

,TITLE VP15A SYSTEM EXERCISER
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 /DIGITAL EQUIPMENT CORPORATION MAYNARD, MASS, 01754
 /REV, DATE 3/1/71
 /PROGRAMMED BY: EARL L. BOUSE

/THIS PROGRAM IS DESIGNED TO EXERCISE THE 'VP15A' STORAGE
 /TUBE DISPLAY SYSTEM,

707764 A ,EBREL
 EBA=707764

00000 R 600014 A UODSW 600014 /I/O DEVICE WITH 'API' ADDRESS '54',
 00001 R 000000 A KRAN 0 /AMOUNT OF RANDOM NUMBERS PLOTTED IN RANDOM TEST, 0=262144
 00002 R 000000 A
 00003 R 000000 A
 00004 R 000070 R
 00005 R 000044 R ,DSA SERVICE
 00006 R 262061 A ,DSA INIT
 00007 R 650140 A ,SIXBT 'VP15A'
 00010 R 000200 A
 00011 R 200 /DATA 'SW10' INHIBITS 'VP15A' TEST,
 ,BLOCK 7
 00020 R 000000 A SYSERR 0 /ERROR INDICATOR FOR MONITOR,
 00021 R 000000 A
 00022 R 000000 A ERCODE 0 /ERROR CODE
 00023 R 000000 A
 00024 R 000000 A
 00025 R 000000 A
 00026 R 000000 A
 00027 R 000000 A

/VP15A IOT'S

00030 R 700522 A CXB 700522 /CLEAR 'X' COORDINATE BUFFER
 00031 R 700622 A CYB 700622 /CLEAR 'Y' COORDINATE BUFFER
 00032 R 700524 A LXB 700524 /LOAD 'X' COORDINATE BUFFER 'AC8-17'
 00033 R 700624 A LYB 700624 /LOAD 'Y' COORDINATE BUFFER 'AC8-17'
 00034 R 700724 A EST 700724 /ERASE STORAGE TUBE
 00035 R 700521 A SDDF 700521 /SKIP ON DISPLAY DONE FLAG,
 00036 R 700722 A CDDF 700722 /CLEAR DISPLAY DONE FLAG,
 00037 R 700564 A LXBD 700564 /LOAD 'X' BUFFER AND DISPLAY 'XB=YB'
 00040 R 700664 A LYBD 700664 /LOAD 'Y' BUFFER AND DISPLAY 'YB=XB'
 00041 R 700721 A EDI 700721 /ENABLE DISPLAY INTERRUPT
 00042 R 700544 A LXDNS 700544 /LOAD 'X' AND DISPLAY - NON STORE
 00043 R 700644 A LYDNS 700644 /LOAD 'Y' AND DISPLAY - NON STORE

707702 A EEM=707702
 707764 A EBA=707764

,EJECT

/INITIALIZE THE 'VP15A' TEST

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00044 R 000000 A INIT 0
00045 R 707764 A EBA /ENABLE BANK ADDRESSING
00046 R 707702 A EEM
00047 R 200044 R LAC INIT
00050 R 040070 R DAC SERVICE
00051 R 140020 R DZM SYSERR /CLEAR ERROR LOCATIONS
00052 R 140021 R DZM SYSERR+1
00053 R 140022 R DZM ERCODE
00054 R 141546 R DZM FLGDRV /CLEAR 'FLAG DRIVEN' LOCATION
00055 R 777776 A LAW =2
00056 R 041550 R DAC THRDCT
00057 R 777634 A LAW =144
00060 R 041545 R DAC RUNCTR /SET UP LOOP COUNTER FOR TEST #1
00061 R 201551 R LAC (2)
00062 R 400041 R XCT EDI /ENABLE DISPLAY INTERRUPT
00063 R 201552 R LAC (TST1
00064 R 040106 R DAC DSTSW1
00065 R 100454 R JMS HOLDSW /CHECK FOR HOLD SWITCH
00066 R 400034 R XCT EST /ERASE STORAGE TUBE
00067 R 620044 R JMP* INIT

