MASTER

K-1671

AEC RESEARCH AND DEVELOPMENT REPORT

352
6-28-66

UCAPP

UNION CARBIDE APT POST PROCESSOR
Program Documentation

AUTHORS:

R. E. Neu
W. V. Schellinger

RELEASED FOR ANNOUNCEMENT
IN NUCLEAR SCIENCE ABSTRACTS

**UNION
CARBIDE**

UNION CARBIDE CORPORATION
NUCLEAR DIVISION

Operating the

OAK RIDGE GASEOUS DIFFUSION PLANT	• OAK RIDGE NATIONAL LABORATORY
OAK RIDGE Y-12 PLANT	• PADUCAH GASEOUS DIFFUSION PLANT

*For the Atomic Energy Commission
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Printed in USA. Price \$4.00. Available from the Clearinghouse for Federal
Scientific and Technical Information, National Bureau of Standards,
U.S. Department of Commerce, Springfield, Virginia

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DATE OF ISSUE: June 28, 1966

K-1671

MATHEMATICS AND COMPUTERS

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H.C. \$ 4.00 MN 1.00

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ACKNOWLEDGMENTS

The authors wish to express their gratitude to R. W. Henderson for his valuable assistance and many pertinent suggestions offered throughout development of the program, to R. V. Miskell for his technical advice and diligent effort in testing the various features of the program, and to Mary King for her efforts in preparing this report for publication.

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INTRODUCTION

This manual is designed as a supplement to the Union Carbide APT Post Processor Report, K-1670. The purpose of this report is to aid the computer-programmer when modifications to or extensions of the UCAPP program become necessary. Program listings, logic flow diagrams, a variable dictionary, and subroutine cross references have been compiled and indexed to enable the programmer to find any pertinent information about a particular subroutine or portion of the program. Within the program listings, comment cards have been utilized to describe the specific function accomplished by each subroutine. In addition to these descriptions, comments have been inserted which define logic branching and logic flow.

The underlying concept of the UCAPP program is generality. Therefore, wherever possible, provisions have been incorporated to produce a control tape for any numerical control machine. Where this capability was not feasible, an effort was made to retain logic consistency and program linkage with any supplementary coding or subroutines which might be added. The option table is utilized wherever possible to allow multiple-post-processing and retain machine independence. It is anticipated that the user will establish initial option settings as a function of his specific N/C machine needs.

Since this manual has been written as a maintenance aid, the subject matter is presented from a computer-programmer's viewpoint. Any matters regarding syntax, language or utilization should be referred to the above mentioned user's manual.

SYSTEM FLOW CHART

ALPHABETIC LISTING AND CROSS REFERENCE
OF UCAPP SUBROUTINES

<u>Name</u>	<u>Flow Chart Page</u>	<u>Listing Page</u>	<u>Calls</u>
AIR*	None	16	None
APTA	97	16	None
ARC	98	16	AXIMOV, CIRCIR, CIREQT, ERREX, LINEAR, PCOORD
ARCSLP	100	20	APTA, ERREX
AUXFUN	101	21	APTA, ERREX, PTAPE, SEQOUT
AXIMOV	102	22	LASTPT, LINEAR, PCOORD
BLDFMT	103	24	None
CHKM	104	25	None
CIRCIR	105	25	DETDIR, PCOORD, PTAPE, SEQOUT
CIRCUL	106	26	CIRCIR, CIREQT, LINEAR, PCOORD
CIREQT	108	28	PCOORD
CONBCD	None	28	ERREX
COOLNT*	None	32	None
DCODE	109	33	None
DELAY	110	33	ERREX, PTAPE, SEQOUT
DETDIR	111	34	ERREX
DISPLY*	None	35	None
DRAFT	112	35	APTA, ERREX
ERREX	114	37	DESPAT, FINI
ERROR4	115	39	APTA, ERREX

* Denotes subroutine is inoperative.

ALPHABETIC LISTING AND CROSS REFERENCE
OF UCAPP SUBROUTINES

<u>Name</u>	<u>Flow Chart Page</u>	<u>Listing Page</u>	<u>Calls</u>
FEDRAT*	None	40	None
FINI	116	40	DESPAT, ERREX, PREINT, PRTON, PTAPE, PUNCHA, SEQOUT
FORMAT	117	41	ERREX, SPWRD
HEAD*	None	42	None
INIT	119	43	None
INSERT	120	46	PUNCHA
LASTPT	121	46	PCOORD
LEADO	122	46	REPAC, SPWRD
LEADER	123	47	APTA, ERREX, PUNCHA
LETTER	124	48	APTA, ERREX
LINEAR	125	49	PCOORD, PTAPE, SEQOUT
MACH01 *	None	50	None
MACH02	126	50	None
MACHIN	127	51	APTA, ERREX, MACH01, MACH02, PREINT
MAGEIA*	None	53	None
MAGTAP*	None	54	None
MCHTOL*	None	54	None
OPSTOP	129	54	PTAPE, SEQOUT
OPTION	130	54	APTA, ERREX
PAC	131	55	None
PARNOM, PARNEM	None	56	PUNCH2, PUNIDS, PUNNON

* Denotes subroutine is inoperative.

ALPHABETIC LISTING AND CROSS REFERENCE
OF UCAPP SUBROUTINES

<u>Name</u>	<u>Flow Chart Page</u>	<u>Listing Page</u>	<u>Calls</u>
PARTNO	132	62	PREINT
PCOORD	133	62	ERREX
PLOT	134	63	APTA, ERREX, PLTOUT, PLTSET
PLTOUT	136	64	CHKM, DCODE, ERREX, PCOORD, PTAPE, SEQOUT, SHIFT
PLTSET	138	66	None
PPRINT	139	67	CHKM, DCODE, ERREX, PTAPE, SEQOUT, SHIFT
PREFUN	141	69	APTA, ERREX, PTAPE, SEQOUT
PREINT	142	69	PARNOM, PUNCHA, PUNIDN, PUNSEQ
PRTON	143	70	None
PRTOUT	144	71	BLDFMT, PAC, PRTTIT
PRTTIT	145	72	None
PTAPE	146	73	CONBCD, LEADO, MAGEIA, MAGTAP, PRTOUT, PUNCHA
PUNCHA	None	75	ERREX, PUNCH2
PUNCH2, PUNCH3	None	80	None
PUNIDN	None	82	
RAPID*	None	82	None
READER	None	82	None
REPAC	149	85	None
RETRCT*	None	86	None
REWIND	150	86	PTAPE, SEQOUT
SEQNOD	151	86	APTA, ERREX, PUNCHA

*Denotes subroutine is inoperative

ALPHABETIC LISTING AND CROSS REFERENCE
OF UCAPP SUBROUTINES

<u>Name</u>	<u>Flow Chart Page</u>	<u>Listing Page</u>	<u>Calls</u>
SEQOUT	152	87	None
SHIFT	153	88	None
SPINDL*	None	88	None
SPWRD	154	88	None
STOP	155	89	PTAPE, SEQOUT
TEND	156	89	PREINT, PTAPE, PUNCHA, SEQOUT
TOOLNO*	None	90	None
TRANS	157	90	APTA, ERREX
TURRET*	None	91	None
UCAPP	8	92	AIR, ARCSLP, AUXFUN, CIRCUL, COOLNT, DELAY, DISPLY, DRAFT, END, ERREX, ERROR4, FEDRAT, FINI, INIT, LASTPT, LEADER, LETTER, LINEAR, MACHIN, MCHTOL, OPTSTOP, OPTION, PARTNO, PLOT, PLTOUT, PPRINT, PREFUN, PTAPE, RAPID, READER, RETRCT, REWIND, SEQNOD, SPINDL, STOP, TOOLNO, TRANS, TURRET

```

      STANDARD COMMON, DIMENSION, AND EQUIVALENCE SET
C... SYSTEM COMMON, DIMENSION, AND EQUIVALENCE STATEMENTS
C
      DIMENSION SYSTEM (1700)
C
      EQUIVALENCE (SYSTEM(1700), KOM (1700), KFLAGS(1692), TAPETB(1622))
C
      EQUIVALENCE (TAPETB(18), PROTAP(18), CANTAP(17), CLTAPE(16),
1  POCTAP(15), PLOTAP(14), SRFTAP(13), LIBTAP(12), CRDTAP(11),
2  CORTAP( 9),
3  TAPES1( 8), TAPES2( 7), TAPES3( 6), TAPES4( 5),
4  FORTIN( 4), INTAPE( 3), IOUTAP( 2), PUNTAP( 1))
C
      EQUIVALENCE (KFLAGS( 70),
1  KD ( 60), FD ( 60), KI ( 59), K2 ( 58), K3 ( 57),
2  K4 ( 56), K5 ( 55), K6 ( 54), K7 ( 53), K8 ( 52),
3  K9 ( 51),
4  KFLAG0( 46), KFLAG1( 45), KFLAG2( 44), KFLAG3( 43), KFLAG4( 42),
5  IWAVER( 40), IPTNLY( 39), NOPOST( 38), INVERT( 37), KAUTOP( 36),
6  ICLPRT( 35), INDEXX( 34), IPLOT( 33), NOPLT( 31),
7  KDYNFG( 30), LOCJPT( 29), LOCBEG( 28), KSECIN( 27), NCLREC( 26),
8  LOCMAC( 25), LENSPO( 24),
9  IPOSTP( 20), NUMPST( 19))
C
      EQUIVALENCE (KOM ( 8), KAPTID(1), KAPTIO(2), KAPTTR(3), KAPTCN(4))
C
      COMMON SYSTEM
C
      DIMENSION KFLAGS(1), IPOSTP(1), KOM(1)
C
C...*****
C
      COMMON MACH, NLOOP, NLOOP1, PNOFLG, MTABLE, NID
C
      DIMENSION MACH(12), PNOFLG(14), MTABLE(10)
C
      COMMON AND DIMENSION FOR UCAPP
C
      COMMON ADUM, BITS, BLANKS, BUFFER, BUFP, DAFTON, DAFST,
1  DFTPEN, DMODE, FORMAT, GMODE, IDUM, INTAP, IORDER, JJ,
2  KOMENT, LIMERR, MACHON, NEUADD, NUMERR, NUMTMS, NWPLT,
3  NWPR, OPTAB, PLOTON, PLOTSY, PREVX, PREVY, PREVZ, RETURN,
4  SEQCOD, SEQCTR, SEQINC, SEQNO, SEQON, SEQSH, SEQVAL,
5  TAPSTO, WORDS, XVALUE, YVALUE, ZVALUE
C
      DIMENSION ADUM(50), BUFFER(104), BUFP(26), FORMAT(26),
1  IDUM(50), INTAP(20), IORDER(27), NUMTMS(3),
2  OPTAB(200), TAPSTO(250), WORDS(26)

```

SUBROUTINE LISTINGS

C
C
C

////////////////////////////////////

C
C////////////////////

* LIST UC010010

```

* LABEL UC010020
CAIR UC010030
SUBROUTINE AIR UC010040
C UC010050
C AIR- THE FUNCTION OF THIS ROUTINE IS TO SET UP THE AUXILIARY UC010060
C FUNCTION SPECIFIED BY THE AIR STATEMENT AND STORE IT IN THE M CODE UC010070
C REGISTER BUFP(26). THE SUBROUTINES SEQOUT AND PTAPE SHOULD BE UC010080
C CALLED TO OUTPUT THE BLOCK. UC010090
C UC010100
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C UC010580
C RETURN UC010590
C END UC010600
C
C ///////////////////////////////////////////////////////////////////
C
* LIST UC 0010
* LABEL UC010020
CAPTA UC010030
SUBROUTINEAPTA(N,APTFLG) UC010040
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C UC010520
C APTA -THIS ROUTINE DETERMINES THE NATURE OF A PARTICULAR UC010530
C WORD,I.E.,APT WORD OR NUMBER. UC010540
C UC010550
C TEST FOR ABSOLUTE ZERO UC010560
C IF(INTAP(N)) 40,20,40 UC010570
C TEST FOR WORD BEING REPRESENTED AS AN INTEGER UC010580
C 40 IF(XABSF(INTAP(N))-32767) 10,10,20 UC010590
C YES, THAN WORD IS AN APT WORD UC010600
C SET THE RETURN FLAG,(APTFLG),TO INDICATE ABOVE UC010610
C 10 APTFLG#0.0 UC010620
C GOTO30 UC010630
C NO, THAN THE WORD IS A NUMBER UC010640
C SET THE RETURN FLAG TO INDICATE ABOVE UC010650
C 20 APTFLG#1.0 UC010660
C 30 RETURN UC010670
C END UC010680
C
C ///////////////////////////////////////////////////////////////////
C
* LIST UC020010
* LABEL UC020020
SUBROUTINEARC UC020030
C A SUBROUTINE TO PRODUCE CIRCULAR INTERPOLATION UC020040
C BLOCKS IN ACCORDANCE WITH THE ARCSLP SPECIFIERS UC020050
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C UC020530
C DIMENSIONIQD(2) UC020540
C DETERMINE TYPE OF ARCSLP MODIFIERS UC020550
C QI#1.0 UC020560
C Q#1.0 UC020570
C K#IDUM(32) UC020580
C GO TO (100,260,200),K UC020590
C RADIUS GIVEN UC020600
C COMPUTE MIDPOINT OF LINE BETWEEN TWO POINTS UC020610
C 100 CALLPCOORD(JJ) UC020620
C XM#(PREVX+XVALUE)/2.0 UC020630

```


YM#(PREVY+YVALUE)/2.0	UC020640
A#SQRTF((XM-PREX)**2+(YM-PREVY)**2)	UC020650
IF(ADUM(30)-A)999,1,1	UC020660
999 CALL ERREX(21)	UC020670
99 IDUM(10)#0	UC020680
RETURN	UC020690
I D#IDUM(33)*IDUM(34)	UC020700
B#SQRTF(ADUM(30)**2-A**2)	UC020710
DELX#XM-PREX	UC020720
DELY#YM-PREVY	UC020730
THETA#ATANF(DELY/DELX)	UC020740
IF(D)101,999,101	UC020750
101 IF(PREX-XVALUE)150,145,150	UC020760
145 XC#XM	UC020770
GO TO 155	UC020780
150 IF(DELY) 152,157,157	UC020790
152 Q#-1.0	UC020800
157 XC#XM+D*Q*B*SINF(THETA)	UC020810
155 IF(PREVY-YVALUE)165,160,165	UC020820
160 YC#YM	UC020830
GO TO 170	UC020840
165 IF(DELY)167,167,166	UC020850
166 Q1#-1.0	UC020860
167 IF(THETA)168,163,163	UC020870
168 Q1#-Q1	UC020880
163 YC#YM+Q1*D*B*COSF(THETA)	UC020890
C DIR GIVES DIRECTION OF MOTION + CCLW, -CLW	UC020900
170 DIR#-IDUM(34)	UC020910
ADUM(17)#XC	UC020920
ADUM(18)#YC	UC020930
ADUM(19)#D.0	UC020940
CALL AXIMOV(1,XC,YC,IQFLG)	UC020950
XX#TAPSTO(JJ)	UC020960
YY#TAPSTO(JJ+1)	UC020970
ZZ#TAPSTO(JJ+2)	UC020980
C DETERMINE QUADRANTS POINTS LIE IN	UC020990
300 XI#XVALUE	UC021000
YI#YVALUE	UC021010
I#2	UC021020
20 IF((XI-XC)*(YI-YC))2,3,4	UC021030
4 IF(XI-XC)5,3,6	UC021040
3 CALL ERREX(21)	UC021050
GOTO99	UC021060
6 IQD(1)#1	UC021070
GOTO9	UC021080
5 IQD(1)#3	UC021090
GOTO9	UC021100
2 IF(XI-XC)7,3,8	UC021110
8 IQD(1)#4	UC021120
GOTO9	UC021130
7 IQD(1)#2	UC021140
9 IF(I-1)26,26,25	UC021150
25 XI#PREX	UC021160
YI#PREY	UC021170
I#1	UC021180
GOTO20	UC021190
26 IF(IQD(1)-IQD(2))31,27,31	UC021200
C POINTS LIE IN SAME QUADRANT	UC021210
C GENERATE CIRCULAR INTERPOLATION BLOCKS	UC021220
270 TAPSTO(JJ)#XX	UC021230

TAPSTO(JJ+1)#YY	UC021240
TAPSTO(JJ+2)#ZZ	UC021250
27 IT#1	UC021260
36 AI#XI-XC	UC021270
AJ#YI-YC	UC021280
CALLCIREQT(JJ,XI,YI,AI,AJ)	UC021290
IF(DIR)28,11,29	UC021300
28 ADUM(20)#2.0	UC021310
GOTO30	UC021320
29 ADUM(20)#3.0	UC021330
30 CALLCIRCIR(JJ,JJ)	UC021340
GOTO(998,98,97,96,95,94,93,92,91),IT	UC021350
31 DELQD#SQRTF(ADUM(30)**2-(OPTAB(34)/2.0)**2)	UC021360
DEL#OPTAB(34)/2.0	UC021370
KQD#IQD(1)	UC021380
32 IF(KQD-IQD(2))33,270,33	UC021390
33 GOTO(110,120,130,140),KQD	UC021400
C PRESENT INITIAL POINT IN FIRST QUADRANT	UC021410
110 IF(DIR)34,34,35	UC021420
34 TAPSTO(JJ)#XC+DELQD	UC021430
TAPSTO(JJ+1)#YC+DEL	UC021440
IT#2	UC021450
GOTO36	UC021460
98 TAPSTO(JJ+1)#YC-DEL	UC021470
CALLLINEAR	UC021480
XI#TAPSTO(JJ)	UC021490
YI#TAPSTO(JJ+1)	UC021500
KQD#4	UC021510
GOTO32	UC021520
35 TAPSTO(JJ)#XC+DEL	UC021530
TAPSTO(JJ+1)#YC+DELQD	UC021540
IT#3	UC021550
GOTO36	UC021560
97 TAPSTO(JJ)#XC-DEL	UC021570
CALLLINEAR	UC021580
XI#TAPSTO(JJ)	UC021590
YI#TAPSTO(JJ+1)	UC021600
KQD#2	UC021610
GOTO32	UC021620
120 IF(DIR)41,41,45	UC021630
C PRESENT INITIAL POINT IN SECOND QUADRANT	UC021640
41 TAPSTO(JJ)#XC-DEL	UC021650
TAPSTO(JJ+1)#YC+DELQD	UC021660
IT#4	UC021670
GOTO36	UC021680
96 TAPSTO(JJ)#XC+DEL	UC021690
CALLLINEAR	UC021700
XI#TAPSTO(JJ)	UC021710
YI#TAPSTO(JJ+1)	UC021720
KQD#1	UC021730
GOTO32	UC021740
45 TAPSTO(JJ)#XC-DELQD	UC021750
TAPSTO(JJ+1)#YC+DEL	UC021760
IT#5	UC021770
GOTO36	UC021780
95 TAPSTO(JJ+1)#YC-DEL	UC021790
CALLLINEAR	UC021800
XI#TAPSTO(JJ)	UC021810
YI#TAPSTO(JJ+1)	UC021820
KQD#3	UC021830

	GOTO32	UC021840
C	PRESENT INITIAL POINT IN THIRD QUADRANT	UC021850
130	IF(DIR)51,51,55	UC021860
51	TAPSTO(JJ)#XC-DELQD	UC021870
	TAPSTO(JJ+1)#YC-DEL	UC021880
	IT#6	UC021890
	GOTO36	UC021900
94	TAPSTO(JJ+1)#YC+DEL	UC021910
	CALLLINEAR	UC021920
	XI#TAPSTO(JJ)	UC021930
	YI#TAPSTO(JJ+1)	UC021940
	KQD#2	UC021950
	GOTO32	UC021960
55	TAPSTO(JJ)#XC-DEL	UC021970
	TAPSTO(JJ+1)#YC-DELQD	UC021980
	IT#7	UC021990
	GOTO36	UC022000
93	TAPSTO(JJ)#XC+DEL	UC022010
	CALLLINEAR	UC022020
	XI#TAPSTO(JJ)	UC022030
	YI#TAPSTO(JJ+1)	UC022040
	KQD#4	UC022050
	GOTO32	UC022060
140	IF(DIR)61,61,65	UC022070
C	PRESENT INITIAL POINT IN FOURTH QUADRANT	UC022080
61	TAPSTO(JJ)#XC+DEL	UC022090
	TAPSTO(JJ+1)#YC-DELQD	UC022100
	IT#8	UC022110
	GOTO36	UC022120
92	TAPSTO(JJ)#XC-DEL	UC022130
	CALLLINEAR	UC022140
	XI#TAPSTO(JJ)	UC022150
	YI#TAPSTO(JJ+1)	UC022160
	KQD#3	UC022170
	GOTO32	UC022180
65	TAPSTO(JJ)#XC+DELQD	UC022190
	TAPSTO(JJ+1)#YC-DEL	UC022200
	IT#9	UC022210
	GOTO36	UC022220
91	TAPSTO(JJ+1)#YC+DEL	UC022230
	CALLLINEAR	UC022240
	XI#TAPSTO(JJ)	UC022250
	YI#TAPSTO(JJ+1)	UC022260
	KQD#1	UC022270
	GOTO32	UC022280
998	IF(IQFLG)99,99,12	UC022290
12	CALL AXIMOV(2,XC,YC,IQFLG)	UC022300
	GOTO99	UC022310
C	START ARC GIVEN	UC022320
200	XI#PREVX	UC022330
	YI#PREVY	UC022340
	CALL PCOORD(JJ)	UC022350
	X2#XVALUE	UC022360
	Y2#YVALUE	UC022370
	GO TO 290	UC022380
C	END ARC GIVEN	UC022390
260	X2#PREVX	UC022400
	Y2#PREVY	UC022410
	CALL PCOORD(JJ)	UC022420
	XI#XVALUE	UC022430

```

      YI#YVALUE
290 SLP#(X1-X2)/(Y2-Y1)
C   ANGLE STORED IN ADUM(30)
C   CONVERT ANGLE TO RADIANS
      ALPHA#ADUM(30)*0.0174533
      TAN#SINF(ALPHA)/COSF(ALPHA)
      IF(ADUM(30)-90.0)201,202,201
201 IF(Y2-Y1)203,204,203
203 XC#(X1-TAN*(Y1+Y2)/2.0+(X1+X2)/2.0*TAN*SLP+YI*TAN)/(1.0+TAN*SLP)
      YC#(X1-XC)/TAN+YI
      GO TO 250
204 XC#(X1+X2)/2.0
      YC#YI+(X1-X2)/(2.0*TAN)
      GO TO 250
202 XC#(Y1-Y2)/2.0*1.0/SLP+(X1+X2)/2.0
      YC#YI
250 ADUM(30)#SQRTF((XC-X1)**2+(YC-Y1)**2)
252 IF(IDUM(34))170,254,170
254 CALL ERREX(22)
      GO TO 99
      END
C
C ///////////////////////////////////////////////////////////////////
C
*   LIST
*   LABEL
*   SUBROUTINEARCSLP
C   A SUBROUTINE TO DETERMINE ARC MODIFIERS
C   ADUM(30) CONTAINS RADIUS OR ANGLE SPECIFIED
C   IDUM(32) SIGNALS TYPE OF ARCSLP MODIFIERS GIVEN
C       1 - RADIUS
C       2 - ENDARC
C       3 - START
C   IDUM(33) SIGNALS MAGNITUDE OF ARC
C       +1 - SMALL I.E., LESS THAN 180
C       -1 - LARGE I.E., GREATER THAN 180
C   SMALL ASSUMED IF MAGNITUDE NOT SPECIFIED
C   IDUM(34) SIGNALS ARC DIRECTION ,I.E. LEFT CLW, RIGHT CCLW
C   IDUM(10) IS ARC SLOPE FLAG2
C       0 - ARC SLOPE NOT POSSIBLE
C       1 - ARC SLOPE POSSIBLE
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C   SET INITIAL CONDITIONS
C   ADUM(30)#0.0
C   IDUM(32)#0
C   IDUM(33)#1
C   IDUM(34)#0
C   NW#3
C   1 NW#NW+1
C   ALL WORDS CHECKED
C   IF(NWPR-NW)25,2,2
C   2 CALL APTA(NW,APTFLG)
C   IS WORD AN APT WORD OR NUMBER
C   IF(APTFLG-1.0)3,20,20
88 CALL ERREX(23)
99 RETURN
C   APT WORD
C   3 IF(INTAP(NW)-23)5,4,5

```

UC022440
UC022450
UC022460
UC022470
UC022480
UC022490
UC022500
UC022510
UC022520
UC022530
UC022540
UC022550
UC022560
UC022570
UC022580
UC022590
UC022600
UC022610
UC022620
UC022630
UC022640

UC030010
UC030020
UC030030
UC030040
UC030050
UC030060
UC030070
UC030080
UC030090
UC030100
UC030110
UC030120
UC030130
UC030140
UC030150
UC030160
UC030170

UC030650
UC030660
UC030670
UC030680
UC030690
UC030700
UC030710
UC030720
UC030730
UC030740
UC030750
UC030760
UC030770
UC030780
UC030790
UC030800
UC030810

C	RADIUS SPECIFIED	UC030820
	4 IDUM(32)#1	UC030830
	GOTO1	UC030840
	5 IF(INTAP(NW)-57)6,7,6	UC030850
C	START SPECIFIED	UC030860
	7 IDUM(32)#3	UC030870
	GOTO1	UC030880
	6 IF(INTAP(NW)-58)9,8,88	UC030890
C	ENDARC SPECIFIED	UC030900
	8 IDUM(32)#2	UC030910
	GOTO1	UC030920
	9 IF(INTAP(NW)-7)88,10,11	UC030930
C	LARGE SPECIFIED IMPLIES ANGLE GREATER THAN 180	UC030940
	10 IDUM(33)#-1	UC030950
	GOTO1	UC030960
	11 IF(INTAP(NW)-8)88,12,13	UC030970
C	LEFT ARC DESIRED	UC030980
	12 IDUM(34)#1	UC030990
	GOTO1	UC031000
	13 IF(INTAP(NW)-24)88,14,15	UC031010
C	RIGHT ARC DESIRED	UC031020
	14 IDUM(34)#-1	UC031030
	GOTO1	UC031040
	15 IF(INTAP(NW)-26)88,16,88	UC031050
C	SMALL SPECIFIED IMPLIES ANGLE LESS THAN 180	UC031060
	16 IDUM(33)#+1	UC031070
	GOTO1	UC031080
C	NUMBER	UC031090
	20 ADUM(30)#TAPSTO(NW)	UC031100
	GOTO1	UC031110
C	HAS THE RADIUS OR AN ANGLE BEEN GIVEN	UC031120
	25 IF(ADUM(30))26,88,26	UC031130
C	YES, ARC SLOPE POSSIBLE	UC031140
	26 IDUM(10)#1	UC031150
	GOTO99	UC031160
	END	UC031170
C	////////////////////////////////////	
C		
*	LIST	UC040010
*	LABEL	UC040020
	SUBROUTINE AUXFUN	UC040030
C		
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC040510
C	AUXFUN - AN M CODE OF N SPECIFIED BY THE AUXFUN/N COMMAND IS	UC040520
C	PLACED IN THE M REGISTER AND THE APPROPRIATE ROUTINES TO	UC040530
C	GENERATE AN OUTPUT BLOCK ARE CALLED.	UC040540
C		UC040550
C	NW#4	UC040560
C	ARE THERE ANY MODIFIERS AFTER THE SLASH	UC040570
	101 IF(NWPR-NW) 1,2,2	UC040580
C	NO, CALL ERROR ROUTINE	UC040590
	1 CALL ERREX(2)	UC040600
	RETURN	UC040610
C	IS IT A NUMBER	UC040620
	2 CALL APTA(NW,APTFLG)	UC040630
	IF(APTFLG-1.0) 7,5,5	UC040640
C	NO, CALL ERROR ROUTINE	UC040650
	7 CALL ERREX(6)	UC040660

	NW#NW+1	UC040670
	GO TO 102	UC040680
C	YES, SET M CODE TO THE NUMBER	UC040690
5	BUFP(26)#TAPSTO(NW)	UC040700
	NW#NW+1	UC040710
C	ARE THERE ANY MORE MODIFIERS	UC040720
102	IF(NWPR-NW)40,2,2	UC040730
C	YES, GO AGAIN, I.E., TRANSFER BACK TO STATEMENT 2	UC040740
C	NO, OUTPUT A BLOCK USING THE LAST M CODE SPECIFIED	UC040750
40	CALL SEQOUT	UC040760
	CALL PTAPE	UC040770
	RETURN	UC040780
	END	UC040790
C	////////////////////////////////////	
C	////////////////////////////////////	
*	LIST	UC050010
*	LABEL	UC050020
	SUBROUTINE AXIMOV(IG,XC,YC,IQFLG)	UC050030
C	A SUBROUTINE TO PREVENT CIRCULAR INTERPOLATION MOVEMENT ACROSS	UC050040
C	THE AXIS OF A CIRCLE	UC050050
C	*****STANDARD COMMON, DIMENSION AND EQUIVALENCE SET *****	
C	GO TO (1,200),IG	UC050530
C	TEST IF INITIAL POINT IS ON OR NEAR CIRCLE AXIS	UC050540
C	IF SO, MOVE IN LINEAR INTERPOLATION AWAY FROM CIRCLE AXIS	UC050550
1	DEL#OPTAB(34)/2.0	UC050560
	DEL I#2.*DEL	UC050570
	DELQD#SQRTF(ADUM(30)**2-(OPTAB(34)/2.0)**2)	UC050580
	DELX#PREVX-XC	UC050590
	DELY#PREVY-YC	UC050600
	D#IDUM(34)	UC050610
	XP#TAPSTO(JJ)	UC050620
	YP#TAPSTO(JJ+1)	UC050630
	ZP#TAPSTO(JJ+2)	UC050640
	DELQDI#SQRTF(ADUM(30)**2-OPTAB(34)**2)	UC050650
	IF(ABSF(DELY)-OPTAB(34)/2.0)5,5,50	UC050660
5	IF(DELY)20,10,10	UC050670
10	IF(DELY#D)15,16,90	UC050680
15	TAPSTO(JJ)#XC+DEL	UC050690
	TAPSTO(JJ+1)#YC+DELQD	UC050700
	GO TO 80	UC050710
16	TAPSTO(JJ)#XC+D*DELI	UC050720
	TAPSTO(JJ+1)#YC+DELQDI	UC050730
	GO TO 80	UC050740
20	IF(DELY#D)90,26,25	UC050750
25	TAPSTO(JJ)#XC-D*DEL	UC050760
	TAPSTO(JJ+1)#YC-DELQD	UC050770
	GO TO 80	UC050780
26	TAPSTO(JJ)#XC-D*DELI	UC050790
	TAPSTO(JJ+1)#YC-DELQDI	UC050800
	GOTO 80	UC050810
50	IF(ABSF(DELY)-OPTAB(34)/2.0)55,55,90	UC050820
55	IF(DELY)60,70,70	UC050830
60	IF(DELY#D)65,66,90	UC050840
65	TAPSTO(JJ)#XC-DELQD	UC050850
	TAPSTO(JJ+1)#YC+D*DEL	UC050860
	GO TO 80	UC050870
66	TAPSTO(JJ)#XC-DELQDI	UC050880
	TAPSTO(JJ+1)#YC+D*DELI	UC050890
		UC050900

