

```

EXPLOD = ***** G   EXPREP = ***** G   EXPX   = ***** G
EXPY   = ***** G   GRAVITY = 000000RG   GRVFLG = ***** G
GRV01  = 000010R   GRV02  = 000024R   GRV05  = 000036R
GRV1   = 000046R   GRV2   = 000112R   GRV3   = 000154R
GRV5   = 000164R   GRV6   = 000232R   GRV65  = 000244R
GRV67  = 000254R   GRV7   = 000320R   GRV73  = 000362R
GRV75  = 000372R   GRV8   = 000432R   HIT1   = ***** G
HIT2   = ***** G   PC     = %000007   R0     = %000000
R1     = %000001   R2     = %000002   R3     = %000003
R4     = %000004   R5     = %000005   R6     = %000006
R7     = %000007   SCORE  = ***** G   SP     = %000006
SUN    = ***** G   SUNSZ  = ***** G   XDISP1 = ***** G
XDISP2 = ***** G   XVELH1 = ***** G   XVELH2 = ***** G
XVELL1 = ***** G   XVELL2 = ***** G   YDISP1 = ***** G
YDISP2 = ***** G   YVELH1 = ***** G   YVELH2 = ***** G
YVELL1 = ***** G   YVELL2 = ***** G   = 000450R

```

END ?

\*\*\*\*\*

# SUBROUTINE GRAVITY

VERSION 1C

BILL SEILER

OCT. 19, 1974

SIMULATES THE ATTRACTION OF GRAVITY  
TOWARD A SUN LOCATED AT (0,0) CENTER SCREEN  
CALLS THE SUN DRAWING ROUTINE  
CHECKS FOR RKT COLLISIONS WITH THE SUN  
R0=COLLISION FLAG  
R1=HIGH WORD GRAVITY  
R3=COMPARE SCRATCH  
R5=LOW WORD GRAVITY

```

000000   R0=%0
000001   R1=%1
000002   R2=%2
000003   R3=%3
000004   R4=%4
000005   R5=%5
000006   R6=%6
000007   R7=%7
000006   SP=R6
000007   PC=R7

```

```

. TITLE  GRAVITY
. GLOBL  SUN, EXPLOD, SCORE, XDISP1, XDISP2, YDISP1, YDISP2
. GLOBL  XVELL1, XVELL2, YVELL1, YVELL2, GRAVITY
. GLOBL  XVELH1, XVELH2, YVELH1, YVELH2
. GLOBL  SUNSZ, GRVFLG, EXPY, EXPX, EXPREP, HIT1, HIT2
. CSECT

```

```

000000 005767' GRAVITY: TST   GRVFLG           ; ARE WE TO DO GRAVITY?
000000
000004 003001   BGT   GRV01           ; YES-SKIP IT
000006 000207   RTS   PC               ; NO-SO GET OUT
000010 005000 GRV01: CLR   R0           ; CLEAR FLAG
000012 016705' MOV   YDISP1, R5        ; GET Y OF RKT1 DISPLACEMENT
000000
000016 010503   MOV   R5, R3           ; IS YDISP1 POSITIVE?
000020 100001   BPL   GRV02           ; YES-SKIP
000022 005103   COM   R3              ; NO-MAKE POSITIVE
000024 022703' GRV02: CMP   #SUNSZ, R3  ; HAS RKT1 Y HIT THE SUN?
000000
000030 002402   BLT   GRV05           ; NO-GO MAKE GRAVITY
000032 012700   MOV   #1, R0          ; SET FLAG FOR Y COLLISION

```

000001					
000036	005001	GRV05:	CLR	R1	;FAKE A SIGN EXTEND
000040	005405		NEG	R5	;REVERSE YDISP1'S DIRECTION
000042	100001		BPL	GRV1	;IF POSITIVE SKIP
000044	005301		DEC	R1	;R1=-1 (177777) TWO'S COMP
000046	006305	GRV1:	ASL	R5	
000050	006101		ROL	R1	
000052	006305		ASL	R5	
000054	006101		ROL	R1	