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/SERVICE ENTRANCE

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00070 R 000000 A SERVICE 0
00071 R 707764 A EBA /ENABLE BANK ADDRESSING
00072 R 707702 A EEM
00073 R 041543 R DAC SAVEAC /SAVE CONTENTS OF 'AC'
00074 R 141546 R DZM FLGDRV /CLEAR 'FLAG DRIVEN' INDICATOR
00075 R 201541 R LAC HOLENB
00076 R 740200 A SZA
00077 R 600104 R JMP SERV1 /WAS INHIBIT SW SET?
00100 R 400035 R XCT SDDF /YES, RECHECK SW,
00101 R 600437 R JMP EXITMP /SKIP ON DISPLAY DONE FLAG,
00102 R 777777 A LAW =1 /NO FLAG, EXIT MINUS '5'
00103 R 041546 R DAC FLGDRV
00104 R 141541 R SERV1 DZM HOLENB /CLEAR INHIBIT SW,
00105 R 620106 R JMP* DSTSW1
00106 R 000000 A DSTSW1 0 /TEST DISTRIBUTION LOCATION
,EJECT

```

/TEST 1
 /DISPLAY A 'BOX' WITH 'BISECTORS' AND 'DIAGONALS',

00107	R	400036	R	TST1	XCT	CDDF	/CLEAR DISPLAY DONE FLAG,
00110	R	777754	A		LAW	=24	
00111	R	041544	R		DAC	CNTR1	/TST1' LOOP COUNTER
00112	R	201553	R		LAC	(XCT LXB	
00113	R	040514	R		DAC	DISP3	
00114	R	040533	R		DAC	DISP5	
00115	R	201554	R		LAC	(XCT LYBD	
00116	R	040517	R		DAC	DISP4	
00117	R	040536	R		DAC	DISP6	
00120	R	750000	A		CLA		
00121	R	100513	R		JMS	PLINE	/PLOT A LINE AT X=0
00122	R	201534	R		LAC	EDGE	/=TO 1777
00123	R	100513	R		JMS	PLINE	/PLOT A LINE AT X=1777
00124	R	201555	R		LAC	(XCT LYB	
00125	R	040514	R		DAC	DISP3	
00126	R	040533	R		DAC	DISP5	
00127	R	201556	R		LAC	(XCT LXBD	
00130	R	040517	R		DAC	DISP4	
00131	R	040536	R		DAC	DISP6	
00132	R	750000	A		CLA		
00133	R	100513	R		JMS	PLINE	/PLOT A LINE AT Y=0
00134	R	201534	R		LAC	EDGE	/=TO 1777
00135	R	100532	R		JMS	MLINE	/PLOT A LINE AT Y=1777
00136	R	201535	R		LAC	CENTER	/=TO 1000
00137	R	100532	R		JMS	MLINE	/PLOT A LINE AT Y=1000
00140	R	201553	R		LAC	(XCT LXB	
00141	R	040514	R		DAC	DISP3	
00142	R	040533	R		DAC	DISP5	
00143	R	201554	R		LAC	(XCT LYBD	
00144	R	040517	R		DAC	DISP4	
00145	R	040536	R		DAC	DISP6	
00146	R	201535	R		LAC	CENTER	
00147	R	100532	R		JMS	MLINE	/PLOT A LINE AT X=1000
00150	R	100551	R		JMS	DIAG1	/PLOT 'LL' TO 'UR' DIAGONAL
00151	R	100563	R		JMS	DIAG2	/PLOT 'UL' TO 'LR' DIAGONAL
00152	R	101022	R		JMS	SETEX5	/FINISHED TEST #1,
00153	R	600112	R		JMP	TST1+3	
00154	R	400034	R	EXTST1	XCT	EST	/ERASE STORAGE TUBE
00155	R	201557	R		LAC	(TST2	/SET UP FOR TEST #2
00156	R	040106	R		DAC	DSTSW1	
00157	R	777777	A		LAW	=1	
00160	R	041546	R		DAC	FLGDRV	
00161	R	600427	R		JMP	EXIT	

,EJECT

/TEST #2
 /SUBROUTINE TO SETUP TO PLOT A CIRCLE USING THE 'X=Y'
 /COORDINATES STORED IN 'XYAXIS' TABLE,

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00162 R 400036 R TST2 XCT CDDF /CLEAR THE DISPLAY DONE FLAG,
00163 R 777700 A LAW =100
00164 R 041544 R DAC CNTR1 /LOOP COUNTER FOR TEST #2
00165 R 201560 R LAC (NOP
00166 R 040676 R DAC CONSTA
00167 R 040703 R DAC CONSTB
00170 R 040721 R DAC CONSTC
00171 R 040726 R DAC CONSTD
00172 R 040746 R DAC CONSTE
00173 R 040755 R DAC CONSTF
00174 R 040771 R DAC CONSTG
00175 R 041000 R DAC CONSTH
00176 R 040677 R DAC CONSTA+1
00177 R 040704 R DAC CONSTB+1
00200 R 040722 R DAC CONSTC+1
00201 R 040727 R DAC CONSTD+1
00202 R 040747 R DAC CONSTE+1
00203 R 040756 R DAC CONSTF+1
00204 R 040772 R DAC CONSTG+1
00205 R 041001 R DAC CONSTH+1
00206 R 100653 R JMS CIRCLE /PLOT CIRCLE
00207 R 101022 R JMS SETEX5 /FINISHED TEST #2?
00210 R 600165 R JMP TST2+3 /NO, LOOP AGAIN
00211 R 600212 R JMP TST3
  
```

/TEST 3
 /PLOT A QUADRENT "COMPLIMENTED" CIRCLE INSIDE THE CIRCLE
 /PLOTTED WITH TEST #2,

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00212 R 400036 R TST3 XCT CDDF /CLEAR DISPLAY DONE
00213 R 777700 A LAW =100
00214 R 041544 R DAC CNTR1
00215 R 201561 R LAC (TAD K77470) /= TO 'TAD (-310)'
00216 R 040676 R DAC CONSTA
00217 R 040703 R DAC CONSTB
00220 R 040771 R DAC CONSTG
00221 R 040726 R DAC CONSTD
00222 R 201562 R LAC (TAD K310 /= TO 'TAD (310)'
00223 R 040746 R DAC CONSTE
00224 R 040755 R DAC CONSTF
00225 R 040721 R DAC CONSTC
00226 R 041000 R DAC CONSTH
00227 R 100653 R JMS CIRCLE /PLOT 'COMPLIMENTED' CIRCLE
00230 R 101022 R JMS SETEX5 /FINISHED TEST #3,
00231 R 600215 R JMP TST3+3 /NO, LOOP AGAIN,
00232 R 400034 R XCT EST /ERASE STORAGE TUBE
00233 R 201563 R LAC (TST4
00234 R 040106 R DAC DSTSW1
00235 R 600427 R JMP EXIT
      .EJECT
  
```

/TEST #4
 /PLOT A 6" CIRCLE VIA USING THE SAME X-Y TABLE AS TEST #2
 /VIA ROTATING ONCE LEFT,

00236 R 400036 R
 00237 R 777700 A
 00240 R 041544 R
 00241 R 201564 R
 00242 R 040676 R
 00243 R 040703 R
 00244 R 040721 R
 00245 R 040726 R
 00246 R 040746 R
 00247 R 040755 R
 00250 R 040771 R
 00251 R 041000 R
 00252 R 100653 R
 00253 R 101022 R
 00254 R 600252 R
 00255 R 600256 R

TST4 XCT CDDF
 LAW =100
 DAC CNTR1
 LAC (CLL)RAL
 DAC CONSTA
 DAC CONSTB
 DAC CONSTC
 DAC CONSTD
 DAC CONSTE
 DAC CONSTF
 DAC CONSTG
 DAC CONSTH
 TST4A JMS CIRCLE
 JMS SETEXS
 JMP TST4A
 JMP TST4B

/PLOT THE CIRCLE,

/TEST #4B
 /PLOT THE QUADRENT CIRCLE OF TEST#4,

00256 R 777700 A
 00257 R 041544 R
 00260 R 201565 R
 00261 R 040677 R
 00262 R 040704 R
 00263 R 040727 R
 00264 R 040772 R
 00265 R 201566 R
 00266 R 040722 R
 00267 R 040747 R
 00270 R 040756 R
 00271 R 041001 R
 00272 R 100653 R
 00273 R 101022 R
 00274 R 600272 R
 00275 R 400034 R
 00276 R 777777 A
 00277 R 041546 R
 00300 R 201567 R
 00301 R 040106 R
 00302 R 600427 R

TST4B LAW =100
 DAC CNTR1
 LAC (TAD K77270
 DAC CONSTA+1
 DAC CONSTB+1
 DAC CONSTD+1
 DAC CONSTG+1
 LAC (TAD K610
 DAC CONSTC+1
 DAC CONSTE+1
 DAC CONSTF+1
 DAC CONSTH+1
 TST4C JMS CIRCLE
 JMS SETEXS
 JMP TST4C
 XCT EST
 LAW =1
 DAC FLGDRV
 LAC (TST5
 DAC DSTSW1
 JMP EXIT
 .EJECT

/PLOT THE COMPLIMENTED CIRCLE,

/ERASE THE STORAGE TUBE,

/TEST #5
 /PLOT A 'DIAMOND' WITH BISECTORS

00303	R	400036	R	TST5	XCT	ODDF	/CLEAR DISPLAY DONE
00304	R	777730	A		LAW	=50	
00305	R	041544	R		DAC	CNTR1	
00306	R	201570	R		LAC	(1000	
00307	R	041524	R		DAC	TEMP1	/INITIALIZE THE 'Y' COORINATE,
00310	R	041526	R		DAC	TEMP3	
00311	R	141525	R		DZM	TEMP2	/INITIALIZE THE 'X' COORDINATE
00312	R	101032	R		JMS	INXCY	/PLOT THE 'UPPER LEFT' VECTOR
00313	R	141524	R		DZM	TEMP1	/INITIALIZE 'Y'
00314	R	201570	R		LAC	(1000	
00315	R	041525	R		DAC	TEMP2	/INITIALIZE 'X'
00316	R	201524	R	TST5A	LAC	TEMP1	/PLOT THE 'VERTICAL' LINE
00317	R	400033	R		XCT	LYB	
00320	R	201525	R		LAC	TEMP2	
00321	R	400037	R		XCT	LXBD	
00322	R	100644	R		JMS	WAITFG	
00323	R	441524	R		ISZ	TEMP1	
00324	R	201524	R		LAC	TEMP1	
00325	R	541571	R		SAD	(1777	
00326	R	741000	A		SKP		
00327	R	600316	R		JMP	TST5A	
00330	R	141524	R		DZM	TEMP1	
00331	R	201570	R		LAC	(1000	
00332	R	041525	R		DAC	TEMP2	
00333	R	201571	R		LAC	(1777	
00334	R	041526	R		DAC	TEMP3	
00335	R	101032	R		JMS	INXCY	/PLOT THE 'LOWER RIGHT' VECTOR
00336	R	141525	R		DZM	TEMP2	
00337	R	201570	R		LAC	(1000	
00340	R	041524	R		DAC	TEMP1	
00341	R	041526	R		DAC	TEMP3	
00342	R	101046	R		JMS	INXDCY	/PLOT THE 'LOWER LEFT' VECTOR
00343	R	201570	R		LAC	(1000	
00344	R	041525	R		DAC	TEMP2	
00345	R	201571	R		LAC	(1777	
00346	R	041524	R		DAC	TEMP1	
00347	R	041526	R		DAC	TEMP3	
00350	R	101046	R		JMS	INXDCY	/PLOT THE 'UPPER RIGHT' VECTOR
00351	R	141525	R		DZM	TEMP2	
00352	R	201570	R		LAC	(1000	
00353	R	041524	R		DAC	TEMP1	

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00354 R 201524 R TST5B LAC TEMP1 /PLOT THE 'HORIZONTAL' LINE
00355 R 400033 R XCT LYB
00356 R 201525 R LAC TEMP2
00357 R 400037 R XCT LXBD
00360 R 100644 R JMS WAITFG
00361 R 441525 R ISZ TEMP2
00362 R 201525 R LAC TEMP2
00363 R 541571 R SAD (1777
00364 R 741000 A SKP
00365 R 600354 R JMP TST5B
00366 R 101022 R JMS SETEXB
00367 R 600306 R JMP TST5+3
00370 R 400034 R XCT EST
00371 R 777777 A LAW =1
00372 R 041546 R DAC FLGDRV
00373 R 201572 R LAC (TST6
00374 R 040106 R DAC DSTSW1
00375 R 600427 R JMP EXIT

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/TEST #6
/PLOT A SERIES OF 'RANDOM' NUMBERS,