	GO TO 80	UC050910
	70 IF(DELY*D)90,76,75	UC050920
	75 TAPSTO(JJ)#XC+DELQD	UC050930
	TAPSTO(JJ+1)#YC-D*DEL	UC050940
	GO TO 80	UC050950
	76 TAPSTO(JJ)#XC+DELQDI	UC050960
	TAPSTO(JJ+1)#YC-D*DELI	UC050970
	80 CALL LINEAR	UC050980
	CALL LASTPT	UC050990
	90 IQFLG#0	UC051000
	TAPSTO(JJ)#XP	UC051010
	TAPSTO(JJ+1)#YP	UC051020
	CALL PCOORD(JJ)	UC051030
C	TEST IF FINAL POINT IS ON OR NEAR CIRCLE AXIS	UC051040
C	IF SO,SET IQFLG TO INDICATE FINAL MOVE IS TO BE MADE IN	UC051050
C	LINEAR INTERPOLATION	UC051060
	DELX#XVALUE-XC	UC051070
	DELY#YVALUE-YC	UC051080
	100 IF(ABSF(DELY)-OPTAB(34)/2.0)105,105,150	UC051090
	105 IF(DELY)110,110,120	UC051100
	110 IF(DELY*D)115,116,150	UC051110
	115 TAPSTO(JJ)#XC+D*DEL	UC051120
	TAPSTO(JJ+1)#YC-DELQD	UC051130
	GO TO 180	UC051140
	116 TAPSTO(JJ)#XC+D*DELI	UC051150
	TAPSTO(JJ+1)#YC-DELQDI	UC051160
	GO TO 180	UC051170
	120 IF(DELY*D)150,126,125	UC051180
	125 TAPSTO(JJ)#XC-D*DEL	UC051190
	TAPSTO(JJ+1)#YC+DELQD	UC051200
	GO TO 180	UC051210
	126 TAPSTO(JJ)#XC-D*DELI	UC051220
	TAPSTO(JJ+1)#YC+DELQDI	UC051230
	GO TO 180	UC051240
	150 IF(ABSF(DELY)-OPTAB(34)/2.0)155,155,190	UC051250
	155 IF(DELY)160,160,170	UC051260
	160 IF(DELY*D)190,166,165	UC051270
	165 TAPSTO(JJ)#XC-DELQD	UC051280
	TAPSTO(JJ+1)#YC-D*DEL	UC051290
	GO TO 180	UC051300
	166 TAPSTO(JJ)#XC-DELQDI	UC051310
	TAPSTO(JJ+1)#YC-D*DELI	UC051320
	GO TO 180	UC051330
	170 IF(DELY*D)175,176,190	UC051340
	175 TAPSTO(JJ)#XC+DELQD	UC051350
	TAPSTO(JJ+1)#YC+D*DEL	UC051360
	GO TO 180	UC051370
	176 TAPSTO(JJ)#XC+DELQDI	UC051380
	TAPSTO(JJ+1)#YC+D*DELI	UC051390
C	SET IQFLG	UC051400
	180 IQFLG#1	UC051410
	CALL PCOORD(JJ)	UC051420
	190 RETURN	UC051430
C	MAKE FINAL MOVE ACROSS CIRCLE AXIS IN LINEAR INTERPOLATION	UC051440
	200 TAPSTO(JJ)#XP	UC051450
	TAPSTO(JJ+1)#YP	UC051460
	TAPSTO(JJ+2)#ZP	UC051470
	CALL LINEAR	UC051480
	GO TO 190	UC051490
	END	UC051500

```
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C ////////////////////////////////////////////////////////////////////
C * LIST UC060010
C * LABEL UC060020
C SUBROUTINE BLDGMT(I,J,FOR,M,ICNT,ARRAY) UC060030
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C BLDFMT - A SUBROUTINE TO EXAMINE DESIRED REGISTERS AND BUILD UC060510
C A FORMAT STATEMENT FOR THE OUTPUT LISTING OF THESE UC060520
C SPECIFIED REGISTERS UC060530
C DIMENSION ARRAY(26),FOR(28),B(26),IB(26) UC060540
C EQUIVALENCE(B,IB) UC060550
C ITC#0 UC060560
C ISTART#ICNT UC060570
C BRING IN THE UPPER AND LOWER BOUNDS OF LOOP TO PROCESS UC060580
C IN THE BUFP ARRAY UC060590
C DO II NOW#I,J UC060600
C M#M+I UC060610
C IS THE REGISTER EQUAL TO BITS UC060620
C IF(BUFP(NOW)-BITS) 1,6,I UC060630
C NO, ARE WE PROCESSING N,G,D,OR M UC060640
C   1 IF(NOW-2)4,4,2 UC060650
C   2 IF(NOW-2)3,4,3 UC060660
C   3 IF(NOW-26)5,4,5 UC060670
C IF SO, GIVE I CONVERSION FORMAT UC060680
C   4 FOR(M)#036731036073 UC060690
C     ITC#ITC+1 UC060700
C     IB(ITC)#BUFP(NOW)+.001 UC060710
C     ICNT#ICNT+1 UC060720
C     GOTO II UC060730
C IF NOT, GIVE F CONVERSION FORMAT UC060740
C   5 FOR(M)#260100330473 UC060750
C     ITC#ITC+1 UC060760
C     B(ITC)#BUFP(NOW) UC060770
C     ICNT#ICNT+1 UC060780
C     GOTOI UC060790
C YES, ARE WE PROCESSING N,G,D,ORM UC060800
C   6 IF(NOW-2)9,9,7 UC060810
C   7 IF(NOW-2)8,9,8 UC060820
C   8 IF(NOW-26)10,9,10 UC060830
C IF SO, SKIP 6 PLACES UC060840
C   9 FOR(M)#060006676073 UC060850
C     GOTOI UC060860
C IF NOT, SKIP 10 PLACES UC060870
C 10 FOR(M)#600100676073 UC060880
C    CONTINUE UC060890
C STORE THOSE NOT BITS INTO THE OUTPUT ARRAY UC060900
C IFINSH#ISTART+ITC UC060910
C IF(ITC) 14,14,12 UC060920
C 12 L#0 UC060930
C     ISTART#ISTART+I UC060940
C     DO13 LM#ISTART,IFINSH UC060950
C     L#L+1 UC060960
C 13 ARRAY(LM)#B(L) UC060970
C 14 RETURN UC060980
C END UC060990
C UC061000
C //
```

* LIST	UC070010
* LABEL	UC070020
CCHKM	UC070030
SUBROUTINE CHKM	UC070040
C	
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C	UC070520
C CHECKM -A SUBROUTINE TO CALCULATE THE MCODE FOR PLOT	UC070530
C A G CODE OF 52 INDICATES DRAW WITH 0 DEGREE ANGLE WITH RESPECT TO	UC070540
C THE X AXIS. G CODE OF 50 INDICATES A 90 DEGREE ANGLE	UC070550
C IS THE MACHINE IN THE DRAW MODE	UC070560
C IF(BUFP(2)-52.0) 1,2,1	UC070570
C 1 IF(BUFP(2)-53.0) 12,2,12	UC070580
C HAS A HEIGHT BEEN SPECIFIED	UC070590
C 2 IF(OPTAB(17))3,4,3	UC070600
C YES, CALCULATE AN APPROXIMATION OF THE SCALE MULTIPLIER	UC070610
C 3 MDS#XMODF(XINTF(OPTAB(17)/.112),16)	UC070620
C IF(MDS)4,4,13	UC070630
C 13 IF(MDS-16) 14,8,8	UC070640
C 14 GO TO(4,5,6,6,6,6,7,7,7,7,8,8,8,8,8),MDS	UC070650
C NO, SET SCALE MULTIPLIER TO THE SMALLEST	UC070660
C BUFP(26),I.E.,M CODE IS SET AS RESULT OF APPROXIMATION	UC070670
C 4 BUFP(26)#50.0	UC070680
C GOTO 9	UC070690
C 5 BUFP(26)#51.0	UC070700
C GO TO 9	UC070710
C 6 BUFP(26)#52.0	UC070720
C GO TO 9	UC070730
C 7 BUFP(26)#53.0	UC070740
C GOTO 9	UC070750
C 8 BUFP(26)#54.0	UC070760
C	UC070770
C DELETE THE M CODE IF THE PREVIOUS CODE WAS THE SAME	UC070780
C	UC070790
C TEMPM CONTAINS PREVIOUS M CODE	UC070800
C 9 IF(BUFP(26)-TEMPM) 11,10,11	UC070810
C 10 BUFP(26)#BITS	UC070820
C GO TO 12	UC070830
C 11 TEMPM#BUFP(26)	UC070840
C 12 RETURN	UC070850
C END	UC070860
C	
C //////////////////////////////////////	
C	
* LIST	UC080010
* LABEL	UC080020
CCIRR	UC080030
SUBROUTINECIRCIR(N,L)	UC080040
C	
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C	UC080520
C CIRCIR -A SUBROUTINE TO OUTPUT A GIVEN BLOCK	UC080530
C OF CIRCULAR INTERPOLATION	UC080540
C IS THIS THE FIRST MOVE AFTER A DRAFT/ON	UC080550
C IF(DAFST)1,20,1	UC080560
C YES , MOVE TO THE START POSITION WITH THE PEN UP	UC080570
C 1 BUFP(3)#PREVX	UC080580
C BUFP(4)#PREVY	UC080590
C BUFP(5)#PREVZ	UC080600
C BUFP(21)#2.0	UC080610

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      DMODE#2.0
      CALL SEQOUT
      IF(GMODE-1.0)5,10,5
5     GMODE#1.0
      BUFP(2)#1.0
10    CALL PTAPE
      DAFST#0.0
C     NO, PROCESS NORMALLY
20    CALLSEQOUT
C     TEST TO SEE IF IN ARC SLOPE MODE, IF NOT CALL DETDIR, OTHERWISE
C     BYPASS CALL TO DETDIR.
      IF(IDUM(10))22,21,22
C     CALL DETDIR TO DETERMINE THE DIRECTION,I.E.,CLW OR CCLW
21    CALL DETDIR(L,N)
22    IF(ADUM(20)-GMODE)25,30,25
25    GMODE#ADUM(20)
C     ADUM(20) CONTAINS PROPER G CODE
C     ADUM(21) AND ADUM(22) CONTAIN THE I AND J VALUES
30    BUFP(14)#ADUM(21)
      BUFP(15)#ADUM(22)
C     SET THE PROPER D CODE
      IF(DMODE-OPTAB(12))35,40,35
35    DMODE#OPTAB(12)
40    JJ#N
      CALLPCOORD(JJ)
      BUFP(2)#GMODE
      BUFP(3)#XVALUE
      BUFP(4)#YVALUE
      BUFP(5)#ZVALUE
      BUFP(21)#DMODE
      CALL PTAPE
      RETURN
      END
C
C ///////////////////////////////////////////////////////////////////
C
*     LIST
*     LABEL
CCIRC SUBROUTINE CIRCUL
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C     CIRCUL - A SUBROUTINE TO CONTROL MOVEMENTS TO BE MADE IN
C             CIRCULAR INTERPOLATION
C     IS THIS A CUT SEQUENCE
      IF(INTAP(2)-5000) 1,2,1
1     RETURN
2     N#6
      M#0
C     IS THIS A CONTINUATION RECORD
      IF(INTAP(3)-6) 4,3,4
3     IF(NEUADD-3)500,500,501
C     NO MULTAX GIVEN
500  N#3
      GOTO390
C     MULTAX SPECIFIED
501  N#1
      M#1
C     YES, BRING IN THE LAST POINT FROM THE PREVIOUS RECORD

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UC080620
UC080630
UC080640
UC080650
UC080660
UC080670
UC080680
UC080690
UC080700
UC080710
UC080720
UC080730
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UC080750
UC080760
UC080770
UC080780
UC080790
UC080800
UC080810
UC080820
UC080830
UC080840
UC080850
UC080860
UC080870
UC080880
UC080890
UC080900
UC080910
UC080920
UC080930
UC080940

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UC090010
UC090020
UC090030
UC090040

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UC090520
UC090530
UC090540
UC090550
UC090560
UC090570
UC090580
UC090590
UC090600
UC090610
UC090620
UC090630
UC090640
UC090650
UC090660
UC090670
UC090680
UC090690

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390	TAPSTO(N)#EX	UC090700
	TAPSTO(N+1)#EY	UC090710
	TAPSTO(N+2)#EZ	UC090720
4	L#N	UC090730
	JJ#N	UC090740
C	NO, DETERMONE PLANE TO BE USED	UC090750
	CALL PCOORD(JJ)	UC090760
	XL#XVALUE	UC090770
	YL#YVALUE	UC090780
	ZL#ZVALUE	UC090790
C	CALCULATE I AND J OF FIRST POINT WITH RESPECT TO THE CENTER	UC090800
C	OF THE CIRCLE.	UC090810
	AI#XVALUE-ADUM(17)	UC090820
	AJ#YVALUE-ADUM(18)	UC090830
5	N#N+NEUADD-M	UC090840
	M#0	UC090850
	JJ#N	UC090860
	CALL PCOORD(JJ)	UC090870
C	TEST I AND J OF EACH SUCCEEDING POINT TO DETERMINE IF AN	UC090880
C	AXIS IS TO BE CROSSED	UC090890
	C#AI*(XVALUE-ADUM(17))	UC090900
	IF(C-.00005) 20,20,8	UC090910
8	C#AJ*(YVALUE-ADUM(18))	UC090920
	IF(C-.00005) 20,20,10	UC090930
C	NO, KEEP CHECKING	UC090940
10	NA#NWPR-(NEUADD-1)	UC090950
C	HAVE ALL THE POINTS BEEN PROCESSED	UC090960
	IF(N-NA) 5,15,15	UC090970
12	JJ#NWPR-(NEUADD-1)	UC090980
C	SAVE THE LAST POINTS IN CASE THE NEXT RECORD IS A	UC090990
C	CONTINUATION RECORD	UC091000
	EX#TAPSTO(JJ)	UC091010
	EY#TAPSTO(JJ+1)	UC091020
	EZ#TAPSTO(JJ+2)	UC091030
	RETURN	UC091040
15	MN#N-L	UC091050
	IF(MN-NEUADD)506,506,40	UC091060
506	IF(NA-6)507,507,25	UC091070
507	N#6	UC091080
	GOTO509	UC091090
20	MN#N-L	UC091100
C	YES, WAS THERE MORE THAN ONE SET OF POINTS ON THE RECORD	UC091110
	IF(MN-2*NEUADD)506,506,39	UC091120
25	N#L+NEUADD	UC091130
509	JJ#N	UC091140
C	CROSS THE AXIS IN LINEAR INTERPOLATION	UC091150
C	NO, OUTPUT BLOCK OF LINEAR INTERPOLATION	UC091160
	CALL LINEAR	UC091170
30	NA#NWPR-(NEUADD-1)	UC091180
	IF(N-NA) 4,12,12	UC091190
39	N#N-NEUADD	UC091200
C	IF AXIS IS TO BE CROSSED THEN CALL ROUTINES TO PRODUCE	UC091210
C	A CIRCULAR BLOCK OF INFORMATION FROM THE FIRST	UC091220
C	POINT TO ONE JUST PRIOR TO THE AXIS	UC091230
C	GO BACK AND CONTINUE PROCESSING WITH NEW START POINT	UC091240
C	IF MORE THEN ONE CUTTER POINT AND ALL TESTED MOVE FROM FIRST TO	UC091250
C	LAST IN THE CIRCULAR MODE	UC091260
40	CALL CIREQT(N,XL,YL,AI,AJ)	UC091270
45	CALL CIRCIR(N,L)	UC091280
	GOTO 30	UC091290

```

C          END
C
C
C
C          LIST
C          LABEL
CCEQT      SUBROUTINECIREQT(N,XL,YL,AI,AJ)
C
C          *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C          MOVE IN CIRCULAR INTERPOLATION AND ASSURE IT
C          REMAINS IN ONE QUADRANT
C          DETERMINE BEGINNING AND END POINTS
C          BXL#XL
C          JJ#N
C          BYL#YL
C          CALL PCOORD(JJ)
C          DX#XVALUE-BXL
C          DY#YVALUE-BYL
C          CALCULATE THE CORRESPONDING I AND J FOR THIS MOVE
C          A#0.5*(DX*(BXL+XVALUE)+DY*(BYL+YVALUE))
C          AI2#BXL-(DY*DY*ADUM(17)-DY*DX*ADUM(18)+
C          IA*DX)/(DX*DX+DY*DY)
C          AJ2#BYL-(DX*DX*ADUM(18)-DY*DX*ADUM(17)+
C          IA*DY)/(DX*DX+DY*DY)
C          IS THIS MOVE WITHIN ONE QUADRANT
C          IF(AI2#AI)5,5,10
C          NO, DID IT CROSS THE Y AXIS
C          YES, SETI#0 AND CALCULATE A NEW J SUCH THAT MOVE IS IN
C          A QUADRANT.
C          5 ADUM(21)#0.0
C          ADUM(22)#BYL+(BXL*DX-A)/DY
C          GOTO20
C          NO, DID IT CROSS THE X AXIS
C          10 IF(AJ2#AJ)11,11,15
C          YES, SETJ#0 AND CALCULATE A NEW I SUCH THAT MOVE IS IN
C          ONE QUADRANT.
C          11 ADUM(21)#BXL+(BYL*DY-A)/DX
C          ADUM(22)#0.0
C          GOTO20
C          YES, KEEP THESE VALUES OF I AND J
C          15 ADUM(21)#AI2
C          ADUM(22)#AJ2
C          20 RETURN
C          END
C
C
C
C          FAP
C          LIST
C          CONBCD ROUTINE 2 WORD FLEXIBLE FORMAT BCD CONVERSION.
C          ENTRY CONBCD
C          BCI I,CONBCD
C          USE CALL CONBCD (A,B,I,J) WHERE -
C          A - IS THE FLOATING POINT NUMBER TO BE CONVERTED.
C          B - BCD ARRAY TO STORE CONVERTED RESULTS.
C          I - IS THE FIELD LENGTH OF BCD NUMBER.
C          IF I IS NEGATIVE, THEN INCLUSION SIGN OF A IS

```

UC091300

UC100010

UC100020

UC100030

UC100040

UC100520

UC100530

UC100540

UC100550

UC100560

UC100570

UC100580

UC100590

UC100600

UC100610

UC100620

UC100630

UC100640

UC100650

UC100660

UC100670

UC100680

UC100690

UC100700

UC100710

UC100720

UC100730

UC100740

UC100750

UC100760

UC100770

UC100780

UC100790

UC100800

UC100810

UC100820

UC100830

UC100840

UC100850

UC100860

UC100870

UC110010

UC110020

UC110030

UC110040

UC110050

UC110060

UC110070

UC110080

UC110090

UC110100

*	DESIRED. THE PROGRAM WILL INCREASE THE FIELD	UC110110
*	LENGTH BY ONE CHARACTER IN THIS CASE.	UC110120
*	J - DEFINES THE NUMBER OF FRACTIONAL DIGITS	UC110130
*	THAT A SHOULD HAVE. IF J IS NEGATIVE, THEN	UC110140
*	A DECIMAL POINT IS TO BE INSERTED.	UC110150
*	IN THIS CASE THE FIELD LENGTH (I) WILL BE	UC110160
*	INCREASED BY ONE.	UC110170
*	IF YOU WISH TO BLANK OUT TRAILING ZEROES, ADD 100	UC110180
*	TO THE MAGNITUDE OF J.	UC110190
*	NOTE - THE ADJUSTED I VALUE CANNOT EXCEED 12 AND	UC110200
*	I CANNOT BE ZERO.	UC110210
*	J WILL NOT BE ALLOWED TO EXCEED 8 IN VALUE.	UC110220
CONBCD	SXA EX,4	UC110230
	SXA EX+1,2	UC110240
	SXA EX+2,1	UC110250
	AXT 0,1	UC110260
	AXT 8,2	UC110270
	STZ PFLAG+8,2	UC110280
	TIX *-1,2,1	UC110290
	CAL BIBA	UC110300
	STP BIBB	UC110310
	CLA BIBC	UC110320
	STO BIBCD	UC110330
	CLA 2,4 B	UC110340
	STA CON5+2	UC110350
	SUB #1	UC110360
	STA CON7	UC110370
	CLA* 3,4 I	UC110380
	SLW I	UC110390
	TZE ERR1 I#0	UC110400
	LDQ* 1,4	UC110410
	TPL **7	UC110420
	ACL ONE	UC110430
	SLW I	UC110440
	CLA #16	UC110450
	TQP **2	UC110460
	ADD #16	UC110470
	STO SFLAG SET SIGN	UC110480
	XCL	UC110490
	STO A	UC110500
	CLA* 4,4	UC110510
	SLW J	UC110520
	CLA J	UC110530
	SUB #100B17	UC110540
	TMI **6	UC110550
	SLW J	UC110560
	CLA BIBA	UC110570
	STP BIBB	UC110580
	CLA NOP	UC110590
	STO BIBCD	UC110600
	CLA* 4,4	UC110610
	TPL **5	UC110620
	CLA I DEC. POINT DESIRED.	UC110630
	ADD ONE	UC110640
	STO I	UC110650
	SLW PFLAG SET FLAG	UC110660
	CLA J	UC110670
	SUB 8V	UC110680
	TMI **3	UC110690
	CLA 8V J IS TOO LARGE SET	UC110700

STO	J	IT TO 8.	UC110710
CLA	J		UC110720
STO	NODEC		UC110730
CLA	12V		UC110740
SUB	I		UC110750
TMI	ERR1	ADJUSTED I IS LARGER 12.	UC110760
CLA	A		UC110770
LXD	J,2	LXA FOR 7090	UC110780
TZE	CON1-1		UC110790
FAD	TAB5,2	ROUND	UC110800
UFA	#HCH00000		UC110810
FAD	#HCH00000		UC110820
SLW	Q1	INTEGRAL A	UC110830
CLA	A		UC110840
UFA	#HCH00000		UC110850
FAD	#HCH00000		UC110860
STO	Q3		UC110870
CLA	A	CONVERT FRACTION	UC110880
FSB	Q3		UC110890
SSP			UC110900
XCA			UC110910
FMP	TAB2,2		UC110920
FAD	#.5		UC110930
STO	Q2	$Q2 \# (A - Q1) * 10 ** J + .5$	UC110940
UFA	#HCH00000		UC110950
SUB	#HCH00000		UC110960
TSX	BIBCD,4		UC110970
TXH	**2,2,6		UC110980
ANA	TAB3,2		UC110990
SLW	BB2		UC111000
TXL	CON1,2,5		UC111010
XCA			UC111020
TSX	BIBCD,4		UC111030
TXI	**1,2,-6		UC111040
ANA	TAB3,2		UC111050
SLW	BB1		UC111060
TXI	**1,1,1		UC111070
CON1	CLA		UC111080
	STO		UC111090
	NZT	DEC. POINT WANTED	UC111100
	TRA	NO	UC111110
	TXL		UC111120
	TXI		UC111130
	CAL		UC111140
	ORS		UC111150
	CLA		UC111160
	ADD		UC111170
	STO		UC111180
CON3	CLA		UC111190
	SUB		UC111200
	ZET		UC111210
	SUB		UC111220
	PDX	PAX FOR-90	UC111230
	TXL		UC111240
	TXI		UC111250
	CLA	CONVERT INTEGRAL PART	UC111260
	UFA		UC111270
	SUB		UC111280
	TSX		UC111290
	ANA		UC111300

	XCL			UC111310
	PXD			UC111320
	LXD	CC,4	LXA FOR 7090	UC111330
	TXL	**3,4,0		UC111340
	LGL	6	MERGE INTEGRAL	UC111350
	TXI	*-2,4,-1	PART	UC111360
	ORS	BB1	WITH	UC111370
	XCL		FRACTION	UC111380
	ORS	BB2		UC111390
	NZT	SFLAG	SIGN WANTED	UC111400
	TRA	CON4	NO	UC111410
	LXD	I,4	LXA FOR 7090F	UC111420
	TXI	**1,4,-1		UC111430
	PXD			UC111440
	LDQ	SFLAG		UC111450
	LGL	6		UC111460
	TIX	*-1,4,1		UC111470
	ORS	BB1		UC111480
	XCL			UC111490
	ORS	BB2		UC111500
CON4	AXT	I,1	FILL IN WITH BLANKS	UC111510
	CLA	I2V		UC111520
	SUB	I		UC111530
	TZE	CON5		UC111540
	PDX	0,2	PAX FOR 7090F	UC111550
	SUB	6V		UC111560
	TZE	CON6		UC111570
	TXL	**3,2,6		UC111580
	TXI	**1,2,-6		UC111590
	AXT	0,1		UC111600
	CAL	TAD4,2		UC111610
	ORS	BB2,1		UC111620
CON5	CLA	BB2		UC111630
	TXH	**3,1,0		UC111640
	STO	**		UC111650
	TXL	EX		UC111660
CON7	STO	**		UC111670
	CLA	BB1		UC111680
	TRA	CON7-2		UC111690
EX	AXT	0,4	EXIT	UC111700
	AXT	0,2		UC111710
	AXT	0,1		UC111720
	TRA	5,4		UC111730
CON6	AXT	0,1		UC111740
	TRA	CON5		UC111750
ERR1	TSX	\$ERREX,4		UC111760
	PZE	#24B17		UC111770
	TRA	EX		UC111780
BIBCC	TZE	I,4		UC111790
	SXA	BIB,4		UC111800
	XCA			UC111810
	AXT	0,4		UC111820
	STZ	Q3		UC111830
	PXD			UC111840
	DVP	#10		UC111850
BIBB	TXL	**7		UC111860
	TNZ	Q3+2		UC111870
	CLA	NODEC		UC111880
	TZE	Q3+2		UC111890
	SUB	ONE		UC111900

	STO	NODEC	UC111910
	CAL	#48	UC111920
	ALS	0,4	UC111930
	ORS	Q3	UC111940
	TXI	*+1,4,-6	UC111950
	TXH	BIBB-2,4,-36	UC111960
	CAL	Q3	UC111970
BIB	AXT	0,4	UC111980
	TRA	1,4	UC111990
Q3	BSS	2	UC112000
	STO	*-1	UC112010
	CAL	BIBA	UC112020
	STP	BIBB	UC112030
	CLA	Q3+1	UC112040
BIBA	TXL	BIBB	UC112050
	DEC	1000000000.,10000000.,10000000.	UC112060
	DEC	100000.,10000.,1000.,100.,10.	UC112070
TAB2	BSS	0	UC112080
	BCI	2,.000000.0000	UC112090
	OCT	33000000,330000,3300	UC112100
TAB1	OCT	33	UC112110
	OCT	77777777777,777777777	UC112120
	OCT	77777777,777777,7777,77	UC112130
TAB3	DEC	0	UC112140
	BCI	1, C	UC112150
	BCI	1, 00	UC112160
	BCI	1, 000	UC112170
	BCI	1, 0000	UC112180
	BCI	1, 00000	UC112190
TAB4	DEC	0	UC112200
PFLAG			UC112210
SFLAG			UC112220
BB1			UC112230
BB2			UC112240
Q1			UC112250
Q2			UC112260
A			UC112270
CC			UC112280
ONE	DEC	1817	UC112290
12V	DEC	12817	UC112300
8V	DEC	8817	UC112310
6V	DEC	6817	UC112320
J			UC112330
I			UC112340
	DEC	.5E-8,.5E-7,.5E-6	UC112350
	DEC	.5E-5,.5E-4,.5E-3,.5E-2	UC112360
	DEC	.5E-1	UC112370
TAB5	DEC	.5	UC112380
NOP	NOP		UC112390
BIBC	TZE	1,4	UC112400
NODEC	PZE		UC112410
	END		UC112420
C			
C	////////////////////////////////////		
C			
*	LIST		UC020010
*	LABEL		UC020020
CCOOL			UC020030
	SUBROUTINE COOLNT		UC020040
C			UC020050

```

C COOLNT- THE FUNCTION OF THIS ROUTINE IS TO SET UP THE          UC020060
C   AUXILIARY FUNCTION AS SPECIFIED BY THE COOLNT STATEMENT. THE UC020070
C   PROPER M-CODE SHOULD BE STORED IN BUFP(26) AND THE ROUTINES UC020080
C   SEQOUT AND PTAPE CALLED TO OUTPUT THE BLOCK.                UC020090
C                                                                UC020100
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C   RETURN                                                         UC020580
C   END                                                            UC020590
C                                                                UC020600
C
C ///////////////////////////////////////////////////////////////////
C
C *      FAP                                                         UC120010
C   ENTRY DCODE                                                         UC120020
DCODE SXA EX,1                                                         UC120030
C   CLA* 1,4                                                         UC120040
C   PAC 0,1                                                         UC120050
C   CLA DCODED,1                                                         UC120060
C   STO* 2,4                                                         UC120070
EX AXT 0,1                                                         UC120080
C   TRA 3,4                                                         UC120090
DCODED DEC 40.,41.,42.,43.,44. 0-4 UC120100
C   DEC 45.,46.,47.,48.,49. 5-9 UC120110
C   DEC 0.,54.,20.,0.,0. B#% UC120120
C   DEC 0.,30.,31.,32.,33. B+ABC UC120130
C   DEC 34.,35.,36.,37.,38. DEFGH UC120140
C   DEC 39.,0.,50.,53.0,0. 18.) UC120150
C   DEC 0.,0.,20.,21.0,22. BB-JK UC120160
C   DEC 23.,24.,25.,26.,27. LMNOP UC120170
C   DEC 28.,29.,0.,0.,58.0 QRBS* UC120180
C   DEC 0.,0.,0.,10.0,11. BBBB/ UC120190
C   DEC 12.,13.,14.,15.,16. STUVW UC120200
C   DEC 17.,18.,19.,0.0,51. XYZB, UC120210
C   DEC 52.,0.,0.,0. ( UC120220
C   END UC120230
C
C ///////////////////////////////////////////////////////////////////
C
C *      LIST                                                         UC130010
C *      LABEL                                                         UC130020
CDLAY SUBROUTINE DELAY UC130030
C                                                                UC130040
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C   DELAY - A DELAY OF T SECONDS, WHERE T IS DEFINED BY THE APT UC130520
C   STATEMENT DELAY/T, IS PRODUCED. UC130530
C   TEST FOR A TIME SPECIFICATION UC130540
C   IF(NWPR-4)10,20,10 UC130550
C   NO, CALL ERROR ROUTINE UC130560
C   10 CALL ERREX(3) UC130570
C   15 RETURN UC130580
C   YES, SET THE G CODE TO THE DWELL MODE UC130590
C   AND X REGISTER TO THE GIVEN DELAY TIME UC130600
C   20 BUFP(2)# 4.0 UC130610
C   BUFP(3)#TAPSTO(4) UC130620
C   CALL SEQOUT UC130630
C   CALL PTAPE UC130640
C   GOTO15 UC130650
C   UC130660

