 02488	FLWST 03362	FRMSW 06151
FROM 07260	FXST 05540	G 05974	GO/ 07534	GOCS 06970
GOFWD 06938	GDLFT 06938	GOMOD 06938	GORGT 06938	GOTO/ 07360
GO1 06347	GO2 06337	HI 00434	HIDSA 07875	INDEX 09676
INDX 07802	INHAP 09908	INTNO 07162	INTOF 06157	INTOL 06990
KTEP 07703	KUT1 06148	KUT2 06149	LO 09875	LOC 06550
LODE1 08826	LOCFN 02451	LOPRM 09943	MOD 08118	MVDNO 07840
NE 00029	NECOM 00222	NEGVF 10548	NF 06155	NNE 00007
NOFIT 10380	NPM 02455	NR 02467	NRT 02471	NSECT 02453
NSRF 02477	NSRT 02475	NSS 02463	NUDIM 08670	NUENT 08730
OFFST 08262	ON 07576	OUTDS 07680	OUTSA 06573	OVOFF 09142
PAST 07576	PDVSW 06152	PROGX 10460	PSA 05851	PSB 05861
PSC 05871	PSD 05881	PSTS 06770	PSSW 06150	RANGE 09038
RESET 08946	RNIN 06139	RNDUT 06143	SCAN 08610	SCUT 02416
SOSRT 02416	SEQOK 06338	SETPY 08990	SFROM 02416	SGO/ 02416
SINFN 02431	SPRET 10752	SPSIS 02416	STACK 02416	START 02416
STOIN 08742	STFL 06163	STFX 06168	STOL 02416	STPOT 02416
SWSET 06191	TAN 07576	TEMP 09255	TLLFT 06894	TLMOD 06894
TLOW 06894	TLRAD 05984	TLRGT 06894	TLT 08229	TLURT 06458
TL1 06145	TL2 06147	YO 07576	TOLI 05994	TOLO 06014
TYPE2 06374	UX 06125	UY 06135	VARB 08878	WARN1 06838
WREAR 09748	X 05820	XI 05923	XO 05892	Y 05830
YJ 05933	YO 05902	Z 05840	ZK 05943	ZO 05912
0.0 06034	0.5 06065	1.0 06075	2.0 06115	AALFRM 11893
ADISCR 11780	ADSCIN 11514	AEXIT 11646	AINPUT 11771	AMESS 12273
AMODT 11880	ANSECT 02453	AOPTLD 11916	AREAD 11562	AREADM 11648
AZMOD 12232	ASMOD 12252			

```

01020*
01030*
01040*
01050*
01060*
01070*
01080
01090*
01100*
01110*
01120
01130*
01140 ENTRY1 DS 5,,
01150 ENTRY2 DS 5,,
01160*
01170 SQRTPN DS 5,,
01180 SINFN DS 5,,
01190 COSFN DS 5,,
01200 ATANFN DS 5,,
02010 EXPFN DS 5,,
02020 LOGFN DS 5,,
02030*
02040*
02050 NSECT DS 2,,
02060 NPM DS 2,,
02070 NSS DS 8,,
02080 NR DS 4,,
02090 NRT DS 4,,
02100 NSRT DS 4,,
02110 NSRF DS 2,,
02120 DS 1,,
02130 FLW DSB 10,87,,
02140 DS 3,,
02150 DS 1,,
02160*
02170 FLWST DSB 10,218,,
02180 DS 11,,
02190 FXWST DSB 27,11,,
02200*
03010 X DS 10,,
03020 Y DS 10,,

```

RCS

```

*NAME ARELEM
*ID NUMBER 0237*DELDIM
*STORE CORE IMAGE
*SYSTEM SYMBOL TABLE
LINKAGE - CALL LINK,ARELEM

```

DORG 2402

02402

```

AD-APT SYSTEM COMMON AREA
SUBPROGRAM REFERENCE ADDRESSES

```

DSA MONITR,RETURN

```

02406 00005 -8562
02411 00005 -9768

```

LOW-ORDER ENTRY TO MONITR-LOADED PROGRAM

02416 00005

HI-ORDER ENTRY TO MONITR-LOADED PROGRAM

02421 00005

SQRTP ENTRY WITHIN FUNCT. SUBR. PACKAGE

02426 00005

SINF ENTRY WITHIN FUNCT. SUBR. PACKAGE

02431 00005

COSF ENTRY WITHIN FUNCT. SUBR. PACKAGE

02436 00005

ATANF ENTRY WITHIN FUNCT. SUBR. PACKAGE

02441 00005

EXPFF ENTRY WITHIN FUNCT. SUBR. PACKAGE

02446 00005

LOGF ENTRY WITHIN FUNCT. SUBR. PACKAGE

02451 00005

I/O AREA AND COMMON STORAGE

(NO. SECTORS-1) IN WHICH AD-APT RECORD CONTAINED

02453 00002

NO. FLOATING-POINT WORDS IN AD-APT RECORD

02455 00002

SOURCE STATEMENT NO.

02463 00008

AD-APT RECORD NUMBER

02467 00004

AD-APT RECORD TYPE

02471 00004

AD-APT SUB-RECORD TYPE

02475 00004

AD-APT SURFACE TYPE

02477 00002

RECORD MARK ALLOCATION

02478 00001

I/O FLOATING-POINT WORD ARRAY

02488 00870

I/O GARBAGE

03351 00003

GROUP MARK ALLOCATION

03352 00001

FLOATING-POINT WORD STACK ARRAY

03362 02150

RECORD MARK ALLOCATION

05513 00011

FIXED-POINT WORD STACK ARRAY

05540 00297

X-COORDINATE OF TOOL CENTER (NEXT POINT)

05820 00010

Y-COORDINATE OF TOOL CENTER (NEXT POINT)

05830 00010

```

03030 Z DS 10,,
03040 DC 1,.,,
03050*
03060 PSA DS 10,,
03070 PSB DS 10,,
03080 PSC DS 10,,
03090 PSD DS 10,,
03100 DS 1,,
03110*
03120 XO DS 10,,
03130 YO DS 10,,
03140 ZO DS 10,,
03150 DC 1,.,,
03160*
03170 XI DS 10,,
03180 YJ DS 10,,
03190 ZK DS 10,,
03200 DS 1,,
04010*
04020 E DS 10,,
04030 F DS 10,,
04040 G DS 10,,
04050*
04060 TLRAD DS 10,,
04070 TQLI DS 10,,
04080 EPSLON DS 10,,
04090 TOLD DS 10,,
04100*
04110 DC 8,-10000000
04120 MIN1.0 DC 2,1,,
04130*
04140 DC 8,0
04150 0.0 DC 2,-99,,
04160*
04170 DC 8,50000000
04180 SEMIN4 DC 2,-3,,
04190*
04200 DC 8,50000000
05010 SEMIN5 DC 2,-4,,
05020 DC 1,.,,
05030*
05040 DC 8,50000000
05050 0.5 DC 2,0,,
05060*

```

Z-COORDINATE OF TOOL CENTER (NEXT POINT)

05840 00010

RECORD MARK

05841 00001

A-COEFFICIENT OF PS PLANE

05851 00010

B-COEFFICIENT OF PS PLANE

05861 00010

C-COEFFICIENT OF PS PLANE

05871 00010

D-COEFFICIENT OF PS PLANE

05881 00010

RECORD MARK ALLOCATION

05882 00001

X-COORDINATE OF TOOL CENTER (PRES. PT)

05892 00010

Y-COORDINATE OF TOOL CENTER (PRES. PT)

05902 00010

Z-COORDINATE OF TOOL CENTER (PRES. PT)

05912 00010

RECORD MARK

05913 00001

X-COMPONENT OF PRESENT AIMING DIRECTION

05923 00010

Y-COMPONENT OF PRESENT AIMING DIRECTION

05933 00010

Z-COMPONENT OF PRESENT AIMING DIRECTION

05943 00010

RECORD MARK ALLOCATION

05944 00001

DS TOOL OFFSET INDICATOR

05954 00010

CS TOOL OFFSET INDICATOR

05964 00010

ROTATION DIRECTION INDICATOR

05974 00010

CUTTER RADIUS

05984 00010

INSIDE TOLERANCE

05994 00010

ALLOWABLE ERROR

06004 00010

OUTSIDE TOLERANCE

06014 00010

-1.0

06022 00008

0.0

06024 00002

0.0005

06032 00008

0.00005

06034 00002

0.00005

06042 00008

0.00005

06044 00002

0.00005

06052 00008

0.00005

06054 00002

0.00005

06055 00001

0.00005

06063 00008

0.5

06065 00002

05070	DC	8,1000000		06073	00008
05080	1.0 DC	2,1,.,	1.0	06075	00002
05090*					
05100	DC	8,1000000		06083	00008
05110	1.0E+8 DC	2,49,.,	1.0E+8	06085	00002
05120*					
05130	DC	8,5000000		06093	00008
05140	SEMIN2 DC	2,-1,.,	0.05	06095	00002
05150*					
05160	DC	8,99939082		06103	00008
05170	COS2D DC	2,0,.,	COSINE 2 DEGREES	06105	00002
05180*					
05190	DC	8,2000000		06113	00008
05200	2.0 DC	2,1,.,	2.0	06115	00002
06010*					
06020	UX DS	10,.,	X-COMPONENT UNIT TANGENT DS VECTOR	06125	00010
				06135	00010
06030	UY DS	10,.,	Y-COMPONENT UNIT TANGENT DS VECTOR	06139	00004
				06143	00004
06040*					
06050	RNIN DS	4,.,	INPUT RECORD COUNTER	06145	00002
06060	RNOUT DS	4,.,	OUTPUT RECORD COUNTER	06147	00002
06070*					
06080	TL1 DS	2,.,	DS TOOL MODIFIER		
06090	TL2 DS	2,.,	CS TOOL MODIFIER		
06100*					
06110	KUT1 DS	1,.,	DS CUTTING MODE INDICATOR	06148	00001
				06149	00001
06120	KUT2 DS	1,.,	CS CUTTING MODE INDICATOR	06150	00001
				06151	00001
06130*					
06140	PSSW DS	1,.,	PS TYPE INDICATOR	06152	00001
06150	FRMSW DS	1,.,	FROM RECORD STATUS INDICATOR	06153	00001
				06155	00002
06160	PDVSW DS	1,.,	PRESENT AIMING DIRECTION INDICATOR	06157	00002
06170	TRCTSW DS	1,.,	TRACUT MODE INDICATOR		
06180	NF DS	2,.,	INTERSECTION NO.		
06190	INTOF DS	2,.,	DS-CS CONFIGURATION INDICATOR		

SIGNIFICANCE OF INDICATOR INTOF

INTOF	DS TYPE	CS TYPE
07010*		
07020*		
07030*	1 LINE	LINE
07040*	2 LINE	CIRCLE
07050*	3 LINE	GCONIC
07060*	4 LINE	TABCYL
07070*	5 CIRCLE	LINE
07080*	6 CIRCLE	CIRCLE
07090*	7 CIRCLE	GCONIC
07100*	8 CIRCLE	TABCYL
07110*	9 GCONIC	LINE
07120*	10 GCONIC	CIRCLE
07130*	11 GCONIC	GCONIC
07140*	12 GCONIC	TABCYL
07150*	13 TABCYL	LINE
07160*	14 TABCYL	CIRCLE
07170*	15 TABCYL	GCONIC
07180*	16 TABCYL	TABCYL
07190*		

07200*					
08010	DSSW DS	1,.,	REVIEW MODE INDICATOR	06158	00001
08020*					
08030	STFL DS	5,.,	FLOATING-POINT WORD STACKING INDEX	06163	00005
				06168	00005
08040	STFX DS	5,.,	FIXED-POINT WORD STACKING INDEX		
08050*					
08060	DUMPSW DS	1,.,	READ-DUMP MODE INDICATOR	06169	00001

INITIALIZATION CONSTANTS

08070*					
08080*					
08090*					
08100	STKSET DSA	FLWST-9,FXMST-26		06174	00005 -3353
				06179	00005 -5514
08110	DC	1,.,		06180	00001
08120	ENDSET DC	4,0		06184	00004
08130	DC	5,.,		06189	00005
08140	SWSET DC	2,0		06191	00002
08150	DC	2,0		06193	00002
08160	DSC	1,0		06194	00001
08170	DSC	1,0		06195	00001
08180	DSC	1,0		06196	00001
08190	DSC	1,0		06197	00001
08200	DSC	1,0		06198	00001
09010	DC	1,.,		06199	00001
09020	NDSSET DC	2,1		06201	00002
09030	DC	3,.,		06204	00003
09040*					
09050*					

PROGRAM INITIALIZATION

09060*					
09070*					
09080	ARELEM TR	ANIN-3,ENDSET-3,.,	SET ANTICIPATED INPUT RECORD NO. AND INITIAL OUTPUT RECORD NO.	06206	31 06136 06181
09090*					
09100*			CLEAR DS AND CS TOOL MODIFIERS,		
09110*			ASSUME CUTTING MODE IS CUT,		
09120*			SET PS TO HORIZNTAL PLANE,		
09130*			SET SWITCH INDICATING NO FROM RECORD,		
09140*			CLEAR PREVIOUS DIRECTION VECTOR AND		
09150*			SET TRACUT/NO MORE MODE INDICATOR	06218	31 06144 06190
09160	TR	TL1-1,SWSET-1			
09170*					
09180*			ASSUME CUTTER RADIUS IS 0.0,		
09190*			SET INTOL=0.0005 AND		
09200*			SET ALLOWABLE ERROR=0.00005		
10010	TR	TLRAD-9,0.0-9		06230	31 05975 06025
10020	TPL	2,0.0,.,	SET BOTTOM CENTER OF TOOL IN X-Y PLANE	06242	06 05860 06034
				06256	06 06016 06044
10030	TPL	TOLO,SEMIN4,.,	SET OUTTOL=0.0005		
10040*					
10050*			SET INTERSECTION NO.=1,		
10060*			SET INTOF=0 AND		
10070*			SET NON-REVIEW MODE INDICATOR	06266	31 06154 06200
10080	TR	NF-1,NDSSET-1			
10090*			SET RECORD STACKING INDICES AND		
10100*			SET READ MODE INDICATOR		
10110	TR	STFL-4,STKSET-4		06278	31 06159 06170
10120	BNR	OUTDS-12,DSSW,.,	BRANCH IF REVIEW MODE PREVAILS	06290	45 07668 06158

10130*					
10140	DFREAD	BTH	A&DSCIN,1,10,	READ ONE AD-APT RECORD FROM INTRAN	06302 17 11514 000-1
10150	SEQCHK	C	NR,RNIN,,	CHECK RECORD SEQUENCE NO.	06314 24 02467 06139
10140	BNE		ER203,,,	BRANCH IF RECORD OUT OF SEQUENCE	06326 47 08292 01200
10170*					
10180	GO2	DC	2,0,,,	CS GO MODIFIER	06337 00002
10190	LOOPSW	DS	1,,-4,	INDICATOR FOR SUBPROGRAM PTBUFR	06333 00001
10200*					
11010	SEQOK	AM	RNIN,1,10,	INCREMENT INPUT RECORD COUNTER	06338 11 06139 000-1
11020	GO1	DC	2,0,,-2,	DS GO MODIFIER	06347 00002
11030*					
11040	CM		NRT,2,8,	TEST FOR TYPE 2 RECORD	06350 14 02471 0-002
11050	BNE		TLURT,,,	BRANCH IF NOT TYPE 2 RECORD	06362 47 06458 01200
11060*					
11070	TYPE2	CM	NSRT,1,8,	TEST FOR END RECORD	06374 14 02475 0-001
11080	BE		END,,,	BRANCH IF END RECORD	06386 46 07390 01200
11090*					
11100	CM		NSRT,1038,8,	TEST FOR TRACUT RECORD	06398 14 02475 0J038
11110	BE		TRACUT,,,	BRANCH IF TRACUT RECORD	06410 46 07458 01200
11120*					
11130	BNR		STACKR,DSSW,,	BRANCH IF REVIEW MODE PREVAILS	06422 45 06862 06158
11140*					
11150	BTH		MONITR,02360,,	CALL DSCOUT SUBPROGRAM VIA MONITR	06434 17 08562 -2360
11160	BTH		DSCOUT,BRMODE,,	WRITE ONE AD-APT RECORD	06446 17 02410 -6818
11170*					
11180*					
11190	TLURT	TD	ARG,NRT,,	EXTRACT LOW-ORDER DIGIT FROM NRT	06458 25 06517 02471
11200	TD		ARG-1,NSRT,,	EXTRACT LOW-ORDER DIGIT FROM NSRT	06470 25 06516 02475
12010	SF		ARG-1,,,	SET 2-DIGIT ARGUMENT FLAG	06482 32 06516 00000
12020	ELMNT	DS	5,,,	STACKING ADDRESS FOR SUBPROGRAM PTBUFR	06493 00005
12030*					
12040	TFM		CMPARE+6,SYMTAB,,	SET TABLE ARGUMENT ADDRESS	06494 16 06512 -6582
12050	CMPARE	CM			06506 14 00000 -0000
12060	ARG	DS	2,,		06517 00002
12070	ARGT	DC	2,0,,-2		06515 00002
12080	BE		LOC,,,	BRANCH IF INPUT AND TABLE ARGUMENTS SAME	06518 46 06550 01200
12090*					
12100	AM		CMPARE+6,7,10,	INDEX TABLE ARGUMENT ADDRESS	06530 11 06512 000-7
12110	B		CMPARE		06542 49 06506 00000
12120	DORG		=-3		06550
12130*					

12140	LOC	AM	CMPARE+6,5,10,	CALCULATE ADDRESS OF FUNCTION ADDRESS	06550 11 06512 000-5
12150	SF		CMPARE+6,,,	FABRICATE INDIRECT ADDRESS	06562 32 06512 00000
12160	OUTSA	DC	5,3400,,,	OUTPUT SECTOR ADDRESS	06573 00005
12170	B		CMPARE+6,,6,	BRANCH TO RECORD TYPE ENTRY	06574 49 0651K 00000
12180					06581
12190*					
12200*					
13010	SYMTAB	DC	2,23	RECORD TYPE BRANCHING TABLE	06582 00002
13020	DSA		DSURF		06587 00005 -7620
13030	DC		2,28		06589 00002
13040	DSA		GORGT		06594 00005 -6938
13050	DC		2,45		06596 00002
13060	DSA		GODLTA		06601 00005 -7330
13070	DC		2,55		06603 00002
13080	DSA		GOTO/		06608 00005 -7360
13090	DC		2,38		06610 00002
13100	DSA		GOFWD		06615 00005 -6938
13110	DC		2,18		06617 00002
13120	DSA		GOLFT		06622 00005 -6938
13130	DC		2,14		06624 00002
13140	DSA		TLLFT		06629 00005 -6894
13150	DC		2,15		06631 00002
13160	DSA		INDIRP		06636 00005 -7290
13170	DC		2,43		06638 00002
13180	DSA		PAST		06643 00005 -7576
13190	DC		2,33		06645 00002
13200	DSA		TO		06650 00005 -7576
14010	DC		2,53		06652 00002
14020	DSA		ON		06657 00005 -7576
14030	DC		2,17		06659 00002
14040	DSA		GO/		06664 00005 -7534
14050	DC		2,66		06666 00002
14060	DSA		CUTTER		06671 00005 -7078
14070	DC		2,34		06673 00002
14080	DSA		TLDN		06678 00005 -6894
14090	DC		2,35		06680 00002
14100	DSA		FROM		06685 00005 -7260
14110	DC		2,13		06687 00002
14120	DSA		PSIS		06692 00005 -6770
14130	DC		2,24		06694 00002
14140	DSA		TLRGT		06699 00005 -6894
14150	DC		2,4		06701 00002
14160	DSA		FINI		06706 00005 -8324
14170	DC		2,36		06708 00002
14180	DSA		INTNO		06713 00005 -7162
14190	DC		2,25		06715 00002
14200	DSA		INDIRV		06720 00005 -7310
15010	DC		2,46		06722 00002
15020	DSA		INTOL		06727 00005 -6990
15030	DC		2,56		06729 00002
15040	DSA		OUTTOL		06734 00005 -7058
15050	DC		2,48		06736 00002
15060	DSA		GOBACK		06741 00005 -6938
15070	DC		2,27		06743 00002
15080	DSA		OFFSET		06748 00005 -7534
15090	DC		2,63		06750 00002
15100	DSA		TAN		06755 00005 -7576

15110	DC	2,16		06757 00002
15120	OSA	DNTCUT		06762 00005 -7230
15130	DC	2,6		06764 00002
15140	OSA	CUT		06769 00005 -7230
15150*				
15160*				
15170	SPSIS	BNR	*ENTRY FOR PART SURFACE RECORD* **24,DUMPSW,,	BRANCH IF STACK-DUMP MODE PREVAILS 06770 45 06794 06169
15180*				
15190	BNR	WARN1,DSSW,,		BRANCH IF REVIEW MODE PREVAILS 06782 45 06838 06158
15200*				
16010	BTM	MONITR,02220,,		CALL SPSIS SUBPROGRAM VIA MONITR 06794 17 08562 -2220
16020	BTM	SPSIS,1,10,,		PROCESS PART SURFACE RECORD 06806 17 02410 000-1
16030*				
16040	BRMODE	BNF	DFREAD,DUMPSW,,	BRANCH IF READ MODE
16050*				06818 44 06302 06169
16060	B	MOD-12		
16070	DORG	--3		06830 49 08106 00000
16080*				06838
16090	WARN1	BTM	MONITR,02250,,	CALL ERPROC SUBPROGRAM VIA MONITR 06838 17 08562 -2250
16100	BTM	ERPROC,20490,,		WRITE ALARM MESSAGE... BRANCH BACK 06850 17 02410 K0490
16110	STACKR	BTM	MONITR,02230,,	CALL STACK SUBPROGRAM VIA MONITR 06862 17 08562 -2230
16120	BT	STACK,STFL,,		STACK INPUT RECORD
16130	B	DFREAD		06874 27 02410 06163
16140	DORG	--3		06886 49 06302 00000
16150*				06894
16160*				
16170	TLNOD	TD	TL2,NSRT,,	SET CS TOOL MODIFIER
16180	BNR	DFREAD,DSSW,,		BRANCH IF REVIEW MODE PREVAILS 06894 25 06147 02475 06906 45 06302 06158
16190*				
16200	TD	TL1,NSRT,,		SET DS TOOL MODIFIER
17010	B	DFREAD		06918 25 06145 02475
17020	DORG	--3		06930 49 06302 00000
17030*				06938
17040*				
17050	GOMOD	BNR	GOC5,DSSW,,	*ENTRY FOR GO MODIFIER RECORD* BRANCH IF REVIEW MODE PREVAILS 06938 45 06970 06158
17060*				
17070	TD	G01,NSRT,,		SET DS GO MODIFIER
17080	B	DFREAD		06950 25 06347 02475
17090	DORG	--3		06962 49 06302 00000
17100*				06970
17110	GOC5	TD	G02,NSRT,,	SET CS GO MODIFIER
17120	B	DFREAD		06970 25 06337 02475
17130	DORG	--3		06982 49 06302 00000
17140*				06990
17150*				
17160	INTOL	TFM	OUTTOL-9,TOLI	*ENTRY FOR INTOL RECORD* 06990 16 07049 -5994
17170	BNR	**24,DUMPSW,,		BRANCH IF STACK-DUMP MODE PREVAILS 07002 45 07026 06169
17180*				
17190	BNR	WARN1,DSSW,,		BRANCH IF REVIEW MODE PREVAILS 07014 45 06838 06158

17200*				
18010	BTM	MONITR,02240,,		CALL STOL SUBPROGRAM VIA MONITR 07026 17 08562 -2240
18020	BTM	STOL,,,		PROCESS TOLERANCE RECORD 07038 17 02410 -0000
18030	B	BRMODE		07050 49 06818 00000
18040	DORG	--3		07058
18050*				
18060*				
18070	OUTTOL	TFM	OUTTOL-9,TOLO	*ENTRY FOR OUTTOL RECORD* 07058 16 07049 -6014
18080	B	INTOL+12		07070 49 07002 00000
18090	DORG	--3		07078
18100*				
18110*				
18120	CUTTER	BNR	**24,DUMPSW,,	*ENTRY FOR CUTTER RECORD* BRANCH IF STACK-DUMP MODE PREVAILS 07078 45 07102 06169
18130*				
18140	BNR	WARN1,DSSW,,		BRANCH IF REVIEW MODE PREVAILS 07090 45 06838 06158
18150*				
18160	FMUL	FLW+0*10,0.5,,		(CUTTER DIAMETER)/2.0
18170	FFL	TLRAD,FLW+0*10,,		STORE CUTTER RADIUS
18180	BNN	BRMODE,,,		BRANCH IF CUTTER DIAMETER IS POSITIVE 07102 03 02488 06065 07114 06 05984 02488 07126 46 06818 01300
18190*				
18200	ER207	BTM	MONITR,02250,,	CALL ERPROC SUBPROGRAM VIA MONITR 07138 17 08562 -2250
19010	BTM	ERPROC,20700,,		WRITE ERROR MESSAGE... SEARCH FOR END 07150 17 02410 K0700
19020*				
19030*				
19040	INTNO	TFM	NF,,10,,	*ENTRY FOR INTERSECTION NUMBER RECORD* CLEAR INTERSECTION NUMBER INDICATOR 07162 16 06155 000-0
19050	FSUB	FLW+0*10,1.0		07174 02 02488 06075
19060	BN	ER207,,,		BRANCH IF INTERSECTION NO. NOT POSITIVE 07186 47 07138 01300
19070*				
19080	AM	NF,1,10,,		FIX INPUT NUMBER
19090	BD	INTNO+12,FLW+0*10-9		07198 11 06155 000-1 07210 43 07174 02479
19100*				
19110	B	DFREAD		07222 49 06302 00000
19120	DORG	--3		07230
19130*				
19140*				
19150	CUTMOD	BT	MONITR,CUTDSA+5,,	*ENTRY FOR CUTTING MODE RECORD* CALL SCUT SUBPROGRAM VIA MONITR 07230 27 08562 07258
19160	B	SCUT,,,		PROCESS CUT OR DNTCUT RECORD 07242 49 02410 00000
19170	DORG	--4		07249
19180*				
19190	CUTDSA	OSA	DFREAD	07253 00005 -6302
19200	DSC	5,02271		07254 00005
20010*				
20020*				
20030	FROM	BT	MONITR,FRMDSA+5,,	*ENTRY FOR FROM RECORD* CALL SFROM SUBPROGRAM VIA MONITR 07260 27 08562 07288
20040	B	SFROM,,,		PROCESS FROM RECORD
20050	DORG	--4		07272 49 02410 00000
20060*				07279
20070	FRMDSA	OSA	DFREAD	07283 00005 -6302

20080 DSC 5,02281 07284 00005
20090*
20100* *ENTRY FOR INDIRP RECORD*
20110 INDIRP BTM MONITR,02290,, CALL SINDRP SUBPROGRAM VIA MONITR 07290 17 08562 -2290
20120 B SINDRP,,, PROCESS INDIRP RECORD 07302 49 02410 00000
20130 DORG *-3 07310
20140*
20150* *ENTRY FOR INDIRV RECORD*
20160 INDIRV BTM MONITR,02300,, CALL SINDRV SUBPROGRAM VIA MONITR 07310 17 08562 -2300
20170 B SINDRV,,, PROCESS INDIRV RECORD 07322 49 02410 00000
20180 DORG *-3 07330
20190*
20200* *ENTRY FOR GODLTA RECORD*
21010 GODLTA BT MONITR,GOLDISA*5,, CALL SGLDLTA SUBPROGRAM VIA MONITR 07330 27 08562 07358
21020 B SGLDLTA,,, PROCESS GODLTA RECORD 07342 49 02410 00000
21030 DORG *-4 07349
21040*
21050 GOLDISA DSA DFREAD 07353 00005 -6302
21060 DSC 5,02311 07354 00005
21070*
21080* *ENTRY FOR GO TO RECORD*
21090 GOTO/ BT MONITR,GTODSA*5,, CALL SGTOD/ SUBPROGRAM VIA MONITR 07360 27 08562 07388
21100 B SGTOD/,,, PROCESS GO TO RECORD 07372 49 02410 00000
21110 DORG *-4 07379
21120*
21130 GTODSA DSA DFREAD 07383 00005 -6302
21140 DSC 5,02321 07384 00005
21150*
21160* *ENTRY FOR END RECORD*
21170 END BNR ER208,DSSW,, BRANCH IF REVIEW MODE PREVAILS 07390 45 07426 06158
21180*
21190 BTM MONITR,02360,, CALL DSCOUT SUBPROGRAM VIA MONITR 07402 17 08562 -2360
21200 BTM DSCOUT,ARELEM*12,, WRITE END RECORD... BRANCH TO ARELEM*12 07414 17 02410 -6218
22010*
22020 ER208 BTM MONITR,02250,, CALL ERPROC SUBPROGRAM VIA MONITR 07426 17 08562 -2250
22030 BTM ERPROC,20890,, WRITE ERROR MESSAGE... BRANCH BACK 07438 17 02410 K0890
22040 B END*12 07450 49 07402 00000
22050 DORG *-3 07458
22060*
22070* *ENTRY FOR TRACUT RECORD*
22080*
22090 TRACUT BNR **24,DUMPSW,, BRANCH IF STACK-DUMP MODE PREVAILS 07458 45 07482 06169
22100*
22110 BNR STACKR,DSSW,, BRANCH IF REVIEW MODE PREVAILS 07470 45 06862 06158
22120*
22130 BNR TRMODE,FLW*0*10*1,, BRANCH IF TRACUT MATRIX 07482 45 07514 02489
22140*
22150 TRMDSW TD TRCTSW,FLW*0*10*1,, SET TRACUT MODE INDICATOR

22160 B BRMODE 07494 25 06153 02489
22170 DORG *-3 07506 49 06818 00000
22180*
22190 TRMODE TR MATRIX*0*10-9,FLW*0*10-9,, STORE TRACUT MATRIX 07514 31 08431 02479
22200 B TRMDSW 07526 49 07494 00000
23010 DORG *-3 07534
23020*
23030* *ENTRY FOR GO AND OFFSET RECORD*
23040 GO/ TF ARG,ARG,, SAVE INPUT RECORD AND SUB-RECORD TYPE 07534 26 06515 06517
23050*
23060 BT MONITR,GO/DSA*5,, CALL SGO/ SUBPROGRAM VIA MONITR 07546 27 08562 07574
23070 B SGO/,,, PROCESS GO OR OFFSET RECORD 07558 49 02410 00000
23080 DORG *-4 07565
23090*
23100 GO/DSA DSA STACKR 07569 00005 -6862
23110 DSC 5,02331 07570 00005
23120*
23130* *ENTRY FOR TD, PAST, ON AND TAN RECORDS*
23140 EXPL BTM MONITR,02340,, CALL STPOT SUBPROGRAM VIA MONITR 07576 17 08562 -2340
23150 TF TL,TL2,, SAVE TOOL2 07588 26 08229 06147
23160 BTM STPOT,1,10,, PROCESS EXPLICIT CS RECORD 07600 17 02410 000-1
23170 B REVMOD*12 07612 49 07942 00000
23180 DORG *-3 07620
23190*
23200* *ENTRY FOR DRIVING SURFACE RECORD*
24010 DSURF BNR REVMOD,DSSW,, BRANCH IF REVIEW MODE PREVAILS 07620 45 07930 06158
24020*
24030 A INTOF,NSRF,, INTOF=INTOF+NSRF 07632 21 06157 02477
24040 BNR CSURF,DSSW,, BRANCH IF REVIEW MODE PREVAILS 07644 45 07760 06158
24050*
24060 TFM KTEMP,1,10 07656 16 07703 000-1
24070 BTM MONITR,02360,, CALL DSCOUT SUBPROGRAM VIA MONITR 07668 17 08562 -2360
24080 OUTDS BTM DSCOUT,**12,, WRITE ONE AD-APT RECORD... BRANCH BACK 07680 17 02410 -7692
24090*
24100 SM INTOF,,, INTOF=INTOF-KTEMP 07692 12 06157 -0000
24110 KTEMP DS 2,* 07703 00002
24120*
24130 MM INTOF,*4,10, 4*(INTOF-KTEMP) 07704 13 06157 000-4
24140 SF 98 07716 32 00098 00000
24150 DORG *-4 07723
24160*
24170 DSA A&DSCIN 07727 00005 J1514
24180*
24190 TF INTOF,99,, MOVE DS-CS CONFIGURATION TYPE INDICATOR 07728 26 06157 00099
24200 TOM DSSW,,, SET IMPLICIT CS MODE INDICATOR 07740 15 06158 00000
25010 B STACKR 07752 49 06862 00000
25020 DORG *-3 07760

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25030*
25040 CSURF CM  ARG,27,10,      TEST FOR OFFSET RECORD
25050          BE  OFFST,,,      BRANCH IF OFFSET CALCULATION REQUIRED
                                07760 14 06515 000K7
                                07772 46 08262 01200
25060*
25070*          SEARCH DIMTAB FOR DIM NO. AS A FUNCTION OF INTOF
25080          TFM  INDX,DIMTAB  07784 16 07802 -7906
25090          C    ,INTOF      07796 24 00000 06157
25100 INDX   DS    5,0-5        07802 00005
25110*
25120          BNN  MVDND        07808 46 07840 01300
25130*
25140          AM  INDX,6,10     07820 11 07802 000-6
25150          B    INDX-6      07832 49 07796 00000
25160          DORG -3          07840
25170*
25180 MVDND  AM  INDX,4,10     07840 11 07802 000-4
25190          TF  DSDSA+4,INDX,11, MOVE DIM NO. TO DSA 07852 26 07903 0780K
25200          CF  DSDSA+1      07864 33 07900 00000
26010          DORG -4          07871
26020*
26030 HSDSA  DSA  A$DISCA+16    07875 00005 J1796
26040*
26050          BT  MONITR,DSDSA+5,, CALL DS EVALUATION SUBPROGRAM VIA MONITR
                                07876 27 08562 07904
26060          B    SDSRT,,,     BRANCH TO DS SUBPROGRAM
                                07888 49 02410 00000
26070          DORG -4          07895
26080*
26090 DSDSA  DSA  BRCST        07899 00005 -8022
26100          OSC  5,1         07900 00005
26110*
26120 DIMTAB DC  2,4           07906 00002
26130          DC  4,0238,,     LINDS SUBPROGRAM DIM NO.
                                07910 00004
26140          DC  2,8           07912 00002
26150          DC  4,0239,,     CIRDS SUBPROGRAM DIM NO.
                                07916 00004
26160          DC  2,12          07918 00002
26170          DC  4,0240,,     CONDS SUBPROGRAM DIM NO.
                                07922 00004
26180          DC  2,16          07924 00002
26190          DC  4,0241,,     TABDS SUBPROGRAM DIM NO.
                                07928 00004
26200*
27010 REVMOD BNR  ENDMP,DUMPSM,, BRANCH IF DUMP MODE PREVAILS
                                07930 45 08186 06169
27020*
27030          BTM  MONITR,02230,, CALL STACK SUBPROGRAM VIA MONITR
                                07942 17 08562 -2230
27040          BT  STACK,STFL,,   STACK CS RECORD
                                07954 27 02410 06163
27050          BTM  MONITR,02350,, CALL START SUBPROGRAM VIA MONITR
                                07966 17 08562 -2350
27060          BT  START,TL1,,    CHECK STARTUP PARAMETERS
                                07978 27 02410 06145
27070          BNC4 DSURF+12,,,   BRANCH IF NOT EXECUTION-INTERRUPT MODE
                                07990 47 07632 00400
27080*
27090          BTM  MONITR,02630,, CALL AEDUMP SUBPROGRAM VIA MONITR

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                                08002 17 08562 -2630
27100          B    AEDUMP        08014 49 02410 00000
27110          DORG -3          08022
27120*
27130 BRCST  BD  EXPLCS,DSSW,,   BRANCH IF EXPLICIT CS MODE
                                08022 43 08218 06158
27140*
27150 IMPLCS TDM  DUMPSW,9,11,   SET STACK DUMP MODE INDICATOR
                                08034 15 06169 0C00R
27160          TFM  ARG,1,10,    SET STARTUP TEST BYPASS SWITCH
                                08046 16 06515 000-1
27170*
27180          TD  TL1,TL2       08058 25 06145 06147
27190          TD  G01,G02       08070 25 06347 06337
27200*
28010*          MOVE STACKED RECORDS TO INPUT AREA FOR PROCESSING
28020 DUMP   TFM  DMPFL+11,FLWST+0*10-9 08082 16 08165 -3353
28030          TFM  ++23,FXWST+0*27-23 08094 16 08117 -5517
28040          TF  ++22          08106 26 08128 00000
28050 MOD   AM  DMPFL+11,1,9     08118 11 08165 00-01
28060          AM  MOD-1,24,10    08130 11 08117 000K4
28070 DMPFX  TR  NSECT-1,MOD-1,11, MOVE FIXED-WORD PORTION OF RECORD
                                08142 31 02452 0811P
28080 DMPFL  TR  FLW+0*10-9,,,   MOVE FLOATING-WORD PORTION OF RECORD
                                08154 31 02479 00000
28090          AM  MOD-1,3,10     08166 11 08117 000-3
28100          B    SEQOK+12,,,   PROCESS DUMPED RECORD
                                08178 49 06350 00000
28110          DORG -3          08186
28120*
28130*          CS RECORD PROCESSED... STACK DUMPING TERMINATES
28140 ENDMP  TD  KUT1,KUT2       08186 25 06148 06149
28150          TFM  NF,1,10       08198 16 06155 000-1
28160          B    DFREAD-24     08210 49 06278 00000
28170          DORG -3          08218
28180*
28190*          STACK DUMPING NOT REQUIRED... CS WAS EXPLICIT
28200 EXPLCS TDM  TL2,,,        RESTORE TOOL2
                                08218 15 06147 00000
29010 TLT   DS    1,0          08229 00001
29020*
29030          TD  TL1,TL2       08230 25 06145 06147
29040          TFM  ARG,1,10,    TURN OFF OFFSET CONTROL SWITCH
                                08242 16 06515 000-0
29050          B    DFREAD-36     08254 49 06266 00000
29060          DORG -3          08262
29070*
29080 OFFST  BT  MONITR,OFSDSA+5,, CALL SOFFST SUBPROGRAM VIA MONITR
                                08262 27 08562 08290
29090          B    SOFFST,,,     PROCESS OFFSET STATEMENT
                                08274 49 02410 00000
29100          DORG -4          08281
29110*
29120 OFSDSA DSA  EXPLCS        08285 00005 -8218
29130          DSC  5,02421      08286 00005
29140*
29150 ER203  BTM  MONITR,02250,, CALL ERPROC SUBPROGRAM VIA MONITR
                                08292 17 08562 -2250
29160          BTM  ERPROC,20390,, WRITE ERROR MESSAGE... EXIT AD-APT
                                08304 17 02410 K0390
29170          CALL EXIT
                                08316 49 00796 00000
29180*

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29190*
29200*
30010 FINI BNR ER208F,DSSW,, *ENTRY FOR FINI RECORD*
                                BRANCH IF REVIEM MODE PREVAILS
                                08324 45 084C0 06158
30020*
30030 BTM MONITR,02360,, CALL DSCOUT SUBPROGRAM VIA MONITR
                                08336 17 08562 -2360
30040 BTM DSCOUT,012,, WRITE FINI RECORD... BRANCH BACK
                                08348 17 02410 -8360
30050 TFM 9ACYLO,17,10, SET REPOSITION ADDRESS TO CYL. 17
                                08360 16 00513 000J7
30060 CALL LINK,MOVDAT,, EXIT ARELEM TO MOVDAT SUBPROGRAM
                                08372 10 00565 -8391
                                08384 49 00716 00000
                                08391 00007 LKO-397
                                08398 00001 '
30070*
30080 ER208F BTM MONITR,02250,, CALL ERPROC SUBPROGRAM VIA MONITR
                                08400 17 08562 -2250
30090 BTM ERPROC,20890,, WRITE ERROR MESSAGE... EXIT ARELEM
                                08412 17 02410 K0890
                                08424 49 08336 00000
                                08431
30100 B FINI*12
30110 DORG *-4
30120*
30130 MATRIX DSB 10,12,, TRACUT MATRIX ARRAY 08440 00120
30140 DS 1,, RECORD MARK ALLOCATION
                                08551 00001
30150*
30160*
30170 DSCOUT DS ,-ENTRY1 02410 00000
30180 GORGT DS ,GOMOD 06938 00000
30190 GOFWD DS ,GOMOD 06938 00000
30200 GOLFT DS ,GOMOD 06938 00000
31010 TLLFT DS ,TLMOD 06894 00000
31020 PAST DS ,EXPL 07576 00000
31030 TO DS ,EXPL 07576 00000
31040 ON DS ,EXPL 07576 00000
31050 TLOD DS ,TLMOD 06894 00000
31060 TLRGT DS ,TLMOD 06894 00000
31070 GOBACK DS ,GOMOD 06938 00000
31080 OFFSET DS ,GO/ 07534 00000
31090 TAN DS ,EXPL 07576 00000
31100 DNTCUT DS ,CUTMOD 07230 00000
31110 CUT DS ,CUTMOD 07230 00000
31120 SPSIS DS ,-ENTRY1 02410 00000
31130 ERPROC DS ,-ENTRY1 02410 00000
31140 STACK DS ,-ENTRY1 02410 00000
31150 STOL DS ,-ENTRY1 02410 00000
31160 SCUT DS ,-ENTRY1 02410 00000
31170 SFROM DS ,-ENTRY1 02410 00000
31180 SINDRP DS ,-ENTRY1 02410 00000
31190 SINDRV DS ,-ENTRY1 02410 00000
31200 SGLTYA DS ,-ENTRY1 02410 00000
32010 SGO TO/ DS ,-ENTRY1 02410 00000
32020 SGO/ DS ,-ENTRY1 02410 00000
32030 STPOT DS ,-ENTRY1 02410 00000
32040 SDSRT DS ,-ENTRY1 02410 00000
32050 START DS ,-ENTRY1 02410 00000
32060 SOFFST DS ,-ENTRY1 02410 00000
32070 AEDUMP DS ,-ENTRY1 02410 00000

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32080*
32090*
32100*
32110*
32120*
32130*
32140*
32150*
32160*
32170*
32180*
32190*
32200*
33010*
33020*
33030*
33040*
33050*
33060*
33070*
33080*
33090*
33100*
33110*
33120*
33130*
33140*
33150*
33160 DC 10,0 08561 00010
33170 RETADD DS 5,0-5, RETURN ADDRESS FOR NON-ERASABLE PROGRAMS
                                08556 00005
33180 DIMNO DS 4,0-1, AD-APT MONITR DIM NO 08560 00004
33190 ERAS DS 1,0, ERASABILITY INDICATOR 08561 00001
33200*
34010 MONITR SF DIMNO-3 08562 32 08557 00000
34020 DORG *-4 08569
34030*
34040 DSA MAPENT*0=20-15 08573 00005 J0795
34050*
34060 TFM CNTR,NE,10 08574 16 08583 000K9
34070 BD CALLNE,ERAS,, BRANCH IF CALLING NON-ERASABLE PROGRAM
                                08586 43 09336 08561
34080*
34090 CALLE TFM POINTR,MAPENT*20*NNE-16 08598 16 08616 J0934
34100 SCAM C ,DIMNO,, SEARCH ERASABLE PROGRAM TABLE FOR DIM NO
                                08610 24 00000 08560
34110 BE INMAP,, BRANCH IF DIMNO LOCATED
                                08622 46 09908 01200
34120*
34130 AM POINTR-1,2,10 08634 11 08615 000-2
34140 SM CNTR,1,10 08646 12 08983 000-1
34150 BNZ SCAM,, BRANCH IF END OF TABLE NOT ENCOUNTERED
                                08658 47 08610 01200
34160*
34170 NUDIM SM POINTR-1,2,10, DIM NO NOT ENTERED IN ERASABLE PROG. TABLE
                                08670 12 08615 000-2
                                08682 14 08616 J0914
34180 CM POINTR,MAPENT*NNE*20-20-16 08694 47 10548,01100
34190 BNP NEOVF,, BRANCH IF ERASABLE PROG. TABLE CAPACITY EXCEEDED
34200*

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IBM 1620-1311 AD-APT SUBPROGRAM FOR SUPERVISING
THE LOADING OF AD-APT SUBROUTINES AND SUBPROGRAMS RCS
LINKAGE - BTM MONITR,NNNO,67, (ERASABLE PROG.)
BT MONITR,DSALBL*5,6, (NON-ERASABLE PROG.)
NNNN IS THE AD-APT MONITR CIM NO OF CALLED PROG.
FIELD AT DSALBL*5 IS EQUIVALENT TO FOLLOWING...
DSALBL DSA RA RETURN ADDRESS TO CALLING PROG.
DSC 4,NNNN, AD-APT MONITR DIM NO
DSC 1,1, ANY NON-ZERO DIGIT
*ERASABLE PROGRAMS NEVER CALL OTHER PROGRAMS
*NON-ERASABLE PROGRAMS CALL OTHER PROGRAMS
*ERASABLE PROGRAMS MUST EXIT BY BRANCH BACK
OR BY BRANCH (TO A FIXED ADDRESS)
*NON-ERASABLE PROGRAMS MUST EXIT BY BRANCH
INDIRECT TO RETURN (IN AD-APT SYSTEM COMMON AREA)


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39170      BNE MEMGAP,,          BRANCH IF LOAD ADDRESS NOT EQUAL TO HI
39180*
39190      SM  POINTR,5,10        09437 12 08616 000-5
39200      CF  POINTR,,6,        CLEAR ERASURE FLAG    09444 33 08610 00000
40010      AM  POINTR-1,1,10     09456 11 08615 000-1
40020      TF  ENTRY1,POINTR,11, SET ENTRY ADDRESS IN SYSTEM COMMON AREA
                                      09468 26 02416 08610
40030*
40040      AM  POINTR,5,10        09480 11 08616 000-5
40050      TF  COMP+11,POINTR,11, RESTORE COMP+11 (SIMULATE LOADING)
                                      09492 26 09073 08610
40060      TF  POINTR,RETADD,6,, REPLACE RETURN ADDRESS
                                      09504 26 08610 08556
40070      TF  HI,COMP+11,,      RESTORE HI INDICATOR  09516 26 00434 09073
40080      B   STNTRY+12         09528 49 09106 00000
40090      DORG #-3              09536
40100*
40110 STRADD TF POINTR,RETADD,6,, STORE RETURN ADDRESS  09536 26 08610 08556
40120*
40130*          CLEAR NON-ERASABLE PROGRAM ENTRIES WHOSE LOAD
40140*          ADDRESSES ARE LESS THAN THE HI INDICATOR
40150      SM  POINTR-1,1,10     09548 12 08615 000-1
40160      TF  ENDTAB+18,POINTR  09560 26 09614 08616
40170      AM  ENDTAB+17,2,10    09572 11 09613 000-2
40180      CM  ENDTAB+18,MAPENT+20*NNE-10 09584 14 09614 J0940
40190 ENDTAB BNM SETPT+12,,,    BRANCH IF END OF TABLE ENCOUNTERED
                                      09596 46 09002 01300
40200*
40210      C   ,HI              09608 24 00000 00434
40220      BNM ENDTAB-24,,,      BRANCH IF ENTRY NEED NOT RE CLEARED
                                      09620 46 09572 01300
40230*
40240      SM  ENDTAB+18,5,10    09632 12 09614 000-5
40250      TFM ENDTAB+18,,6711,, CLEAR NON-ERASABLE ENTRY FROM TABLE
                                      09644 16 0961M -000-
40260      AM  ENDTAB+18,25,10   09656 11 09614 000K5
40270      B   ENDTAB-12         09668 49 09584 00000
40280      DORG #-3              09676
40290*
40300 INDEX AM POINTR-1,2,10    09676 11 08615 000-2
40310      CM  POINTR,MAPENT+NNE+20-15 09688 14 08616 J0935
40320      BN  CALLNE+12,,,      BRANCH IF NON-ERASABLE PROGRAM TABLE
                                      09700 47 09348 01300
40330*          CAPACITY NOT EXCEEDED
40340*
40350 NNEOVF TFM WRERR+9,NNECDN,9 09712 16 09757 00K23
40360      TFM LO,20000,,        RE-DEFINE LO INDICATOR
                                      09724 16 09875 K0000
40370      BTM MONITR,ERRDIM,,    CALL ERROR PROCESSING SUBPROGRAM
                                      09736 17 08562 -2250
40380 WRERR BTM ERROUT,90,67,,  WRITE ERROR MESSAGE... CALL EXIT
                                      09748 17 02410 -0090
40390      CALL EXIT,,,          EXIT AD-APT SYSTEM (NON-RECOVERABLE)
                                      09760 49 00796 00000
40400*          MONITR TABLE OVERFLOW ERROR)
40410*
40420*          *ENTRY FOR INDIRECT RETURN TO NON-ERASABLE PROGS.
40430*          *SEARCH FOR LAST EXITED PROGRAM
40440 RETURN TFM POINTR,MAPENT-1+20-15,,

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42050      AM  POINTR-1,2,10     09768 16 08616 J0775
42060      BNF #-12,POINTR,11,,  BRANCH IF PROGRAM NOT ERASED
                                      09780 11 08615 000-2
                                      09792 44 09780 08610
42070*
42080      SM  POINTR,5,10        09804 12 08616 000-5
42090      TF  EXIT+6,POINTR,11, SET RETURN ADDRESS    09816 26 09906 08610
42100      TF  POINTR,HI,6,,      SAVE HI INDICATOR    09828 26 08610 00434
42110*
42120      TF  COMP+11,HI,,       STORE HI INDICATOR   09840 26 09073 00434
42130*
42140      SM  POINTR,15,10       09852 12 08616 000J5
42150      SF  POINTR,,6,,       SET NON-ERASABLE PROGRAM EXIT FLAG
                                      09864 32 08610 00000
42160 LO    DC   5,-1,,          LO INDICATOR         09875 00005
42170*
42180      AM  POINTR,5,10        09876 11 08616 000-5
42190      TF  HI,POINTR,11,,    RESET HI INDICATOR TO EFFECT OVERLOAD
                                      09888 26 00434 08610
42200 EXIT  B   ...             RETURN TO CALLING PROGRAM
                                      09900 49 00000 00000
42210*          DORG #-3          09908
42220*
42230*          DIM NO IS IN ERASABLE PROGRAM TABLE
42240 INMAP AM POINTR,1,10       09908 11 08616 000-1
42250      BNF INCORE,POINTR,11,, BRANCH IF PROGRAM IS IN MEMORY
                                      09920 44 10348 08610
42260*
42270      CF  POINTR,,6,        CLEAR ERASURE FLAG    09932 33 08610 00000
42280      AM  POINTR,15,10,,    LOAD ERASABLE PROGRAM INTO UPPER MEMORY
                                      09944 11 08616 000J5
42290      TF  TEMP,LO,,         IF (LO-NO. CORES) IS NOT LESS THAN HI
                                      09956 26 09255 09875
42300      TF  LOPRM,LO,,        SAVE LO INDICATOR    09968 26 09943 09875
42310      S   TEMP,POINTR,11,, TEMP=(LO-NO. CORES)  09980 22 09255 08610
42320      C   TEMP,HI           09992 24 09255 00434
42330      BL  NOFIT,,,          BRANCH IF HI EXCEEDS (LO-NO. CORES)
                                      10004 47 10380 01300
42340*
42350 FIT   TF  LO,TEMP,,        RE-DEFINE LO INDICATOR
                                      10016 26 09875 09255
42360      SM  POINTR-1,1,10     10028 12 08615 000-1
42370      TF  TEMP,HI,,         SAVE HI INDICATOR    10040 26 09255 00434
42380      TF  HI,LO,,          SET HI TO LO        10052 26 00434 09875
42390      TFM VARB+6,LOLOAD     10064 16 08884 J0084
42400      B   LODI-36           10076 49 08790 00000
42410      DORG #-3              10084
42420*
42430 LLOAD TF HI,TEMP,,        RESTORE HI INDICATOR  10084 26 00434 09255
42440*
42450*          ERASE ENTRIES OF ERASABLE PROGRAMS WHOSE HIGHEST
42460*          CORE IS GREATER THAN LO INDICATOR, AND WHOSE LOAD
42470*          ADDRESS IS LESS THAN THE PREVIOUS LO INDICATOR
42480*
42490      TFM LAMLOP+6,MAPENT+20*NNE-1+20-10 10096 16 10150 J0920
42500      AM  LAMLOP+5,2,10     10108 11 10149 000-2
42510 EXTNT CM LAMLOP+6,MAPENT+20*NNE+20*NNE-1+20-10 10120 14 10150 J1500
42520      BP  CLEAR2,,,         BRANCH IF ERASING COMPLETED
                                      10132 46 10316 01100
42530*
42540*

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44140 LAMLOP C ,LOPRM 10144 24 0000 09943
44150 BNM EXTNT-12,,, BRANCH IF PREVIOUS LO EXCEEDS LOAD ADDRESS
10156 46 10108 01300

44160*
44170 TF LOMHIP+11,LAMLOP+6,11 10168 26 10215 1015-
44180 AM LAMLOP+5,1,10 10180 11 10149 000-1
44190 A LOMHIP+11,LAMLOP+6,11 10192 21 10215 1015-
44200 LOMHIP CM LD 10204 14 09875 -0000
45010 BN CSELF,,, BRANCH IF HIGHEST CORE USED EXCEEDS PRESENT LO
10216 47 10248 01300

45020*
45030 AM LAMLOP+5,1,10 10228 11 10149 000-1
45040 B EXTNT 10240 49 10120 00000
45050 DORG --3 10248
45060*
45070 CSELF SM LAMLOP+6,15,10 10248 12 10150 000J5
45080 C LAMLOP+6,ERAS,6 10260 24 1015- 08561
45090 BE ERENT+12,,, BRANCH IF ENTRY IS SAME AS DIMNO
10272 46 10296 01200

45100*
45110 ERENT SF LAMLOP+6,,6, ERASE ENTRY 10284 32 1015- 00000
45120 AM LAMLOP+6,25,10 10296 11 10150 000K5
45130 B EXTNT 10308 49 10120 00000
45140 DORG --3 10316
45150*
45160* CLEAR NON-ERASABLE PROGRAM ENTRIES WHOSE
45170* HIGHEST CORE EXCEEDS THE LO INDICATOR
45180*
45190 CLEARZ TFM PRGX-18,STNTRY 10316 16 10442 -9094
45200 TFM PRGX+23,LO 10328 16 10483 -9875
46010 B CLEAR1 10340 49 10400 00000
46020 DORG --3 10348
46030*
46040* PROGRAM CALLED IS IN MEMORY
46050*
46060 INCORE AM POINTR-1,1,10 10348 11 08615 000-1
46070 TF ENTRY1,POINTR,11, SET ENTRY ADDRESS IN SYSTEM COMMON AREA
10360 26 02416 08610
46080 B STNTRY+12 10372 49 09106 00000
46090 DORG --3 10380
46100*
46110* CALLED PROGRAM MUST BE LOADED PER HI INDICATOR
46120*
46130 NOFIT SM POINTR-1,1,10 10380 12 08615 000-1
46140 B STDIM+24 10392 49 08766 00000
46150 DORG --3 10400
46160*
46170 CLEAR1 TFM PRGX-1,MAPENT-1*20-15 10400 16 10459 J0775
46180 AM PRGX-2,2,10 10412 11 10458 000-2
46190 CM PRGX-1,MAPENT+NNE*20-1*20-15 10424 14 10459 J0915
46200 BP ,,,, BRANCH IF ENTRY CLEARING COMPLETED
10436 46 00000 01100

47010*
47020 BNF CLEAR1+12,,, BRANCH IF PROGRAM NOT EXITED
10448 44 10412 00000

47030*
47040 PROGX AM PRGX-1,15,10 10460 11 10459 000J5
47050 C PRGX-1,,6 10472 24 1045R C0000
47060 BP CLENT1,,, BRANCH IF ENTRY CLEARING IS REQUIRED
10484 46 10516 01100

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47070*
47080 AM PRGX-1,5,10 10496 11 10459 000-5
47090 B CLEAR1+24 10508 49 10424 00000
47100 DORG --3 10516
47110*
47120 CLENT1 SM PRGX-1,15,10 10516 12 10459 000J5
47130 TFM PRGX-1,,6711, CLEAR NON-ERASABLE PROGRAM ENTRY
10528 16 1045R -000-
10540 49 10412 00000
47140 B CLEAR1+12 10548
47150 DORG --3 10548
47160*
47170 NEOVF TFM WRERR+9,NECON,9 10548 16 09757 00K22
47180 B NNEOVF+12 10560 49 09724 00000
47190 DORG --3 10568
47200*
48010 SPTEST BNF **20,MAPENT+NNE*20+1*20-15,, BRANCH IF SORTF IS AVAILABLE
10568 44 10588 10955

48020*
48030 NOO200 B STDIM-12 10580 49 08730 00000
48040 DORG --3 10588
48050*
48060 CM DIMNO,0210,8 10588 14 08560 0-210
48070 BE CDFUV,,, BRANCH IF CALLING DISTF SUBPROGRAM
10600 46 10636 01200

48080*
48090 CM DIMNO,0211,8 10612 14 08560 0-211
48100 BNE STDIM-12,,, BRANCH IF CALLING UNITY SUBPROGRAM
10624 47 08730 01200

48110*
48120 CDFUV TF ARROW,POINTR 10636 26 10690 08616
48130 AM ARROW-1,2,10 10648 11 10689 000-2
48140 CM ARROW,MAPENT+NNE*20-16 10660 14 10690 J0934
48150 BNM STDIM-12 10672 46 08730 01300
48160*
48170 C ,DIMNO 10684 24 00000 08560
48180 BNE CDFUV+12 10696 47 10648 01200
48190*
48200 NOLOAD TFM 02411,SPRET,, SET SPECIAL RETURN ADDRESS IN SYST. CMN.
10708 16 02411 J0752
10720 11 10690 000J1
49010 AM ARROW,11,10 10732 26 08616 10690
49020 TF POINTR,ARROW 10744 49 10360 00000
49030 B INCORE+12 10752
49040 DORG --3
49050*
49060 SPRET TFM 02411,RETURN,, RESTORE RETURN DSA IN SYST. CMN.
10752 16 02411 -9768
49070 B RETADD,,6, RETURN TO CALLING PROGRAM
10764 49 08550 00000
49080 DORG --3 10772
49090*
49100 MENGAP SM POINTR,6,10 10772 12 08616 000-6
49110 B SPTEST 10784 49 10568 00000
49120 DORG --4 10791
49130*
49140 NME OS 2,7, MAXIMUM NO. OF LINKS IN NON-ERASABLE CALLING CHAIN
00007 00002
49150 NE OS 2,29, MAXIMUM NO. OF ERASABLE PROGRAMS TO BE CALLED
00029 00002
49160 MAPENT DSB 20,NME 10810 00140
49170 DSA 20,NME 10950 00580

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49180*
49190*
49200*
50010*
50020*
50030*
50040*
50050
50060
50070
50080
50090
50100
50110
50120
50130
50140
50150
50160
50170
50180
50190
50200
51010
51020
51030
51040
51050
51060
51070
51080
51090
51100
51110
51120
51130
51140*
51150*
51160*
51170*
51180*
51190*
51200*

*FORMAT OF NON-ERASABLE PROGRAM ENTRIES...