```

00376 R 400036 R TST6 XCT CDDF
00377 R 200001 R LAC KRAN
00400 R 741200 A SNA
00401 R 600404 R JMP TST6,1
00402 R 740001 A CMA
00403 R 341573 R TAD (1)
00404 R 041544 R TST6,1 DAC CNTR1
00405 R 100473 R JMS RANDOM
00406 R 501571 R AND (1777
00407 R 400033 R XCT LYB /LOAD THE 'Y' BUFFER,
00410 R 100473 R JMS RANDOM
00411 R 501571 R AND (1777
00412 R 400037 R XCT LXBD /LOAD 'X' AND DISPLAY 'XB=YB',
00413 R 100644 R JMS WAITFG
00414 R 441544 R ISZ CNTR1
00415 R 600405 R JMP TST6,1+1
00416 R 777774 A LAW =4
00417 R 040020 R DAC SYSERR
00420 R 041546 R DAC FLGDRV
00421 R 777770 A LAW =10
00422 R 041550 R DAC THRDCT
00423 R 400036 R XCT CDDF
00424 R 441550 R ISZ THRDCT
00425 R 600423 R JMP =2
00426 R 600427 R JMP EXIT

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,EJECT

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00427 R 201546 R EXIT LAC FLGDRV
00430 R 741200 A SNA /WAS PROGRAM FLAG DRIVEN?
00431 R 600442 R JMP NOFLAG /NO
00432 R 705512 A RPL
00433 R 751100 A SPA;CLA /'API' ENABLED?
00434 R 201543 R LAC SAVEAC /YES, RESTORE 'AC',
00435 R 703344 A DBR
00436 R 620070 R JMP* SERVICE
/
/SET UP FOR A "-5" EXIT
/
00437 R 777773 A EXITM5 LAW =5
00440 R 040020 R DAC SYSERR
00441 R 600432 R JMP EXIT+3
/
/EXIT !MINUS 5! IF NOT FLAG DRIVEN,
/
00442 R 705512 A NOFLAG RPL
00443 R 741100 A SPA /WAS 'API' ON?
00444 R 600446 R JMP ERROR1 /YES, ILLEGAL 'API' ENTRY
00445 R 600437 R JMP EXITM5
/
/ERROR #1, ILLEGAL 'API' ENTRY
/
00446 R 777777 A ERROR1 LAW =1
00447 R 040020 R DAC SYSERR
00450 R 040021 R DAC SYSERR+1
00451 R 201573 R LAC (1
00452 R 040022 R DAC ERCODE
00453 R 600432 R JMP EXIT+3
/
/TEST FOR DATA 'SW10' WHICH INHIBITS THE VP15A TEST,
/
00454 R 000000 A HOLDSW 0
00455 R 750004 A LAS
00456 R 500010 R AND UODSW+10 /MASK DATA SW10
00457 R 741200 A SNA
00460 R 620454 R JMP* HOLDSW
00461 R 200106 R LAC DSTSW1
00462 R 041542 R DAC SAVDST
00463 R 777777 A LAW =1
00464 R 041541 R DAC HOLENB
00465 R 201574 R LAC (HOLD,1
00466 R 040106 R DAC DSTSW1
00467 R 600437 R JMP EXITM5
00470 R 201542 R HOLD,1 LAC SAVDST
00471 R 040106 R DAC DSTSW1
00472 R 600455 R JMP HOLDSW+1
,EJECT

```


/RANDOM NØ, GENERATOR, EXIT WITH NØ, IN THE 'AC,

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RANDOM /
00473 R 000000 A
00474 R 341536 R TAD RANA
00475 R 341537 R TAD RANB
00476 R 341540 R TAD RANC
00477 R 041536 R DAC RANA
00500 R 750010 A GLK
00501 R 341536 R TAD RANA
00502 R 341537 R TAD RANB
00503 R 341540 R TAD RANC
00504 R 041537 R DAC RANB
00505 R 750010 A GLK
00506 R 341536 R TAD RANA
00507 R 341537 R TAD RANB
00510 R 341540 R TAD RANC
00511 R 041540 R DAC RANC
00512 R 620473 R JMP* RANDOM
    
```