```

```

      END
UC130670
C
C ///////////////////////////////////////////////////////////////////
C
* LIST UC140010
* LABEL UC140020
CDETR UC140030
      SUBROUTINE DETDIR(II,N) UC140040
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C UC140520
C DETDIR -ASUBROUTINE WHICH DETERMINES THE DIRECTION OF THE UC140530
C MOVEMENT IN CIRCULAR INTERPOLATION. UC140540
C DIMENSION DIR(2) UC140550
C M#0 UC140560
C DIR(2)#0.0 UC140570
C JJ#II UC140580
C DETERMINE WHICH PLANE HAS BEEN REQUESTED UC140590
C XY,YZ,XZ,XYZ,OR ALL UC140600
C IF(OPTAB(1)-2.0)1,2,3 UC140610
C UC140620
C YZ PLANE UC140630
C UC140640
C UC140650
1 IND1#JJ+1 UC140660
27 IND1#IND1 UC140670
4 IF(II-1)28,28,29 UC140680
28 M#2 UC140690
C KI#1 UC140700
C GOT030 UC140710
29 KI#0 UC140720
30 DO5 I#1,2 UC140730
      IND1#IND1+(I-1)*(NEUADD-M) UC140740
      M#(M-1)*KI UC140750
      IND2#IND1+NEUADD-M UC140760
      UI#TAPSTO(IND1)-ADUM(17) UC140770
      J#IND1+INDAJ UC140780
      VI#TAPSTO(J)-ADUM(18) UC140790
      U2#TAPSTO(IND2)-ADUM(17) UC140800
      K#IND2+INDAJ UC140810
      V2#TAPSTO(K)-ADUM(18) UC140820
C UC140830
C DOT TWO SUCCESSIVE VECTORS TO DETERMINE SIGN UC140840
C SIGN OF THE DOT PRODUCT DETERMINES DIRECTION UC140850
C UC140860
C DIR(1)#UI*V2-U2*VI UC140870
C UC140880
C TEST TO SEE THERE IS A THIRD POINT UC140890
C UC140900
      IF((JJ+2*NEUADD)-N)5,5,6 UC140910
5 CONTINUE UC140920
      IF(DIR(1)*DIR(2))7,6,6 UC140930
7 CALL ERREX(4) UC140940
      RETURN UC140950
6 IF(DIR(1))8,10,9 UC140960
C UC140970
C CLW UC140980
C UC140990
8 ADUM(20)#2.0 UC141000
11 RETURN UC141010
C

```

C	CCLW	UC141020
C		UC141030
9	ADUM(20)#3.0	UC141040
	GOTO11	UC141050
10	IF(DIR(2))8,7,9	UC141060
C		UC141070
C	XZPLANE	UC141080
C		UC141090
2	INDI#JJ	UC141100
	INDAJ#2	UC141110
	GOTO4	UC141120
C		UC141130
C	XYGIVENWHETHERXY,XYZ,ORALL	UC141140
C	SETIDUM(2)#1,FORXY,2FORALL,3FORXYZ	UC141150
C		UC141160
3	IF(OPTAB(1)-4.)13,14,15	UC141170
13	IDUM(2)#1.0	UC141180
	GOTO25	UC141190
14	IDUM(2)#2.0	UC141200
	GOTO25	UC141210
15	IDUM(2)#3.0	UC141220
25	INDI#JJ	UC141230
	GOTO27	UC141240
	END	UC141250
C		
C	////////////////////////////////////	
C		
*	LIST	UC030010
*	LABEL	UC030020
CDSPL		UC030030
	SUBROUTINE DISPLY	UC030040
C		UC030050
C	DISPLY- THE FUNCTION OF THIS ROUTINE IS TO PRODUCE THE	UC030060
C	NECESSARY OUTPUT BLOCKS TO ENERGIZE A PANEL INDICATOR	UC030070
C	ON THE CURRENT MACHINE.	UC030080
C		UC030090
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC030570
	RETURN	UC030580
	END	UC030590
C		
C	////////////////////////////////////	
C		
*	LIST	UC150010
*	LABEL	UC150020
CDRFT		UC150030
	SUBROUTINE DRAFT	UC150040
C		
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC150520
C		UC150530
	IF(OPTAB(27)) 1,2,1	UC150540
2	RETURN	UC150550
1	NW#3	UC150560
100	IF(NWPR-NW) 2,2,3	UC150570
3	NW#NW+1	UC150580
	CALL APTA(NW,APTFLG)	UC150590
	IF(APTFLG-1.0) 5,4,4	UC150600
4	CALL ERREX(5)	UC150610
	GOTO 100	UC150620

```

5  IF(INTAP(NW)-71) 7,6,7
C TEST FOR APT WORD ON( IF SO SET DRAFT MODE ON
C
6  IF(DAFTON-1.0) 200,100,100
200 DAFTON#1.0
    PLOTON#0.0
    DAFST#1.0
    GOTO100
7  IF(INTAP(NW)-72) 8,9,8
C
C APT WORD OFF ENCOUNTERED,SET FLGAG DAFTON#0.0
C
9  DAFTON#0.0
    DAFST#0.0
    GOTO100
8  IF(INTAP(NW)-128) 10,11,10
11  IF(NWPR-(NW+1)) 12,13,13
12  IF(OPTAB(13)) 14,100,14
14  CALL ERREX(6)
    GOTO100
13  CALL APTA(NW+1,APTFLG)
    IF(APTFLG-1.0) 16,17,17
17  NW#NW+1
    IF(OPTAB(13)) 18,100,18
18  OPTAB(13)#TAPSTO(NW)
    GOTO100
16  DO 20 I#1,5
    IF(INTAP(NW)-(128+I)) 20,19,20
20  CONTINUE
    GOTO12
19  IF(OPTAB(13)) 21,100,21
21  OPTAB(13)#I
    GOTO100
10  IF(INTAP(NW)-134) 22,23,22
23  IF(NWPR-(NW+1)) 24,25,25
24  IF(OPTAB(14)) 26,100,26
26  CALL ERREX(7)
25  CALL APTA(NW+1,APTFLG)
    IF(APTFLG-1.0) 96,27,27
96  NW#NW+1
101 IF(OPTAB(14)) 28,100,28
28  OPTAB(14) #TAPSTO(NW)
    GO TO 100
27  IF(INTAP(NW+1)-61) 101,30,29
29  IF(INTAP(NW+1)-100) 101,31,32
32  IF(INTAP(NW+1)-137) 101,33,101
30  NW#NW+1
    IF(OPTAB(14)) 34,100,34
34  OPTAB(14)#1.0
    GOTO 100
31  NW#NW+1
    IF(OPTAB(14)) 35,100,35
35  OPTAB(14)#2.0
    GOTO 100
33  NW#NW+1
    IF(OPTAB(14)) 36,100,36
36  OPTAB(14) #3.0
    GOTO100
22  DO 40 M#1,2
    IF(INTAP(NW)-(124+M)) 40,41,40

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UC150630
UC150640
UC150650
UC150660
UC150670
UC150680
UC150690
UC150700
UC150710
UC150720
UC150730
UC150740
UC150750
UC150760
UC150770
UC150780
UC150790
UC150800
UC150810
UC150820
UC150830
UC150840
UC150850
UC150860
UC150870
UC150880
UC150890
UC150900
UC150910
UC150920
UC150930
UC150940
UC150950
UC150960
UC150970
UC150980
UC150990
UC151000
UC151010
UC151020
UC151030
UC151040
UC151050
UC151060
UC151070
UC151080
UC151090
UC151100
UC151110
UC151120
UC151130
UC151140
UC151150
UC151160
UC151170
UC151180
UC151190
UC151200
UC151210
UC151220

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41 IF(OPTAB(12)) 42,100,42 UC151230
42 OPTAB(12)#M+5 UC151240
   GOTO 100 UC151250
40 CONTINUE UC151260
   DO 45 MD#1,2 UC151270
   IF(INTAP(NW)-(187+MD)) 45,46,45 UC151280
46 IF(OPTAB(12)) 47,100,47 UC151290
47 IF(MD-1)49,48,49 UC151300
48 OPTAB(12)#4 UC151310
   GO TO 100 UC151320
49 OPTAB(12)#1 UC151330
   GO TO 100 UC151340
45 CONTINUE UC151350
   GOTO 4 UC151360
   END UC151370

C
C //////////////////////////////////////
C
* LIST UC160010
* LABEL UC160020
CERRX UC160030
   SUBROUTINE ERREX(M) UC160040

C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
   DIMENSION IERFLC(50),CRDNO(50),CRDNOI(50),ITAPNO(50) UC160520
   ADUM(40)#0.0 UC160530
   I#0 UC160540
   IF(M)2,1,1 UC160550
1 NUMERR#NUMERR+1 UC160560
   IERFLG(NUMERR)#M UC160570
   CRDNO(NUMERR)#ADUM(1) UC160580
   CRDNOI(NUMERR)#ADUM(2) UC160590
   ITAPNO(NUMERR)#INTAP(1) UC160600
   LIMERR#OPTAB(28)+.1 UC160610
   IF(LIMERR-NUMERR)4,4,66 UC160620
2 IF(OPTAB(200)-1.0)66,3,66 UC160630
3 IF(NUMERR)66,66,7 UC160640
4 IF(OPTAB(29)) 7,5,7 UC160650
5 MIV#KFLAGS(50)+4 UC160660
   DO6 MN#1,MIV UC160670
   CALL TAPEOP(PUNTAP,3,IXX) UC160680
6 CONTINUE UC160690
   CALL TAPEOP(PUNTAP,2,IXX) UC160700
   CALL TAPEOP(PUNTAP,3,IXX) UC160710
   KFLAGS(50)#0 UC160720
   ADUM(40)#1.0 UC160730
7 WRITE OUTPUT TAPE 6,8 UC160740
8 FORMAT(1H1,34HTHE FOLLOWING ERRORS HAVE OCCURRED) UC160750
9 I#I+1 UC160760
   K#IERFLG(I) UC160770
   GOTO(10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29, UC160780
   130,31,32,33,34,35),K UC160790
10 WRITE OUTPUT TAPE 6,100,CRDNO(I),CRDNOI(I),ITAPNO(I) UC160800
100 FORMAT(1H0,62HNO INCREMENT VALUE SPECIFIED AFTER INCR IN THE SEQNO UC160810
   1 STATEMENT/1X11H1.0 ASSUMED,53X11HCARD NUMBER,2A6,6X11HTAPE NUMBER UC160820
   2,15) UC160830
   GOTO61 UC160840
11 WRITE OUTPUT TAPE 6,101,CRDNO(I),CRDNOI(I),ITAPNO(I) UC160850
101 FORMAT(1H0,58HNO MODIFIER OR AN INVALID MODIFIER SPECIFIED IN THE UC160860

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1	AUXFUN/IX9HSTATEMENT,55XIHCARD NUMBER,2A6,6XIHTAPE NUMBER,15)	UC160880
	GOTO61	UC160890
12	WRITE OUTPUT TAPE 6,102,CRDNO(I),CRDNO(I),ITAPNO(I)	UC160900
102	FORMAT(1H0,40HNO TIME SPECIFIED IN THE DELAY STATEMENT,24XIHCARD	UC160910
	NUMBER,2A6,6XIHTAPE NUMBER,15)	UC160920
	GOTO61	UC160930
13	WRITE OUTPUT TAPE 6,103,CRDNO(I),CRDNO(I),ITAPNO(I)	UC160940
103	FORMAT(1H0,65HERROR IN DETERMINING DIRECTION OF CIRCULAR INTERPOLA	UC160950
	TION MOVEMENT/IX,29HCAUSED BY INVALID CLTAPE DATA,35XIHCARD NUMBE	UC160960
	2R,2A6,6XIHTAPE NUMBER,15)	UC160970
	GOTO61	UC160980
14	WRITE OUTPUT TAPE 6,104,CRDNO(I),CRDNO(I),ITAPNO(I)	UC160990
104	FORMAT(1H0,39HINVALID MODIFIER IN THE DRAFT STATEMENT,25XIHCARD	UC161000
	NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161010
	GOTO61	UC161020
15	WRITE OUTPUT TAPE 6,105,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161030
105	FORMAT(1H0,41HINVALID PEN OPTION IN THE DRAFT STATEMENT,23XIHCARD	UC161040
	NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161050
	GOTO61	UC161060
16	WRITE OUTPUT TAPE 6,106,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161070
106	FORMAT(1H0,54HINVALID PEN INTENSITY SPECIFIED IN THE DRAFT STATEME	UC161080
	INT,10XIHCARD NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161090
	GOTO61	UC161100
17	WRITE OUTPUT TAPE 6,107,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161110
107	FORMAT(1H/,23HINVALID ERROR4 MODIFIER,41XIHCARD NUMBER,2A6,6XIHT	UC161120
	TAPE NUMBER,15)	UC161130
	GOTO61	UC161140
18	WRITE OUTPUT TAPE 6,108,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161150
108	FORMAT(1H0,50HINVALID MODIFIER SPECIFIED IN THE LETTER STATEMENT,	UC161160
	114XIHCARD NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161170
	GOTO61	UC161180
19	WRITE OUTPUT TAPE 6,109,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161190
109	FORMAT(1H0,38HINVALID MODIFIER IN THE PLOT STATEMENT,26XIHCARD	UC161200
	NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161210
	GOTO61	UC161220
20	WRITE OUTPUT TAPE 6,110,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161230
110	FORMAT(1H0,56HTHE MACHIN STATEMENT HAS INCORRECT OPTION SPECIFICAT	UC161240
	IONS,8XIHCARD NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161250
	GOTO61	UC161260
21	WRITE OUTPUT TAPE 6,111,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161270
111	FORMAT(1H0,56HTHE OPTION STATEMENT HAS INCORRECT OPTION SPECIFICAT	UC161280
	IONS,14XIHCARD NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161290
	GOTO61	UC161300
22	WRITE OUTPUT TAPE 6,112,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161310
112	FORMAT(1H0,55HAN APT WORD SPECIFIED AS AN OPTION VALUE IN THE OPTI	UC161320
	ION /IX,9HSTATEMENT,55XIHCARD NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161330
	GOTO61	UC161340
23	WRITE OUTPUT TAPE 6,113,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161350
113	FORMAT(1H0,38HIMPROPER PLANE SPECIFIED IN OPTION (2),26XIHCARD	UC161360
	NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161370
	GOTO61	UC161380
24	WRITE OUTPUT TAPE 6,114,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161390
114	FORMAT(1H0,55HINVALID MODIFIER FOLLOWED SYMBOL OR INTEGR IN THE PL	UC161400
	OT /IX9HSTATEMENT,55XIHCARD NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161410
	GOTO61	UC161420
25	WRITE OUTPUT TAPE 6,115,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161430
115	FORMAT(1H0,56HPA PLOT/ON COMMAND GIVEN BEFORE INFORMATION TO BE PLO	UC161440
	TTED,8XIHCARD NUMBER,2A6,6XIHTAPE NUMBER,15)	UC161450
	GOTO61	UC161460
26	WRITE OUTPUT TAPE 6,116,CRDNO(I),CRDNO(I),ITAPNO(I)	UC161470

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116 FORMAT(1H0,49HALL BLANK WORDS SPECIFIED IN THE PPRINT STATEMENT, UC161480
119X11HCARD NUMBER,2A6,6X11HTAPE NUMBER,15) UC161490
GOTO61 UC161500
27 WRITE OUTPUT TAPE 6,117,CRDNO(I),CRDNOI(I),ITAPNO(I) UC161510
117 FORMAT(1H0,52HINVALID OR NO MODIFIER SPECIFIED IN PREFUN STATEMENT UC161520
1,12X11HCARD NUMBER,2A6,6X11HTAPE NUMBER,15) UC161530
GOTO61 UC161540
28 WRITE OUTPUT TAPE 6,118,CRDNO(I),CRDNOI(I),ITAPNO(I) UC161550
118 FORMAT(1H0,45HINVALID MODIFIER SPECIFIED IN TRANS STATEMENT,19X11HUC161560
ICARD NUMBER,2A6,6X11HTAPE NUMBER,15) UC161570
GOTO61 UC161580
29 WRITE OUTPUT TAPE 6,119,CRDNO(I),CRDNOI(I),ITAPNO(I) UC161590
119 FORMAT(1H0,50HINVALID CHARACTER OCCURRED IN THE FORMAT STATEMENT, UC161600
114X11HCARD NUMBER,2A6,6X11HTAPE NUMBER,15) UC161610
GOTO61 UC161620
30 WRITE OUTPUT TAPE 6,120,CRDNO(I),CRDNOI(I),ITAPNO(I) UC161630
120 FORMAT(1H0,34HINVALID POINTS FOR ARCSLP MOVEMENT,30X11HCARD NUMBER UC161640
1,2A6,6X11HTAPE NUMBER,15) UC161650
GOTO61 UC161660
31 WRITE OUTPUT TAPE 6,121,CRDNO(I),CRDNOI(I),ITAPNO(I) UC161670
121 FORMAT(1H0,50HNEITHER LEFT NOR RIGHT SPECIFIED IN ARCSLP COMMAND, UC161680
114X11HCARD NUMBER,2A6,6X11HTAPE NUMBER,15) UC161690
GOTO61 UC161700
32 WRITE OUTPUT TAPE 6,122,CRDNO(I),CRDNOI(I),ITAPNO(I) UC161710
122 FORMAT(2H0,36HINVALID MODIFIER IN ARCSLP STATEMENT,28X11HCARD NUMBUC161720
IER,2A6,6X11HTAPE NUMBER,15) UC161730
GOTO61 UC161740
33 WRITE OUTPUT TAPE6,123,CRDNO(I),CRDNOI(I),ITAPNO(I) UC161750
123 FORMAT(1H0,36HINVALID CHARACTER OCCURRED IN CONBCD,28X11HCARD NUMBUC161760
IER,2A6,6X11HTAPE NUMBER,15) UC161770
GOTO61 UC161780
34 WRITE OUTPUT TAPE6,124,CRDNO(I),CRDN UC161790
124 FORMAT(1H0,52HINVALID OR NO MODIFIER SPECIFIED IN LEADER STATEMENT UC161800
1,12X11HCARD NUMBER,2A6,6X11HTAPE NUMBER,15) UC161810
GOTO61 UC161820
35 WRITE OUTPUT TAPE6,125,CRDNO(I),CRDN UC161830
125 FORMAT(1H0,23HERROR IN READING CLTAPE,41X11HCARD NUMBER,2A6,6X11HTUC161840
IAPE NUMBER,15) UC161850
61 IF(I-NUMERR)9,62,62 UC161860
62 KOMENT#1 UC161870
IF(M)66,63,63 UC161880
63 WRITE OUTPUT TAPE6,630 UC161890
630 FORMAT(1H0,48HTHE NUMBER OF ALLOWABLE ERRORS HAS BEEN EXCEEDED) UC161900
IF(ADUM(40))65,65,64 UC161910
64 CALL DESPAT UC161920
65 CALL FINI UC161930
66 RETURN UC161940
END UC161950

C
C ///////////////////////////////////////////////////////////////////
C
* LIST UC170010
* LABEL UC170020
CERR4 UC170030
SUBROUTINE ERROR4 UC170040

C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C ERROR4 - THE ERROR4/ STATEMENT MODIFIERS ESTABLISH COMMON FLAGS UC170520
C SPECIFYING THE NUMBER OF ERRORS WHICH MAY OCCUR BEFORE UC170530
C UC170540

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C          PROCESSING OF THE INPUT TAPE IS TERMINATED, AND WHETHER UC170550
C          THE RESULTING OUTPUT BLOCKS ARE TO BE DELETED OR UC170560
C          PRESERVED WHEN THE ERROR LIMIT IS REACHED. UC170570
C UC170580
C          INITIALIZE WORD COUNT UC170590
C          NW#3 UC170600
C UC170610
C          IS THE WORD COUNT EQUAL TO NUMBER OF WORDS ON THIS RECORD UC170620
C 100 IF(NWPR-NW)1,1,2 UC170630
C          NO UC170640
C          1 RETURN UC170650
C          2 NW#NW+1 UC170660
C          YES, IS IT AN APT WORD UC170670
C          CALL APTA(NW,APTFLG) UC170680
C          IF(APTFLG-1.0)3,4,4 UC170690
C          NO, SET ERROR LIMIT,(OPTAB(28)),EQUAL TO NUMBER UC170700
C          4 OPTAB(28)#TAPSTO(NW) UC170710
C          LIMERR#TAPSTO(NW) UC170720
C          GOTO100 UC170730
C          YES, IS IT PROCEED OR NOMORE UC170740
C          3 IF(INTAP(NW)-227) 6,7,6 UC170750
C          PROCEED, SET FLAG,(OPTAB(29)),TO RETAIN N/C TAPE UC170760
C          IF THE ERROR LIMIT IS REACHED UC170770
C          7 OPTAB(29)#1.0 UC170780
C          GOTO100 UC170790
C          6 IF(INTAP(NW)-53) 8,9,8 UC170800
C          NOMORE, SET FLAG,(OPTAB(29)),TO REWIND THE N/C TAPE UC170810
C          IF THE ERROR LIMIT IS REACHED UC170820
C          9 OPTAB(29)#0.0 UC170830
C          GOTO100 UC170840
C UC170850
C          NEITHER, RECORD ERROR BY CALLING ERROR ROUTINE UC170860
C          8 CALL ERREX(8) UC170870
C          11 GOTO100 UC170880
C          END UC170890
C
C ///////////////////////////////////////////////////////////////////
C
C * LIST UC040010
C * LABEL UC040020
CFERT UC040030
C          SUBROUTINE FEDRAT UC040040
C UC040050
C          FEDRAT-THE FUNCTION OF THIS ROUTINE IS TO PROCESS THE FEDRAT/STATE- UC040060
C          MENT AND DETERMINE THE PROPER FEED RATE SPECIFIED BY THE UC040070
C          MODIFIERS. THE FEED RATE VALUE SHOULD BE STORED IN THE UC040080
C          F-REGISTER,BUFP(23) AND THE ROUTINES SEQOUT AND PTAPE CALLED UC040090
C          TO OUTPUT THE BLOCK. UC040100
C UC040110
C          *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C UC040590
C          RETURN UC040600
C          END UC040610
C
C ///////////////////////////////////////////////////////////////////
C
C * LIST UC180010
C * LABEL UC180020
CFINI UC180030
C          SUBROUTINE FINI UC180040

```

```

C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C FINI - THIS ROUTINE COMPLETES THE OUTPUT REQUIREMENTS AND ALL UC180520
C NECESSARY BOOKKEEPING TO TERMINATE THE PROGRAM AND THEN UC180530
C RETURN TO CHAIN 400 DISPATCH. UC180540
C UC180550
C DIMENSION AA(12) UC180560
C MNUM#MTABLE(6) UC180570
C TRANSFER ON THE MACHINE UC180580
C GO TO(1,2),MNUM UC180590
C BENSON-LEHNOR ,THERE FORE PICK UP THE PEN IN A SEPERATE BLOCK UC180600
C 1 BUFP(21)#2.0 UC180610
C BUFP(3)#PREVX UC180620
C BUFP(4)#PREVY UC180630
C BUFP(5)#PREVZ UC180640
C CALL SEQOUT UC180650
C CALL PTAPE UC180660
C GERBER UC180670
C UC180680
C THE BUFFER MUST BE CLEARED TO ASSURE ALL INFORMATION IS OUT UC180690
C THIS IS ACCOMPLISHED BY CALLING PUNCHA WITH 72 BLANKS. UC180700
C 2 DO111KIB#1,100 UC180710
C 111 BUFFER(KIB)#BLANKS UC180720
C N#-72 UC180730
C JI#1 UC180740
C K#0 UC180750
C IDUM(4)#IDUM(4)+1 UC180760
C CALL PUNCHA(N,BUFFER,JI,K) UC180770
C IF(IDUM(4)-2) 20,10,10 UC180780
C FINI PRODUCES THE TRAILER THROUGH PREINT UC180790
C 20 CALL PREINT UC180800
C 10 N#MTABLE(6) UC180810
C CABCTR # KFLAGS(50) UC180820
C CABON #CABCTR* .6 +8.0 UC180830
C JCAB # CABON UC180840
C PRTON GIVES THE TAPE FOOTAGE ON LINE UC180850
C CALL PRTON(N,JCAB) UC180860
C KFLAGS(39) # KFLAGS(39) + JCAB UC180870
C KFLAGS(50) #0 UC180880
C IF(KOMENT)88,88,99 UC180890
C CALL ERREX TO POST ANY ERRORS THAT HAVE OCCURRED UC180900
C 88 CALLERREX(-1) UC180910
C DESPAT IS THE CONTROL PROGRAM FOR 400 UC180920
C 99 CALL DESPAT UC180930
C RETURN UC180940
C END UC180950
C
C //////////////////////////////////////
C
C * LIST UC190010
C * LABEL UC190020
C SUBROUTINE FORMAT UC190030
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C EQUIVALENCE(CHECK,ICHECK) UC190510
C DIMENSION CHECK(6),ICHECK(6),IHOLD(3) UC190520
C INITIALIZE POSITION PARAMETERS UC190530
C KAN#2 UC190540
C FLAG#0.0 UC190550
C UC190560

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	ICNT#0	UC190570
	1 KAN#KAN+1	UC190580
C	SPREAD THE WORD INTO SEPARATE PARTS	UC190590
	CALL SPWRD(KAN,ICHECK,TAPSTO)	UC190600
C	BEGIN TESTING EACH PART FOR A LETTER /,), +, -, OR *	UC190610
	DO16KS#1,6	UC190620
	DO2KSI#1,26	UC190630
	IF(ICHECK(KS)-WORDS(KSI))2,14,2	UC190640
2	CONTINUE	UC190650
	IF(ICHECK(KS)-ISLASH)3,16,3	UC190660
3	IF(ICHECK(KS)-IPERD)4,15,4	UC190670
4	IF(ICHECK(KS)-IASTER)5,17,5	UC190680
5	IF(FLAG)6,6,7	UC190690
CC	OTHERS CALL ERROR ROUTINE	UC190700
6	CALL ERREX(20)	UC190710
	GOTO16	UC190720
7	IF(LAMB)8,8,13	UC190730
8	IF(ICHECK(KS)-IMINUS)9,11,9	UC190740
9	IF(ICHECK(KS)-IPLUS)10,12,10	UC190750
C	+ /R - STORE 1.0 /R -1.0 AND GO ONTO THE NEXT POSITION	UC190760
10	LAMB#LAMB+2	UC190770
	IHOLD(1)#1	UC190780
	IHOLD(2)#ICHECK(KS)	UC190790
	GOTO16	UC190800
11	IHOLD(1)#-1	UC190810
	LAMB#LAMB+1	UC190820
	GOTO16	UC190830
12	IHOLD(1)#1	UC190840
	LAMB#LAMB+1	UC190850
	GOTO16	UC190860
13	IHOLD(LAMB)#ICHECK(KS)	UC190870
	LAMB#LAMB+1	UC190880
	GOTO16	UC190890
C	LETTER STORE POSITION OF THE BUFP ARRAY IN THE IORDER ARRAY	UC190900
C	SET FLAG TO PICK UP THE NUMBERS WHICH FOLLOW	UC190910
14	IORDER(KAN-2)#KSI	UC190920
	FLAG#1.0	UC190930
	ICNT#ICNT+1	UC190940
	GOTO16	UC190950
C	PERIOD INDICATES END OF THE FORMAT SPECIFICATION FOR THIS	UC190960
C	PARTICULAR REGISTER	UC190970
15	LAMB#0	UC190980
	FLAG#0.0	UC190990
	FORMAT(KSI)#IHOLD(1)*((IHOLD(2)+IHOLD(3))*10+IHOLD(3))	UC191000
C	SLASH, GO TO THE NEXT POSITION	UC191010
16	CONTINUE	UC191020
	GOTO1	UC191030
C	ASTERISK INDICATES THE END OF THE ENTIRE FORMAT STATEMENT	UC191040
C	ALL WORDS HAVE BEEN CHECKED OR AN ASTERISK HAS BEEN FOUND	UC191050
C	STORE THE COUNT I.E., LIMIT IN IORDER(27)	UC191060
17	FORMAT(KSI)#IHOLD(1)*((IHOLD(2)+IHOLD(3))*10+IHOLD(3))	UC191070
	IORDER(27)#ICNT	UC191080
	RETURN	UC191090
	END	UC191100
C	////////////////////////////////////	
C		
*	LIST	UC050010
*	LABEL	UC050020
CHEAD		UC050030