AD-APT	MONITR	NON-ZERO	LOAD	ENTRY	RETURN
DIM NO		DIGIT	ADDRESS	ADDRESS	ADDRESS
XXXX		X	XXXXX	XXXXX	XXXXX
DORG	HAPENT+0*20-19			10791	
DC	5,-0			10795	00005
DC	5,0			10800	00005
DORG	HAPENT+0*20-4			10806	
DC	5,0			10810	00005
DC	5,-0			10815	00005
DC	5,0			10820	00005
DORG	HAPENT+1*20-4			10826	
DC	5,0			10830	00005
DC	5,-0			10835	00005
DC	5,0			10840	00005
DORG	HAPENT+2*20-4			10846	
DC	5,0			10850	00005
DC	5,-0			10855	00005
DC	5,0			10860	00005
DORG	HAPENT+3*20-4			10866	
DC	5,0			10870	00005
DC	5,-0			10875	00005
DC	5,0			10880	00005
DORG	HAPENT+4*20-4			10886	
DC	5,0			10890	00005
DC	5,-0			10895	00005
DC	5,0			10900	00005
DORG	HAPENT+NNE*20-2*20-4			10906	
DC	5,0			10910	00005
DC	5,-0			10915	00005
DC	5,0			10920	00005
DORG	HAPENT+NNE*20-1*20-4			10926	
DC	5,0			10930	00005

*FORMAT OF ERASABLE PROGRAM ENTRIES...

AD-APT	MONITR	ZERO	LOAD	ENTRY	NUMBER
DIM NO		DIGIT	ADDRESS	ADDRESS	CORES
XXXX		X	XXXXX	XXXXX	XXXXX
DORG	HAPENT+NNE*20+0*20-19			10931	
DC	4,0214,,		NORMLN SUBPROGRAM DIMNO		
				10934	00004
DC	1,0			10935	00001
DC	5,99999,,		DUMMY LOAD ADDRESS	10940	00005
DORG	HAPENT+NNE*20+0*20-4			10946	
DC	5,236,,		NORMLN SUBPROGRAM CORE SIZE		
				10950	00005
DC	4,0200,,		SQRTF SUBROUTINE DIMNO		
				10954	00004
DC	1,0			10955	00001
DC	5,99999,,		DUMMY LOAD ADDRESS	10960	00005
DORG	HAPENT+NNE*20+1*20-4			10966	
DC	5,446,,		SQRTF SUBROUTINE CORE SIZE		
				10970	00005
DC	4,0201,,		SINF-COSF SUBROUTINE DIMNO		
				10974	00004

52130	DC	1,0		10975	00001
52140	DC	5,99999,,	DUMMY LOAD ADDRESS	10980	00005
52150	DORG	HAPENT+NNE*20+2*20-4		10986	
52160	DC	5,488,,	SINF-COSF SUBROUTINE CORE SIZE		
				10990	00005
52170	DC	4,0250,,	FBOFFS SUBPROGRAM DIMNO		
				10994	00004
52180	DC	1,0		10995	00001
52190	DC	5,99999,,	DUMMY LOAD ADDRESS	11000	00005
52200	DORG	HAPENT+NNE*20+3*20-4		11006	
53010	DC	5,264,,	FBOFFS SUBPROGRAM CORE SIZE		
				11010	00005
53020	DC	4,0212,,	LCNONI SUBPROGRAM DIMNO		
				11014	00004
53030	DC	1,0		11015	00001
53040	DC	5,99999,,	DUMMY LOAD ADDRESS	11020	00005
53050	DORG	HAPENT+NNE*20+4*20-4		11026	
53060	DC	5,292,,	LCNONI SUBPROGRAM CORE SIZE		
				11030	00005
53070	DC	4,0202,,	ATANF SUBROUTINE DIMNO		
				11034	00004
53080	DC	1,0		11035	00001
53090	DC	5,99999,,	DUMMY LOAD ADDRESS	11040	00005
53100	DORG	HAPENT+NNE*20+5*20-4		11046	
53110	DC	5,738,,	ATANF SUBROUTINE CORE SIZE		
				11050	00005
53120	DC	4,0223,,	STACK SUBPROGRAM DIMNO		
				11054	00004
53130	DC	1,0		11055	00001
53140	DC	5,99999,,	DUMMY LOAD ADDRESS	11060	00005
53150	DORG	HAPENT+NNE*20+6*20-4		11066	
53160	DC	5,140,,	STACK SUBPROGRAM CORE SIZE		
				11070	00005
53170	DC	4,0249,,	LROFFS SUBPROGRAM DIMNO		
				11074	00004
53180	DC	1,0		11075	00001
53190	DC	5,99999,,	DUMMY LOAD ADDRESS	11080	00005
53200	DORG	HAPENT+NNE*20+7*20-4		11086	
54010	DC	5,226,,	LROFFS SUBPROGRAM CORE SIZE		
				11090	00005
54020	DC	4,0235,,	START SUBPROGRAM DIMNO		
				11094	00004
54030	DC	1,0		11095	00001
54040	DC	5,99999,,	DUMMY LOAD ADDRESS	11100	00005
54050	DORG	HAPENT+NNE*20+8*20-4		11106	
54060	DC	5,244,,	START SUBPROGRAM CORE SIZE		
				11110	00005
54070	DC	4,0218,,	FISH SUBPROGRAM DIMNO		
				11114	00004
54080	DC	1,0		11115	00001
54090	DC	5,99999,,	DUMMY LOAD ADDRESS	11120	00005
54100	DORG	HAPENT+NNE*20+9*20-4		11126	
54110	DC	5,204,,	FISH SUBPROGRAM CORE SIZE		
				11130	00005
54120	DC	4,0205,,	LINLIN SUBPROGRAM DIMNO		
				11134	00004
54130	DC	1,0		11135	00001
54140	DC	5,99999,,	DUMMY LOAD ADDRESS	11140	00005
54150	DORG	HAPENT+NNE*20+10*20-4		11146	
54160	DC	5,228,,	LINLIN SUBPROGRAM CORE SIZE		
				11150	00005

54170	DC	4,0236,,	DSCOUT SUBPROGRAM DIMNO	11154	00004
54180	DC	1,0		11155	00001
54190	DC	5,99999,,	DUMMY LOAD ADDRESS	11160	00005
54200	DORG	MAPENT+NNE=20+11*20-4		11166	
55010	DC	5,360,,	DSCOUT SUBPROGRAM CORE SIZE	11170	00005
55020	DC	4,0213,,	MINIF-MAXIF SUBPROGRAM DIMNO	11174	00004
55030	DC	1,0		11175	00001
55040	DC	5,99999,,	DUMMY LOAD ADDRESS	11180	00005
55050	DORG	MAPENT+NNE=20+12*20-4		11186	
55060	DC	5,92,,	MINIF-MAXIF SUBPROGRAM CORE SIZE	11190	00005
55070	DC	4,0234,,	STPOT SUBPROGRAM DIMNO	11194	00004
55080	DC	1,0		11195	00001
55090	DC	5,99999,,	DUMMY LOAD ADDRESS	11200	00005
55100	DORG	MAPENT+NNE=20+13*20-4		11206	
55110	DC	5,150,,	STPOT SUBPROGRAM CORE SIZE	11210	00005
55120	DC	4,0224,,	STOL SUBPROGRAM DIMNO	11214	00004
55130	DC	1,0		11215	00001
55140	DC	5,99999,,	DUMMY LOAD ADDRESS	11220	00005
55150	DORG	MAPENT+NNE=20+14*20-4		11226	
55160	DC	5,92,,	STOL SUBPROGRAM CORE SIZE	11230	00005
55170	DC	4,0222,,	SPSIS SUBPROGRAM DIMNO	11234	00004
55180	DC	1,0		11235	00001
55190	DC	5,99999,,	DUMMY LOAD ADDRESS	11240	00005
55200	DORG	MAPENT+NNE=20+15*20-4		11246	
56010	DC	5,126,,	SPSIS SUBPROGRAM CORE SIZE	11250	00005
56020	DC	4,0225,,	ERPROC SUBPROGRAM DIMNO	11254	00004
56030	DC	1,0		11255	00001
56040	DC	5,99999,,	DUMMY LOAD ADDRESS	11260	00005
56050	DORG	MAPENT+NNE=20+16*20-4		11266	
56060	DC	5,388,,	ERPROC SUBPROGRAM CORE SIZE	11270	00005
56070	DC	4,0230,,	SINDRV SUBPROGRAM DIMNO	11274	00004
56080	DC	1,0		11275	00001
56090	DC	5,99999,,	DUMMY LOAD ADDRESS	11280	00005
56100	DORG	MAPENT+NNE=20+17*20-4		11286	
56110	DC	5,100,,	SINDRV SUBPROGRAM CORE SIZE	11290	00005
56120	DC	4,0203,,	EXPF SUBROUTINE DIMNO	11294	00004
56130	DC	1,0		11295	00001
56140	DC	5,99999,,	DUMMY LOAD ADDRESS	11300	00005
56150	DORG	MAPENT+NNE=20+18*20-4		11306	
56160	DC	5,768,,	EXPF SUBROUTINE CORE SIZE	11310	00005
56170	DC	4,0204,,	LOGF SUBROUTINE DIMNO	11314	00004
56180	DC	1,0		11315	00001
56190	DC	5,99999,,	DUMMY LOAD ADDRESS	11320	00005
56200	DORG	MAPENT+NNE=20+19*20-4		11326	
57010	DC	5,632,,	LOGF SUBROUTINE CORE SIZE	11330	00005

57020	DC	4,0226,,	FSPKG SUBPROGRAM DIMNO	11334	00004
57030	DC	1,0		11335	00001
57040	DC	5,99999,,	DUMMY LOAD ADDRESS	11340	00005
57050	DORG	MAPENT+NNE=20+20*20-4		11346	
57060	DC	5,3070,,	FSPKG SUBPROGRAM CORE SIZE	11350	00005
57070	DC	4,0251,,	DTDS SUBPROGRAM DIMNO	11354	00004
57080	DC	1,0		11355	00001
57090	DC	5,99999,,	DUMMY LOAD ADDRESS	11360	00005
57100	DORG	MAPENT+NNE=20+21*20-4		11366	
57110	DC	5,124,,	DTDS SUBPROGRAM CORE SIZE	11370	00005
57120	DC	4,0252,,	STRACT SUBPROGRAM DIMNO	11374	00004
57130	DC	1,0		11375	00001
57140	DC	5,99999,,	DUMMY LOAD ADDRESS	11380	00005
57150	DORG	MAPENT+NNE=20+22*20-4		11386	
57160	DC	5,318,,	STRACT SUBPROGRAM CORE SIZE	11390	00005
57170	DC	4,0208,,	DYDX SUBPROGRAM DIMNO	11394	00004
57180	DC	1,0		11395	00001
57190	DC	5,99999,,	DUMMY LOAD ADDRESS	11400	00005
57200	DORG	MAPENT+NNE=20+23*20-4		11406	
58010	DC	5,290,,	DYDX SUBPROGRAM CORE SIZE	11410	00005
58020	DC	4,0229,,	SINDRP SUBPROGRAM DIMNO	11414	00004
58030	DC	1,0		11415	00001
58040	DC	5,99999,,	DUMMY LOAD ADDRESS	11420	00005
58050	DORG	MAPENT+NNE=20+24*20-4		11426	
58060	DC	5,168,,	SINDRP SUBPROGRAM CORE SIZE	11430	00005
58070	DC	4,0262,,	ELINF SUBPROGRAM DIMNO	11434	00004
58080	DC	1,0		11435	00001
58090	DC	5,99999,,	DUMMY LOAD ADDRESS	11440	00005
58100	DORG	MAPENT+NNE=20+25*20-4		11446	
58110	DC	5,292,,	ELINF SUBPROGRAM CORE SIZE	11450	00005
58120	DC	4,0263,,	AEDUMP SUBPROGRAM DIMNO	11454	00004
58130	DC	1,0		11455	00001
58140	DC	5,99999,,	DUMMY LOAD ADDRESS	11460	00005
58150	DORG	MAPENT+NNE=20+26*20-4		11466	
58160	DC	5,476,,	AEDUMP SUBPROGRAM CORE SIZE	11470	00005
58170	DC	4,0271,,	LCNON2 SUBPROGRAM DIMNO	11474	00004
58180	DC	1,0		11475	00001
58190	DC	5,99999,,	DUMMY LOAD ADDRESS	11480	00005
58200	DORG	MAPENT+NNE=20+27*20-4		11486	
59010	DC	5,282,,	LCNON2 SUBPROGRAM CORE SIZE	11490	00005
59020	DC	4,0,,	DUMMY DIMNO	11494	00004
59030	DC	1,0		11495	00001
59040	DC	5,99999,,	DUMMY LOAD ADDRESS	11500	00005
59050	DORG	MAPENT+NNE=20+NE=20-4		11506	
59060	DC	5,0,,	DUMMY CORE SIZE	11510	00005

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59080 CNTR DS 2,MONTR+21 08583 00002
59090 POINTR DS ,SCAN+6 08E16 00000
59100 HI DS 5,434 00434 00005
59110 ENTRY DS 5,2136 02136 00005
59120 DNCS DS 4,0201 00201 00004
59130 TEMP DS 5,ERASE+11 09255 00005
59140 LOPRM DS 5,INMAP+35 09943 00005
59150 NECON DS ,222 00222 00000
59160 NNECON DS ,223 00223 00000
59170 ERRDIM DS ,02250 02250 00000
59180 ERRDUT DS ,2416 02416 00000
59190 ARROW DS 5,NLOAD-24+6 10690 00005
59200 DS 1 11511 00001
60010+
60020+
60030 HEAD A 00000
60040+ IBM 1620-1311 AD-APT DISC-FILE INPUT SUBROUTINE
60050+ RCS
60060+ LINKAGE - BTM DSCIN,1,10
60070 DC 2,0,, DUMMY ARGUMENT 11513 00002
60080+
60090+ SUBPROGRAM ENTRY
60100 DSCIN TDM EXIT-23,3,, SET 43 OP CODE (BD) 11514 15 11623 00003
60110 TDM NSECT-1+100,,, SET TERMINAL GROUP MARK (1-SECTOR READ) 11526 15 02552 00000
11537 00001
60120 DGM * 11537 00001
60130 TFM DISCR+13,NSECT-1,, SET CORE ADDRESS (1-SECTOR READ) 11538 16 11793 -2452
60140 TDM DISCR+8,1,, SET SECTOR COUNT (1-SECTOR READ) 11550 15 11788 00001
60150 READ GET INPUT, READ N SECTORS FROM SCRATCH DISC AREA 11562 10 00565 J1585
11574 49 00566 J1771
60160 A DISCR+5,DISCR+8,, READY SECTOR ADDRESS FOR NEXT READ 11586 21 11785 11788
60170 A SECNTR,DISCR+8,, CALCULATE NO. SECTORS READ 11598 21 11658 11788
60180 BV CYLOVF,,, BRANCH IF 200 SECTORS READ 11610 46 11740 01400
60190+
60200 NOP READN,NSECT,, NOP OR BD (VARIABLE OP CODE) 11622 41 11648 02453
61010+
61020 TDM SETVGM+6,,6,, CLEAR PREVIOUS TERMINAL GROUP MARK 11634 15 11700 00000
11646 42 00000 00000
61030 EXIT B82 ,,, EXIT 11648 15 11623 00001
61040+
61050 READN TDM EXIT-23,1,, SET 41 OP CODE (NOP) 11658 00003
61060 SECNTR DC 3,800,-1, SECTOR COUNTER
61070+
61080 TDM NSECT-1+100,,, CLEAR PREVIOUS TERMINAL GROUP MARK 11660 15 02552 00000
11672 16 11702 -2552
61090 TFM SETVGM+6,NSECT-1+100 11684 21 11700 02453
61100 A SETVGM+4,NSECT
61110 SETVGM TDM ,,, SET TERMINAL GROUP MARK (N-SECTOR READ) 11696 15 00000 00000
11707 00001
61120 DGM * 11707 00001
61130 TFM DISCR+13,NSECT-1+100,, SET CORE ADDRESS (N-SECTOR READ) 11708 16 11793 -2552
61140 TD DISCR+8,NSECT,, SET SECTOR COUNT (N-SECTOR READ)
11720 25 11788 02453
11732 49 11562 00000
61150 B7 READ
61160+
61170 CYLOVF TDM SECNTR-2,8,11, RESTORE SECTOR COUNTER 11740 15 11656 00000
61180 AM 9RCYLO,1,10,, SET REPOSITICN ADDRESS TO NEXT CYLINDER 11752 11 00513 000-1
11764 49 11622 00000
61190 B7 EXIT-24
61200+
62010 INPUT DDW ,DISCR,,,A 11771 00002 20
11773 00005 J1780
11778 00001 *
11780 00006 0-2000
11786 00003 -00
11789 00005 -0000
11794 00001
62020 DISCR DDA ,0,2000,0,0
62030 DC 1, *
62040+
62050 NSECT DS ,2453 02453 00000
62060+
62070+
62080 LODMEM TDM 0,0,, CALCULATE MEMORY CAPACITY 11796 15 00000 00000
11808 11 09875 K0000
11820 31 0987N 11852
11832 45 11808 C0000
62090 AM $LO,20000
62100 TR $LO,ALFRM-1,6
62110 BNR LODMEM+12
62120+
62130 AM $LO,1,10,, INITIALIZE LO INDICATOR 11844 11 09875 000-1
11853 00002
62140 ALFRM DC 2,*,*-2
62150+
62160 CM $LO-3,20,10 11856 14 09872 000K0
62170 BV 5MOD,,, BRANCH IF MEMORY CAPACITY IS 100K 11868 46 12252 01400
62180+
62190 MODT BP 2MOD,,, BRANCH IF MEMORY CAPACITY EXCEEDS 20K 11880 46 12232 01100
62200+
63010 TFM OPTLD-1,MAPENT+ $NNE*20-16 11892 16 11915 J0934
63020 TF OPTLD+10 11904 26 11926 00000
63030 OPTLD BTM MONTR,,, LOAD COMMON SUBPROGRAMS VIA MONTR 11916 17 08562 -0000
11928 11 11914 000-2
63040 AM OPTLD-2,2,10 11940 14 11915 J1234
63050 CM OPTLD-1,MAPENT+ $NNE*20-1*20+16*20-16 11952 47 11904 01100
63060 BNP OPTLD-12
63070+
63080 CM OPTLD+35,MAPENT+ $NNE*20-1*20+28*20-16 11964 14 11951 J1474
63090 ONE RSETHI,,, BRANCH IF MEMORY CAPACITY IS 20K 11976 47 12164 01200
63100+
63110 TF $HI, $LO 11988 26 00434 09875
63120 SM $HI,142,8 12000 12 00434 0-142
63130 TFM MAPENT+ $NNE*20-1*20-15,02101,711,STORE MONTR DIM NO. 12012 16 10915 -210J
63140 TF MAPENT+ $NNE*20-1*20-10, $HI,, STORE DISTF LOAD ADDRESS 12024 26 10920 00434
63150 CALL LOAD,DISTF,, LOAD DISTF SUBPROGRAM BY HI INDICATOR 12036 10 00565 J2055
12048 49 00716 00000
12055 00007 L20-210
12062 00001 *

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63160 TF MAPENT* SNNE=20-1*20-5, SENTRY,, STORE DISTF ENTRY ADDRESS
12064 26 10925 02136
63170 TF $HI,MAPENT* SNNE=20-1*20-10 12076 26 00434 10920
63180 SM $HI,160,8 12088 12 00434 0-160
63190 TFM MAPENT* SNNE=20-2*20-15,02111,711,STORE MONITR DIM NO.
12100 16 10895 -211J
63200 TF MAPENT* SNNE=20-2*20-10, $HI,, STORE UNITY LOAD ADDRESS
12112 26 10900 00434
64010 CALL LOAD,UNITY,, LOAD UNITY SUBPROGRAM BY HI INDICATOR
12124 10 00565 J2143
12136 49 00716 00000
12143 00007 L20-211
12150 00001 '
64020 TF MAPENT* SNNE=20-2*20-5, SENTRY,, STORE UNITY ENTRY ADDRESS
12152 26 10905 02136
64030 RSETHI TFM $HI,DISCR+16,, RESET HI INDICATOR 12164 16 00434 J1796
64040 RCTY 12176 34 00000 00102
64050 RCTY 12188 34 00000 00102
64060 WATY MESS 12200 39 12273 00100
64070 RCTY 12212 34 00000 00102
64080 B ARELEM 12224 49 06206 00000
64090 DORG 0-3 12232
64100*
64110 ZMOD TFM OPTLD+35,MAPENT* SNNE=20-1*20+28*20-16 12232 16 11951 J1474
64120 B OPTLD-24 12244 49 11892 00000
64130 DORG 0-3 12252
64140*
64150 SMOD TFM $LD,99998 12252 16 09875 R9998
64160 B ZMOD 12264 49 12232 00000
64170 DORG 0-4 12271
64180*
64190 MESS DAC 25,A R E L E M L O A D E D' 12273 00050
64200 DEND LODMEN 11796
    