/SUBROUTINE TO DISPLAY A FULL LENGTH LINE EITHER HORIZONTAL
/OR VERTICAL AT A POINT DETERMINED BY THE CONTENTS OF THE AC,

```

PLINE /
00513 R 000000 A
00514 R 740040 A DISP3 XX /LOAD 'X' OR 'Y' BUFFER
00515 R 041522 R DAC KSTOR1 /SAVE POINT
00516 R 750000 A CLA
00517 R 740040 A DISP4 XX /LOAD 'X' OR 'Y' BUFFER AND DISPLAY,
00520 R 341573 R TAD (1
00521 R 041524 R DAC TEMP1
00522 R 541575 R SAD (2000 /UPPER LIMIT?
00523 R 741000 A SKP /YES, EXIT
00524 R 600527 R JMP LINEA /NO, REPEAT
00525 R 201522 R LAC KSTOR1
00526 R 620513 R JMP* PLINE
LINEA /
00527 R 100644 R JMS WAITFG /WAIT FOR DONE FLAG
00530 R 201524 R LAC TEMP1
00531 R 600517 R JMP DISP4
,EJECT
    
```

/SUBROUTINE TO DISPLAY A FULL LINE (MINUS INCREMENTS)
 /((HORIZONTAL OR VERTICAL) AT THE POSITION DETERMINED BY
 /THE CONTENTS OF THE AC,

```

00532 R 000000 A MLINE 0
00533 R 740040 A DISP5 XX /LOAD 'X' OR 'Y' BUFFER,
00534 R 041522 R DAC KSTOR1
00535 R 201534 R LAC EDGE
00536 R 740040 A DISP6 XX /LOAD 'X' OR 'Y' AND DISPLAY,
00537 R 341576 R TAD (=1 /DECREMENT POINT PLOT
00540 R 041524 R DAC TEMP1
00541 R 541576 R SAD (=1 /FINISHED?
00542 R 741000 A SKP /YES
00543 R 600546 R JMP LINEB
00544 R 201522 R LAC KSTOR1
00545 R 620532 R JMP# MLINE
/
00546 R 100644 R LINEB JMS WAITFG /WAIT FOR DONE FLAG
00547 R 201524 R LAC TEMP1
00550 R 600536 R JMP DISP6
/

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/SUBROUTINE TO DISPLAY A DIAGONAL LINE FROM
 /LOWER LEFT TO UPPER RIGHT,

```

00551 R 000000 A DIAG1 0
00552 R 750000 A CLA /ZERO "X"
00553 R 040555 R DAC ,+2 /ZERO "Y"
00554 R 100601 R JMS POINT /DISPLAY X,Y
00555 R 000000 A 0 /'X'
00556 R 440555 R ISZ ,=1 /INCREMENT "Y"
00557 R 200555 R LAC ,=2 /GET 'X'
00560 R 541575 R SAD (2000 /FINISHED LINE?
00561 R 620551 R JMP# DIAG1 /YES, EXIT
00562 R 600554 R JMP ,=6 /NO, DISPLAY NEXT POINT
/

```

/SUBROUTINE TO DISPLAY A DIAGONAL LINE FROM
 /UPPER LEFT TO LOWER RIGHT

```

00563 R 000000 A DIAG2 0
00564 R 201571 R LAC (1777 /INITIALIZE 'Y'
00565 R 040570 R DAC ,+3
00566 R 750000 A CLA /ZERO X
00567 R 100601 R JMS POINT /PLOT X,Y
00570 R 001777 A 1777 /Y
00571 R 750001 A CLA,CMA /SUBTRACT 1
00572 R 340570 R TAD ,=2 /FROM "Y" AND
00573 R 040570 R DAC ,=3 /RESTORE
00574 R 541576 R SAD (=1 /ALL POINTS DISPLAYED?
00575 R 620563 R JMP# DIAG2 /YES, EXIT
00576 R 441547 R ISZ COORD /NO, INCREMENT "X"
00577 R 201547 R LAC COORD
00600 R 600567 R JMP ,=11 /DISPLAY NEXT POINT
,EJECT

```

/SUBROUTINE TO DISPLAY A POINT WHERE THE 'X' COORDINATE
/IS IN THE 'AC' AND THE 'Y' COORDINATE IS IN "JMS+1"

```

00601 R 000000 A POINT 0
00602 R 400032 R XCT LXB /LOAD 'X' BUFFER
00603 R 041547 R DAC COORD
00604 R 220601 R LAC* POINT
00605 R 400040 R XCT LYBD /LOAD 'Y' AND DISPLAY 'YB,XB'
00606 R 100644 R JMS WAITFG /WAIT FOR DONE FLAG
00607 R 440601 R ISZ POINT
00610 R 201547 R LAC COORD
00611 R 620601 R JMP* POINT
    
```

/INCREMENT 'RUN COUNTER' AND SETUP TO EXIT
/MINUS 5! AFTER PLOTTING '100' POINTS

```

00612 R 000000 A INCRUN 0
00613 R 441545 R ISZ RUNCTR
00614 R 620612 R JMP* INCRUN
00615 R 200612 R LAC INCRUN
00616 R 040106 R DAC DSTSW1
00617 R 777634 A LAW =144
00620 R 041545 R DAC RUNCTR
00621 R 777777 A LAW =1
00622 R 041546 R DAC FLGDRV
00623 R 441550 R ISZ THRDCT
00624 R 600427 R JMP EXIT
    /
00625 R 777776 A LAW =2
00626 R 041550 R DAC THRDCT
00627 R 201577 R LAC (INCR,1)
00630 R 040106 R DAC DSTSW1
00631 R 400035 R XCT SODF
00632 R 600631 R JMP =1
00633 R 400036 R XCT CDDF
00634 R 777777 A LAW =1
00635 R 041541 R DAC HOLENB
00636 R 600437 R JMP EXITM5
    /
    