```

SUBROUTINE HEAD
C
C HEAD- THE FUNCTION OF THIS ROUTINE IS TO PROCESS THE HEAD/ STATEMENT
C AND SET APPROPRIATE PROGRAM FLAGS AS SPECIFIED.
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C 30 RETURN
C END
C
C ///////////////////////////////////////////////////////////////////
C
*      FAP
*      ENTRY  INIT
*
*  SYSTEM COMMON, DIMENSION, AND EQUIVALENCE STATEMENTS FOR FAP
NOTAPS EQU      18      NUMBER OF TAPES
NOFLGS EQU      70      NUMBER OF FLAGS IN FLAG AREA
BUFNUM EQU       4      NUMBER OF BUFFERS
NOBLKS EQU       4      NO. OF BLOCKS ALLOWED TAPEWT CALL SEQ.
BUFSIZ EQU      400     SIZE OF ONE BUFFER BLOCK
*****
SYSTEM COMMON  8
KFLAGS COMMON NOFLGS
TAPETB COMMON NOTAPS
BUFTBL COMMON BUFNUM
BUFER1 COMMON BUFSIZ
BUFER2 COMMON BUFSIZ
BUFER3 COMMON BUFSIZ
BUFER4 COMMON BUFSIZ
KOM EQU      SYSTEM
KAPTID EQU   KOM-7
KAPTIO EQU   KOM-6
KAPTTR EQU   KOM-5
KAPTCN EQU   KOM-4
K0 EQU      KFLAGS-10
K1 EQU      KFLAGS-11
K2 EQU      KFLAGS-12
K3 EQU      KFLAGS-13
K4 EQU      KFLAGS-14
K5 EQU      KFLAGS-15
K6 EQU      KFLAGS-16
K7 EQU      KFLAGS-17
K8 EQU      KFLAGS-18
K9 EQU      KFLAGS-19
KFLAG0 EQU   KFLAGS-24
KFLAG1 EQU   KFLAGS-25
KFLAG2 EQU   KFLAGS-26
KFLAG3 EQU   KFLAGS-27
KFLAG4 EQU   KFLAGS-28
IWAVEN EQU   KFLAGS-30
IPTNLY EQU   KFLAGS-31
NOPOST EQU   KFLAGS-32
INVERT EQU   KFLAGS-33
KAUTOP EQU   KFLAGS-34
ICLPRT EQU   KFLAGS-35
INDEXX EQU   KFLAGS-36
IPLOTR EQU   KFLAGS-37
NOPL0T EQU   KFLAGS-39
K0YNFG EQU   KFLAGS-40

IDENTIFICATION OF LAST LIBTAP RECORD
APT I-O COMMAND
TRANSFER TO LAST SECTION READ FROM LIBTAP
CONTINUATION FLAG
KFLAGS(11)