PAGE 001

000056	006305		ASL	R5	
000060	006101		ROL	R1	
000062	006305		ASL	R5	
000064	006101		ROL	R1	;MAKE 16 TIMES LARGER
000066	060567'		ADD	R5,YVELL1	;ADD Y GRAY. LOW WORDS
	000000				
000072	005501		ADC	R1	;ADD CARRY TO HIGH WORD
000074	060167'		ADD	R1,YVELH1	;ADD Y GRAY. HIGH WORDS
	000000				
000100	016705'		MOV	XDISP1,R5	;GET XDISP1
	000000				
000104	010503		MOV	R5,R3	;IS XDISP POSITIVE?
000106	100001		BPL	GRV2	;YES-SKIP
000110	005103		COM	R3	;NO-MAKE POSITIVE
000112	022703'	GRV2:	CMP	#SUNSZ,R3	;HAS RKT1 X HIT THE SUN?
	000000				
000116	002416		BLT	GRV3	;NO-GO MAKE GRAVITY
000120	005700		TST	R0	;YES-DID RKT1 Y HIT?
000122	003414		BLE	GRV3	;NO-GO MAKE GRAVITY
000124	016767'		MOV	YDISP1,EXPY	;YES-SET EXPLOD Y
	000000				
	000000				
000132	010567'		MOV	R5,EXPX	;SET EXPLOD X
	000000				
000136	005367'		DEC	HIT1	;REMOVE ONE SHIELD FROM RKT1
	000000				
000142	003533		BLE	GRV8	;IF ALL GONE SHOW SCORE
000144	005067'		CLR	EXPREP	;SET EXPLOD REPEATS TO ONE
	000000				
000150	004767'		JSR	PC,EXPLOD	;GO BOOM ON RKT1
	000000				
000154	005001	GRV3:	CLR	R1	;FAKE A SIGN EXTEND
000156	005405		NEG	R5	;REVERSE XDISP1'S DIRECTION
000160	100001		BPL	GRV5	;IF POSITIVE SKIP
000162	005301		DEC	R1	;R1=-1 (177777) TWO'S COMP
000164	006305	GRV5:	ASL	R5	
000166	006101		ROL	R1	
000170	006305		ASL	R5	
000172	006101		ROL	R1	
000174	006305		ASL	R5	
000176	006101		ROL	R1	
000200	006305		ASL	R5	
000202	006101		ROL	R1	;MAKE 16 TIMES LARGER
000204	060567'		ADD	R5,XVELL1	;ADD X GRAY. LOW WORDS
	000000				
000210	005501		ADC	R1	;ADD CARRY
000212	060167'		ADD	R1,XVELH1	;ADD X GRAY. HIGH WORDS
	000000				
000216	005000		CLR	R0	;CLEAR FLAG
000220	016705'		MOV	YDISP2,R5	;GET YDISP OF RKT2
	000000				
000224	010503		MOV	R5,R3	;IS YDISP2 POSITIVE?
000226	100001		BPL	GRV6	;YES-SKIP
000230	005103		COM	R3	;NO-MAKE POSITIVE

000232 002703' GRV6: CMP #SUNSZ,R3 ;HAS RKT2 Y HIT SUN?  
000000

PAGE 002

```
000236 002402 BLT GRV65 ;NO-MAKE GRAVITY
000240 012700 MOV #1,R0 ;YES-SET FLAG
000001
000244 005001 GRV65: CLR R1 ;FAKE A SIGN EXTEND
000246 005405 NEG R5 ;REVERSE YDISP2'S DIRECTION
000250 100001 BPL GRV67 ;IF POSITIVE SKIP
000252 005301 DEC R1 ;R1=-1 (177777) TWO'S COMP
000254 006305 GRV67: ASL R5
000256 006101 ROL R1
000260 006305 ASL R5
000262 006101 ROL R1
000264 006305 ASL R5
000266 006101 ROL R1
000270 006305 ASL R5
000272 006101 ROL R1 ;16 TIMES BIGGER
000274 060567' ADD R5,YVELL2 ;ADD Y GRAY. LOW WORDS
000000
000300 005501 ADC R1 ;ADD CARRY
000302 060167' ADD R1,YVELH2 ;ADD Y GRAY. HIGH WORDS
000000
000306 016705' MOV XDISP2,R5 ;GET XDISP RKT2
000000
000312 010503 MOV R5,R3 ;IS XDISP2 POSITIVE?
000314 100001 BPL GRV7 ;YES-SKIP
000316 005103 COM R3 ;NO-MAKE POSITIVE
000320 022703' GRV7: CMP #SUNSZ,R3 ;HAS RKT2 X HIT THE SUN?
000000
000324 002416 BLT GRV73 ;NO-GO MAKE GRAVITY
000326 005700 TST R0 ;YES-DID RKT2 Y HIT?
000330 003414 BLE GRV73 ;NO-GO MAKE GRAVITY
000332 016767' MOV YDISP2,EXPV ;YES-SET EXPLOD Y
000000
000000
000340 010567' MOV R5,EXPX ;SET EXPLOD X
000000
000344 005367' DEC HIT2 ;REMOVE ONE SHIELD FROM RKT2
000000
000350 003430 BLE GRV8 ;IF ALL GONE SHOW SCORE
000352 005067' CLR EXPREP ;IF NOT SET EXPLOD REPEATS TO ON
000000
000356 004767' JSR PC,EXPLOD ;GO BOOM ON RKT2
000000
000362 005001 GRV73: CLR R1 ;FAKE SIGN EXTEND
000364 005405 NEG R5 ;REVERSE XDISP2'S DIRECTION
000366 100001 BPL GRV75 ;IF POSITIVE SKIP
000370 005301 DEC R1 ;R1=-1 (177777) TWO'S COMP
000372 006305 GRV75: ASL R5
000374 006101 ROL R1
000376 006305 ASL R5
000400 006101 ROL R1
000402 006305 ASL R5
000404 006101 ROL R1
000406 006305 ASL R5
000410 006101 ROL R1 ;16 TIMES BIGGER
000412 060567' ADD R5,XVELL2 ;ADD X GRAY. LOW WORDS
000000
```

PAGE 003

```
000416 005501 ADC R1 ;ADD CARRY
000420 060167' ADD R1,XVELH2 ;ADD X GRAY. HIGH WORDS
```

```

000000
000424 004767' JSR PC, SUN ; DRAW THE SUN
000000
000430 000207 RTS PC ; ALL DONE!!!!!!!!!!!!!!!!!!!!!!
000432 012767' GRV8: MOV #40, EXPREP ; SET EXPLOD REPEATS FOR 32
000040
000000
000440 004767' JSR PC, EXPLOD ; GO BOOM ON RKT
000000
000444 000167' JMP SCORE ; GO TELL THE SCORE
000000
000001 .END

```

PAGE 004

000000 ERRORS

PAL-115 V003A

\*S H

\*B H

\*L T

\*T T