```

```

00637 R 200644 R INCR,1 LAC WAITFG
00640 R 040106 R DAC DSTSW1
00641 R 777777 A LAW =1
00642 R 041541 R DAC HOLENB
00643 R 600437 R JMP EXITM5
    ,EJECT
    
```

/WAIT FOR DISPLAY DONE FLAG AND CLEAR FLAG,

```

00644 R 000000 A   WAITFG 0
00645 R 100612 R   JMS      INCRUN      /INCREMENT RUN COUNTER,
00646 R 400035 R   XCT      SDDF        /SKIP IN DISPLAY DONE,
00647 R 600646 R   JMP      ,=1
00650 R 400036 R   XCT      CDDF        /CLEAR DISPLAY DONE
00651 R 100454 R   JMS      HOLDSW     /CHECK FOR THE INHIBIT SW,
00652 R 620644 R   JMP*     WAITFG

```

/PLOT '4' QUADRENTS OF A CIRCLE

```

00653 R 000000 A   CIRCLE 0
00654 R 201600 R   LAC      (XYAXIS
00655 R 041527 R   DAC      YPOINT      /ADDRESS OF 'X-Y' COORDINATE TABLE,
00656 R 100671 R   JMS      PLOTUR      /PLOT THE 'UPPER RIGHT' QUADRENT
00657 R 201601 R   LAC      (TABEND=1
00660 R 041527 R   DAC      YPOINT
00661 R 100712 R   JMS      PLOTUL      /PLOT THE 'UPPER LEFT' QUADRENT
00662 R 201600 R   LAC      (XYAXIS
00663 R 041527 R   DAC      YPOINT
00664 R 100737 R   JMS      PLOTLL      /PLOT THE 'LOWER RIGHT' QUADRENT,
00665 R 201601 R   LAC      (TABEND=1
00666 R 041527 R   DAC      YPOINT
00667 R 100764 R   JMS      PLOTLR      /PLOT THE 'LOWER RIGHT' QUADRENT,
00670 R 620653 R   JMP*     CIRCLE

```

/SUBROUTINE TO PLOT THE 'UPPER RIGHT' QUADRENT OF A CIRCLE,

```

00671 R 000000 A   PLOTUR 0
00672 R 221527 R   LAC*     YPOINT
00673 R 541576 R   SAD      (=1          /END OF TABLE?
00674 R 620671 R   JMP*     PLOTUR      /YES, EXIT
00675 R 501602 R   AND      (777
00676 R 740040 A   CONSTA  XX          /'NO!' OR 'QUADRENT COMPLIMENT
00677 R 740040 A   XX
00700 R 341570 R   TAD      (1000      /ADD SCREEN OFF=SET
00701 R 400032 R   XCT      LXB        /LOAD THE 'X' BUFFER,
00702 R 101011 R   JMS      MASKY      /MASK 'Y' COORDINATE
00703 R 740040 A   CONSTB  XX          /'NO!' OR 'QUADRENT COMPLIMENT
00704 R 740040 A   XX
00705 R 341570 R   TAD      (1000      /ADD SCREEN OFF=SET
00706 R 400040 R   XCT      LYBD       /LOAD 'Y' AND DISPLAY 'YB=XB'
00707 R 100644 R   JMS      WAITFG
00710 R 441527 R   ISZ     YPOINT      /INCREMENT COORDINATE POINTER,
00711 R 600672 R   JMP     PLOTUR+1    /DISPLAY NEXT POINT
      .EJECT

```

/SUBROUTINE TO PLOT THE 'UPPER LEFT' QUADRENT OF A CIRCLE

```

/
00712 R 000000 A PLOTUL 0
00713 R 221527 R LAC# YPOINT
00714 R 541576 R SAD (-1 /END OF TABLE?
00715 R 620712 R JMP* PLOTUL /YES, EXIT
00716 R 501602 R AND (777 /MASK 'X' COORDINATE
00717 R 740001 A CMA
00720 R 341573 R TAD (1
00721 R 740040 A CONSTC XX /NOP OR TAD (=310
00722 R 740040 A XX
00723 R 341570 R TAD (1000 /ADD SCREEN OFF-SET,
00724 R 400032 R XCT LYB /LOAD 'X' BUFFER
00725 R 101011 R JMS MASKY /GET 'Y' COORDINATE
00726 R 740040 A CONSTD XX
00727 R 740040 A XX
00730 R 341570 R TAD (1000 /ADD SCREEN OFF-SET,
00731 R 400040 R XCT LYBD /LOAD 'Y' AND DISPLAY 'YB-XB'
00732 R 100644 R JMS WAITFG /INCREMENT 'RUN' COUNTER
00733 R 201527 R LAC YPOINT
00734 R 341576 R TAD (-1 /DECREMENT 'COORDINATE' POINTER
00735 R 041527 R DAC YPOINT /SAVE IT
00736 R 600713 R JMP PLOTUL+1 /PLOT NEXT POINT
/

```

/SUBROUTINE TO PLOT THE 'LOWER LEFT' QUADRENT OF A CIRCLE.

```

/
00737 R 000000 A PLOTLL 0
00740 R 221527 R LAC# YPOINT
00741 R 541576 R SAD (-1 /END OF TABLE?
00742 R 620737 R JMP* PLOTLL /YES, EXIT
00743 R 501602 R AND (777 /MASK 'X' COORDINATE
00744 R 740001 A CMA
00745 R 341573 R TAD (+1
00746 R 740040 A CONSTE XX /'NOP' OR TAD (=310
00747 R 740040 A XX
00750 R 341570 R TAD (1000 /ADD SCREEN OFF-SET
00751 R 400032 R XCT LYB /LOAD 'X' BUFFER
00752 R 101011 R JMS MASKY /MASK 'Y' COORDINATE
00753 R 740001 A CMA
00754 R 341573 R TAD (1
00755 R 740040 A CONSTF XX /NOP OR TAD (=310
00756 R 740040 A XX
00757 R 341570 R TAD (1000 /ADD SCREEN OFF-SET,
00760 R 400040 R XCT LYBD /LOAD 'Y' BUFFER AND DISPLAY 'YB-XB'
00761 R 100644 R JMS WAITFG
00762 R 441527 R ISZ YPOINT /INCREMENT 'COORDINATE' POINTER
00763 R 600740 R JMP PLOTLL+1 /PLOT NEXT POINT
,EJECT

```

/SUBROUTINE TO PLOT THE 'LOWER RIGHT' QUADRENT OF A CIRCLE,