KFLAGS(31)

```

UC050040
UC050050
UC050060
UC050070
UC050080
UC050560
UC050570
UC050580
UC200010
UC200020
UC200030
UC200040
UC200050
UC200060
UC200070
UC200080
UC200090
UC200100
UC200110
UC200120
UC200130
UC200140
UC200150
UC200160
UC200170
UC200180
UC200190
UC200200
UC200210
UC200220
UC200230
UC200240
UC200250
UC200260
UC200270
UC200280
UC200290
UC200300
UC200310
UC200320
UC200330
UC200340
UC200350
UC200360
UC200370
UC200380
UC200390
UC200400
UC200410
UC200420
UC200430
UC200440
UC200450
UC200460
UC200470
UC200480

LOCJPT	EQU	KFLAGS-41	UC200490
LOCBEG	EQU	KFLAGS-42	UC200500
KSECIN	EQU	KFLAGS-43	UC200510
NCLREC	EQU	KFLAGS-44	UC200520
LOCMAC	EQU	KFLAGS-45	UC200530
LENSPC	EQU	KFLAGS-46	UC200540
IPOSTP	EQU	KFLAGS-50	UC200550
NUMPST	EQU	KFLAGS-51	UC200560
PROTAP	EQU	TAPETB	UC200570
CANTAP	EQU	TAPETB-1	UC200580
CLTAPE	EQU	TAPETB-2	UC200590
POCTAP	EQU	TAPETB-3	UC200600
PLOTAP	EQU	TAPETB-4	UC200610
SRFTAP	EQU	TAPETB-5	UC200620
LIBTAP	EQU	TAPETB-6	UC200630
CRDTAP	EQU	TAPETB-7	UC200640
CORTAP	EQU	TAPETB-9	UC200650
TAPES1	EQU	TAPETB-10	UC200660
TAPES2	EQU	TAPETB-11	UC200670
TAPES3	EQU	TAPETB-12	UC200680
TAPES4	EQU	TAPETB-13	UC200690
FORTIN	EQU	TAPETB-14	UC200700
INTAPE	EQU	TAPETB-15	UC200710
IOUTAP	EQU	TAPETB-16	UC200720
PUNTAP	EQU	TAPETB-17	UC200730
*****			UC200740
*			UC200750
*			UC200760
MACH	COMMON	12	UC200770
NLOOP	COMMON	1	UC200780
NLOOP1	COMMON	1	UC200790
PNOFLG	COMMON	14	UC200800
MTABLE	COMMON	10	UC200810
NID	COMMON	1	UC200820
ADUM	COMMON	50	UC200830
BITS	COMMON	1	UC200840
BLANKS	COMMON	1	UC200850
BUFFER	COMMON	104	UC200860
BUFP	COMMON	26	UC200870
DAFTON	COMMON	1	UC200880
DAFTST	COMMON	1	UC200890
DFTPEN	COMMON	1	UC200900
DMODE	COMMON	1	UC200910
FORMAT	COMMON	26	UC200920
GMODE	COMMON	1	UC200930
IDUM	COMMON	50	UC200940
INTAP	COMMON	20	UC200950
IORDER	COMMON	27	UC200960
JJ	COMMON	1	UC200970
KOMENT	COMMON	1	UC200980
LIMERR	COMMON	1	UC200990
MACHON	COMMON	1	UC201000
NEUADD	COMMON	1	UC201010
NUMERR	COMMON	1	UC201020
NUMTMS	COMMON	3	UC201030
NWPLOT	COMMON	1	UC201040
NWPR	COMMON	1	UC201050
OPTAB	COMMON	200	UC201060
PLOTON	COMMON	1	UC201070
PLUTSY	COMMON	1	UC201080

PREVX	COMMON	I	UC201090
PREVY	COMMON	I	UC201100
PREVZ	COMMON	I	UC201110
RETURN	COMMON	I	UC201120
SEQCOD	COMMON	I	UC201130
SEQCTR	COMMON	I	UC201140
SEQINC	COMMON	I	UC201150
SEQNO	COMMON	I	UC201160
SEQON	COMMON	I	UC201170
SEQSHT	COMMON	I	UC201180
SEQVAL	COMMON	I	UC201190
TAPSTO	COMMON	250	UC201200
WORDS	COMMON	26	UC201210
XVALUE	COMMON	I	UC201220
YVALUE	COMMON	I	UC201230
ZVALUE	COMMON	I	UC201240
INIT	SXA	EX,4	UC201250
	SXA	EX+1,2	UC201260
	SXA	EX+2,1	UC201270
	AXT	0,1	UC201280
	STZ	ADUM,1	UC201290
	TXI	*+1,1,1	UC201300
	TXL	*-2,1,ADUM+1-ZVALUE	UC201310
	CLA	BB	UC201320
	STO	BITS	UC201330
	CLA	BI	UC201340
	STO	BLANKS	UC201350
	AXT	0,1	UC201360
LOOPP	CLA	BITS	UC201370
	STO	BUFP,1	UC201380
	CLA	B3,1	UC201390
	STO	WORDS,1	UC201400
	TXI	*+1,1,1	UC201410
	TXL	LOOPP,1,25	UC201420
	AXT	0,1	UC201430
	CLA	BITS	UC201440
	STO	BUFFER,1	UC201450
	TXI	*+1,1,1	UC201460
	TXL	*-3,1,103	UC201470
EX	AXT	0,4	UC201480
	AXT	0,2	UC201490
	AXT	0,1	UC201500
	TRA	1,4	UC201510
BB	OCT	777777777777	UC201520
BI	OCT	606060606060	UC201530
	BCI	1, M	UC201540
	BCI	1, T	UC201550
	BCI	1, S	UC201560
	BCI	1, F	UC201570
	BCI	1, E	UC201580
	BCI	1, D	UC201590
	BCI	1, C	UC201600
	BCI	1, B	UC201610
	BCI	1, A	UC201620
	BCI	1, L	UC201630
	BCI	1, K	UC201640
	BCI	1, J	UC201650
	BCI	1, I	UC201660
	BCI	1, H	UC201670
	BCI	1, R	UC201680

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      BCI      I,  Q      UC201690
      BCI      I,  P      UC201700
      BCI      I,  O      UC201710
      BCI      I,  W      UC201720
      BCI      I,  V      UC201730
      BCI      I,  U      UC201740
      BCI      I,  Z      UC201750
      BCI      I,  Y      UC201760
      BCI      I,  X      UC201770
      BCI      I,  G      UC201780
B3    BCI      I,  N      UC201790
      END                UC201800

C
C ///////////////////////////////////////////////////////////////////
C
*      LIST                UC210010
*      LABEL                UC210020
      SUBROUTINE INSERT    UC210030
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
      CALL PUNCHA(-66,TAPSTO(4),0,0)      UC210510
C INSERT- THE FUNCTION OF THIS ROUTINE IS TO PUNCH INTO THE OUTOUT UC210520
C      TAPE ANY 66 CHARACTERS AS SPECIFIED IN THE INSERT COMMAND UC210530
C      RETURN                UC210540
      END                    UC210550
                          UC210560
C
C ///////////////////////////////////////////////////////////////////
C
*      LIST                UC220010
*      LABEL                UC220020
CLSPT SUBROUTINE LASTPT    UC220030
                          UC220040
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C      LASTPT - A SUBROUTINE THAT STORES LAST CUTTER POINTS INTO UC220520
C      TEMPORARY LOCATIONS IN CASE, THE NEXT CUT SEQUENCE REQUIRES UC220530
C      PREVIOUS LOCATION UC220540
C      PCOORD DETERMINES THE PLANE REQUESTED AND STORES THE UC220550
C      COORDINATES ACCORDINGLY. UC220560
C      CALL PCOORD(JJ) UC220570
C      PREVX#XVALUE UC220580
C      PREVY#YVALUE UC220590
C      PREVZ#ZVALUE UC220600
C      RETURN UC220610
      END UC220620
                          UC220630
                          UC220640
C
C ///////////////////////////////////////////////////////////////////
C
C      A SUBROUTINE TO BLANK LEADING ZEROES UC230010
C      SUBROUTINE LEAD(B,N,I,J) UC230020
C      DIMENSION BT(12),B(104) UC230030
C      N#N UC230040
B      BLK#606060606060 UC230050
B      ZERO#606000606060 UC230060
B      P#606020606060 UC230070
B      XN#606040606060 UC230080
      ITAB#8 UC230090

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DO20 IK#1,6	UC230100
IF(N-ITAB) 21,23,21	UC230110
21 IF(IK-3)20,22,20	UC230120
22 ITAB#40	UC230130
20 ITAB#ITAB+4	UC230140
GOTO10	UC230150
23 K#XMODF(J,100)	UC230160
IF(I-6)11,11,12	UC230170
11 L#6-K	UC230180
GO TO 13	UC230190
12 L#12-K	UC230200
13 CALL SPWRD(N,BT,B)	UC230210
CALL SPWRD(N+1,BT(7),B)	UC230220
IF(BT(1)-ZERO)7,3,7	UC230230
3 BT(1)#BLK	UC230240
GO TO 2	UC230250
7 IF(BT(1)-P)8,2,8	UC230260
8 IF(BT(1)-XN)9,2,9	UC230270
9 IF(BT(1)-BLK)10,2,10	UC230280
2 DO 1 M#2,L	UC230290
IF(BT(M)-ZERO) 6,4,6	UC230300
6 IF(BT(M)-BLK) 5,1,5	UC230310
4 BT(M)#BLK	UC230320
1 CONTINUE	UC230330
5 CALL REPAC(BT,N,B)	UC230340
10 RETURN	UC230350
END	UC230360
C	
C//	
C	
* LIST	UC240010
* LABEL	UC240020
SUBROUTINE LEADER	UC240030
C	
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C	UC240510
C LEADER - THE NECESSARY NUMBER OF OUTPUT BLOCKS ARE GENERATED TO	UC240520
C PRODUCE T INCHES OF BLANK TAPE WHERE T IS DEFINED BY THE	UC240530
C COMMAND LEADER/T.	UC240540
C WAS THERE A MODIFIER AFTER THE SLASH	UC240550
IF(NWPR-4)40,10,10	UC240560
20 CALL ERREX(25)	UC240570
40 RETURN	UC240580
C YES, WAS IT A NUMBER	UC240590
10 CALL APTA(4,APTFLG)	UC240600
IF(APTFLG-1.0) 70,80,80	UC240610
C NO, CALL ERROR ROUTINE	UC240620
70 GOTO 20	UC240630
C YES, DETERMINE NUMBER OF BLANKS TO BE PRODUCED	UC240640
80 FOOT#TAPSTO(4)/.1	UC240650
DO 100 I#1,104	UC240660
100 BUFFER(I) #BLANKS	UC240670
C IS IT LESS THAN 5 FEET	UC240680
IF(FOOT-600.0) 101,99,99	UC240690
C YES,PUT OUT THE DESIRED AMOUNT AND RETURN	UC240700
101 IFOOT#FOOT+.5	UC240710
CALL PUNCHA(-IFOOT,BUFFER,0,1)	UC240720
GOTO 40	UC240730
C NO, PUNCH 5 FEET OF BLANKS AND REDUCE DESIRED AMOUNT	UC240740
99 CALL PUNCHA(-660,BUFFER,0,1)	UC240750

C	BY 5 FEET AND TRY AGAIN	UC240760
	FOOT#FOOT-600.0	UC240770
	IF(FOOT-600.0)101,99,99	UC240780
	END	UC240790
C	////////////////////////////////////	
C		
*	LIST	UC250010
*	LABEL	UC250020
CLETT		UC250030
	SUBROUTINE LETTER	UC250040
C		
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC250520
C	LETTER THIS ROUTINE SETS THE LETTERING PARAMETERS, HEIGHT,LENGTH,	UC250530
C	AND ANGLE ORIENTATION. IT ALSO DETERMINES MODE,I.E.,DRAW	UC250540
C	OR TYPE	UC250550
C		UC250560
C	DOES LETTER COMMAND APPLY TO THIS MACHINE	UC250570
C		UC250580
	IF(OPTAB(30))2,1,2	UC250590
C	NO	UC250600
1	RETURN	UC250610
C	YES	UC250620
2	NW#3	UC250630
C	ARE THERE MODIFIERS AFTER THE SLASH	UC250640
3	IF(NWPR-NW)1,1,4	UC250650
C	YES	UC250660
4	NW#NW+1	UC250670
	CALL APTA(NW,APTFLG)	UC250680
	IF(APTFLG-1.0)6,5,5	UC250690
C	NO, CALL ERROR ROUTINE	UC250700
5	CALL ERREX(9)	UC250710
	GOTO3	UC250720
C		UC250730
C	CHECK FOR ONE OF THE FOLLOWING,DRAW,TYPE,HEIGHT,LENGTH,ATANGL	UC250740
C	IF NONE OF THESE, CALL ERROR ROUTINE	UC250750
C		UC250760
6	IF(INTAP(NW)-197)7,12,7	UC250770
7	IF(INTAP(NW)-98)8,13,8	UC250780
8	IF(INTAP(NW)-226)9,16,9	UC250790
9	IF(INTAP(NW)-9)10,17,10	UC250800
10	IF(INTAP(NW)-1)11,18,11	UC250810
11	CALL ERREX(9)	UC250820
	GOTO3	UC250830
12	A#1.0	UC250840
	GOTO14	UC250850
13	A#2.0	UC250860
C	IS THIS A DRAFTING MACHINE	UC250870
14	IF(OPTAB(16))15,3,15	UC250880
C	OPTAB(16)#1.0FOR DRAW, 2.0 FOR TYPE	UC250890
15	OPTAB(16)#A	UC250900
	GOTO3	UC250910
16	JM#1	UC250920
	GOTO19	UC250930
17	JM#2	UC250940
	GOTO19	UC250950
18	JM#3	UC250960
19	CALL APTA(NW+1,APTFLG)	UC250970
	IF(APTFLG-1.0)20,21,21	UC250980

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20 CALL ERREX(9)                                UC250990
   GOT03                                         UC251000
21 GOTO(22,22,25),JM                             UC251010
C TEST FOR NECESSITY OF HEIGHT OR LENGTH IN THIS MACHINE UC251020
22 IF(OPTAB(JM+16))23,24,23                       UC251030
C OPTAB(17) CONTAINS HEIGHT INFORMATION          UC251040
C OPTAB(18) CONTAINS LENGTH INFORMATION          UC251050
C OPTAB(19) CONTAINS ANGLE INFORMATION           UC251060
23 OPTAB(JM+16)#TAPSTO(NW+1)                     UC251070
24 NW#NW+1                                         UC251080
   GOT03                                         UC251090
25 OPTAB(19)#TAPSTO(NW+1)                         UC251100
   GOT024                                         UC251110
   END                                           UC251120

C
C ///////////////////////////////////////////////////
C
* LIST                                           UC260010
* LABEL                                          UC260020
  SUBROUTINE LINEAR                             UC260030
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C LINEAR - THIS ROUTINE PROCESSES THE CLTAPE CUTTER DATA AND UC260510
C PRODUCE THE REQUIRED OUTPUT BLOCKS FOR LINEAR UC260520
C INTERPOLATION. UC260530
C DOES DRAFT APPLY UC260540
C UC260550
C IF(OPTAB(27))1,6,1 UC260560
C YES, IS THE DRAFT/ON UC260570
1 CALL PCOORD(JJ) UC260580
  IF(IDUM(31))41,41,40 UC260590
UC260600
40 BUFP(3)#PREVX-OPTAB(23) UC260610
  BUFP(4)#PREVY-OPTAB(24) UC260620
  BUFP(4)#PREVZ-OPTAB(25) UC260630
  BUFP(2)#1.0 UC260640
  BUFP(21)#2.0 UC260650
  CALL SEQOUT UC260660
  CALL PTAPE UC260670
UC260680
41 IF(PREVX-XVALUE)10,11,10 UC260690
11 IF(PREY-YVALUE) 10,12,10 UC260700
12 IF(PREVZ-ZVALUE) 10,4,10 UC260710
C YES, IS THIS THE FIRST TIME UC260720
10 IF(DAFST) 5,6,5 UC260730
C DRAFT/OFF RETURN UC260740
4 RETURN UC260750
C YES, FIRST TIME ,MOVE WITH THE PEN UP UC260760
5 BUFP(3)#PREVX UC260770
  BUFP(4)#PREVY UC260780
  BUFP(5)#PREVZ UC260790
  BUFP(21)#2.0 UC260800
  DMODE#2.0 UC260810
C UC260820
C IDUM(5) GIVES THE PROPER GCODE FOR PLOT UC260830
C UC260840
C IDUM(5)#1 UC260850
  GMODE#1.0 UC260860
  BUFP(2)#1.0 UC260870
  CALL SEQOUT UC260880

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      CALL PTAPE
      DAFST#0.0
C
C      NO, THIS IS NOT THE FIRST TIME
C
C      6  CALL PCOORD(JJ)
      BUFP(3)#XVALUE
      BUFP(4)#YVALUE
      BUFP(5)#ZVALUE
      IF(DAFTON)50,15,50
C      15 DMODE#2.0
      GOTO86
C      50 DMODE#OPTAB(12)
C      86 IF(GMODE-1.0) 18,16,18
C      18 GMODE#1.0
C      16 BUFP(2)#GMODE
      BUFP(21)#DMODE
      CALL SEQOUT
      CALL PTAPE
      GOTO 4
      END
C
C ///////////////////////////////////////////////////////////////////
C
C      *      LIST8
C      *      LABEL
CMACH01
      SUBROUTINE MACH01
C
C      *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C      MACH01 - A SUBROUTINE TO INITIALIZE VARIABLES FOR THE
C      BENSON-LEHNER MACHINE
C      RETURN
      END
C
C ///////////////////////////////////////////////////////////////////
C
C      *      LIST8
C      *      LABEL
CMACH02
      SUBROUTINE MACH02
C
C      *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C      MACH02 - A SUBROUTINE TO INITIALIZE VARIABLES FOR THE
C      GERBER MACHINE
C      INITIALIZE THE FORMAT TABLE
      FORMAT(1)#30.0
      FORMAT(2)#20.0
      FORMAT(3)#-53.0
      FORMAT(4)#-53.0
      FORMAT(5)#-53.0
      FORMAT(14)#53.0
      FORMAT(15)#53.0
      FORMAT(16)#53.0
      FORMAT(21)#20.0
      FORMAT(23)#0.0
      FORMAT(26)#20.0
C      SET THE ORDER OF OUTPUT ON THE PUNCHED TAPE

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UC260890
UC260900
UC260910
UC260920
UC260930
UC260940
UC260950
UC260960
UC260970
UC260980
UC260990
UC261000
UC261010
UC261020
UC261030
UC261040
UC261050
UC261060
UC261070
UC261080
UC261090

UC060010
UC060020
UC060030
UC060040

UC060520
UC060530
UC060540
UC060550
UC060560

UC270010
UC270020
UC270030
UC270040

UC270520
UC270530
UC270540
UC270550
UC270560
UC270570
UC270580
UC270590
UC270600
UC270610
UC270620
UC270630
UC270640
UC270650
UC270660
UC270670

	IORDER(1)#1	UC270680
	IORDER(2)#2	UC270690
	IORDER(3)#3	UC270700
	IORDER(4)#4	UC270710
	IORDER(5)#5	UC270720
	IORDER(6)#14	UC270730
	IORDER(7)#15	UC270740
	IORDER(8)#16	UC270750
	IORDER(9)#21	UC270760
	IORDER(10)#23	UC270770
	IORDER(11)#26	UC270780
	IORDER(27)#11	UC270790
C	SET UP THE OPTION TABLE	UC270800
	OPTAB(1)#3.0	UC270810
	OPTAB(2)#1.0	UC270820
	OPTAB(5)#1.0	UC270830
	OPTAB(6)#99.5	UC270840
	OPTAB(12)#1.0	UC270850
	OPTAB(13)#0.0	UC270860
	OPTAB(14)#0.0	UC270870
	OPTAB(15)#58.0	UC270880
	OPTAB(16)#1.0	UC270890
	OPTAB(17)#.112	UC270900
	OPTAB(18)#1.0	UC270910
	OPTAB(19)#0.0	UC270920
	OPTAB(22)#2.0	UC270930
	OPTAB(23)#-.3	UC270940
	OPTAB(24)#0.0	UC270950
	OPTAB(25)#0.0	UC270960
	OPTAB(26)#0.0	UC270970
	OPTAB(27)#1.0	UC270980
	OPTAB(28)#5.0	UC270990
	OPTAB(30)#1.0	UC271000
	OPTAB(31)#1.0	UC271010
	OPTAB(33)#1.0	UC271020
	OPTAB(200)#1.0	UC271030
	NEUADD#3	UC271040
	SEQCOD#2.0	UC271050
	SEQINC#1.0	UC271060
	RETURN	UC271070
	END	UC271080
C	////////////////////////////////////	
C		
*	LIST	UC280010
*	LABEL	UC280020
	SUBROUTINE MACHIN(J)	UC280030
C		
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC2800510
C	MACHIN - THE ROUTINE EXAMINES THE MACHIN/ COMMAND TO DETERMINE	UC2800520
C	WHETHER IT APPLIES TO THE CURRENT MACHINE AND IF IT DOES	UC2800530
C	TO ESTABLISH THE PROPER CONDITIONS, I.E., (ON, OFF),	UC2800540
C	COORDINATES TO BE PLOTTED, AND INTERPOLATION MADE.	UC2800550
	N#3	UC2800560
C	WAS MACHIN CALLED FROM UCAPP	UC2800570
	GO TO (77,30),J	UC2800580
C	NO, ARE THERE ANY MODIFIERS	UC2800590
30	IF(NWPR-N)10,10,20	UC2800600
C	YES, INCREMENT COUNT	UC2800610

20	N#N+1	UC280620
C	IS THE PRESENT MODIFIER AN APT WORD	UC280630
	CALL APTA(N,APTF LG)	UC280640
	IF(APTF LG-1.0) 40,50,50	UC280650
C	NO, IS THE N+1 MODIFIER AN APT WORD	UC280660
50	IF(NWPR-(N+1))60,70,70	UC280670
C	YES, CALL ERROR ROUTINE	UC280680
60	CALL ERREX(11)	UC280690
10	RETURN	UC280700
C	NO, SET OPTION(N)#VALUE OF N+1 MODIFIER	UC280710
70	J#INTAP(N)	UC280720
	OPTAB(J)#INTAP(N+1)	UC280730
	N#N+1	UC280740
	GOTO30	UC280750
C	YES, THE FIRST MODIFIER WAS AN APT WORD	UC280760
C	TEST FOR NOX,NOY,NOZ,ALL,ON,OFF,CIRCUL,LINEAR,	UC280770
C	OR XYZ RESPECTIVELY	UC280780
40	IF(INTAP(N)-14) 90,32,33	UC280790
33	IF(INTAP(N)-16)41,42,34	UC280800
34	IF(INTAP(N)-51)35,43,35	UC280810
35	IF(INTAP(N)-71)36,44,36	UC280820
36	IF(INTAP(N)-72)37,45,37	UC280830
37	IF(INTAP(N)-75)38,46,38	UC280840
38	IF(INTAP(N)-76)39,47,39	UC280850
39	IF(INTAP(N)-108) 90,48,90	UC280860
C	NOX	UC280870
32	OPTAB(1)#1.0	UC280880
	GOTO30	UC280890
C	NOY	UC280900
41	OPTAB(1)#2.0	UC280910
	GOTO30	UC280920
C	NOZ	UC280930
42	OPTAB(1)#3.0	UC280940
	GOTO30	UC280950
C	ALL	UC280960
43	OPTAB(1)#4.0	UC280970
	GOTO30	UC280980
C	ON	UC280990
44	MACHON#1	UC281000
	IF(IDUM(40)-1) 72,73,73	UC281010
72	CALLPREINT	UC281020
	IDUM(40)#1	UC281030
73	GOTO30	UC281040
C	OFF	UC281050
45	MACHON#0	UC281060
	GOTO30	UC281070
C	CIRCUL	UC281080
46	OPTAB(6)#99.5	UC281090
	GOTO30	UC281100
C	LINEAR	UC281110
47	OPTAB(6)#0.0	UC281120
	GOTO30	UC281130
C	XYZ	UC281140
48	OPTAB(1)#5	UC281150
	GOTO30	UC281160
90	IF(N-4)50,91,50	UC281170
C	LESS THAN 14 TEST TO SEE IF THE APPROPRIATE MACHIN,IF NOT RETURN	UC281180
91	IF(INTAP(4)-MACH(1))10,92,10	UC281190
92	IF(INTAP(5)-MACH(2))10,93,10	UC281200
93	IF(INTAP(6)-MACH(3))10,94,10	UC281210

94	N#6	UC281220
	GOTO3C	UC281230
C	YES, MACHIN WAS CALLED FROM UCAPP, SET OPTIONS,ETC.,	UC281240
C	AS SPECIFIED FOR THE CURRENT MACHINE AS PROCESSED BY SECTION4	UC281250
77	N#MTABLE(6)	UC281260
	GO TO (1,2),N	UC281270
1	CALL MACH01	UC281280
	GO TO 3	UC281290
2	CALL MACH02	UC281300
	IDUM(40)#1	UC281310
	CALL PREINT	UC281320
3	DO 140 I#4,12	UC281330
	IF(MACH(I)-14) 140,132,133	UC281340
133	IF(MACH(I)-16) 141,142,134	UC281350
134	IF(MACH(I)-51) 135,143,135	UC281360
135	IF(MACH(I)-71) 136,144,136	UC281370
136	IF(MACH(I)-72) 137,145,137	UC281380
137	IF(MACH(I)-75) 138,146,138	UC281390
138	IF(MACH(I)-76) 139,147,139	UC281400
139	IF(MACH(I)-108) 140,148,140	UC281410
132	OPTAB(1)#1.0	UC281420
	GOTO140	UC281430
141	OPTAB(1)#2.0	UC281440
	GOTO 140	UC281450
142	OPTAB(1)#3.0	UC281460
	GOTO140	UC281470
143	OPTAB(1)#4.0	UC281480
	GOTO140	UC281490
144	MACHON#1	UC281500
	GO TO 140	UC281510
145	MACHON#0	UC281520
	GOTO140	UC281530
146	OPTAB(6)#99.5	UC281540
	GOTO140	UC281550
147	OPTAB(6) #0.0	UC281560
	GOTO140	UC281570
148	OPTAB(1) #5.U	UC281580
140	CONTINUE	UC281590
	GOTO10	UC281600
	END	UC281610
C	////////////////////////////////////	
C	SUBROUTINE MAGEIA	UC070010
C		UC070020
C	MAGEIA- THE FUNCTION OF THIS ROUTINE IS TO CONVERT THE INFORMATION	UC070030
C	CONTAINED IN THE OUTPUT BUFFER TO EIA CODE AND GENERATE A	UC070040
C	MAGNETIC TAPE CONTAINING EIA CODE IMAGES.	UC070050
C		UC070060
	RETURN	UC070070
	END	UC070080
C	////////////////////////////////////	
C		
*	LIST	UC080090
*	LABEL	UC080100
	SUBROUTINE MAGTAP	UC080110
C		
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC080590

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C      MAGTAP
C      A SUBROUTINE TO PRODUCE A MAGNETIC TAPE
C      FOR MAG TAPE DRAFTING MACHINES OR CRT.
C      THIS ROUTINE UTILIZES PLOTTING ROUTINES
C      ORBLI OR CRBLI WRITTEN AT UNION
C      CARBIDE CDP ,OAK RIDGE, TENN. FOR BENSON
C      LEHNER PLOTTER.
C
C      RETURN
C      END
C
C      ///////////////////////////////////////////////////
C
C      *      LIST
C      *      LABEL
CMCTL
C      SUBROUTINE MCHTOL
C
C      *****STANDARD COMMON, DIMENSION AND EQUIVALENCE SET *****
C
C      MCHTOL- THE FUNCTION OF THIS ROUTINE IS TO PROCESS THE MCHTOL/ STATE-
C      MENT AND DETERMINE THE PERMISSIVE OVERSHOOT AND UNDERSHOOT
C      FOR ACCELERATION-DECELERATION CALCULATIONS FOR FEED RATE.
C
C      RETURN
C      END
C
C      ///////////////////////////////////////////////////
C
C      *      LIST
C      *      LABEL
COPST
C      SUBROUTINE OPSTOP
C
C      *****STANDARD COMMON, DIMENSION AND EQUIVALENCE SET *****
C
C      OPSTOP - AN MOI CODE IS PLACED IN THE M REGISTER AND THE
C      APPROPRIATE ROUTINES CALLED TO GENERATE AN OUTPUT BLOCK.
C      SET THE PROPER M CODE OF 1.0
C      BUFP(26) # 1.0
C      OUTPUT BLOCK
C      CALL SEQOUT
C      CALL PTAPE
C      RETURN
C      END
C
C      ///////////////////////////////////////////////////
C
C      *      LIST
C      *      LABEL
COPTN
C      SUBROUTINE OPTION
C
C      *****STANDARD COMMON, DIMENSION AND EQUIVALENCE SET *****
C
C      OPTION - OPTION NUMBER N IS ALTERED FROM ITS INITIALIZED VALUE TO
C      THE VALUE T, WHERE N AND T ARE DEFINED BY THE STATEMENT
C      OPTION/N,T. EACH COUPLET IS PROCESSED INDEPENDENTLY AND
C      ANY NUMBER OF COUPLETS MAY BE INCLUDED IN THE STATEMENT.
C
C      NW#3

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UC080600
UC080610
UC080620
UC080630
UC080640
UC080650
UC080660
UC080670
UC080680
UC080690

UC090010
UC090020
UC090030
UC090040
UC090520
UC090530
UC090540
UC090550
UC090560
UC090570
UC090580
UC090590

UC290010
UC290020
UC290030
UC290040
UC290520
UC290530
UC290540
UC290550
UC290560
UC290570
UC290580
UC290590
UC290600
UC290610

UC300010
UC300020
UC300030
UC300040
UC300520
UC300530
UC300540
UC300550
UC300560
UC300570

C	ARE THERE ANY MODIFIERS	UC300580
50	IF(NWPR-NW)10,10,20	UC300590
C	NO	UC300600
10	RETURN	UC300610
20	NW#NW+1	UC300620
C	YES, ARE THEY IN A COUPLET	UC300630
	IF(NWPR-(NW+1))30,40,40	UC300640
C	NO,CALL ERROR ROUTINE	UC300650
30	CALL ERREX(12)	UC300660
	NW#NW+1	UC300670
	GOTO50	UC300680
C	YES, IS EITHER MODIFIER OF PAIR AN APT WORD	UC300690
40	CALL APTA(NW,APTFLG)	UC300700
	IF(APTFLG-1.0) 70,77,77	UC300710
77	CALL APTA(NW+1,APTFLG)	UC300720
	IF(APTFLG-1.0) 70,81,81	UC300730
C	YES, CALL ERROR ROUTINE	UC300740
70	CALL ERREX(13)	UC300750
	NW#NW+1	UC300760
	GOTO50	UC300770
C	NO, IS THE FIRST WITHIN THE RANGE OF THE OPTION TABLE	UC300780
81	IF(TAPSTO(NW)) 70,70,83	UC300790
83	IF(TAPSTO(NW)-200.0) 84,84,70	UC300800
84	J#TAPSTO(NW)	UC300810
C	YES, SET THE OPTION MATCH EQUAL TO LATTER OF PAIR	UC300820
	OPTAB(J)#TAPSTO(NW+1)	UC300830
C	INCREMENT WORD COUNT AND TEST FOR OTHERS	UC300840
	NW#NW+1	UC300850
	GOTO50	UC300860
	END	UC300870
C	////////////////////////////////////	
C		
*	FAP	UC310010
*	PAC - A SUBROUTINE TO REPRODUCE THE IMAGE OF THE PUNCHED TAPE	UC310020
*	FOR OUTPUT	UC310030
	ENTRY PAC	UC310040
PAC	SXA EX,4	UC310050
	SXA EX+1,2	UC310060
	SXA EX+2,1	UC310070
	CLA 1,4	UC310080
	STA START **BUFFERARRAY**I	UC310090
	CLA 2,4	UC310100
	STA SAVE **OUTPUTARRAY**	UC310110
	STA FIX	UC310120
	CLA 3,4	UC310130
	STA CNT	UC310140
*	SET COUNTERS	UC310150
	CLA ZERO	UC310160
	STO MOD6	UC310170
	AXT 0,4	UC310180
	AXT 0,1	UC310190
START	LDQ *,1	UC310200
	AXT 6,2	UC310210
*	CLEAR ACCUMULATOR TO READY FOR PACKING	UC310220
6A	CLA ZERO	UC310230
*	START TESTING THE BUFFER ARRAY	UC310240
	LGL 6	UC310250
	CAS CHWD	UC310260
	TRA **+2	UC310270

	TRA	RETRY	UC310280
	LGR	6	UC310290
SAVE	CAL	*,4	UC310300
	LGL	6	UC310310
*	PACK LETTER AND SAVE CUONT		UC310320
	SLW*	*-2	UC310330
	CLA	MOD6	UC310340
	ADD	WVS	UC310350
	STO	MOD6	UC310360
	SUB	MDS	UC310370
	TZE	**2	UC310380
	TRA	RETRY	UC310390
	CLA	ZERO	UC310400
	STO	MOD6	UC310410
	TXI	**1,4,+1	UC310420
RETRY	TIX	6A,2,1	UC310430
	TXI	**1,1,+1	UC310440
	TXL	START,1,84	UC310450
*	FILL WORD COMPLETELY BEFORE STORING		UC310460
*	AFTER ALL WORDS HAVE BEEN CHECKED RETURN WITH TOTAL		UC310470
	CLA	MDS	UC310480
	SUB	MOD6	UC310490
	TZE	OK	UC310500
	XCA		UC310510
	MPY	MDS	UC310520
	XCA		UC310530
	STA	**3	UC310540
FIX	CAL	*,4	UC310550
	LDQ	BLKS	UC310560
	LGL	2	UC310570
	SLW*	*-3	UC310580
OK	PXD	,4	UC310590
	ADD	#1B17	UC310600
CNT	STO	*	UC310610
	LXA	EX,4	UC310620
	LXA	EX+1,2	UC310630
	LXA	EX+2,1	UC310640
	TRA	4,4	UC310650
EX	BSS	3	UC310660
WVS	DEC	1	UC310670
MDS	DEC	6	UC310680
ZERO	DEC	0	UC310690
MOD6	DEC	0	UC310700
CHWD	OCT	000000000000	UC310710
BLKS	OCT	606060606060	UC310720
	END		UC310730

C
C//

*	FAP	UC320010
*PARNEM00		UC320020
*	PART NO. PUNCH TAPE ROUTINE FOR NUMERICAL CONTROL	UC320030
	ENTRY PARNOM	UC320040
	ENTRY PARNEM	UC320050
	BCI 1,PARNOM	UC320060
*	USE - CALL PARNOM (N,A) OR	UC320070
*	CALL PARNEM (N,A) WHERE -	UC320080
*	** A - IS THE BCD ARRAY WHOSE CHARACTERS WILL BE	UC320090
*	PUNCHED ON TAPE IN 5X5 MATRIX. FOR	UC320100
*	PARNOM THE PARITY WILL BE ODD - EVEN	UC320110

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*          FOR PARNEM.
*          *   IF N IS NEGATIVE, THE ARRAY /A/ WILL
*              BE CONSIDERED TO BE STORED BACKWARDS IN
*              CORE - OTHERWISE FORWARD IN CORE.
*          ** N - IS THE NUMBER OF CHARACTERS TO BE
*              PROCESSED IN ARRAY /A/. IF A $ SHOULD
*              BE ENCOUNTERED, PROCESSING WILL STOP.
*              THIS ROUTINE SHOULD BE USED TO LABEL A PUNCHED TAPE.
PARNOM CLA    SO
LDQ     SO+1
TXL     PARNEM+2
PARNEM CLA    SE
LDQ     SE+1
STO     ST1
STQ     ST2
SXA     EX,4
SXA     EX+1,2
SXA     EX+2,1
SXA     F3
CLA*    $PUNIDS      GET ID
STO     CARDN+1
CLA*    $PUNNOM      GET SEQ. NO.
UFA     #HCH0000
SUB     #HCH0000
STO     CARDN
CLA     2,4
STA     LOAD+1
SXA     LOAD
CLA*    1,4          SET UP CHAR. COUNT
PDX     0,2
TXI     *+1,2,1
AXT     1,1
TMI     *+2
AXC     1,1          SET UP STORAGE DIR
SXD     LOAD+2,1
AXT     24,4
STZ     TAP+24,4
TIX     *-1,4,1
CLA     CS
STA     TS
PAR3    TSX     LOAD,4
TNX     PAR1,2,1
LDQ     JOE
PXD     6
LGL     6
STQ     JOE
CAS     #43          IS IT $
TRA     *+2
TRA     PAR1         YES
LXA     TAB1,4       SEARCH TABLE
CAS     TAB1,4
TRA     *+2
TRA     PAR5         FOUND
TIX     *-3,4,1
PAR4    TIX     PAR3+1,1,1
TXL     PAR3
PAR5    PXA     0,4
SXA     F5,1
ALS     1           DOUBLE
PAX     0,1

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UC320120
UC320130
UC320140
UC320150
UC320160
UC320170
UC320180
UC320190
UC320200
UC320210
UC320220
UC320230
UC320240
UC320250
UC320260
UC320270
UC320280
UC320290
UC320300
UC320310
UC320320
UC320330
UC320340
UC320350
UC320360
UC320370
UC320380
UC320390
UC320400
UC320410
UC320420
UC320430
UC320440
UC320450
UC320460
UC320470
UC320480
UC320490
UC320500
UC320510
UC320520
UC320530
UC320540
UC320550
UC320560
UC320570
UC320580
UC320590
UC320600
UC320610
UC320620
UC320630
UC320640
UC320650
UC320660
UC320670
UC320680
UC320690
UC320700
UC320710

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F3	AXT	0,4		UC320720
ST1	CLA	**,1		UC320730
	STO	TAP,4		UC320740
ST2	CLA	**,1		UC320750
	STO	TAP+1,4		UC320760
F5	AXT	0,1		UC320770
	TXI	*+1,4,-2		UC320780
	SXA	F3,4		UC320790
	TXH	*+3,4,-24		UC320800
	TSX	PUNC,4	OUTPUT CARD	UC320810
	SXA	F3		UC320820
TS	TRA	**		UC320830
PAR1	CLA	CS1	FILL REST OF CARD	UC320840
	STA	TS	AND EXIT	UC320850
PAR1A	LXA	F3,4	CARD FULL	UC320860
	TXL	EX,4,0	YES	UC320870
	LXA	TAB1,4		UC320880
	TRA	PAR5		UC320890
EX	AXT	0,4		UC320900
	AXT	0,2		UC320910
	AXT	0,1		UC320920
	TRA	3,4		UC320930
JOE				UC320940
BOTROW	EQU	7		UC320950
TAP	BSS	24		UC320960
CARDN	BSS	2		UC320970
LOAD	AXT	0,1		UC320980
	LDQ	**,1		UC320990
	TXI	*+1,1,**		UC321000
	SXA	LOAD,1		UC321010
	STQ	JOE		UC321020
	AXT	6,1		UC321030
	TRA	1,4		UC321040
PUNC	SXA	PUNC1,4		UC321050
	TSX	\$PUNCH2,4		UC321060
	PZE	0,6		UC321070
	TXH	CARDN,6,2		UC321080
	TXH	TAP,2,24		UC321090
	CLA	CARDN		UC321100
	ADD	#1		UC321110
	STO	CARDN		UC321120
	ADD	#HCH0000		UC321130
	FAD	#HCH0000		UC321140
	STO*	\$PUNNOM		UC321150
	AXT	24,4		UC321160
	STZ	TAP+24,4		UC321170
	TIH	*-1,4,1		UC321180
PUNC1	AXT	0,4		UC321190
	TRA	1,4		UC321200
SO	CLA	TAB0,1		UC321210
	CLA	TAB0+1,1		UC321220
SE	CLA	TABE,1		UC321230
	CLA	TABE+1,1		UC321240
CS		PAR4		UC321250
CS1		PAR1A		UC321260
TA	OCT	60,0,1,2	012	UC321270
	OCT	3,4,5,6	3456	UC321280
	OCT	7,10,11,13	789#	UC321290
	OCT	20,21,22,23	+ABC	UC321300
	OCT	24,25,26,27	DEFG	UC321310

	OCT	30,31,33,34	HI.)	UC321320
	OCT	40,41,42,43	-JKL	UC321330
	OCT	44,45,46,47	MNOP	UC321340
	OCT	50,51,53,54	QRS*	UC321350
	OCT	61,62,63,64	/STU	UC321360
	OCT	65,66,67,70	VWXY	UC321370
	OCT	71,73,74	Z,I	UC321380
TABI	PZE	TABI-TA		UC321390
	REM	TABLE FOR ODD PARITY		UC321400
ZA	EQU	9-BOTROW		UC321410
Z	EQU	ZA*2		UC321420
	VFD	12/128*Z,12/128*Z,12/128*Z		UC321430
	VFD	12/128*Z,12/128*Z,12/128*Z		UC321440
	VFD	12/62*Z,12/193*Z,12/193*Z		UC321450
	VFD	12/193*Z,12/62*Z,12/128*Z		UC321460
	VFD	12/N1,12/2*Z,12/127*Z		UC321470
	VFD	12/N1,12/N1,12/N1		UC321480
	VFD	12/194*Z,12/97*Z,12/81*Z		UC321490
	VFD	12/73*Z,12/70*Z,12/N1		UC321500
	VFD	12/161*Z,12/193*Z,12/73*Z		UC321510
	VFD	12/205*Z,12/179*Z,12/N1		UC321520
	VFD	12/152*Z,12/148*Z,12/146*Z		UC321530
	VFD	12/127*Z,12/16*Z,12/N1		UC321540
	VFD	12/167*Z,12/69*Z,12/69*Z		UC321550
	VFD	12/69*Z,12/185*Z,12/N1		UC321560
	VFD	12/188*Z,12/194*Z,12/73*Z		UC321570
	VFD	12/73*Z,12/176*Z,12/N1		UC321580
	VFD	12/Z,12/Z,12/121*Z		UC321590
	VFD	12/133*Z,12/131*Z,12/N1		UC321600
	VFD	12/182*Z,12/73*Z,12/73*Z		UC321610
	VFD	12/73*Z,12/182*Z,12/N1		UC321620
	VFD	12/134*Z,12/73*Z,12/73*Z		UC321630
	VFD	12/161*Z,12/158*Z,12/N1		UC321640
	VFD	12/162*Z,12/162*Z,12/162*Z		UC321650
	VFD	12/162*Z,12/162*Z,12/N1		UC321660
	VFD	12/8*Z,12/8*Z,12/62*Z		UC321670
	VFD	12/8*Z,12/8*Z,12/N1		UC321680
	VFD	12/254*Z,12/145*Z,12/145*Z		UC321690
	VFD	12/145*Z,12/254*Z,12/N1		UC321700
	VFD	12/127*Z,12/73*Z,12/73*Z		UC321710
	VFD	12/73*Z,12/182*Z,12/N1		UC321720
	VFD	12/62*Z,12/193*Z,12/193*Z		UC321730
	VFD	12/193*Z,12/162*Z,12/N1		UC321740
	VFD	12/127*Z,12/193*Z,12/193*Z		UC321750
	VFD	12/193*Z,12/62*Z,12/N1		UC321760
	VFD	12/127*Z,12/73*Z,12/73*Z		UC321770
	VFD	12/73*Z,12/193*Z,12/N1		UC321780
	VFD	12/127*Z,12/137*Z,12/137*Z		UC321790
	VFD	12/137*Z,12/Z,12/N1		UC321800
	VFD	12/62*Z,12/193*Z,12/193*Z		UC321810
	VFD	12/73*Z,12/121*Z,12/N1		UC321820
	VFD	12/127*Z,12/8*Z,12/8*Z		UC321830
	VFD	12/8*Z,12/127*Z,12/N1		UC321840
	VFD	12/N1,12/193*Z,12/127*Z		UC321850
	VFD	12/193*Z,12/N1,12/N1		UC321860
	VFD	12/N1,12/N1,12/224*Z		UC321870
	VFD	12/224*Z,12/N1,12/N1		UC321880
	VFD	12/N1,12/193*Z,12/193*Z		UC321890
	VFD	12/162*Z,12/28*Z,12/N1		UC321900
	VFD	12/8*Z,12/8*Z,12/8*Z		UC321910

VFD	12/8*Z, 12/8*Z, 12/NI	UC321920
VFD	12/32*Z, 12/64*Z, 12/64*Z	UC321930
VFD	12/191*Z, 12/NI, 12/NI	UC321940
VFD	12/127*Z, 12/8*Z, 12/148*Z	UC321950
VFD	12/162*Z, 12/193*Z, 12/NI	UC321960
VFD	12/127*Z, 12/64*Z, 12/64*Z	UC321970
VFD	12/64*Z, 12/64*Z, 12/NI	UC321980
VFD	12/127*Z, 12/2*Z, 12/140*Z	UC321990
VFD	12/2*Z, 12/127*Z, 12/NI	UC322000
VFD	12/127*Z, 12/2*Z, 12/4*Z	UC322010
VFD	12/8*Z, 12/127*Z, 12/NI	UC322020
VFD	12/62*Z, 12/193*Z, 12/69*Z	UC322030
VFD	12/67*Z, 12/62*Z, 12/NI	UC322040
VFD	12/127*Z, 12/137*Z, 12/137*Z	UC322050
VFD	12/137*Z, 12/134*Z, 12/NI	UC322060
VFD	12/62*Z, 12/193*Z, 12/81*Z	UC322070
VFD	12/161*Z, 12/94*Z, 12/NI	UC322080
VFD	12/127*Z, 12/137*Z, 12/25*Z	UC322090
VFD	12/41*Z, 12/70*Z, 12/NI	UC322100
VFD	12/70*Z, 12/73*Z, 12/127*Z	UC322110
VFD	12/73*Z, 12/49*Z, 12/NI	UC322120
VFD	12/8*Z, 12/42*Z, 12/28*Z	UC322130
VFD	12/42*Z, 12/8*Z, 12/NI	UC322140
VFD	12/32*Z, 12/16*Z, 12/8*Z	UC322150
VFD	12/4*Z, 12/2*Z, 12/NI	UC322160
VFD	12/70*Z, 12/73*Z, 12/73*Z	UC322170
VFD	12/73*Z, 12/49*Z, 12/NI	UC322180
VFD	12/Z, 12/Z, 12/127*Z	UC322190
VFD	12/Z, 12/Z, 12/NI	UC322200
VFD	12/191*Z, 12/64*Z, 12/64*Z	UC322210
VFD	12/64*Z, 12/191*Z, 12/NI	UC322220
VFD	12/143*Z, 12/176*Z, 12/64*Z	UC322230
VFD	12/176*Z, 12/143*Z, 12/NI	UC322240
VFD	12/191*Z, 12/64*Z, 12/188*Z	UC322250
VFD	12/64*Z, 12/191*Z, 12/NI	UC322260
VFD	12/227*Z, 12/148*Z, 12/8*Z	UC322270
VFD	12/148*Z, 12/227*Z, 12/NI	UC322280
VFD	12/7*Z, 12/8*Z, 12/112*Z	UC322290
VFD	12/8*Z, 12/7*Z, 12/NI	UC322300
VFD	12/97*Z, 12/81*Z, 12/73*Z	UC322310
VFD	12/69*Z, 12/67*Z, 12/NI	UC322320
VFD	12/NI, 12/NI, 12/208*Z	UC322330
VFD	12/176*Z, 12/NI, 12/NI	UC322340
VFD	12/NI, 12/28*Z, 12/162*Z	UC322350
VFD	12/193*Z, 12/193*Z, 12/NI	UC322360
TABO	BSS	UC322370
KI	EQU	UC322380
NI	EQU	UC322390
REM	TABLE FOR EVEN PARITY	UC322400
VFD	12/KI, 12/KI, 12/KI	UC322410
VFD	12/KI, 12/KI, 12/KI	UC322420
VFD	12/190*Z, 12/65*Z, 12/65*Z	UC322430
VFD	12/65*Z, 12/190*Z, 12/KI	UC322440
VFD	12/KI, 12/130*Z, 12/255*Z	UC322450
VFD	12/KI, 12/KI, 12/KI	UC322460
VFD	12/66*Z, 12/225*Z, 12/209*Z	UC322470
VFD	12/201*Z, 12/198*Z, 12/KI	UC322480
VFD	12/33*Z, 12/65*Z, 12/201*Z	UC322490
VFD	12/77*Z, 12/51*Z, 12/KI	UC322500
VFD	12/24*Z, 12/20*Z, 12/18*Z	UC322510

VFD	12/255*Z,12/144*Z,12/K1	UC322520
VFD	12/39*Z,12/197*Z,12/197*Z	UC322530
VFD	12/197*Z,12/57*Z,12/K1	UC322540
VFD	12/60*Z,12/66*Z,12/201*Z	UC322550
VFD	12/201*Z,12/48*Z,12/K1	UC322560
VFD	12/129*Z,12/129*Z,12/249*Z	UC322570
VFD	12/5*Z,12/3*Z,12/K1	UC322580
VFD	12/54*Z,12/201*Z,12/201*Z	UC322590
VFD	12/201*Z,12/54*Z,12/K1	UC322600
VFD	12/6*Z,12/201*Z,12/201*Z	UC322610
VFD	12/33*Z,12/30*Z,12/K1	UC322620
VFD	12/34*Z,12/34*Z,12/34*Z	UC322630
VFD	12/34*Z,12/34*Z,12/K1	UC322640
VFD	12/136*Z,12/136*Z,12/190*Z	UC322650
VFD	12/136*Z,12/136*Z,12/K1	UC322660
VFD	12/126*Z,12/17*Z,12/17*Z	UC322670
VFD	12/17*Z,12/126*Z,12/K1	UC322680
VFD	12/255*Z,12/201*Z,12/201*Z	UC322690
VFD	12/201*Z,12/54*Z,12/K1	UC322700
VFD	12/190*Z,12/65*Z,12/65*Z	UC322710
VFD	12/65*Z,12/34*Z,12/K1	UC322720
VFD	12/255*Z,12/65*Z,12/65*Z	UC322730
VFD	12/65*Z,12/190*Z,12/K1	UC322740
VFD	12/255*Z,12/201*Z,12/201*Z	UC322750
VFD	12/201*Z,12/65*Z,12/K1	UC322760
VFD	12/255*Z,12/9*Z,12/9*Z	UC322770
VFD	12/9*Z,12/129*Z,12/K1	UC322780
VFD	12/190*Z,12/65*Z,12/65*Z	UC322790
VFD	12/201*Z,12/249*Z,12/K1	UC322800
VFD	12/255*Z,12/136*Z,12/136*Z	UC322810
VFD	12/136*Z,12/255*Z,12/K1	UC322820
VFD	12/K1,12/65*Z,12/255*Z	UC322830
VFD	12/65*Z,12/K1,12/K1	UC322840
VFD	12/K1,12/K1,12/96*Z	UC322850
VFD	12/96*Z,12/K1,12/K1	UC322860
VFD	12/K1,12/65*Z,12/65*Z	UC322870
VFD	12/34*Z,12/156*Z,12/K1	UC322880
VFD	12/136*Z,12/136*Z,12/136*Z	UC322890
VFD	12/136*Z,12/136*Z,12/K1	UC322900
VFD	12/160*Z,12/K1,12/K1	UC322910
VFD	12/63*Z,12/K1,12/K1	UC322920
VFD	12/255*Z,12/136*Z,12/20*Z	UC322930
VFD	12/34*Z,12/65*Z,12/K1	UC322940
VFD	12/255*Z,12/K1,12/K1	UC322950
VFD	12/K1,12/K1,12/K1	UC322960
VFD	12/255*Z,12/130*Z,12/12*Z	UC322970
VFD	12/130*Z,12/255*Z,12/K1	UC322980
VFD	12/255*Z,12/130*Z,12/132*Z	UC322990
VFD	12/136*Z,12/255*Z,12/K1	UC323000
VFD	12/190*Z,12/65*Z,12/197*Z	UC323010
VFD	12/195*Z,12/190*Z,12/K1	UC323020
VFD	12/255*Z,12/9*Z,12/9*Z	UC323030
VFD	12/9*Z,12/6*Z,12/K1	UC323040
VFD	12/190*Z,12/65*Z,12/209*Z	UC323050
VFD	12/33*Z,12/222*Z,12/K1	UC323060
VFD	12/255*Z,12/9*Z,12/153*Z	UC323070
VFD	12/169*Z,12/198*Z,12/K1	UC323080
VFD	12/198*Z,12/201*Z,12/255*Z	UC323090
VFD	12/201*Z,12/177*Z,12/K1	UC323100
VFD	12/136*Z,12/170*Z,12/156*Z	UC323110

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VFD      12/170*Z,12/136*Z,12/K1      UC323120
VFD      12/160*Z,12/144*Z,12/136*Z    UC323130
VFD      12/132*Z,12/130*Z,12/K1      UC323140
VFD      12/198*Z,12/201*Z,12/201*Z    UC323150
VFD      12/201*Z,12/177*Z,12/K1      UC323160
VFD      12/129*Z,12/129*Z,12/255*Z    UC323170
VFD      12/129*Z,12/129*Z,12/K1      UC323180
VFD      12/63*Z,12/K1,12/K1          UC323190
VFD      12/K1,12/63*Z,12/K1          UC323200
VFD      12/15*Z,12/48*Z,12/K1        UC323210
VFD      12/48*Z,12/15*Z,12/K1        UC323220
VFD      12/63*Z,12/K1,12/60*Z        UC323230
VFD      12/K1,12/63*Z,12/K1          UC323240
VFD      12/99*Z,12/20*Z,12/136*Z     UC323250
VFD      12/20*Z,12/99*Z,12/K1        UC323260
VFD      12/135*Z,12/136*Z,12/240*Z    UC323270
VFD      12/136*Z,12/135*Z,12/K1      UC323280
VFD      12/225*Z,12/209*Z,12/201*Z    UC323290
VFD      12/197*Z,12/195*Z,12/K1      UC323300
VFD      12/K1,12/K1,12/80*Z          UC323310
VFD      12/48*Z,12/K1,12/K1          UC323320
VFD      12/K1,12/156*Z,12/34*Z        UC323330
VFD      12/65*Z,12/65*Z,12/K1        UC323340
TABE     BSS      0                    UC323350
END                                             UC323360

C
C///////////////////////////////////////////////////
C
*      LIST                        UC330010
*      LABEL                      UC330020
CPRNO                                UC330030
      SUBROUTINE PARTNO              UC330040
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C      PARTNO - THIS ROUTINE REDEFINES THE PARTNO. AS SPECIFIED      UC330520
C      J#14                                                         UC330530
C      STORE THE PARTNO INFORMATION                                  UC330540
C      DO18 K#4,14                                                  UC330550
C      J#J-1                                                         UC330560
C      18 PNOFLG(J)#TAPSTO(K)                                       UC330570
C      PNOFLG(2)#TAPSTO(4)                                         UC330580
C      IDUM(4)#0                                                    UC330590
C      CALL PREINT TO PRODUCE NEW LEADER                            UC330600
C      CALL PREINT                                                  UC330610
C      RETURN                                                         UC330620
C      END                                                            UC330630
C
C///////////////////////////////////////////////////
C
*      LIST                        UC340010
*      LABEL                      UC340020
CPCRD                                UC340030
      SUBROUTINE PCOORD(JJ)      UC340040
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C      PCOORD -THIS ROUTINE DETERMINES WHICH PLANE IS TO BE REFERENCED UC340520
C                                                         UC340530
C                                                         UC340540
C                                                         UC340550

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C      TEST WHICH PLANE IF ANNY HAS BEEN REQUESTED                UC340560
      IF(ABSF(OPTAB(1))-2.5)-2.5)7,7,6                            UC340570
C      NONE, CALL ERROR ROUTINE                                    UC340580
      CALL ERREX(14)                                              UC340590
      6 7 ITABI#OPTAB(1)+.5                                         UC340600
C      TRANSFER ON PLANE NOX,NOY,NOZ,XYZ,ALL                       UC340610
      GO TO(1,2,3,4,4), ITABI                                     UC340620
C      YZ PLANE                                                    UC340630
      1  XVALUE#TAPSTO(JJ+1)                                       UC340640