```

SYMBOL TABLE

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RETURN 02411 NORMLN 02416 MONITR 02406 MINI.0 06024 LNSTRY 02416
ERPROC 02416 EPSLON 06004 DINTAB 12461 DELTAB 03338 DEFTIP 12026
BOFFDS 03338 ADVEPS 12170 AIMUV 11868 ARGT 06515 BDS 03372
CSDIM 12374 DSA1 11939 DSA2 11949 DSA3 11969 DSA4 11979
DSAS 11989 DSA6 11999 E 05954 ER217 12434 FISH 02416
FLW 02488 FLWST 03362 INTOF 06157 KTEMP 07703 LINDS 11796
MDS 03362 REVE 11892 SCSRT 02416 SENSE 02416 SORTF 02416
TEMP1 03318 TLRAD 05984 TL2 06147 TOLI 05994 TOLO 06014
UNITY 02416 UNVEC 11844 UX 06125 UY 06135 XOFFO 03318
XO 05892 X1 03338 YOFFO 03328 YO 05902 Y1 03348
1.0 06075
    
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01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
01020* THE CUTTER PATH ON LINE DRIVE SURFACES
01030* RCS
01040* *NAME LINDS... NON-ERASABLE ARELEM SUBPROGRAM
01050* *ID NUMBER 0238+DELDIM
01060* *STORE CORE IMAGE
01070* LINKAGE - B LINDS
01080*
01090 DORG 11796 11796
01100* SUBPROGRAM ENTRY
01110 LINDS BTM MONITR,02180,67, CALL FISH SUBPROGRAM VIA MONITR
11796 17 02400 -2180
01120 BT FISH,TL2,6, CALCULATE DS-CS OFFSET INDICATORS
11808 27 02410 06147
01130 TFM KTEMP,1,10, SET DS TYPE INDICATOR 11820 16 07703 000-1
01140 BT MONITR,DSA1+5,6, CALL UNITY SUBPROGRAM VIA MONITR
11832 27 02400 11944
01150 UNVEC BT UNITY,DSA2+15,6, CALCULATE UNIT VECTOR
TANGENT TO DS
11844 27 02410 11964
01160 BT MONITR,DSA3+5,6, CALL SENSE SUBPROGRAM VIA MONITR
11856 27 02400 11974
01170 AIMUV BTM SENSE,1,610, ADJUST SENSE OF UNIT TANGENT VECTOR
11868 17 02410 000-1
01180 BNF REVE+12,UX-2,, BRANCH IF UX IS POSITIVE
11880 44 11904 06123
01190*
01200 REVE FMUL E,MINI.0,, E--E (IMPENDING MOTION RIGHT-TO-LEFT)
11892 03 05954 06024
02010 BD DEFTIP,ARGT,, BRANCH IF STARTUP TEST REDUNDANT
11904 43 12026 06515
02020*
02030 BT MONITR,DSA4+5,6, CALL LNSTRY SUBPROGRAM VIA MONITR
11916 27 02400 11984
02040 B LNSTRY,,6, VERIFY CUTTER STARTUP POSITION
11928 49 02410 00000
11935
02050 DORG 0-4
02060*
02070 DSA1 DSA UNVEC+12 11939 00005 J1856
02080 DSC S,02111 11940 00005
02090 DORG DSA1+5+5+6-6 11958
02100 NOP UY,0 11958 41 06135 00000
02110 DORG 0-21 11948
02120 NOP FLWST+0*10,UX 11948 41 03362 06125
02130 DORG 0-14 11945
    
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02140 DSA2 DSA 1.0 11949 00005 -6075
02150 DORG **5*4-4 11965
02160 DSA3 DSA AIMUV+12 11969 00005 J1880
02170 DSC 5,02431 11970 00005
02180 DSA4 DSA DEFTIP 11979 00005 J2026
02190 DSC 5,02191 11980 00005
02200 DSA5 DSA ER217-12 11989 00005 J2422
03010 DSC 5,1 11990 00005
03020 DORG DSA5+5*5*6-6 12018
03030 NOP YOFFO,0 12018 41 03328 00000
03040 DORG *-21 12008
03050 NOP BOFFDS,XOFFO 12008 41 03338 03318
03060 DORG *-21 11998
03070 NOP YO,MDS 11998 41 05902 03362
03080 DORG *-14 11995
03090 DSA6 DSA X0 11999 00005 -5892
03100 DORG **5*6-4 12025
03110*
03120 DEFTIP TFL DELTAB,MDS 12026 06 03338 03362
03130 FMUL DELTAB,MDS,, MDS**2 12038 03 03338 03362
03140 FADD DELTAB,1.0,, 1.0*MDS**2 12050 01 03338 06075
03150 BTM MONITR,02000,67, CALL SQRTF SUBROUTINE VIA MONITR 12062 17 02400 -2000
03160 BTM SQRTF,DELTAB,67, SQRTF(1.0*MDS**2) 12074 17 02410 -3338
03170 FMUL DELTAB,E,, E*SQRTF(1.0*MDS**2) 12086 03 03338 05954
03180 FMUL DELTAB,TLRAD,, E*TLRAD*SQRTF(1.0*MDS**2) 12098 03 03338 05984
03190 FADD BOFFDS,BDS,, BDS+E*TLRAD*SQRTF(1.0*MDS**2) 12110 01 03338 03372
03200 BTM MONITR,02140,67, CALL NORMLN SUBPROGRAM VIA MONITR 12122 17 02400 -2140
04010 BT NORMLN,DSA6*25,6, PROJECT CUTTER CENTER TO OFFSET LINE 12134 27 02410 12024
04020 TFL X0,XOFFO 12146 06 05892 03318
04030 TFL YO,YOFFO 12158 06 05902 03328
04040* ADVANCE CUTTER STARTUP POSITION A DISTANCE EQUAL
04050* TO 20.0*EPSLON IN THE DIRECTION OF UNIT VECTOR
04060 ADVEPS TFL TEMPI,TOLO 12170 06 03318 06014
04070 FADD TEMPI,TOLI,, 20.0*EPSLON 12182 01 03318 05994
04080 FMUL TEMPI,UX,, 20.0*UX*EPSLON 12194 03 03318 06125
04090 FADD X0,TEMPI,, X0=X0+20.0*UX*EPSLON 12206 01 05892 03318
04100 TFL TEMPI,TOLO 12218 06 03318 06014
04110 FADD TEMPI,TOLI,, 20.0*EPSLON 12230 01 03318 05994
04120 FMUL TEMPI,UY,, 20.0*UY*EPSLON 12242 03 03318 06135
04130 FADD YO,TEMPI,, YO=YO+20.0*UY*EPSLON 12254 01 05902 03318
04140 TFL X1,UX 12266 06 03338 06125
04150 TFL Y1,UY 12278 06 03348 06135
04160 AM X1,2,10, X1=100.0*UX 12290 11 03338 000-2
04170 AM Y1,2,10, Y1=100.0*UY 12302 11 03348 000-2
04180 FADD X1,X0,, X1=X0+100.0*UX 12314 01 03338 05892
04190 FADD Y1,Y0,, Y1=YO+100.0*UY 12326 01 03348 05902
04200 TFM CSDIM+11,DIMTAB-4 12338 16 12385 J2457
05010 MM INTOP,4,10, 4*INTOP 12350 13 06157 000-4
05020 A CSDIM+11,99 12362 21 12385 00099
05030 CSDIM TF DSA5+4,, SET CS DIM NO. 12374 26 11993 00000
05040 CF DSA5+1 12386 33 11990 00000
05050 BT MONITR,DSA5+5,6, CALL CS SUBPROGRAM VIA MONITR 12398 27 02400 11994
05060 BTM SCVRT,**13,67, EVALUATE CUT VECTOR AT CS 12410 17 02410 J2423

05070 NOP RETURN,,6, NOP DR B (VARIABLE OP CODE) 12422 41 0241J 00000
05080 ER217 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR 12434 17 02400 -2250
05090 BTM ERPROC,21700,67, WRITE ERROR MESSAGE... SEARCH FOR END 12446 17 02410 K1700
05100 DIMTAB DC 4,0244 12461 00004
05110 DC 4,0245 12465 00004
05120 DC 4,0246 12469 00004
05130 DC 4,0247 12473 00004
05140*
05150 MONITR DS ,2406 02406 00000
05160 FISH DS ,2416 02416 00000
05170 TL2 DS ,6147 06147 00000
05180 UNITY DS ,2416 02416 00000
05190 SENSE DS ,2416 02416 00000
05200 UX DS ,6125 06125 00000
06010 E DS ,5954 05954 00000
06020 MINI.0 DS ,6024 06024 00000
06030 LNSTRT DS ,2416 02416 00000
06040 FLWST DS ,3362 03362 00000
06050 UY DS ,6135 06135 00000
06060 FLW DS ,2488 02488 00000
06070 I.0 DS ,6075 06075 00000
06080 X1 DS ,FLW*85*10 03338 00000
06090 Y1 DS ,X1+10 03348 00000
06100 X0 DS ,5892 05892 00000
06110 YO DS ,5902 05902 00000
06120 INTOP DS ,6157 06157 00000
06130 SCVRT DS ,2416 02416 00000
06140 RETURN DS ,2411 02411 00000
06150 ERPROC DS ,2416 02416 00000
06160 KTEMP DS ,7703 07703 00000
06170 MDS DS ,FLWST*0*10 03362 00000
06180 EPSLON DS ,6004 06004 00000
06190 DELTAB DS 10,X1 03338 00010
06200 BOFFDS DS ,DELTAB 03338 00000
07010 XOFFO DS ,X1-20 03318 00000
07020 YOFFO DS ,XOFFO*10 03328 00000
07030 SQRTF DS ,2416 02416 00000
07040 NORMLN DS ,2416 02416 00000
07050 BDS DS ,FLWST*1*10 03372 00000
07060 TLRAD DS ,5984 05984 00000
07070 TEMPI DS ,XOFFO 03318 00000
07080 ARGT DS ,6515 06515 00000
07090 TOLO DS ,6014 06014 00000
07100 TOLI DS ,5994 05994 00000
07110 DEND LINDS 11796

SYMBOL TABLE

VERIFY 12060	RETURN 02411	ON/OUT 12308	MONITR 02406	MINI.O 06024
ERPROC 02416	EPSLON 06004	DINTAB 12916	CRSTAT 02416	ADVEPS 12572
AIMUV 11964	ARGT 06515	ATANF 02416	CIRDS 11796	CONT 12848
COSF 02421	CROSS 03338	CSDIM 12548	OSA1 12071	OSA2 12081
DSA3 12101	DSA4 12111	DSA5 12121	OSA6 12137	DSA7 12907
E 05954	ER202 12148	ER207 12930	ER215 12950	FISH 02416
FLW 02488	FLWST 03362	G 05974	GENCV 12668	H 03362
IN 12276	INTOF 06157	K 03372	KTEMP 07703	L/2 03318
LCALC 12216	NCNT 03288	NMAX 03298	PHI 03318	PI 12978
R 03382	REVEG 12184	RMITI 03338	RPLTD 03308	SCSRT 02416
SENSE 02416	SIGMA 03328	SINF 02416	SORTF 02416	TEMP 03348
THETA 03338	TLRAD 05984	TL2 06147	TOLI 05994	TOLO 06014
UNITV 02416	UNVEC 11892	UX 06125	UY 06135	WERM 12172
X 05820	XCOMP 03308	XO 05892	XI 03338	Y 05830
YCOMP 03338	YO 05902	YI 03348	L.O 06075	Z.O 06115

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
01020* THE CUTTER PATH ON CIRCLE DRIVE SURFACES
01030*
01040* *NAME CIRDS... NON-ERASABLE ARELEM SUBPROGRAM RCS
01050* *ID NUMBER 0239*DELDIM
01060* STORE CORE IMAGE
01070* LINKAGE - B CIRDS
01080*
01090* DORG 11796 11796
01100* SUBPROGRAM ENTRY
01110 CIRDS BTM MONITR,02180,67, CALL FISH SUBPROGRAM VIA MONITR
11796 17 02400 -2180
01120 BT FISH,TL2,6, CALCULATE DS-CS OFFSET INDICATORS
11808 27 02410 06147
01130 TFM KTEMP,5,10, SET DS TYPE INDICATOR 11820 16 07703 000-5
01140 TFL YCOMP,H 11832 06 03338 03362
01150 FSUB YCOMP,XO,, H-XO 11844 02 03338 05892
01160 TFL XCOMP,YO 11856 06 03308 05902
01170 FSUB XCOMP,K,, YO-K 11868 02 03308 03372
01180 BT MONITR,DSA1+5,6, CALL UNITY SUBPROGRAM VIA MONITR
11880 27 02400 12076
01190 UNVEC BT UNITY,DSA2+15,6, CALCULATE UNIT VECTOR TANGENT TO DS
11892 27 02410 12096
01200 BV ER202,, BRANCH IF CUTTER AND CIRCLE CONCENTRIC
11904 46 12148 01400
02010*
02020* FMUL YCOMP,MINI.O,, XO-H 11916 03 03338 06024
02030 BTM MONITR,02020,67, CALL ATANF SUBROUTINE VIA MONITR
11928 17 02400 -2020
02040 BT ATANF,DSA5+10,6, CALCULATE ARGUMENT OF RADIAL VECTOR
11940 27 02410 12131
02050 BT MONITR,DSA3+5,6, CALL SENSE SUBPROGRAM VIA MONITR
11952 27 02400 12106
02060 AIMUV BTM SENSE,1,610, ADJUST SENSE OF UNIT VECTOR
11964 17 02410 000-1
02070 TFL G,1.0,, ASSUME CW CUTTER MOTION ABOUT DS CIRCLE
11976 06 05974 06075
02080 FMUL YCOMP,UY,, UY=(XO-H) 11988 03 03338 06135
02090 FMUL XCOMP,UX,, UX=(YO-K) 12000 03 03308 06125
02100 FSUB CROSS,XCOMP,, UY=(XO-H)+UX*(K-YO) 12012 02 03338 03308

02110 BP REVEG,, BRANCH IF CROSS PRODUCT IS POSITIVE
12024 46 12184 01100
02120*
02130 BD LCALC,ARGT,, BRANCH IF STARTUP TEST REDUNDANT
12036 43 12216 06515
02140*
02150 BT MONITR,DSA4+5,6, CALL CRSTAT SUBPROGRAM VIA MONITR
12048 27 02400 12116
02160 VERIFY B CRSTAT,,6, VERIFY CUTTER STARTUP POSITION
12060 49 02410 00000
12067
02170 DORG --4
02180*
02190 DSA1 DSA UNVEC+12 12071 00005 J1904
02200 DSC 5,02111 12072 00005
03010 DORG DSA1+5*5*4-6 12090
03020 NOP UY,0 12090 41 06135 00000
03030 DORG --21 12080
03040 NOP YCOMP,UX 12080 41 03338 06125
03050 DORG --14 12077
03060 DSA2 DSA XCOMP 12081 00005 -3308
03070 DORG --5*4-4 12097
03080 DSA3 DSA AIMUV+12 12101 00005 J1976
03090 DSC 5,02431 12102 00005
03100 DSA4 DSA LCALC 12111 00005 J2216
03110 DSC 5,02201 12112 00005
03120 DORG DSA4+5*5*3-11 12120
03130 NOP XCOMP,SIGMA 12120 41 03308 03328
03140 DORG --14 12117
03150 DSA5 DSA YCOMP 12121 00005 -3338
03160 DORG --5*3-4+5*3-11 12136
03170 NOP L/2,PHI 12136 41 03318 03318
03180 DORG --14 12133
03190 DSA6 DSA RMITI 12137 00005 -3338
03200 DORG --5*3-4 12148
04010*
04020 ER202 TFM WERM+9,202,9 12148 16 12161 00K02
04030 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
12160 17 02400 -2250
04040 WERM BTM ERPROC,1,67, WRITE ERROR MESSAGE... SEARCH FOR END
12172 17 02410 -0001
04050 REVEG FMUL E,MINI.O,, E=-E (IMPENDING MOTION CCM) 12184 03 05954 06024
04060 SF G-2,, SET CCM INDICATOR 12196 32 05972 00000
04070 B VERIFYFV-24 12208 49 12036 00000
04080 DORG --3 12216
04090*
04100 LCALC TFL RPLTD,TLRAD 12216 06 03308 05984
04110 FMUL RPLTD,E,, E=TLRAD 12228 03 03308 05954
04120 FADD RPLTD,R,, R+E=TLRAD 12240 01 03308 03382
04130 TFL RMITI,RPLTO 12252 06 03338 03308
04140 BWF ON/OUT,E-2,, BRANCH IF CUTTER NOT INSIDE DS CIRCLE
12264 44 12308 05952
04150*
04160 IN FADD RPLTD,TOLI,, R+E=TLRAD+TOLI 12276 01 03308 05994
04170 FSUB RMITI,TOLO,, R+E=TLRAD+TOLO 12288 02 03338 06014
04180 B ON/OUT+24 12300 49 12332 00000
04190 DORG --3 12308
04200*
05010 ON/OUT FADD RPLTD,TOLO,, R+E=TLRAD+TOLO 12308 01 03308 06014
05020 FSUB RMITI,TOLI,, R+E=TLRAD+TOLI 12320 02 03338 05994

10090	SQRTF	DS	,2416	02416	00000
10100	Z.O	DS	,6115	06115	00000
10110	NMAX	DS	10,XCOMP-10	03298	00010
10120	NCNT	DS	10,NMAX-10	03288	00010
10130	THEYA	DS	,RMITJ	03338	00000
10140	COSF	DS	,2421	02421	00000
10150	INTOF	DS	,6157	06157	00000
10160	SINF	DS	,2416	02416	00000
10170	SCSRT	DS	,2416	02416	00000
10180	RETURN	DS	,2411	02411	00000
10190	KTEMP	DS	,7703	07703	00000
10200	EPSLON	DS	,6004	06004	00000
11010	X	DS	10,5820	05820	00010
11020	Y	DS	10,X+10	05830	00010
11030	ARGT	DS	,6515	06515	00000
11040	DEND	CIRBS		11796	

SYMBOL TABLE

SEMIN3	14380	1.OE48	06085	YIPYNO	03178	XIMXNO	03168	UNITV2	13040
SINCOS	14250	REVERS	12788	RETURN	02411	RETADD	14079	ON/DUT	12664
NVERTL	13328	NOTLIN	12188	NORPLN	02416	NORMCN	02416	MONITR	02406
MNO.25	14390	MINI.O	06024	LINLIN	02416	LCNCMI	02416	INSIDE	12644
HYPFLG	03349	ERPROC	02416	EPSLON	06004	ENTRYI	12092	DICALC	12452
DNCALC	13412	DIMTAB	12175	DELTAB	03328	CNSTRT	02416	BOFFDS	03328
ACON	03362	BCON	03372	BN02	03178	BRNOP	12116	BO2	03218
CCON	03382	CONDS	11796	CCNT	12944	CONVI	12912	CONV2	13496
CROSS	00069	CSDIM	11852	CVCTR	12921	DCON	03392	DELX	14118
DEVI	03268	DGENC	11888	DISTF	02416	DM	03308	DMAX	03228
DMIN	03298	DMXNM	14074	DN	03318	DSA1	13615	DSA10	13831
DSA11	13841	DSA12	13861	DSA13	13871	DSA14	13901	DSA15	13931
DSA16	13941	DSA17	13966	DSA18	13977	DSA19	13997	OSA2	13625
DSA20	14015	DSA21	14033	DSA22	14051	OSA3	13655	OSA4	13665
DSA5	13675	OSA6	13725	OSA7	13735	OSA8	13761	OSA9	13791
DYDX	02416	DI	03318	E	05954	ECCN	03402	ER217	12136
ER227	12936	FCON	03412	FLW	02488	FLWST	03362	G	05974
GENCV	12344	GRAD	03238	INCRT	14081	INTOF	06157	ITER1	12392
ITER2	12844	ITER3	13184	MNO2	03168	MO2	03208	NORM1	12428
NORM2	13232	RESXY	14069	REVI	13136	REZID	12620	RO	00069
SCSRT	02416	SENSE	13052	SORTF	02416	TEMP	00079	THEYA	03158
TLDF	12684	TLON	12476	TLRAD	05984	TRIGF	14082	UNITV	02416
UX	06125	UXT	06125	UY	06135	UYT	06135	VARB1	12732
VARB2	12780	VERTL	13592	WERN	12140	XFUN	14330	XI	05923
XNO	03248	XOFFO	03318	XSAVE	03148	XO	05892	XI	03338
X2	03278	X2MXO	03278	X3	03188	YCEPT	03328	YFUN	14274
YJ	05933	YNO	03258	YOFFO	03328	YO	05902	YI	03348
Y2	03288	Y2MYO	03288	Y3	03198	0.5	06065	1.0	06075
40.0	14370	40EPS	02949	80EPS	03308				

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
01020* THE CUTTER PATH ON CONIC DRIVE SURFACES
01030* RCS
01040* *NAME CONDS... NON-ERASABLE ARELEN SUBPROGRAM
01050* *ID NUMBER 0240*DELDIM
01060* *STORE CORE IMAGE
01070* LINKAGE - B CONDS
01080*
01090* DORG 11796 11796
01100* SUBPROGRAM ENTRY
01110 CONDS BT MONITR,DSA1*5,6, CALL CNSTRT SUBPROGRAM VIA MONITR 11796 27 02400 13620
01120 B CNSTRT,,6, BRANCH TO CONIC STARTUP ROUTINE 11808 49 02410 00000
01130 DORG *-3 11816
01140*
01150 TFM CSDIM*11,DIMTAB*36 11816 16 11863 J2139
01160 MM INTOF,4,10, *INTOF 11828 13 06157 000-4
01170 A CSDIM*11,99 11840 21 11863 00099
01180 CSDIM TFM DSA3*4,,, SET CS DIM NO. 11852 26 13659 00000
01190 CF DSA3*1 11864 33 13656 00000
01200 SD NOTLIN,G,, BRANCH IF CONIC IS NOT A LINE 11876 43 12188 05974
02010*
02020 DGENC TFL DELTAB,DCON 11888 06 03328 03392
02030 FMUL DELTAB,DCON,, 0**2 11900 03 03328 03392

07030*
 07040 ITER2 BTFL TRIGF,DSA19+12,, PROJECT POINT P1 TO OUTER TOLER-
 12844 07 14082 14009
 07050 BTFL TRIGF,DSA20+12,, ANCE OFFSET DRIVE SURFACE
 12856 07 14082 14027
 07060 TFL X1,XSAVE 12868 06 03338 03148
 07070 BTM MONITR,02140,67, CALL NORMLN SUBPROGRAM VIA MONITR
 12880 17 02400 -2140
 07080 BT NORMLN,DSA8+25,6, PROJECT POINT P1 NORMAL TO CV LINE
 12892 27 02410 13786
 07090 B NORM1-12 12904 49 12416 00000
 07100 DORG --3 12912
 07110*
 07120 CONV1 SM CVCTR,1,10, CVCTR=CVCTR-1 12912 12 12921 000-1
 07130 BNN ENTRY1,,, BRANCH IF CVCTR IS NON-NEGATIVE
 12924 46 12092 01300
 07140*
 07150 ER227 B WERM-12 12936 49 12148 00000
 07160 DORG --3 12944
 07170*
 07180 CONT BTM MONITR,02080,67, CALL DYDX SUBPROGRAM VIA MONITR
 12944 17 02400 -2080
 07190 BT DYDX,DSA9+35,6, CALCULATE SLOPE OF CONIC AT POINT PNO
 12956 27 02410 13826
 07200 TFL YCEPT,YO 12968 06 03328 05902
 08010 TFL TEMP,GRAD 12980 06 00079 03238
 08020 FMUL TEMP,XO 12992 03 00079 05892
 08030 FSUB YCEPT,TEMP,, YCEPT=YQ-GRAD*XO 13004 02 03328 00079
 08040 TFL DN,1.0E48,, DN=1.0E48 13016 06 03318 06085
 08050 BT MONITR,DSA10+5,6, CALL UNITV SUBPROGRAM VIA MONITR
 13028 27 02400 13836
 08060 UNITV2 BT UNITV,DSA11+15,6, CALCULATE UNIT TANGENT VECTOR AT PNO
 13040 27 02410 13856
 08070 SENSE TFL CROSS,XI 13052 06 00069 05923
 08080 FMUL CROSS,UY,, XI=UY 13064 03 00069 06135
 08090 TFL TEMP,YJ 13076 06 00079 05933
 08100 FMUL TEMP,UX,, YJ=UX 13088 03 00079 06125
 08110 FSUB CROSS,TEMP,, XI=UY-YJ*UX 13100 02 00069 00079
 08120 FMUL CROSS,G,, G=(XI*UY-YJ*UX) 13112 03 00069 05974
 08130 BNP REVU+24,,, BRANCH IF UNIT VECTOR SENSE IS PROPER
 13124 47 13160 01100
 08140*
 08150 REVU FMUL UX,MINI1.0,, UX=-UX 13136 03 06125 06024
 08160 FMUL UY,MINI1.0,, UY=-UY 13148 03 06135 06024
 08170 FMUL UX,80EPS,, UX=80.0*EPSLON+UX 13160 03 06125 03308
 08180 FMUL UY,80EPS,, UY=80.0*EPSLON+UY 13172 03 06135 03308
 08190 ITER3 FADD X1,UX,, X1=X1+80.0*EPSLON+UX 13184 01 03338 06125
 08200 FADD Y1,UY,, Y1=Y1+80.0*EPSLON+UY 13196 01 03348 06135
 09010 TFL DM,DN,, DM=DN 13208 06 03308 03318
 09020 BT MONITR,DSA12+5,6, CALL NORMCN SUBPROGRAM VIA MONITR
 13220 27 02400 13866
 09030 NORM2 BT NORMCN,DSA5+45,6, CALCULATE NORMAL TO DS CONIC
 13232 27 02410 13720
 09040 BTFL TRIGF,DSA21+12,, PROJECT POINT P1 TO INNER TOLER-
 13244 07 14082 14045
 09050 BTFL TRIGF,DSA22+12,, ANCE OFFSET DRIVE SURFACE
 13256 07 14082 14063
 09060 BTM MONITR,02120,67, CALL LCNON1 SUBPROGRAM VIA MONITR
 13268 17 02400 -2120
 09070 BT LCNON1,DSA13+25,6, DETERMINE EQ. OF LINE THRU P0 AND P2

13280 27 02410 13896
 13292 06 00079 06024
 09080 TFL TEMP,MINI1.0 -1.0/MO2 13304 09 00079 03208
 09090 FDIV TEMP,MO2,, BRANCH IF MO2 IS 0.0 13316 46 13592 01400
 09100 BV VERTL,,,
 09110*
 09120 NVERTL TFL MNO2,TEMP 13328 06 03168 00079
 09130 FMUL TEMP,X2 13340 03 00079 03278
 09140 TFL BNO2,Y2 13352 06 03178 03288
 09150 FSUB BNO2,TEMP,, BNO2=Y2-MNO2*X2 13364 02 03178 00079
 09160 BTM MONITR,02050,67, CALL LINLIN SUBPROGRAM VIA MONITR
 13376 17 02400 -2050
 09170 BT LINLIN,DSA14+25,6, PROJECT P2 TO L2, NORMAL TO LINE (POP2)
 13388 27 02410 13926
 09180 BT MONITR,DSA15+5,6, CALL DISTF SUBPROGRAM VIA MONITR
 13400 27 02400 13936
 09190 DNCALC BT DISTF,DSA16+20,6, CALCULATE DISTANCE BETWEEN P1 AND P3
 13412 27 02410 13961
 09200 TFL X1,X3,, X1=X3 13424 06 03338 03188
 10010 TFL Y1,Y3,, Y1=Y3 13436 06 03348 03198
 10020 FSUB DM,DN 13448 02 03308 03318
 10030 CF DM-2,,, ABSF(DM-DN) 13460 33 03306 00000
 10040 FSUB DM,DEV1 13472 02 03308 03268
 10050 BP ITER3+24,,, BRANCH IF CONVERGENCE NOT REALIZED
 13484 46 13208 01100
 10060*
 10070 CONV2 TFL X1,X2,, X1=X2 13496 06 03338 03278
 10080 TFL Y1,Y2,, Y1=Y2 13508 06 03348 03288
 10090 TFL GRAD,MO2,, GRAD=MO2 13520 06 03238 03208
 10100 TFL YCEPT,B02,, YCEPT=B02 13532 06 03328 03218
 10110 FSUB X2MXO,XO 13544 02 03278 05892
 10120 FSUB Y2MYO,YO 13556 02 03288 05902
 10130 BT MONITR,DSA17+5,6, CALL UNITV SUBPROGRAM VIA MONITR
 13568 27 02400 13971
 10140 BT UNITV,DSA18+15,6, CALCULATE UNIT VECTOR FROM P0 TO P2
 13580 27 02410 13992
 10150 VERTL TFL TEMP,1.0E48,, TEMP=1.0E48 13592 06 00079 06085
 10160 B NVERTL 13604 49 13328 00000
 10170 DORG --4 13611
 10180*
 10190 DSA1 DSA CONDS+20 13615 00005 J1816
 10200 DSC 5,02661 13616 00005
 11010 DORG DSA1+5+5+6-6 13644 41 03328 00000
 11020 NOP YOFFO,0 13634
 11030 DORG --21 13634 41 03328 03318
 11040 NOP B0FFDS,XOFFO 13624
 11050 DORG --21 13624 41 05902 03362
 11060 NOP YO,ACON 13621
 11070 DORG --14 13625 00005 -5892
 11080 DSA2 DSA XO 13651
 11090 DORG --5+6-4 13655 00005 J2116
 11100 DSA3 DSA BRNOP 13656 00005
 11110 DSC 5,1 13665 00005 J2440
 11120 DSA4 DSA NORM1+12 13666 00005
 11130 DSC 5,02161 13714
 11140 DORG DSA4+5+5+10-6 13714 41 03258 00000
 11150 NOP YNO,0 13704
 11160 DORG --21 13704 41 03412 03248
 11170 NOP FCON,XMO 13694
 11180 DORG --21 13694 41 03402 03392
 11190 NOP ECOM,DCOM

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11200 DORG +-21
12010 NOP ACON,CCON
12020 DORG +-21
12030 NOP Y1,BCON
12040 DORG +-14
12050 DSA5 DSA X1
12060 DORG ++5+10-4
12070 DSA6 DSA D1CALC+12
12080 DSC 5,02101
12090 DORG DSA6+5+5+5-11
12100 NOP Y1,D1
12110 DORG +-21
12120 NOP YNO,X1
12130 DORG +-14
12140 DSA7 DSA XNO
12150 DORG ++5+5-4+5+6-6
12160 NOP Y1,0
12170 DORG +-21
12180 NOP YCEPT,X1
12190 DORG +-21
12200 NOP Y1,GRAD
13010 DORG +-14
13020 DSA8 DSA X1
13030 DORG ++5+6-4+5+8-6-2
13040 NOP GRAD,0
13050 DORG +-21
13060 NOP ECON,OCON
13070 DORG +-21
13080 NOP ACON,CCON
13090 DORG +-21
13100 NOP YNO,BCON
13110 DORG +-14
13120 DSA9 DSA XNO
13130 DORG ++5+8-4
13140 DSA10 DSA SENSE
13150 DSC 5,02111
13160 DORG DSA10+5+5+4-6
13170 NOP UY,0
13180 DORG +-21
13190 NOP GRAD,UX
13200 DORG +-14
14010 DSA11 DSA 1,0
14020 DORG ++5+4-4
14030 DSA12 DSA NORM2+12
14040 DSC 5,02161
14050 DORG DSA12+5+5+6-6
14060 NOP 802,0
14070 DORG +-21
14080 NOP Y2,M02
14090 DORG +-21
14100 NOP Y0,X2
14110 DORG +-14
14120 DSA13 DSA X0
14130 DORG ++5+6-4+5+6-6-2
14140 NOP Y3,0
14150 DORG +-21
14160 NOP BNO2,X3
14170 DORG +-21
14180 NOP YCEPT,MNO2
14190 DORG +-14

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13684
13684 41 03362 03382
13674
13674 41 03346 03372
13671
13675 00005 -3338
13721
13725 00005 J2464
13726 00005
13744
13744 41 03348 03318
13734
13734 41 03258 03338
13731
13735 00005 -3248
13780
13780 41 03348 00000
13770
13770 41 03328 03338
13760
13760 41 03348 03238
13757
13761 00005 -3338
13819
13820 41 03238 00000
13810
13810 41 03402 03392
13800
13800 41 03362 03382
13790
13790 41 03258 03372
13787
13791 00005 -3248
13827
13831 00005 J3052
13832 00005
13850
13850 41 06135 00000
13840
13840 41 03238 06125
13837
13841 00005 -6075
13857
13861 00005 J3244
13862 00005
13890
13890 41 03218 00000
13880
13880 41 03288 03208
13870
13870 41 05902 03278
13867
13871 00005 -5892
13919
13920 41 03198 00000
13910
13910 41 03178 03188
13900
13900 41 03328 03168
13897

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14200 DSA14 DSA GRAD
15010 DORG ++5+6-4
15020 DSA15 DSA DNICALC+12
15030 DSC 5,02101
15040 DORG DSA15+5+5+5-11
15050 NOP Y3,0N
15060 DORG +-21
15070 NOP Y1,X3
15080 DORG +-14
15090 DSA16 DSA X1
15100 DORG ++5+5-4
15110 DSA17 DSA GENCV-24
15120 DSC 5,02111
15130 DORG DSA17+5+5+4-6
15140 NOP UY,0
15150 DORG +-21
15160 NOP Y2MY0,UX
15170 DORG +-14
15180 DSA18 DSA X2MX0
15190 DORG ++5+4-4+5+3-11-2
15200 NOP DMAX,ITER2+12
16010 DORG +-14
16020 DSA19 DSA XSAVE
16030 DORG ++5+3-4
16040 DC 2,-10
16050 DORG DSA19+12+5+3-11
16060 NOP DMAX,ITER2+24
16070 DORG +-14
16080 DSA20 DSA Y1
16090 DORG ++5+3-4
16100 DC 2,0
16110 DORG DSA20+12+5+3-11
16120 NOP DMIN,NORM2+24
16130 DORG +-14
16140 DSA21 DSA X2
16150 DORG ++5+3-4
16160 DC 2,-10
16170 DORG DSA21+12+5+3-11
16180 NOP DMIN,NORM2+36
16190 DORG +-14
16200 DSA22 DSA Y2
17010 DORG ++5+3-4
17020 DC 2,0
17030 DORG DSA22+14

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13901 00005 -3238
13927
13931 00005 J3424
13932 00005
13950
13950 41 03198 03318
13940
13940 41 03348 03188
13937
13941 00005 -3338
13962
13966 00005 J2320
13967 00005
13985
13986 41 06135 00000
13976
13976 41 03288 06125
13973
13977 00005 -3278
13995
13996 41 03228 12856
13993
13997 00005 -3148
14008
14009 00002
14013
14014 41 03228 12868
14011
14015 00005 -3348
14026
14027 00002
14031
14032 41 03298 13256
14029
14033 00005 -3278
14044
14045 00002
14049
14050 41 03298 13268
14047
14051 00005 -3288
14062
14063 00002
14065

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SUBROUTINE FOR PROJECTING A POINT P1(X1,Y1)
TO AN INNER OR OUTER TOLERANCE BAND OF A
CURVE, OFFSET TO A GENERAL CONIC

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17040*
17050*
17060*
17070*
17080*
17090 RESXY DS 5,, ADDRESS OF RESULT 14069 00005
17100 DMXNM DS 5,, ADDRESS OF PROJECTION DISTANCE
RETURN ADDRESS 14074 00005
SUBROUTINE ENTRY CONTROL FIELD 14079 00005
14081 00002
17110 RETADD DS 5,, Y1MYNO=Y1-YNO 14082 06 03178 03348
17120 INCRD DS 2,, Y1MYNO=X1-YNO 14094 02 03178 03258
14106 06 03168 03338
17130 TRIGF TFL Y1MYNO,Y1 X1MXNO=X1-XNO 14118 02 03168 03248
17140 FSUB Y1MYNO,YNO,, CALL SQRTF SUBROUTINE VIA MONITA
17150 TFL X1MXNO,X1
17160 DELX FSUB X1MXNO,XNO,,
17170 BTM MONITA,02000,67,

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17180	TFM	++35,Y1MYNO	14130 17 02400 -2000
17190	A	++23,INCRT	14142 16 14177 -3178
17200	TFL	THETA	14154 21 14177 14081
18010	TFL	TEMP,X1MXNO	14166 06 03158 00000
18020	FMUL	TEMP,X1MXNO,, (X1-XNO)**2	14178 06 00079 03168
18030	TFL	TEMP-10,Y1MYNO	14190 03 00079 03168
18040	FMUL	TEMP-10,Y1MYNO,, (Y1-YNO)**2	14202 06 00069 03178
18050	FADD	TEMP,TEMP-10,, (X1-XNO)**2+(Y1-YNO)**2	14214 03 00069 03178
			14226 01 00079 00069
18060	BTM	SQRTF,TEMP,67,	SQRTF((X1-XNO)**2+(Y1-YNO)**2)
			14238 17 02410 -0079
18070	SINCOS	FDIV THETA,TEMP,,	SINF(THETA) OR COSF(THETA)
			14250 09 03158 00079
18080	BD	XFUN,INCRT-1,,	BRANCH IF INCREMENT IS -10
			14262 43 14320 14080
18090*			
18100	YFUM	TFL RESXY,YNO,6	14274 06 1406R 03258
18110	MF	THETA-2,Y1MYNO-2,,	THETA=SIGNF(THETA,Y1-YNO)
			14286 71 03156 03176
18120	FMUL	THETA,DMXNM,11,	THETA*DMXNM
18130	FADD	RESXY,THETA,6	14298 03 03158 1407M
18140	B	RETADD,,6,	EXIT
18150	DORG	==3	14322 49 1407R 00000
			14330
18160*			
18170	XFUM	TFL RESXY,XNO,6	14330 06 1406R 03248
18180	MF	THETA-2,X1MXNO-2,,	THETA=SIGNF(THETA,X1-XNO)
			14342 71 03156 03166
18190	B	YFUM+24	14354 49 14298 00000
18200	DORG	==4	14361
19010*			
19020	DC	8,40000000	14368 00008
19030	DC	2,2	14370 00002
19040	DC	8,50000000	14378 00008
19050	SEMIN3	DC 2,-2	14380 00002
19060	DC	8,-25000000	14388 00008
19070	MNO.25	DC 2,0	14390 00002
19080*			
19090	MONITR	DS ,2406	02406 00000
19100	CNSTRY	DS ,2416	02416 00000
19110	G	DS ,5974	05974 00000
19120	FLWST	DS ,3362	03362 00000
19130	FLW	DS ,2488	02488 00000
19140	ACON	DS ,FLWST+0*10	03362 00000
19150	BCON	DS ,ACON+10	03372 00000
19160	CCON	DS ,BCON+10	03382 00000
19170	DCON	DS ,CCON+10	03392 00000
19180	ECON	DS ,DCON+10	03402 00000
19190	FCOM	DS ,ECON+10	03412 00000
19200	X1	DS 10,FLW+85*10	03338 00010
20010	Y1	DS 10,X1+10	03348 00010
20020	DELTAB	DS 10,X1-10	03328 00010
20030	L.0	DS ,6075	06075 00000
20040	SQRTF	DS ,2416	02416 00000
20050	E	DS ,5954	05954 00000
20060	TLRAD	DS ,5984	05984 00000
20070	BDFDSDS	DS ,DELTAB	03328 00000
20080	NORMLN	DS ,2416	02416 00000
20090	UXT	DS ,6125	06125 00000
20100	UYT	DS ,UYT+10	06135 00000

20110	XOFFO	DS 10,DELTAB-10	03318 00010
20120	YOFFO	DS 10,XOFFO+10	03328 00010
20130	INTOP	DS ,6157	06157 00000
20140	SCSRT	DS ,2416	02416 00000
20150	RETURN	DS ,2411	02411 00000
20160	ERPROC	DS ,2416	02416 00000
20170	CVCTR	DS 3,CONV1+9	12921 00003
20180	XO	DS ,5692	05692 00000
20190	YO	DS ,XO+10	05902 00000
20200	40EPS	DS ,2949	02949 00000
21010	UX	DS ,UYT	06125 00000
21020	UY	DS ,UYT	06135 00000
21030	NORMCM	DS ,2416	02416 00000
21040	DISTF	DS ,2416	02416 00000
21050	D1	DS ,XOFFO	03318 00000
21060	DMAX	DS ,3228	03228 00000
21070	DMIN	DS ,3298	03298 00000
21080	DEV1	DS ,3268	03268 00000
21090	GRAD	DS 10,3238	03238 00010
21100	YCEPT	DS 10,YOFFO	03328 00010
21110	TEMP	DS 10,79	00079 00010
21120	DYDX	DS ,2416	02416 00000
21130	DM	DS 10,XOFFO-10	03308 00010
21140	DN	DS 10,DM+10	03318 00010
21150	L.0E48	DS ,6085	06085 00000
21160	UNITY	DS ,2416	02416 00000
21170	CROSS	DS 10,69	00069 00010
21180	XI	DS ,5923	05923 00000
21190	YJ	DS ,XI+10	05933 00000
21200	MIN1.0	DS ,6024	06024 00000
22010	0.5	DS ,6065	06065 00000
22020	80EPS	DS 10,DN-10	03308 00010
22030	LCNON1	DS ,2416	02416 00000
22040	M02	DS 10,3208	03208 00010
22050	B02	DS 10,M02+10	03218 00010
22060	X2	DS 10,3278	03278 00010
22070	Y2	DS 10,3288	03288 00010
22080	LINLIN	DS ,2416	02416 00000
22090	X3	DS 10,3188	03188 00010
22100	Y3	DS 10,3198	03198 00010
22110	X2MXO	DS ,X2	03278 00000
22120	Y2MYO	DS ,Y2	03288 00000
22130	XNO	DS ,3248	03248 00000
22140	YNO	DS ,XNO+10	03258 00000
22150	X1MXNO	DS 10,3168	03168 00010
22160	Y1MYNO	DS 10,3178	03178 00010
22170	THETA	DS 10,X1MXNO-10	03158 00010
22180	MNO2	DS ,X1MXNO	03168 00000
22190	BNO2	DS ,Y1MYNO	03178 00000
22200	EPSLON	DS ,6004	06004 00000
23010	XSAVE	DS 10,THETA-10	03148 00010
23020	HYPFLG	DS ,Y1+1	03349 00000
23030	R0	DS 10,CROSS	00069 00010
23040	DEND	CONDS	11796

SYMBOL TABLE

XYSIGN 12656	XYFORM 02416	VNSET3 12584	VNSET2 12264	VNSET1 11976
UPCOMP 14001	TRFVN2 12300	TBSTRT 02416	STEPXY 13978	SLPMAX 13930
SETZRO 11844	SETVN2 13830	RTRADD 13100	RETURN 02411	RESIGN 12860
NEXTPT 13610	NEWINT 12168	MONITR 02406	MINI.O 06024	LASTPT 03209
FLGUYA 13971	FIXVN2 12276	ERPROC 02416	ENDVN2 12336	ENDVNI 12120
ENDPNT 02416	ENDINT 12408	ECHECK 12500	DVTEST 03082	DSAT12 13483
DSAT11 13463	DSAT10 13443	DSAM23 13311	DSAM22 13301	DSAM21 13291
DSAM20 13281	DSAM19 13171	DSAM18 13271	DSAM17 13261	DSAM16 13251
DSAM15 13241	DSAM14 13231	DSAM13 13231	DSAM12 13221	DSAM11 13211
DSAM10 13201	DMTAB 13982	DELTA1 12024	CUTVNI 13560	CHORDL 02416
CHKVNI 12596	CALVEC 12716	CALLER 13800	BNLADD 13829	A 03328
ALPHA 03204	B 03162	BNOP 13088	CHOR1 11952	CHOR2 12240
CHOR3 12560	CSDIM 13040	CURPT 12536	DSAM1 13111	DSAM2 13121
DSAM3 13131	DSAM4 13141	DSAM5 13151	DSAM6 13161	DSAM7 13171
DSAM8 13181	DSAM9 13191	DSAT1 13321	DSAT2 13331	DSAT3 13343
DSAT4 13355	DSAT5 13371	DSAT6 13387	DSAT7 13399	DSAT8 13415
DSAT9 13431	DSAV1 13503	DSAV2 13513	DSAV3 13523	DSAV4 13533
DSAV5 13543	DVI 13980	DV2 13980	ER208 13768	ER219 13788
ETEST 03220	FLW 02488	INTDF 06157	NEWPT 12396	NEXT1 12156
PARAM 02416	PCUR1 11928	PCUR2 12216	PEND1 11904	PEND2 12192
PEND3 12432	R 03189	RCMIN 13940	RLC 13970	SCSRT 02416
SETUP 12456	SUB1 13551	SUB3 13697	SUB4 13825	TABDS 11796
TL1 06145	UNITV 02416	UNVEC 13706	URN4 03179	URX 03152
URY 03162	UXA 03112	UXB 03132	UYA 03122	UYB 03142
VEC1 12752	VEC2 12788	VFIX2 03219	VNI 13559	VNIM1 13554
VNO 03240	VNI 03270	VN2 03300	VN4 03230	WRERR 13812
XCOMP 03092	XNN 13700	XANP1 13705	XNO 03250	XN1 03280
XN2 03310	XPT 03194	X1 03338	YCOMP 03102	YNN 13700
YNNP1 13705	YNO 03260	YN1 03290	YN2 03320	YPT 03199
Y1 03348	O.O 06034	O.5 06065		

01010+ IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
01020+ THE CUTTER PATH ON TABCYL DRIVE SURFACES
01030+
01040+ *ID NUMBER 0241+DELDIM
01050+ *STORE CORE IMAGE
01060+ LINKAGE - B TABDS,,6
01070+
01080+ SUBPROGRAM ENTRY
01090 DORG 11796 11796
01100 TABDS TF A,STEPXY,, SET ADDRESS STEPPING CONSTANT IN COMMON
11796 26 03328 13978
01110 TOM VNO+81,,, SET RECORD MARK 11808 15 03321 00000
01120 DC 1,*,* 11819 00001
01130 BT MONITR,DSAM1+5,6, CALL TBSTRT SUBPROGRAM VIA MONITR
11820 27 02400 13116
01140 BT TBSTRT,DSAT1+5,6, CUTTER START UP ON TABCYL
11832 27 02410 13326
01150 SETZRO TFL VNO,0,0,, INITIALIZATICN 11844 06 03240 06034
01160 TFL VFIX2,0,0 11856 06 03219 06034
01170 TOM ETEST,1 11868 15 03220 00001
01180 BT MONITR,DSAM2+5,6, CALL ENDPNT SUBPROGRAM VIA MONITR
11880 27 02400 13126
01190 BTM ENDPNT,VN4,67, VN4=END POINT COORD OF A CURVE SEGMENT
11892 17 02410 -3230
01200 PEND1 BT MONITR,DSAM3+5,6, CALL PARAM SUBPROGRAM VIA MONITR
11904 27 02400 13136
02010 BT PARAM,DSAT2+6,6, MAX SLOPE AND R OF C FOR END POINT
11916 27 02410 13337
02020 PCUR1 BT MONITR,DSAM4+5,6, CALL PARAM SUBPROGRAM VIA MONITR
11928 27 02400 13146
02030 BT PARAM,DSAT3+6,6, SLOPE AND MIN R OF C FOR CURRENT POINT
11940 27 02410 13349
02040 CHOR1 BT MONITR,DSAM5+5,6, CALL CHORDL SUBPROGRAM VIA MONITR
11952 27 02400 13156
02050 BT CHORDL,DSAT4+10,6, DV1=CHORD LENGTH 11964 27 02410 13365
02060 VNSET1 TFL VNI,VNO,, SET VNI=NEXT POSITION OF TOOL CENTER
11976 06 03270 03240
02070 FADD VNI,DV1 11988 01 03270 13950
02080 BT MONITR,DSAM6+5,6, CALL XYFORM SUBPROGRAM VIA MONITR
12000 27 02400 13166
02090 BT XYFORM,DSAT5+10,6, (XN1,YN1) TRANSFORMED FROM (V,U) POINT
12012 27 02410 13381
02100 DELTA1 TFL DVTEST,VNI,, TEST DV1 EXCEEDS END POINT
12024 06 03082 03270
02110 FSUB DVTEST,VN4 12036 02 03082 03230
02120 BNL ENDVNI,,, FIRST INTERVAL EXCEEDS END POINT
12048 46 12120 01300
02130 FADD DVTEST,DV1,, TEST 2*DV1 EXCEEDS END POINT
12060 01 03082 13950
02140 BL SETUP,,, CALCULATE PARAMETERS FOR POINT (N+2)
12072 47 12456 01300
02150 BT CUTVNI,DSAV1+5,, SET VNI=CUT POINT 12084 27 13560 13508
02160 BT MONITR,DSAM7+5,6, CALL XYFORM SUBPROGRAM VIA MONITR
12096 27 02400 13176
02170 BT XYFORM,DSAT5+10,6, (XN1,YN1) TRANSFORMED FROM (V,U) POINT
12108 27 02410 13381
02180+ FIRST INTERVAL EXCEEDS END POINT
02190 ENDVNI TFL VNI,VN4,, SET VNI=END POINT 12120 06 03270 03230
02200 BT MONITR,DSAM8+5,6, CALL XYFORM SUBPROGRAM VIA MONITR
12132 27 02400 13186
03010 BT XYFORM,DSAT5+10,6, (XN1,YN1) TRANSFORMED FROM (V,U) POINT
12144 27 02410 13381
03020+ STEP STORAGE ADDRESSES FOR NEXT POINT-CHECK FOR LAST POINT
03030 NEXT1 BT NEXTPT,NEXTPT-1,, ADDRESS SET FOR NEWINT RETURN
12156 27 13610 13609
03040 NEWINT BT MONITR,DSAM9+5,6, CALL ENDPNT SUBPROGRAM VIA MONITR
12168 27 02400 13196
03050 BTM ENDPNT,VN4,67, VN4=END POINT COORD OF A CURVE SEGMENT
12180 17 02410 -3230
03060 PEND2 BT MONITR,DSAM10+5,6, CALL PARAM SUBPROGRAM VIA MONITR
12192 27 02400 13206
03070 BT PARAM,DSAT2+6,6, MAX SLOPE AND R OF C FOR END POINT
12204 27 02410 13337
03080 PCUR2 BT MONITR,DSAM11+5,6, CALL PARAM SUBPROGRAM VIA MONITR
12216 27 02400 13216
03090 BT PARAM,DSAT6+6,6, SLOPE AND MIN R OF C FOR CURRENT POINT
12228 27 02410 13393
03100 CHOR2 BT MONITR,DSAM12+5,6, CALL CHORDL SUBPROGRAM VIA MONITR
12240 27 02400 13226
03110 BT CHORDL,DSAT7+10,6, DV2=CHORD LENGTH 12252 27 02410 13409
03120+ SET VN2=NEXT POSITION OF TOOL CENTER
03130+ TEST DV2 AND 2*DV2 EXCEEDS END POINT
03140 VNSET2 BTM SETVN2,ENDVN2,, ENDVN2=BNL RETURN ADDRESS
12264 17 13830 J2336
03150 FIXVN2 BT CUTVNI,DSAV2+5,, SET VN2=CUT POINT 12276 27 13560 13518

03160 TFL VFIX2,VN2,, FIX NEXT VN2 TO BE THE SAME
 03170 TRFVN2 TFM RTRADD*6,SETUP,, SET RETURN ADDRESS FOR NEXT POINT
 03180 BT MONITR,DSAM13*5,6, CALL XYFORM SUBPROGRAM VIA MONITR
 03190 BT XYFORM,DSAT8*10,6, (XN2,VN2) TRANSFORMED FROM (V,U) POINT
 03200 SECOND INTERVAL EXCEEDS END POINT
 04010 ENDEVN2 TFL VN2,VN4,, SET VN2=END POINT 12288 06 03219 03300
 04020 TDM ET-ST,0,, SET ETEST FLAG FOR END POINT 12300 16 13106 J2496
 04030 TFM RTRADD*6,NEWPT,, SET RETURN ADDRESS FOR NEXT POINT
 04040 BT MONITR,DSAM14*5,6, CALL XYFORM SUBPROGRAM VIA MONITR
 04050 BT XYFORM,DSAT8*10,6, (XN2,VN2) TRANSFORMED FROM (V,U) POINT
 04060 STEP STORAGE ADDRESSES FOR NEXT POINT-CHECK FOR LAST POINT
 04070 NEWPT BT NEXTPT,NEXTPT-1,, ADDRESS SET FOR ENDINT RETURN
 04080 ENDINT BT MONITR,DSAM15*5,6, CALL ENDPNT SUBPROGRAM VIA MONITR
 04090 BTM ENDPNT,VN4,67, VN4=END POINT COORD OF A CURV SEGMENT
 04100 PEND3 BT MONITR,DSAM16*5,6, CALL PARAM SUBPROGRAM VIA MONITR
 04110 BT PARAM,DSAT2*6,6, MAX SLOPE AND R OF C FOR END POINT
 04120 SET UP FOR NEXT POINT ON TABCYL
 04130 SF TUP FSUB VFIX2,0,0,, TEST VN2 FIXED 12456 02 03219 06034
 04140 BNM ECHECK,, VFIX2=(NEGATIVE OR ZERO)
 04150 TFL VFIX2,0,0,, VFIX2=POSITIVE (RESET FIX FLAG)
 04160 BT ENDEVN2,, SET VN2=END POINT 12480 06 03219 06034
 04170 ECHECK RD CURPT,ETEST,, TEST ETEST FLAG SET 12492 49 12336 00000
 04180 TDM ETEST,1,, ETEST=POSITIVE (RESET ETEST)
 04190 TFL VN1,0,0,, RESET VN1 12512 15 03220 00001
 04200 CURPT BT MONITR,DSAM17*5,6, CALL PARAM SUBPROGRAM VIA MONITR
 05010 BT PARAM,DSAT9*6,6, SLOPE AND MIN R OF C FOR CURRENT POINT
 05020 CHQR3 BT MONITR,DSAM18*5,6, CALL CHORDL SUBPROGRAM VIA MONITR
 05030 BT CHORDL,DSAT7*10,6, DV2=CHORD LENGTH
 05040 SET VN2=NEXT POSITION OF TOOL CENTER
 05050 TEST DV2 AND 2*DV2 EXCEEDS END POINT
 05060 VNSET3 BTM SETVN2,CHKVN1,, CMKVN1=BNL RETURN ADDRESS
 05070 CMKVN1 CM VN1,-6,10, TEST VN1=0.0 12584 17 13830 J2596
 05080 BL ENDEVN2,, VN1=0.0 (SET VN2=END POINT) 12596 14 03270 000-0
 05090 BT CUTVN1,DSAV1*5,, SET VN1-CUT POINT 12608 47 12336 01300
 05100 BT MONITR,DSAM19*5,6, CALL XYFORM SUBPROGRAM VIA MONITR
 05110 BT XYFORM,DSAT5*10,6, (XN1,VN1) TRANSFORMED FRM (V,U) POINT
 05120 DETERMINE SIGN FOR CUTTER OFFSET

05130 XYSIGN TFL RLC,R,, ASSUME TLRGT POSITION 12656 06 13970 03189
 05140 CM TLL,1,10, TEST TLLFT OR TLRGT 12668 14 06145 000-1
 05150 BM CALVECT,, TLRGT 12680 46 12716 01100
 05160 BL ER200,, ERROR-INVALID TOOL POSITION
 05170 SF RLC-2,, TLLFT 12692 47 13768 01300
 05180 CALCULATE UNIT VECTOR LINE SEGMENTS
 05190 CALVEC BT UNVEC,DSAV3*5,, SET PARAMETERS FOR UNITY CALCULATION
 05200 BT MONITR,DSAM20*5,6, CALL UNITY SUBPROGRAM VIA MONITR
 06010 BT UNITY,DSAT10*15,6, CALCULATE UNIT VECTOR LINE SEGMENT
 06020 VECE1 BT UNVEC,DSAV4*5,, SET PARAMETERS FOR UNITY CALCULATION
 06030 BT MONITR,DSAM21*5,6, CALL UNITY SUBPROGRAM VIA MONITR
 06040 BT UNITY,DSAT11*15,6, CALCULATE UNIT VECTOR LINE SEGMENT
 06050 CALCULATE NORMALS TO LINE BY CROSS K AND ADD TO RESULTANT
 06060 VECE2 TD FLGUYA,UYA-2,, SAVE SIGN OF UYA 12788 25 13971 03120
 06070 FMUL UYA,MINI,0,, UYA=-UYA 12800 03 03122 06024
 06080 FMUL UXB,MINI,0,, UXB=-UXB 12812 03 03132 06024
 06090 BT UNVEC,DSAV5*5,, SET PARAMETERS FOR UNITY CALCULATION
 06100 BT MONITR,DSAM22*5,6, CALL UNITY SUBPROGRAM VIA MONITR
 06110 BT UNITY,DSAT12*15,6, CALCULATE UNIT VECTOR LINE SEGMENT
 06120 RESIGN TD UYA-2,FLGUYA,, RESTORE SIGN OF UYA 12848 27 02410 13498
 06130 FMUL UYA,URX,, CALCULATE DISTANCE OF OFFSET TO POINT
 06140 FMUL UXA,URY, 12872 01 03122 03152
 06150 FSUB UYA,UXA, 12884 03 03112 03162
 06160 FDIV RLC,UYA,, RLC=+ OR -(R)/(UYA=URX-URX*URY)
 06170 TFL X1,RLC,, CALCULATE CUTTER CENTER COORDINATES
 06180 FMUL X1,URX, 12920 06 03338 13970
 06190 FADD X1,XN1,, X OFFSET COORDINATE CUTTER CENTER
 06200 TFL Y1,RLC, 12944 01 03338 03280
 07010 FMUL Y1,URY, 12956 06 03348 13970
 07020 FADD Y1,YN1,, Y OFFSET COORDINATE CUTTER CENTER
 07030 TR VNO-9,VN1-9,, SAVE PARAMETERS FOR NEXT CUT
 07040 CHECK SURFACE CUT VECTOR CALCULATION
 07050 TFM CSDIM*11,DIMTAB-52,,CALCULATE AND SET PROPER
 07060 MM INTDF,4,10, DIM NUMBER OF CHECK 13004 16 13051 J3930
 07070 A CSDIM*11,99,, SURFACE SUBPROGRAM TO 13016 13 06157 000-4
 07080 CSOIM TF DSAM23*4,, BE CALLED BY 13028 21 13051 00099
 07090 CF DSAM23*1,, MONITR 13040 26 13315 00000
 07100 BT MONITR,DSAM23*5,6, CALL CS SUBPROGRAM VIA MONITR 13052 33 13312 00000
 07110 BTM SCSRT,*13,67, CALCULATE CUT VECTOR OF CS 13064 27 02400 13316
 13076 17 02410 J3089

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07120 BNOP NOP RETURN,,6, NOP OR B (VARIABLE OP CODE)
07130 RTRADD B7 ..., PROCESS A NEW POINT ON TABCYL
07140*
07150* MONITOR ARGUMENT ADDRESSES
07160 DSAM1 DSA SETZRD 13111 00005 J1844
07170 DSC 5,02561 13112 00005
07180 DSAM2 DSA PEND1 13121 00005 J1904
07190 DSC 5,02571 13122 00005
07200 DSAM3 DSA PCUR1 13131 00005 J1928
08010 DSC 5,02581 13132 00005
08020 DSAM4 DSA CHOR1 13141 00005 J1952
08030 DSC 5,02581 13142 00005
08040 DSAM5 DSA VNSET1 13151 00005 J1976
08050 DSC 5,02591 13152 00005
08060 DSAM6 DSA DELTA1 13161 00005 J2024
08070 DSC 5,02601 13162 00005
08080 DSAM7 DSA ENDEVN2 13171 00005 J2336
08090 DSC 5,02601 13172 00005
08100 DSAM8 DSA NEXT1 13181 00005 J2156
08110 DSC 5,02601 13182 00005
08120 DSAM9 DSA PEND2 13191 00005 J2192
08130 DSC 5,02571 13192 00005
08140 DSAM10 DSA PCUR2 13201 00005 J2216
08150 DSC 5,02581 13202 00005
08160 DSAM11 DSA CHOR2 13211 00005 J2240
08170 DSC 5,02581 13212 00005
08180 DSAM12 DSA VNSET2 13221 00005 J2264
08190 DSC 5,02591 13222 00005
08200 DSAM13 DSA XYSIGN 13231 00005 J2656
09010 DSC 5,02601 13232 00005
09020 DSAM14 DS ,DSAM13 13231 00000
09030 DSAM15 DSA PEND3 13241 00005 J2432
09040 DSC 5,02571 13242 00005
09050 DSAM16 DSA SETUP 13251 00005 J2456
09060 DSC 5,02581 13252 00005
09070 DSAM17 DSA CHOR3 13261 00005 J2560
09080 DSC 5,02581 13262 00005
09090 DSAM18 DSA VNSET3 13271 00005 J2584
09100 DSC 5,02591 13272 00005
09110 DSAM19 DS ,DSAM7 13171 00000
09120 DSAM20 DSA VEC1 13281 00005 J2752
09130 DSC 5,02111 13282 00005
09140 DSAM21 DSA VEC2 13291 00005 J2788
09150 DSC 5,02111 13292 00005
09160 DSAM22 DSA RESIGN 13301 00005 J2860
09170 DSC 5,02111 13302 00005
09180 DSAM23 DSA BNOP 13311 00005 J3088
09190 DSC 5,1 13312 00005
09200*
10010* EXTERNAL ARGUMENT ADDRESSES
10020 DORG DSAM23+5+5+2-6 13320
10030 NOP YNO,0 13320 41 03260 00000
10040 DORG --14 13317
10050 DSAT1 DSA XNO 13321 00005 -3250
10060 DORG ++5+2-4+5+2-6-2 13329
10070 NOP SLPMAX,0 13330 41 13930 00000
10080 DORG --14 13327
10090 DSAT2 DSA VN4 13331 00005 -3230

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10100 DORG ++5+2-4 13337
10110 DSC 1,0 13337 00001
10120 DORG DSAT2+6+5+2-6 13341
10130 NOP RCMIN,0 13342 41 13940 00000
10140 DORG --14 13339
10150 DSAT3 DSA VNO 13343 00005 -3240
10160 DORG ++5+2-4 13349
10170 DSC 1,1 13349 00001
10180 DORG DSAT3+6+5+3-11 13353
10190 NOP RCMIN,DV1 13354 41 13940 13950
10200 DORG --14 13351
1010 DSAT4 DSA SLPMAX 13355 00005 J3930
11020 DORG ++5+3-4+5+3-11 13370
11030 NOP XN1,YN1 13370 41 03280 03290
11040 DORG --14 13367
11050 DSAT5 DSA VN1 13371 00005 -3270
11060 DORG ++5+3-4+5+2-6 13386
11070 NOP RCMIN,0 13386 41 13940 00000
11080 DORG --14 13383
11090 DSAT6 DSA 0,0 13387 00005 -6034
11100 DORG ++5+2-4 13393
11110 DSC 1,1 13393 00001
11120 DORG DSAT6+6+5+3-11 13397
11130 NOP RCMIN,DV2 13398 41 13940 13960
11140 DORG --14 13395
11150 DSAT7 DSA SLPMAX 13399 00005 J3930
11160 DORG ++5+3-4+5+3-11 13414
11170 NOP XN2,YN2 13414 41 03310 03320
11180 DORG --14 13411
11190 DSAT8 DSA VN2 13415 00005 -3300
11200 DORG ++5+3-4+5+2-6 13430
12010 NOP RCMIN,0 13430 41 13940 00000
12020 DORG --14 13427
12030 DSAT9 DSA VN1 13431 00005 -3270
12040 DORG ++5+2-4 13437
12050 DSC 1,1 13437 00001
12060 DORG DSAT9+6+5+4-6 13451
12070 NOP UYA,0 13452 41 03122 00000
12080 DORG --21 13442
12090 NOP YCOMP,UXA 13442 41 03102 03112
12100 DORG --14 13439
12110 DSAT10 DSA XCOMP 13443 00005 -3092
12120 DORG ++5+4-4+5+4-6-2 13471
12130 NOP UYB,0 13472 41 03142 00000
12140 DORG --21 13462
12150 NOP YCOMP,UXB 13462 41 03102 03132
12160 DORG --14 13459
12170 DSAT11 DSA XCOMP 13463 00005 -3092
12180 DORG ++5+4-4+5+4-6-2 13491
12190 NOP URX,0 13492 41 03152 00000
12200 DORG --21 13482
13010 NOP YCOMP,URY 13482 41 03102 03162
13020 DORG --14 13479
13030 DSAT12 DSA XCOMP 13483 00005 -3092
13040 DORG ++5+4-4+5+2-6-2 13501
13050*
13060* INTERNAL ARGUMENT ADDRESSES
13070 NOP VN1,0 13502 41 03270 00000
13080 DORG --14 13499
13090 DSAV1 DSA VNO 13503 00005 -3240

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13100 DORG ++5*2-4+5*2-6-2
13110 NOP VN2,0
13120 DORG --14
13130 DSAV2 DSA VNI
13140 DORG ++5*2-4+5*2-6-2
13150 NOP XN1,0
13160 DORG --14
13170 DSAV3 DSA XNO
13180 DORG ++5*2-4+5*2-6-2
13190 NOP XN2,0
13200 DORG --14
14010 DSAV4 DSA XN1
14020 DORG ++5*2-4+5*2-6-2
14030 NOP UXB,0
14040 DORG --14
14050 DSAV5 DSA UKA
14060 DORG ++5*2-4
14070
14080 SET VN1=CUT POINT
14090 SUB1 DAS 5
14100 VNIM1 DS 5,SUB1+3, VNO OR VN1 ADDRESS 13551 00010
14110 VNI DS 5,SUB1+8, VN1 OR VN2 ADDRESS 13554 00005
14120 CUTVNI TFL VNI,VN4,6 13559 00005
14130 FSUB VNI,VNIM1,611 13560 06 1355R 03230
14140 FMUL VNI,0.5,6 13572 02 1355R 1355M
14150 FADD VNI,VNIM1,611, VNI=VNIM1+(VN4-VNIM1)*0.5 13584 03 1355R 06065
13596 01 1355R 1355M
13608 42 00000 00000

14160 BBZ ,,, BRANCH BACK
14170
14180 STEP STORAGE ADDRESSES FOR NEXT POINT-CHECK FOR LAST POINT
14190 DUMMY INPUT ARGUMENT
14200 NEXTPT A YPT,STEPXY,, STEP X-Y COORDINATE ADDRESSES
13610 21 03199 13978
15010 A YPT,STEPXY 13622 21 03199 13978
15020 TF ALPHA,XPT,, GET ADDRESS OF CURRENT ANGLE ALPHA
13634 26 03204 03194
15030 SM ALPHA,10 13646 12 03204 -0010
15040 C LASTPT,YPT,, TEST TABCYL TABLE LIMIT EXCEEDED
13658 24 03209 03199
15050 BV ++12,, RESET OVERFLOW INDICATOR
13670 46 13682 01400
15060 BL ER219,,, ERROR-TABLE LIMIT EXCEEDED
13682 47 13788 01300
15070 BBZ ,,, RETURN TO PROCESS NEW OR END INTERVAL
13694 42 00000 00000

15080
15090 SET PARAMETERS FOR UNITY CALCULATION
15100 SUB3 DAS 5 13697 00010
15110 XNN DS 5,SUB3+3, XN(N) COORDINATE ADDRESS 13700 00005
15120 XNNP1 DS 5,SUB3+8, XN(N+1) COORDINATE ADDRESS 13705 00005
15130 YNN DS ,XNN, YN(N) COORDINATE ADDRESS 13700 00000
15140 YNNP1 DS ,XNNP1, YN(N+1) COORDINATE ADDRESS 13705 00000
15150 UNVEC TFL XCOMP,XNNP1,11, XCOMP=XN(N+1) 13706 06 03092 1370N
15160 FSUB XCOMP,XNN,11, XCOMP=XN(N+1)-XN(N) 13718 02 03092 1370-
15170 A XNNP1,UPCOMP,, GET YN(N) AND YN(N+1) COORD ADDRESSES 13730 21 13705 14001
13730 21 13705 14001

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15180 TFL YCOMP,YNNP1,11, YCOMP=YN(N+1) 13742 06 03102 1370N
15190 FSUB YCOMP,YNN,11, YCOMP=YN(N+1)-YN(N) 13754 02 03102 1370-
15200 BBZ ,,, BRANCH BACK 13766 42 00000 00000
16010
16020 ERROR CONDITION-IMPROPER START UP ON TABCYL
16030 ER200 TFM WRERR+9,200,9, SET ERROR NUMBER 200 13768 16 13821 00K00
16040 B7 CALLER,,, BRANCH TO PROCESS ERROR 13780 49 13800 00000
16050 ERROR CONDITION-TABCYL TABLE LIMIT (PCINTS) EXCEEDED
16060 ER219 TFM WRERR+9,219,9, SET ERROR NUMBER 219 13788 16 13821 00K19
16070 CALLER BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR 13800 17 02400 -2250
16080 WRERR BTM ERPROC,1,67, WRITE ERROR MESSAGE.....SEARCH FOR END 13812 17 02410 -0001

16090
16100 SET VN2=NEXT POSITION OF TOOL CENTER
16110 TEST DV2 AND 2*DV2 EXCEEDS END POINT
16120 SUB4 DAS 3 13825 00006
16130 BNLADD DS 5,SUB4+4, BNL RETURN ADDRESS 13829 00005
16140 SETVN2 TFL VN2,VN1,, SET VN2=NEXT POSITION OF TOOL CENTER 13830 06 03300 03270
16150 FADD VN2,DV2 13842 01 03300 13960
16160 TFL DVTEST,VN2,, TEST DV2 EXCEEDS END POINT 13854 06 03082 03300
16170 FSUB DVTEST,VN4 13866 02 03082 03230
16180 BNL BNLADD,,6, SECOND INTERVAL EXCEEDS END POINT 13878 46 1382R 01300
16190 FADD DVTEST,DV2,, TEST 2*DV2 EXCEEDS END POINT 13890 01 03082 13960
16200 BL TRFVN2,,, TRANSFORM VN2 13902 47 12300 01300
17010 B7 FIXVN2,,, SET VN2=CUT POINT 13914 49 12276 00000
17020
17030 STORAGE ALLOCATION
17040
17050 SUBPROGRAM AND SUBROUTINE ADDRESSES
17060 MONITR DS ,2406, AD-APT MONITOR 02406 00000
17070 TBSTRT DS ,2416, TABCYL START UP 02416 00000
17080 ENDPNT DS ,2416, END POINT 02416 00000
17090 PARAM DS ,2416, PARAMETERS (SLOPE AND R OF C) 02416 00000
17100 CHORDL DS ,2416, CHORD LENGTH 02416 00000
17110 XYFORM DS ,2416, X-Y TRANSFORMATION 02416 00000
17120 UNITV DS ,2416, UNIT VECTOR 02416 00000
17130 SCSRT DS ,2416, SELECT CS ROUTINE 02416 00000
17140 ERPROC DS ,2416, ERROR PROCESSOR 02416 00000
17150 RETURN DS ,2411, MONITR STORAGE FOR RETURN ADDRESS 02411 00000

17160
17170 WORKING PARAMETERS
17180 SLPMAX DS 10,, MAXIMUM SLOPE 13930 00010
17190 RCMIN DS 10,, MINIMUM RADIUS OF CURVATURE 13940 00010
17200 DV1 DS 10,, CHORD LENGTH (NO-N1) 13950 00010
18010 DV2 DS 10,, CHORD LENGTH (N1-N2) 13960 00010
18020 ALC DS 10,, TOOL CONDITION (RIGHT-LEFT) 13970 00010
18030 FLGUYA DS 1,, SAVE UYA SIGN 13971 00001
18040 PLW DS ,2488, I/O FLOATING POINT WORD ARRAY 02488 00000
18050 A DS ,FLW*84*10, PERMANENT ADDRESS COUNTER

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18060 STEPXY DC	7,6000060,,	COORDINATE ADDRESS STEPPING CONSTANT	03328 00000 13978 00007
18070 VNO DS	10,A-88,	COORDINATES OF PRESENT	03240 00010
18080 XNO DS	10,VNO+10,	TOOL CENTER POSITION	03250 00010
18090 YNO DS	10,VNO+20,	COORDINATES OF NEXT	03260 00010
18100 VN1 DS	10,VNO+30,	TOOL CENTER POSITION	03270 00010
18110 XN1 DS	10,VNO+40,	COORDINATES OF NEXT+1	03280 00010
18120 YN1 DS	10,VNO+50,	TOOL CENTER POSITION	03290 00010
18130 VN2 DS	10,VNO+60,	COORDINATES OF NEXT+1	03300 00010
18140 XN2 DS	10,VNO+70,	TOOL CENTER POSITION	03310 00010
18150 YN2 DS	10,VNO+80,	POSITION	03320 00010
18160 VN4 DS	10,A-98,	END POINT OF CURRENT INTERVAL	03230 00010
18170 ETEST DS	1,A-108,	FLAG FOR TESTING END POINT	03220 00001
18180 VFIX2 DS	10,A-109,	FLAG FOR SETTING VN2=END POINT	03219 00010