```

00764 R 000000 A PLOTLR /
00765 R 221527 R LAC* YPOINT
00766 R 541576 R SAD (-1 /END OF TABLE?
00767 R 620764 R JMP* PLOTLR /YES, EXIT
00770 R 501602 R AND (777 /MASK 'X' COORDINATE
00771 R 740040 A CONSTG XX
00772 R 740040 A XX
00773 R 341570 R TAD (1000
00774 R 400032 R XCT LYB /LOAD THE 'X' BUFFER,
00775 R 101011 R JMS MASKY /MASK 'Y' COORDINATE
00776 R 740001 A CMA
00777 R 341573 R TAD (1
01000 R 740040 A CONSTH XX
01001 R 740040 A XX
01002 R 341570 R TAD (1000 /ADD SCREEN OFF-SET
01003 R 400040 R XCT LYBD /LOAD THE 'Y' BUFFER AND DISPLAY
01004 R 100644 R JMS WAITFG /INCREMENT 'RUN' COUNTER
01005 R 201527 R LAC YPOINT
01006 R 341576 R TAD (-1 /DECREMENT COORDINATE POINTER
01007 R 041527 R DAC YPOINT
01010 R 600765 R JMP PLOTLR+1

```

/MASK THE 'Y' COORDINATE AND EXIT WILL RESULT IN THE 'AC',

```

01011 R 000000 A MASKY /
01012 R 221527 R LAC* YPOINT
01013 R 501603 R AND (777000
01014 R 746020 A CLL:RTR
01015 R 742020 A RTR
01016 R 742020 A RTR
01017 R 742020 A RTR
01020 R 740020 A RAR
01021 R 621011 R JMP* MASKY

```

/INCREMENT PASS COUNTER AND SET DSTSW1

```

01022 R 000000 A SETEX5 /
01023 R 201022 R LAC SETEX5
01024 R 040106 R DAC DSTSW1
01025 R 041541 R DAC HOLENB
01026 R 441022 R ISZ SETEX5
01027 R 441544 R ISZ CNTR1
01030 R 600437 R JMP EXITM5
01031 R 621022 R JMP* SETEX5
      .EJECT

```

/SUBROUTINE TO INCREMENT AND PLOT A PREDETERMINED
/X' AND 'Y' COUNT '1000' POINTS.

```

01032 R 000000 A   INCXY  /
01033 R 201524 R   LAC      TEMP1
01034 R 400033 R   XCT      LYB          /LOAD 'Y' BUFFER
01035 R 441524 R   ISZ      TEMP1
01036 R 201525 R   LAC      TEMP2
01037 R 400037 R   XCT      LXBD          /LOAD 'X' AND DISPLAY 'XB=YB'
01040 R 441525 R   ISZ      TEMP2
01041 R 100644 R   JMS      WAITFG
01042 R 201525 R   LAC      TEMP2
01043 R 541526 R   SAD      TEMP3
01044 R 621032 R   JMP*     INCXY
01045 R 601033 R   JMP      INCXY+1

```

/SUBROUTINE TO INCREMENT 'X' AND DECREMENT 'Y',