      YVALUE#TAPSTO(JJ+2)                                         UC340650
      GOTO 10                                                      UC340660
C      XZ PLANE                                                    UC340670
      2  XVALUE#TAPSTO(JJ)                                         UC340680
      YVALUE#TAPSTO(JJ+2)                                         UC340690
      GOTO 10                                                      UC340700
C      XY PLANE                                                    UC340710
      3  XVALUE#TAPSTO(JJ)                                         UC340720
      YVALUE#TAPSTO(JJ+1)                                         UC340730
      GOTO 10                                                      UC340740
C      XYZ OR ALL                                                  UC340750
      4  XVALUE#TAPSTO(JJ)                                         UC340760
      YVALUE#TAPSTO(JJ+1)                                         UC340770
      ZVALUE#TAPSTO(JJ+2)                                         UC340780
      GOTO 5                                                        UC340790
      10 ZVALUE#0.0                                                UC340800
      5  RETURN                                                    UC340810
      END                                                            UC340820

C
C ///////////////////////////////////////////////////////////////////
C
C      LIST                                                        UC350010
C      LABEL                                                       UC350020
CPLOT SUBROUTINE PLOT                                             UC350030
      UC350040
C
C      *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C      PLOT - THIS ROUTINE EXAMINES THE PLOT/ COMMAND AND TAKES   UC350520
C      APPROPRIATE ACTION ON ALL MODIFIERS I.E., ON, OFF,        UC350530
C      HOLLERITH CHARACTER SETS, ETC.                             UC350540
C      DOES PLOT APPLY TO THIS MACHINE                             UC350550
C      IF(OPTAB(31))2,1,2                                         UC350560
C      RETURN                                                      UC350570
      1  RETURN                                                    UC350580
      2  NW#3                                                       UC350590
C      HAVE ALL WORDS BEEN EXAMINED                                UC350600
      4  IF(NWPR-NW) 19,19,5                                       UC350610
      5  NW#NW+1                                                    UC350620
C
C      CHECK FOR THE APT WORD ON                                   UC350630
C
C      IF(INTAP(NW)-71) 7,6,7                                       UC350640
C      IF(PLOTON-1.0) 23,4,23                                       UC350650
      6  IF(PLOTON-1.0) 23,4,23                                       UC350660
      23 PLOTON#1.0                                                 UC350670
      PLOTSY#1.0                                                    UC350680
      DAFTON#0.0                                                    UC350690
      GOTO 4                                                        UC350700
C
C      CHECK FOR THE APT WORD OFF                                  UC350710
C
C      IF(INTAP(NW)-72) 9,8,9                                       UC350720
      7  IF(INTAP(NW)-72) 9,8,9                                       UC350730
      UC350740
      UC350750

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C	YES	UC350760
8	PLOTON#0.0	UC350770
	GO TO 4	UC350780
C		UC350790
C	CHECK FOR THE APT WORD SYMBOL	UC350800
9	IF(INTAP(NW)-194) 14,10,14	UC350810
C	YES	UC350820
10	NW#NW+1	UC350830
	CALL APTA(NW,APTF LG)	UC350840
	IF(APTF LG-1.0) 21,11,11	UC350850
11	DO 12 M#10,64	UC350860
	IF(TAPSTO(NW)-FLOATF(M)) 12,13,12	UC350870
12	CONTINUE	UC350880
13	CALL PLTSET(M,1,NUMTMS)	UC350890
	GO TO 4	UC350900
C		UC350910
C	CHECK FOR THE APT WORD INTEGER	UC350920
C		UC350930
14	IF(INTAP(NW)-196) 17,15,17	UC350940
15	NW#NW+1	UC350950
	CALL APTA(NW,APTF LG)	UC350960
	IF(APTF LG-1.0) 21,16,16	UC350970
16	INTAP(NW)#TAPSTO(NW)	UC350980
	CALL PLTSET(INTAP(NW),2,NUMTMS)	UC350990
	GO TO 4	UC351000
C		UC351010
C	CHECK FOR THE APT WORD HOLRTH	UC351020
C		UC351030
17	IF(INTAP(NW)-195) 22,18,22	UC351040
18	NW#NW+1	UC351050
	CALL PLTSET(INTAP(NW),3,NUMTMS)	UC351060
	GO TO 4	UC351070
C		UC351080
C	CALL PLTOUT IF PLOTON#1.0	UC351090
C		UC351100
19	IF(PLOTSY-1.0) 1,20,1	UC351110
20	CALL PLTOUT(NUMTMS)	UC351120
	GO TO 1	UC351130
C	ERRORS 21 AN APT WORD WHERE A NUMBER SHOULD BE, OR	UC351140
C	22 AN IMPROPER PLOT MODIFIER	UC351150
21	CALL ERREX(15)	UC351160
	GO TO 4	UC351170
22	CALL ERREX(10)	UC351180
	GO TO 4	UC351190
	END	UC351200
C		
C	////////////////////////////////////	
C		
*	LIST	UC360010
*	LABEL	UC360020
CPLUT		UC360030
	SUBROUTINE PLTOUT(NUMTMS)	UC360040
C		
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC360520
	J#0	UC360530
C	PLTOUT - A SUBROUTINE TO SET UP PLOT INFORMATION	UC360540
C	WHEN THE MACHINE IS IN THE PLOT MODE	UC360550
C	IS THIS THE FIRST TIME AFTER A PLOT/ON	UC360560
	IF(PLOTSY-1.0)5,1,5	UC360570

C	TRANSFER ON MACHINE	UC360580
1	M#MTABLE(6)	UC360590
	GOTO(4,2,17,17,17),M	UC360600
C	GERBER FLOWS THIS WAY	UC360610
C	ARE WE IN THE DRAW OR TYPE MODE	UC360620
2	IF(OPTAB(16)-1.0) 17,4,3	UC360630
C	TYPE THEREFORE ADD OFFSET	UC360640
3	BUFP(3)#PREVX+OPTAB(23)	UC360650
	BUFP(4)#PREVY+OPTAB(24)	UC360660
	BUFP(5)#PREVZ+OPTAB(25)	UC360670
	IDUM(31)#1	UC360680
	PLOTSY#0.0	UC360690
	GOTO8	UC360700
C	DRAW MODE AND OR BENSON-LEHNER	UC360710
4	BUFP(3)#PREVX	UC360720
	BUFP(4)#PREVY	UC360730
	BUFP(5)#PREVZ	UC360740
	IDUM(31)#0	UC360750
	PLOTSY#0.0	UC360760
C	OUTPUT SEPERATE BLOCK IF GERBER	UC360770
	GOTO(9,8,17,17,17),M	UC360780
C	NOT THE FIRST TIME,WHAT IS THE PRESENT MODE	UC360790
5	CALL PCOORD(JJ)	UC360800
	M#MTABLE(6)	UC360810
	IF(OPTAB(16)-1.0)17,6,19	UC360820
C	DRAW,WAS LAST MOVE IN TYPE MODE	UC360830
6	IF(IDUM(31)) 20,20,7	UC360840
C	YES,SUBTRACT OFFSET AND RESET FLAG IDUM(31)	UC360850
7	XVALUE#XVALUE-OPTAB(23)	UC360860
	YVALUE#YVALUE-OPTAB(24)	UC360870
	ZVALUE#ZVALUE-OPTAB(25)	UC360880
	IDUM(31)#0	UC360890
	GOTO20	UC360900
C	TYPE, WAS THE LAST MOVE IN THE DRAW MODE	UC360910
19	IF(IDUM(31))18,18,20	UC360920
C	YES,ADD OFFSET AND RESET FLAG IDUM(31)	UC360930
18	XVALUE#XVALUE+OPTAB(23)	UC360940
	YVALUE#YVALUE+OPTAB(24)	UC360950
	ZVALUE#ZVALUE+OPTAB(25)	UC360960
	IDUM(31)#1	UC360970
C	NO MODE DID NOT CHANGE BETWEEN MOVES	UC360980
20	BUFP(3)#XVALUE	UC360990
	BUFP(4)#YVALUE	UC361000
	BUFP(5)#ZVALUE	UC361010
C	OUTPUT BLOCK IF GERBER	UC361020
	GOTO(9,8,17,17,17),M	UC361030
8	BUFP(2)#1.0	UC361040
	BUFP(21)#2.0	UC361050
	CALL SEQOUT	UC361060
	CALL PTAPE	UC361070
C	START PROCESSING NUMTMS ARRAY FOR SYMBOL,INTEGER,OR HOLRTH	UC361080
9	IF(OPTAB(19)-45.0) 31,30,30	UC361090
30	TEMPG#53.0	UC361100
	GOTO35	UC361110
31	IF(OPTAB(16))32,17,32	UC361120
32	IF(OPTAB(16)-1.0) 34,33,34	UC361130
33	TEMPG#52.0	UC361140
	GOTO35	UC361150
34	TEMPG#51.0	UC361160
35	DO 15 M#1,3	UC361170

	IF(NUMTMS(M))14,14,10	UC361180
	IF(M-3)11,12,12	UC361190
C	SYMBOL OR INTEGER	UC361200
11	BUFP(21)#FLOATF(IDUM(M+14))	UC361210
	BUFP(2)#TEMPG	UC361220
	CALL CHKM	UC361230
	CALL SEQOUT	UC361240
	CALL PTAPE	UC361250
	GOTO15	UC361260
C	HOLRTH	UC361270
12	IF(TEMPG-51.0)37,38,37	UC361280
38	IF(IDUM(31))36,36,37	UC361290
36	BUFP(3)#BUFP(3)+OPTAB(23)	UC361300
	BUFP(4)#BUFP(4)+OPTAB(24)	UC361310
	BUFP(5)#BUFP(5)+OPTAB(25)	UC361320
	IDUM(31)#1	UC361330
	BUFP(2)#1.0	UC361340
	BUFP(21)#2.0	UC361350
	CALL SEQOUT	UC361360
	CALL PTAPE	UC361370
37	BUFP(2)#TEMPG	UC361380
	DO13 L#1,6	UC361390
	K#6*(6-L)	UC361400
	CALL SHIFT(IDUM(17),K,DWORD)	UC361410
	CALL DCODE(DWORD,DNOW)	UC361420
	BUFP(21)#DNOW	UC361430
	CALL CHKM	UC361440
	CALL SEQOUT	UC361450
13	CALL PTAPE	UC361460
	GOTO15	UC361470
14	J#J+1	UC361480
15	CONTINUE	UC361490
	IF(J-3)17,16,16	UC361500
16	CALL ERREX(16)	UC361510
17	RETURN	UC361520
	END	UC361530
C		
C	////////////////////////////////////	
C		
*	LIST	UC370010
*	LABEL	UC370020
CPLST		UC370030
	SUBROUTINE PLTSET(M,J,NUMTMS)	UC370040
C		
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC370520
C	PLTSET - A SUBROUTINE TO STORE PLOT INFORMATION FOR	UC370530
C	SUBSEQUENT MOVEMENTS	UC370540
C		UC370550
C	TEST IDUM(6) FOR A NEW PLOT STATEMENT	UC370560
C		UC370570
	IF(IDUM(6)-1) 1,15,1	UC370580
1	J#J	UC370590
	GO TO(8,9,10),J	UC370600
C		UC370610
C	M CONTAINS A SYMBOL	UC370620
C		UC370630
8	NUMTMS(1)#1	UC370640
	IDUM(15)#M	UC370650
	ADUM(26)#TEMPG	UC370660

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C      GO TO 11 UC370670
C      M CONTAINS AN INTEGER UC370680
C      UC370690
C      UC370700
C      9  NUMTMS(2)#1 UC370710
C      IDUM(16)#M+40 UC370720
C      ADUM(27)#TEMPG UC370730
C      GO TO 11 UC370740
C      UC370750
C      M CONTAINS HOLRTH INFORMATION UC370760
C      UC370770
C      10 NUMTMS(3)#1 UC370780
C      IDUM(17)#M UC370790
C      ADUM(28)#TEMPG UC370800
C      11 RETURN UC370810
C      12 DO 13 K#1,3 UC370820
C      13 NUMTMS(K)#0 UC370830
C      IDUM(6)# 0 UC370840
C      GO TO 1 UC370850
C      UC370860
C      YES,TEST FOR THE MODE OF PLOTTING,I.E. ARE THE BUFFERS TO BE UC370870
C      CHANGED EACH TIME OR ARE THEY TO CHANGE ONLY THOSE SPECIFIED BY UC370880
C      THE NEW PLOT STATEMENT UC370890
C      UC370900
C      15 IF(OPTAB(199)-1.0) 12,1,12 UC370910
C      END UC370920
C
C ///////////////////////////////////////////////////////////////////
C
C      * LIST UC380010
C      * LABEL UC380020
C      SUBROUTINE TO PRINT A LINE OF INFORMATION ON A PAGE UC380030
C      SUBROUTINE PPRINT UC380040
C
C      *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C      PPRINT - CHARACTERS (UP TO 66) FOLLOWING THE PPRINT STATEMENT UC380520
C      APPEAR IN THE OUTPUT LISTING. FOR DRAFTING MACHINES THE UC380530
C      CHARACTERS ARE PLACED ON THE DRAWING AT THE CURRENT UC380540
C      POSITION IN A MODE ESTABLISHED BY THE LETTER/ COMMAND. UC380550
C      UC380560
C      DIMENSION KARRAY(11) UC380570
C      K#0 UC380580
C      M#MTABLE(6) UC380590
C      PLT#0.0 UC380600
C
C      IS MACHINE IN THE DRAW OR TYPE MODE UC380610
C      IF(OPTAB(16)-1.0)19,22,20 UC380620
C      20 GOTO(22,21,19,19,19),M UC380630
C      TYPE,IF GERBER, HAS AN OFFSET BEEN GIVEN UC380640
C      21 IF(IDUM(31)) 23,23,22 UC380650
C      YES,FLOW THE SAME WAY AS DRAW MODE UC380660
C      DRAW, SET UP BLOCK WITHOUT OFFSET UC380670
C      22 BUFP(3)#PREVX UC380680
C      BUFP(4)#PREVY UC380690
C      BUFP(5)#PREVZ UC380700
C      OLDX#BUFP(3) UC380710
C      GOTO24 UC380720
C
C      NO, OUTPUT SEPARATE BLOCK WITH OFFSET ANDPEN UP UC380730
C      23 BUFP(3)#PREVX+OPTAB(23) UC380740
C      BUFP(4)#PREVY+OPTAB(24) UC380750
C      BUFP(5)#PREVZ+OPTAB(25) UC380760

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	OLDX#BUFP(3)	UC380770
C	TRANSFER ON MACHINE	UC380780
	GOTO(26,24,19,19,19),M	UC380790
C	GERBER, OUTPUT BLOCK WITH PEN UP	UC380800
24	BUFP(2)#1.0	UC380810
	BUFP(21)#2.0	UC380820
	CALL SEQOUT	UC380830
	CALL PTAPE	UC380840
26	IF(OPTAB(19)-45.12,1,1	UC380850
1	TEMG#53.0	UC380860
	GO TO 6	UC380870
2	IF(OPTAB(16)) 3,18,3	UC380880
3	IF(OPTAB(16)-1.0) 5,4,5	UC380890
4	TEMG#52.0	UC380900
	GO TO 6	UC380910
5	TEMG#51.0	UC380920
6	BUFP(2)#TEMG	UC380930
C	DETERMINE NUMBER AND POSITION OF NON-BLANK WORDS IN THE STATEMENT	UC380940
	DO 8 LM#4,14	UC380950
	IF(TAPSTO(LM)-BLANKS) 7,8,7	UC380960
7	K#K+1	UC380970
	KARRAY(K)#LM	UC380980
8	CONTINUE	UC380990
	IF(K)9,18,9	UC381000
C	EXAMINE POSITION OF EACH WORD AND RELOCATE HEAD AS NECESSARY	UC381010
9	DO 16 J#1,K	UC381020
	IF(J-1) 12,12,10	UC381030
10	MQ#KARRAY(J)-KARRAY(J-1)	UC381040
	IF(MQ-1)14,14,11	UC381050
11	XMOVE#FLOATF(MQ)*(OPTAB(17)*5.25)	UC381060
	BUFP(3)#OLDX+XMOVE	UC381070
	BUFP(4)#PREVY	UC381080
	BUFP(5)#PREVZ	UC381090
	OLDX#BUFP(3)	UC381100
	GO TO 14	UC381110
12	IF(KARRAY(1)-4) 14,14,13	UC381120
13	XMOVE#FLOATF(KARRAY(1)-4)*(OPTAB(17)*5.25)	UC381130
	BUFP(3)#BUFP(3)+XMOVE	UC381140
	OLDX#BUFP(3)	UC381150
C	BREAK UP EACH WORD ,AND GIVE PROPER D CODE FOR EACH LETTER	UC381160
14	DO 15 L#1,6	UC381170
	KM#6*(6-L)	UC381180
	JFK#KARRAY(J)	UC381190
	CALL SHIFT(TAPSTO(JFK),KM,DWORD)	UC381200
	CALL DCODE(DWORD,DNOW)	UC381210
	BUFP(21)#DNOW	UC381220
	CALL CHKM	UC381230
	CALL SEQOUT	UC381240
C	OUTPUT SEPARATE BLOCK FOR EACH LETTER CONTAINING G,D,AND M CODES	UC381250
15	CALL PTAPE	UC381260
C	HAVE ALL WORDS BEEN PROCESSED	UC381270
C	NO,GO AGAIN	UC381280
16	CONTINUE	UC381290
C	YES, IS THE MACHINE IN THE DRAFT MODE	UC381300
	IF(DAFTON-1.0) 19,17,19	UC381310
17	BUFP(2)#1.0	UC381320
C	YES,OUTPUT BLOCK TO SUBTRACT OFFSET IF GIVEN	UC381330
	BUFP(3)#PREVX	UC381340
	BUFP(4)#PREVY	UC381350
	BUFP(5)#PREVZ	UC381360


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      BUFP(21)#2.0                                UC381370
      CALL SEQOUT                                  UC381380
      CALL PTAPE                                   UC381390
      GO TO 19                                     UC381400
C     NONE, CALL ERROR ROUTINE                     UC381410
18    CALL ERREX(17)                              UC381420
C     NO, RETURN                                   UC381430
19    RETURN                                       UC381440
      END                                          UC381450
C
C ///////////////////////////////////////////////////
C
*     LIST                                         UC390010
*     LABEL                                       UC390020
CPFUN                                           UC390030
      SUBROUTINE PREFUN                           UC390040
C                                                  UC390050
C
C     *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C     PREFUN - A G CODE OF N SPECIFIED BY THE PREFUN/N COMMAND IS UC390530
C               PLACED IN THE G REGISTER AND THE APPROPRIATE ROUTINES TO UC390540
C               GENERATE AN OUTPUT BLOCK ARE CALLED. UC390550
C
C     DOES A MODIFIER EXIST UC390560
C     IF(NWPR-4)20,15,20 UC390570
C     NO, CALL ERROR ROUTINE UC390580
20    CALL ERREX(18) UC390590
10    RETURN UC390600
C     YES, IS IT AN APT WORD UC390610
15    CALL APTA(4,APTF LG) UC390620
      IF(APTF LG-1.0) 20,16,16 UC390630
C     NO, PROCESS NORMALLY UC390640
16    BUFP(2)#TAPSTO(4) UC390650
C     OUTPUT SEPARATE BLOCK WITH G CODE SPECIFIED UC390660
      CALL SEQOUT UC390670
      CALL PTAPE UC390680
      GOTO 10 UC390690
      END UC390700
C                                                  UC390710
C ///////////////////////////////////////////////////
C
*     LIST8                                       UC400010
*     LABEL                                       UC400020
CPREINT UC400030
      SUBROUTINE PREINT                           UC400040
C
C     *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C     PREINT - A SUBROUTINE TO PUNCH LEADER AND TRAILER UC400520
C               INFORMATION ON THE N/C CONTROL TAPE UC400530
C
C     COMMON JTABL UC400540
C     DIMENSION JTABL(50) UC400550
C     DIMENSION AG(12),ABB(15),ABC(12) UC400560
C     WAS PREINT CALLED TO PRODUCE LEADER OR TRAILER UC400570
C     IF(IDUM(4))301,300,301 UC400580
C     LEADER, PUNCH SPECIAL CHARACTERS TO IDENTIFY LEADER UC400590
B 300 AE#606060606060 UC400600
      DO 799 J7#1,12 UC400610
      799 AG(J7)#AE UC400620
B     AG(9)#606044000053 UC400630
      UC400640

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B	AG(10)#606044000053	UC400650
B	AG(11)#440000757575	UC400660
	N#-72	UC400670
	J#0	UC400680
	K#1	UC400690
	CALL PUNCHA(N,AG,J,K)	UC400700
	N#-6	UC400710
	CALL PUNCHA(N,AG(10),J,K)	UC400720
	N#-12	UC400730
	CALL PUNCHA(N,AG(11),J,K)	UC400740
C	PUNCH MACHINE INFORMATION	UC400750
301	NN#MTABLE(6)	UC400760
	IF(NN-5)5,5,50	UC400770
	5 GO TO (11,12,13,14,15),NN	UC400780
	11 GO TO 50	UC400790
B	12 ABB(1)#272551222551	UC400800
B	ABB(2)#736047434663	UC400810
B	ABB(3)#255173606547	UC400820
B	ABB(4)#010000006060	UC400830
	GO TO 20	UC400840
	13 GO TO 50	UC400850
	14 GO TO 50	UC400860
	15 GO TO 50	UC400870
	20 K#14	UC400880
C	PUNCH PARTNO INFORMATION	UC400890
	DO 25 J#5,15	UC400900
	K#K-1	UC400910
	25 ABB(J)#PNOFLG(K)	UC400920
	N#-90	UC400930
	CALL PARNOM (N,ABB)	UC400940
	C#BITS	UC400950
	CALL PUNIDN(C)	UC400960
	B#7.0	UC400970
	CALL PUNSEQ(B)	UC400980
	IF(IDUM(4))50,302,50	UC400990
302	M#-60	UC401000
	DO30 L#1,10	UC401010
B	30 ABC(L)#131313131313	UC401020
	J#0	UC401030
	K#1	UC401040
	CALL PUNCHA(M,ABC,J,K)	UC401050
	M#-3	UC401060
B	ADD#343434536060	UC401070
	CALL PUNCHA(M,ADD,J,K)	UC401080
	50 RETURN	UC401090
	END	UC401100
C	C//	
C		
*	FAP	UC410010
*	PRTON - A SUBROUTINE TO PRINT ON-LINE ACCUMULATION	UC410020
*	OF THE PUNCHED TAPE FOOTAGE	UC410030
	ENTRY PRTON	UC410040
PRTON	CLA* 1,4	UC410050
	ARS 18	UC410060
	XCA	UC410070
	PXD 0,0	UC410080
	MPY N6	UC410090
	XCA	UC410100
	ADD ADR	UC410110

	STA	DO		UC410120
	SXA	B,4		UC410130
*	PICK UP	ACCUMULATED FOOTAGE		UC410140
	CLA*	2,4		UC410150
	STO	BB		UC410160
*	PRINT THE MESSAGE ON-LINE WITH THE GIVEN FOOTAGE			UC410170
	AXT	0,4		UC410180
DO	CLA	0,4		UC410190
	STO	PRT+5,4		UC410200
	TXI	*+1,4,1		UC410210
	TXL	DO,4,5		UC410220
	CALL	(SPH),PRT		UC410230
	CALL	(FIL)		UC410240
	LFTM			UC410250
	CALL	(SPH),ACC		UC410260
	LDQ	BB		UC410270
	STR			UC410280
	CALL	(FIL)		UC410290
	LFTM			UC410300
	LXA	B,4		UC410310
	TRA	3,4		UC410320
B	PZE	0		UC410330
BB	PZE	0		UC410340
ACC	BCI	6,(19H LENGTH OF TAPE IS 15,6H FEET)		UC410350
N6	OCT	6		UC410360
ADR	PZE	E1-1		UC410370
PRT	BSS	6		UC410380
E1	BCI	6,(30H0PUNCHED TAPE FOR B.L.)		UC410390
E2	BCI	6,(30H0PUNCHED TAPE FOR GERBER)		UC410400
	END			UC410410
C	C//			
C				
*	LIST			UC420010
*	LABEL			UC420020
	SUBROUTINE PRTOUT(N)			UC420030
C				
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****			
C				UC420510
C	PRTOUT- THE FUNCTION OF THIS ROUTINE IS TO PRODUCE THE PRINTED			UC420520
C	OUTPUT.			UC420530
	DIMENSION CATCH(10),ARRAY(26),IARRAY(26),FOR(28)			UC420540
	EQUIVALENCE(IARRAY,ARRAY)			UC420550
	KVD#0			UC420560
	ICNT#0			UC420570
B	FOR(1)#607401306073			UC420580
	DO1 K#1,10			UC420590
1	CATCH(K)#BLANKS			UC420600
	DO 2 K#2,28			UC420610
2	FOR(K)#BLANKS			UC420620
	IF(IDUM(3)) 3,3,4			UC420630
3	CALL PRTTIT			UC420640
4	IF(OPTAB(22))13,13,5			UC420650
5	M#XFIXF(OPTAB(22))			UC420660
	GOTO(13,6,6,13,13),M			UC420670
6	NOW#1			UC420680
	CALL BLDFMT(1,5,FOR,NOW,ICNT,ARRAY)			UC420690
	M#M			UC420700
	GOTO(13,8,7,13,13),M			UC420710
7	NOW#6			UC420720

	CALL BLDFMT(14,16,FOR,NOW,ICNT,ARRAY)	UC420730
	GOTO14	UC420740
8	NOW#NOW+1	UC420750
B	FOR(NOW)#600306676073	UC420760
14	NOW#NOW+1	UC420770
	CALL PAC(BUFFER,CATCH,KVD)	UC420780
	IF(KVD-6) 9,9,10	UC420790
B	9 FOR(NOW)#056706210660	UC420800
	IDUM(3)#IDUM(3)+1	UC420810
	GOTO11	UC420820
B	10 FOR(NOW)#056706210661	UC420830
B	FOR(NOW+1)#070767042106	UC420840
	IDUM(3)#IDUM(3)+2	UC420850
	NOW#NOW+1	UC420860
B	11 FOR(NOW+1)#603460606060	UC420870
	ICNT#ICNT	UC420880
	KVD#KVD	UC420890
	WRITE OUTPUT TAPE6,FOR,(ARRAY(I),I#1,ICNT),(CATCH(KL),KL#1,KVD)	UC420900
	IF(IDUM(3)-45) 13,12,12	UC420910
12	IDUM(3)#0	UC420920
13	RETURN	UC420930
	END	UC420940
C	////////////////////////////////////	
C		
*	LIST	UC430010
*	LABEL	UC430020
	SUBROUTINEPRTTIT	UC430030
C		
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC430510
C	PRTTIT - A SUBROUTINE TO WRITE TITLE,PARTNO,AND APPROPRIATE	UC430520
C	HEADING AT THE TOP OF EACH PAGE OF OUTPUT	UC430530
	DIMENSION STOPRT(10)	UC430540
C	HAS OUTPUT OTHER THAN ERRORS BEEN REQUESTED	UC430550
	IF(OPTAB(22))4,4,1	UC430560
C	YES, PRINT TITLE AND THE PARTNO	UC430570
1	WRITEOUTPUTTAPE6,7	UC430580
	DO9 J#5,14	UC430590
	K#15-J	UC430600
9	STOPRT(K)#PNOFLG(J)	UC430610
B	STOPRT(1)#472151634546	UC430620
	WRITE OUTPUT TAPE6,8,(STOPRT(J),J#1,10)	UC430630
	N#MTABLE(6)	UC430640
	GOTO(10,12,14,14,14),N	UC430650
10	WRITE OUTPUT TAPE 6,11	UC430660
11	FORMAT(1H0,2X27HMACHIN/BENSON,PLOTTER,1)	UC430670
	GOTO14	UC430680
12	WRITE OUTPUT TAPE 6,13	UC430690
13	FORMAT(1H0,2X27HMACHIN/GERBER,PLOTTER,VP1000)	UC430700
14	M#XFIXF(OPTAB(22))	UC430710
C	WHICH TYPE OF HEADING HAS BEEN REQUESTED	UC430720
	GOTO(4,2,3,4,4),M	UC430730
C	ERRORS PLUS X,Y,Z,AND PUNCHED TAPE	UC430740
2	WRITEOUTPUTTAPE6,5	UC430750
	GOTO4	UC430760
C	ERRORS PLUS X,Y,Z,I,J,K,AND PUNCHED TAPE	UC430770
3	WRITEOUTPUTTAPE6,6	UC430780
C	ALL OTHERS RETURN	UC430790
4	RETURN	UC430800

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5  FORMAT(1H0,4X1HN,5X1HG,9X1HX,12X1HY,
   112X1HZ,36X12HPUNCHED TAPE)
6  FORMAT(1H0,5X1HN,5X1HG,8X1HX,10X1HY,10X1HZ,10X1HI,10X1HJ,
   1 18X12HPUNCHED TAPE)
7  FORMAT(1H1,2X46HUNION CARBIDE APT POSTPROCESSOR OUTPUT LISTING)
8  FORMAT(1H0,2X11A6)
   END
C
C ///////////////////////////////////////////////////////////////////
C
*   LIST
*   LABEL
C   A SUBROUTINE TO SET UP OUTPUT BUFFER
   SUBROUTINE PTAPE
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C   PTAPE - A SUBROUTINE TO SETUP THE OUTPUT BUFFER
   IT2#OPTAB(3)+.0001
   IT1#OPTAB(2)+.0001
   LIM#IORDER(27)
   NN#-2
   SAVGTP#0.0
C IS THIS A FROM STATEMENT
   IF(INTAP(2)+INTAP(3)-5003)261,27,261
C   YES
   27 IF(OPTAB(5))26,29,26
C   INCREMENTAL MODE -- STORE COORDINATES IN ROUNDED FORM
   29 DO 31 I#3,6
       NI3#FORMAT(I)/10.+0.001
       NI4#ARSF(FORMAT(I)-FLOATF(NI3)*10.)+0.001
       NI5#XFIXF(TAPSTO(I+3)*10.**NI4+SIGNF(0.5,TAPSTO(I+3)))
   31 ADUM(I+20)#FLOATF(NI5)/(10.**NI4)
       GO TO 26
C
C   INITIALIZE OUTPUT BUFFER
   261 GOTO(260,260,260,3000,3000),IT1
   260 DO1 J#1,104
       1 BUFFER(J)#BLANKS
   B   BUFFER(104)#536060606060
C   DETERMINE PLANE TO BE USED
   3000 IF(OPTAB(1)-4.0)2,41,3
       2 BUFP(5)#BITS
       N11#4
       GO TO 47
C   IS INTERPOLATION MODE CIRCULAR
   41 IF(IDUM(12)-1)42,3,42
C   NO - PUT OUT IJK COORDINATES FROM CLTAPE
   42 DO 43 K#3,5
       KK#JJ+K
   43 BUFP(K+11)#TAPSTO(KK)
C   YES - IJK COORDINATES COMPUTED BY CIRCULAR INTERPOLATION ROUTINES
   3 N11#5
   47 IF(BUFP(2)-BITS)44,45,44
   44 IF(ADUM(29)-BUFP(2))46,45,46
   46 ADUM(29)#BUFP(2)
       SAVGTP#1.0
C   IS G-CODE MODAL
   45 IF(OPTAB(4))4,4,48
C   NO

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UC430810
UC430820
UC430830
UC430840
UC430850
UC430860
UC430870

UC440010
UC440020
UC440030
UC440040

UC440520
UC440530
UC440540
UC440550
UC440560
UC440570
UC440580
UC440590
UC440600
UC440610
UC440620
UC440630
UC440640
UC440650
UC440660
UC440670
UC440680
UC440690
UC440700
UC440710
UC440720
UC440730
UC440740
UC440750
UC440760
UC440770
UC440780
UC440790
UC440800
UC440810
UC440820
UC440830
UC440840
UC440850
UC440860
UC440870
UC440880
UC440890
UC440900
UC440910
UC440920
UC440930
UC440940
UC440950

48	BUFP(2)#ADUM(29)	UC440960
	GOTO404	UC440970
C	YES	UC440980
4	IF(SAVGTP-1.0)405,406,405	UC440990
405	BUFP(2)#BITS	UC441000
406	SAVGTP#0.0	UC441010
404	IF(BUFP(21)-10.0)4040,503,503	UC441020
4040	IF(BUFP(21)-BITS)500,503,500	UC441030
500	IF(SAVDTP-BUFP(21))501,502,501	UC441040
501	SAVDTP#BUFP(21)	UC441050
	GOTO503	UC441060
502	BUFP(21)#BITS	UC441070
C	DOES FEEDRATE APPLY TO THIS MACHINE	UC441080
503	IF(OPTAB(10))6,5,6	UC441090
C	NO	UC441100
5	BUFP(23)#BITS	UC441110
C	IS THIS A CUT SEQUENCE	UC441120
6	IF(BUFP(4)-BITS)7,8,7	UC441130
C	IS OUTPUT ABSOLUTE OR INCREMENTAL	UC441140
7	IF(OPTAB(5))8,9,8	UC441150
C	INCREMENTAL MODE	UC441160
9	DO 10 NI2#3,NI1	UC441170
	NI3#FORMAT(NI2)/10.+0.001	UC441180
	NI4#ABSF(FORMAT(NI2)-FLOATF(NI3)*10.)+0.001	UC441190
	NI5#XFIXF(BUFP(NI2)*10.**NI4+SIGNF(3.5,BUFP(NI2)))	UC441200
	AI1#FLOATF(NI5)/(10.0**NI4)	UC441210
	BUFP(NI2)#AI1-ADUM(NI2+20)	UC441220
10	ADUM(NI2+20)#AI1	UC441230
C	SET UP BUFFER ACCORDING TO OUTPUT FORMAT SPECIFIED	UC441240
8	GO TO (80,70,80,80,70),ITI	UC441250
B	70 TAB#546060606060	UC441260
	D033 LQ#4,100,4	UC441270
33	BUFFER(LQ)#TAB	UC441280
80	D012 NOW#1,LIM	UC441290
	L#IORDER(NOW)	UC441300
	IF(BUFP(L)-BITS)13,12,13	UC441310
13	FOR#FORMAT(L)/10.0+0.001	UC441320
	IX#FOR	UC441330
	FT#IX	UC441340
	A#ABSF(FORMAT(L)-(FT*10.0))+0.1	UC441350
	NN#NN+4	UC441360
	IF(OPTAB(3))16,17,17	UC441370
16	JX#A+100.0	UC441380
	GO TO 19	UC441390
17	JX#A	UC441400
19	CALL CONBCD(BUFP(L),BUFFER(NN),IX,JX)	UC441410
	IF(OPTAB(3))61,61,62	UC441420
62	CALL LEADD(BUFFER,NN,IX,JX)	UC441430
C	IS WORD ADDRESS DESIRED	UC441440
61	ITI#ITI	UC441450
	GOTO(14,14,15,15,14),ITI	UC441460
14	BUFFER(NN-1)#WORDS(L)	UC441470
	GO TO 12	UC441480
15	GO TO 12	UC441490
12	CONTINUE	UC441500
	IT3#OPTAB(33)	UC441510
C	BRANCH ACCORDING TO TYPE OF OUTPUT MEDIA	UC441520
	GO TO (20,21,22,23,24,25),IT3	UC441530
20	NB#-600	UC441540
	CALL PUNCHA(NB,BUFFER,0,0)	UC441550

GO TO 50	UC441560
21 CALL MAGEIA	UC441570
C MAGEIA WILL PRODUCE A MAGNETIC TAPE IN EIA FORMAT	UC441580
GO TO 50	UC441590
22 GO TO 50	UC441600
23 GO TO 50	UC441610
24 GO TO 50	UC441620
25 CALL MAGTAP	UC441630
C MAGTAP PRODUCES A MAGNETIC TAPE IN SPECIAL BINARY FORMAT FOR	UC441640
C THE BENSON-LEHNER PLOTTING EQUIPMENT AT UCCND,OAK RIDGE,TENN.	UC441650
50 IF(OPTAB(22)-2.0)52,51,51	UC441660
51 CALL PRTOU(1)	UC441670
52 DO 60 J#1,26	UC441680
60 BUFP(J)#BITS	UC441690
26 RETURN	UC441700
END	UC441710
C	
C//	
C	
* FAP	UC450010
*PUNCHA00	UC450020
ENTRY PUNCHA	UC450030
* PUNCHA - GENERATE PUNCH TAPE FOR BCD FORMATS.	UC450040
BCI 1,PUNCHA	UC450050
* USE - CALL PUNCHA (N,A,J,K) WHERE -	UC450060
* ** A - IS THE BCD ARRAY WHOSE CHARACTERS WILL	UC450070
* BE CONVERTED TO THE PUNCH TAPE FORMAT.	UC450080
* /A/ IS ASSUMED TO BE STORED FORWARD IN	UC450090
* CORE IF N IS POSITIVE - OTHERWISE IT	UC450100
* WILL BE ASSUMED BACKWARDS IN CORE.	UC450110
* ** N - IS THE NUMBER OF CHARACTERS CONTAINED IN	UC450120
* /A/ TO BE CONVERTED.THIS COUNT WILL BE	UC450130
* OVERRULED IF A \$ IS ENCOUNTERED.	UC450140
* ** J - FLAG. IF J#0 ON ENTRY INTO PROGRAM,	UC450150
* PROCESS CHAR. IN /A/. ON FIRST ENTRY	UC450160
* GO GET ID AND SEQUENCE NO. FROM PUNIDN	UC450170
* AND PUNSEQ.	UC450180
* IF J#1, FILL UP PRESENT	UC450190
* CARD WITH CODE DELETES AND OUTPUT CARD. IN	UC450200
* ADDITION PUT OUT A BLANK CARD.	UC450210
* IF J#2, PROCESS AS J#0 WITHOUT EOB AT END	UC450220
* IF J#3, PROCESS FIRST CHARACTER (DEFINED BY	UC450230
* K) N-TIMES AND DO NOT PUT EOB AT END.	UC450240
* IF J IS LESS THAN ZERO, PUT OUT A BLANK CARD.	UC450250
* THUS, IF J IS NOT ZERO, SET UP A FIRST ENTRY	UC450260
* CONDITION AND DO NOT PROCESS CHAR. FROM /A/.	UC450270
* ** K - IF K IS SPECIFIED AND IS NON-ZERO,DO NOT	UC450280
* IGNORE BLANK CHARACTERS IN /A/.	UC450290
* IF K#0 OR IS NOT SPECIFIED, IGNORE	UC450300
* BLANK CHAR. IN /A/.	UC450310
PUNCHA SXA EX,4	UC450320
SXA EX+1,2	UC450330
SXA EX+2,1	UC450340
SXA LOAD	UC450350
BOTROW EQU 7	UC450360
CLA 4,4 K	UC450370
ANA TSX	UC450380
SUB TSX	UC450390
TZE PNI K EXISTS	UC450400
AXT 4,2	UC450410

	SXD	BLFL		UC450420
	SXD	FLIF		UC450430
PN2	SXA	EX+3,2		UC450440
	CLA*	3,4	J	UC450450
	TZE	PN3	NORMAL PROCESS	UC450460
	TMI	PN4		UC450470
	SUB	#1B17		UC450480
	TNZ	PN3		UC450490
	LXA	COLC,2	END CODE	UC450500
	TXL	PN4A,2,0		UC450510
	CLA	#020	PUT IN SPACE CODES	UC450520
	TSX	MERGE,4	I	UC450530
	TRA	*-4		UC450540
PN4	TSX	PUNC,4	DUMP A BLANK CARD	UC450550
PN4A	STZ	PUNDF	SET UP FIRST ENTRY	UC450560
EX	AXT	0,4	EXIT	UC450570
	AXT	0,2		UC450580
	AXT	0,1		UC450590
	TRA	** ,4		UC450600
PN3	CLA	2,4		UC450610
	STA	LOAD+1		UC450620
	CLA*	1,4	N	UC450630
	PDX	0,2		UC450640
	TXI	*+1,2,1		UC450650
	AXT	1,1		UC450660
	TMI	*+2	A IS STORED BACKWARDS	UC450670
	AXC	1,1		UC450680
	SXD	LOAD+2,1		UC450690
	ZET	PUNDF	IS IT FIRST ENTRY	UC450700
	TRA	PSN		UC450710
	CLA*	\$PUNIDS	SET UP	UC450720
	STO	CARDN+1		UC450730
	CLA*	\$PUNNOM	SEQUENCE NO	UC450740
	UFA	#HCHC0000		UC450750
	SUB	#HCHC0000		UC450760
	STO	CARDN		UC450770
	SXA	COLC		UC450780
	CLA	#1		UC450790
	STO	PUNDF		UC450800
	CLA	#0200	STOP CODE IN COL. I	UC450810
	TSX	MERGE,4		UC450820
	TRA	PSN		UC450830
PN5	TSX	LOAD,4	CHECK CHARACTER COUNT	UC450840
	TNX	PN8,2,1		UC450850
	LDQ	JOE		UC450860
	PXD			UC450870
	LGL	6		UC450880
	STQ	JOE	DO WE INCLUDE BLANKS	UC450890
	LXD	BLFL,4	YES	UC450900
	TXH	*+4,4,0	NO	UC450910
	CAS	#48		UC450920
	TRA	*+2		UC450930
	TRA	PN7	IGNORE	UC450940
	CAS	#43	IS IT \$	UC450950
	TRA	*+2		UC450960
	TRA	PN8	YES EXIT	UC450970
	LXA	TAB1,4		UC450980
	CAS	TAB1,4		UC450990
	TRA	*+2		UC451000
	TRA	PN6		UC451010

	TIX	*-3,4,1		UC451020
ERR	STO	PUNDF		UC451030
	CAL	#6B17		UC451040
	TSX	\$(STH),4		UC451050
	TSX	FOR		UC451060
	LDQ	PUNDF		UC451070
	STR			UC451080
	TSX	\$(FIL),4		UC451090
	TSX	\$ERREX,4		UC451100
	PZE	#26B17		UC451110
	TRA	EX		UC451120
FOR	BCI	7,(33H THE FOLLOWING ILLEGAL CHARACTER ,012,		UC451130
	BCI	5,26H DOES NOT EXIST IN PUNCHA.)		UC451140
PN7	TIX	PN5+1,1,1		UC451150
	TXL	PN5		UC451160
PN6	CLA	TAB2,4		UC451170
	TSX	MERGE,4		UC451180
	TRA	PN7		UC451190
PN8	LXD	FLIF,4		UC451200
	TXH	EX,4,0		UC451210
	CLA	#0200	PUT IN EOB CODE	UC451220
	TSX	MERGE,4		UC451230
	TXL	EX		UC451240
JOE				UC451250
CARDN	BSS	2		UC451260
TAP	BSS	24		UC451270
TI				UC451280
LOAD	AXT	0,1	BRING IN NEXT WORD	UC451290
	LDQ	**,1		UC451300
	TXI	**+1,1,**		UC451310
	SXA	LOAD,1		UC451320
	STQ	JOE		UC451330
	AXT	6,1		UC451340
	TRA	1,4		UC451350
PUNC	SXA	PUNCI,4	PUT OUT A CARD	UC451360
	TSX	\$PUNCH2,4		UC451370
	PZE	0,6		UC451380
	TXH	CARDN,6,2		UC451390
	TXH	TAP,2,24		UC451400
	CLA	CARDN	UPDATE SEQ. NO.	UC451410
	ADD	#1		UC451420
	STO	CARDN		UC451430
	ADD	#HCH0000		UC451440
	FAD	#HCH0000		UC451450
	STO*	\$PUNNOM		UC451460
	CLA	KFLG50		UC451470
	ADD	#1B17		UC451480
	STO	KFLG50		UC451490
	AXT	24,4	CLEAR TAP AREA	UC451500
	STZ	TAP+24,4		UC451510
	TIX	*-1,4,1		UC451520
	SXA	COLC		UC451530
PUNCI	AXT	0,4		UC451540
	TRA	1,4		UC451550
MERGE	ALS	9-BOTROW		UC451560
	STO	TI		UC451570
	SXA	EXI,2		UC451580
	SXA	EXI+1,4		UC451590
COLC	AXT	0,4	COL. COUNT IN X4	UC451600
	TXH	M2,4,71	CHECK COUNT	UC451610

	TXI	*+1,4,1	CARD NOT FULL	UC451620
	SXA	COLC,4	INDEX COUNT	UC451630
	TXH	*+4,4,1		UC451640
	SXA	M3		UC451650
	AXT	-24,4		UC451660
	SXA	M4,4		UC451670
M3	AXT	0,4	WORD INDEX	UC451680
M4	AXT	-24,2	SHIFT COUNT INDEX	UC451690
M5	ALS	0,2		UC451700
	ORS	TAP,4		UC451710
	TXL	M6,2,0	IS PUNCH WORD FULL	UC451720
	TXI	*+1,2,12	NO - INDEX SHIFT	UC451730
	SXA	M4,2		UC451740
M7	LXA	COLC,4	IS CARD FULL	UC451750
	TXH	M8,4,71	YES	UC451760
EXI	AXT	0,2	EXIT	UC451770
	AXT	0,4		UC451780
	TRA	1,4		UC451790
M8	TSX	PUNC,4	PUNCH OUT CARD	UC451800
	TXL	EXI		UC451810
M6	AXT	-24,2	WORD FULL	UC451820
	SXA	M4,2		UC451830
	TXI	*+1,4,-1	INDEX WORD	UC451840
	SXA	M3,4		UC451850
	TXL	M7		UC451860
M2	TSX	PUNC,4	CARD FULL	UC451870
	CLA	T1		UC451880
	TXL	COLC	GO PROCESS	UC451890
ZERO				UC451900
PUNDF				UC451910
TA	OCT	0,1,2,3	0-3	UC451920
	OCT	4,5,6,7	4-7	UC451930
	OCT	10,11,13,20	89#+	UC451940
	OCT	21,22,23,24	ABCD	UC451950
	OCT	25,26,27,30	EFGH	UC451960
	OCT	31,33,34,40	I.)-	UC451970
	OCT	41,42,43,44	JKLM	UC451980
	OCT	45,46,47,50	NOPQ	UC451990
	OCT	51,53,54,60	R\$*	UC452000
	OCT	61,62,63,64,65	/STUV	UC452010
	OCT	66,67,70,71	WXYZ	UC452020
	OCT	73,74,75	, (	UC452030
TAB1	PZE	TAB1-TA		UC452040
	REM	TABLE 2		UC452050
	OCT	40,1,2,23	0-3	UC452060
	OCT	4,25,26,7	4-7	UC452070
	OCT	10,31,177,160	89#+	UC452080
	OCT	141,142,163,144	ABCD	UC452090
	OCT	165,166,147,150	EFGH	UC452100
	OCT	171,153,13,100	I.)-	UC452110
	OCT	121,122,103,124	JKLM	UC452120
	OCT	105,106,127,130	NOPQ	UC452130
	OCT	111,200,76,20	R\$*	UC452140
	OCT	61,62,43,64,45	/STUV	UC452150
	OCT	46,67,70,51	WXYZ	UC452160
	OCT	73,52,370	, (	UC452170
TAB2	BSS	0		UC452180
TSX	TSX			UC452190
PN1	AXT	5,2		UC452200
	CLA*	4,4		UC452210

	TZE	PN2-2	IGNORE BLANKS	UC452220
	SXD	BLFL,2		UC452230
BLFL	TXL	PN2		UC452240
PSN	LXA	EX,4		UC452250
	CLA*	3,4		UC452260
	TZE	PN5	J#0	UC452270
	SUB	#2B17		UC452280
	TNZ	*+4	J#3	UC452290
	CLA	#2B17	NO EOB DESIRED	UC452300
	STD	FLIF	J#2	UC452310
FLIF	TXL	PN5		UC452320
	SUB	#1B17	1 CHARACTER N.TIMES	UC452330
	TNZ	ERR1	WITHOUT EOB.	UC452340
P6N	TSX	LOAD,4		UC452350
	TNX	EX,2,1		UC452360
	LDQ	JOE		UC452370
	PXD			UC452380
	LGL	6		UC452390
	STQ	JOE		UC452400
	LXD	BLFL,4		UC452410
	TXH	*+4,4,0		UC452420
	CAS	#48		UC452430
	TRA	*+2		UC452440
	TRA	P7N		UC452450
	LXA	TAB1,4		UC452460
	CAS	TAB1,4		UC452470
	TRA	*+2		UC452480
	TRA	*+3		UC452490
	TIX	*-3,4,1		UC452500
	TRA	ERR		UC452510
	CLA	TAB2,4		UC452520
	STD	JOE		UC452530
	LXA	EX,4		UC452540
	CLA*	1,4		UC452550
	PDX	0,2		UC452560
	CLA	JOE		UC452570
	TSX	MERGE,4		UC452580
	TIX	*-2,2,1		UC452590
	TXL	EX		UC452600
P7N	TIX	P6N+1,1,1		UC452610
	TRA	P6N		UC452620
ERR1	LAC	EX,4		UC452630
	SXD	PUNDF		UC452640
	CAL	#6B17		UC452650
	TSX	\$(STH),4		UC452660
	TSX	FOR1		UC452670
	LDQ	PUNDF		UC452680
	STR			UC452690
	TSX	\$(FIL),4		UC452700
	TSX	\$EXIT,4		UC452710
FOR1	BCI	7,(45H BAD CALLING SEQUENCE FOR PUNCHA AT LO		UC452720
	BCI	2,CATION 012)		UC452730
KFLG50	EQU	32504		UC452740
	END			UC452750
C				
C//				
C				
*	LIST			UC460010
*	FAP			UC460020
*	PUNCH	00		UC460030

ENTRY	PUNCH2		UC460040
ENTRY	PUNCH3		UC460050
* IF APT II CARDPN CALLING SEQUENCE			UC460060
* USE PUNCH2 AND IT WILL CALL			UC460070
* APT III CARDPN CORRECTLY			UC460080
* IF APT III CARPN CALLING SEQUENCE			UC460090
* USE PUNCH 3			UC460100
*			UC460110
* IF MODE OF CARD PUNCHING IS			UC460120
* SET IN CALLING SEQUENCE (M)			UC460130
* BCD +1 (FORTRAN ARRAY) -1 (FAP ARRAY)			UC460140
* COL +2 (FORTRAN ARRAY) -2 (FAP ARRAY)			UC460150
* ROW +3 (FORTRAN ARRAY) -3 (FAP ARRAY)			UC460160
*			UC460170
* APT III CALLING SEQUENCE FOR			UC460180
* CARD PUNCHING			UC460190
*			UC460200
* CALL CARDPN (A,N,M,I,D)			UC460210
*			UC460220
PUNCH3	SXA	EX,1	UC460230
	SXA	EX+1,2	UC460240
	SXA	EX+2,4	UC460250
	CLA	TRA64	UC460260
	STO	EX+3	UC460270
	CLA	1,4	UC460280
	STO	CSCP+1	UC460290
	CLA	2,4	UC460300
	STO	CSCP+2	UC460310
	CLA	3,4	UC460320
	STO	CSCP+3	UC460330
	CLA	4,4	UC460340
	STO	CSCP+4	UC460350
	CLA	5,4	UC460360
	STO	CSCP+5	UC460370
	TRA	CSCP	UC460380
PUNCH2	SXA	EX,1	UC460390
	SXA	EX+1,2	UC460400
	SXA	EX+2,4	UC460410
	STZ	M	UC460420
	CLA	1,4	UC460430
	TPL	++3	UC460440
	CLS	III	UC460450
	STO	M	UC460460
	CLA	2,4	UC460470
	ANA	MK7	UC460480
	SUB	MK6	UC460490
	TNZ	NOSQ	UC460500
	CLA	TRA44	UC460510
	STO	EX+3	UC460520
	CLA	2,4	UC460530
	STA	++3	UC460540
	ADD	II	UC460550
	STA	++3	UC460560
	CLA	**	UC460570
	STO	I	UC460580
	CLA	**	UC460590
	STO	D	UC460600
	CLA	I3	UC460610
	STA	ORIGN	UC460620
	TRA	ORIGN	UC460630

NOSQ	CLA	TRA34	SET TRA, SEQ	UC460640
	STO	EX+3	NO. NOT USED	UC460650
	CLA	I2		UC460660
	STA	**+1		UC460670
ORIGN	CLA	3,4	ADDRESS WAS MODIFIED	UC460680
	STA	AL	ORIGIN	UC460690
	STD	N	NUM. OF WORDS	UC460700
	ANA	MK7	PRESERVE TAG	UC460710
	SUB	MK1		UC460720
	TNZ	COL	2 IN TAG#COL OR BCD	UC460730
	CLS	II3	1 IN TAG#ROW	UC460740
	STO	M		UC460750
	TRA	SUCS		UC460760
COL	CLA	M		UC460770
	TNZ	SUCS	BCD # -1	UC460780
	CLS	II2		UC460790
	STO	M		UC460800
SUCS	AXT	5,1		UC460810
	CLA	DL+1,1	LOAD ADDRESSES	UC460820
	STO	CSCP+6,1	INTO CALLING	UC460830
	TIX	*-2,1,1	SEQUENCE OF CARDPN	UC460840
	TRA	CSCP		UC460850
CSCP	TSX	\$CARDPN,4		UC460860
	TSX	0,0,0	A (ORIGIN)	UC460870
	TSX	0,0,0	N (NO. OF WORDS)	UC460880
	TSX	0,0,0	M (MODE)	UC460890
	TSX	0,0,0	I (SEQ. NO.)	UC460900
	TSX	0,0,0	D (BCD ID)	UC460910
EX	AXT	**+1		UC460920
	AXT	**+2		UC460930
	AXT	**+4		UC460940
	TRA	4,4	ADDRESS WAS MODIFIED	UC460950
N	PZE			UC460960
M	PZE			UC460970
I	PZE			UC460980
D	PZE			UC460990
AL	PZE			UC461000
NL	PZE	N		UC461010
ML	PZE	M		UC461020
IL	PZE	I		UC461030
DL	PZE	D		UC461040
MK7	OCT	000000700000		UC461050
MK6	OCT	000000600000		UC461060
MK1	OCT	000000100000		UC461070
TRA64	TRA	6,4		UC461080
TRA44	TRA	4,4		UC461090
TRA34	TRA	3,4		UC461100
I1	PZE	1,0,1		UC461110
I2	PZE	2,0,2		UC461120
I3	PZE	3,0,3		UC461130
I11	PZE	0,0,1		UC461140
I12	PZE	0,0,2		UC461150
I13	PZE	0,0,3		UC461160
	END			UC461170
C				
C				
C				
*	FAP			UC470010
*	PUNCH CARD ID AND SEQUENCE NO. ROUTINE			UC470020
	ENTRY PUNIDN			UC470030

ENTRY	PUNSEQ	UC470040
ENTRY	PUNNUM	UC470050
ENTRY	PUNNOM	UC470060
ENTRY	PUNIDS	UC470070
*	PROGRAMMER USES - PUNIDN - TO SET UP ID	UC470080
*	PROGRAMS USES - PUNIDS - INDIR. TO GET ID	UC470090
*	PROGRAMMER USES - PUNSEQ - TO SET UP SEQ. NO.	UC470100
*	PROGRAMS UPDATES - PUNNOM - INDIR.	UC470110
*	PROGRAMMER INTEROGATES - PUNNUM - TO GET SEQ. NO.	UC470120
PUNIDN	CLA* 1,4	UC470130
	SUB BITS	UC470140
	TZE P1	UC470150
	CLA* 1,4	UC470160
	TRA P2	UC470170
P1	CLA BLANKS	UC470180
P2	STO PUNIDS	UC470190
	TRA 2,4	UC470200
PUNIDS	BSS 1	UC470210
PUNNOM	BSS 1	UC470220
PUNSEQ	CLA* 1,4	UC470230
	STO PUNNOM	UC470240
	TRA 2,4	UC470250
PUNNUM	CLA PUNNOM	UC470260
	STO* 1,4	UC470270
	TRA 2,4	UC470280
BITS	OCT -377777777777	UC470290
BLANKS	BCI 1,	UC470300
	END	UC470310
C		
C//		
C		
*	LIST	UCD10010
*	LABEL	UCD10020
CRAPD		UCD10030
	SUBROUTINE RAPID	UCD10040
C		UCD10050
C	RAPID- THE FUNCTION OF THIS ROUTINE IS TO PROCESS THE RAPID/ STATEMENT	UCD10060
C	AND SET APPROPRIATE PROGRAM FLAGS TO INDICATE THAT THE MOTION	UCD10070
C	IS TO BE A HIGH-SPEED TRAVERSE.	UCD10080
C		UCD10090
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UCD10570
	RETURN	UCD10580
	END	UCD10590
C		
C//		
C		
*	FAP	UC480010
	ENTRY READER	UC480020
*		UC480030
*	SUBROUTINE READER	UC480040
*	READS RECORD FROM CLTAPE WRITTEN BY APT III	UC480050
*		UC480060
*		UC480070
*	SYSTEM COMMON, DIMENSION, AND EQUIVALENCE STATEMENTS FOR FAP	UC480080
NOTAPS EQU	18	NUMBER OF TAPES
NOFLGS EQU	70	NUMBER OF FLAGS IN FLAG AREA
BUFNUM EQU	4	NUMBER OF BUFFERS
NOBLKS EQU	4	NO. OF BLOCKS ALLOWED TAPEWT CALL SEQ.
BUFSIZ EQU	400	SIZE OF ONE BUFFER BLOCK
		UC480090
		UC480100
		UC480110
		UC480120
		UC480130