18190 LASTPT DS	5,A-119,	ADDRESS OF LAST POINT (Y) IN CANON ARRAY	03209 00005
18200 ALPHA DS	5,A-124,	ADDRESS OF ANGLE ALPHA IN CANON ARRAY	03204 00005
19010 XPT DS	5,A-134,	ADDRESS OF X COORD IN CANON ARRAY	03194 00005
19020 YPT DS	5,XPT+5,	ADDRESS OF Y COORD IN CANON ARRAY	03199 00005
19030 R DS	10,A-139,	TOOL RADIUS CONDITION (RIGHT-LEFT-DM)	03189 00010
19040 URN4 DS	10,A-149,	END POINT RADIUS OF CURVATURE	03179 00010
19050 B DS	,FLW+68*10-6,	TEMPORARY ADDRESS COUNTER	03162 00000
19060 UXA DS	10,B-50,	UNIT VECTOR COORDINATES OF	03112 00010
19070 UYA DS	10,UXA+10,	(XNO,YNO)-(XN1,YN1)	03122 00010
19080 UXB DS	10,UXA+20,	UNIT VECTOR COORDINATES OF	03132 00010
19090 UYB DS	10,UXA+30,	((XN1,YN1)-(XN2,YN2)	03142 00010
19100 URX DS	10,UXA+40,	RESULTANT UNIT VECTOR COORDINATES OF	03152 00010
19110 URY DS	10,UXA+50,	(UXA,UYA)-(UXB,UYB)	03162 00010
19120 XCOMP DS	10,B-70,	X COMPONENT FOR UNITV CALCULATION	03092 00010
19130 YCOMP DS	10,XCOMP+10,	Y COMPONENT FOR UNITV CALCULATION	03102 00010
19140 DVTEST DS	10,B-80,	CHORD LENGTH TESTING	03082 00010
19150 X1 DS	,FLW+85*10,	X OFFSET COORDINATE CUTTER CENTER	03338 00000
19160 Y1 DS	,X1+10,	Y OFFSET COORDINATE CUTTER CENTER	03348 00000
19170 TL1 DS	,6145,	DS TOOL MODIFIER	06145 00000
19180 INTOP DS	,6157,	DS-CS CONFIGURATION INDICATOR	06157 00000
19190*			
19200*	CONSTANTS		
20010 DIMTAB DC	4,0244,,	CHECK SURFACE	13982 00004
20020 DC	4,0245,,		13986 00004

20030 DC	4,0246,,	DIM NUMBER	13990 00004
20040 DC	4,0247,,	STEPPING CONSTANT (X-Y COORD ADDRESSES)	14001 00007
20050 UPCOMP DC	7,1000010,,	FLOATING POINT ZERO	06034 00000
20060 0.0 DS	,6034,	FLOATING POINT ONE HALF	06065 00000
20070 0.5 DS	,6065,	MINUS FLOATING POINT ONE	06024 00000
20080 MINI.0 DS	,6024,		
20090*			
20100*		11796
20110	DEND TABDS		

SYMBOL TABLE

6XNSEG 13787	1.0E48 06085	VERTAN 14110	TABSLP 13634	SOFFST 11796
SELECT 13590	RETURN 02411	PTBUFR 02416	PNTLOC 02416	OFFTAB 13090
OFFSET 14154	OFFLIN 11832	OFFCON 12336	OFFCIR 11940	NORMAL 14234
MONITR 02406	MINI.0 06024	LOCCLP 13802	LINTAB 02416	LINSLP 14010
LINLOC 02416	LINLIN 02416	LINCON 02416	LINCIR 02416	INTFLG 13473
HORTAN 14214	FLGINT 13462	ERPROC 02416	DZCALC 12024	DICALC 12000
CONVRT 13258	CONSLP 14130	CIRSLP 14030	BSLOPE 12132	ATANF 02416
CFLAG 13234	CON2 14518	CCN54 14524	CON60 14512	DECR 13426
DGENT 12372	DISTF 02416	DMIN 04244	DOT1 12084	DOT2 12236
DOT3 12260	DOT4 14294	DSA1 12485	DSA10 12669	DSA11 12729
DSA12 12739	DSA13 12809	DSA14 12819	DSA15 12855	DSA16 12885
DSA17 12915	DSA18 12951	DSA19 12976	DSA2 12515	DSA20 12987
DSA21 13002	DSA22 13013	DSA23 13053	DSA24 13063	DSA25 13083
DSA3 12525	DSA4 12570	DSA5 12581	DSA6 12606	DSA7 12617
DSA8 12643	DSA9 12659	DTDS 02416	OTPRF 12150	DX 04354
DYDX 02416	D1 04254	D2 04284	ER220 11880	ER221 12292
F 05964	FISH 02416	FLAG 00079	FLW 02488	FLWST 03362
LOCPT 13742	MINIF 02416	MOVE1 12108	MST 04314	MXV 04324
NLNCR 12312	NOINT 00019	NCNE 13874	NPW 02455	NSRF 02477
NVPTS 13789	ONE 13930	OUTPT 14470	REVU 14446	S 04294
SETRM 13482	SUM 13294	T 04304	TANF 02416	TLINE 12412
TLRAD 05984	TL2 06147	UNITV 02416	UNVEC 14270	UX 04334
UY 04344	VARB 12284	WERM 11916	X 05820	XI 05923
XN 12144	XNMXO 04264	XO 05892	X1 02488	X2 02510
X3 02532	Y 05830	YJ 05933	YN 12149	YNMYO 04274
YO 05902	Y1 02498	Y2 02520	Y3 02542	L.0 06075
LINT 12404	ZINT 11988			

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR PROCESSING
01020* AN OFFSET/ TO, PAST OR ON RECORD
01030* RCS
01040* *NAME SOFFST... NON-ERASABLE ARELEM SUBPROGRAM
01050* *IO NUMBER 0242+DELDIR
01060* *STORE CORE IMAGE
01070* LINKAGE - B SOFFST
01080*
01090* DORG 11796 11796
01100* SUBPROGRAM ENTRY
01110 SOFFST TFM VARB+6,ER221 11796 16 12290 J2292
01120 CM NSRF,2,10 11808 14 02477 000-2
01130 BNL WERM+12,,, BRANCH IF SURFACE IS NOT A LINE
11870 46 11928 01300
01140*
01150 OFFLIN TFM BSLOPE+6,LINSLP 11832 16 12138 J4010
01160 BTM MONITR,02050,67, CALL LINLIN SUBPROGRAM VIA MONITR
11844 17 02400 -2050
01170 BT LINLIN,DSA1+25,6, CALCULATE INTERSECTIONS PDV AND LINE
11856 27 02410 12510
01180 BNR DOT3,X1,, BRANCH IF INTERSECTION EXISTS
11868 45 12260 02488
01190*
01200 ER220 TFM WERM+11,22000 11880 16 11927 K2000
02010 A WERM+11,NSRF 11892 21 11927 02477
02020 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
11904 17 02400 -2250
02030 WERM BTM ERPROC,,6, WRITE ERROR MESSAGE... SEARCH FOR END
11916 17 02410 00000
02040 BNE NLNCR,,, BRANCH IF SURFACE IS A CONIC OR TABCYL
11928 47 12312 01200
02050*
02060 OFFCIR TFM BSLOPE+6,CIRSLP 11940 16 12138 J4030
02070 BT MONITR,DSA2+5,6, CALL LINCIR SUBPROGRAM VIA MONITR
11952 27 02400 12520
02080 BT LINCIR,DSA3+40,6, CALCULATE INTERSECTIONS PDV AND CIRCLE
11964 27 02410 12565
02090 BNR ER220,FLAG,, BRANCH IF 2 INTERSECTIONS DO NOT EXIST
11976 45 11880 00079
02100*
02110 ZINT BT MONITR,DSA4+5,6, CALL DISTF SUBPROGRAM VIA MONITR
11988 27 02400 12575
02120 DICALC BT DISTF,DSA5+20,6, CALC. DISTANCE BETWEEN PTS. PO AND P1
12000 27 02410 12601
02130 BT MONITR,DSA6+5,6, CALL DISTF SUBPROGRAM VIA MONITR
12012 27 02400 12611
02140 DZCALC BT DISTF,DSA7+20,6, CALC. DISTANCE BETWEEN PTS. PO AND P2
12024 27 02410 12637
02150 BTM MONITR,02130,67, CALL MINIF-MAXIF SUBPROGRAM VIA MONITR
12036 17 02400 -2130
02160 BT MINIF,DSA8+11,6, SELECT SMALLER OF ELEMENTS D1 AND D2
12048 27 02410 12654
02170 FSUB DMIN,D1 12060 02 04244 04254
02180 BNE DOT2,,, BRANCH IF D1 NOT SMALLER ELEMENT
12072 47 12236 01200
02190*
02200 DOT1 BT DTPRF,DSA5+5 12084 27 12150 12586
03010 RNP DOT2,,, BRANCH IF POINT P1 IS NOT INDIRV PDV
12096 47 12236 01100
03020*
03030 MOVE1 TFL X,XN,11 12108 06 05820 1214M
03040 TFL Y,YN,11 12120 06 05830 1214R
03050 BSLOPE B ... BRANCH TO APPROPRIATE SLOPE CALCULATION
12132 49 00000 00000
12140
03060 DORG -3
03070*
03080* DOT PRODUCT FUNCTION
03090 DC 10,0 12149 00010
03100 XN DS 5,-5, X-COORDINATE OF POINT ON CURVE
12144 00005
03110 YN DS 5,, Y-COORDINATE OF POINT ON CURVE
12149 00005
03120*
03130 DTPRF TFL XNMXO,XN,11 12150 06 04264 1214M
03140 FSUB XNMXO,XO,, XN-XO 12162 02 04264 05892
03150 FNUL XNMXO,XI,, XI*(XN-XO) 12174 03 04264 05923
03160 TFL YNMYO,YN,11 12186 06 04274 1214R
03170 FSUB YNMYO,YO,, YN-YO 12198 02 04274 05902
03180 FNUL YNMYO,YJ,, YJ*(YN-YO) 12210 03 04274 05933
03190 FADD XNMXO,YNMYO,, XI*(XN-XO)+YJ*(YN-YO) 12222 01 04264 04274
03200 BB ... EXIT 12234 42 00000 00000
04010 DORG -9 12236
04020*
04030 DOT2 BT DTPRF,DSA7+5 12236 27 12150 12622
04040 BP MOVE1,,, BRANCH IF POINT P2 IS INDIRV PDV
12248 46 12108 01100
04050*
04060 DOT3 BT DTPRF,DSA5+5 12260 27 12150 12586

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04070 BP MOVE1,,, BRANCH IF POINT P1 IS INDIRV PDV
12272 46 12108 01100
04080*
04090 VARS B 12284 49 00000 00000
04100 DORG *-3 12292
04110*
04120 ER221 TFM WERM+11,22100 12292 16 11927 K2100
04130 B ER220+12 12304 49 11892 00000
04140 DORG *-3 12312
04150*
04160 NLNCR CM NSRF,3,10 12312 14 02477 C00-3
04170 BP OFFTAB,,, BRANCH IF SURFACE IS A TABCYL
12324 46 13090 01100
04180*
04190 OFFCON TFM BSLOPE+6,CNNSLP 12336 16 12138 J4130
04200 BT MONITR,DSA9+5,6, CALL LINCON SUBPROGRAM VIA MONITR
12348 27 02400 12664
05010 BT LINCON,DSA10+55,6, CALCULATE INTERSECTIONS PDV AND CONIC
12380 27 02410 12724
05020 BGENF BNR **20,FLAG,, BRANCH IF TWO INTERSECTIONS DO NOT EXIST
12372 45 12392 00079
05030*
05040 B 2INT 12384 49 11988 00000
05050 DORG *-3 12392
05060*
05070 BD TLINE,FLAG,, BRANCH IF ONE INTERSECTION EXISTS
12392 43 12412 00079
05080*
05090 LINT B ER220 12404 49 11880 00000
05100 DORG *-3 12412
05110*
05120 TLINE BD ER220,FLWST+2*10+1-9,, BRANCH IF A-COEFF. IS NON-ZERO
12412 43 11880 03374
05130*
05140 BD ER220,FLWST+3*10+1-9,, BRANCH IF B-COEFF. IS NON-ZERO
12424 43 11880 03384
05150*
05160 BD ER220,FLWST+4*10+1-9,, BRANCH IF C-COEFF. IS NON-ZERO
12436 43 11880 03394
05170*
05180 TFL X,X1 12448 06 05820 02488
05190 TFL Y,Y1 12460 06 05830 02498
05200 B CNNSLP 12472 49 14130 00000
06010 DORG *-4+5*6-6 12503
06020*
06030 NOP Y1,0 12504 41 02498 00000
06040 DORG *-21 12494
06050 NOP FLWST+3*10+1,X1 12494 41 03393 02488
06060 DORG *-21 12484
06070 NOP FLWST+1*10,FLWST+2*10+1 12484 41 03372 03383
06080 DORG *-14 12481
06090 DSA1 DSA FLWST+0*10 12485 00005 -3362
06100 DORG *-5*6-4 12511
06110 DSA2 DSA 2INT-12 12515 00005 J1976
06120 DSC 5,02061 12516 00005
06130 DORG DSA2+5*5*9-11 12554
06140 NOP X2,Y2 12554 41 02510 02520
06150 DORG *-21 12544
06160 NOP X1,Y1 12544 41 02488 02498
06170 DORG *-21 12534

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06180 NOP FLWST+3*10+1,FLWST+4*10+1 12534 41 03393 03403
06190 DORG *-21 12524
06200 NOP FLWST+1*10,FLWST+2*10+1 12524 41 03372 03383
07010 DORG *-14 12521
07020 DSA3 DSA FLWST+0*10 12525 00005 -3362
07030 DORG *-5*9-4 12566
07040 DSA4 DSA D2CALC+12 12570 00005 J2012
07050 DSC 5,02101 12571 00005
07060 DORG DSA4+5*5*5-11 12589
07070 NOP Y0,D1 12590 41 05902 04254
07080 DORG *-21 12580
07090 NOP Y1,X0 12580 41 02498 05892
07100 DORG *-14 12577
07110 DSA5 DSA X1 12581 00005 -2488
07120 DORG *-5*5-4 12602
07130 DSA6 DSA D2CALC+12 12606 00005 J2036
07140 DSC 5,02101 12607 00005
07150 DORG DSA6+5*5*5-11 12625
07160 NOP Y0,D2 12626 41 05902 04284
07170 DORG *-21 12616
07180 NOP Y2,X0 12616 41 02520 05892
07190 DORG *-14 12613
07200 DSA7 DSA X2 12617 00005 -2510
08010 DORG *-5*5-4+5*3-11 12642
08020 NOP D2,DMIN 12642 41 04284 04244
08030 DORG *-14 12639
08040 DSA8 DSA D1 12643 00005 -4254
08050 DORG *-5*3-4 12654
08060 DSC 1,6 12654 00001
08070 DSA9 DSA DCENT 12659 00005 J2372
08080 DSC 5,02091 12660 00005
08090 DORG DSA9+5*5*12-6 12718
08100 NOP Y2,0 12718 41 02520 00000
08110 DORG *-21 12708
08120 NOP Y1,X2 12708 41 02498 02510
08130 DORG *-21 12698
08140 NOP FLWST+7*10+1,X1 12698 41 03433 02488
08150 DORG *-21 12688
08160 NOP FLWST+6*10+1,FLWST+5*10+1 12688 41 03423 03413
08170 DORG *-21 12678
08180 NOP FLWST+2*10+1,FLWST+4*10+1 12678 41 03383 03403
08190 DORG *-21 12668
08200 NOP FLWST+1*10,FLWST+3*10+1 12668 41 03372 03393
09010 DORG *-14 12665
09020 DSA10 DSA FLWST+0*10 12669 00005 -3362
09030 DORG *-5*12-4 12725
09040 DSA11 DSA SUM 12729 00005 J3294
09050 DSC 5,02691 12730 00005
09060 DORG DSA11+5*5*14-6 12798
09070 NOP 0,0 12798 41 00000 00000
09080 DORG *-21 12788
09090 NOP 0,0 12788 41 00000 00000
09100 DORG *-21 12778
09110 NOP 0,0 12778 41 00000 00000
09120 DORG *-21 12768
09130 NOP 0,0 12768 41 00000 00000
09140 DORG *-21 12758
09150 NOP 0,0 12758 41 00000 00000
09160 DORG *-21 12748
09170 NOP 0,0 12748 41 00000 00000

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09180	DORG	=-21	12738
09190	NOP	FLWST+89*10+2,0	12738 41 04254 00000
09200	DORG	=-14	12735
10010	DSA12	DSA FLWST+88*10+2	12739 00005 -4244
10020	DORG	**5*14-4	12805
10030	DSA13	DSA CONVRT*12	12809 00005 J3270
10040	DSC	5,02681	12810 00005
10050	DORG	DSA13*5*5*7-11	12838
10060	NOP	FLWST+88*10+2,FLWST+89*10+2	12838 41 04244 04254
10070	DORG	=-21	12828
10080	NOP	FLWST+0*10,FLWST+1*10	12828 41 03362 03372
10090	DORG	=-21	12818
10100	NOP	0,0	12818 41 00000 00000
10110	DORG	=-14	12815
10120	DSA14	DSA 0	12819 00005 -0000
10130	DORG	**5*7-4*5*6-6	12874
10140	NOP	FLWST+6*10+1,0	12874 41 03423 00000
10150	DORG	=-21	12864
10160	NOP	FLWST+4*10+1,FLWST+5*10+1	12864 41 03403 03413
10170	DORG	=-21	12854
10180	NOP	FLWST+3*10+1,FLWST+7*10+1	12854 41 03393 03433
10190	DORG	=-14	12851
10200	DSA15	DSA FLWST+2*10+1	12855 00005 -3383
11010	DORG	**5*6-4*5*6-6-2	12903
11020	NOP	Y3,0	12904 41 02542 00000
11030	DORG	=-21	12894
11040	NOP	Y2,X3	12894 41 02520 02532
11050	DORG	=-21	12884
11060	NOP	Y1,X2	12884 41 02498 02510
11070	DORG	=-14	12881
11080	DSA16	DSA X1	12885 00005 -2488
11090	DORG	**5*6-4*5*7-11-2	12933
11100	NOP	5,T	12934 41 04294 04304
11110	DORG	=-21	12924
11120	NOP	X,Y	12924 41 05820 05830
11130	DORG	=-21	12914
11140	NOP	0,0	12914 41 00000 00000
11150	DORG	=-14	12911
11160	DSA17	DSA 0	12915 00005 -0000
11170	DORG	**5*7-4*5*5-11	12960
11180	NOP	0,MST	12960 41 00000 04314
11190	DORG	=-21	12950
11200	NOP	0,0	12950 41 00000 00000
12010	DORG	=-14	12947
12020	DSA18	DSA S	12951 00005 -4294
12030	DORG	**5*5-4	12972
12040	DSA19	DSA LOCPT*12	12976 00005 J3754
12050	DSC	5,02541	12977 00005
12060	DORG	DSA19*5*5*3-11	12985
12070	NOP	MST,MY	12986 41 04314 04324
12080	DORG	=-14	12983
12090	DSA20	DSA 1.0	12987 00005 -6075
12100	DORG	**5*3-4	12998
12110	DSA21	DSA OFFSET	13002 00005 J4154
12120	DSC	5,02211	13003 00005
12130	DORG	DSA21*5*5*8-6	13041
12140	NOP	MY,0	13042 41 04324 00000
12150	DORG	=-21	13032
12160	NOP	FLWST+6*10+1,FLWST+5*10+1	13032 41 03423 03413
12170	DORG	=-21	13022

12180	NOP	FLWST+2*10+1,FLWST+4*10+1	13022 41 03383 03403
12190	DORG	=-21	13012
12200	NOP	Y,FLWST+3*10+1	13012 41 05830 03393
13010	DORG	=-14	13009
13020	DSA22	DSA X	13013 00005 -5820
13030	DORG	**5*8-4	13049
13040	DSA23	DSA DDT4	13053 00005 J4294
13050	DSC	5,02111	13054 00005
13060	DORG	DSA23*5*5*4-6	13072
13070	NOP	UY,0	13072 41 04344 00000
13080	DORG	=-21	13062
13090	NOP	MY,UX	13062 41 04324 04334
13100	DORG	=-14	13059
13110	DSA24	DSA 1.0	13063 00005 -6075
13120	DORG	**5*4-4	13079
13130	DSA25	DSA OUTPT*24	13083 00005 J4494
13140	DSC	5,02481	13084 00005
13150*			
13160	OFFTAB	TFM BSLOPE*6,ONE	13090 16 12138 J3930
13170	TFM	VARB*6,NONE	13102 16 12290 J3874
13180	TFM	Y3*3	13114 15 02545 00000
13190	DC	1,*,*	13125 00001
13200	TFM	FLGINT*6,Y1-2*10,, INITIALIZE INTERVAL INDICATOR STORAGE	13126 16 13468 -2478
14010	TF	DSA14*10,DSA15*10,, INITIALIZE SUBPROGRAM CALLING ARGUMENTS	13138 26 12829 12865
14020	TF	DSA12*35,DSA15*25	13150 26 12774 12880
14030	TF	DSA12*65,DSA16*25	13162 26 12804 12910
14040	CF	DSA12*36,,,	13174 33 12775 00000
14050	TFH	NVPTS,,10,, REMOVE DSA FLAG	13186 16 13789 000-0
			13198 26 13787 02455
14060	TF	6XNSEG,NPW	13210 12 13787 000-2
14070	SM	6XNSEG,2,10,, NO. OF TABCYL INTERVALS (MODULO 6)	13222 16 13473 000-0
14080	TFH	INTFLG,,10,, CLEAR TABCYL INTERVAL COUNTER	13234 33 12745 00000
14090	CFLAG	CF DSA12*6,,,	13246 27 02400 12814
14100	BT	MONITR,DSA13*5,6,, CALL LINLOC SUBPROGRAM VIA MONITR	13258 27 02410 12849
14110	CONVRT	BT LINLOC,DSA14*30,6,, CONVERT LINE PARAMETERS TO LOCAL SYSTEM	13270 27 02400 12734
14120	BT	MONITR,DSA11*5,6,, CALL LINTAB SUBPROGRAM VIA MONITR	13282 27 02410 12804
14130	BT	LINTAB,DSA12*65,6,, CALCULATE INTERSECTIONS PDV AND TABCYL	13294 21 13789 00019
14140	SUM	A NVPTS,NOINT,, SUM NO. OF INTERSECTION POINTS	13306 21 12828 14512
14150*			
14160	A	DSA14*9,CON60,, INDEX SUBPROGRAM ARGUMENT ADDRESSES	13318 26 12758 12828
14170	TF	DSA12*19,DSA14*9,, FOR NEXT INTERVAL OF TABCYL	13330 21 12773 14512
14180	A	DSA12*34,CON60	13342 13 00019 000K2
14190	MH	NOINT,22,10	
14200*			
15010	A	DSA12*40,99,, MODIFY ADDRESSES AT WHICH X AND Y	13354 21 12779 00099
15020	A	DSA12*45,99,, COORDINATES OF INTERSECTION POINTS	13366 21 12784 00099
15030	A	DSA12*50,99,, ARE STORED (22 CORE POSITIONS PER POINT)	

15040	A	DSA12+55,99	13378 21 12789 00079
15050	A	DSA12+60,99	13390 21 12794 00099
15060	A	DSA12+65,99	13402 21 12799 00099
15070*			13414 21 12804 00099
15080	DECR	SM NDINT,1,10	13426 12 00019 000-1
15090	BN	SETRM	13438 47 13482 01300
15100*			
15110	AM	FLGINT+6,22,10	13450 11 13468 000K2
15120	FLGINT	TFM ,,,	SET INTERVAL INDICATOR
			13462 16 00000 -0000
15130	INTFLG	DS 2,,	13473 00002
15140	B	DECR	13474 49 13426 00000
15150	DORG	=-3	13482
15160*			
15170	SETRM	TF **30,FLGINT+6	13482 26 13512 13468
15180	AM	**18,1,10	13494 11 13512 000-1
15190	TDM	TFM ,,,	SET RECORD MARK AFTER INTERVAL
			13506 15 00000 00000
15200	DC	1,,',,	INDICATOR OF LAST INTERSECTION POINT
			13517 00001
16010	AM	INTFLG,6,10,	STEP TABCYL INTERVAL COUNTER (MODULO 6)
			13518 11 13473 000-6
16020	SM	6XNSEG,6,10,	DECREMENT NO. OF TABCYL INTERVALS
			13530 12 13787 000-6
16030	BNZ	CFLAG,,,	BRANCH IF NOT ALL INTERVALS EXAMINED
			13542 47 13234 01200
16040*			
16050	CM	NVPTS,,10	13554 14 13789 000-0
16060	BZ	ER220,,,	BRANCH IF NO VALID INTERSECTION EXISTS
			13566 46 11880 01200
16070*			
16080	TFM	SELECT+18,DOT3	13578 16 13608 J2260
16090	SELECT	SM NVPTS,1,10	13590 12 13789 000-1
16100	BZ	TFM ,,,	BRANCH IF ALL POINTS ON TABCYL EXAMINED
			13602 46 00000 01200
16110*			
16120	BP	ZINT,,,	BRANCH IF TWO OR MORE POINTS REMAIN
			13614 46 11988 01100
16130*			
16140	B	SELECT+18,,6	13626 49 13600 00000
16150	DORG	=-3	13634
16160*			
16170	TABSLP	TFM DSA17+10,FLWST+7*10+1	13634 16 12925 -3433
16180	A	DSA17+9,YN,11	13646 21 12924 1214R
16190	TF	DSA17+5,DSA17+10	13658 26 12920 12925
16200	CF	DSA17,DSA17+10	13670 26 12915 12925
17010	CF	DSA17+1,,,	REMOVE DSA FLAGS
			13682 33 12916 00000
17020	CF	DSA17+6	13694 33 12921 00000
17030	S	DSA17+4,CON54	13706 22 12919 14524
17040	TF	DSA18+15,DSA17+10	13718 26 12966 12925
17050	BT	MONITR,DSA19+5,6,	CALL PNTLOC SUBPROGRAM VIA MONITR
			13730 27 02400 12981
17060	LOCPT	BT PNTLOC,DSA17+30,6,	EVALUATE POINT IN LOCAL COORD. SYSTEM
			13742 27 02410 12945
17070	A	DSA18+9,CON2	13754 21 12960 14518
17080	SM	DSA18+14,1,10	13766 12 12965 000-1
17090	CF	DSA18+1,,,	REMOVE DSA FLAG
			13778 33 12952 00000
17100	BTM	MONITR,02510,67,	CALL DTDS SUBPROGRAM VIA MONITR
			13790 17 02400 -2510

17110	LOCSLP	BT DTDS,DSA18+20,6,	EVALUATE SLOPE TABCYL AT POINT ON TABCYL
			13802 27 02410 12971
17120	BTM	MONITR,02020,67,	CALL ATANF SUBPROGRAM VIA MONITR
			13814 17 02400 -2020
17130	BT	ATANF,DSA20+10,6,	CALCULATE ANG. DISPLACEMENT OF TAN. LINE
			13826 27 02410 12997
17140	FADD	MX,Y,DSA17+10,11	13838 01 04324 1292N
17150	BT	MONITR,DSA21+5,6,	CALL TANF SUBPROGRAM VIA MONITR
			13850 27 02400 13007
17160	BTM	TANF,MX,Y,67,	SLOPE OF TAN. LINE IN X-Y COORD. SYSTEM
			13862 17 02410 -4324
17170	NONE	TR X1-9,X3-9,,	ELIMINATE TWO POINTS ON TABCYL
			13874 31 02479 02523
17180	CM	SELECT+18,TABSLP	13886 14 13608 J3634
17190	BE	SELECT	13898 46 13590 01200
17200*			
18010	TFM	SELECT+18,ER221	13910 16 13608 J2292
18020	B	SELECT	13922 49 13590 00000
18030	DORG	=-3	13930
18040*			
18050	ONE	TFM SELECT+18,TABSLP	13930 16 13608 J3634
18060	TFL	X2,XN,11	13942 06 02510 1214R
18070	TFL	Y2,YN,11	13954 06 02520 1214R
18080	AM	YN,2,10	13966 11 12149 000-2
18090	TF	Y2+2,YN,11	13978 26 02522 1214R
18100	TR	X1-9,X2-9,,	ELIMINATE ONE POINT ON TABCYL
			13990 31 02479 02501
18110	B	SELECT	14002 49 13590 00000
18120	DORG	=-3	14010
18130*			
18140	LINSLP	TFL MX,Y,FLWST+2*10+1	14010 06 04324 03383
18150	B	OFFSET	14022 49 14154 00000
18160	DORG	=-3	14030
18170*			
18180	CIRSLP	TFL MX,Y,FLWST+2*10+1	14030 06 04324 03383
18190	FSUB	MX,Y,X,,	H-X
			14042 02 04324 05820
18200	TFL	DX,Y	14054 06 04354 05830
19010	FSUB	DX,FLWST+3*10+1,,	Y-K
			14066 02 04354 03393
19020	BZ	VERTAN,,,	BRANCH IF TAN. LINE IS VERTICAL
			14078 46 14110 01200
19030*			
19040	FDIV	MX,Y,DX,,	MX,Y=(H-X)/(Y-K)
			14090 09 04324 04354
19050	B	OFFSET	14102 49 14154 00000
19060	DORG	=-3	14110
19070*			
19080	VERTAN	TFL MX,Y,1.0E48,,	SET MX,Y=1.0E48
			14110 06 04324 06085
19090	B	OFFSET	14122 49 14154 00000
19100	DORG	=-3	14130
19110*			
19120	CONSLP	BTM MONITR,02080,67,	CALL DYDX SUBPROGRAM VIA MONITR
			14130 17 02400 -2080
19130	BT	DYDX,DSA22+35,6,	EVALUATE SLOPE OF GENERAL CONIC
			14142 27 02410 13048
19140	OFFSET	FSUB FLWST*0+10,MX,Y	14154 02 03362 04324
19150	BE	ER220	14166 46 11880 01200
19160*			
19170	BTM	MONITR,02180,67,	CALL FISH SUBPROGRAM VIA MONITR
			14178 17 02400 -2180
19180	BT	FISH,TL2,6,	CALCULATE OFFSET INDICATOR F
			14190 27 02410 06147

19190	BD	NORMAL,MXY=0,,	BRANCH IF SLOPE TAN. LINE IS NON-ZERO	14202 43 14234 04315
19200*				
20010	MORTAN	TFL MXY,1.0E40,,	SET MXY=1.0E40	14214 06 04324 06085
20020	B	UNVEC		14226 49 14270 00000
20030		DORG =-3		14234
20040*				
20050	NORMAL	TFL FLWST+0*10,MINI.0		14234 06 03362 06024
20060		FDIV FLWST+0*10,MXY,,	-1.0/MXY	14246 09 03362 04324
20070		TFL MXY,FLWST+0*10		14258 06 04324 03362
20080	UNVEC	BT MONITR,DSA23+5,6,	CALL UNITY SUBPROGRAM VIA MONITR	14270 27 02400 13058
20090		BT UNITY,DSA24+15,6,	CALCULATE UNIT NORMAL OFFSET VECTOR	14282 27 02410 13078
20100	DOT*	FMUL UX,TLRAD,,	UX=UX*TLRAD	14294 03 04334 05964
20110		FMUL UY,TLRAD,,	UY=UY*TLRAD	14306 03 04344 05984
20120		TFL FLWST+0*10,XI		14318 06 03362 05923
20130		FMUL FLWST+0*10,UX,,	XI=UX	14330 03 03362 04334
20140		TFL FLWST+1*10,YJ		14342 06 03372 05933
20150		FMUL FLWST+1*10,UY,,	YJ=UY	14354 03 03372 04344
20160		FADD FLWST+0*10,FLWST+1*10,,	XI=UX+YJ*UY	14366 01 03362 03372
20170		FMUL FLWST+0*10,F,,	F=(XI*UX+YJ*UY)	14378 03 03362 05964
20180		BZ OUTPT,,,	BRANCH IF OFFSET VECTOR IS ZERO	14390 46 14470 01200
20190*				
20200	BP	REVV,,,	BRANCH IF POSITIVE DOT PRODUCT	14402 46 14446 01100
21010*				
21020		FADD X,UX,,	X=X+UX	14414 01 05820 04334
21030		FADD Y,UY,,	Y=Y+UY	14426 01 05830 04344
21040		B OUTPT		14438 49 14470 00000
21050		DORG =-3		14446
21060*				
21070	REVV	FSUB X,UX,,	X=X-UX	14446 02 05820 04334
21080		FSUB Y,UY,,	Y=Y-UY	14458 02 05830 04344
21090	OUTPT	BT MONITR,DSA25+5,6,	CALL PTBUFR SUBPROGRAM VIA MONITR	14470 27 02400 13088
21100		BTM PTBUFR,,610,	SET OUT TIP OF CUT VECTOR	14482 17 02410 000-0
21110		B RETURN,,6,	RETURN TO MONITR	14494 49 0241J 00000
21120		DORG =-3		14502
21130*				
21140	CON60	DC 11,60000600006		14512 00011
21150	CON2	DC 6,200002		14518 00006
21160	CON54	DC 6,500004		14524 00006
21170*				
21180	NSRF	DS ,2477		02477 00000
21190	MONITR	DS ,2406		02406 00000
21200	LINLIN	DS ,2416		02416 00000
22010	FLW	DS ,2488		02488 00000
22020	FLWST	DS ,3362		03362 00000
22030	X1	DS 10,FLW+0*10		02488 00010
22040	Y1	DS 10,X1+10		02498 00010
22050	X2	DS 10,Y1+10+2		02510 00010
22060	Y2	DS 10,X2+10		02520 00010
22070	X3	DS 10,Y2+10+2		02532 00010
22080	Y3	DS 10,X3+10		02542 00010
22090	ERPROC	DS ,2416		02416 00000
22100	LINCIR	DS ,2416		02416 00000
22110	FLAG	DS ,79		00079 00000

22120	DISTF	DS ,2416		02416 00000
22130	MINIF	DS ,2416		02416 00000
22140	DMIN	DS 10,FLWST+88*10+2		04244 00010
22150	D1	DS 10,DMIN+10		04254 00010
22160	X	DS 10,5820		05820 00010
22170	Y	DS 10,X+10		05830 00010
22180	XMX0	DS 10,D1+10		04264 00010
22190	YNMY0	DS 10,XMX0+10		04274 00010
22200	X0	DS ,5892		05892 00000
23010	Y0	DS ,X0+10		05902 00000
23020	XI	DS ,5923		05923 00000
23030	YJ	DS ,XI+10		05933 00000
23040	LINCOM	DS ,2416		02416 00000
23050	D2	DS 10,YNMY0+10		04284 00010
23060	S	DS 10,D2+10		04294 00010
23070	T	DS 10,S+10		04304 00010
23080	MST	DS 10,T+10		04314 00010
23090	MXY	DS 10,MST+10		04324 00010
23100	UX	DS 10,MXY+10		04334 00010
23110	UY	DS 10,UX+10		04344 00010
23120	RETURN	DS ,2411		02411 00000
23130	NVPTS	DS 2,LOCCLP-13		13789 00002
23140	6XNSEG	DS 2,NVPTS-2		13787 00002
23150	NPW	DS ,2455		02455 00000
23160	LINLOC	DS ,2416		02416 00000
23170	LINTAB	DS ,2416		02416 00000
23180	NOINT	DS ,19		00019 00000
23190	PNTLOC	DS ,2416		02416 00000
23200	DTDS	DS ,2416		02416 00000
24010	ATANF	DS ,2416		02416 00000
24020	TANF	DS ,2416		02416 00000
24030	DX	DS 10,UY+10		04354 00010
24040	1.0E48	DS ,6085		06085 00000
24050	1.0	DS ,6075		06075 00000
24060	DYDX	DS ,2416		02416 00000
24070	FISH	DS ,2416		02416 00000
24080	TL2	DS ,6147		06147 00000
24090	MINI.0	DS ,6024		06024 00000
24100	UNITY	DS ,2416		02416 00000
24110	TLRAD	DS ,5984		05984 00000
24120	F	DS ,5964		05964 00000
24130	PTBUFR	DS ,2416		02416 00000
24140	DEND	SOFFST		11796

SYMBOL TABLE

RETURN 02411	PCROSS 00322R	PARLEL 00478R	NCROSS 00254R	MONITR 02406
MINI.O 04024	ERPROC 02416	CDOT 00366R	COS2D 06105	CROSS 02488
DOT 02498	ER216 00298R	FLW 02488	G01 06347	NDOT 00438R
NPERP 00342R	PDOT 00438R	PERP 00218R	REVV 00266R	SENSE 00002R
SINE 02508	SQRTF 02416	TEMP1 02498	TEMP2 02508	UX 06125
UY 06135	XI 05923	YJ 05933		

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01010+      IBM 1620-1311 AD-APT SUBPROGRAM FOR ESTABLISHING
01020+      THE CORRECT SENSE OF UNIT TANGENT DS VECTORS
01030+
01040+      *NAME SENSE... NON-ERASABLE ARELEM SUBPROGRAM
01050+      *ID NUMBER 0243+DELDIM
01060+      *ASSEMBLE RELOCATABLE
01070+      *STORE RELOADABLE
01080+      LINKAGE - BTM SENSE,1,610
01090+
01100      DC 2,0,,          DUMMY ARGUMENT          00001 00002
01110+
01120+      SUBPROGRAM ENTRY
01130 SENSE TFL CROSS,XI          00002 06 02488 05923
01140      FMUL CROSS,UY,,        XI*UY              00014 03 02488 06135
01150      TFL TEMP1,YJ          00026 06 02498 05933
01160      FMUL TEMP1,UX,,        YJ*UX              00038 03 02498 06125
01170      FSUB CROSS,TEMP1,,     CROSS=XI*UY-YJ*UX   00050 02 02488 02498
01180      BZ PARLEL,,,           BRANCH IF CROSS PRODUCT IS ZERO
                                           00062 M6 00478 01200
01190+
01200      TFL TEMP1,XI          00074 06 02498 05923
02010      FMUL TEMP1,XI,,        XI**2              00086 03 02498 05923
02020      TFL TEMP2,YJ          00098 06 02508 05933
02030      FMUL TEMP2,YJ,,        YJ**2              00110 03 02508 05933
02040      FADD TEMP1,TEMP2,,     XI**2+YJ**2       00122 01 02498 02508
02050      BTM MONITR,02000,67,  CALL SQRTF SUBROUTINE VIA MONITR
                                           00134 17 02400 -2000
02060      BTM SQRTF,TEMP1,67,   SQRTF(XI**2+YJ**2)  00146 17 02410 -2498
02070      TFL TEMP2,CROSS        00158 06 02508 02488
02080      CF TEMP2-2,,,          ABSF(CROSS)        00170 33 02506 00000
02090      FDIV SINE,COS2D,,     ABSF(CROSS)/SQRTF(XI**2+YJ**2)
                                           00182 09 02508 02498
02100      FSUB SINE,COS2D,,     SINE-COSF(2 DEGR.)  00194 02 02508 06105
02110      BN NPERP,,,           BRANCH IF VECTORS NOT PERPENDICULAR
                                           00206 M7 00342 01300
02120+
02130 PERP CM G01,2,10         00218 14 06347 000-2
02140      BP ER216,,,          BRANCH IF G01 IS GOFND OR GOBACK
                                           00230 M6 00298 01100
02150+
02160      BNF PCROSS,CROSS-2,,  BRANCH IF CROSS PRODUCT IS POSITIVE
                                           00242 M4 00322 02486
02170+
02180 NCROSS BE RETURN,,6,     BRANCH IF G01 IS GORGT
                                           00254 46 0241J 01200
02190+
02200 REVU FMUL UX,MINI.O,,     UX=-UX            00266 03 06125 06024
03010      FMUL UY,MINI.O,,     UY=-UY            00278 03 06135 06024
03020      B RETURN,,6,         RETURN TO MONITR  00290 49 0241J 00000
    
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03030      DORG *-3              00298
03040+
03050 ER216 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
                                           00298 17 02400 -2250
03060      BTM ERPROC,21600,67,  WRITE ERROR MESSAGE... SEARCH FOR END
                                           00310 17 02410 K1600
03070 PCROSS BNE RETURN,,6,     RETURN TO MONITR  00322 47 0241J 01200
03080+
03090      B REVU                00334 M9 00266 00000
03100      DORG *-3              00342
03110+
03120 NPERP CM G01,2,10         00342 14 06347 000-2
03130      BNP NCROSS-12,,,     BRANCH IF G01 IS GOLFT OR GORGT
                                           00354 M7 00242 01100
03140+
03150 CDOT TFL DOT,XI          00366 06 02498 05923
03160      FMUL DOT,UX,,        XI*UX              00378 03 02498 06125
03170      TFL TEMP2,YJ          00390 06 02508 05933
03180      FMUL TEMP2,UY,,        YJ*UY              00402 03 02508 06135
03190      FADD DOT,TEMP2,,     DOT=XI*UX+YJ*UY    00414 01 02498 02508
03200      BN NDOT,,,           BRANCH IF DOT PRODUCT IS NEGATIVE
                                           00426 M7 00458 01300
04010+
04020 PDOT CM G01,3,10         00438 14 06347 000-3
04030      B NCROSS              00450 M9 00254 00000
04040      DORG *-3              00458
04050+
04060 NDOT CM G01,4,10         00458 14 06347 000-4
04070      B NCROSS              00470 M9 00254 00000
04080      DORG *-3              00478
04090+
04100 PARLEL CM G01,3,10         00478 14 06347 000-3
04110      BN ER216,,,          BRANCH IF G01 IS GOLFT OR GORGT
                                           00490 M7 00298 01300
04120+
04130      DSC 2,49              00502 00002
04140      DSA CDOT              00508 00005 -0366
04150+
04160 FLW DS ,2488              02488 00000
04170 CROSS DS 10,FLW+0*10     02488 00010
04180 XI DS ,5923              05923 00000
04190 UY DS ,6135              06135 00000
04200 TEMP1 DS 10,CROSS*10     02498 00010
05010 YJ DS ,5933              05933 00000
05020 UX DS ,6125              06125 00000
05030 TEMP2 DS 10,TEMP1*10     02508 00010
05040 MONITR DS ,2406          02406 00000
05050 SQRTF DS ,2416           02416 00000
05060 SINE DS ,TEMP2           02508 00000
05070 COS2D DS ,6105           06105 00000
05080 G01 DS ,6347             06347 00000
05090 RETURN DS ,2411          02411 00000
05100 MINI.O DS ,6024          06024 00000
05110 ERPROC DS ,2416          02416 00000
05120 DOT DS ,TEMP1           02498 00000
05130      DEMO SENSE            00002
    
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SYMBOL TABLE

YCOMP1 03122	YCOMP0 03002	XCOMP1 03112	XCOMP0 02982	TOLCON 03082
RETURN 02411	PTBUFR 02416	NOTERM 00510R	NORMLN 02416	MONITR 02406
MOFFCS 02962	MINI.0 06024	LROFFS 02416	LOPSM 06333	LINLIN 02416
LCNOM2 02416	GOFDBK 01136R	FBOFFS 02416	CONVRG 00792R	BOFFCS 02972
BCV 03002	BRGO2 00306R	CALL1 01172R	COST 01248R	COS20 06105
DISTF 02416	DIVRG 00462R	DOT1 00366R	DOT2 00848R	DSA1 00533R
DSA10 00685R	DSA11 00715R	DSA12 00725R	DSA13 00735R	DSA14 00760R
DSA15 00771R	DSA4 00563R	DSA5 00588R	DSA6 00599R	DSA7 00629R
DSA8 00655R	FLW 02488	GO2 06337	LINCS 00006R	LNW 01272R
MAGCV 03092	MAGNV 03102	MCV 02982	MF 06155	NORM 00114R
POFF1 01204R	SORTF 02416	STFL 06163	TARG 01296R	TERM 01116R
TNEXT 00952R	TOL1 05994	TOLM 01420R	TOL0 06014	TOLZ 01376R
UNITN 00198R	UX 06125	UY 06135	VARB1 00816R	VARB2 00932R
X 05820	XNO 03022	XN1 03042	XOFF0 02992	XOFF1 03062
XO 05892	XI 03338	XIMXO 02962	Y 05830	YNO 03032
YNI 03052	YOFF0 03012	YOFF1 03072	YO 05902	Y1 03348
YIMYO 02972	Z 00079	O.0 06034	L.0 06075	

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01010+      IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
01020+      THE TERMINAL CUTTER POSITION AT LINE CS
01030+
01040+      *NAME LINCS... NON-ERASABLE ARELEM SUBPROGRAM      RCS
01050+      *ID NUMBER 0244+DELDIR
01060+      *ASSEMBLE RELOCATABLE
01070+      *STORE RELOADABLE
01080+      LINKAGE - BTM LINCS,+13,67
01090+
01100      DC      6,0                      00005 00006
01110+
01120+      SUBPROGRAM ENTRY
01130 LINCS TF      DSA6+10,STFL          00006 K6 00609 06163
01140      SM      DSA6+10,12,10,        ADDRESS OF SLOPE OF CS LINE
                                           00018 J2 00609 000J2
01150      TF      DSA6+15,DSA6+10       00030 KO 00614 00609
01160      AM      DSA6+15,10,10,        ADDRESS OF Y-INTERCEPT OF CS LINE
                                           00042 J1 00614 000J0
01170      CF      DSA6+11              00054 L3 00610 00000
01180      TF      DSA1+15,DSA6+15      00066 KO 00548 00614
01190      TF      UNITN+11,DSA1+10     00078 KO 00209 00543
01200      CF      DSA1+6               00090 L3 00539 00000
02010      CF      DSA6+6               00102 L3 00605 00000
02020 NORM BTM      MONITR,02140,67,    CALL NORMLN SUBPROGRAM VIA MONITR
                                           00114 I7 02400 -2140
02030      BT      NORMLN,DSA1+25,6,    PROJECT CV ORIGIN TO CS LINE
                                           00126 2P 02410 00558
02040      TFL     XIMXO,XI              00138 06 02962 03338
02050      FSUB    XIMXO,XO,,           XI-XO
                                           00150 02 02962 05892
02060      TFL     YIMYO,YI            00162 06 02972 03348
02070      FSUB    YIMYO,YO,,           YI-YO
                                           00174 02 02972 05902
02080+      CALCULATE UNIT NORMAL VECTOR TO CHECK SURFACE LINE
02090      BTM      MONITR,02000,67,    CALL SORTF SUBROUTINE VIA MONITR
                                           00186 I7 02400 -2000
02100 UNITN TFL     UX,,               UX=M
                                           00198 06 06125 00000
02110      TFL     UY,MINI.0,,         UY=-1.0
                                           00210 06 06135 06024
02120      TFL     Z,UX
                                           00222 06 00079 06125
02130      FMUL    Z,Z
                                           00234 03 00079 00079

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02140      FADD    Z,1.0,,              Z=M+2+1.0
                                           00246 01 00079 06075
02150      BTM      SORTF,Z,67,         Z=SQRTF(Z)
                                           00258 17 02410 -0079
02160      FDIV   UX,Z,,               UX=M/Z
                                           00270 09 06125 00079
02170      FDIV   UY,Z,,               UY=-1.0/Z
                                           00282 09 06135 00079
02180      CM      GO2,Z,10            00294 14 06337 000-2
02190 BRGO2 BP      GOFDBK,,          BRANCH IF GO2 IS GOFWD OR GOBACK
                                           00306 M6 01136 01100
02200+
03010      TFM      VARB1+6,VARB1+8    00318 JO 00822 -0824
03020      TFM      VARR2+6,VARB2+8    00330 JO 00938 -0940
03030      BTM      MONITR,02490,67,    CALL LROFFS SUBPROGRAM VIA MONITR
                                           00342 I7 02400 -2490
03040      BT      LROFFS,DSA4+15,6,    PROJECT CV ORIGIN TO OFFSET CS LINE
                                           00354 2P 02410 00578
03050 DOT1 TFL     XCOMP0,XOFF0        00366 06 02982 02992
03060      FSUB    XCOMP0,XO,,         XOFF0-XO
                                           00378 02 02982 05892
03070      TFL     YCOMP0,YOFF0        00390 06 03002 03012
03080      FSUB    YCOMP0,YO,,         YOFF0-YO
                                           00402 02 03002 05902
03090      FMUL   XCOMP0,XIMXO,,       (XOFF0-XO)*(XI-XO)
                                           00414 03 02962 02962
03100      FMUL   YCOMP0,YIMYO,,       (YOFF0-YO)*(YI-YO)
                                           00426 03 03002 02972
03110      FADD    XCOMP0,YCOMP0,,     (XOFF0-XO)*(XI-XO)+(YOFF0-YO)*(YI-YO)
                                           00438 01 02982 03002
03120      BP      CONVRG,,           BRANCH IF CV CONVERGING TO OFFSET CS
                                           00450 M6 00792 01100
03130+
03140 DIVRG TFL     X,XI               00462 06 05820 03338
03150      TFL     Y,YI               00474 06 05830 03348
03160      BT      MONITR,DSAS+5,6,    CALL PTBUFR SUBPROGRAM VIA MONITR
                                           00486 2P 02400 00593
03170      BTM      PTBUFR,-1,610,     SET OUT TIP OF CUT VECTOR
                                           00498 I7 02410 000-J
03180 NOTERM TOM  LINCS-1,1,6,        SET NOP INSTRUCTION IN CALLING PROGRAM
                                           00510 J5 0000N 00001
03190      B      RETURN,,6,          RETURN TO MONITR
                                           00522 49 0241J 00000
03200      DORG   +-4+5+6-6-2        00551
04010+
04020      NOP     YNO,0               00552 41 03032 00000
04030      DORG   +-21                00542
04040      NOP     O,XNO               00542 41 00000 03022
04050      DORG   +-21                00532
04060      NOP     YO,0               00532 41 05902 00000
04070      DORG   +-14                00529
04080 DSA1 DSA     XO                 00533 00005 -5892
04090      DORG   +-5+6-4+5+5-11-2    00571
04100      NOP     YOFF0,TOLCON        00572 41 03012 03082
04110      DORG   +-21                00562
04120      NOP     YNO,XOFF0          00562 41 03032 02992
04130      DORG   +-14                00559
04140 DSA4 DSA     XNO                 00563 00005 -3022
04150      DORG   +-5+5-4              00584
04160 DSA5 DSA     NOTERM              00588 00005 -0510
04170      DSC     3,02481            00589 00005
04180      DORG   DSAS+5+5+6-6        00617
04190      NOP     YNI,0               00618 41 03052 00000
04200      DORG   +-21                00608
05010      NOP     O,XNI              00608 41 00000 03042
05020      DORG   +-21                00598
05030      NOP     YI,0               00598 41 03348 00000
05040      DORG   +-14                00595
05050 DSA6 DSA     XI                 00599 00005 -3138

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10050*				01236 M6 01376 01100
10060 COST	BT	MONTR,DSA12+9,6,	CALL DISTF SUBPROGRAM VIA MONTR	
			01248 2P 02400 00730	
10070	BT	DISTF,DSA13+20,6,	CALCULATE LENGTH OF CUT VECTOR	
			01260 2P 02410 00755	
10080 LNV	BT	MONTR,DSA14+5,6,	CALL DISTF SUBPROGRAM VIA MONTR	
			01272 2P 02400 00765	
10090	BT	DISTF,DSA15+20,6,	CALCULATE LENGTH OF NORMAL VECTOR	
			01284 2P 02410 00791	
10100 TARG	FMUL	MAGNV,MAGCV,,	(LENGTH OF CV)=(LENGTH OF NV)	
			01296 03 03102 03092	
10110	B2	TNEXT	01308 M6 00952 01200	
10120*				
10130	FDIV	XCOMP1,MAGNV,,	COSINE (ANGLE BETWEEN VECTORS)	
			01320 09 03112 03102	
10148	GF	XCOMP1=8	01332 33 03118 00000	
10150	FSUB	XCOMP1,COS2D	01344 02 03112 06105	
10160	BN	TNEXT,,,	BRANCH IF ANGLE EXCEEDS 2 DEGREES	
			01356 M7 00952 01300	
10170*				
10180	B	DIVRG	01368 M9 00462 00000	
10190	DDRG	--3	01376	
10200*				
11010 TOLZ	TFL	TOLCON,0.0	01376 06 03082 06034	
11020	TFM	VARB2+6,TOLN-12	01388 J0 00938 -1408	
11030	B	CALL1	01400 M9 01172 00000	
11040	DDRG	--3	01408	
11050*				
11060	BNP	COST,,,	BRANCH IF CV CROSSES OFFSET C5	
			01408 M7 01248 01100	
11070*				
11080 TOLN	FSUB	TOLCON,TOLI,,	TOLCON--TOLI	
			01420 02 03082 05994	
11090	TFM	VARB2+6,TNEXT-12	01432 J0 00938 -0940	
11100	DSC	2.49	01444 00002	
11110	DSA	CALL1	01450 00005 -1172	
11120*				
11130 MONTR	DS	,2406	02406 00000	
11140 NORMLN	DS	,2416	02416 00000	
11150 FLW	DS	,2488	02488 00000	
11160 X1MX0	DS	10,FLW+46*10+14	02962 00010	
11170 X1	DS	,FLW+85*10	03338 00000	
11180 X0	DS	,5892	05892 00000	
11190 Y1MY0	DS	10,X1MX0+10	02972 00010	
11200 Y1	DS	,X1+10	03348 00000	
12010 Y0	DS	,X0+10	05902 00000	
12020 SQRTF	DS	,2416	02416 00000	
12030 G02	DS	,6337	06337 00000	
12040 LROFFS	DS	,2416	02416 00000	
12050 XCOMP0	DS	10,Y1MY0+10	02982 00010	
12060 XOFF0	DS	10,XCOMP0+10	02992 00010	
12070 YCOMP0	DS	10,XOFF0+10	03002 00010	
12080 YOFF0	DS	10,YCOMP0+10	03012 00010	
12090 X	DS	,5820	05820 00000	
12100 Y	DS	,X+10	05830 00000	
12110 PTBUFR	DS	,2416	02416 00000	
12120 RETURN	DS	,2411	02411 00000	
12130 XNO	DS	10,YOFF0+10	03022 00010	
12140 YNO	DS	10,XNO+10	03032 00010	
12150 MIN1.0	DS	,6024	06024 00000	

12160 UX	DS	,6125	06125 00000
12170 UY	DS	,6135	06135 00000
12180 XN1	DS	10,YNO+10	03042 00010
12190 YN1	DS	10,XN1+10	03052 00010
12200 XOFF1	DS	10,YN1+10	03062 00010
13010 YOFF1	DS	10,XOFF1+10	03072 00010
13020 MCV	DS	10,XCOMP0	02982 00010
13030 BCY	DS	10,YCOMP0	03002 00010
13040 HOFFCS	DS	10,X1MX0	02962 00010
13050 BOFFCS	DS	10,Y1MY0	02972 00010
13060 TOLCOM	DS	10,YOFF1+10	03082 00010
13070 MAGCV	DS	10,TOLCOM+10	03092 00010
13080 MAGNV	DS	10,MAGCV+10	03102 00010
13090 STFL	DS	,6163	06163 00000
13100 XCOMP1	DS	10,MAGNV+10	03112 00010
13110 YCOMP1	DS	10,XCOMP1+10	03122 00010
13120 NF	DS	,6155	06155 00000
13130 LCNON2	DS	,2416	02416 00000
13140 LINLIN	DS	,2416	02416 00000
13150 FBOFFS	DS	,2416	02416 00000
13160 TOL0	DS	,6014	06014 00000
13170 DISTF	DS	,2416	02416 00000
13180 COS2D	DS	,6105	06105 00000
13190 0.0	DS	,6034	06034 00000
13200 TOLI	DS	,5994	05994 00000
14010 1.0	DS	,6075	06075 00000
14020 Z	DS	,79	00079 00000
14030 LOOPSW	DS	,6333	06333 00000
14040	DEND	LINCS	00006

04040 DPLUSR BT DISTF,DSA36+20,6, CALC. DIST. FROM CV ORIGIN TO CS CENTER 00428 2P 02400 02736
04050 FSUB CRIT,DSA2+20,11, CRIT-DISTANCE FROM CV ORIGIN TO CS 00440 2P 02410 02761
04060 TFL TEMPI,EPSLON 00452 0K 03052 0210N
04070 FADD TEMPI,EPSLON,, 2.0*EPSLON 00464 06 00079 06004
04080 AM TEMPI,1,10, 20.0*EPSLON 00476 01 00079 06004
04090 FSUB CRIT,TEMPI,, CRIT=CRIT-20.0*EPSLON 00488 11 00079 000-1
04100 TFL TEMPI,F 00500 02 03052 00079
04110 FMUL TEMPI,TLRAD,, F*TLRAD 00512 06 00079 05964
04120 CF TEMPI-2,,, ABSF(F*TLRAD) 00524 03 00079 05984
04130 FSUB CRIT,TEMPI,, CRIT=CRIT-ABSF(F*TLRAD) 00536 33 00077 00000
04140 FSUB CRIT,MAGCV,, CRIT=CRIT-MAGCV 00548 02 03052 00079
04150 BP DIVRG,,, BRANCH IF RESULT IS POSITIVE 00560 02 03052 03072
00572 M6 01340 01100
04160*
04170 NORM1 BT MONITR,DSA1+5,6, CALL NORMCR SUBPROGRAM VIA MONITR 00584 2P 02400 02080
04180 BT NORMCR,DSA2+30,6, PROJECT CV ORIGIN TO CS CIRCLE 00596 2P 02410 02115
04190 BNR CMN,FLAG,,, BRANCH IF CV ORIGIN AND CENTER NOT SAME 00608 M5 01552 00079
04200*
05010 RARE BT MONITR,DSA4+5,6, CALL NORMCR SUBPROGRAM VIA MONITR 00620 2P 02400 02161
05020 BT NORMCR,DSA3+30,6, PROJECT CV TIP TO CS CIRCLE 00632 2P 02410 02151
05030 TFL XNO,XN1 00644 06 02982 03152
05040 TFL YNO,YN1 00656 06 02992 03162
05050 DELTAS TFL XLMXO,XL 00668 06 02962 03338
05060 FSUB XLMXO,XO,, X1-XO 00680 02 02962 05892
05070 TFL YIMYO,YI 00692 06 02972 03344
05080 FSUB YIMYO,YO,, Y1-YO 00704 02 02972 05902
05090 TFL XNOMH,XNO 00716 06 03002 02982
05100 FSUB XNOMH,XN1, XNO-M 00728 0K 03002 02094
05110 TFL YNOMK,YNO 00740 06 03012 02992
05120 FSUB YNOMK,K,11, YNO-K 00752 0K 03012 0210-
05130 BT MONITR,DSA5+5,6, CALL UNITV SUBPROGRAM VIA MONITR 00764 2P 02400 02171
05140 UNITO BT UNITV,DSA6+15,6, DETERMINE UNIT NORMAL TO CS CIRCLE (PNO) 00776 2P 02410 02192
05150 CM GO2,2,10 00788 14 06337 000-2
05160 BRGO2 BP GOFDBK,,, BRANCH IF GO2 IS GOFWD OR GOBACK 00800 M6 01572 01100
05170*
05180 SF GOFLAG,,, SET FLAG INDICATING TO, PAST, ON CS 00812 L2 00823 00000
05190 BTM MONITR,02490,67, CALL LROFFS SUBPROGRAM VIA MONITR 00824 17 02400 -2490
05200 BT LROFFS,DSA9+15,6, PROJECT CV ORIGIN TO OFFSET CS CIRCLE 00836 2P 02410 02242
06010 ENTRY1 BT MONITR,DSA27+5,6, CALL DISTF SUBPROGRAM VIA MONITR 00848 2P 02400 02586
06020 DOCALC BT DISTF,DSA20+20,6, CALCULATE RADIUS OF OFFSET CIRCLE 00860 2P 02410 02477
06030 TFL DN,DO 00872 06 03022 03032
06040 BT REZIDF,DSA2+5,, EVALUATE RESIDUAL OF POINT PO 00884 KP 01418 02090

06050 BNP MOUTO,,, BRANCH IF PO NOT OUTSIDE OFFSET CS 00896 M7 02028 01100
06060*
06070 OUTO BT DTPRF,DSA28+15,, DOT CUT VECTOR AND NORMAL VECTOR 00908 KP 00020 02606
06080 BNP DIVRG,,, BRANCH IF DOT PRODUCT IS NOT POSITIVE 00920 M7 01340 01100
06090*
06100 CONVRG BNF CRTN1+12,GOFFLAG,, BRANCH IF GO2 IS GOFWD OR GOBACK 00932 MM 01776 00823
06110*
06120 TDM DSA26+11,-6,, SET CONTROL DIGIT TO EXECUTE MINIF 00944 J5 02576 00000
06130 BTM MONITR,02710,67, CALL LCNON2 SUBPROGRAM VIA MONITR 00956 17 02400 -2710
06140 BT LCNON2,DSA18+25,6, CALCULATE SLOPE-INTERCEPT OF CV LINE 00968 2P 02410 02406
06150 CALL1 BT MONITR,DSA21+5,6, CALL LINCIR SUBPROGRAM VIA MONITR 00980 2P 02400 02487
06160 BT LINCIR,DSA19+40,6, CALC. INTOF CV LINE AND OFFSET CS CIRCLE 00992 2P 02410 02451
06170 BNF FB2,GOFFLAG,, BRANCH IF GO2 IS GOFWD OR GOBACK 01004 MM 03010 00823
06180*
06190 BRFLAG BNR DIVRG,FLAG,, BRANCH IF 1 OR NO INTERSECTION EXISTS 01016 M5 01340 00079
06200*
07010 BT MONITR,DSA22+5,6, CALL DISTF SUBPROGRAM VIA MONITR 01028 2P 02400 02497
07020 D2CALC BT DISTF,DSA23+20,6, CALC. DIST. FROM CV ORIGIN TO POINT P2 01040 2P 02410 02523
07030 BT MONITR,DSA24+5,6, CALL DISTF SUBPROGRAM VIA MONITR 01052 2P 02400 02533
07040 D3CALC BT DISTF,DSA25+20,6, CALC. DIST. FROM CV ORIGIN TO POINT P3 01064 2P 02410 02559
07050 BTM MONITR,02130,67, CALL MINIF-MAXIF SUBPROGRAM VIA MONITR 01076 17 02400 -2130
07060 SLCT1 BT HXR1F,DSA26+11,6, SELECT COMPARATIVE ELEMENT FROM D2, D3 01088 2P 02410 02576
07070 FSUB DCOMP,D2 01100 02 03042 03052
07080 BE MOVE2,,, BRANCH IF D2 IS COMPARATIVE ELEMENT 01112 M6 01308 01200
07090*
07100 MOVE3 TFL X,X3 01124 06 05820 02982
07110 TFL Y,Y3 01136 06 05830 02992
07120 DOT1 BT DTPRF,DSA29+15 01148 KP 00020 02626
07130 BNP SWPT,,, BRANCH IF PT. P NOT INDYR CUT VECTOR 01160 M7 02782 01100
07140*
07150 BD DIFF3,DCOMP-9,, BRANCH IF DCOMP NOT ZERO 01172 M3 01288 03033
07160*
07170 DIFF2 FSUB D2,MAGCV 01184 02 03052 03072
07180 BP DIVRG,,, BRANCH IF OFFSET CS NOT CONTACTED 01196 M6 01340 01100
07190*
07200 BNF COST,GOFFLAG,, BRANCH IF GO2 IS GOFWD OR GOBACK 01208 MM 03030 00823
08010*
08020 TNEXT1 SM NF,1,10 01220 12 06195 000-1

29020	NF	DS	,6155	06155	00000
29030	TOLCON	DS	10,MAGCV+10	03082	00010
29040	TOLD	DS	,6014	06014	00000
29050	TOLI	DS	,5994	05994	00000
29060	XNINH	DS	10,XNOMH	03002	00010
29070	YNIMK	DS	10,YNOMK	03012	00010
29080	EPSLOW	DS	,6004	06004	00000
29090	D1	DS	10,FLW+44*10+1+10	02939	00010
29100	UX	DS	,6125	06125	00000
29110	UY	DS	,UX+10	06135	00000
29120	XOFF0	DS	10,TOLCON+10	03092	00010
29130	YOFF0	DS	10,XOFF0+10	03102	00010
29140	XOFF1	DS	10,YOFF0+10	03112	00010
29150	YOFF1	DS	10,XOFF1+10	03122	00010
29160	MCV	DS	10,YOFF1+10	03132	00010
29170	BCV	DS	10,MCV+10	03142	00010
29180	HRL	DS	10,MCV	03132	00010
29190	BRL	DS	10,BCV	03142	00010
29200	XN1	DS	10,BRL+10	03152	00010
30010	YN1	DS	10,XN1+10	03162	00010
30020	L.O	DS	,6079	06075	00000
30030	D.O	DS	,6034	06034	00000
30040	COS2D	DS	,6105	06105	00000
30050	XIMH	DS	10,TEMP1	00079	00010
30060	YIMK	DS	10,59	00059	00010
30070	STFL	DS	,6163	06163	00000
30080	IOFLAG	DS	,OUTCS-1	01719	00000
30090	GOFLAG	DS	,BRG02+23	00823	00000
30100	F	DS	,5964	05964	00000
30110	LOOPSW	DS	,6333	06333	00000
30120	TLRAD	DS	,5984	05984	00000
30130	CRIT	DS	,02	03052	00000
30140	INTOF	DS	,6157	06157	00000
30150	SEMIN5	DS	,6054	06054	00000
30160		DEND	CIRCS	00112	

SYMBOL TABLE

MONITR 02406 ERPROC 02416 CCNCS 00006A

01010*			IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING		
01020*			THE TERMINAL CUTTER POSITION AT CONIC CS		
01030*					RCS
01040*			*NAME CONCS... NON-ERASABLE ARELEM SUBPROGRAM		
01050*			*ID NUMBER 0246*DELDIN		
01060*			*ASSEMBLE RELOCATABLE		
01070*			*STORE RELOADABLE		
01080*			LINKAGE - BTM CONCS,*+13,67		
01090*					
01100	DC	6,0		00005	00006
01110*			SUBPROGRAM ENTRY		
01120	CONCS	BTM	MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR		
				00006	17 02400 -2250
01130	BTM	ERPROC,22500,67,	WRITE ERROR MESSAGE... SEARCH FOR END		
				00018	17 02410 K2500
01140*					
01150	MONITR	DS	,2406	02406	00000
01160	ERPROC	DS	,2416	02416	00000
01170		DEND	CONCS	00006	

SYMBOL TABLE

MONTR 02406 ERPROC 02416 TABCS 00006R

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01010+      IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
01020+      THE TERMINAL CUTTER POSITION AT TABCYL CS.
01030+
01040+      *NAME TABCS... NON-ERASABLE ARELEM SUBPROGRAM
01050+      *ID NUMBER 0247*DELDIM
01060+      *ASSEMBLE RELOCATABLE
01070+      *STORE RELOADABLE
01080+      LINKAGE - BTM TABCS,,+13,67
01090+
01100+      DC 6,0
01110+      SUBPROGRAM ENTRY
01120+      TABCS BTM MONTR,02250,67, CALL ERPROC SUBPROGRAM VIA MONTR
01130+      BTM ERPROC,22500,67, WRITE ERROR MESSAGE... SEARCH FOR END
01140+
01150+      MONTR DS ,2406
01160+      ERPROC DS ,2416
01170+      DEND TABCS
00005 00006
00006 17 02400 -2250
00018 17 02410 K2500
02406 00000
02416 00000
00006
    
```