```

01046 R 000000 A   INXDCY /
01047 R 201524 R   LAC      TEMP1
01050 R 400033 R   XCT      LYB
01051 R 201524 R   LAC      TEMP1
01052 R 341576 R   TAD      (=1
01053 R 041524 R   DAC      TEMP1
01054 R 201525 R   LAC      TEMP2
01055 R 400037 R   XCT      LXBD
01056 R 441525 R   ISZ      TEMP2
01057 R 100644 R   JMS      WAITFG
01060 R 201525 R   LAC      TEMP2
01061 R 541526 R   SAD      TEMP3
01062 R 621046 R   JMP*     INXDCY
01063 R 601047 R   JMP      INXDCY+1
          .EJECT

```

/TABLE OF 'X-Y' COORDINATES FOR A 4" CIRCLE

			/Y,X
01064	R	777777	A 777777
01065	R	000310	A XYAXIS 0310
01066	R	001310	A 1310
01067	R	002310	A 2310
01070	R	003310	A 3310
01071	R	004310	A 4310
01072	R	005310	A 5310
01073	R	006310	A 6310
01074	R	007310	A 7310
01075	R	010310	A 10310
01076	R	011310	A 11310
01077	R	012310	A 12310
01100	R	013310	A 13310
01101	R	014310	A 14310
01102	R	015310	A 15310
01103	R	016310	A 16310
01104	R	017310	A 17310
01105	R	020307	A 20307
01106	R	021307	A 21307
01107	R	022307	A 22307
01110	R	023307	A 23307
01111	R	024307	A 24307
01112	R	025307	A 25307
01113	R	026307	A 26307
01114	R	027307	A 27307
01115	R	030307	A 30307
01116	R	031306	A 31306
01117	R	032306	A 32306
01120	R	033306	A 33306
01121	R	034306	A 34306
01122	R	035306	A 35306
01123	R	036306	A 36306
01124	R	037306	A 37306
01125	R	040305	A 40305
01126	R	041305	A 41305
01127	R	042305	A 42305
01130	R	043305	A 43305
01131	R	044305	A 44305
01132	R	045305	A 45305
01133	R	046304	A 46304
01134	R	047304	A 47304
01135	R	050304	A 50304
01136	R	051304	A 51304
01137	R	052304	A 52304
01140	R	053303	A 53303
01141	R	054303	A 54303
01142	R	055303	A 55303
01143	R	056303	A 56303
01144	R	057302	A 57302
01145	R	060302	A 60302
01146	R	061302	A 61302

01147	R	062302	A	62302
01150	R	063301	A	63301
01151	R	064301	A	64301
01152	R	065301	A	65301
01153	R	066301	A	66301
01154	R	067300	A	67300
01155	R	070300	A	70300
01156	R	071300	A	71300
01157	R	072277	A	72277
01160	R	073277	A	73277
01161	R	074277	A	74277
01162	R	075276	A	75276
01163	R	076276	A	76276
01164	R	077276	A	77276
01165	R	100275	A	100275
01166	R	101275	A	101275
01167	R	102275	A	102275
01170	R	103274	A	103274
01171	R	104274	A	104274
01172	R	105274	A	105274
01173	R	106273	A	106273
01174	R	107273	A	107273
01175	R	110273	A	110273
01176	R	111272	A	111272
01177	R	112272	A	112272
01200	R	113271	A	113271
01201	R	114271	A	114271
01202	R	115271	A	115271
01203	R	116270	A	116270
01204	R	117270	A	117270
01205	R	120267	A	120267
01206	R	121267	A	121267
01207	R	122266	A	122266
01210	R	123266	A	123266
01211	R	124266	A	124266
01212	R	125265	A	125265
01213	R	126265	A	126265
01214	R	127264	A	127264
01215	R	130264	A	130264
01216	R	131263	A	131263
01217	R	132263	A	132263
01220	R	133262	A	133262
01221	R	134262	A	134262
01222	R	135261	A	135261
01223	R	136261	A	136261
01224	R	137260	A	137260
01225	R	140257	A	140257
01226	R	141257	A	141257
01227	R	142256	A	142256
01230	R	143256	A	143256
01231	R	144255	A	144255
01232	R	145255	A	145255
01233	R	146254	A	146254

01234	R	147253	A	147253
01235	R	150253	A	150253
01236	R	151252	A	151252
01237	R	152252	A	152252
01240	R	153251	A	153251
01241	R	154250	A	154250
01242	R	155250	A	155250
01243	R	156247	A	156247
01244	R	157246	A	157246
01245	R	160246	A	160246
01246	R	161245	A	161245
01247	R	162244	A	162244
01250	R	163244	A	163244
01251	R	164243	A	164243
01252	R	165242	A	165242
01253	R	166241	A	166241
01254	R	167241	A	167241
01255	R	170240	A	170240
01256	R	171237	A	171237
01257	R	172236	A	172236
01260	R	173236	A	173236
01261	R	174235	A	174235
01262	R	175234	A	175234
01263	R	176233	A	176233
01264	R	177233	A	177233
01265	R	200232	A	200232
01266	R	201231	A	201231
01267	R	202230	A	202230
01270	R	203227	A	203227
01271	R	204226	A	204226
01272	R	205226	A	205226
01273	R	206225	A	206225
01274	R	207224	A	207224
01275	R	210223	A	210223
01276	R	211222	A	211222
01277	R	212221	A	212221
01300	R	213220	A	213220
01301	R	214217	A	214217
01302	R	215216	A	215216
01303	R	216215	A	216215
01304	R	217214	A	217214
01305	R	220213	A	220213
01306	R	221212	A	221212
01307	R	222211	A	222211
01310	R	223210	A	223210
01311	R	224207	A	224207
01312	R	225206	A	225206
01313	R	226205	A	226205
01314	R	226204	A	226204
01315	R	227203	A	227203
01316	R	230202	A	230202
01317	R	231201	A	231201
01320	R	232200	A	232200

01321	R	233177	A	233177
01322	R	233176	A	233176
01323	R	234175	A	234175
01324	R	235174	A	235174
01325	R	236173	A	236173
01326	R	236172	A	236172
01327	R	237171	A	237171
01330	R	240170	A	240170
01331	R	241167	A	241167
01332	R	241166	A	241166
01333	R	242165	A	242165
01334	R	243164	A	243164
01335	R	244163	A	244163
01336	R	244162	A	244162
01337	R	245161	A	245161
01340	R	246160	A	246160
01341	R	246157	A	246157
01342	R	247156	A	247156
01343	R	250155	A	250155
01344	R	250154	A	250154
01345	R	251153	A	251153
01346	R	252152	A	252152
01347	R	252151	A	252151
01350	R	253150	A	253150
01351	R	253147	A	253147
01352	R	254146	A	254146
01353	R	255145	A	255145
01354	R	255144	A	255144
01355	R	256143	A	256143
01356	R	256142	A	256142
01357	R	257141	A	257141
01360	R	257140	A	257140
01361	R	260137	A	260137
01362	R	261136	A	261136
01363	R	261135	A	261135
01364	R	262134	A	262134
01365	R	262133	A	262133
01366	R	263132	A	263132
01367	R	263131	A	263131
01370	R	264130	A	264130
01371	R	264127	A	264127
01372	R	265126	A	265126
01373	R	265125	A	265125
01374	R	266124	A	266124
01375	R	266123	A	266123
01376	R	266122	A	266122
01377	R	267121	A	267121
01400	R	267120	A	267120
01401	R	270117	A	270117
01402	R	270116	A	270116
01403	R	271115	A	271115
01404	R	271114	A	271114
01405	R	271113	A	271113

01406	R	272112	A	272112
01407	R	272111	A	272111
01410	R	273110	A	273110
01411	R	273107	A	273107
01412	R	273106	A	273106
01413	R	274105	A	274105
01414	R	274104	A	274104