```

*****
SYSTEM COMMON 8
KFLAGS COMMON NOFLGS
TAPETB COMMON NOTAPS
BUFTBL COMMON BUFNUM
BUFER1 COMMON BUFSIZ
BUFER2 COMMON BUFSIZ
BUFER3 COMMON BUFSIZ
BUFER4 COMMON BUFSIZ
KCM EQU SYSTEM
KAPTID EQU KOM-7
KAPTIO EQU KOM-6
KAPTTR EQU KOM-5
KAPTCN EQU KOM-4
K0 EQU KFLAGS-10
K1 EQU KFLAGS-11
K2 EQU KFLAGS-12
K3 EQU KFLAGS-13
K4 EQU KFLAGS-14
K5 EQU KFLAGS-15
K6 EQU KFLAGS-16
K7 EQU KFLAGS-17
K8 EQU KFLAGS-18
K9 EQU KFLAGS-19
KFLAG0 EQU KFLAGS-24
KFLAG1 EQU KFLAGS-25
KFLAG2 EQU KFLAGS-26
KFLAG3 EQU KFLAGS-27
KFLAG4 EQU KFLAGS-28
IWAVEN EQU KFLAGS-30
IPTNLY EQU KFLAGS-31
NOPOST EQU KFLAGS-32
INVERT EQU KFLAGS-33
KAUTOP EQU KFLAGS-34
ICLPRT EQU KFLAGS-35
INDEXX EQU KFLAGS-36
IPLOTR EQU KFLAGS-37
NOPLOT EQU KFLAGS-39
KDYNFG EQU KFLAGS-40
LOCJPT EQU KFLAGS-41
LOCBEG EQU KFLAGS-42
KSECIN EQU KFLAGS-43
NCLREC EQU KFLAGS-44
LOCMAC EQU KFLAGS-45
LENSPC EQU KFLAGS-46
IPOSTP EQU KFLAGS-50
NUMPST EQU KFLAGS-51
PROTAP EQU TAPETB
CANTAP EQU TAPETB-1
CLTAPE EQU TAPETB-2
POCTAP EQU TAPETB-3
PLOTAP EQU TAPETB-4
SRFTAP EQU TAPETB-5
LIBTAP EQU TAPETB-6
CRDTAP EQU TAPETB-7
CORTAP EQU TAPETB-9
TAPES1 EQU TAPETB-10
TAPES2 EQU TAPETB-11
TAPES3 EQU TAPETB-12
TAPES4 EQU TAPETB-13

IDENTIFICATION OF LAST LIBTAP RECORD
APT I-O COMMAND
TRANSFER TO LAST SECTION READ FROM LIBTAP
CONTINUATION FLAG
KFLAGS(11)

KFLAGS(31)

UC480140
UC480150
UC480160
UC480170
UC480180
UC480190
UC480200
UC480210
UC480220
UC480230
UC480240
UC480250
UC480260
UC480270
UC480280
UC480290
UC480300
UC480310
UC480320
UC480330
UC480340
UC480350
UC480360
UC480370
UC480380
UC480390
UC480400
UC480410
UC480420
UC480430
UC480440
UC480450
UC480460
UC480470
UC480480
UC480490
UC480500
UC480510
UC480520
UC480530
UC480540
UC480550
UC480560
UC480570
UC480580
UC480590
UC480600
UC480610
UC480620
UC480630
UC480640
UC480650
UC480660
UC480670
UC480680
UC480690
UC480700
UC480710
UC480720
UC480730