SYMBOL TABLE

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ZCOORD 02416 XI=0.0 01596R XCMP=0 00508R UNVEC2 00992R UNVEC1 00788R
TRCTSW 06153 TRACUT 00552R TABCYL 01628R STRACT 02416 RETURN 02411
RERITE 01380R PTBUFR 00002R PRESPT 00190R PRESOR 00154R OUTPUT 01752R
NSRT=6 00632R NSRT=5 01532R NONTRM 01648R MCNTR 02406 MINI.0 06024
MAGCV2 03002 MAGCV1 02992 LOPPSW 06333 KUT1=1 00318R JIGGER 00752R
EPSLON 06004 DSCOUT 02416 CROSS2 01148R CROSS1 01028R CROSSP 01312R
CROSSN 01220R CMN 01552R CRIT 03012 0 03022 DISCW 01760R
DISTF 02416 DSA1 00353R DSA10 00501R DSA2 00368R DSA3 00379R
DSA4 00404R DSA5 00415R DSA6 00440R DSA7 00451R DSA8 00471R
DSA9 00481R ELMNT 06493 FLW 02488 FXWST 05540 KUT1 06148
KUT2 06149 MOVEZ 00106R MVI 00656R MV2 00680R NPM 02455
NPM=0 00608R NSECT 02453 NSRF 02477 NSRT 02475 OUTSA 06573
PSSW 06150 RARE 01356R RATIO 02982 RESET 01732R RESTZ 01476R
SLOPE 00932R STACK 00222R TEMP 02972 TEMPI 03032 TEMP2 03042
TERM 00282R TNPW 00584R TPST 00074R UNITY 02416 UX 06125
UY 06135 VARB1 00214R VIXU 01196R V3XV1 01124R X 05820
XI 05923 XMX0 02982 XO 05892 Y 05830 YJ 05933
YMY0 02992 YO 05902 Z 05840 0.0 06034 0.5 06065
L.0 06075 19.0 01784R 9.0 01794R
    
```

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01010+      IBM 1620-1311 AD-APT SUBPROGRAM FOR BUFFERING
01020+      DRIVING SURFACE OUTPUT DATA
01030+
01040+      *NAME PTBUFR... NON-ERASABLE ARELEM SUBPROGRAM
01050+      *ID NUMBER 0248*DELDIM
01060+      *ASSEMBLE RELOCATABLE
01070+      *STORE RELOADABLE
01080+      LINKAGE - BTM PTBUFR,N,610
01090+      N IS -1 FOR NON-TERMINAL PT. OF CUT SEQUENCE
01100+      N IS +0 FOR TERMINAL PT. OF CUT SEQUENCE
01110+
01120+      DC 2,0
01130+
01140+      SUBPROGRAM ENTRY
01150+      PTBUFR BNF TPST-24,LOPPSW,, BRANCH IF NOT FIRST PTBUFR CALL
01160+
01170+      TFM NPM,,10, SETUP FIXED-WORD AREA FOR OUTPUT
01180+      TR NSRF-1,FXWST+0*27-2
01190+      TDM LOOPSW,,, TURN OFF FIRST POINT INDICATOR
01200+      TFM VARB1+6,STACK
02010+      BNF TNPW,PTBUFR-1,, BRANCH IF TERMINAL PT. OF CUT SEQUENCE
02020+
02030+      TPST BNF MOVEZ,PSSW,, BRANCH IF PS IS HORIZONTAL PLANE
02040+
02050+      BT MONTR,DSA10+5,6, CALL ZCOORD SUBPROGRAM VIA MONTR
02060+      B ZCOORD,,6, CALCULATE Z-COORDINATE OF CUTTER CENTER
02070+      DORG --3
02080+
02090+      MOVEZ YFL TEMP,Z
00001 00002
00002 M4 00050 06333
00014 16 02455 000-0
00026 31 02476 05538
00038 15 06333 00000
00050 J0 00220 -0222
00062 M4 00584 00001
00074 M4 00106 06150
00086 2P 02400 00506
00098 49 02410 00000
00106
00106 06 02972 05840
    
```



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07130      BT  MONTR,DSA6+9,6,  CALL UNITV SUBPROGRAM VIA MONTR
                                00776 2P 02400 00445
07140 UNVEC1 BT  UNITV,DSA7+19,6,  CALC. UNIT VECTOR OF
                                00788 2P 02410 00466
                                00800 03 06125 02992
07150      FMUL UX,MAGCV1,,  UX=UX*MAGCV1
                                00812 03 06135 02992
07160      FMUL UY,MAGCV1,,  UY=UY*MAGCV1
                                00824 02 05892 06125
07170      FSUB XO,UX,,  RE-DEFINE LENGTH OF PREVIOUS CUT VECTOR
                                00836 02 05902 06135
                                00848 06 03022 06075
07180      FSUB YO,UY  2.0=RATIO
                                00860 01 02982 02982
07190      TFL D,1.0  1.0-2.0=RATIO
                                00872 02 03022 02982
07200      FADD RATIO,RATIO,,  EPSLON=11.0-2.0*RATIO)
08010      FSUB D,RATIO,,
08020      FMUL D,EPSLON,,
                                00884 03 03022 06004
                                00896 14 02477 000-4
08030      CM  NSRF,4,10  BRANCH IF TABCYL CUT VECTOR
08040      BE  TABCYL,,,  00908 M6 01628 01200
                                19.0*EPSLON=11.0-2.0*RATIO)
08050*
08060      FMUL D,19.0,,  00920 0L 03022 01784
                                00932 06 06125 05933
08070 SLOPE TFL UX,YJ  YJ/XI
                                00944 09 06125 05923
08080      FDIV UX,XI,,
                                00956 06 06135 06024
08090      TFL UY,MINI.0  BRANCH IF XI=0.0
                                00968 M6 01596 01400
08100      BV  XI=0.0,,
08110*
08120      BT  MONTR,DSA8+9,6,  CALL UNITV SUBPROGRAM VIA MONTR
                                00980 2P 02400 00476
08130 UNVEC2 BT  UNITV,DSA9+19,6,  CALC. UNIT VECTOR PERPTO PREVIOUS CV
                                00992 2P 02410 00496
                                01004 03 06125 03022
08140      FMUL UX,D,,  UX=D*UX
                                01016 03 06135 03022
08150      FMUL UY,D,,  UY=D*UY
                                01028 06 03032 05820
08160 CROSS1 TFL TEMP1,X  X-XO
                                01040 02 03032 05892
08170      FSUB TEMP1,XO,,  X-XO+XI
                                01052 01 03032 05923
08180      FADD TEMP1,XI,,  IX-XO+XI)=YJ
                                01064 03 03032 05933
08190      FMUL TEMP1,YJ,,  01076 06 03042 05830
08200      TFL TEMP2,Y  Y-YO
                                01088 02 03042 05902
09010      FSUB TEMP2,YO,,  Y-YO+YJ
                                01100 01 03042 05933
09020      FADD TEMP2,YJ,,  IY-YO+YJ)=XI
                                01112 03 03042 05923
09030      FMUL TEMP2,XI,,  IX-XO+XI)=YJ-(Y-YO+YJ)*XI
09040 V3XV1 FSUB TEMP1,TEMP2,,  01124 02 03032 03042
                                01136 P1 01220 03030
09050      MF  CROSS,TEMP1-2  01148 06 03032 05923
09060 CROSS2 TFL TEMP1,XI  XI*UY
                                01160 03 03032 06135
09070      FMUL TEMP1,UY,,  01172 06 03042 05933
09080      TFL TEMP2,YJ  YJ*UX
                                01184 03 03042 06125
09090      FMUL TEMP2,UX,,  XI*UY-YJ*UX
                                01196 02 03032 03042
09100 VIXU FSUB TEMP1,TEMP2,,  BRANCH IF RESULT IS POSITIVE
09110      BP  CROSSP,,,  01208 M6 01312 01100
                                01220 MM 01324 01220
09120*
09130 CROSSN BNF CROSSP+12,0,,  BRANCH IF CW CUTTING MODE
09140*
09150      FADD XO,UX,,  RE-DEFINE PREVIOUS CUT VECTOR
                                01232 01 05892 06125
                                01244 01 05902 06135
09160      FADD YO,UY  SAVE X-Y COORDINATES
                                01256 06 03032 05820
09170      TFL TEMP1,X,,  01268 06 03042 05830
09180      TFL TEMP2,Y  X=XO
                                01280 06 05820 05892
09190      TFL X,XO,,  Y=YO
                                01292 06 05830 05902
09200      TFL Y,YO,,

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12070	MONTRM	CM	NPW,45,10		01648 14 02455 000M5
12080		BNE	RETURN,,6,	BRANCH IF BUFFER NOT FULL	01660 47 0241J 01200
12090*					
12100	TFM		ELMNT,FLW+0*10-9		01672 16 06493 -2479
12110	BD		RESET,KUT1,,	BRANCH IF KUT1 IS ONTCUT	01684 M3 01732 06148
12120*					
12130	BTM		MONITR,02360,67,	CALL DSCOUT SUBPROGRAM VIA MONITR	01696 17 02400 -2360
12140	BTM		DSCOUT,,*12,67,	WRITE ONE AD-APT RECORD... BRANCH BACK	01708 1P 02410 -1720
12150	TDM		NSRT,6,,	NEXT OUTPUT RECORD IS CONTINUATION TYPE	01720 15 02475 00Q06
12160	RESET	TFM	NPW,,10		01732 16 02455 000-0
12170		B	RETURN,,6,	RETURN TO MONITR	01744 49 0241J 00000
12180		DORG	6-3		01752
12190*					
12200	OUTPUT	DDW	,DISCH,,R,A		01752 00002 K0
					01754 00005 -1760
13010	DISCH	DDA	,0,0,1,NSECT-1+4=100		01759 00001
					01760 00006 0-0000
					01766 00003 -01
					01769 00005 -2852
13020		DC	1,,		01774 00001
13030		DC	8,19000000		01782 00008
13040	19.0	DC	2,2		01784 00002
13050		DC	8,90000000		01792 00008
13060	9.0	DC	2,1		01794 00002
13070*					
13080	LOOPSW	DS	,6333		06333 00000
13090	NPW	DS	,2455		02455 00000
13100	NSRT	DS	,2475		02475 00000
13110	PSSW	DS	,6150		06150 00000
13120	FLW	DS	,2488		02488 00000
13130	MONITR	DS	,2406		02406 00000
13140	Z	DS	,5840		05840 00000
13150	X	DS	,5820		05820 00000
13160	Y	DS	,5830		05830 00000
13170	ELMNT	DS	,6493		06493 00000
13180	XMx0	DS	10,FLW+48*10+14		02982 00010
13190	X0	DS	,5892		05892 00000
13200	XI	DS	,5923		05923 00000
14010	YJ	DS	,5933		05933 00000
14020	YO	DS	,5902		05902 00000
14030	KUT1	DS	,6148		06148 00000
14040	DSCOUT	DS	,2416		02416 00000
14050	RETURN	DS	,2411		02411 00000
14060	KUT2	DS	,6149		06149 00000
14070	YMY0	DS	,XMx0+10		02992 00000
14080	STRACT	DS	,2416		02416 00000
14090	TRCTSW	DS	,6153		06153 00000
14100	TEMP	DS	10,XMx0-10		02972 00010
14110	RATIO	DS	,XMx0		02982 00000
14120	MAGCV1	DS	10,RATIO+10		02992 00010
14130	MAGCV2	DS	10,MAGCV1+10		03002 00010
14140	CRIT	DS	10,MAGCV2+10		03012 00010
14150	0.5	DS	,6065		06065 00000
14160	UNITV	DS	,2416		02416 00000
14170	DISTF	DS	,2416		02416 00000

14180	UX	DS	10,6125		06125 00010
14190	UY	DS	10,UX+10		06135 00010
14200	D	DS	10,CRIT+10		03022 00010
15010	1.0	DS	,6075		06075 00000
15020	EPSLON	DS	,6004		06004 00000
15030	MINI.0	DS	,6024		06024 00000
15040	TEMP1	DS	10,D+10		03032 00010
15050	TEMP2	DS	10,TEMP1+10		03042 00010
15060	OUTSA	DS	,6573		06573 00000
15070	0.0	DS	,6034		06034 00000
15080	NSECT	DS	,2453		02453 00000
15090	NSRF	DS	,2477		02477 00000
15100	FxBST	DS	,5540		05540 00000
15110	ZCOORD	DS	,2416		02416 00000
15120	DEND	PTBUFR			00002

SYMBOL TABLE

MINI.O 06024	LROFFS 00020R	ADDCON 00019R	F 05964	FXTR 00069
TEMP 00079	TLRAD 05984	UX 06125	UY 06135	XNN 06008R
XOFFN 00014R	XIMXO 02962	YAN 00009R	YOFFN 00019R	YIMYO 02972

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01010*          IBN 1620-1311 AD-APT SUBPROGRAM FOR PROJECTING A POINT
01020*          FROM THE CHECK SURFACE ITSELF TO THE OFFSET CHECK
01030*          SURFACE IN THE DIRECTION OF A UNIT NORMAL VECTOR
01040*          A TO, PAST OR ON CHECK SURFACE IS REQUIRED
01050*
01060*          *NAME LROFFS... ERASABLE ARELEM SUBPROGRAM          RCS
01070*          *ID NUMBER 0249+DELDIM
01080*          *ASSEMBLE RELOCATABLE
01090*          *STORE RELOADABLE
01100*          LINKAGE - BT LROFFS,DSALBL+15,6
01110*          DSALBL IS ADDRESS OF X-COORDINATE OF POINT ON CS
01120*          DSALBL+9 IS ADDRESS OF Y-COORDINATE OF POINT ON CS
01130*          DSALBL+10 IS ADDRESS OF X-COORDINATE PROJECTED PT.
01140*          DSALBL+15 IS ADDRESS OF Y-COORDINATE PROJECTED PT.
01150*
01160 ADDCON DC 20,0
01170 XNN DS 5,ADDCON-15
01180 YNN DS 5,XNN+5
01190 XOFFN DS 5,YNN+5
01200 YOFFN DS 5,0
02010*
02020*          SUBPROGRAM ENTRY
02030 LROFFS TFL FXTR,F
02040 FMUL FXTR,TLRAD,, F*TLRAD
02050 TFL XOFFN,XIMXO,6, X1-XO
02060 FMUL XOFFN,UX,6, (X1-XO)*UX
02070 TFL YOFFN,YIMYO,6, Y1-YO
02080 FMUL YOFFN,UY,6, (Y1-YO)*UY
02090 FADD XOFFN,YOFFN,611, (X1-XO)*UX+(Y1-YO)*UY
02100 FMUL XOFFN,F,6, ((X1-XO)*UX+(Y1-YO)*UY)*F
02110 FMUL XOFFN,MINI.O,6, -((X1-XO)*UX+(Y1-YO)*UY)*F
02120 TFL TEMP,XOFFN,11
02130 MF FXTR-2,TEMP-2,, SIGNF(FXTR,-((X1-XO)*UX+(Y1-YO)*UY)*F)
02140 TFL XOFFN,FXTR,6
02150 TFL YOFFN,FXTR,6
02160 FMUL XOFFN,UX,6, FXTR*UX
02170 FMUL YOFFN,UY,6, FXTR*UY
02180 FADD XOFFN,XNN,611, XOFFN*XNN+FXTR*UX
02190 FADD YOFFN,YNN,611, YOFFN*YNN+FXTR*UY
02200 DSC 2,42,, EXIT
03010*
03020 FXTR DS 10,69
03030 F DS ,5964
03040 TLRAD DS ,5984
03050 XIMXO DS ,2962
03060 UX DS ,6125
03070 YIMYO DS ,XIMXO+10
03080 UY DS ,6135
03090 MINI.O DS ,6024
    
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00019	00020		
00004	00005		
00009	00005		
00014	00005		
00019	00005		
00020	06	00069	05964
00032	03	00069	05984
00044	-6	0001M	02962
00056	-3	0001M	06125
00068	-6	0001R	02972
00080	-3	0001R	06135
00092	-J	0001R	0001R
00104	-3	0001M	05964
00116	-3	0001M	06024
00178	90	00079	0001M
00140	71	00067	00077
00152	-6	0001M	00069
00164	-6	0001R	00069
00176	-3	0001M	06125
00188	-3	0001R	06135
00200	-J	0001M	0000M
00212	-J	0001R	0000R
00224	00002		
00069	00010		
05964	00000		
05984	00000		
02962	00000		
06125	00000		
02972	00000		
06135	00000		
06024	00000		

```

03100 TEMP DS 10,79
03110 DEND LROFFS
00079 00010
00020
    
```

SYMBOL TABLE

TOLCON 00025R	FBOFFS 00026R	ADDCON 00025R	F 05964	F=0.0 00086R
FNOTZ 00160R	FXTR 00069	TEMP 00079	TLRAD 05984	UX 06125
UY 06135	XNN 00005R	XOFFN 00015R	XIMXO 02962	YNN 00010R
YOFFN 00020R	YIMYO 02972			

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01010*          IBM 1620-1311 AD-APT SUBPROGRAM FOR PROJECTING A POINT
01020*          FROM THE CHECK SURFACE ITSELF TO THE OFFSET CHECK
01030*          SURFACE IN THE DIRECTION OF A UNIT NORMAL VECTOR
01040*          A TANTO CHECK SURFACE IS REQUIRED
01050*
01060*          *NAME FBOFFS... ERASABLE ARELEM SUBPROGRAM          RCS
01070*          *ID NUMBER 0250+DELDIM
01080*          *ASSEMBLE RELOCATABLE
01090*          *STORE RELOADABLE
01100*          LINKAGE - BT FBOFFS,DSALBL+20,6
01110*          DSALBL IS ADDRESS OF X-COORDINATE OF POINT ON G3
01120*          DSALBL+5 IS ADDRESS OF Y-COORDINATE OF POINT ON G3
01130*          DSALBL+10 IS ADDRESS OF X-COORDINATE PROJECTED PT.
01140*          DSALBL+15 IS ADDRESS OF Y-COORDINATE PROJECTED PT.
01150*          DSALBL+20 IS ADDRESS OF DIRECTED TOLERANCE
01160*
01170 ADDCON DC 26,0          00025 00026
01180 XNN DS 5,ADDCON-20     00005 00005
01190 YNN DS 5,XNN+5        00010 00005
01200 XOFFN DS 5,YNN+5      00015 00005
02010 YOFFN DS 5,XOFFN+5    00020 00005
02020 TOLCON DS 5,         00025 00005
02030*
02040*          SUBPROGRAM ENTRY
02050 FBOFFS TFL FXTR,F      00026 06 00069 05964
02060 FMUL FXTR,TLRAD,,      F=TLRAD          00038 03 00069 05984
02070 CF FXTR-2,,,          ABSF(F=TLRAD) 00050 33 00067 00000
02080 FADD FXTR,TOLCON,11,    ABSF(F=TLRAD)+TOLCON 00062 0J 00069 0002N
02090 BD FNOTZ,F-9,,         BRANCH IF F IS NOT ZERO 00074 M3 00160 05955
02100*
02110 F=0.0 TFL XOFFN,FXTR,6 00086 -6 0001N 00069
02120 TFL YOFFN,FXTR,6      00098 -6 0002- 00069
02130 FMUL XOFFN,UX,6,      FXTR=UX          00110 -3 0001N 06125
02140 FMUL YOFFN,UY,6,      FXTR=UY          00122 -3 0002- 06135
02150 FADD XOFFN,XNN,611,    XOFFN=XNN+FXTR=UX 00134 -J 0001N 0000N
02160 FADD YOFFN,YNN,611,    YOFFN=YNN+FXTR=UY 00146 -J 0002- 0001-
02170 BB ,,                 EXIT                  00158 42 00000 00000
02180 DORG *-9              00160
02190*
02200 FNOTZ TFL XOFFN,XIMXO,6 X1-XO          00160 -6 0001N 02962
03010 FMUL XOFFN,UY,6,      (X1-XO)=UY      00172 -3 0001N 06135
03020 TFL YOFFN,YIMYO,6,    Y1-YO          00184 -6 0002- 02972
03030 FMUL YOFFN,UX,6,      (Y1-YO)=UX      00196 -3 0002- 06125
03040 FSUB XOFFN,YOFFN,611, (X1-XO)=UY-(Y1-YO)=UX 00208 -K 0001N 0002-
03050 FMUL XOFFN,F,6,      ((X1-XO)=UY-(Y1-YO)=UX)=F 00220 -3 0001N 05964
03060 TFL TEMP,XOFFN,11     00232 00 00079 0001N
03070 MF FXTR-2,TEMP-2,,    SIGNF(FXTR,((X1-XO)=UY-(Y1-YO)=UX)=F) 00244 7I 00067 00077
03080 DSC 2,49              00256 00002

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03090 DSA F=0.0          00262 00005 -0086
03100*
03110 FXTR DS 10,69       00069 00010
03120 F DS ,5964         05964 00000
03130 TLRAD DS ,5984     05984 00000
03140 XIMXO DS ,2962     02962 00000
03150 UY DS ,6135       06135 00000
03160 YIMYO DS ,XIMXO+10 02972 00000
03170 UX DS ,6125       06125 00000
03180 TEMP DS 10,79     00079 00010
03190 DEND FBOFFS      00026

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SYMBOL TABLE

ADDCON 00025R	AADDR 00010R	BADDR 00015R	CADDR 00020R	DTDS 00020R
DTDSA 00025R	SADDR 00005R			

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING SLOPE
 01020* OF A CUBIC CURVE AT ANY POINT ON THE CURVE
 01030* RCS
 01040* *NAME DTDS... ERASABLE SYSTEM SUBPROGRAM
 01050* *ID NUMBER 0251*DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BT DTDS,DSALBL+20,6
 01090* DSALBL IS ADDRESS OF S-COORDINATE OF POINT
 01100* DSALBL+5 IS ADDRESS OF A-COEFFICIENT OF CUBIC
 01110* DSALBL+10 IS ADDRESS OF B-COEFFICIENT OF CUBIC
 01120* DSALBL+15 IS ADDRESS OF C-COEFFICIENT OF CUBIC
 01130* DSALBL+20 IS ADDRESS OF SLOPE OF CUBIC
 01140* CUBIC EQUATION FORM... $T=A*S^3+B*S^2+C*S$
 01150*
 01160 ADDCON DC 26,0 00025 00026
 01170 SADDR DS 5,ADDCON-20 00005 00005
 01180 AADDR DS 5,SADDR+5 00010 00005
 01190 BADDR DS 5,AADDR+5 00015 00005
 01200 CADDR DS 5,BADDR+5 00020 00005
 02010 DTDSA DS 5,CADDR+5 00025 00005
 02020*
 02030* SUBPROGRAM ENTRY
 02040 DTDS TFL DTDSA,SADDR,611 00026 -0 0002N 0000N
 02050 FADD DTDSA,SADDR,611, 2,0*5 00038 -J 0002N 0000N
 02060 FADD DTDSA,SADDR,611, 3,0*5 00050 -J 0002N 0000N
 02070 FMUL DTDSA,AADDR,611, 3,0*A*5 00062 -L 0002N 0001-
 02080 FADD DTDSA,BADDR,611, 3,0*A*5+B 00074 -J 0002N 0001N
 02090 FADD DTDSA,BADDR,611, 3,0*A*5+2,0*B 00086 -J 0002N 0001N
 02100 FMUL DTDSA,SADDR,611, 3*(3,0*A*5+2,0*B) 00098 -L 0002N 0000N
 02110 FADD DTDSA,CADDR,611, 3*(3,0*A*5+2,0*B)+C 00110 -J 0002N 0002-
 02120 OSC 2,42,, EXIT 00122 00002
 02130 DEND DTDS 00026

SYMBOL TABLE

STRAC T 00016R	MATRIX 08440	ADDCON 00015R	A1 08440	A2 08480
A3 08520	B1 08450	B1X 00069	B2 08490	B2Y 00059
R3 08530	B3Z 00059	C1 08460	C1X 00079	C2 08500
C2Y 00049	C3 08540	D1 08470	D2 08510	D3 08550
XADDR 00005R	YADDR 00010R	ZADDR 00015R		

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR PERFORMING
 01020* A TRACUT OPERATION ON ANY GIVEN POINT
 01030* RCS
 01040* *NAME STRAC T... ERASABLE ARELEM SUBPROGRAM
 01050* *ID NUMBER 0252*DELDIM
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BT STRAC T,DSALBL+10,6
 01090* DSALBL IS ADDRESS OF X-COORDINATE OF POINT
 01100* DSALBL+5 IS ADDRESS OF Y-COORDINATE OF POINT
 01110* DSALBL+10 IS ADDRESS OF Z-COORDINATE OF POINT
 01120*
 01130 ADDCON DC 16,0 00015 00016
 01140 XADDR DS 5,ADDCON-10 00005 00005
 01150 YADDR DS 5,XADDR+5 00010 00005
 01160 ZADDR DS 5, 00015 00005
 01170*
 01180* SUBPROGRAM ENTRY
 01190 STRAC T TFL C1X,C1 00016 06 00079 08460
 01200 FMUL C1X,XADDR,11, C1*X 00028 0L 00079 0000N
 02010 TFL B1X,B1 00040 06 00069 08450
 02020 FMUL B1X,XADDR,11, B1*X 00052 0L 00069 0000N
 02030 FMUL XADDR,A1,6, A1*X 00064 -3 0000N 08440
 02040 TFL B2Y,B2 00076 06 00059 08490
 02050 FMUL B2Y,YADDR,11, B2*Y 00088 0L 00059 0001-
 02060 TFL C2Y,C2 00100 06 00049 08500
 02070 FMUL C2Y,YADDR,11, C2*Y 00112 0L 00049 0001-
 02080 FMUL YADDR,A2,6, A2*Y 00124 -3 0001- 08480
 02090 FADD XADDR,YADDR,611, A1*X+A2*Y 00136 -J 0000N 0001-
 02100 TFL YADDR,A3,6 00148 -6 0001- 08520
 02110 FMUL YADDR,ZADDR,611, A3*Z 00160 -L 0001- 0001N
 02120 FADD XADDR,YADDR,611, A1*X+A2*Y+A3*Z 00172 -J 0000N 0001-
 02130 FADD XADDR,D1,6, X=A1*X+A2*Y+A3*Z+D1 00184 -1 0000N 08470
 02140 TFL YADDR,B1X,6 00196 -6 0001- 00069
 02150 FADD YADDR,B2Y,6, B1*X+B2*Y 00208 -1 0001- 00059
 02160 TFL B3Z,B3 00220 06 00059 08530
 02170 FMUL B3Z,ZADDR,11, B3*Z 00232 0L 00059 0001N
 02180 FADD YADDR,B3Z,6, B1*X+B2*Y+B3*Z 00244 -1 0001- 00059
 02190 FADD YADDR,D2,6, Y=B1*X+B2*Y+B3*Z+D2 00256 -1 0001- 08510
 02200 FMUL ZADDR,C3,6, C3*Z 00268 -3 0001N 08540
 03010 FADD ZADDR,C1X,6, C1*X+C3*Z 00280 -1 0001N 00079
 03020 FADD ZADDR,C2Y,6, C1*X+C2*Y+C3*Z 00292 -1 0001N 00049
 03030 FADD ZADDR,D3,6, Z=C1*X+C2*Y+C3*Z+D3 00304 -1 0001N 08550
 03040 OSC 2,42,, EXIT 00316 00002
 03050*
 03060 MATRIX DS ,8440 08440 00000
 03070 C1X DS 10,79 00079 00010
 03080 C1 DS ,MATRIX+20 08460 00000
 03090 B1X DS 10,69 00069 00010
 03100 B1 DS ,MATRIX+10 08450 00000

03110 A1	DS	,MATRIX	08440 00000
03120 B2Y	DS	10,59	00059 00010
03130 B2	DS	,MATRIX+50	08490 00000
03140 C2Y	DS	10,49	00049 00010
03150 C2	DS	,MATRIX+60	08500 00000
03160 A2	DS	,MATRIX+40	08480 00000
03170 A3	DS	,MATRIX+80	08520 00000
03180 D1	DS	,MATRIX+30	08470 00000
03190 B3Z	DS	,B2Y	00059 00000
03200 B3	DS	,MATRIX+90	08530 00000
04010 D2	DS	,MATRIX+70	08510 00000
04020 C3	DS	,MATRIX+100	08540 00000
04030 D3	DS	,MATRIX+110	08550 00000
04040	DEND	STRACT	00016

SYMBOL TABLE

SINALF 00043	RETURN 02411	MONITR 02406	LINLOC 00036R	COSALF 00033
ADDCON 00035R	ALPHA 00015R	ATANF 02416	BST 00035R	BXY 00025R
C 00023	COSF 02421	DSA1 00511R	DSA2 00526R	MOVE 00156R
MST 00030R	MXY 00020R	SINF 02416	TANF 02416	TEMP1 00025R
TEMP2 00015R	THETA 00030R	VERTL 00368R	XORG 00005R	YORG 00010R
L.O 00541R				

```

01010*
01020*
01030*
01040*
01050*
01060*
01070*
01080*
01090*
01100*
01110*
01120*
01130*
01140*
01150*
01160*
01170*
01180 ADDCON DC 36,0
01190 XORG DS 5,ADDCON-30
01200 YORG DS 5,XORG+5
02010 ALPHA DS 5,YORG+5
02020 MXY OS 5,ALPHA+5
02030 BXY OS 5,MXY+5
02040 MST DS 5,BXY+5
02050 BST DS 5,MST+5
02060*
02070*
02080 LINLOC SF MXY-4
02090 TF DSA1+5,MXY
02100 CF DSA1+1
02110 CF DSA1+6
02120 BTM MONITR,02020,67,
02130 BT ATANF,DSA1+10,6,
02140 FSUB THETA,ALPHA,611,
02150 BT MONITR,DSA2+5,6,
02160 BTM TANF,MST,6711,
02170 BTM MONITR,02010,67,
02180 MOVE TFL COSALF,ALPHA,11
02190 TFL SINALF,COSALF
02200 BTM SINF,SINALF,67,
03010 BTM COSF,COSALF,67,
03020 CM MXY,49,610
03030 BML VERTL,,,

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IBM 1620-1311 AD-APT SUBPROGRAM FOR CONVERTING
THE CANONICAL FORM PARAMETERS OF A LINE
INTO THE REFERENCE SYSTEM OF A LOCAL CUBIC CURVE

RCS

*NAME LINLOC... NON-ERASABLE SYSTEM SUBPROGRAM
*ID NUMBER 0253+DELDIM
*ASSEMBLE RELOCATABLE
*STORE RELOADABLE

LINKAGE - BT LINLOC,DSALBL+30,6
DSALBL IS ADDRESS OF X-COORD. OF CUBIC ORIGIN
DSALBL+5 IS ADDRESS OF Y-COORD. OF CUBIC ORIGIN
DSALBL+10 IS ADDRESS OF REF. ANGLE OF CUBIC SYSTEM
DSALBL+15 IS ADDRESS OF SLOPE (X-Y SYSTEM)
DSALBL+20 IS ADDRESS OF Y-INTERCEPT (X-Y SYSTEM)
DSALBL+25 IS ADDRESS OF SLOPE (S-T SYSTEM)
DSALBL+30 IS ADDRESS OF T-INTERCEPT (S-T SYSTEM)

00035 00036
00005 00005
00010 00005
00015 00005
00020 00005
00025 00005
00030 00005
00035 00005

SUBPROGRAM ENTRY

00036 L2 00016 00000
00048 K0 00516 00020
0006C L3 00512 00000
00072 L3 00517 00000

00084 17 02400 -2020
00096 2P 02410 00521
00108 -K 0003- 0001N
00120 2P 02400 00531
00132 1P 02410 -003-
00144 17 02400 -2010
00156 00 00033 0001N
00168 06 00043 00033
00180 17 02410 -0043
00192 17 0242J -0033
00204 J4 0002- 000W9
00216 W6 00368 01300

CALL ATANF SUBROUTINE VIA MONITR
CALCULATE THETA, WHERE MXY=TANF(THETA)
THETA-ALPHA
CALL TANF SUBPROGRAM VIA MONITR
CALCULATE MST=TANF(THETA-ALPHA)
CALL SINF-COSF SUBROUTINE VIA MONITR

BRANCH IF INPUT LINE IS VERTICAL

```

03040*
03050 TFL BST,BXY,611 00228 -0 0003M 0002M
03060 FSUB BST,YORG,611, BXY-YORG 00240 -K 0003M 0001-
03070 TFL TEMP1,COSALF 00252 -6 0002S 00033
03080 FMUL COSALF,MST,11, MST=COSF(ALPHA) 00264 0L 00033 0003-
03090 TFL TEMP2,SINALF 00276 -6 0001S 00043
03100 FMUL SINALF,MST,11, SINALF=MST*SINF(ALPHA)
03110 FSUB TEMP1,SINALF,, COSF(ALPHA)-MST*SINF(ALPHA)
03120 FMUL BST,TEMP1,6, (BXY-YORG)*(COSF(ALPHA)-MST*SINF(ALPHA))
03130 FADD TEMP2,COSALF,, SINF(ALPHA)+MST*COSF(ALPHA)
03140 FMUL TEMP2,XORG,11, XORG=(SINF(ALPHA)+MST*COSF(ALPHA))
03150 FADD BST,TEMP2,6 00336 -L 0001S 0000M
03160 B RETURN,,6, 00348 -J 0003M 0001S
03170 DORG +-3 00360 49 0241J 00000
03180*
03190 VERTL TFL C,BXY,11 00368 00 00023 0002M
03200 FDIV C,MXY,11, -C-BXY/MXY 00380 0R 00023 0002-
04010 FADD C,XORG,11, C=XORG-C 00392 0J 00023 0000M
04020 TFL BST,MST,611 00404 -0 0003M 0003-
04030 FMUL BST,YORG,611, MST=YORG 00416 -L 0003M 0001-
04040 FADD BST,C,6, MST=YORG+C 00428 -1 0003M 00023
04050 FMUL BST,SINALF,6, SINF(ALPHA)*(MST+YORG+C)
04060 FMUL C,MST,11, MST=C 00440 -3 0003M 00043
04070 FSUB C,YORG,11, MST=C-YORG 00452 0L 00023 0003-
04080 FMUL C,COSALF,, COSF(ALPHA)*(MST+C-YORG)
04090 FADD BST,C,6 00476 03 00023 00033
04100 B RETURN,,6, 00488 -1 0003M 00023
04110 DORG +-4 00500 49 0241J 00000
04120*
04130 DSA1 DSA 1,0,0,-THETA 00511 0000S -0541
00516 0000S -0000
00521 0000S -003-
00526 0000S -0144
04140 DSA2 DSA MOVE-12
04150 DSC 5,02211 00527 0000S
04160 DC 8,10000000 00539 00008
04170 1.0 DC 2,1 00541 00002
04180*
04190 MONITR DS ,2406 02406 00000
04200 ATANF DS ,2416 02416 00000
05010 THETA DS ,MST 00030 00000
05020 TANF DS ,2416 02416 00000
05030 SINALF DS 10,43 00043 00010
05040 COSALF DS 10,33 00033 00010
05050 SINF DS ,2416 02416 00000
05060 COSF DS ,2421 02421 00000
05070 TEMP1 DS 10,BXY 00025 00010
05080 TEMP2 DS 10,ALPHA 00015 00010
05090 RETURN DS ,2411 02411 00000
05100 C DS 10,23 00023 00010
05110 DEND LINLOC 00036

```

SYMBOL TABLE

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SINALF 00010R RETURN 02411 PNTLOC 00036R MONITR 02406 COSALF 00025R
ADDCON 00035R ALPHA 00015R COSF 02421 S 00030R SINF 02416
T 00035R TEMP1 00079 TEMP2 00069 X 00020R XORG 00005R
Y 00025R YORG 00010R

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IBM 1620-1311 AD-APT SUBPROGRAM FOR TRANSFORMING
THE COORDINATES OF ANY POINT IN THE X-Y
COORDINATE SYSTEM INTO A LOCAL COORDINATE SYSTEM

```

RCS
*NAME PNTLOC... NON-ERASABLE SYSTEM SUBPROGRAM
*ID NUMBER 0254+DELDIR
*ASSEMBLE RELOCATABLE
*STORE RELOADABLE
LINKAGE - BT PNTLOC,DSALBL+30,6
DSALBL IS ADDRESS OF X-COORD. LOCAL SYST. ORIGIN
DSALBL+5 IS ADDRESS OF Y-COORD. LOCAL SYST. ORIGIN
DSALBL+10 IS ADDRESS OF ANGLE ROTATION LOCAL SYST.
DSALBL+15 IS ADDRESS OF X-COORD. OF POINT (INPUT)
DSALBL+20 IS ADDRESS OF Y-COORD. OF POINT (INPUT)
DSALBL+25 IS ADDRESS OF S-COORD. OF POINT (OUTPUT)
DSALBL+30 IS ADDRESS OF T-COORD. OF POINT (OUTPUT)
01180 ADDCON DC 36,0 00035 00036
01190 XORG DS 5,ADDCON-30 00005 00005
01200 YORG DS 5,XORG+5 00010 00005
02010 ALPHA DS 5,YORG+5 00015 00005
02020 X DS 5,ALPHA+5 00020 00005
02030 Y DS 5,X+5 00025 00005
02040 S DS 5,Y+5 00030 00005
02050 T DS 5,S+5 00035 00005
02060*
02070*
SUBPROGRAM ENTRY
02080 PNTLOC TFL S,X,611 00036 -0 0003- 0002-
02090 FSUB S,XORG,611, X-XORG 00048 -K 0003- 0000M
02100 TFL T,Y,611 00060 -0 0003M 0002M
02110 FSUB T,YORG,611, Y-YORG 00072 -K 0003M 0001-
02120 TFL YORG,ALPHA,11, MOVE ALPHA 00084 -0 00010 0001M
02130 TFL Y,YORG,, MOVE ALPHA 00096 -0 0002S 00010
02140 BTM MONITR,02010,67, CALL SINF-COSF SU PROGRAM VIA MONITR
02150 BTM SINF,SINALF,67, SINALF=SINF(ALPHA) 00108 17 02400 -2010
02160 BTM COSF,COSALF,67, COSALF=COSF(ALPHA) 00120 1P 02410 -0010
02170 TFL TEMP1,S,11, MOVE X-XORG 00132 1P 0242J -0025
02180 TFL TEMP2,T,11, MOVE Y-YORG 00144 00 00079 0003-
02190 FMUL S,COSALF,6, (X-XORG)*COSALF 00156 00 00069 0003M
02200 FMUL TEMP2,SINALF,, (Y-YORG)*SINALF 00168 -L 0003- 0002S
03010 FADD S,TEMP2,6, S=(X-XORG)*COSALF+(Y-YORG)*SINALF
00180 0L 00069 00010
00192 -1 0003- 00069
00204 -L 0003M 0002S
00216 0L 00079 00010
00228 -2 0003M 00079
00240 00002
00246 0000S -241J
03050 DSC 2,49,, RETURN TO MONITR
03060 DSA -RETURN 00246 0000S -241J
03070*
03080 MONITR DS ,2406 02406 00000