01415	R	274103	A	274103
01416	R	275102	A	275102
01417	R	275101	A	275101
01420	R	275100	A	275100
01421	R	276077	A	276077
01422	R	276076	A	276076
01423	R	276075	A	276075
01424	R	277074	A	277074
01425	R	277073	A	277073
01426	R	277072	A	277072
01427	R	300071	A	300071
01430	R	300070	A	300070
01431	R	300067	A	300067
01432	R	301066	A	301066
01433	R	301065	A	301065
01434	R	301064	A	301064
01435	R	301063	A	301063
01436	R	302062	A	302062
01437	R	302061	A	302061
01440	R	302060	A	302060
01441	R	302057	A	302057
01442	R	303056	A	303056
01443	R	303055	A	303055
01444	R	303054	A	303054
01445	R	303053	A	303053
01446	R	304052	A	304052
01447	R	304051	A	304051
01450	R	304050	A	304050
01451	R	304047	A	304047
01452	R	304046	A	304046
01453	R	305045	A	305045
01454	R	305044	A	305044
01455	R	305043	A	305043
01456	R	305042	A	305042
01457	R	305041	A	305041
01460	R	305040	A	305040
01461	R	306037	A	306037
01462	R	306036	A	306036
01463	R	306035	A	306035
01464	R	306034	A	306034
01465	R	306033	A	306033
01466	R	306032	A	306032
01467	R	306031	A	306031
01470	R	307030	A	307030
01471	R	307027	A	307027
01472	R	307026	A	307026

01473	R	307025	A		307025
01474	R	307024	A		307024
01475	R	307023	A		307023
01476	R	307022	A		307022
01477	R	307021	A		307021
01500	R	307020	A		307020
01501	R	310017	A		310017
01502	R	310016	A		310016
01503	R	310015	A		310015
01504	R	310014	A		310014
01505	R	310013	A		310013
01506	R	310012	A		310012
01507	R	310011	A		310011
01510	R	310010	A		310010
01511	R	310007	A		310007
01512	R	310006	A		310006
01513	R	310005	A		310005
01514	R	310004	A		310004
01515	R	310003	A		310003
01516	R	310002	A		310002
01517	R	310001	A		310001
01520	R	310000	A		310000
01521	R	777777	A	TABEND	777777
01522	R	000000	A	KSTOR1	0
01523	R	000000	A	KSTOR2	0
01524	R	000000	A	TEMP1	0
01525	R	000000	A	TEMP2	0
01526	R	000000	A	TEMP3	0
01527	R	000000	A	YPOINT	0
01530	R	777470	A	K77470	777470
01531	R	000310	A	K310	310
01532	R	777155	A	K77270	777155
01533	R	000613	A	K610	613
01534	R	001777	A	EDGE	1777
01535	R	001000	A	CENTER	1000
01536	R	137260	A	RANA	137260
01537	R	643767	A	RANB	643767
01540	R	765432	A	RANC	765432
01541	R	000000	A	HOLENB	0
01542	R	000000	A	SAVDST	0
01543	R	000000	A	SAVEAC	0
01544	R	000000	A	CNTR1	0
01545	R	000000	A	RUNCTR	0
01546	R	000000	A	FLGDRV	0
01547	R	000000	A	COORD	0
01550	R	000000	A	THRDC	0

.EJECT

END UODSW

000000 R
01551 R 000002 A #L
01552 R 000107 R #L
01553 R 400032 R #L
01554 R 400040 R #L
01555 R 400033 R #L
01556 R 400037 R #L
01557 R 000162 R #L
01560 R 740000 A #L
01561 R 341530 R #L
01562 R 341531 R #L
01563 R 000236 R #L
01564 R 744010 A #L
01565 R 341532 R #L
01566 R 341533 R #L
01567 R 000303 R #L
01570 R 001000 A #L
01571 R 001777 A #L
01572 R 000376 R #L
01573 R 000001 A #L
01574 R 000470 R #L
01575 R 002000 A #L
01576 R 777777 A #L
01577 R 000637 R #L
01600 R 001065 R #L
01601 R 001520 R #L
01602 R 000777 A #L
01603 R 777000 A #L

SIZE=01606

NO ERROR LINES

CDDF	00036	R	CENTER	01535	R	CIRCLE	00653	R	CNTR1	01544	R
CONSTA	00676	R	CONSTB	00703	R	CONSTC	00721	R	CONSTD	00726	R
CONSTE	00746	R	CONSTF	00755	R	CONSTG	00771	R	CONSTH	01000	R
COORD	01547	R	CXB	00030	R	CYB	00031	R	DIAG1	00551	R
DIAG2	00563	R	DISP3	00514	R	DISP4	00517	R	DISP5	00533	R
DISP6	00536	R	DSTSW1	00106	R	EBA	707764	A	EDGE	01534	R
EDI	00041	R	EEM	707702	A	ERCODE	00022	R	ERROR1	00446	R
EST	00034	R	EXIT	00427	R	EXITM5	00437	R	EXTST1	00154	R
FLGDRV	01546	R	HOLDSW	00454	R	HOLD,1	00470	R	HOLENB	01541	R
INCRUN	00612	R	INCR,1	00637	R	INCXY	01032	R	INIT	00044	R
INXDCY	01046	R	KRAN	00001	R	KSTOR1	01522	R	KSTOR2	01523	R
K310	01531	R	K610	01533	R	K77270	01532	R	K77470	01530	R
LINEA	00527	R	LINEB	00546	R	LXB	00032	R	LXBD	00037	R
LXDNS	00042	R	LYB	00033	R	LYBD	00040	R	LYDNS	00043	R
MASKY	01011	R	MLINE	00532	R	NOFLAG	00442	R	PLINE	00513	R
PLOTLL	00737	R	PLOTLR	00764	R	PLOTUL	00712	R	PLOTUR	00671	R
POINT	00601	R	RANA	01536	R	RANB	01537	R	RANC	01540	R
RANDOM	00473	R	RUNCTR	01545	R	SAVDST	01542	R	SAVEAC	01543	R
SDDF	00035	R	SERVCE	00070	R	SERV1	00104	R	SETEX5	01022	R
SYSERR	00020	R	TABEND	01521	R	TEMP1	01524	R	TEMP2	01525	R
TEMP3	01526	R	THRDCT	01550	R	TST1	00107	R	TST2	00162	R
TST3	00212	R	TST4	00236	R	TST4A	00252	R	TST4B	00256	R
TST4C	00272	R	TST5	00303	R	TST5A	00316	R	TST5B	00354	R
TST6	00376	R	TST6,1	00404	R	UODSW	00000	R	WAITFG	00644	R
XYAXIS	01065	R	YPOINT	01527	R						

UODSW	00000	R	KRAN	00001	R	SYSERR	00020	R	ERCODE	00022	R
CXB	00030	R	CYB	00031	R	LXB	00032	R	LYB	00033	R
EST	00034	R	SDDF	00035	R	CDDF	00036	R	LXBD	00037	R
LYBD	00040	R	EDI	00041	R	LXDNS	00042	R	LYDNS	00043	R
INIT	00044	R	SERVCE	00070	R	SERV1	00104	R	DSTSW1	00106	R
TST1	00107	R	EXTST1	00154	R	TST2	00162	R	TST3	00212	R
TST4	00236	R	TST4A	00252	R	TST4B	00256	R	TST4C	00272	R
TST5	00303	R	TST5A	00316	R	TST5B	00354	R	TST6	00376	R
TST6.1	00404	R	EXIT	00427	R	EXITM5	00437	R	NOFLAG	00442	R
ERROR1	00446	R	HOLDSW	00454	R	HOLD.1	00470	R	RANDOM	00473	R
PLINE	00513	R	DISP3	00514	R	DISP4	00517	R	LINEA	00527	R
MLINE	00532	R	DISP5	00533	R	DISP6	00536	R	LINEB	00546	R
DIAG1	00551	R	DIAG2	00563	R	POINT	00601	R	INCRUN	00612	R
INCR.1	00637	R	WAITFG	00644	R	CIRCLE	00653	R	PLOTUR	00671	R
CONSTA	00676	R	CONSTB	00703	R	PLOTUL	00712	R	CONSTC	00721	R
CONSTD	00726	R	PLOTLL	00737	R	CONSTE	00746	R	CONSTF	00755	R
PLOTLR	00764	R	CONSTG	00771	R	CONSTH	01000	R	MASKY	01011	R
SETEX5	01022	R	INCXY	01032	R	INXDCY	01046	R	XYAXIS	01065	R
TABEND	01521	R	KSTOR1	01522	R	KSTOR2	01523	R	TEMP1	01524	R
TEMP2	01525	R	TEMP3	01526	R	YPOINT	01527	R	K77470	01530	R
K310	01531	R	K77270	01532	R	K610	01533	R	EDGE	01534	R
CENTER	01535	R	RANA	01536	R	RANB	01537	R	RANC	01540	R
HOLENB	01541	R	SAVDST	01542	R	SAVEAC	01543	R	CNTR1	01544	R
RUNCTR	01545	R	FLGDRV	01546	R	COORD	01547	R	THRDCT	01550	R
EEM	707702	A	EBA	707764	A						