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FORTIN	EQU	TAPETB-14	UC480740
INTAPE	EQU	TAPETB-15	UC480750
IOUTAP	EQU	TAPETB-16	UC480760
PUNTAP	EQU	TAPETB-17	UC480770
*****			UC480780
*			UC480790
*			UC480800
MACH	COMMON	12	UC480810
NLOOP	COMMON	1	UC480820
NLOOP1	COMMON	1	UC480830
PNOFLE	COMMON	14	UC480840
MTABLE	COMMON	10	UC480850
NID	COMMON	1	UC480860
ADUM	COMMON	50	UC480870
BITS	COMMON	1	UC480880
BLANKS	COMMON	1	UC480890
BUFFER	COMMON	104	UC480900
BUFP	COMMON	26	UC480910
DAFTON	COMMON	1	UC480920
DAFTST	COMMON	1	UC480930
DFTPEN	COMMON	1	UC480940
DMODE	COMMON	1	UC480950
FORMAT	COMMON	26	UC480960
GMODE	COMMON	1	UC480970
IDUM	COMMON	50	UC480980
INTAP	COMMON	20	UC480990
IORDER	COMMON	27	UC481000
JJ	COMMON	1	UC481010
KOMENT	COMMON	1	UC481020
LIMERR	COMMON	1	UC481030
MACHON	COMMON	1	UC481040
NEUADD	COMMON	1	UC481050
NUMERR	COMMON	1	UC481060
NUMTMS	COMMON	3	UC481070
NWPLOT	COMMON	1	UC481080
NWPR	COMMON	1	UC481090
OPTAB	COMMON	200	UC481100
PLOTON	COMMON	1	UC481110
PLOTSY	COMMON	1	UC481120
PREVX	COMMON	1	UC481130
PREVY	COMMON	1	UC481140
PREVZ	COMMON	1	UC481150
RETURN	COMMON	1	UC481160
SEQCOD	COMMON	1	UC481170
SEQCTR	COMMON	1	UC481180
SEQINC	COMMON	1	UC481190
SEQNO	COMMON	1	UC481200
SEQON	COMMON	1	UC481210
SEQSHT	COMMON	1	UC481220
SEQVAL	COMMON	1	UC481230
TAPSTO	COMMON	250	UC481240
WORDS	COMMON	26	UC481250
XVALUE	COMMON	1	UC481260
YVALUE	COMMON	1	UC481270
ZVALUE	COMMON	1	UC481280
READER	SXA	READX,1	UC481290
	SXA	READX+1,2	UC481300
	SXA	READX+2,4	UC481310
	CALL	TAPERD,CLTAPE,IRETN,NWPR,NBLKS,TAPSTO,WORD	UC481320
	CLA	IRETN	UC481330

	TZE	EOF	UC481340
	TMI	READOK	UC481350
	CLS	ONE	UC481360
	STO	RETURN	UC481370
	TRA	READOK+1	UC481380
READOK	STZ	RETURN	UC481390
	AXT	20,1	UC481400
	CLA	TAPSTO+1,1	UC481410
	STO	INTAP+1,1	UC481420
	TIX	*-2,1,1	UC481430
READX	AXT	0,1	UC481440
	AXT	0,2	UC481450
	AXT	0,4	UC481460
	TRA	1,4	UC481470
EOF	CLA	ONE	UC481480
	STO	RETURN	UC481490
	TRA	READX	UC481500
*			UC481510
IRETN	PZE		UC481520
NBLKS	PZE	0,0,1	UC481530
WORD	PZE		UC481540
ONE	DEC	1.0	UC481550
	END		UC481560
C			
C			
C			
*FAP			UC490010
	ENTRY	REPAC	UC490020
*	REPAC	- A SUBROUTINE TO REPACK A BUFFER AFTER THE	UC490030
*		LEADING ZEROS HAVE BEEN BLANKED	UC490040
	REPAC	SXA EX,4	UC490050
		SXA EX+1,2	UC490060
		SXA EX+2,1	UC490070
*		PULL IN THE ARRAY TO BE PACKED AND THE LOCATION OF THE	UC490080
*		BUFFER TO PUT THE WORD	UC490090
		CLA 1,4	UC490100
		STA PACIT	UC490110
		CLA* 2,4	UC490120
		SUB #1B17	UC490130
		STO TEMP	UC490140
*		PACK THE GIVEN WORD	UC490150
		LXD TEMP,2	UC490160
AGAIN	AXT	0,4	UC490170
PACIT	LDQ	*,4	UC490180
	RQL	12	UC490190
	LGL	6	UC490200
	TXI	*+1,4,1	UC490210
	TXL	*-4,4,5	UC490220
*		STORE IN THE GIVEN LOCATION	UC490230
HERE	SLW	*,2	UC490240
*		HAVE ALL WORDS BEE PACKED	UC490250
		TXI *+1,2,1	UC490260
		TXL AGAIN,2,1	UC490270
	LXA	EX,4	UC490280
	LXA	EX+1,2	UC490290
	LXA	EX+2,1	UC490300
	TRA	4,4	UC490310
EX	BSS	3	UC490320
TEMP	BSS	1	UC490330
	END		UC490340

```

C
C ///////////////////////////////////////////////////////////////////
C
C      *      LIST                                UC011010
C      *      LABEL                                UC011020
CRETR                                UC011030
      SUBROUTINE RETRCT                                UC011040
C                                                    UC011050
C RETRCT- THE FUNCTION OF THIS ROUTINE IS TO PROCESS THE RETRCT STATE- UC011060
C          MENT AND PRODUCE AN OUTPUT BLOCK TO RETRACT THE TOOL. THE UC011070
C          ROUTINES SEQOUT AND PTAPE ARE CALLED TO OUTPUT THE BLOCK UC011080
C                                                    UC011090
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C                                                    UC011570
C          RETURN                                UC011580
C          END                                    UC011590
C
C ///////////////////////////////////////////////////////////////////
C
C          SUBROUTINE REWIND                                UC500010
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C                                                    UC500490
C          REWIND - AN M CODE OF 30 IS PLACED IN THE M REGISTER AND THE UC500500
C                  APPROPRIATE ROUTINES TO GENERATE AN OUTPUT BLOCK ARE UC500510
C                  CALLED. UC500520
C          BUFP(26) #30.0 UC500530
C          CALL SEQOUT UC500540
C          CALL PTAPE UC500550
C          RETURN UC500560
C          END UC500570
C ///////////////////////////////////////////////////////////////////
C
C
C      *      LIST                                UC510010
C      *      LABEL                                UC510020
CSEQN                                UC510030
      SUBROUTINE SEQNOD                                UC510040
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C                                                    UC510520
C          SEQNO - THE SEQNO/ STATEMENT IS INTERROGATED TO DETERMINE THE UC510530
C                  TYPE OF SEQUENCING DESIRED. THE APPROPRIATE FLAGS AND UC510540
C                  PARAMETERS ARE SET TO INSURE THAT THE PROPER SEQUENCE UC510550
C                  NUMBER IS AVAILABLE TO THE OUTPUT ROUTINES WHEN NEEDED. UC510560
C          INITIALIZE THE WORD COUNT AND TEST FOR MODIFIERS UC510570
C          NW#3 UC510580
C          100 NW#NW+1 UC510590
C              IF(NWPR-NW)2,1,1 UC510600
C          NONE, RETURN UC510610
C          2 RETURN UC510620
C          YES, IS PRESENT MODIFIER AN APT WORD UC510630
C          1 CALL APTA(NW,APTF LG) UC510640
C              IF(APTF LG-1.0) 4,5,5 UC510650
C          NOT AN APT WORD, STORE GIVEN SEQUENCE NUMBER AND SET THE UC510660
C          SEQUENCE TYPE ACCORDINGLY UC510670
C          5 SEQSH#TAPSTC(NW) UC510680
C              SEQVAL#SEQCOD UC510690
C              SEQCOD#3.0 UC510700
C              GOTO100 UC510710

```

C	AN APT WORD, IS IT INCR	UC510720
4	IF(INTAP(NW)-66) 7,6,7	UC510730
C	YES, SET SEQUENCE TYPE	UC510740
6	SEQCOD#2.0	UC510750
C	WAS THERE AN INCREMENT SPECIFIED	UC510760
	IF(NWPR-(NW+1)) 8,9,9	UC510770
8	SEQINC#1.0	UC510780
	GOTO2	UC510790
9	CALL APTA(NW+1,APTFLG)	UC510800
	IF(APTFLG-1.0) 10,11,11	UC510810
C	NO, SET SEQUENCE INCR TO 1.0 AND CALL ERROR ROUTINE	UC510820
10	SEQINC#1.0	UC510830
16	CALL ERREX(1)	UC510840
	GOTO100	UC510850
C	YES, STORE IN THE SEQUENCE INCREMENT	UC510860
11	SEQINC#TAPSTO(NW+1)	UC510870
	NW#NW+1	UC510880
	GOTO100	UC510890
C	WAS IT THE APT WORD START	UC510900
7	IF(INTAP(NW)-57) 12,13,12	UC510910
B 13	ABC#345360606060	UC510920
C	YES, PUNCH AN END OF RECORD ON THE N/C TAPE(I.E.,124 PUNCH)	UC510930
	CALL PUNCHA(-2,ABC,0,0)	UC510940
	GOTO100	UC510950
C	IS IT THE APT WORD ON	UC510960
12	IF(INTAP(NW)-71) 14,15,14	UC510970
C	YES, SET THE SEQUENCE TYPE ACCORDINGLY	UC510980
15	SEQCOD#1.0	UC510990
	GOTO100	UC511000
C	WAS IT THE APT WORD OFF	UC511010
C	YES, SET SEQUENCE TYPEAND ZERO SEQUENCE INCREMENT	UC511020
14	IF(INTAP(NW)-72) 16,17,16	UC511030
C	YES, ZERO SEQUENCE TYPEAND ZERO SEQUENCE INCREMENT	UC511040
17	SEQINC#0.0	UC511050
	SEQCOD#2.0	UC511060
	GOTO100	UC511070
C	NONE OF THE ABOVE CALL ERROR ROUTINE	UC511080
	END	UC511090
C	////////////////////////////////////	
C		
*	LIST	UC520010
*	LABEL	UC520020
CSEQ0		UC520030
	SUBROUTINE SEQOUT	UC520040
		UC520050
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****	
C		UC520530
C	SEQOUT - A SUBROUTINE WHICH EXAMINES THE SEQUENCE TYPE	UC520540
C	AND SETS THE N CODE ACCORDINGLY	UC520550
C	HAS A SEQUENCE TYPE BEEN SPECIFIED	UC520560
	IF(SEQCOD)5,5,1	UC520570
C	TRANSFER ON THE SEQUENCE TYPE	UC520580
1	M#XFIXF(SEQCOD)	UC520590
	GOTO(2,3,4,5,5),M	UC520600
C	TYPE 1, SET N TO THE CLTAPE RECORD NUMBER	UC520610
2	BUFP(1)#INTAP(1)	UC520620
	SEQNO#BUFP(1)	UC520630
	GOTO5	UC520640
C	TYPE 2, SET N TO OLD N + SEQUENCE INCREMENT	UC520650

```

3  SEQNO#SEQNO+SEQINC UC520660
   BUFP(1)#SEQNO UC520670
   GOTO5 UC520680
C  TYPE 3, A ONE SHOT ACTION, SET N TO VALUE SPECIFIED UC520690
4  BUFP(1)#SEQVAL UC520700
C  ALL OTHERS RETURN UC520710
5  RETURN UC520720
   END UC520730

C
C ///////////////////////////////////////////////////////////////////
C
*  FAP UC530010
   ENTRY SHIFT UC530020
MASK OCT 77 UC530030
SHIFT CLA* 2,4 UC530040
   ARS 18 UC530050
   STA **2 UC530060
   CAL* 1,4 UC530070
   ARS UC530080
   ANA MASK UC530090
   STO* 3,4 UC530100
   TRA 4,4 UC530110
   END UC530120

C
C ///////////////////////////////////////////////////////////////////
C
*  LIST UC012010
*  LABEL UC012020
CSPIN UC012030
      SUBROUTINE SPINDL UC012040
C UC012050
C SPINDL- THE FUNCTION OF THIS ROUTINE IS TO PROCESS THE SPINDL/ STATE- UC012060
C MENT AND GENERATE THE PROPER M AND S CODES. THE SPINDLE SPEED UC012070
C SHOULD BE STORED IN THE S REGISTER, BUFP(24) AND THE SPINDLE UC012080
C DIRECTION IN THE M REGISTER, BUFP(26) AND THE ROUTINES SEQOUT UC012090
C AND PTAPE CALLED TO OUTPUT THE BLOCK. UC012100
C UC012110
C *****STANDARD COMMON, DIMENSION AND EQUIVALENCE SET *****
C UC012590
C RETURN UC012600
C END UC012610

C
C ///////////////////////////////////////////////////////////////////
C
*FAP UC540010
   ENTRY SPWRD UC540020
*  SPWRD - A SUBROUTINE TO SPREAD A WORD INTO SIX PARTS UC540030
*  PUT EACH LETTER OR NUMBER INTO THE DECREMENT WITH BLANKS IN UC540040
*  ALL OTHER POSITIONS UC540050
SPWRD SXA EX,4 UC540060
   SXA EX+1,2 UC540070
   SXA EX+2,1 UC540080
*  WHEN FULL WORD HAS BEEN SPREAD RETURN UC540090
   CLA* 1,4 UC540100
   SUB #1B17 UC540110
   STO TEMP UC540120
   CLA 2,4 UC540130
   STA GO UC540140
   CLA 3,4 UC540150
   STA HERE UC540160

```

	AXT	0,2	UC540170
	LXA	TEMP,1	UC540180
HERE	LDQ	*,1	UC540190
NEXT	CAL	BLKS	UC540200
	LGL	6	UC540210
	STQ	HOLD	UC540220
	LDQ	BLKS	UC540230
	LGL	18	UC540240
*	STORE EACH PART IN A SEPRATE LOCATION OF THE RETURN ARRAY		UC540250
GO	STO	*,2	UC540260
	LDQ	HOLD	UC540270
	TXI	*+1,2,1	UC540280
	TXL	NEXT,2,5	UC540290
	LXA	EX,4	UC540300
	LXA	EX+1,2	UC540310
	LXA	EX+2,1	UC540320
	TRA	4,4	UC540330
EX	BSS	3	UC540340
TEMP	BSS	1	UC540350
HOLD	BSS	1	UC540360
BLKS	OCT	606060606060	UC540370
	END		UC540380
C			
C //			
C			
*	LIST		UC550010
*	LABEL		UC550020
CSTOP			UC550030
	SUBROUTINE STOP		UC550040
C			
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****		
C			UC550520
C	STOP	- AN M CODE OF G IS PLACED IN THE M REGISTER AND THE	UC550530
C		APPROPRIATE ROUTINES TO GENERATE AN OUTPUT BLOCK ARE	UC550540
C		CALLED.	UC550550
C	BUFP(26)# 0.0		UC550560
	CALL SEQOUT		UC550570
	CALL PTAPE		UC550580
	RETURN		UC550590
	END		UC550600
C			
C //			
C			
*	LIST		UC560010
*	LABEL		UC560020
	SUBROUTINE TEND		UC560030
C			
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****		
C			UC560510
C	END	- AN M02 CODE IS PLACED IN THE M REGISTER AND THE	UC560520
C		APPROPRIATE ROUTINES TO GENERATE AN OUTPUT BLOCK ARE	UC560530
C		CALLED.	UC560540
C	SET THE PRPER M CODE FOR END		UC560550
	BUFP(26)#2.0		UC560560
	CALL SEQOUT		UC560570
	CALL PTAPE		UC560580
	IDUM(4)#IDUM(4)+1		UC560590
C	CLEAR OUT THE OUTPUT BUFFER		UC560600
C	PRODUCE THE TRAILER INFORMATION ON THE N/C TAPE		UC560610
	DOI K18#1,100		UC560620

```

1  BUFFER(KIB)#BLANKS                                UC560630
   N#-72                                              UC560640
   JI#1                                              UC560650
   K#0                                              UC560660
   CALL PUNCHA(N,BUFFER,JI,K)                      UC560670
   IF(IDUM(4)-2)2,3,3                              UC560680
2  CALL PREINT                                       UC560690
3  RETURN                                           UC560700
   END                                              UC560710

C
C ///////////////////////////////////////////////////////////////////
C
*  LIST                                              UC013010
*  LABEL                                             UC013020
CTOOL SUBROUTINE TOOLNO                             UC013030
C                                                    UC013040
C                                                    UC013050
C TOOLNO- THE FUNCTION OF THIS ROUTINE IS TO PROCESS THE TOOLNO STATE- UC013060
C          MENT AND PRODUCE THE APPROPRIATE OUTPUT BLOCK TO SELECT THE UC013070
C          SPECIFIED TOOL. THE M REGISTER, BUFP(26), SHOULD BE SET TO UC013080
C          THE PROPER HEAD SELECTION M CODE AND ROUTINES SEQOUT AND UC013090
C          PTAPE CALLED TO OUTPUT THE BLOCK.          UC013100
C                                                    UC013110
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C                                                    UC013590
C          RETURN                                     UC013600
C          END                                         UC013610

C
C ///////////////////////////////////////////////////////////////////
C
*  LIST                                              UC570010
*  LABEL                                             UC570020
SUBROUTINE TRANS                                     UC570030
CTRAN                                              UC570040
C
C *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C
C TRANS - THE TRANS/ STATEMENT IS EXAMINED AND THE APPROPRIATE
C          TRANSFORMATION IS DETERMINED AND APPLIED TO THE
C          APPLICABLE CLTAPE DATA.
C          INITIALIZE TRANSLATION ARRAY
C          DO I I#3,14
C          1 ADUM(I)#0.0
C          TEST FOR WHAT HAS BEEN SPECIFIED
C          IDUM(I) IS FLAG SET AS FOLLOWS
C          0#NEITHER OR NOMORE
C          1# TRANSFORMATION ONLY
C          2#ROTATION OR BOTH
C
C          IF(NWPR-4) 2,4,3
C          2 RETURN
C          TEST FOR APT WORD NOMORE
C          4 CALL APTA(4,APTF LG)
C          IF(APTF LG-1.0) 5,6,6
C          5 IF(INTAP(4)-53)7,8,7
C          7 CALL ERREX(19)
C          GOTO2
C          YES, TURN FLAG OFF,I.E.,IDUM(I)#0
C          8 IDUM(I)#0
C          GOTO2

```

```

C ///////////////////////////////////////////////////////////////////
C
C      LIST                                UC014010
C      LABEL                                UC014020
CTURT                                     UC014030
      SUBROUTINE TURRET                    UC014040
C                                           UC014050
C TURRET- THE FUNCTION OF THIS ROUTINE IS TO PROCESS THE TURRET STATE- UC014060
C          MENT AND GENERATE AN OUTPUT BLOCK TO INDEX THE TURRET ACCORD- UC014070
C          ING TO THE TURRET COMMAND MODIFIERS. THE PARAMETERS SPECIFIED UC014080
C          IN THE TURRET STATEMENT SHOULD BE STORED IN THE APPROPRIATE UC014090
C          REGISTERS AND THE ROUTINES SEQOUT AND PTAPE CALLED TO OUTPUT UC014100
C          THE BLOCK.                    UC014110
C                                           UC014120
C      *****STANDARD COMMON,DIMENSION AND EQUIVALENCE SET *****
C                                           UC014600
C          RETURN                          UC014610
C          END                            UC014620
C
C ///////////////////////////////////////////////////////////////////
C
C      LIST                                UC580010
C      LABEL                                UC580020
CUCAP                                     UC580030

```

	SUBROUTINE UCAPP	UC580040
C		UC580050
C	*****STANDARD COMMON,DIMENSION AND EQUIVALENC SET *****	
C	INIALIZATION	UC5800530
	ADUM(29)#BITS	UC5800540
	NUMERR#0	UC5800550
	CALL INIT	UC5800560
	MACHON#1	UC5800570
	CALL MACHIN(1)	UC5800580
8	CALL READER	UC5800590
	IF(RETURN) 4,5,6	UC5800600
4	CALL ERREX(26)	UC5800610
6	CALL TAPEOP(CLTAPE,3,RETURN)	UC5800620
9	CALL FINI	UC5800630
	RETURN	UC5800640
5	IND2#INTAP(2)/1000	UC5800650
	IF(IND2-14) 10,9,10	UC5800660
10	IF(IND2-2) 15,11,12	UC5800670
15	ADUM(1)#TAPSTO(4)	UC5800680
	ADUM(2)#TAPSTO(5)	UC5800690
	GOTO 8	UC580700
11	IF(INTAP(3)-1015) 12,13,12	UC580710
13	CALL MACHIN(2)	UC580720
	GOTO 8	UC580730
12	IF(MACHON-1) 8,14,8	UC580740
14	GOTO(191,20,30,8,50,8,8,8,90,8,8,8,8),IND2	UC580750
30	IDUM(11)#0	UC580760
	IF(INTAP(5)-4) 8,31,8	UC580770
C	HAS A TRANSFORMATION BEEN REQUESTED	UC580780
31	IF(IDUM(1)-1) 35,32,33	UC580790
C	YES APPLY TRANSFORMATION	UC580800
32	TAPSTO(9)#TAPSTO(9)+ADUM(3)	UC580810
	TAPSTO(10)#TAPSTO(10)+ADUM(4)	UC580820
	TAPSTO(11)#TAPSTO(11)+ADUM(5)	UC580830
C	HAS A ROTATION BEEN REQUESTED	UC580840
33	IF(IDUM(1)-1) 35,35,34	UC580850
C	YES APPLY ROTATION	UC580860
34	TAPSTO(9)#TAPSTO(9)*ADUM(6)+TAPSTO(10)*ADUM(7)+	UC580870
	TAPSTO(11)*ADUM(8)	UC580880
	TAPSTO(10)#TAPSTO(9)*ADUM(9)+TAPSTO(10)*ADUM(10)+	UC580890
	TAPSTO(11)*ADUM(11)	UC580900
	TAPSTO(11)#TAPSTO(9)*ADUM(12)+TAPSTO(10)*ADUM(13)+	UC580910
	TAPSTO(11)*ADUM(14)	UC580920
35	ADUM(17)#TAPSTO(9)	UC580930
	ADUM(18)#TAPSTO(10)	UC580940
	ADUM(19)#TAPSTO(11)	UC580950
	IF(OPTAB(6)) 8,8,36	UC580960
36	IF(OPTAB(6)-TAPSTO(15)) 8,37,37	UC580970
37	IDUM(11)#1	UC580980
	GOTO 8	UC580990
C		UC581000
C	THE 5000 RECORD IS PROCESSED HERE	UC581010
C		UC581020
	50 IF(IDUM(1)-1) 53,51,51	UC581030
C	APPLY TRANSFORMATION	UC581040
51	DO52 L#6,VWPR,NEUADD	UC581050
	TAPSTO(L)#TAPSTO(L)+ADUM(3)	UC581060
	TAPSTO(L+1)#TAPSTO(L+1)+ADUM(4)	UC581070
52	TAPSTO(L+2)#TAPSTO(L+2)+ADUM(5)	UC581080
		UC581090

C		UC581100
C	APPLY ROTATION IF CALLED FOR	UC581110
C		UC581120
53	IF (IDUM(1)-1) 56, 56, 54	UC581130
54	DO55 L#6, NWPR, NEUADD	UC581140
	TAPSTO(L) # TAPSTO(L) * ADUM(6) + TAPSTO(L+1) * ADUM(7) + TAPSTO(L+2) *	UC581150
	IADUM(8)	UC581160
	TAPSTO(L+1) # TAPSTO(L) * ADUM(9) + TAPSTO(L+1) * ADUM(10) + TAPSTO(L+2) *	UC581170
	IADUM(11)	UC581180
55	TAPSTO(L+2) # TAPSTO(L) * ADUM(12) + TAPSTO(L+1) * ADUM(13) + TAPSTO(L+2) *	UC581190
	IADUM(14)	UC581200
56	JJ#6	UC581210
	NWPL#(NWPR-5)/NEUADD	UC581220
C		UC581230
C	TEST FOR A FROM MOVEMENT	UC581240
C		UC581250
	IF (INTAP(3)-3) 57, 59, 57	UC581260
57	IF (INTAP(3)-5) 58, 62, 58	UC581270
58	IF (INTAP(3)-6) 8, 74, 8	UC581280
C		UC581290
C	FROM MOVEMENT	UC581300
C		UC581310
59	IF (OPTAB(5)-1.0) 60, 61, 61	UC581320
60	CALL PTAPE	UC581330
	GOTO8	UC581340
61	CALL LASTPT	UC581350
	GOTO8	UC581360
62	IF (IDUM(11)) 63, 63, 71	UC581370
C		UC581380
C	LINEAR	UC581390
C		UC581400
63	IF (NWPL-1) 66, 64, 66	UC581410
64	IF (IDUM(10)-1) 66, 65, 66	UC581420
65	CALL ARC	UC581430
	GO TO 61	UC581440
66	IDUM(12) # 0	UC581450
	DO69 K#1, NWPL	UC581460
	IF (PLOTON-1.0) 68, 67, 68	UC581470
67	CALL PLTOUT (NUMTMS)	UC581480
	GOTO69	UC581490
68	CALL LINEAR	UC581500
69	JJ#JJ+NEUADD	UC581510
	JJ#JJ-NEUADD	UC581520
70	CALL LASTPT	UC581530
	IDUM(11) # 0	UC581540
	GOTO8	UC581550
71	IDUM(12) # 1	UC581560
	IDUM(11) # 0	UC581570
	IF (NWPR-11) 66, 66, 72	UC581580
72	IF (DAFTON-1.0) 66, 73, 66	UC581590
73	CALL CIRCUL	UC581600
	CALL LASTPT	UC581610
	GOTO8	UC581620
74	TAPSTO(3) # PREVX	UC581630
	TAPSTO(4) # PREVY	UC581640
	TAPSTO(5) # PREVZ	UC581650
	JJ#3	UC581660
C		UC581670
C	TEST FOR A CONTINUATION OF A CIRCLE OR A LINE	UC581680
C		UC581690

[illegible]

C
C////////////////////

SUBROUTINE FLOW CHARTS

SUBROUTINE APTA

SUBROUTINE ARC

SUBROUTINE ARCSLP

SUBROUTINE AXIMOV

SUBROUTINE BLDFMT

SUBROUTINE CHKM

SUBROUTINE CIRCIR

SUBROUTINE CIRCUL

SUBROUTINE CIREQT

SUBROUTINE DECODE
(FAP)

SUBROUTINE DELAY

SUBROUTINE DETDIR

SUBROUTINE DRAFT

SUBROUTINE ERREX

SUBROUTINE ERROR4

SUBROUTINE FINI

SUBROUTINE FORMAT

SUBROUTINE INIT
(FAP)

SUBROUTINE INSERT

SUBROUTINE LASTPT

SUBROUTINE LEADO

SUBROUTINE LEADER

SUBROUTINE LETTER

SUBROUTINE LINEAR

SUBROUTINE MACH02
(Gerber Plotter)

SUBROUTINE MACHIN

SUBROUTINE OPSTOP

SUBROUTINE OPTION

SUBROUTINE PAC
(FAP)

SUBROUTINE PARTNO

SUBROUTINE PCOORD

SUBROUTINE PLOT

SUBROUTINE PLTOUT

SUBROUTINE PLTSET

SUBROUTINE PPRINT

SUBROUTINE PREFUN

SUBROUTINE PREINT

SUBROUTINE PRTON

SUBROUTINE PRTOUT

SUBROUTINE PRTTIT

SUBROUTINE PTAPE

SUBROUTINE REPAC

SUBROUTINE REWIND

SUBROUTINE SEQNOD

SUBROUTINE SEQOUT

SUBROUTINE SHIFT
(FAP)

SUBROUTINE SPWRD
(FAP)

SUBROUTINE STOP

SUBROUTINE TEND

SUBROUTINE TRANS

VARIABLE DICTIONARY

ADUM(50)*	An array in common used for general purpose flags and temporary storage locations.
APTFLG	Flag used to signify if word tested was an APT word where 0.0 = yes and 1.0 = no.
ARRAY(26)	Array which contains values of registers desired in printed output.
BITS	A location in common consisting of octal 7's.
BLANKS	A location in common consisting of octal 60's.
BUFFER(104)	An array in common containing BCD information for the punched tape.
BUFP(26)	An array in common used as output array.
CABCTR	VARIABLE which contains number of card images punched.
CABON	Location which contains number of feet of punched tape to be printed on line.
CATCH(10)	Array which contains image of the punched tape for printed output.
DAFTON	Flag in common used to determine if a machine is in the draft mode.
DAFST	Flag in common which signifies that the previous statement was DRAFT/ON.
DFTPEN	Not currently used.
DMODE	Location in common used to store current D mode.
DNOW	D code match of character in DWORD.
DWORD	Return variable which contains one alphanumeric character in the decrement portion.
FOR(28)	Array to hold format specification for a line of printed output.

* Dimension if any in parenthesis.

FORMAT(26)	An array in common which contains format specifications for corresponding register values in BUFP array.
GMODE	Location in common used to store current G code.
IDUM(50)	An array in common used for general purpose flags and temporary storage locations.
INTAP(20)	An array in common used as a temporary location of a portion of each CLTAPE record as it is read and processed.
IORDER(27)	An array in common used to specify order in which word addresses are to be processed. Final location used to signify the number of registers valid for this machine.
JJ	A location in common used to point to the position of TAPSTO currently being processed.
KARRAY(11)	An array used to give location of non-blank words in PPRINT statement.
KOMENT	Flag in common used to signify errors have been printed.
LIMERR	Location in common which contains number of allowable errors before processing ceases.
MACHON	Flag in common to determine if machine being processed is on (1.0) or off (0.0).
NEUADD	Flag in common to signify whether I, J, and K vectors have been requested. ((3 = no); (6 = yes), i.e., MULTAX/ specified).
NUMERR	A location in common used to store number of errors which occur during processing.
NUMTMS(3)	An array in common used to indicate what type of information is to be plotted, i.e., SYMBOL, INTEGER, or HOLRTH.
NWPLOT	Not currently used.
NWPR	A location in common which contains number of words in the record being processed.
OPTAB(200)	The option table, refer to K-Report 1670.

PLOTON	Flag in common used to denote that the machine is or is not in Plot mode where 1.0 = yes and 0.0 = no.
PLOTSY	Flag in common which signifies that previous statement was PLOT/ON.
PREVX	Location in common which contains last X coordinate processed.
PREVY	Location in common which contains last Y coordinate processed.
PREVZ	Location in common which contains last Z coordinate processed.
RETURN	Flag in common used to test read of CLTAPE as successful or not.
SEQCOD	Location in common which contains sequence type as follows: <ol style="list-style-type: none"> 1) use CLTAPE sequence number 2) use previous sequence number plus increment specified 3) use special number specified in SEQNO/N statement.
SEQCTR	Not currently used.
SEQINC	Location in common used to store increments used for sequencing when type 2 specified.
SEQNO	Location in common which holds present sequence number.
SEQON	Not currently used.
SEQSHT	Location in common used to store special sequence number desired when specified by SEQNO/N.
SEOVAL	Location in common used to store sequence type prior to a one shot action.
TAPSTO(250)	An array in common used to hold CLTAPE record being processed.
WORDS(26)	An array in common which contains actual word addresses desired.

XVALUE	Location in common used to store present X coordinate after the plane desired has been determined.
YVALUE	Location in common used to store present Y coordinate after the plane desired has been determined.
ZVALUE	Location in common used to store present Z coordinate after the plane desired has been determined.