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03090	SINF	DS	,2416	07416	00090
03100	COSF	DS	,2421	07421	00090
03110	SINF	DS	10,YORG	00010	00010
03120	COSALF	DS	10,Y	00029	00010
03130	TEMP1	DS	10,79	00079	00010
03140	TEMP2	DS	10,69	00069	00010
03150	RETURN	DS	,2411	02411	00000
03160		DEND	PNTLOC	00036	

SYMBOL TABLE

TWOPOS 00744R	THREEA 02677R	SNCALC 00804R	SMXMN2 00029	SMXMN1 02687R
SETCNT 01096R	SAMEPT 00876R	RETURN 02411	PNTREF 02416	ONEPOS 00712R
ONENEG 00480R	MONITR 02406	MODIFY 02334R	MINI.D 02548R	LNCUBE 02416
LINTAB 00070R	INFLPT 00912R	FOURAC 00069	EPSLON 02564R	DIFFPT 00944R
CONVRT 01866R	ADDCON 00049R	A=0.0 01000R	ALFN 00024R	AN 00029R
AZERO 01766R	B=0.0 01056R	BN 00034R	BST 00009R	RZERO 01846R
CALL1 01496R	CMN 01746R	CN 00039R	COMP 02394R	CON60 02554R
CRIT 00039	DECR 01556R	DISTF 02416	DS41 00177R	DSA2 00187R
DSA3 00242R	DSA4 00253R	DSA5 00289R	DS46 00309R	DSA7 00329R
DSAB 00349R	DSA9 00374R	DUPL 02226R	ELIMF 02416	EXIT 01974R
FLAG 00019	FLAGF 00105R	FLAGT 00091R	INCR1 02506R	INCR2 02518R
INDEX 02358R	MOD1 01938R	MOD2 02026R	P003 02102R	MOD4 01726R
MOVE1 01412R	MOVE2 01324R	MST 00004R	NOINT 00166R	NPT5 00093R
PNT2 01994R	PNT3 02070R	RARE 02134R	RM 02453R	RTARG 00079
SAVE1 01544R	SAVE2 01604R	SAVE3 01664R	S1 02616R	SLT 02462R
SMAX 02647R	SMAX1 02788R	SMAX2 02798R	SMIN 02637R	SMXMN 02778R
SN 02667R	SQRTF 02416	STORF 01688R	S1 02574R	S1T 02697R
S2 02595R	S2T 02717R	S3 02616R	S3T 02737R	S4T 02757R
T=0.0 01076R	TEST1 01288R	TEST2 01344R	TEST3 01380R	T1 02626R
TMXMN 02657R	TWOA 02677R	TWOB 02657R	T1 02584R	T1T 02707R
T2 02605R	T2T 02727R	T3 02626R	T3T 02747R	T4T 02767R
WEED 00380R	X1 02757R	XN 00014R	X1 00044R	X2 00054R
X3 00064R	Y1 02767R	YN 00019R	Y1 00049R	Y2 00059R
Y3 00069R	O.0 02538R	3AC 00029		

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING
 01020* THE INTERSECTIONS OF A LINE AND TABCYL INTERVAL
 01030* RCS
 01040* *NAME LINTAB... NON-ERASABLE SYSTEM SUBPROGRAM
 01050* *ID NUMBER 0235+DELDIR
 01060* *ASSEMBLE RELOCATABLE
 01070* *STORE RELOADABLE
 01080* LINKAGE - BY LINTAB,DSALBL+65,6
 01090* DSALBL IS ADDRESS OF SLOPE OF LINE (S-T SYSTEM)
 01100* DSALBL+5 IS ADDRESS OF Y-INTERCEPT (S-T SYSTEM)
 01110* DSALBL+10 IS ADDRESS OF X-COORD. INTERVAL ORIGIN
 01120* DSALBL+15 IS ADDRESS OF Y-COORD. INTERVAL ORIGIN
 01130* DSALBL+20 IS ADDRESS OF ANGLE ROTATION S-T SYSTEM
 01140* DSALBL+25 IS ADDRESS OF A-COEFFICIENT OF INTERVAL
 01150* DSALBL+30 IS ADDRESS OF B-COEFFICIENT OF INTERVAL
 01160* DSALBL+35 IS ADDRESS OF C-COEFFICIENT OF INTERVAL
 01170* DSALBL+40 IS ADDRESS OF X-COORDINATE (POINT 1)
 01180* DSALBL+45 IS ADDRESS OF Y-COORDINATE (POINT 1)
 01190* DSALBL+50 IS ADDRESS OF X-COORDINATE (POINT 2)
 01200* DSALBL+55 IS ADDRESS OF Y-COORDINATE (POINT 2)
 02010* DSALBL+60 IS ADDRESS OF X-COORDINATE (POINT 3)
 02020* DSALBL+65 IS ADDRESS OF Y-COORDINATE (POINT 3)
 02030* NO. OF INTERSECTIONS INDICATED BY 2-DIGIT
 02040* FIELD IN CORE POSITIONS 00010-00019
 02050*
 02060*
 02070 ADDCON DC 50,0 00049 00050
 02080 MST DS 3,ADDCON-49 00004 00005
 02090 BST DS 3,MST+5 00009 00005
 02100 XN DS 3,BST+5 00014 00005
 02110 YN DS 3,XN+5 00019 00005


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08010 DDRC --3 00712
08020*
08030 ONEPOS BNF TWOPOS,SMAX2-2,, BRANCH IF 2 NON-NEG. S-VALUES AT T=0.0
00712 MM 00744 02796
08040*
08050 TFL SMAX,SMAX1,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
00724 -0 02647 02788
08060 B ONENEG+12 00736 M9 00692 00000
08070 DDRC --3 00744
08080*
08090 TWOPOS TF DSAB+5,YN 00744 KO 00354 00019
08100 TF DSAB+15,YN 00756 KO 00364 00019
08110 A DSAB+14,CON60,, FABRICATE ADDRESSES OF X(N+1) AND Y(N+1)
00768 KJ 00363 02554
00780 L3 00355 00000
08120 CF DSAB+6 00792 2P 02400 00379
08130 BT MONITR,DSA9+5,6, CALL DISTF SUBPROGRAM VIA MONITR
00804 2P 02410 00369
08150 TFL CRIT,SN 00816 00 00039 02667
08160 FSUB CRIT,SMAX1,, S(N)-SMAX1 00828 OK 00039 02788
08170 CF CRIT-2,,, ABSF(S(N)-SMAX1) 00840 33 00037 00000
08180 FSUB CRIT,EPSLON,, ABSF(S(N)-SMAX1)-EPSLON 00852 OK 00039 02564
08190 BP DIFFPT,,, BRANCH IF (SMAX1,0.0) IS NOT END POINT
00864 M6 00944 01100
08200*
09010 SAMEPT TFL CRIT,SMAX2 00876 00 00039 02798
09020 FSUB CRIT,SN,, SMAX2-S(N) 00888 OK 00039 02667
09030 BNN ONEPOS+12,,, BRANCH IF S(N) DOES NOT EXCEED SMAX2
00900 M6 00724 01300
09040*
09050* AN INFLECTION POINT EXISTS WITHIN TABCYL INTERVAL
09060 INFLPT TFL SMAX,SMAX2,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
00912 -0 02647 02798
09070 TFM DECR+18,RARE 00924 JO 01574 -2134
09080 B SETCNT 00936 M9 01096 00000
09090 DDRC --3 00944
09100*
09110 DIFFPT TFL CRIT,SMAX1 00944 00 00039 02788
09120 FSUB CRIT,SN,, SMAX1-S(N) 00956 OK 00039 02667
09130 BP ONENEG,,, BRANCH IF SMAX1 EXCEEDS SIN)
00968 M6 00680 01100
09140*
09150 TFL SMAX,SMAX1,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
00980 -0 02647 02788
09160 B INFLPT+12 00992 M9 00924 00000
09170 DDRC --3 01000
09180*
09190 A=0.0 TFL SMAX,CN,11 01000 -0 02647 0003R
09200 FDIV SMAX,BN,11, C(N)/B(N) 01012 -R 02647 0003M
10010 BV B=0.0,,, BRANCH IF B(N)=0.0 01024 M6 01056 01400
10020*
10030 FMUL SMAX,MINI.0,, SMAX=-C(N)/B(N) 01036 -L 02647 02548
10040 B ONENEG+12 01048 M9 00692 00000
10050 DDRC --3 01056
10060*
10070 B=0.0 TFM DSA9,T=0.0 01056 JO 00374 -1076
10080 B TWOPOS 01068 M9 00744 00000
10090 DDRC --3 01076

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10100*
10110 T=0.0 TFL SMAX,SN,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
01076 -0 02647 02667
10120 B ONENEG+12 01088 M9 00692 00000
10130 DDRC --3 01096
10140*
10150 SETCNT TF FLAGT,NPTS,, SAVE NUMBER OF INTERSECTION POINTS
01096 KO 00091 00093
10160*
10170 FADD TWOA,AN,11, CALCULATE S(MIN-MAX)... SET DT/DS=0.0
3.0*A(N) 01108 -J 02677 0002R
10180 BZ AZERO,,, BRANCH IF A(N)=0.0 01120 M6 01766 01200
10190*
10200 TFL RTARG,BN,11 01132 00 00079 0003M
10210 FMUL RTARG,RTARG,, B(N)**2 01144 03 00079 00079
10220 TFL 3AC,THREEA 01156 00 00029 02677
10230 FMUL 3AC,CN,11, 3.0*A(N)*C(N) 01168 0L 00029 0003R
10240 FSUB RTARG,3AC,, B(N)**2-3.0*A(N)*C(N) 01180 02 00079 00029
10250 BTM SQRTF,RTARG,67, RTARG=SQRTF(B(N)**2-3.0*A(N)*C(N))
01192 17 02410 -0079
01204 -0 02687 0003M
10260 TFL SMXMN1,BN,11 -B(N) 01216 -L 02687 02548
10270 FMUL SMXMN1,MINI.0,, -B(N) 01228 00 00029 02687
10280 TFL SMXMN2,SMXMN1 -B(N)+RTARG 01240 -1 02687 00079
10290 FADD SMXMN1,RTARG,, -B(N)-RTARG 01252 02 00029 00079
10300 FSUB SMXMN2,RTARG,, SMXMN2=(-B(N)-RTARG)/(3.0*A(N))
01264 0R 00029 02677
10310 FDIV SMXMN2,THREEA,, SMXMN1=(-B(N)+RTARG)/(3.0*A(N))
01276 -R 02687 02677
01288 00 00039 02647
10320 TEST1 TFL CRIT,SMAX SMAX-SMXMN1 01300 OK 00039 02687
10330 FSUB CRIT,SMXMN1,, BRANCH IF SMXMN1 DOES NOT EXCEED SMAX
01312 M6 01344 01300
10340 BNN TEST2,,,
11160*
11170 MOVE2 TFL SMXMN,SMXMN2,, SMXMN=SMXMN2 01324 -6 02778 00029
11180 B MOVE1+12 01336 M9 01424 00000
11190 DDRC --3 01344
11200*
12010 TEST2 TFL CRIT,SMIN 01344 00 00039 02637
12020 FSUB CRIT,SMXMN1,, SMIN-SMXMN1 01356 OK 00039 02687
12030 BN MOVE2,,, BRANCH IF SMIN EXCEEDS SMXMN1
01368 M7 01324 01300
12040*
12050 TEST3 TFL SMXMN,SMXMN1 01380 -0 02778 02687
12060 TFL SMXMN1,SMXMN2 01392 -6 02687 00029
12070 B MOVE1+12 01404 M9 01424 00000
12080 DDRC --3 01412
12090*
12100 MOVE1 TFL SMXMN,SMXMN1,, SMXMN=SMXMN1 01412 -0 02778 02687
12110 EVALUATE T AT S=SMXMN
12120 TFL TXMN,AN,11 01424 -0 02657 0002R
12130 FMUL TXMN,SMXMN,, A(N)*SMXMN 01436 -L 02657 02778
12140 FADD TXMN,BN,11, A(N)+SMXMN*B(N) 01448 -J 02657 0003M
12150 FMUL TXMN,SMXMN,, SMXMN*(A(N)+SMXMN*B(N))
01460 -L 02657 02778
12160 FADD TXMN,CN,11, SMXMN*(A(N)+SMXMN*B(N))+C(N)
01472 -J 02657 0003R
12170 FMUL TXMN,SMXMN,, TXMN=A(N)+SMXMN**3+B(N)*SMXMN**2+C(N)*SMXMN
01484 -L 02657 02778
12180 CALL1 BTM MONITR,02620,67, CALL ELIMP SUBPROGRAM VIA MONITR
01496 17 02400 -2620

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12190 TFM FLAG,,10 01508 16 00019 000-0
12200 BT ELIMP,DSA3+15,6, VERIFY THAT POINT (S1,T1) IS ON TABCYL
13010 BNR SAVE1+12,FLAG-2,, BRANCH IF POINT IS NOT ON TABCYL
13020* 01520 2P 02410 00304
13030 SAVE1 BTM STORF,S1-9,, SAVE POINT (S1,T1) 01544 JP 01688 -2565
13040 DECR SM FLAGT,1,10 01556 J2 00091 000-1
13050 BZ ,, BRANCH IF ALL POINTS EXAMINED
13060* 01568 46 00000 01200
13070 BT ELIMP,DSA6+15,6, VERIFY THAT POINT (S2,T2) IS ON TABCYL
13080 BNR SAVE2+12,FLAG-2,, BRANCH IF POINT IS NOT ON TABCYL
13090* 01580 2P 02410 00324
13100 SAVE2 BTM STORF,S2-9,, SAVE POINT (S2,T2) 01604 JP 01688 -2586
13110 SM FLAGT,1,10 01616 J2 00091 000-1
13120 BZ DECR+18,,6, BRANCH IF ALL POINTS EXAMINED
13130* 01628 M6 0157M 01200
13140 BT ELIMP,DSA7+15,6, VERIFY THAT POINT (S3,T3) IS ON TABCYL
13150 BNR DECR+18,FLAG-2,6, BRANCH IF POINT IS NOT ON TABCYL
13160* 01640 2P 02410 00344
13170 SAVE3 BTM STORF,S3-9,, SAVE POINT (S3,T3) 01664 JP 01688 -2607
13180 B DECR+18,,6 01676 M9 0157M 00000
13190* 01688 J0 01711 -2688
13200 STORF TFM STORF+23,SIT-9 01688 J0 01711 -2688
14010 BNR MOD4,,, BRANCH IF NO RECORD MARK
14020* 01700 M5 01726 00000
14030 TR STORF+23,STORF-1,611 01712 LJ 0171J 0168P
14040 BB ,, EXIT 01724 42 00000 00000
14050 DORG *-9 01726
14060* 01726 J1 01710 000-2
14070 MOD4 AM STORF+22,2,10 01738 M9 01700 00000
14080 B STORF+12 01746
14090 DORG *-3
14100* 01746
14110 CMN BD CONVRT,FLAG,, BRANCH IF NO. OF PTS. ON TABCYL NON ZERO
14120* 01746 M3 01866 00019
14130 B RETURN,,6, RETURN TO MONITR 01758 49 0241J 00000
14140 DORG *-3 01766
14150* 01766 -0 02657 0003M
14160 AZERO TFL TWOB,BN,11 2.0*B(N) 01778 -J 02657 02657
14170 FADD TWOB,TWOB,, BRANCH IF B(N)=0.0 01790 M6 01846 01200
14180 BZ BZERO,,, -C(N) 01802 -0 02778 02538
14190* 01814 -K 02778 0003R
14200 TFL SHXMN,0.0 SHXMN=-C(N)/(2.0*B(N)) 01826 -R 02778 02657
15010 FSUB SHXMN,CN,11, 01838 M9 01424 00000
15020 F01V SHXMN,TWOB,, 01846
15030 B MOVE1+12 01846 -0 02657 02538
15040 DORG *-3 01858 M9 01496 00000
15050* 01858
15060 BZERO TFL THXMN,0.0 01858 M9 01496 00000
15070 B CALL1

15080 DORG *-3 01866
15090* 01866
15100 CONVRT TF FLAG,FLAG 01866 K6 00091 00019
15110 TF DSA4+10,ALFN,, MOVE ADDRESSES OF XN,YN AND ALFN 01878 K0 00263 00024
15120 TR S1-9,S1T-9,, MOVE COORDINATES OF POINT (S1T,T1T) 01890 LJ 02607 02688
15130 TFM DSA3,MOD1,, SET RETURN ADDRESS TO LINTAB PROGRAM 01902 J0 00242 -1938
15140 BT MONITR,DSA3+5,6, CALL PNTREF SUBPROGRAM VIA MONITR 01914 2P 02400 00247
15150 BT PNTREF,DSA4+30,6, TRANSFORM POINT INTO X-Y COORD. SYSTEM 01926 2P 02410 00283
15160 MOD1 TFL X1,X1,6, MOVE X-Y COORDINATES TO OUTPUT ADDRESSES 01938 -0 0004M 02757
15170 TFL Y1,Y1,6 01950 -0 0004R 02767
15180 BNR PNT2,S2T-9,, BRANCH IF NOT ONLY ONE POINT ON TABCYL 01962 MN 01994 02708
15190* 01962
15200 EXIT TF FLAG,FLAGT,, SET NUMBER OF TABCYL INTERSECTIONS 01974 20 00019 00091
16010 B RETURN,,6, RETURN TO MONITR 01986 49 0241J 00000
16020 DORG *-3 01994
16030* 01994
16040 PNT2 TR S1-9,S2T-9,, MOVE COORDINATES OF POINT (S2T,T2T) 01994 LJ 02607 02708
16050 TFM DSA3,MOD2 02006 J0 00242 -2026
16060 B MOD1-24 02018 M9 01914 00000
16070 DORG *-3 02026
16080* 02026
16090 MOD2 TFL X2,X1,6, MOVE X-Y COORDINATES TO OUTPUT ADDRESSES 02026 -0 0005M 02757
16100 TFL Y2,Y1,6 02038 -0 0005R 02767
16110 BNR PNT3,S3T-9,, BRANCH IF THREE POINTS ON TABCYL 02050 MN 02070 02728
16120* 02050
16130 B EXIT 02062 M9 01974 00000
16140 DORG *-3 02070
16150* 02070
16160 PNT3 TR S1-9,S3T-9,, MOVE COORDINATES OF POINT (S3T,T3T) 02070 LJ 02607 02728
16170 TFM DSA3,MOD3 02082 J0 00242 -2102
16180 B MOD1-24 02094 M9 01914 00000
16190 DORG *-3 02102
16200* 02102
17010 MOD3 TFL X3,X1,6, MOVE X-Y COORDINATES TO OUTPUT ADDRESSES 02102 -0 0006M 02757
17020 TFL Y3,Y1,6 02114 -0 0006R 02767
17030 B EXIT 02126 M9 01974 00000
17040 DORG *-3 02134
17050* 02134
17060* 02134
17070 RARE C NPTS,FLAG 02134 K4 00093 00019
17080 BE CONVRT,,, BRANCH IF ALL CUBIC POINTS ON TABCYL 02146 M6 01866 01200
17090* 02146
17100 TF FLAGT,NPTS 02158 K0 00091 00093
17110 TF FLAGP,FLAG,, NO. OF POINTS ON TABCYL WITHIN SEMI-INT. 02170 K6 00105 00019
17120 TFL SWIN,SWAX,, SET SWIN=SWAX 02182 -0 02637 02647

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SYMBOL TABLE

YNOADD 14019	XYADDR 14019	XNOADD 14014	TRANS2 03092	TRANS1 03102
TOLCRK 03072	TBSTRT 14020	TABPT2 14236	TABPT1 14200	STEPXY 03328
RETURN 02411	MONITR 02406	MINI.O 06024	MINCHK 14448	MAXDEV 15324
LFRGT 14352	LASTPT 03209	ERPROC 02416	EPSLON 06004	DSATS1 14709
AVGTOL 05974	A 03328	AGAIN 14496	ALPHA 03204	B 03162
CHK2 15226	CHK3 15194	COSF 02421	DIR1 03122	DIR2 03112
DISTF 02414	DIST1 03162	DSAM1 14699	OTCX 03142	OTCY 03132
EPSI 15314	ER200 14532	ER216 14556	EXIT 15298	FISH 02416
FLW 02488	FLWST 03362	FXWST 05540	GOLR 14730	GOL 06347
KTEMP 07703	R 03189	SINF 02416	TESTD 03192	TLDIR 14814
TLPOS 14580	TLRAD 05984	TL1 06145	TL2 06147	TOLER 14284
UX 03082	WORK1 03072	XI 05923	XPT 03194	XO 05892
YJ 05933	YPT 03199	YO 05902	O.O 06034	1.05 15334

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01010*      IBM 1620-1311 AD-APT SUBPROGRAM FOR VERIFYING
01020*      THE START-UP POSITION OF THE CUTTER ON
01030*      TABCYL DRIVE SURFACE
01040*
01050*      *ID NUMBER 0256+DELDIM
01060*      *STORE CORE IMAGE
01070*      LINKAGE - BT TBSTRT,DSALBL+5,6
01080*
01090      DORG 14010
01100 XYADDR DC 10,0,,          COORDINATE ADDRESSES OF TOOL CENTER
                                14019 00010
01110 XNOADD DS 5,XYADDR-5,     X COORDINATE ADDRESS 14014 00005
01120 YNOADD DS 5,XYADDR,      Y COORDINATE ADDRESS 14019 00005
01130*      SUBPROGRAM ENTRY
01140 TBSTRT BTM MONITR,02180,67, CALL FISH SUBPROGRAM VIA MONITR
                                14020 17 02400 -2180
01150      BT FISH,TL2,6,,      CALCULATE DS-CS OFFSET INDICATORS
                                14032 27 02410 06147
01160      TFM KTEMP,13,10,     SET DS TYPE INDICATOR 14044 16 07703 000J3
01170      TFL EPSI,EPSLON,,    CALCULATE TOOL TOLERANCE
                                14056 06 15314 06004
01180      AM EPSI,1,10        14068 11 15314 000-1
01190      TFL AVGTOL,EPsi,,    AVERAGE TOLER FOR SUBPROGRAM CHORDL
                                14080 06 05974 15314
01200      FADD EPSI,EPSLON    14092 01 15314 06004
02010      MM FXWST-23,10,9,,   CALCULATE LAST PARAMETER WORD ADDRESS
                                14104 13 05517 00-10
02020      AM 99,FLWST-10      14116 11 00099 -3352
02030      TF LASTPT,99        14128 26 03209 00099
02040      TFL R,TLRAD,,       SET TOOL RADIUS FOR TLLFT OR TLRGT
                                14140 06 03189 05984
02050      CM TLI,3,10,        TEST TOOL POSITION (TLLFT,TLRGT,TLOM)
                                14152 14 06145 000-3
02060      BL TABPT1,,,        TLLFT OR TLRGT 14164 47 14200 01300
02070      BH ER200,,,         ERROR-INVALID TOOL POSITION
                                14176 46 14532 01100
02080      TFL R,0,0,,         SET TOOL RADIUS FOR TLOM
                                14188 06 03189 06034
02090 TABPT1 TFM XPT,FLWST-60,, INITIALIZE X-Y COORDINATE ADDRESSES
                                14200 16 03194 -3302
02100      TFM YPT,FLWST-50,,   FOR CUTTER DISTANCE TEST
                                14212 16 03199 -3312

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02110      CF YPT-4            14224 33 03195 00000
02120 TABPT2 A YPT,STEPXY,,    STEP X-Y COORDINATE ADDRESSES
                                14236 21 03199 03328
02130      TF DSATS1+5,YPT,,    SET X-Y COORDINATES FOR DISTANCE TEST
                                14248 26 14714 03199
02140      BT MONITR,DSAM1+5,6, CALL DISTF SUBPROGRAM VIA MONITR
                                14260 27 02400 14704
02150      BT DISTF,DSATS1+20,6, DIST1=SQRTF((XPT-XO)**2+(YPT-YO)**2)
                                14272 27 02410 14729
02160 TOLER TFL TESTD,DIST1,,  SAVE CALCULATED DISTANCE
                                14284 06 03152 03162
02170      CM TLI,3,10,        TEST TLOM 14296 14 06145 000-3
02180      BNE LFRGT          14308 47 14352 01200
02190      FSUB TESTD,R,,      TEST CUTTER DISTANCE WITHIN TOLERANCE
                                14320 02 03152 03189
02200      FSUB TESTD,EPsi,,   DIST1=DIST1-R-EPsi 14332 02 03152 15314
03010      BT MINCHK,,,        CHECK MINIMUM DEVIATION
                                14344 49 14448 00000
03020 LFRGT TFL MAXDEV,AVGTOL,, CALCULATE MAXIMUM
                                14352 06 15324 05974
03030      FADD MAXDEV,R,,     DEVIATION OF CUTTER
                                14364 01 15324 03189
03040      FMUL MAXDEV,R,,    FROM CURVE 14376 03 15324 03189
03050      TFL WORK1,R        14388 06 03072 03189
03060      FSUB WORK1,AVGTOL 14400 02 03072 05974
03070      FDIV MAXDEV,WORK1 14412 09 15324 03072
03080      FMUL MAXDEV,1.05,,  MAXDEV=1.05*(R+(R+10E)/(R-10E))
                                14424 03 15324 15334
03090      FSUB TESTD,MAXDEV,, TEST CUTTER DISTANCE WITHIN TOLERANCE
                                14436 02 03152 15324
03100 MINCHK BH AGAIN,,       NOT CORRECT TABLE POINT...TRY AGAIN
                                14448 46 14496 01100
03110      FSUB DIST1,R        14460 02 03162 03189
03120      FADD DIST1,EPsi,,   DIST1=DIST2-R+EPsi 14472 01 03162 15314
03130      BNL TLPOS,,        TOOL POSITION WITHIN TOLERANCE
                                14484 46 14580 01300
03140 AGAIN C LASTPT,YPT,,    TEST LAST PARAMETER WORD (LAST POINT)
                                14496 24 03209 03199
03150      BV **12,,          RESET OVERFLOW INDICATOR
                                14508 46 14520 01400
03160      BNE TABPT2,,       PREPARE TO TEST NEXT SET OF COORDINATES
                                14520 47 14236 01200
03170*      ERROR CONDITION-IMPROPER START UP ON TABCYL
03180 ER200 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
                                14532 17 02400 -2250
03190      BTM ERPROC,20001,67, WRITE ERROR MESSAGE...SEARCH FOR END
                                14544 17 02410 K0001
03200 ER216 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR
                                14556 17 02400 -2250
04010      BTM ERPROC,21601,67, WRITE ERROR MESSAGE...SEARCH FOR END
                                14568 17 02410 K1601
04020 TLPOS TFL XNOADD,XPT,611, SET PRESENT POSITION OF TOOL CENTER
                                14580 06 1401M 0319M
04030      TFL YNOADD,YPT,611 14592 06 1401R 0319R
04040      TFL OTCX,XI,,       ASSUME CUTTER TRAVEL DIRECTION (GOFWD)
                                14604 06 03142 05923
04050      TFL DTCY,YJ        14616 06 03132 05913
04060      CM GOL,3,10,       TEST CUTTER DIRECTION 14628 14 06347 000-3
04070      BL GOLR,,          GOLFT OR GORGT 14640 47 14730 01300
04080      BE TLDIR,,         GOFWD 14652 46 14814 01200
04090      FMUL DTCX,MINI.O,,  GOBACK 14664 03 03142 06024
04100      FMUL DTCY,MINI.O    14676 03 03132 06024

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04110      B7  TLDIR                      14688 49 14814 00000
04120*
04130*      EXTERNAL ARGUMENT ADDRESSES
04140 DSAM1 DSA  TOLER                      14699 00005 J4284
04150      DSC 3,02101                      14700 00005
04160      DORG DSAM1*5*5*5-11             14718
04170      MDP  Y0,DIST1                    14718 41 05902 03162
04180      DORG  *-21                       14708
04190      MDP  0,X0                        14708 41 00000 05892
04200      DORG  *-14                      14705
05010 DSATS1 DSA  0                         14709 00005 -0000
05020      DORG  **5*5-4                    14730
05030*
05040 GOLR  TFL  DTCX,Y,J,,                ASSUME CUTTER TRAVEL DIRECTION (GORG)
                                           14730 06 03142 05933
                                           14742 06 03132 05923
05050      TFL  DTCY,XI                     14754 03 03132 06024
05060      FMUL DTCY,MINI.0
05070      CM  G01,L,10,,                  TEST CUTTER DIRECTION 14766 14 06347 000-1
05080      BH  TLDIR,,                      GORGT 14778 46 14814 01100
05090      FMUL DTCX,MINI.0,,              GOLPT 14790 03 03142 06024
05100      FMUL DTCY,MINI.0
05110 TLDIR  A  YPT,STEPXY,,              GET ADDRESS OF NEXT POINT ON CURVE
                                           14814 21 03199 03328
05120      TFL  DIR2,YPT,11,,              CALCULATE DIRECTION VECTOR OF THE CURVE
                                           14826 06 03112 0319R
05130      FSUB DIR2,YNOADD,11,,           DIR2=(Y(I+1)-YNO)
05140      FMUL DIR2,DTCY,,                DIR2=(Y(I+1)-YNO)*DTCY
                                           14850 03 03112 03132
                                           14862 06 03122 0319M
05150      TFL  DIR1,XPT,11                DIR1=(X(I+1)-XNO)
05160      FSUB DIR1,XNOADD,11,,           DIR1=(X(I+1)-XNO)*DTCK
05170      FMUL DIR1,DTCX,,                DIR1=(X(I+1)-XNO)*DTCK
                                           14886 03 03122 03142
                                           14898 01 03122 03112
05180      FADD DIR1,DIR2,,                ERROR-NEGATIVE DIRECTION VECTOR
                                           14910 47 14556 01300
05190      BL  ER216,,                      GET ADDRESS OF CURRENT ANGLE ALPHA
                                           14922 26 03204 03194
05200      TF  ALPHA,XPT,,                CALCULATE TOOL POSITION IN THE LOCAL
                                           14934 12 03204 -0010
06010      SM  ALPHA,10,,                  TRANSFORMED COORDINATE SYSTEM
                                           14946 06 03102 0320M
06020      TFL  TRANS1,ALPHA,11,,          CALL SIN-F-COSF SUBROUTINE VIA MONITR
                                           14958 17 02400 -2010
06030      BTM  MONITR,02010,67,,          TRANS1=SINF(ALPHA) 14970 17 02410 -3102
06040      BTM  SIN-F,TRANS1,67,,          TRANS2=(X0-XNO) 14982 06 03092 05892
06050      TFL  TRANS2,X0
06060      FSUB TRANS2,XNOADD,11,,         TRANS2=(X0-XNO)*SINF(ALPHA)
06070      FMUL TRANS2,TRANS1,,           TRANS2=(X0-XNO)*SINF(ALPHA)
                                           15006 03 03092 03102
                                           15018 06 03102 0320M
06080      TFL  TRANS1,ALPHA,11,,          TRANS1=COSF(ALPHA) 15030 17 0242J -3102
06090      BTM  COSF,TRANS1,67,,          UX=(Y0-YNO) 15042 06 03082 05902
06100      TFL  UX,Y0
06110      FSUB UX,YNOADD,11,,            UX=(Y0-YNO)*COSF(ALPHA)
06120      FMUL UX,TRANS1,,                UX=(Y0-YNO)*COSF(ALPHA)
                                           15066 03 03082 03102
06130      FSUB UX,TRANS2,,                UX=UX-(X0-XNO)*SINF(ALPHA)
                                           15078 02 03082 03092
06140      BH  CHK2,,                      TEST TOOL POSITION AND
06150      BE  CHK3,,                      DIRECTION COMMANDS
                                           15090 46 15226 01100

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06160      CM  T11,2,10,,                UX IS NEGATIVE-TEST TOOL POSITION
                                           15102 46 15194 01200
06170      BE  EXIT,,                      TLRGT 15114 14 06145 000-2
06180      BL  ER200,,                      ERROR-TLLFT 15126 46 15298 01200
06190      TFL  TOLCHK,UX,,                TLRGT-TLLFT 15138 47 14532 01300
                                           TLRGT-TLLFT 15150 06 03072 03082
06200      FADD TOLCHK,EPSI                 ERROR-TOL NOT NEAR SPECIFIED CURVE
07010      BL  ER200,,                      15162 01 03072 15314
                                           15174 47 14532 01300
07020      B7  EXIT                         15186 49 15298 00000
07030 CHK3  CM  T11,3,10,,                UX IS ZERO-TEST TOOL POSITION
                                           15194 14 06145 000-3
07040      BNE ER200,,                      ERROR-TLLFT OR TLRGT 15206 47 14532 01200
07050      B7  EXIT                         15218 49 15298 00000
07060 CHK2  CM  T11,2,10,,                UX IS POSITIVE-TEST TOOL POSITION
                                           15226 14 06145 000-2
07070      BL  EXIT,,                      TLLFT 15238 47 15298 01300
07080      BE  ER200,,                      ERROR-TLRGT 15250 46 14532 01200
07090      TFL  TOLCHK,UX,,                TLRGT-TLLFT 15262 06 03072 03082
                                           15274 02 03072 15314
07100      FSUB TOLCHK,EPSI                 ERROR-TOL NOT NEAR SPECIFIED CURVE
07110      BM  ER200,,                      15286 46 14532 01100
07120 EXIT  B7  RETURN,,6,,                RETURN TO TABDS SUBPROGRAM
                                           15298 49 0241J 00000
07130*.....
07140*.....      STORAGE ALLOCATION      *.....
07150*
07160*      SUBPROGRAM AND SUBROUTINE ADDRESSES
07170 MONITR DS  ,2406,,                   AD-APT MONITOR      02406 00000
07180 FISH  DS  ,2416,,                   DS-CS OFFSET INDICATORS
                                           02416 00000
07190 DISTF DS  ,2416,,                   DISTANCE FUNCTION   02416 00000
07200 ERPROC DS  ,2416,,                   ERROR PROCESSOR     02416 00000
08010 SIN-F DS  ,2416,,                   SINE                 02416 00000
08020 COSF  DS  ,2421,,                   COSINE               02421 00000
08030 RETURN DS  ,2411,,                   MONITR STORAGE FOR RETURN ADDRESS
                                           02411 00000
08040*
08050*      WORKING PARAMETERS
08060 EPSI  DS  10,,                       CALCULATED TOOL TOLERANCE (11 EPSILON)
                                           15314 00010
08070 MAXDEV DS  10,,                       MAXIMUM DEVIATION OF CUTTER FROM CURVE
                                           15324 00010
08080 FLW   DS  ,2488,,                       I/O FLOATING POINT WORD ARRAY
                                           02488 00000
08090 A     DS  ,FLW*84*10,,                 PERMANENT ADDRESS COUNTER
                                           03328 00000
08100 STEPXY DS  ,A,,                       COORDINATE ADDRESS STEPPING CONSTANT
                                           03328 00000
08110 LASTPT DS  5,A-119,,                   ADDRESS OF LAST POINT (Y) IN CANON ARRAY
                                           03209 00005
08120 ALPHA DS  5,A-124,,                   ADDRESS OF ANGLE ALPHA IN CANON ARRAY
                                           03204 00005
08130 XPT   DS  5,A-134,,                   ADDRESS OF X COORD IN CANON ARRAY
                                           03194 00005
08140 YPT   DS  5,XPT*5,,                   ADDRESS OF Y COORD IN CANON ARRAY
                                           03199 00005
08150 R     DS  10,A-139,,                   TOOL RADIUS CONDITION (RIGHT-LEFT-ON)

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08160 B DS	,FLW+68*10-6,	TEMPORARY ADDRESS COUNTER	03189 00010
08170 DIST1 DS	10,8,	DISTANCE BETWEEN POINTS	03162 00000
08180 TESTD DS	10,8-10,	CUTTER DISTANCE TOLERANCE TEST	03162 00010
08190 DTCX DS	10,8-20,	X COORD (CUTTER TRAVEL DIRECTION)	03152 00010
08200 DTCY DS	10,8-30,	Y COORD (CUTTER TRAVEL DIRECTION)	03142 00010
09010 DIR1 DS	10,8-40,	DIRECTION VECTOR	03132 00010
09020 DIR2 DS	10,8-50,	DIRECTION VECTOR	03122 00010
09030 TRANS1 DS	10,8-60,	TRANSFORM TOOL POSITION	03112 00010
09040 TRANS2 DS	10,8-70,	TRANSFORM TOOL POSITION	03102 00010
09050 UX DS	10,8-80,	TRANSFORMED TOOL POSITION	03092 00010
09060 TOLCHK DS	10,8-90,	TOLERANCE CHECK	03082 00010
09070 WORK1 DS	,TOLCHK,	WORKING STORAGE	03072 00010
09080 FLWST DS	,3362,	FLOATING POINT WORD STACK	03072 00000
09090 FXWST DS	,5540,	FIXED POINT WORD STACK	03362 00000
09100 XO DS	,5892,	X COORD OF TOOL CENTER (PRESENT POINT)	05540 00000
09110 YO DS	,X0*10,	Y COORD OF TOOL CENTER (PRESENT POINT)	05892 00000
09120 XI DS	,5923,	X COORD (PRESENT AIMING DIRECTION)	05902 00000
09130 YJ DS	,5933,	Y COORD (PRESENT AIMING DIRECTION)	05923 00000
09140 AVGTOL DS	,5974,	AVERAGE TOLERANCE	05933 00000
09150 TLRAD DS	,5984,	TOOL RADIUS	05974 00000
09160 EPSLON DS	,6004,	CALCULATED TCOL TOLERANCE (1/20 INTOL)	05984 00000
09170 TL1 DS	,6145,	DS TOOL MODIFIER	06004 00000
09180 TL2 DS	,6147,	CS TOOL MODIFIER	06145 00000
09190 G01 DS	,6347,	DS GO/(MODIFIER)	06147 00000
09200 KTEMP DS	,7703,	DS TYPE INDICATOR	06347 00000
10010*			07703 00000
10020*	CONSTANTS		
10030 DC	8,10500000	FLOATING POINT 1.05	15332 00008
10040 1.05 DS	2,1.,	FLOATING POINT ZERO	15334 00002
10050 0.0 DS	,6034,	MINUS FLOATING POINT ONE	06034 00000
10060 MINI.0 DS	,6024,		06024 00000
10070*			
10080*
10090	DEND TBSTRT		14020

SYMBOL TABLE

STEPXY 03328	RETURN 02411	MONITR 02406	ENDPNT 14016	A 03328
ALPHA 03204	B 03162	COSF 02421	FLW 02488	PHI 03204
SINF 02416	VN4 14015	V1 03162	V2 03152	XPT 03194
YPT 03199				

1081620-1311 AD-APT SUBPROGRAM FOR EVALUATING THE V-COORDINATE OF THE END POINT OF A TABCYL CURVE SEGMENT

*ID NUMBER 0257*DELDIM
*STORE CORE IMAGE
LINKAGE - BTM ENDPNT,VN4,67

01010*					
01020*					
01030*					
01040*					
01050*					
01060*					
01070*					
01080*					
01090	DORG 14010			14010	
01100 VN4 DC	6,0.,	ADDRESS OF VN4		14015 00006	
01110*		SUBPROGRAM ENTRY			
01120 ENDPNT TFL	V1,XPT,11,	V1=X(N+1)		14016 06 03162 0319M	
01130 TFL	V2,YPT,11,	V2=Y(N+1)		14028 06 03152 0319R	
01140 S	YPT,STEPXY,,	SET X-Y COORDINATE ADDRESSES		14040 22 03199 0332R	
01150 FSUB	V1,XPT,11,	V1=X(N+1)-XN		14052 02 03162 0319M	
01160 FSUB	V2,YPT,11,	V2=Y(N+1)-YN		14064 02 03152 0319R	
01170 TFL	VN4,PHI,611			14076 06 1401N 0320M	
01180 BTM	MONITR,02010,67,	CALL SINF-COSF SUBROUTINE VIA MONITR			
01190 BTM	SINF,VN4,6711,	VN4=SINF(PHI)		14088 17 02400 -2010	
01200 FMUL	V2,VN4,11,	V2=(Y(N+1)-YN)*SINF(PHI)		14100 17 02410 J401N	
02010 TFL	VN4,PHI,611			14112 03 03152 1401N	
02020 BTM	COSF,VN4,6711,	VN4=COSF(PHI)		14124 06 1401N 0320M	
02030 FMUL	VN4,V1,6,	VN4=(X(N+1)-XN)*COSF(PHI)		14136 17 0242J J401N	
02040 FADD	VN4,V2,6,	VN4=VN4+(Y(N+1)-YN)*SINF(PHI)		14148 03 1401N 03162	
02050 B7	RETURN,,6,	RETURN TO TABDS SUBPROGRAM		14160 01 1401N 03152	
02060*			14172 49 0241J 00000	
02070*	
02080*		SUBPROGRAM AND SUBROUTINE ADDRESSES			
02090 MONITR DS	,2406,	AD-APT MONITOR		02406 00000	
02100 SINF DS	,2416,	SINE		02416 00000	
02110 COSF DS	,2421,	COSINE		02421 00000	
02120 RETURN DS	,2411,	MONITR STORAGE FOR RETURN ADDRESS		02411 00000	
02130*					
02140*		WORKING PARAMETERS			
02150 FLW DS	,2488,	I/O FLOATING POINT WORD ARRAY		02488 00000	
02160 A DS	,FLW+84*10,	PERMANENT ADDRESS COUNTER		03328 00000	
02170 STEPXY DS	,A,	COORDINATE ADDRESS STEPPING CONSTANT		03328 00000	
02180 ALPHA DS	5,A-124,	ADDRESS OF ANGLE ALPHA IN CANON ARRAY		03204 00005	
02190 PHI DS	,ALPHA			03204 00000	
02200 XPT DS	5,A-134,	ADDRESS OF X COORD IN CANON ARRAY		03204 00000	

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03010 YPT DS 5,XPT+5, ADDRESS OF Y COORD IN CANON ARRAY 03194 00005
03020 B DS ,FLW+68*10-6, TEMPORARY ADDRESS COUNTER 03199 00005
03030 V1 DS 10,B, WORKING STORAGE 03162 00000
03040 V2 DS 10,B-10, WORKING STORAGE 03162 00010
03050*
03060*.....
03070 DEND ENDPNT 14016
    
```

SYMBOL TABLE

```

10000. 14639 VN4DIG 14021 RETURN 02411 MONITR 02406 MINRAD 14530
FLAGKP 14609 ECADDR 14021 DIVIDE 14390 A 03328 ALPHA 03204
B 03162 COEFF 03162 EXIT 14602 FLW 02488 MAX1 03117
PARAM 14022 RMIN 14020 SLROC 14020 SMAX 14020 SQRTF 02416
UR 03137 URN4 03179 UV 03127 VNI 14015 V1 03157
V2 03147 1.0 06075 3.0 14619 6.0 14629
    
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01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
01020* THE SLOPE AND RADIUS OF CURVATURE FOR A
01030* POINT DEFINED BY V IN A GIVEN TABCYL
01040* CURVE SEGMENT AND DETERMINING THE
01050* MAXIMUM SLOPE OR MINIMUM RADIUS OF
01060* CURVATURE AT THAT POINT
01070*
01080* *ID NUMBER 0258*DELDIM
01090* *STORE CORE IMAGE
01100* LINKAGE - BT PARAM,DSALBL*6,6
01110*
01120 DORG 14010 14010
01130 ECADDR DC 12,0,, END OR CURRENT POINT ARGUMENT ADDRESSES
    
```

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01140 VNI DS 5,ECADDR-6, V-COORDINATE ADDRESS 14015 00005
01150 SLROC DS 5,ECADDR-1, MAX SLOPE OR MIN RAD OF CURV ADDRESS
01160 VN4DIG DS 1,ECADDR, END POINT DIGIT (0=YES,1=NO)
01170* SUBPROGRAM ENTRY 14021 00001
01180* PARAM TF COEFF,ALPHA,, SET COEFFICIENT ADDRESSES
01190 SM COEFF,10,, C COEFFICIENT ADDRESS 14022 26 03162 03204
01200 TFL V1,COEFF,11, V1=C 14034 12 03162 -0010
02010 SM COEFF,10,, B COEFFICIENT ADDRESS 14046 06 03157 0316K
02020 TFL V2,COEFF,11, V2=B 14058 12 03162 -0010
02030 FADD V2,V2,, V2=2B 14070 06 03147 0316K
02040 TFL UR,V2,, UR=2B 14082 01 03147 03147
02050 FMUL V2,VNI,11, V2=2BV 14094 06 03137 03147
02060 FADD V2,V1,, V2=2BV+C 14106 03 03147 1401N
02070 SM COEFF,10,, A COEFFICIENT ADDRESS 14118 01 03147 03157
02080 TFL UV,VNI,11, UV=V 14130 12 03162 -0010
02090 FMUL UV,UV,, UV=V*2 14142 06 03127 1401N
02100 FMUL UV,COEFF,11, UV=AV*2 14154 03 03127 03127
02110 FMUL UV,3.0,, UV=3AV*2 14166 03 03127 0316K
02120 FADD UV,V2,, UV=3AV*2+2BV+C (SLOPE) 14178 03 03127 14619
02130 TFL V2,UR,, V2=2B 14190 01 03127 03147
02140 TFL UR,UV,, UR=UV 14202 06 03147 03137
02150 FMUL UR,UR,, UR=UV*2 14214 06 03137 03127
02160 FADD UR,1.0,, UR=1+UV*2 14226 03 03137 03137
02170 TFL V1,UR,, V1=1+UV*2 14238 01 03137 06075
02180 FMUL UR,UR,, UR=(1+UV*2)**2 14250 06 03157 03137
02190 FMUL UR,V1,, UR=(1+UV*2)**3 14262 03 03137 03137
02200 BTM MONITR,02000,67, CALL SQRTF SUBROUTINE VIA MONITR 14274 03 03137 03157
03010 BTM SQRTF,UR,67, UR=SQRTF((1+UV**2)**.5) 14286 17 02400 -2000
03020 TFL V1,COEFF,11, V1=A 14298 17 02410 -3137
    
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03030 FMUL V1,VN1,11, V1=AV 14322 03 03157 1401N
03040 FMUL V1,6,0,, V1=6AV 14334 03 03157 14629
03050 FADD V1,V2,, V1=6AV+2B 14346 01 03157 03147
03060 BNZ DIVIDE,,, STRAIGHT LINE - TEST R OF C 14358 47 14390 01200
03070 TFL UR,10000,,, SET R OF C=10000.0 14370 06 03137 14639
03080 B7 DIVIDE+12 14382 49 14402 00000
03090 DIVIDE FDIV UR,V1,, UR=SQRTF((1+UV**2)**3)/(6AV+2B) (R OF C) 14390 09 03137 03157
03100 BD MINRAD,VN4DIG,, TEST END POINT DIGIT 14402 43 14530 14021
03110* END POINT.....CALCULATE MAXIMUM SLOPE
03120 TFL URN4,UR,, SAVE END POINT RADIUS OF CURVATURE 14414 06 03179 03137
03130 CF UV-2,,, ABSOLUTE VALUE OF UV 14426 33 03125 00000
03140 TFL SMAX,UV,6,, ASSUME CALCILATED SLOPE MAXIMUM 14438 06 1402- 03127
03150 AM COEFF,20,, C COEFFICIENT ADDRESS 14450 11 03162 -0020
03160 TFL MAX1,COEFF,11,, MAX1=C 14462 06 03117 0316K
03170 CF MAX1-2,,, ABSOLUTE VALUE OF C 14474 33 03115 00000
03180 FSUB UV,MAX1,, TEST MAX(ABSF(UV),ABSF(C)) 14486 02 03127 03117
03190 BM EXIT,,, ASSUMED MAXIMUM SLOPE IS CORRECT 14498 46 14602 01100
03200 TFL SMAX,MAX1,6,, SET C COEFFICIENT SLOPE MAXIMUM 14510 06 1402- 03117
04010 B7 EXIT,,, BRANCH TO EXIT 14522 49 14602 00000
04020* CURRENT POINT.....CALCULATE MINIMUM RADIUS OF CURVATURE
04030 MINRAD CF UR-2,,, ABSOLUTE VALUE OF UR 14530 33 03135 00000
04040 TFL RMIN,UR,6,, ASSUME CURRENT POINT R OF C MINIMUM 14542 06 1402- 03137
04050 CF URN4-2,,, ABSOLUTE VALUE OF URN4 14554 33 03177 00000
04060 FSUB UR,URN4,, TEST MIN(ABSF(UR),ABSF(URN4)) 14566 02 03137 03179
04070 BL EXIT,,, ASSUMED MINIMUM R OF C IS CORRECT 14578 47 14602 01300
04080 TFL RMIN,URN4,6,, SET END POINT R OF C MINIMUM 14590 06 1402- 03179
04090 EXIT B7 RETURN,,6,, RETURN TO TABDS SUBPROGRAM 14602 49 0241J 00000
04100*****
04110***** STORAGE ALLOCATION *****
04120* SUBPROGRAM AND SUBROUTINE ADDRESSES *****
04130 MONITR DS ,2406,, AD-APT MONITOR 02406 00000
04140 SQRTF DS ,2416,, SQUARE ROOT 02416 00000
04150 RETURN DS ,2411,, MONITR STORAGE FOR RETURN ADDRESS 02411 00000
04160*
04170* WORKING PARAMETERS
04180 FLAGP DS 1,, SAVE END POINT R OF C SIGN 14609 00001
04190 SHAX DS ,SLROC,, MAXIMUM SLOPE ADDRESS 14020 00000
04200 RMIN DS ,SLROC,, MINIMUM RADIUS OF CURVATURE ADDRESS 14020 00000
05010 FLW DS ,2488,, I/O FLOATING POINT WORD ARRAY 02488 00000
05020 A DS ,FLW+84*10,, PERMANENT ADDRESS COUNTER 03328 00000
05030 ALPHA DS 5,A-124,, ADDRESS OF ANGLE ALPHA IN CANON ARRAY 03204 00005
05040 URN4 DS 10,A-149,, END POINT RADIUS OF CURVATURE 03179 00010
05050 B DS ,FLW+68*10-6,, TEMPORARY ADDRESS COUNTER 03162 00000
05060 COEFF DS 5,B,, ADDRESS OF COEFFICIENTS 03162 00005
05070 V1 DS 10,B-5,, WORKING STORAGE 03157 00010
05080 V2 DS 10,B-15,, WORKING STORAGE 03147 00010
05090 UR DS 10,B-25,, RADIUS OF CURVATURE 03137 00010
05100 UV DS 10,B-35,, SLOPE 03127 00010
05110 MAX1 DS 10,B-45,, WORKING STORAGE 03117 00010
05120*
05130* CONSTANTS
05140 DC 8,30000000 FLOATING POINT THREE 14617 00008
05150 3.0 DC 2,1,, FLOATING POINT SIX 14629 00002
05160 DC 8,60000000 FLOATING POINT TEN THOUSAND 14639 00002
05170 6.0 DC 2,1,, FLOATING POINT ONE 06075 00000
05180 DC 8,10000000
05190 10000. DC 2,5,,
05200 1.0 DS ,6075,,
06010*
06020* DEND PARAM 14022
06030

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SYMBOL TABLE

XYFORM 14026	VXYADD 14025	RETURN 02411	MCNITR 02406	A 03328
ALPHA 03204	B 03162	CC 03157	COEFF 03162	COSF 02421
FLW 02488	PHI 03204	SINF 02416	SS 03147	UU 03137
U1 03127	U2 03117	VNI 14015	XNI 14020	XPT 03194
VNI 14025	YPT 03199			

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR EVALUATING
 01020* THE CORRESPONDING ORDINATE U FOR ANY
 01030* POINT V IN A GIVEN TABCYL SEGMENT AND
 01040* TRANSFORMING THE (V,U) POINT TO THE
 01050* GENERAL X-Y COORDINATE SYSTEM
 01060*
 01070* *ID NUMBER 0260*DELDIM
 01080* *STORE CORE IMAGE
 01090* LINKAGE - BT XYFORM,DSALBL+10,6
 01100*

01110	DORG	14010	14010
01120	VXYADD DC	16,0,,	V-X-Y COORDINATE ADDRESSES
			14025 00016
01130	VNI DS	5,VXYADD-10,	V COORDINATE ADDRESS 14015 00005
01140	XNI DS	5,VXYADD-5,	X COORDINATE ADDRESS 14020 00005
01150	VNI DS	5,VXYADD,	Y COORDINATE ADDRESS 14025 00005
01160*			SUBPROGRAM ENTRY
01170	XYFORM TFL	CC,PHI,11	14026 06 03157 0320H
01180	BTM	MONITR,02010,67,	CALL SINF-COSF SUBROUTINE VIA MONITR
			14038 17 0240D -2010
01190	BTM	COSF,CC,67,	CC=COSF(PHI)
01200	TFL	SS,PHI,11	14050 17 0242J -3157
02010	BTM	SINF,SS,67,	SS=SINF(PHI)
			14062 06 03147 0320H
02020	TF	COEFF,PHI,,	14074 17 02410 -3147
			SET COEFFICIENT ADDRESSES
02030	SM	COEFF,10,,	14086 26 03162 03204
02040	TFL	UU,COEFF,11,	C COEFFICIENT ADDRESS 14098 12 03162 -0010
02050	FMUL	UU,VNI,11,	UU=C 14110 06 03137 0316K
02060	SM	COEFF,10,,	UU=CV 14122 03 03137 1401N
02070	TFL	U1,COEFF,11,	B COEFFICIENT ADDRESS 14134 12 03162 -0010
02080	TFL	U2,VNI,11,	U1=B 14146 06 03127 0316K
02090	FMUL	U2,U2,,	U2=V 14158 06 03117 1401N
02100	FMUL	U1,U2,,	U2=V**2 14170 03 03117 03117
02110	FADD	UU,U1,,	U1=BV**2 14182 03 03127 03117
02120	FMUL	U2,VNI,11,	UU=BV**2+CV 14194 01 03137 03127
02130	SM	COEFF,10,,	U2=V**3 14206 03 03117 1401N
02140	FMUL	U2,COEFF,11,	A COEFFICIENT ADDRESS 14218 12 03162 -0010
02150	FADD	UU,U2,,	U2=AV**3 14230 03 03117 0316K
			UU=AV**3+BV**2+CV+D (D=0)
			14242 01 03137 03117
02160	TFL	XNI,VNI,611,	X=V 14254 06 1402- 1401N
02170	FMUL	XNI,CC,6,	X=V*COSF(PHI) 14266 03 1402- 03157
02180	TFL	U1,UU,,	U1=AV**3+BV**2+CV+U 14278 06 03127 03137
02190	FMUL	U1,SS,,	U1=U*SINF(PHI) 14290 03 03127 03147
02200	FSUB	XNI,U1,6,	X=V*COSF(PHI)-U*SINF(PHI) 14302 02 1402- 03127
			14314 01 1402- 0319H
03010	FADD	XNI,XPT,611,	X=V*COSF(PHI)-U*SINF(PHI)+XN 14326 06 1402N 1401N
			14338 03 1402N 03147
03020	TFL	VNI,VNI,611,	Y=V 14350 03 03157 03157
03030	FMUL	VNI,SS,6,	Y=V*SINF(PHI)
03040	FMUL	UU,CC,,	UU=U*COSF(PHI)

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03050      FADD YN1,UU,6,      Y=V*SINF(PHI)+U*COSF(PHI)      14362 01 1402M 03137
03060      FADD YN1,YPT,611,    Y=V*SINF(PHI)+U*COSF(PHI)+YN    14374 01 1402M 0319R
03070      BT  RETURN,,6,      RETURN TO TABDS SUBPROGRAM      14386 49 0241J 00000
03080*.....
03090*.....      STORAGE ALLOCATION      .....
03100*
03110*      SUBPROGRAM AND SUBROUTINE ADDRESSES
03120 MONITR DS ,2406,      AD-APT MONITOR      02406 00000
03130 SINP DS ,2416,      SINE      02416 00000
03140 COSF DS ,2421,      COSINE      02421 00000
03150 RETURN DS ,2411,      MONITR STORAGE FOR RETURN ADDRESS      02411 00000

03160*
03170*      WORKING PARAMETERS
03180 FLW DS ,2488,      I/O FLOATING POINT WORD ARRAY      02488 00000
03190 A DS ,FLW*8+10,      PERMANENT ADDRESS COUNTER      03328 00000
03200 ALPHA DS 5,A-124,      ADDRESS OF ANGLE ALPHA IN CANON ARRAY      03204 00005
04010 PHI DS ,ALPHA      03204 00000
04020 XPT DS 5,A-134,      ADDRESS OF X COORD IN CANON ARRAY      03194 00005
04030 YPT DS 5,XPT+5,      ADDRESS OF Y COORD IN CANON ARRAY      03199 00005
04040 B DS ,FLW*68+10-6,      TEMPORARY ADDRESS COUNTER      03162 00000
04050 COEFF DS 5,8,      ADDRESS OF COEFFICIENTS      03162 00005
04060 CC DS 10,B-5,      COSF(PHI)      03157 00010
04070 SS DS 10,B-15,      SINP(PHI)      03147 00010
04080 UU DS 10,B-25,      WORKING STORAGE      03137 00010
04090 U1 DS 10,B-35,      WORKING STORAGE      03127 00010
04100 U2 DS 10,B-45,      WORKING STORAGE      03117 00010
04110*
04120*.....
04130      DEND XYFORM      14026

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SYMBOL TABLE

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SINALF 00010R      RETURN 02411      PNTREF 00036R      MONITR 02406      COSALF 00039
ADDCON 00035R      ALFN 00015R      COSF 02421      SINP 02416      SLOC 00020R
TEMP1 00039      TEMP2 00029      TLOC 00025R      XN 00005R      XREF 00030R
YN 00010R      YREF 00035R

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01010*      IBM 1620-1311 AD-APT SUBPROGRAM FOR TRANSFORMING
01020*      THE COORDINATES OF ANY POINT IN A LOCAL COORDINATE
01030*      SYSTEM INTO THE X-Y COORDINATE SYSTEM      RCS
01040*
01050*      *NAME PNTREF... NON-ERASABLE SYSTEM SUBPROGRAM
01060*      *ID NUMBER 0261+DELDIM
01070*      *ASSEMBLE RELOCATABLE
01080*      *STORE RELOADABLE
01090*      LINKAGE - BT PNTREF,DSALBL+30,6
01100*      DSALBL IS ADDRESS OF X-COORD. LOCAL SYST. ORIGIN
01110*      DSALBL+5 IS ADDRESS OF Y-COORD. LOCAL SYST. ORIGIN
01120*      DSALBL+10 IS ADDRESS OF ANGLE ROTATION LOCAL SYST.
01130*      DSALBL+15 IS ADDRESS OF S-COORD. OF POINT (INPUT)
01140*      DSALBL+20 IS ADDRESS OF T-COORD. OF POINT (INPUT)
01150*      DSALBL+25 IS ADDRESS OF X-COORD. OF POINT (OUTPUT)
01160*      DSALBL+30 IS ADDRESS OF Y-COORD. OF POINT (OUTPUT)
01170*
01180 ADDCON DC 36,0      00035 00036
01190 XN DS 5,ADDCON-30      00005 00005
01200 YN DS 5,XN+5      00010 00005
02010 ALFN DS 5,YN+5      00015 00005
02020 SLOC DS 5,ALFN+5      00020 00005
02030 TLOC DS 5,SLOC+5      00025 00005
02040 XREF DS 5,TLOC+5      00030 00005
02050 YREF DS 5,XREF+5      00035 00005
02060*
02070*      SUBPROGRAM ENTRY
02080 PNTREF BTM MONITR,02010,67,      CALL SINP-COSF SUBROUTINE VIA MONITR
02090      TFL XREF,XN,611,      MOVE XN      00036 17 02400 -2010
02100      TFL YREF,YN,611,      MOVE YN      00048 -0 0003- 0000N
02110      TFL YN,ALFN,11,      MOVE ALFN      00060 -0 0003M 0001-
02120      TFL TEMP1,YN,,      MOVE ALFN      00072 -0 00010 0001N
02130      BTM SINP,SINALF,67,      SINP=SINF(ALFN)      00096 1P 02410 -0010
02140      BTM COSF,COSALF,67,      COSALF=COSF(ALFN)      00108 17 0242J -0039
02150      TFL TEMP2,TLOC,11,      MOVE TLOC      00120 00 00029 0002N
02160      FMUL TEMP2,SINALF,,      TLOC*SINALF      00132 0L 00029 00010
02170      FSUB XREF,TEMP2,8,      XN-TLOC*SINALF      00144 -2 0003- 00029
02180      TFL TEMP2,SLOC,11,      MOVE SLOC      00156 00 00029 0002-
02190      FMUL TEMP2,COSALF,,      SLOC*COSALF      00168 03 00029 00039
02200      FADD XREF,TEMP2,8,      XREF=XN-TLOC*SINALF+SLOC*COSALF
03010      FMUL COSALF,TLOC,11,      TLOC*COSALF      00180 -1 0003- 00029
03020      FMUL SINALF,SLOC,11,      SLOC*SINALF      00192 0L 00039 0002N
03030      FADD COSALF,SINALF,,      TLOC*COSALF+SLOC*SINALF
03040      FADD YREF,COSALF,6,      YREF=YN+TLOC*COSALF+SLOC*SINALF
03050      DSC 2,49,,      RETURN TO MONITR      00228 -1 0003M 00039
03060      DSA -RETURN      00240 0000J
03070*      00246 00005 -241J

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03080 TEMP1 DS 10,39
 03090 SINF DS ,2416
 03100 SINALF DS ,YM
 03110 COSF DS ,2421
 03120 COSALF DS ,TEMP1
 03130 TEMP2 DS 10,29
 03140 RETURN DS ,2411
 03150 MONITR DS ,2406
 03160 DEND PNTREF

00039 00010
 02416 00000
 00010 00000
 02421 00000
 00039 00000
 00029 00010
 02411 00000
 02406 00000
 00036

SYMBOL TABLE

ADDCON 00019R CRIT 00058 ELIMF 00020R EXIT 00104R FLAG 00019
 ONTAB 00214R SMAX 00014R SMIN 00009R SN 00068 SNM9 00004R
 T=MAX 00240R T=MIN 00178R TABS 00019R TEST1 00032R TEST2 00106R
 TEST3 00130R TMXMN 00058 TN 00078

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR ELIMINATING POINTS
 01020* ON A CUBIC CURVE THAT ARE NOT ON A TABCYL INTERVAL RCS
 01030* *NAME ELIMF... ERASABLE SYSTEM SUBPROGRAM
 01040* *ID NUMBER 0262+DELDIM
 01050* *ASSEMBLE RELOCATABLE
 01060* *STORE RELOADABLE
 01070* LINKAGE - BY ELIMF,DSALBL+15,6
 01080* DSALBL IS MI-ORDER ADDRESS OF S-COORD. OF POINT
 01090* DSALBL+5 IS ADDRESS OF MINIMUM S-VALUE
 01100* DSALBL+10 IS ADDRESS OF MAXIMUM S-VALUE
 01110* DSALBL+15 IS ADDRESS OF MIN-MAX T-VALUE
 01120*
 01130* POINT ON TABCYL DENOTED BY RM IN POSITION 00017
 01140* POINT NOT ON TABCYL DENOTED BY 0 IN POSITION 00017
 01150* NO. OF POINTS ON TABCYL MAINTAINED IN POSN. 00019
 01160*
 01170*
 01180 ADDCON DC 20,0 00019 00020
 01190 SNM9 DS 5,ADDCON-15 00004 00005
 01200 SMIN DS 5,SNM9+5 00009 00005
 02010 SMAX DS 5,SMIN+5 00014 00005
 02020 TABS DS 5,SMAX+5 00019 00005
 02030*
 02040* SUBPROGRAM ENTRY
 02050 ELIMF TR SN-9,SNM9,11, MOVE S-T COORDINATES OF POINT
 00020 3J 00059 0000M
 02060 TEST1 TFL CRIT,SMIN,11 00032 00 00058 0000R
 02070 FSUB CRIT,SN,, SMIN-SN 00044 02 00058 00068
 02080 BNP TEST2,,, BRANCH IF SMIN DOES NOT EXCEED SN
 00056 MY 00106 01100
 02090*
 02100 CM CRIT,-3,10 00068 14 00058 000-L
 02110 BNP TEST2,,, BRANCH IF SMIN-SN IS APPROXIMATELY ZERO
 00080 MY 00106 01100
 02120*
 02130 TDM FLAG-2,,, SET 0... POINT NOT ON TABCYL
 00092 15 00017 00000
 02140 EXIT BB ... EXIT 00104 42 00000 00000
 02150 DORG *-9 00106
 02160*
 02170 TEST2 FSUB SN,SMAX,11, SN-SMAX 00106 0K 00068 0001M
 02180 BNP EXIT-12,,, BRANCH IF SN EXCEEDS SMAX
 00118 M6 00092 01100
 02190*
 02200 TEST3 TFL TMXMN,TABS,11 00130 00 00058 0001R
 03010 CM TN,-3,10 00142 14 00078 000-L
 03020 BNP ONTAB,,, BRANCH IF TN IS APPROXIMATELY ZERO
 00154 MY 00214 01100
 03030*
 03040 BNP T=MAX,TMXMN-2,, BRANCH IF TMXMN IS NON-NEGATIVE
 00166 M6 00240 00056

03050*					
03060	T=MIN	BNF	EXIT-12, TN-2,,	BRANCH IF TN IS NON-NEGATIVE	00178 M4 00092 00076
03070*					
03080		FSUB	TN, TMXMN,,	TN-TMXMN	00190 02 00078 00058
03090		BN	EXIT-12,,,	BRANCH IF TMXMN EXCEEDS TN	00202 M7 00092 01300
03100*					
03110	ONTAB	TDM	FLAG-2,,,	SET RM... POINT ON TABCYL	00214 15 00017 00000
03120		DC	1,,*		00225 00001
03130		AM	FLAG, 1, 10,	INCREMENT NO. OF POINTS ON TABCYL	00226 11 00019 000-1
03140		BB	,,,	EXIT	00238 42 00000 00000
03150		DORG	--9		00240
03160*					
03170	T=MAX	BNF	++20, TN-2,,	BRANCH IF TN IS NON-NEGATIVE	00240 M4 00260 00076
03180*					
03190		B	EXIT-12		00252 M9 00092 00000
03200		DORG	--3		00260
04010*					
04020		FSUB	TN, TMXMN,,	TN-TMXMN	00260 02 00078 00058
04030		BNP	ONTAB,,,	BRANCH IF TN DOES NOT EXCEED TMXMN	00272 M7 00214 01100
04040*					
04050		DSC	2, 49		00284 00002
04060		DSA	EXIT-12		00290 00005 -0092
04070*					
04080	SN	DS	10, 68		00068 00010
04090	TN	DS	10, SN+10		00078 00010
04100	CRIT	DS	10, SN-10		00058 00010
04110	FLAG	DS	3, 19		00019 00003
04120	TMXMN	DS	10, CRIT		00058 00010
04130		DEND	ELIMF		00020

SYMBOL TABLE

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RESTD2 00092R	RESTD1 00068R	OUTPUT 00376R	AEDUMP 00000R	ALFRM 00473R
COUNT 00116R	MESS 00391R	NMOD 00009R	POSN 00248R	TREC 00188R

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01010*           IBM 1620-1311 AD-APT SUBPROGRAM FOR ARELEM
01020*           EXECUTION-INTERRUPT MODE MEMORY TO FILE DUMP
01030*                                           RCS
01040*           *NAME AEDUMP... ERASABLE ARELEM SUBPROGRAM
01050*           *ID NUMBER 0263*DELDIR
01060*           *ASSEMBLE RELOCATABLE
01070*           *STORE RELOADABLE
01080*           LINKAGE - B  AEDUMP
01090*
01100*           SUBPROGRAM ENTRY
01110 AEDUMP TFM NMOD,,10,          CLEAR MEMORY MODULE COUNTER
                                00000 J6 00009 000-0
01120         TFM OUTPUT+5,,,        INITIALIZE SECTOR ADDRESS
                                00012 J6 00381 -0000
01130         TFM OUTPUT+13,,,       INITIALIZE MEMORY ADDRESS
                                00024 J6 00389 -0000
01140         TFM TREC+6,-1          CLEAR POSITICN 00000 00036 J6 00194 -000J
01150         TOM 0,0,,              00048 I5 00000 00000
01160         B  COUNT               00060 M9 00116 00000
01170         DORG -3                00068
01180*
01190 RESTD1 TOM TREC+6,,6,         RESTORE POSITION NMOD+20000-1
                                00068 J5 0019M 00000
01200         SM TREC+6,19999        00080 J2 00194 J9999
02010 RESTD2 TOM TREC+6,,6,         RESTORE POSITION NMOD+20000-20000
                                00092 J5 0019M 00000
02020         AM TREC+6,19999        00104 J1 00194 J9999
02030 COUNT AM  NMOD,1,10,          NMOD=NMOD+1
                                00116 J1 00009 000-1
02040         AM TREC+6,1,10        00128 J1 00194 000-1
02050         CF TREC+6             00140 L3 00194 00000
02060         TD RESTD2+11,TREC+6,11,SAVE POSITION NMOD+20000-20000
                                00152 KN 00103 0019M
02070         AM TREC+6,19999        00164 J1 00194 J9999
02080         TD RESTD1+11,TREC+6,11,SAVE POSITION NMOD+20000-1
                                00176 KN 00079 0019M
02090 TREC TR  ,ALFRM-1             00188 J3 00000 00472
02100         BNR RESTD1,,,          BRANCH IF NO RM IN POSITION 00000
                                00200 M5 00068 00000
02110*
02120         TD TREC+6,RESTD1+11,6, RESTORE POSITION NMOD+20000-1
                                00212 KN 0019M 00079
02130         SM TREC+6,19999        00224 J2 00194 J9999
02140         TD TREC+6,RESTD2+11,6, RESTORE POSITION NMOD+20000-20000
                                00236 KN 0019M 00103
02150 POSN SK  OUTPUT,,,            POSITION ARM FOR DISK WRITE
                                00248 L4 00376 00701
02160         WDN OUTPUT,,,          DUMP 20K TO DISK (200 SECTORS)
                                00260 L8 00376 00702
02170         AM OUTPUT+3,2,10,      MODIFY SECTOR ADDRESS 00272 J1 00379 000-2
02180         AM OUTPUT+10,20,10,    MODIFY MEMORY ADDRESS 00284 J1 00386 000K0
02190         SM NMOD,1,10           00296 J2 00009 000-1
02200         BNZ POSN,,,            BRANCH IF DUMP NOT COMPLETE
                                00308 M7 00248 01200

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03010*
03020         RCTY                    00320 34 00000 C0102
03030         RCTY                    00332 34 00000 C0102
03040         WATY MESS                00344 L9 00391 00100
03050         H      ,,,,             PAUSE FOR OPERATOR ACTION
                                00356 48 00000 00000
03060         CALL EXIT,,,             EXIT AD-APT SYSTEM 00368 49 00796 00000
03070*
03080 OUTPUT DDA ,0,0,200,0          00376 00006 0-0000
                                00382 00003 K00
                                00385 00005 -0000
03090 MESS DAC 42,00 AD-APT ARELEM EXECUTION INTERRUPTED
                                ***
                                00391 00084
03100*
03110 NMOD DS 2,AEDUMP+9             00009 00002
03120 ALFRM DS 2,MESS+41*2          00473 00002
03130         DEND AEDUMP            00000

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SYMBOL TABLE

9RCYL3 00519	9RCYL2 00517	9RCYL1 00515	9RCYLO 00513	9CCYL3 02117
9CCYL2 02115	9CCYL1 02113	9CCYLO 02111	MONITR 08562	INPUT3 12096
INPUT2 12082	INPUT1 12068	DELDIM 00000	AELOAD 11800	ALFRM 12185
CLMAP 11896	COUNT 11812	DSURF 07620	MESS 12111	NMOD 11821
POSN1 11860	POSN2 11996	POSN3 11988	TREC 11836	

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01010*          IBM 1620-1311 AD-APT PROGRAM FOR ARELEM
01020*          EXECUTION-REINSTATE MODE FILE TO MEMORY DUMP
01030*
01040*          *NAME AELOAD...
01050*          *ID NUMBER 0264*DELDIM
01060*          *STORE CORE IMAGE
01070*          *SYSTEM SYMBOL TABLE
01080          DORG 11800
01090 AELOAD TDM 0,0,,          CLEAR POSITION 0000 11800 15 00000 00000
01100 COUNT AM NMOD,1,810,    NMOD=NMOD+1          11812 11 11821 0-0-1
01110          AM TREC+6,20000          11824 11 11842 K0000
01120 TREC TR -1,ALFRM-1,2    11836 31 -000J 12184
01130          BNR COUNT,,,          BRANCH IF NO RM IN POSITION 00000
          11848 45 11812 00000
01140*
01150 POSN1 SK INPUT1,,,      POSITION ARM TO CYLINDER 00
          11860 34 12068 00701
01160          RDN INPUT1,,,      LOAD CORE POSITIONS 00000 THRU 11799
          11872 36 12068 00702
01170          RDN INPUT2,,,      LOAD CORE POSITIONS 12200 THRU 19999
          11884 36 12082 00702
01180 CLMAP TFM MONITR+11,,6711, CLEAR FIRST MAP ENTRY 11896 16 0857L -000-
01190          AM INPUT3+4,20,10,    MODIFY SECTOR ADDRESS 11908 11 12100 000K0
01200          AM INPUT3+10,20,10,    MODIFY MEMORY ADDRESS 11920 11 12106 000K0
02010          SM NMOD,1,10,          NMOD=NMOD-1          11932 12 11821 000-1
02020          BZ POSN3,,,          BRANCH IF MEMORY FULLY REINSTATED
          11944 46 11988 01200
02030*
02040 POSN2 SK INPUT3,,,      POSITION ARM FOR DISK READ
          11956 34 12096 00701
02050          RDN INPUT3,,,      LOAD 20K TO MEMORY (200 SECTORS)
          11968 36 12096 00702
02060          B CLMAP+12          11980 49 11908 00000
02070          DORG 0-3          11988
02080*
02090 POSN3 MH 9CCYLO,20,10    11988 13 02111 000K0
02100          TF INPUT3+4,99      12000 26 12100 00099
02110          SK INPUT3,,,      REPOSITION ARM TO CYLINDER AT DUMP TIME
          12012 34 12096 00701
02120          RCTY          12024 34 00000 00102
02130          RCTY          12036 34 00000 00102
02140          MATY MESS          12048 39 12111 00100
02150          B DSURF+12          12060 49 07632 00000
02160          DORG 0-3          12068
02170*
02180 INPUT1 DDA ,0,0,118,0    12068 00006 0-0000
          12074 00003 J18
          12077 00005 -0000
02190 INPUT2 DDA ,0,122,78,12200 12082 00006 0-0122
          12088 00003 -78
          12091 00005 J2200
          12096 00006 0-0000
          12102 00003 K00
          12105 00005 -0000
          12111 00076
03010 MESS DAC 30,,* AD-APT ARELEM EXECUTION RESUMED ** 12111 00076
03020*
03030 NMOD DS 2,COUNT+9          11821 00002
03040 ALFRM DS 2,MESS+37*2      12185 00002
03050 MONITR DS ,8562          08562 00000
03060 DSURF DS ,7620          07620 00000
03070          DEND AELOAD          11800
    
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10160 ZPA DS	.L	01476 00000
10170 Q DS	,X1ADDR	00044 00000
10180 ROOT DS	10.18	00018 00010
10190 MONITR DS	,2406	02406 00000
10200 SQRTF DS	,2416	02416 00000
11010 FLAG DS	,79	00079 00000
11020 RETURN DS	,2411	02411 00000
11030	DEND TANCON	00060

SYMBOL TABLE

SEMIN5 17358	1.0E48 06085	VERIFY 15400	UNVECT 15076	UNVECN 15112
TWOTAN 14632	TWOINT 14920	TOLCHK 15532	TANPSI 14800	TANLMS 14608
TANCON 02416	RO=0.0 15100	REZIDF 15974	RETURN 02411	ONFLAG 15383
OFFSTD 15412	OFFCHK 16708	NDUTSO 16780	NORMLN 02416	NORMCN 02416
NORMAL 15028	M1.E48 17348	MONITR 02406	MINI.0 06024	LINCON 02416
JIGGER 15652	HYPFLG 03349	HYFLAG 03338	GOLFRT 17232	GOFDBK 17296
FOURAC 00079	ERPROC 02416	EPSLON 06004	ENTRY1 14884	D2CALC 14956
D1CALC 14932	DEVIAT 15520	CONVCA 15592	CNSTRY 14392	ADVEPS 15700
ACON 03362	ADJUV 17072	AIMUV 15280	ARGT 06515	ATAMF 02416
BBIS 03168	BCON 03372	BYT 00069	CCGN 03382	CMN 16824
CRIT1 00048	CRIT2 00038	CYT 00069	DCON 03392	DEV1 03268
DISTF 02416	DMAX 03228	DMIN 03298	DSA1 16148	DSA10 16357
DSA11 16382	DSA12 16393	DSA13 16418	DSA14 16429	DSA15 16479
DSA16 16519	DSA17 16529	DSA18 16549	DSA19 16559	DSA2 16159
DSA20 16579	DSA21 16589	DSA22 16599	DSA23 16624	DSA24 16635
DSA25 16655	DSA26 16665	DSA27 16695	DSA3 16219	DSA4 16235
DSA5 16251	DSA6 16267	DSA7 16277	DSAB 16287	DSA9 16347
DYDX 02416	D1 00048	D2 00038	E 05954	ECOM 03402
ENEG 15864	EPOS 15932	ER200 16768	ER201 16744	FCOM 03412
FISH 02416	FLAG 00079	FLW 02488	FLWST 03362	G 05974
GO1 06347	GRAD 03238	HYP1 16792	HYP2 16892	HYP3 17276
IN 17208	IN/DN 17164	KTEMP 07703	LINEL 17036	MAX1F 02416
MBIS 03268	MIN1F 02416	MODN 03308	MOVE1 14992	MOVE2 16948
NHYP1 16836	NHYP3 14536	NVERT 14836	ON 17176	OUTSD 15244
OVOFF 17256	PSI 03268	PSI1 03278	PSI2 03288	RARE 17024
REVE 17096	REVEG 15364	RO 03218	SENSE 02416	TAMF 02416
TEMP 00079	TLRAD 05984	TL2 06147	TOLI 05994	TOLD 06014
UNITV 02416	UXN 03178	UXNT 03198	UXT 06125	UYN 03188
UYNT 03208	UYT 06135	VERT 16980	XI 05923	XMI 03298
XM2 03318	XNO 03248	XT 15968	XO 05892	XI 03298
X2 03318	YJ 05933	YMI 03308	YM2 03328	YNO 03258
YT 15973	YO 05902	Y1 03308	Y2 03328	O.0 06034
0.5 06065	1.0 06075	ZOEPS 00079		

01010* IBM 1620-1311 AD-APT SUBPROGRAM FOR VERIFYING
 01020* THE START-UP POSITION OF THE CUTTER
 01030* ON GENERAL CONIC DRIVE SURFACES
 01040* RCS
 01050* *NAME CNSTRY... NON-ERASABLE ARELEM SUBPROGRAM
 01060* *ID NUMBER 0266*DELDIM
 01070* *STORE CORE IMAGE
 01080* LINKAGE - B CNSTRY,,6
 01090*
 01100* DORG 14392 14392
 01110* SUBPROGRAM ENTRY
 01120 CNSTRY BTM MONITR,02180,67, CALL FISH SUBPROGRAM VIA MONITR
 14392 17 02400 -2180
 01130 BT FISH,TL2,,6, CALCULATE DS-CS OFFSET INDICATORS
 14404 27 02410 06147
 01140 TFM KTEMP,9,10, SET DS TYPE INDICATOR 14416 16 07703 000-9
 01150 TOM G,,11, SET DEGENERATE CONIC INDICATOR
 14428 15 05974 0000-
 01160 TFL HYFLAG,BCON 14440 06 03338 03372
 01170 FMUL HYFLAG,BCON,, B**2 14452 03 03338 03372
 01180 TFL FOURAC,ACON 14464 06 00079 03362
 01190 FMUL FOURAC,CCON 14476 03 00079 03382

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01200 FADD FOURAC,FOURAC 14488 01 00079 00079
02010 FADD FOURAC,FOURAC,, 14500 01 00079 00079
02020 FSUB HYFLAG,FOURAC,, 14512 02 03338 00079
02030 BP HYP3,,, BRANCH IF CONIC IS AN HYPERBOLA
                                         14524 46 17276 01100

02040*
02050 NHYP3 SF HYPFLG,,, SET NON-HYPERBOLA INDICATOR FLAG
                                         14536 32 03349 00000

02060 BT REZIDF,DSA2+5,, EVALUATE RESIDUAL OF POINT P0
                                         14548 27 15974 16164

02070 TD ONFLAG,R0-9,, SET RESIDUAL INDICATOR FLAG
                                         14560 25 15383 03209

02080 FMUL HYFLAG,R0 14572 03 03338 03218
02090 BNM IN/ON,,, BRANCH IF CUTTER NOT OUTSIDE CONIC
                                         14584 46 17164 01300

02100*
02110 BT MONITR,DSA1+5,6, CALL TANCON SUBPROGRAM VIA MONITR
                                         14596 27 02400 16153

02120 TANLNS BT TANCON,DSA2+55,6, DETERMINE TANGENT LINES TO CONIC
                                         14608 27 02410 16214

02130 BNR RARE,FLAG,, BRANCH IF TWO LINES DO NOT EXIST
                                         14620 45 17024 00079

02140*
02150 TWTOTAN FSUB XM1,X0,, XM1=XM1-X0 14632 02 03298 05892
02160 FSUB YM1,Y0,, YM1=YM1-Y0 14644 02 03308 05902
02170 BTM MONITR,02020,67, CALL ATANF SUBPROGRAM VIA MONITR
                                         14656 17 02400 -2020

02180 BT ATANF,DSA3+10,6, CALCULATE ARGUMENT OF TANGENT VECTOR
                                         14668 27 02410 16229

02190 FSUB XM2,X0,, XM2-X0 14680 02 03318 05892
02200 FSUB YM2,Y0,, YM2-Y0 14692 02 03328 05902
03010 BT ATANF,DSA4+10,6, CALCULATE ARGUMENT OF TANGENT VECTOR
                                         14704 27 02410 16245

03020 BTM MONITR,02130,67, CALL MINIF SUBPROGRAM VIA MONITR
                                         14716 17 02400 -2130

03030 BT MINIF,DSA5+11,6, SELECT SMALLER OF PS11 AND PS12
                                         14728 27 02410 16262

03040 FSUB PS11,PS12 14740 02 03278 03288
03050 FMUL PS11,0.5 14752 03 03278 06065
03060 CF PS11-2,,, PS11=ABS(PS11-PS12)/2.0
                                         14764 33 03276 00000

03070 FADD PSI,PS11,, PSI=PSI+PS11 14776 01 03268 03278
03080 BT MONITR,DSA6+5,6, CALL TANF SUBPROGRAM VIA MONITR
                                         14788 27 02400 16272

03090 TANPSI BTM TANF,PSI,67, MBIS=TANF(PSI) 14800 17 02410 -3268
03100 CM MBIS,5,10 14812 14 03268 000-5
03110 BNM VERT,,, BRANCH IF LINE VERTICAL BY DEFINITION
                                         14824 46 16980 01300

03120*
03130 NVERT TFL BBIS,Y0 14836 06 03168 05902
03140 TFL PS12,X0 14848 06 03288 05892
03150 FMUL PS12,MBIS 14860 03 03288 03268
03160 FSUB BBIS,PS12,, BBIS=Y0-MBIS*X0 14872 02 03168 03288
03170 ENTRY1 BT MONITR,DSA7+5,6, CALL LINCON SUBPROGRAM VIA MONITR
                                         14884 27 02400 16282

03180 BT LINCON,DSA8+55,6, CALCULATE INTOF BISECTOR AND CONIC
                                         14896 27 02410 16342

03190 BNR MOVE1,FLAG,, BRANCH IF TWO INTERSECTIONS DO NOT EXIST
                                         14908 45 14992 00079

03200*

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04010 TWOINT BT MONITR,DSA9+5,6, CALL DISTF SUBPROGRAM VIA MONITR
                                         14920 27 02400 16352

04020 DICALC BT DISTF,DSA10+20,6, CALC. DIST. FROM POINT P0 TO POINT P1
                                         14932 27 02410 16377

04030 BT MONITR,DSA11+5,6, CALL DISTF SUBPROGRAM VIA MONITR
                                         14944 27 02400 16387

04040 DZCALC BT DISTF,DSA12+20,6, CALC. DIST. FROM POINT P0 TO POINT P2
                                         14956 27 02410 16413

04050 FSUB D1,D2 14968 02 00048 00038
04060 BNM MOVE2,,, BRANCH IF D2 DOES NOT EXCEED D1
                                         14980 46 16948 01300

04070*
04080 MOVE1 TFL XNO,X1,, XNO=X1 14992 06 03248 03298
04090 TFL YNO,Y1,, YNO=Y1 15004 06 03258 03308
04100 BT MONITR,DSA13+5,6, CALL NORMCN SUBPROGRAM VIA MONITR
                                         15016 27 02400 16423

04110 NORMAL BT NORMCN,DSA14+45,6, PROJECT POINT P0 NORMAL TO CONIC
                                         15028 27 02410 16474

04120 BTM MONITR,02080,67, CALL DYDX SUBPROGRAM VIA MONITR
                                         15040 17 02400 -2080

04130 BT DYDX,DSA15+35,6, CALCULATE SLOPE OF CONIC AT POINT PNO
                                         15052 27 02410 16514

04140 BT MONITR,DSA16+5,6, CALL UNITV SUBPROGRAM VIA MONITR
                                         15064 27 02400 16524

04150 UNVECT BT UNITV,DSA17+15,6, CALCULATE UNIT VECTOR TANGENT TO DS
                                         15076 27 02410 16544

04160 BD CMN,ONFLAG,, BRANCH IF POINT P0 NOT ON CONIC
                                         15088 43 16824 15383

04170*
04180 RO=0.0 BT MONITR,DSA18+5,6, CALL UNITV SUBPROGRAM VIA MONITR
                                         15100 27 02400 16554

04190 UNVECN BT UNITV,DSA19+15,6, CALCULATE UNIT VECTOR NORMAL TO DS
                                         15112 27 02410 16574
                                         15124 06 00079 06014

04200 TFL ZOEPS,TOLD
05010 FADD ZOEPS,TOLI,, (TOLI+TOLD)=TOTAL TOLERANCE
                                         15136 01 00079 05994

05020 FMUL UXN,ZOEPS,, UXN=(TOLI+TOLD)*UXN 15148 03 03178 00079
05030 FMUL UYN,ZOEPS,, UYN=(TOLI+TOLD)*UYN 15160 03 03188 00079
05040 TFL XM1,X0 15172 06 03298 05892
05050 FADD XM1,UXN,, XM1=X0+UXN 15184 01 03298 03178
05060 TFL YM1,Y0 15196 06 03308 05902
05070 FADD YM1,UYN,, YM1=Y0+UYN 15208 01 03308 03188
05080 BT REZIDF,DSA3+5,, EVALUATE RESIDUAL OF POINT PM1
                                         15220 27 15974 16224

05090 BNM NOUTSD,,, BRANCH IF POINT PM1 NOT OUTSIDE CONIC
                                         15232 47 16780 01100

05100*
05110 OUTSD BNF HYP1,HYPFLG,, BRANCH IF CONIC IS AN HYPERBOLA
                                         15244 44 16792 03349

05120*
05130 TFL UXNT,UXN 15256 06 03198 03178
05140 TFL UYNT,UYN 15268 06 03208 03188
05150 AIMUV BT MONITR,DSA20+5,6, CALL SENSE SUBPROGRAM VIA MONITR
                                         15280 27 02400 16584

05160 BTM SENSE,1,610, ADJUST SENSE OF UNIT TANGENT VECTOR
                                         15292 17 02410 000-1

05170 TFL G,1.0,, ASSUME CW CUTTER MOTION ABOUT DS CONIC
                                         15304 06 05974 06075
                                         15316 03 03178 06135
                                         15328 03 03188 06125

05180 FMUL UXN,UYT
05190 FMUL UYN,UYT

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05200 FSUB UXN,UYN,, UXN=UYT-UYN*UXT 15340 02 03178 03188
06010 BNP VERIFY-12,,, BRANCH IF CROSS PRODUCT IS NOT POSITIVE
                                15352 47 15388 01100
06020*
06030 REVEG FMUL E,MIN1.0,, E=-E (IMPENDING MOTION CCM)
                                15364 03 05954 06024
06040 SF G-2,,, SET CCM INDICATOR 15376 32 05972 00000
06050 BD CONVCR,ARGT,, BRANCH IF STARTUP TEST REDUNDANT
                                15388 43 15592 04515
06060*
06070 VERIFY BT MONITR,DSA21+5.6, CALL DISTF SUBPROGRAM VIA MONITR
                                15400 27 02400 16594
06080* CALCULATE DISTANCE FROM CUTTER CENTER TO CONIC
06090 OFFSTD BT DISTF,DSA22+20.6 15412 27 02410 16619
06100 TFL CRIT1,TOLI 15424 06 00048 05994
06110 FADD CRIT1,EPSLON 15436 01 00048 04004
06120 SF CRIT1-2,,, CRIT1=-(TOLI+EPSLON) 15448 32 00046 00000
06130 TFL CRIT2,TOLO 15460 06 00038 06014
06140 FADD CRIT2,EPSLON,, CRIT2=TOLO+EPSLON 15472 01 00038 06004
06150 TFL TEMP,E 15484 06 00079 05954
06160 FMUL TEMP,TLRAD,, E=TLRAD 15496 03 00079 05984
06170 CF TEMP-2,,, ABSF(E=TLRAD) 15508 33 00077 00000
06180 DEVIAT FSUB MODN,TEMP,, MODN=DISPLACEMENT OF CUTTER PERIPHERY
                                15520 02 03308 00079
                                FROM DS CONIC (IN DIRECTION OF CUTTER CENTER)
06200 TOLCHK FSUB CRIT1,MODN 15532 02 00048 03308
07010 BP ER200-12,,, BRANCH IF CUTTER NOT WITHIN TOLERANCE
                                15544 46 16756 01100
07020*
07030 FSUB CRIT2,MODN 15556 02 00038 03308
07040 BN ER200-12,,, BRANCH IF CUTTER NOT WITHIN TOLERANCE
                                15568 47 16756 01300
07050*
07060 BD OFFCHK,E-9,,, BRANCH IF TOOL1 IS TLLFT OR TLRGT
                                15580 43 16708 05945
07070*
07080 CONVCR TFL DMAX,TOLO,, DMAX=TOLO 15592 06 03228 06014
07090 TFL DMIN,TOLI 15604 06 03298 05994
07100 SF DMIN-2,,, DMIN=-TOLI 15616 32 03296 00000
07110 BD ENEG-12,E-9,,, BRANCH IF TOOL1 IS TLLFT OR TLRGT
                                15628 43 15852 05945
07120*
07130 BD ADVEPS,ONFLAG,, BRANCH IF POINT PO NOT ON CONIC
                                15640 43 15700 15383
07140*
07150 JIGGER FMUL UXNT,0.5 15652 03 03198 06065
07160 FMUL UYNT,0.5 15664 03 03208 06065
07170 FSUB XO,UXNT,, XO=XO-10.0*EPSLON*UXN 15676 02 05892 03198
07180 FSUB YO,UYNT,, YO=YO-10.0*EPSLON*UYN 15688 02 05902 03208
07190* ADVANCE CUTTER STARTUP POSITION A DISTANCE EQUAL
07200* TO 20.0*EPSLON IN THE DIRECTION OF UNIT VECTOR
08010 ADVEPS TFL TEMP,TOLO 15700 06 00079 06014
08020 FADD TEMP,TOLI,, 20.0*EPSLON 15712 01 00079 05994
08030 FMUL TEMP,UXT,, 20.0*UXT*EPSLON 15724 03 00079 06125
08040 FADD XO,TEMP,, XO=XO+20.0*UXT*EPSLON 15736 01 05892 00079
08050 TFL TEMP,TOLO 15748 06 00079 06014
08060 FADD TEMP,TOLI,, 20.0*EPSLON 15760 01 00079 05994
08070 FMUL TEMP,UYT,, 20.0*UYT*EPSLON 15772 03 00079 06135
08080 FADD YO,TEMP,, YO=YO+20.0*UYT*EPSLON 15784 01 05902 00079
08090 BTH MONITR,02130.67, CALL MAXIF SUBPROGRAM VIA MONITR

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                                15796 17 02400 -2130
08100 TFL TEMP,EPSLON 15808 06 00079 06004
08110 SM TEMP,1.10 15820 12 00079 000-1
08120 BT MAXIF,DSA27+11.6, DEVI=MAXIF(0.1*EPSLON,5.0E-5)
                                15832 27 02410 16706
08130 B RETURN,,6, RETURN TO MONITR 15844 49 0241J 00000
08140 DORG --3 15852
08150*
08160 BNF EPOS,E-2,, BRANCH IF TOOL OUTSIDE CONIC
                                15852 44 15932 05952
08170*
08180 ENEG TFL DMAX,TOLI 15864 06 03228 05994
08190 FSUB DMAX,TLRAD,, DMAX=TOLI-TLRAD 15876 02 03228 05984
08200 TFL DMIN,TOLO 15888 06 03298 06014
09010 SF DMIN-2 15900 32 03296 00000
09020 FSUB DMIN,TLRAD,, DMIN=-(TOLO+TLRAD) 15912 02 03298 05984
09030 B ADVEPS 15924 49 15700 00000
09040 DORG --3 15932
09050*
09060 EPOS FADD DMAX,TLRAD,, DMAX=TOLO+TLRAD 15932 01 03228 05984
09070 FADD DMIN,TLRAD,, DMIN=-TOLI+TLRAD 15944 01 03298 05984
09080 B ADVEPS 15956 49 15700 00000
09090 DORG ++7 15974
09100*
09110* GENERAL CCNIC RESIDUAL SUBROUTINE
09120 XT DS 5,-5 15968 00005
09130 YT DS 5,XT+5 15973 00005
09140 REZIDF TFL RO,XT,11 15974 06 03218 15960
09150 FMUL RO,ACON 15986 03 03218 03362
09160 FADD RO,DCON,, A*XT+D 15998 01 03218 03392
09170 TFL BYT,BCON 16010 06 00069 03372
09180 FMUL BYT,YT,11 16022 03 00069 15974
09190 FADD RO,BYT,, A*XT+B*YT+D 16034 01 03218 00069
09200 FMUL RO,XT,11, XT=(A*XT+B*YT+D) 16046 03 03218 15960
10010 FADD RO,FCON,, XT=(A*XT+B*YT+D)+F 16058 01 03218 03412
10020 TFL CYT,CCON 16070 06 00069 03382
10030 FMUL CYT,YT,11, C*YT 16082 03 00069 15974
10040 FADD CYT,ECON,, C*YT+E 16094 01 00069 03402
10050 FMUL CYT,YT,11, YT=(C*YT+E) 16106 03 00069 15974
10060 FADD RO,CYT,, RO=A*XT+B*YT+C*YT+D*XT+E*YT+F 16118 01 03218 00069
10070 BXV ++12,,, TURN OFF EXPONENT CHECK INDICATOR
                                16130 46 16142 01500
                                EXIT
10080 BB 16142 42 00000 00000
10090 DORG --9 16144
10100*
10110 DSA1 DSA TANLMS+12 16148 00005 J4620
10120 DSC 5,02651 16149 00005
10130 DORG DSA1+9+5*12-6 16207
10140 NOP YM2,0 16208 41 03328 00000
10150 DORG --21 16198
10160 NOP YM1,YM2 16198 41 03308 03318
10170 DORG --21 16188
10180 NOP FCON,XM1 16188 41 03412 03298
10190 DORG --21 16178
10200 NOP DCON,ECON 16178 41 03392 03402
11010 DORG --21 16168
11020 NOP BCON,CCON 16168 41 03372 03382
11030 DORG --21 16158
11040 NOP YO,ACON 16158 41 05902 03362

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11050 DORG --14
 11060 DSA2 DSA XO
 11070 DORG ++5-12-4+5+3-11-2
 11080 NOP YM1,PS11
 11090 DORG --14
 11100 DSA3 DSA XM1
 11110 DORG ++5+3-4+5+3-11
 11120 NOP YM2,PS12
 11130 DORG --14
 11140 DSA4 DSA XM2
 11150 DORG ++5+3-4+5+3-11
 11160 NOP PS12,PS1
 11170 DORG --14
 11180 DSA5 DSA PS11
 11190 DORG ++5+3-4
 11200 DSC 1,6
 12010 DSA6 DSA TAMPST+12
 12020 DSC 5,02211
 12030 DSA7 DSA ENTRY1+24
 12040 DSC 5,02091
 12050 DORG DSA7+5+3+12-6
 12060 NOP Y2,0
 12070 DORG --21
 12080 NOP Y1,X2
 12090 DORG --21
 12100 NOP FCON,X1
 12110 DORG --21
 12120 NOP ECON,DCON
 12130 DORG --21
 12140 NOP ACON,CCON
 12150 DORG --21
 12160 NOP BB15,BCON
 12170 DORG --14
 12180 DSA8 DSA MB15
 12190 DORG ++5+12-4
 12200 DSA9 DSA D1CALC+12
 13010 DSC 5,02101
 13020 DORG DSA9+5+5+5-11
 13030 NOP Y1,01
 13040 DORG --21
 13050 NOP Y0,X1
 13060 DORG --14
 13070 DSA10 DSA XO
 13080 DORG ++5+5-4
 13090 DSA11 DSA D2CALC+12
 13100 DSC 5,02101
 13110 DORG DSA11+5+5+5-11
 13120 NOP Y2,D2
 13130 DORG --21
 13140 NOP Y0,X2
 13150 DORG --14
 13160 DSA12 DSA XO
 13170 DORG ++5+5-4
 13180 DSA13 DSA NORMAL+12
 13190 DSC 5,02161
 13200 DORG DSA13+5+5+10-6
 14010 NOP YNO,0
 14020 DORG --21
 14030 NOP FCON,XNO
 14040 DORG --21

16155
 16159 00005 -5892
 16217
 16218 41 03308 03278
 16215
 16219 00005 -3298
 16234
 16234 41 03328 03288
 16231
 16235 00005 -3318
 16250
 16250 41 03288 03268
 16247
 16251 00005 -3278
 16262
 16262 00001
 16267 00005 J4812
 16268 00005
 16277 00005 J4908
 16278 00005
 16336
 16336 41 03328 00000
 16326
 16326 41 03308 03318
 16316
 16316 41 03412 03298
 16306
 16306 41 03402 03392
 16296
 16296 41 03362 03382
 16286
 16286 41 03168 03372
 16283
 16287 00005 -3268
 16343
 16347 00005 J4944
 16348 00005
 16366
 16366 41 03308 00048
 16356
 16356 41 05902 03298
 16353
 16357 00005 -5892
 16378
 16382 00005 J4968
 16383 00005
 16401
 16402 41 03328 00038
 16392
 16392 41 05902 03318
 16389
 16393 00005 -5892
 16414
 16418 00005 J5040
 16419 00005
 16467
 16468 41 03258 00000
 16458
 16458 41 03412 03248
 16448

14050 NOP ECON,DCON
 14060 DORG --21
 14070 NOP ACON,CCON
 14080 DORG --21
 14090 NOP Y0,BCON
 14100 DORG --14
 14110 DSA14 DSA XO
 14120 DORG ++5+10-4+5+8-6-2
 14130 NOP GRAD,0
 14140 DORG --21
 14150 NOP ECON,DCON
 14160 DORG --21
 14170 NOP ACON,CCON
 14180 DORG --21
 14190 NOP YNO,BCON
 14200 DORG --14
 15010 DSA15 DSA XNO
 15020 DORG ++5+8-4
 15030 DSA16 DSA UNVECT+12
 15040 DSC 5,02111
 15050 DORG DSA16+5+5+4-6
 15060 NOP UYT,0
 15070 DORG --21
 15080 NOP GRAD,UXT
 15090 DORG --14
 15100 DSA17 DSA 1,0
 15110 DORG ++5+4-4
 15120 DSA18 DSA UNVECH+12
 15130 DSC 5,02111
 15140 DORG DSA18+5+5+4-6
 15150 NOP UYN,0
 15160 DORG --21
 15170 NOP MIN1,0,UXN
 15180 DORG --14
 15190 DSA19 DSA GRAD
 15200 DORG ++5+4-4
 16010 DSA20 DSA AIMUV+24
 16020 DSC 5,02431
 16030 DSA21 DSA OFFSTD+12
 16040 DSC 5,02101
 16050 DORG DSA21+5+5+5-11
 16060 NOP YNO,MOON
 16070 DORG --21
 16080 NOP YO,XNO
 16090 DORG --14
 16100 DSA22 DSA XO
 16110 DORG ++5+5-4
 16120 DSA23 DSA LINE1+24
 16130 DSC 5,02111
 16140 DORG DSA23+5+5+4-6
 16150 NOP UYT,0
 16160 DORG --21
 16170 NOP DCON,UXT
 16180 DORG --14
 16190 DSA24 DSA MIN1,0
 16200 DORG ++5+4-4
 17010 DSA25 DSA ADJUV+12
 17020 DSC 5,02431
 17030 DORG DSA25+5+5+6-6
 17040 NOP YNO,0

16448 41 03402 03392
 16438
 16438 41 03362 03382
 16428
 16428 41 05902 03372
 16425
 16429 00005 -5892
 16507
 16508 41 03238 00000
 16498
 16498 41 03402 03392
 16488
 16488 41 03362 03382
 16478
 16478 41 03258 03372
 16475
 16479 00005 -3248
 16515
 16519 00005 J5088
 16520 00005
 16538
 16538 41 06135 00000
 16528
 16528 41 03238 06125
 16525
 16529 00005 -6075
 16543
 16549 00005 J5124
 16550 00005
 16568
 16568 41 03188 00000
 16558
 16558 41 06024 03178
 16555
 16559 00005 -3238
 16575
 16579 00005 J5304
 16580 00005
 16589 00005 J5424
 16590 00005
 16608
 16608 41 03258 03308
 16598
 16598 41 05902 03248
 16595
 16599 00005 -5892
 16620
 16624 00005 J7068
 16625 00005
 16643
 16644 41 06135 00000
 16634
 16634 41 03392 06125
 16631
 16635 00005 -6024
 16651
 16655 00005 J7084
 16656 00005
 16684
 16684 41 03258 00000

17050 DORG *-21 16674
17060 NOP BCON,XMO 16674 41 03372 03240
17070 DORG *-21 16664
17080 NOP YO,ACOM 16664 41 05902 03362
17090 DORG *-14 16661
17100 DSA26 DSA XO 16665 00005 -5892
17110 DORG *+5*6-4+5*3-11-2 16693
17120 NOP 5EMIN5,DEVI 16694 41 17358 03268
17130 DORG *-14 16691
17140 DSA27 DSA TEMP 16695 00005 -0079
17150 DORG *+5*3-4 16706
17160 DSC 1,7 16706 00001
17170*
17180 OFFCHK FMUL HYFLAG,E 16708 03 03338 05954
17190 BN CONVCR,,, BRANCH IF CUTTER ON PROPER SIDE 16720 47 15592 01300

17200*
18010 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR 16732 17 02400 -2250
18020 ER201 BTM ERPROC,20103,67, WRITE ERROR MESSAGE... SEARCH FOR END 16744 17 02410 K0103
18030 BTM MONITR,02250,67, CALL ERPROC SUBPROGRAM VIA MONITR 16756 17 02400 -2250
18040 ER200 BTM ERPROC,20003,67, WRITE ERROR MESSAGE... SEARCH FOR END 16768 17 02410 K0003

18050*
18060 NOUTSD BNF AIMUV-24,HYPFLG,, BRANCH IF CONIC IS AN HYPERBOLA 16780 44 15256 03349

18070*
18080 HYP1 FMUL UXN,MINI.0,, UXN=-UXN 16792 03 03178 06024
18090 FMUL UYN,MINI.0,, UYN=-UYN 16804 03 03188 06024
18100 B AIMUV-24 16816 49 15256 00000
18110 DORG *-3 16824
18120*
18130 CMN BNF HYP2,HYPFLG,, BRANCH IF CONIC IS AN HYPERBOLA 16824 44 16892 03349

18140*
18150 NHYP1 TFL UXN,XNO 16836 06 03178 03248
18160 FSUB UXN,XO,, UXN=XNO-XO 16848 02 03178 05892
18170 TFL UYN,YNO 16860 06 03188 03258
18180 FSUB UYN,YO,, UYN=YNO-YO 16872 02 03188 05902
18190 B AIMUV 16884 49 15280 00000
18200 DORG *-3 16892

19010*
19020 HYP2 TFL UXN,XO 16892 06 03178 05892
19030 FSUB UXN,XMO,, UXN=XO-XMO 16904 02 03178 03248
19040 TFL UYN,YO 16916 06 03188 05902
19050 FSUB UYN,YNO,, UYN=YO-YNO 16928 02 03188 03258
19060 B AIMUV 16940 49 15280 00000
19070 DORG *-3 16948

19080*
19090 MOVE2 TFL XNO,XZ,, XNO=XZ 16948 06 03248 03318
19100 TFL YNO,YZ,, YNO=YZ 16960 06 03258 03328
19110 B NORMAL-12 16972 49 15016 00000
19120 DORG *-3 16980

19130*
19140 VERT TFL MBIS,1.0E48,, SET MBIS=1.0E48 16980 06 03268 06085
19150 TFL BBIS,ML.E48 16992 06 03168 17348
19160 FMUL BBIS,XO,, BBIS=-1.0E48*XO 17004 03 03168 05892
19170 B ENTRY1 17016 49 14884 00000

19180 DORG *-3 17024
19190*
19200 RARE BNF ER200-12,FLAG,, BRANCH IF ONE TANGENT LINE EXISTS 17024 44 16756 00079

20010*
20020 LINE1 BT MONITR,DSA23+5,6, CALL UNITY SUBPROGRAM VIA MONITR 17036 27 02400 16629
20030 BT UNITY,DSA24+15,6, CALCULATE UNIT VECTOR TANGENT TO DS 17048 27 02410 16650
20040 BT MONITR,DSA25+5,6, CALL SENSE SUBPROGRAM VIA MONITR 17060 27 02400 16660
20050 ADJUV BTM SENSE,1,610, ADJUST SENSE OF UNIT TANGENT VECTOR 17072 17 02410 000-1
20060 BNF REVE+12,UXT-2,, BRANCH IF UXT IS POSITIVE 17084 44 17108 06123

20070*
20080 REVE FMUL E,MINI.0,, E=-E (IMPENDING MOTION RIGHT-TO-LEFT) 17096 03 05954 06024
20090 BTM MONITR,02140,67, CALL NORMLN SUBPROGRAM VIA MONITR 17108 17 02400 -2140

20100 FSUB ACON,DCON,, ACON=-DCON 17120 02 03362 03392
20110 FSUB BCON,FCON,, BCON=-FCON 17132 02 03372 03412
20120 BTM NORMLN,DSA26+25,6, PROJECT CUTTER CENTER TO DS LINE 17144 17 02410 16690
20130 B VERIFY-12 17156 49 15388 00000
20140 DORG *-3 17164
20150*
20160 IN/ON BD IN,RO-9,, BRANCH IF POINT PO NOT ON CONIC 17164 43 17208 03209

20170*
20180 OM TFL XNO,XO,, XNO=XO 17176 06 03248 05892
20190 TFL YNO,YO,, YNO=YO 17188 06 03258 05902
20200 B NORMAL+12 17200 49 15040 00000
20210 DORG *-3 17208

21020*
21030 IN CM G01,2,10 17208 14 06347 000-2
21040 BP G0FDBK,,, BRANCH IF G01 IS G0FWD OR G0BACK 17220 46 17296 01100

21050*
21060 GOLFRIT TFL MBIS,YJ 17232 06 03268 05933
21070 FDIV MBIS,XI,, MBIS=YJ/XI 17244 09 03268 05923
21080 DVOFF BV VERT,,, BRANCH IF XI=0.0 17256 46 16980 01400

21090*
21100 B TANPSI+12 17268 49 14812 00000
21110 DORG *-3 17276
21120*
21130 HYP3 CF HYPFLG,,, SET HYPERBOLA INDICATOR FLAG 17276 33 03349 00000
21140 B NHYP3+12 17288 49 14548 00000
21150 DORG *-3 17296

21160*
21170 G0FDBK TFL MBIS,XI 17296 06 03268 05923
21180 FMUL MBIS,MINI.0 17308 03 03268 06024
21190 FDIV MBIS,YJ,, MBIS=-YJ/XI 17320 09 03268 05933
21200 B DVOFF 17332 49 17296 00000
22010 DORG *-4 17339

22020*
22030 DC 8,-10000000 17344 00008
22040 M1.E48 DC 2,40 17348 00002
22050 DC 8,50000000 17356 00008

22060	SEMINS	DC	2,-4	17358	00002
22070*					
22080	FLW	DS	,2488	02488	00000
22090	MONITR	DS	,2406	02406	00000
22100	FISH	DS	,2416	02416	00000
22110	TL2	DS	,6147	06147	00000
22120	KTEMP	DS	,7703	07703	00000
22130	FLWST	DS	,3362	03362	00000
22140	HYFLAG	DS	10,FLW+85*10	03338	00010
22150	ACON	DS	,FLWST+0*10	03362	00000
22160	BCON	DS	,ACON*10	03372	00000
22170	CCON	DS	,BCON*10	03382	00000
22180	DCON	DS	,CCON*10	03392	00000
22190	ECON	DS	,DCON*10	03402	00000
22200	FCON	DS	,ECON*10	03412	00000
23010	FOURAC	DS	10,79	00079	00010
23020	G	DS	,5974	05974	00000
23030	BYT	DS	10,FOURAC-10	00069	00010
23040	CYT	DS	10,8YT	00069	00010
23050	HYFFLG	DS	1,HYFLAG+11	03349	00001
23060	TANCON	DS	,2416	02416	00000
23070	FLAG	DS	,79	00079	00000
23080	XM1	DS	10,HYFLAG-40	03298	00010
23090	YM1	DS	10,XM1+10	03308	00010
23100	XM2	DS	10,YM1+10	03318	00010
23110	YM2	DS	10,XM2+10	03328	00010
23120	PS11	DS	10,XM1-20	03278	00010
23130	PS12	DS	10,XM1-10	03288	00010
23140	PS1	DS	10,PS11-10	03268	00010
23150	DEVI	DS	,PS1	03268	00000
23160	X1	DS	10,XM1	03298	00010
23170	Y1	DS	10,YM1	03308	00010
23180	X2	DS	10,XM2	03318	00010
23190	Y2	DS	10,YM2	03328	00010
23200	X0	DS	,5892	05892	00000
24010	Y0	DS	,X0+10	05902	00000
24020	D1	DS	10,48	00048	00010
24030	D2	DS	10,38	00038	00010
24040	XNO	DS	10,PS1-20	03248	00010
24050	YNO	DS	10,XNO+10	03258	00010
24060	GRAD	DS	10,XNO-10	03238	00010
24070	L.O	DS	,6075	06075	00000
24080	UXT	DS	10,6125	06125	00010
24090	UYT	DS	10,UXT+10	06135	00010
24100	MIN1.0	DS	,6024	06024	00000
24110	MODN	DS	10,Y1	03308	00010
24120	ATANF	DS	,2416	02416	00000
24130	MINIF	DS	,2416	02416	00000
24140	MAXIF	DS	,2416	02416	00000
24150	O.5	DS	,6065	06065	00000
24160	TANF	DS	,2416	02416	00000
24170	LINCON	DS	,2416	02416	00000
24180	DISTF	DS	,2416	02416	00000
24190	NORMCN	DS	,2416	02416	00000
24200	DYDX	DS	,2416	02416	00000
25010	UNIVT	DS	,2416	02416	00000
25020	ZOEPS	DS	10,79	00079	00010
25030	TOLI	DS	,5994	05994	00000
25040	TOLO	DS	,6014	06014	00000
25050	SENSE	DS	,2416	02416	00000

25060	E	DS	,5954	05954	00000
25070	ARGT	DS	,6515	06515	00000
25080	CRIT1	DS	10,48	00048	00010
25090	CRIT2	DS	10,38	00038	00010
25100	EPSLON	DS	,6004	06004	00000
25110	TEMP	DS	10,79	00079	00010
25120	TLRAD	DS	,5984	05984	00000
25130	DMAX	DS	10,GRAD-10	03228	00010
25140	DMIN	DS	10,XM1	03298	00010
25150	RETURN	DS	,2411	02411	00000
25160	ERPROC	DS	,2416	02416	00000
25170	L.OE48	DS	,6085	06085	00000
25180	NORMLN	DS	,2416	02416	00000
25190	G01	DS	,6347	06347	00000
25200	YJ	DS	,5933	05933	00000
26010	XI	DS	,YJ-10	05923	00000
26020	RO	DS	10,DMAX-10	03218	00010
26030	UXNT	DS	10,RO-20	03198	00010
26040	UYNT	DS	10,UXNT+10	03208	00010
26050	UXN	DS	10,UXNT-20	03178	00010
26060	UYN	DS	10,UXN+10	03188	00010
26070	ONFLAG	DS	1,REVEG+19	15383	00001
26080	MBIS	DS	,PS1	03268	00000
26090	BBIS	DS	10,UXN-10	03168	00010
26100	D.O	DS	,6034	06034	00000
26110		DEND	CNSTRY	14392	

SYMBOL TABLE

ZCOORD	00000R	RETURN	02411	MONITR	02406	FLW	02488	N	02962
NAPX	02972	NBPY	02972	PSA	05851	PSASQ	02972	PSB	05861
PSBSQ	02982	PSC	05871	PSCSQ	02992	PSD	05881	SQRTF	02416
TLRAD	05984	X	05820	Y	05830	Z	05840	ZCALC	00144R

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01010*      IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING
01020*      THE Z-COORDINATE OF THE CUTTER BOTTOM CENTER
01030*      WHEN THE PART SURFACE IS AN INCLINED PLANE
01040*
01050*      *NAME ZCOORD... NON-ERASABLE ARELEM SUBPROGRAM      RCS
01060*      *ID NUMBER 0267*DELDIM
01070*      *ASSEMBLE RELOCATABLE
01080*      *STORE RELOADABLE
01090*      LINKAGE - B ZCOORD,,6
01100*
01110*      SUBPROGRAM ENTRY
01120 ZCOORD TFL N,TLRAD          00000 06 02962 05984
01130      TFL PSASQ,PSA          00012 06 02972 05851
01140      FMUL PSASQ,PSA,,      PSA**2      00024 03 02972 05851
01150      TFL PSBSQ,PSB          00036 06 02982 05861
01160      FMUL PSBSQ,PSB,,      PSB**2      00048 03 02982 05861
01170      TFL PSCSQ,PSC          00060 06 02992 05871
01180      FMUL PSCSQ,PSC,,      PSC**2      00072 03 02992 05871
01190      FADD PSASQ,PSBSQ,,    PSA**2+PSB**2  00084 01 02972 02982
01200      FADD PSASQ,PSCSQ,,    PSA**2+PSB**2+PSC**2  00096 01 02972 02992
02010      BTM MONITR,02000,67,  CALL SQRTF SUBROUTINE VIA MONITR
                                           00108 17 02400 -2000
02020      BTM SQRTF,PSASQ,67,   SQRTF(PSA**2+PSB**2+PSC**2)
                                           00120 17 02410 -2972
02030      FDIV N,PSASQ,,        N=TLRAD/SQRTF(PSA**2+PSB**2+PSC**2)
                                           00132 09 02962 02972
02040 ZCALC TFL Z,PSD           00144 06 05840 05881
02050      TFL NAPX,N           00156 06 02972 02962
02060      FMUL NAPX,PSA,,      N*PSA      00168 03 02972 05851
02070      FADD NAPX,X,,        X+N*PSA    00180 01 02972 05820
02080      FMUL NAPX,PSA,,      PSA*(X+N*PSA)  00192 03 02972 05851
02090      FSUB Z,NAPX,,        D-PSA*(X+N*PSA)  00204 02 05840 02972
02100      TFL NBPY,N           00216 06 02972 02962
02110      FMUL NBPY,PSB,,      N*PSB      00228 03 02972 05861
02120      FADD NBPY,Y,,        Y+N*PSB    00240 01 02972 05830
02130      FMUL NBPY,PSB,,      PSB*(Y+N*PSB)  00252 03 02972 05861
02140      FSUB Z,NBPY,,        D-PSA*(X+N*PSA)-PSB*(Y+N*PSB)
                                           00264 02 05840 02972
02150      FDIV Z,PSC,,         (D-PSA*(X+N*PSA)-PSB*(Y+N*PSB))/PSC
                                           00276 09 05840 05871
02160      FSUB Z,TLRAD,,       (D-PSA*(X+N*PSA)-PSB*(Y+N*PSB))/PSC-TLRAD
                                           00288 02 05840 05984
02170      FMUL N,PSC,,         N*PSC      00300 03 02962 05871
02180      FSUB Z,N,,           Z=(D-PSA*(X+N*PSA)-PSB*(Y+N*PSB))/PSC-N*PSC-TLRAD
                                           00312 02 05840 02962
02190      DSC 2,49,,           RETURN TO MONITR
                                           00324 00002
02200      DSA -RETURN          00330 00005 -241J
03010*
03020 FLW DS ,2488              02488 00000
03030 N DS 10,FLW+46*10+14    02962 00010
03040 TLRAD DS ,5984           05984 00000

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03050	PSA	DS	,5851	05851	00000
03060	PSB	DS	,PSA+10	05861	00000
03070	PSC	DS	,PSB+10	05871	00000
03080	PSD	DS	,PSC+10	05881	00000
03090	PSASQ	DS	10,N+10	02972	00010
03100	PSBSQ	DS	10,PSASQ+10	02982	00010
03110	PSCSQ	DS	10,PSBSQ+10	02992	00010
03120	NAPX	DS	,PSASQ	02972	00000
03130	NBPY	DS	,NAPX	02972	00000
03140	X	DS	,5820	05820	00000
03150	Y	DS	,X+10	05830	00000
03160	Z	DS	,Y+10	05840	00000
03170	MONITR	DS	,2406	02406	00000
03180	SQRTF	DS	,2416	02416	00000
03190	RETURN	DS	,2411	02411	00000
03200	DEND	ZCOORD		00000	

SINALF 00043	RETURN 02411	MONITR 02406	LINLOC 14562	COSALF 00033
ADDCON 14561	ALPHA 14541	ATANF 02416	BST 14561	BXY 14551
C 00023	COSF 02421	DSAL 15037	DSAZ 15052	MOVE 14482
MST 14556	MXY 14546	SINF 02416	TANF 02416	TEMP1 14551
TEMP2 14541	THETA 14536	VERTL 14894	XORG 14531	YORG 14536
1.0 15067				

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01010*      IBM 1620-1311 AD-APT SUBPROGRAM FOR CONVERTING
01020*      THE CANONICAL FORM PARAMETERS OF A LINE
01030*      INTO THE REFERENCE SYSTEM OF A LOCAL CUBIC CURVE
01040*
01050*      *NAME AC1253... NON-ERASABLE ARELEM SUBPROGRAM      RCS
01060*      *ID NUMBER 0268+DELOIM
01070*      *STORE CORE IMAGE
01080*      LINKAGE = BY LINLOC,DSALBL+30,6
01090*      DSALBL IS ADDRESS OF X-COORD. OF CUBIC ORIGIN
01100*      DSALBL+5 IS ADDRESS OF Y-COORD. OF CUBIC ORIGIN
01110*      DSALBL+10 IS ADDRESS OF REF. ANGLE OF CUBIC SYSTEM
01120*      DSALBL+15 IS ADDRESS OF SLOPE (X-Y SYSTEM)
01130*      DSALBL+20 IS ADDRESS OF Y-INTERCEPT (X-Y SYSTEM)
01140*      DSALBL+25 IS ADDRESS OF SLOPE (S-T SYSTEM)
01150*      DSALBL+30 IS ADDRESS OF T-INTERCEPT (S-T SYSTEM)
01160*
01170      DORG 14526
01180 ADDCON DC 36,0
01190 XORG DS 5,ADDCON-30
01200 YORG DS 5,XORG+5
02010 ALPHA DS 5,YORG+5
02020 MXY DS 5,ALPHA+5
02030 BXY DS 5,MXY+5
02040 MST DS 5,BXY+5
02050 BST DS 5,MST+5
02060*
02070*      SUBPROGRAM ENTRY
02080 LINLOC SF MXY-4
02090 TF DSA1+5,MXY
02100 CF DSA1+1
02110 CF DSA1+6
02120 BTM MONITR,02020,67, CALL ATANF SUBROUTINE VIA MONITR
02130 BT ATANF,DSA1+10,6, CALCULATE THETA, WHERE MXY=TANF(THETA)
02140 FSUB THETA,ALPHA,611, THETA-ALPHA
02150 BT MONITR,DSAZ+5,6, CALL TANF SUBPROGRAM VIA MONITR
02160 BTM TANF,MST,6711, CALCULATE MST=TANF(THETA-ALPHA)
02170 BTM MONITR,02010,67, CALL SINF-COSF SUBROUTINE VIA MONITR
02180 MOVE TFL COSALF,ALPHA,11
02190 TFL SINALF,COSALF
02200 BTM SINF,SINALF,67, SINALF=SINF(ALPHA)
03010 BTM COSF,COSALF,67, COSALF=COSF(ALPHA)
03020 CM MXY,49,610
03030 BNL VERTL,,, BRANCH IF INPUT LINE IS VERTICAL

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03040*
03050      TFL BST,BXY,611
03060      FSUB BST,YORG,611, BXY-YORG
03070      TFL TEMP1,COSALF
03080      FMUL COSALF,MST,11, MST=COSF(ALPHA)
03090      TFL TEMP2,SINALF
03100      FMUL SINALF,MST,11, SINALF=MST*SINF(ALPHA)
03110      FSUB TEMP1,SINALF,, COSF(ALPHA)-MST*SINF(ALPHA)
03120      FMUL BST,TEMP1,6, (BXY-YORG)*(COSF(ALPHA)-MST*SINF(ALPHA))
03130      FADD TEMP2,COSALF,, SINF(ALPHA)+MST*COSF(ALPHA)
03140      FMUL TEMP2,XORG,11, XORG*(SINF(ALPHA)+MST*COSF(ALPHA))
03150      FADD BST,TEMP2,6
03160      B RETURN,,6, RETURN TO MONITR
03170      DORG *-3
03180*
03190 VERTL TFL C,BXY,11
03200 FDIV C,MXY,11, -C=BXY/MXY
04010 FADD C,XORG,11, C=XORG-C
04020 TFL BST,MST,611
04030 FMUL BST,YORG,611, MST=YORG
04040 FADD BST,C,6, MST=YORG+C
04050 FMUL BST,SINALF,6, SINF(ALPHA)*(MST+YORG+C)
04060 FMUL C,MST,11, MST*C
04070 FSUB C,YORG,11, MST=C-YORG
04080 FMUL C,COSALF,, COSF(ALPHA)*(MST+C-YORG)
04090 FADD BST,C,6
04100 B RETURN,,6, RETURN TO MONITR
04110 DORG *-4
04120*
04130 DSA1 DSA 1.0,0,-THETA
04140 DSA2 DSA MOVE-12
04150 DSC 5,02211
04160 DC 8,10000000
04170 1.0 DC 2,1
04180*
04190 MONITR DS ,2406
04200 ATANF DS ,2416
05010 THETA DS ,MST
05020 TANF DS ,2416
05030 SINALF DS 10,43
05040 COSALF DS 10,33
05050 SINF DS ,2416
05060 COSF DS ,2421
05070 TEMP1 DS 10,BXY
05080 TEMP2 DS 10,ALPHA
05090 RETURN DS ,2411
05100 C DS 10,23
05110 DEND LINLOC

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SYMBOL TABLE

TWOPOS 15270	THREEA 17203	SNCALC 15330	SMXNM2 00029	SMXNM1 17213
SETCNT 15622	SAMEPT 15402	RETURN 02411	PNTREF 02416	ONEPOS 15238
ONENEG 15206	MONITR 02406	MODIFY 16860	MINL.O 17074	LNCUBE 02416
LINTAB 14596	INFLPT 15438	FOURAC 00069	EPSLON 17090	DIFFPT 15470
CONVRT 16392	ADDCOM 14575	A=O.O 15526	ALFN 14550	AN 14555
AZERO 16292	B=O.O 15582	BN 14960	BST 14535	BZERO 16372
CALL1 16022	CNN 16272	CN 14565	COMP 16920	CON60 17080
CRIT 00039	DECA 16082	DISTF 02416	DSA1 14703	DSA2 14713
DSA3 14768	DSA4 14779	DSA5 14815	DSA6 14835	DSA7 14855
DSAB 14875	DSA9 14900	DUPL 16752	ELIMP 02416	EXIT 16500
FLAG 00019	FLAGF 14631	FLAGT 14617	INCR1 17032	INCR2 17044
INDEX 16884	MOD1 16464	MOD2 16552	MOD3 16628	MOD4 16252
MOVE1 15938	MOVE2 15850	MST 14930	NOINT 14692	NPTS 14619
PNTZ 16520	PNT3 16596	RARE 16660	RM 16979	RYARG 00079
SAVE1 16070	SAVE2 16130	SAVE3 16190	S1 17142	S2T 16988
SMAX 17173	SMAX1 17314	SMAX2 17324	SMIN 17163	SMXNM 17304
SN 17193	SQRTF 02416	STORF 16214	S1 17100	S1T 17223
S2 17121	S2T 17243	S3 17142	S3T 17263	S4T 17283
T=O.O 15602	TEST1 15814	TEST2 15870	TEST3 15906	T1 17152
TMXNM 17183	TWDA 17203	TWOB 17183	T1 17110	T1T 17233
T2 17131	T2T 17253	T3 17152	T3T 17273	T4T 17293
WEED 14906	X1 17283	XN 14540	X1 14570	X2 14580
X3 14590	Y1 17293	YN 14545	Y1 14575	Y2 14585
Y3 14595	O.O 17064	3AC 00029		

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01010*          IBM 1620-1311 AD-APT SUBPROGRAM FOR DETERMINING
01020*          THE INTERSECTIONS OF A LINE AND TABCYL INTERVAL
01030*
01040*          *NAME AC1255... NON-ERASABLE ARELEM SUBPROGRAM          RCS
01050*          *ID NUMBER 0269*DEL01M
01060*          *STORE CORE IMAGE
01070*          LINKAGE - BT LINTAB,DSALBL+65,6
01080*          DSALBL IS ADDRESS OF SLOPE OF LINE (S-T SYSTEM)
01090*          DSALBL+5 IS ADDRESS OF T-INTERCEPT (S-T SYSTEM)
01100*          DSALBL+10 IS ADDRESS OF X-COORD. INTERVAL ORIGIN
01110*          DSALBL+15 IS ADDRESS OF Y-COORD. INTERVAL ORIGIN
01120*          DSALBL+20 IS ADDRESS OF ANGLE ROTATION S-T SYSTEM
01130*          DSALBL+25 IS ADDRESS OF A-COEFFICIENT OF INTERVAL
01140*          DSALBL+30 IS ADDRESS OF B-COEFFICIENT OF INTERVAL
01150*          DSALBL+35 IS ADDRESS OF C-COEFFICIENT OF INTERVAL
01160*          DSALBL+40 IS ADDRESS OF X-COORDINATE (POINT 1)
01170*          DSALBL+45 IS ADDRESS OF Y-COORDINATE (POINT 1)
01180*          DSALBL+50 IS ADDRESS OF X-COORDINATE (POINT 2)
01190*          DSALBL+55 IS ADDRESS OF Y-COORDINATE (POINT 2)
01200*          DSALBL+60 IS ADDRESS OF X-COORDINATE (POINT 3)
02010*          DSALBL+65 IS ADDRESS OF Y-COORDINATE (POINT 3)
02020*
02030*          NO. OF INTERSECTIONS INDICATED BY 2-DIGIT
02040*          FIELD IN CORE POSITIONS 00018-00019
02050*
02060          DORG 14526          14526
02070 ADDCOM DC 50,0          14575 00050
02080 MST DS 5,ADDCOM-45      14530 00005
02090 BST DS 5,MST+5          14535 00005
02100 XN DS 5,BST+5          14540 00005
02110 YN DS 5,XN+5           14545 00005

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02120 ALFN DS 5,YN+5          14550 00005
02130 AN DS 5,ALFN+5         14555 00005
02140 BN DS 5,AN+5          14560 00005
02150 CN DS 5,BN+5          14565 00005
02160 X1 DS 5,CN+5          14570 00005
02170 Y1 DS 5,X1+5          14575 00005
02180 OC DC 20,0            14595 00020
02190 X2 DS 5,Y1+5          14580 00005
02200 Y2 DS 5,X2+5          14585 00005
03010 X3 DS 5,Y2+5          14590 00005
03020 Y3 DS 5,X3+5          14595 00005
03030*
03040*          SUBPROGRAM ENTRY
03050 LINTAB TF DSA2+5,BST,, SET ADDRESS ARGUMENTS FOR LNCUBE
03060 SF XN-4                14596 26 14718 14535
03070 SF AN-4                14608 32 14536 00000
03080 TF DSA2+20,CN         14620 32 14551 00000
03090 CF DSA2+6             14632 26 14733 14565
03100 BT MONITR,DSA1+5,6, CALL LNCUBE SUBPROGRAM VIA MONITR
03110 BT LNCUBE,DSA2+50,6, CALCULATE INTERSECTIONS LINE AND CUBIC
03120 BD WEED,FLAG,, BRANCH IF INTERSECTION EXISTS
03130*
03140 NOINT B RETURN,,6, RETURN TO MONITR 14680 43 14906 00019
03150 DORG B-4              14680 49 0241J 00000
03160*
03170 DSA1 DSA NOINT-12     14680 49 0241J 00000
03180 OSC 5,02701          14703 00005 J4680
03190 DORG DSA1+5+5*11-11 14704 00005
03200 NOP 53,T3            14752
04010 DORG B-21           14752 41 17142 17152
04020 DORG B-21           14742
04030 DORG B-21           14742 41 17121 17131
04040 DORG B-21           14732
04050 DORG B-21           14732 41 17100 17110
04060 DORG B-21           14722
04070 DORG B-21           14722 41 00000 00000
04080 DORG B-21           14712
04090 DORG B-21           14712 41 00000 00000
04100 DSA2 DSA 0           14709
04110 DSA DSA 0           14713 00005 -0000
04120 DSA3 DSA 0           14764
04130 DSA DSA 0           14768 00005 -0000
04140 DSA DSA 0           14769 00005
04150 DSA DSA 0           14797
04160 DSA DSA 0           14798 41 17283 17293
04170 DSA DSA 0           14788
04180 DSA DSA 0           14788 41 17142 17152
04190 DSA DSA 0           14778
04200 DSA DSA 0           14778 41 00000 00000
05010 DSA4 DSA 0           14775
05020 DSA DSA 0           14779 00005 -0000
05030 DSA DSA 0           14824
05040 DSA DSA 0           14824 41 17183 00000
05050 DSA DSA 0           14814
05060 DSA DSA 0           14814 41 17163 17173
05070 DSA DSA 0           14811
05080 DSA DSA 0           14815 00005 J7091

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05080 DORG +-5+4-4+5+4-6-2 14843
05090 NOP TMAXN,0 14844 41 17183 00000
05100 DORG +-21 14834
05110 NOP SMIN,SMAX 14834 41 17163 17173
05120 DORG +-14 14831
05130 DSA6 DSA S2-9 14835 00005 J7112
05140 DORG +-5+4-4+5+4-6-2 14863
05150 NOP TMAXN,0 14864 41 17183 00000
05160 DORG +-21 14854
05170 NOP SMIN,SMAX 14854 41 17163 17173
05180 DORG +-14 14851
05190 DSA7 DSA S3-9 14855 00005 J7133
05200 DORG +-5+4-4+5+5-11-2 14883
06010 NOP O,SN 14884 41 00000 17193
06020 DORG +-21 14874
06030 NOP O,0 14874 41 00000 00000
06040 DORG +-14 14871
06050 DSA8 DSA 0 14875 00005 -0000
06060 DORG +-5+5-4 14896
06070 DSA9 DSA 0 14900 00005 -0000
06080 DSC 5,02101 14901 00005
06090*
06100*
06110 WEED TFL SMIN,0.0,, CALCULATE MAXIMUM S-VALUE IN TABCYL INTERVAL
06120 TF NPTS,FLAG,, SET SMIN = 0.0 14906 06 17163 17064
STORE NO. OF INTERSECTION POINTS
06130 TD S1T-9,RM 14918 26 14619 00019
06140 TD S2T-9,RM 14930 25 17214 16979
06150 TD S3T-9,RM 14942 25 17234 16979
06160 TFL TWOA,AN,11 14954 25 17254 16979
06170 FADD TWOA,TWOA,, 2.0*A(N) 14966 06 17203 1455N
06180 BZ A=0.0,,, BRANCH IF A(N) =0.0 14978 01 17203 17203
14990 46 15526 01200
06190*
06200 TFM DSA9,SNCLC+12 15002 16 14900 J5342
07010 BTM MONITR,02000,67, CALL SORTF SUBROUTINE VIA MONITR
15014 17 02400 -2000
07020 TFL RTARG,BN,11 15026 06 00079 1456-
07030 FMUL RTARG,RTARG,, B(N)**2 15038 03 00079 00079
07040 TFL F DURAC,TWOA 15050 06 00069 17203
07050 FADD F DURAC,TWOA,, 4.0*A(N) 15062 01 00069 17203
07060 FMUL F DURAC,CN,11, 4.0*A(N)*C(N) 15074 03 00069 1456N
07070 F SUB RTARG,F DURAC,, B(N)**2-4.0*A(N)*C(N) 15086 02 00079 00069
07080 BTM SORTF,RTARG,67, RTARG=SQRT(B(N)**2-4.0*A(N)*C(N))
15098 17 02410 -0079
07090 TFL SMAX1,BN,11 15110 06 17314 1456-
07100 FMUL SMAX1,MINI,0., -B(N) 15122 03 17314 17074
07110 TFL SMAX2,SMAX1 15134 06 17324 17314
07120 FADD SMAX1,RTARG,, -B(N)+RTARG 15146 01 17314 00079
07130 F SUB SMAX2,RTARG,, -B(N)-RTARG 15158 02 17324 00079
07140 F DIV SMAX2,TWOA,, (-B(N)-RTARG)/(2.0*A(N))
15170 09 17324 17203
07150 F DIV SMAX1,TWOA,, (-B(N)+RTARG)/(2.0*A(N))
15182 09 17314 17203
07160 BP ONEPOS,,, BRANCH IF SMAX1 IS POSITIVE
15194 46 15238 01100
07170*
07180 ONENEG TFL SMAX,SMAX2,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
15206 06 17173 17324
07190 TFM DECR+18,CMN 15218 16 16100 J6272
07200 B SETCNT 15230 49 15622 00000

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08010 DORG +-3 15238
08020*
08030 ONEPOS BNF TWOPOS,SMAX2-2,, BRANCH IF 2 NON-NEG. S-VALUES AT T=0.0
15238 44 15270 17322
08040*
08050 TFL SMAX,SMAX1,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
15250 06 17173 17314
08060 B ONENEG+12 15262 49 15218 00000
08070 DORG +-3 15270
08080*
08090 TWOPOS TF DSAB+5,YN 15270 26 14880 14545
08100 TF DSAB+15,YN 15282 26 14890 14545
08110 A DSAB+14,CN60,, FABRICATE ADDRESSES OF X(N+1) AND Y(N+1)
15294 21 14889 17080
08120 CF DSAB+6 15306 33 14881 00000
08130 BT MONITR,DSA9+5,6, CALL DISTF SUBPROGRAM VIA MONITR
15318 27 02400 14905
08140 SNCLC BT DISTF,DSA8+20,6, CALCULATE S AT INTERVAL END POINT
15330 27 02410 14895
08150 TFL CRIT,SN 15342 06 00039 17193
08160 F SUB CRIT,SMAX1,, S(N)-SMAX1 15354 02 00039 17314
08170 CF CRIT-2,,, ABSF(S(N)-SMAX1) 15366 33 00037 00000
08180 F SUB CRIT,EPSLON,, ABSF(S(N)-SMAX1)-EPSLON
15378 02 00039 17090
08190 BP DIFFPT,,, BRANCH IF (SMAX1,0.0) IS NOT END POINT
15390 46 15470 01100
08200*
09010 SAMEPT TFL CRIT,SMAX2 15402 06 00039 17324
09020 F SUB CRIT,SN,, SMAX2-S(N) 15414 02 00039 17193
09030 BNN ONEPOS+12,,, BRANCH IF S(N) DOES NOT EXCEED SMAX2
15426 46 15250 01300
09040*
09050* AN INFLECTION POINT EXISTS WITHIN TABCYL INTERVAL
09060 INFLPT TFL SMAX,SMAX2,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
15438 06 17173 17324
09070 TFM DECR+18,RARE 15450 16 16100 J6660
09080 B SETCNT 15462 49 15622 00000
09090 DORG +-3 15470
09100*
09110 DIFFPT TFL CRIT,SMAX1 15470 06 00039 17314
09120 F SUB CRIT,SN,, SMAX1-S(N) 15482 02 00039 17193
09130 BP ONENEG,,, BRANCH IF SMAX1 EXCEEDS S(N)
15494 46 15206 01100
09140*
09150 TFL SMAX,SMAX1,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
15506 06 17173 17314
09160 B [INFLPT+12 15518 49 15450 00000
09170 DORG +-3 15526
09180*
09190 A=0.0 TFL SMAX,CN,11 15526 06 17173 1456N
09200 F DIV SMAX,BN,11, C(N)/B(N) 15538 09 17173 1456-
10010 BV B=0.0,,, BRANCH IF B(N)=0.0 15550 46 15582 01400
10020*
10030 FMUL SMAX,MINI,0., SMAX=-C(N)/B(N) 15562 03 17173 17074
10040 B ONENEG+12 15574 49 15218 00000
10050 DORG +-3 15582
10060*
10070 B=0.0 TFM DSA9,T=0.0 15582 16 14900 J5602
10080 B TWOPOS 15594 49 15270 00000
10090 DORG +-3 15602

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10100*
10110 T=0.0 TFL SMAX,SN,, SET MAXIMUM S-VALUE IN TABCYL INTERVAL
15602 06 17173 17193
10120 B ONENEG+12 15614 49 15218 00000
10130 DORG =-3 15622
10140*
10150 SETCNT TF FLAGT,NPTS,, SAVE NUMBER OF INTERSECTION POINTS
15622 26 14617 14619
10160* CALCULATE S(MIN-MAX)... SET DT/DS=0.0
10170 FADD TNOA,AN,11, 3.0*A(N) 15634 01 17203 1455N
10180 BZ AZERO,,, BRANCH IF A(N)=0.0 15646 46 16292 01200
10190*
10200 TFL RTARG,BN,11 15658 06 00079 1456-
11010 FMUL RTARG,RTARG,, B(N)**2 15670 03 00079 00079
11020 TFL 3AC,THREEA 15682 06 00029 17203
11030 FMUL 3AC,CN,11, 3.0*A(N)*C(N) 15694 03 00029 1456N
11040 FSUB RTARG,3AC,, B(N)**2-3.0*A(N)*C(N) 15706 02 00079 00029
11050 BTM SORTF,RTARG,67, RTARG=SQRTF(B(N)**2-3.0*A(N)*C(N))
15718 17 02410 -0079
11060 TFL SMXMN1,BN,11 15730 06 17213 1456-
11070 FMUL SMXMN1,MINI,0.0, -B(N) 15742 03 17213 17074
11080 TFL SMXMN2,SMXMN1 15754 06 00029 17213
11090 FADD SMXMN1,RTARG,, -B(N)+RTARG 15766 01 17213 00079
11100 FSUB SMXMN2,RTARG,, -B(N)-RTARG 15778 02 00029 00079
11110 FDIV SMXMN2,THREEA,, SMXMN2=(-B(N)-RTARG)/(3.0*A(N))
15790 09 00029 17203
11120 FDIV SMXMN1,THREEA,, SMXMN1=(-B(N)+RTARG)/(3.0*A(N))
15802 09 17213 17203
11130 TEST1 TFL CRIT,SMAX 15814 06 00039 17173
11140 FSUB CRIT,SMXMN1,, SMAX-SMXMN1 15826 02 00039 17213
11150 BNN TEST2,,, BRANCH IF SMXMN1 DOES NOT EXCEED SMAX
15838 46 15870 01300
11160*
11170 MOVF2 TFL SMXMN,SMXMN2,, SMXMN-SMXMN2 15850 06 17304 00029
11180 B MOVE1+12 15862 49 15950 00000
11190 DORG =-3 15870
11200*
12010 TEST2 TFL CRIT,SMIN 15870 06 00039 17163
12020 FSUB CRIT,SMXMN1,, SMIN-SMXMN1 15882 02 00039 17213
12030 BN MOVE2,,, BRANCH IF SMIN EXCEEDS SMXMN1
15894 47 15850 01300
12040*
12050 TEST3 TFL SMXMN,SMXMN1 15906 06 17304 17213
12060 TFL SMXMN1,SMXMN2 15918 06 17213 00029
12070 B MOVE1+12 15930 49 15950 00000
12080 DORG =-3 15938
12090*
12100 MOVE1 TFL SMXMN,SMXMN1,, SMXMN-SMXMN1 15938 06 17304 17213
12110 EVALUATE T AT S=SMXMN
12120 TFL TMXMN,AN,11 15950 06 17183 1455N
12130 FMUL TMXMN,SMXMN,, A(N)*SMXMN 15962 03 17183 17304
12140 FADD TMXMN,BN,11, A(N)+SMXMN*B(N) 15974 01 17183 1456-
12150 FMUL TMXMN,SMXMN,, SMXMN*(A(N)+SMXMN*B(N))
15986 03 17183 17304
12160 FADD TMXMN,CN,11, SMXMN*(A(N)+SMXMN*B(N))+C(N)
15998 01 17183 1456N
12170 FMUL TMXMN,SMXMN,, TMXMN=A(N)*SMXMN**3+B(N)*SMXMN**2+C(N)*SMXMN
16010 03 17183 17304
12180 CALL1 BTM MONTR,02620,67, CALL ELIMF SUBPROGRAM VIA MONTR
16022 17 02400 -2620

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12190 TFM FLAG,,10 16034 16 00019 000-0
12200 BT ELIMF,DSA5+15,6, VERIFY THAT POINT (S1,T1) IS ON TABCYL
16046 27 02410 14830
13010 BNR SAVE1+12,FLAG-2,, BRANCH IF POINT IS NOT ON TABCYL
16058 45 16082 00017
13020*
13030 SAVE1 BTM STORF,S1-9,, SAVE POINT (S1,T1) 16070 17 16214 J7091
13040 DECR SM FLAGT,1,10 16082 12 14617 000-1
13050 BZ ,, BRANCH IF ALL POINTS EXAMINED
16094 46 00000 01200
13060*
13070 BT ELIMF,DSA6+15,6, VERIFY THAT POINT (S2,T2) IS ON TABCYL
16106 27 02410 14850
13080 BNR SAVE2+12,FLAG-2,, BRANCH IF POINT IS NOT ON TABCYL
16118 45 16142 00017
13090*
13100 SAVE2 BTM STORF,S2-9,, SAVE POINT (S2,T2) 16130 17 16214 J7112
13110 SM FLAGT,1,10 16142 12 14617 000-1
13120 BZ DECR+18,,6, BRANCH IF ALL POINTS EXAMINED
16154 46 1610- 01200
13130*
13140 BT ELIMF,DSA7+15,6, VERIFY THAT POINT (S3,T3) IS ON TABCYL
16166 27 02410 14870
13150 BNR DECR+18,FLAG-2,6, BRANCH IF POINT IS NOT ON TABCYL
16178 45 1610- 00017
13160*
13170 SAVE3 BTM STORF,S3-9,, SAVE POINT (S3,T3) 16190 17 16214 J7133
13180 B DECR+18,,6 16202 49 1610- 00000
13190*
13200 STORF TFM STORF+23,SIT-9 16214 16 16237 J7214
14010 BNR MOD4,,, BRANCH IF NO RECORD MARK
16226 45 16252 00000
14020*
14030 TR STORF+23,STORF-1,611 16238 31 1623P 1621L
14040 BB ,, EXIT 16250 42 00000 00000
14050 DORG =-9 16252
14060*
14070 MOD4 AM STORF+22,2,10 16252 11 16236 000-2
14080 B STORF+12 16264 49 16226 00000
14090 DORG =-3 16272
14100*
14110 CMN BD CONVRT,FLAG,, BRANCH IF NO. OF PTS. ON TABCYL NON ZERO
16272 43 16392 00019
14120*
14130 B RETURN,,6, RETURN TO MONTR 16284 49 0241J 00000
14140 DORG =-3 16292
14150*
14160 AZERO TFL TWOB,BN,11 16292 06 17183 1456-
14170 FADD TWOB,TWOB,, 2.0*B(N) 16304 01 17183 17183
14180 BZ BZERO,,, BRANCH IF B(N)=0.0 16316 46 16372 01200
14190*
14200 TFL SMXMN,0.0 16328 06 17304 17064
15010 FSUB SMXMN,CN,11, -C(N) 16340 02 17304 1456N
15020 FDIV SMXMN,TWOB,, SMXMN=-C(N)/(2.0*B(N))
16352 09 17304 17183
15030 B MOVE1+12 16364 49 15950 00000
15040 DORG =-3 16372
15050*
15060 BZERO TFL TMXMN,0.0 16372 06 17183 17064
15070 B CALL1 16384 49 16022 00000

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07080 MP/EZ RZ ZROOTS,,, BRANCH IF RESULT IS ZERO
                                18224 46 18536 01200
07090*
07100 1ROOT CM MST,49,610
07110 BN NVERT,,, BRANCH IF LINE IS NOT VERTICAL
                                18236 14 1733J 000M9
                                18248 47 18304 01300
07120*
07130 VERT TFL S1,BST,611, S1=BST 18260 06 17350 17330
07140 FMUL S1,MINI.0,6, S1=-BST 18272 03 17350 19066
07150 FDIV S1,MST,611, S1=-BST/MST 18284 09 17350 1733J
07160 B TICALC 18296 49 18054 00000
07170 DORG =-3 18304
07180*
07190 NVERT BTM MONITR,02000,67, CALL SORTF SUBROUTINE VIA MONITR
                                18304 17 02400 -2000
07200 BTM SORTF,SQRTA,67, SORTF(SQRTA) 18316 17 02410 J9136
08010 TFL CAPA,SQRTA, TFL CAPA,SQRTA 18328 06 19156 19136
08020 FADD CAPA,SMB/2,, CAPA=SMB/2+SQRTA 18340 01 19156 19116
08030 CBRTA BT CUBRTF,DSA2+5,, CAPA=(SMB/2+SQRTA)**(1.0/3.0)
                                18352 27 18590 18110
08040 TFL CAPB,SMB/2 18364 06 19146 19116
08050 PSUB CAPB,SQRTA,, CAPB=SMB/2-SQRTA 18376 02 19146 19136
08060 CBRTB BT CUBRTF,DSA3+5,, CAPB=(SMB/2-SQRTA)**(1.0/3.0)
                                18388 27 18590 18120
08070 TFL S1,CAPA,6 18400 06 17350 19156
08080 FADD S1,CAPB,6 18412 01 17350 19146
08090 PSUB S1,P,6, S1=CAPA+CAPB-P 18424 02 17350 19126
08100 CM FLAGT,1,10 18436 14 17729 000-1
08110 BE TICALC,,, BRANCH IF ONE INTERSECTION EXISTS
                                18448 46 18054 01200
08120*
08130 ZINT FMUL CAPA,CAPB,, CAPA*CAPB 18460 03 19156 19146
08140 BP ZUNEEK,,, BRANCH IF RESULT IS POSITIVE
                                18472 46 18054 01100
08150*
08160 IINT TDM FLAGT,1,, ONE INTERSECTION EXISTS
                                18484 15 17729 00001
                                18496 49 18054 00000
                                18504
08170 B TICALC
08180 DORG =-3
08190*
08200 ZUNEEK TFL S2,S1,611, S2=S1 18504 06 17360 17350
09010 SZCALC FMUL S2,MINO.5,6, S2=-S1/2.0 18516 03 17360 19106
09020 B TZCALC 18528 49 18042 00000
09030 DORG =-3 18536
09040*
09050 ZROOTS CM MST,49,610
09060 BNN VERT,,, BRANCH IF LINE IS VERTICAL
                                18536 14 1733J 000M9
                                18548 46 18260 01300
09070*
09080 TDM FLAGT,2,, TWO INTERSECTIONS EXIST
                                18560 15 17729 00002
                                18572 49 18304 00000
                                18589
09090 B NVERT
09100 DORG =+6
09110*
09120 CUBRTF TFL TEMPF,ARG,11 18590 06 19166 1858M
09130*
09140 ARG DS 5,CUBRTF-6 18584 00005
09150 EXADD DS 5,ARG+5 18589 00005
09160*
09170 MF SIGN,TEMPF-2 18602 71 18684 19166

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09180 BTM MONITR,02040,67, CALL LOGF SUBROUTINE VIA MONITR
                                18614 17 02400 -2040
09190 BTM LOGF,TEMPF,67, LOGF(ABSF(ARG)) 18626 17 02410 J9166
09200 FMUL TEMPF,1/3, LOGF(ABSF(ARG))/3.0 18638 03 19166 19076
10010 BTM MONITR,02030,67, CALL EXPF SUBROUTINE VIA MONITR
                                18650 17 02400 -2030
10020 BTM EXPF,TEMPF,67, EXPF(LOGF(ABSF(ARG))/3.0)
                                18662 17 02410 J9166
                                18674 71 19166 18684
                                18686 06 1858M 19166
10030 SIGNF MF TEMPF-2,SIGN EXIT 18698 49 1858R 00000
10040 TFL ARG,TEMPF,6 18706
10050 B EXADD,,6, 18706
10060 DORG =-3 18706
10070*
10080 A=0 TFL 2XB,BCUBE,11 18706 06 19126 17340
10090 FADD 2XB,2XB,, 2.0*B 18718 01 19126 19126
10100 BZ B=0,,, BRANCH IF B IS ZERO 18730 46 19018 01200
10110*
10120 BNOTZ TFL TEMP,CMINM 18742 06 19156 19116
10130 FMUL TEMP,CMINM,, (C-MST)**2 18754 03 19156 19116
10140 TFL TEMPF,2XB 18766 06 19166 19126
10150 FADD TEMPF,2XB,, 4.0*B 18778 01 19166 19126
10160 FMUL 4XB,BST,11, 4.0*B*BST 18790 03 19166 17330
10170 FADD TEMP,4XB,, (C-MST)**2+4.0*B*BST 18802 01 19156 19166
10180 FMUL CMINM,MINI.0,, -CMINM 18814 03 19116 19066
10190 FDIV CMINM,2XB,, -CMINM/2.0/B 18826 09 19116 19126
10200 BD NOTO,TEMP-9,, BRANCH IF NOT ONE INTERSECTION EXISTS
                                18838 43 18858 19147
11010*
11020 IREAL B SICALC 18850 49 18962 00000
11030 DORG =-3 18858
11040*
11050 NOTO BNF ZREAL,TEMP-2,, BRANCH IF TWO INTERSECTIONS EXIST
                                18858 44 18890 19154
11060*
11070 FLAGO TFM FLAG,,10, NO INTERSECTION EXISTS
                                18870 16 00019 000-0
                                18882 49 0241J 00000
                                18890
11080 B RETURN,,6, RETURN TO MONITR
11090 DORG =-3
11100*
11110 ZREAL BTM MONITR,02000,67, CALL SORTF SUBROUTINE VIA MONITR
                                18890 17 02400 -2000
11120 BTM SORTF,TEMP,67, SORTF((C-MST)**2+4.0*B*BST)-ROOT
                                18902 17 02410 J9156
11130 FDIV TEMP,2XB,, ROOT/(2.0*B) 18914 09 19156 19126
11140 TFL S2,CMINM,6, S2=C-MST 18926 06 17360 19116
11150 FADD S2,TEMP,6, S2=C-MST+ROOT 18938 01 17360 19156
11160 TDM FLAGT,2,, TWO INTERSECTIONS EXIST
                                18950 15 17729 00002
                                18962 02 19116 19156
11170 SICALC PSUB CMINM,TEMP,, C-MST-ROOT
11180 TFL S1,CMINM,6, S1=C-MST-ROOT 18974 06 17350 19116
11190 CM FLAGT,2,10 18986 14 17729 000-2
11200 BE TZCALC,,, BRANCH IF TWO INTERSECTIONS EXIST
                                18998 46 18042 01200
12010*
12020 B TICALC 19010 49 18054 00000
12030 DORG =-3 19018
12040*
12050 B=0 BD **20,CMINM-9,, BRANCH IF (C-MST) IS NOT ZERO
                                19018 43 19038 19107
12060*

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03040	FSUB	BADDR,TEMP,6,	B=Y1-M*X1	00186	-2	0002R	00079
03050	EXIT	BB	EXIT	00198	42	00000	00000
03060		DORG		00200			
03070*							
03080	ERFLAG	TFM	SLOPE-6,COINC,,	SET SWITCH INDICATING	EQUALITY		
03090	B	MOVEX2		00200	JO	00108	-0258
03100	DORG	--3		00212	M9	00078	00000
03110*				00220			
03120	VERT	TFL	MADDR,1.0E48,6,	SET M=1.0E48			
03130		TFL	BADDR,M1.E48,6	00220	-6	0002M	06085
03140		FMUL	BADDR,X2ADDR,611,	00232	-D	0002R	00281
03150		BB		00244	-L	0002R	0001M
03160		DORG		00256	42	00000	00000
03170*				00258			
03180	COINC	TDM	FLAG,,6,	SET RM... POINTS ARE	COINCIDENT		
03190	DC	1,*,*		00258	J5	0002M	00000
03200	BB			00269			00001
04010	DORG	--9		00270	42	00000	00000
04020*				00272			
04030	DC	8,-10000000		00279			00008
04040	M1.E48	DC	2,49	00281			00002
04050*							
04060	1.0E48	DS	,6085	06085			00000
04070	DELTA	DS	,MADDR	00024			00000
04080	DELTA	DS	,BADDR	00029			00000
04090	TEMP	DS	10,79	00079			00010
04100	FLAG	DS	1,DELTA	00024			00001
04110	DEND	LCNOM2		00030			