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; =====
;                               LIVEWIRE
; =====

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; =====
;                               WRITTEN BY: TOM HUDSON
;                               A.N.A.L.O.G. COMPUTING #12
;                               =====

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;
; -----
;                               PAGE ZERO USAGE
; -----

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```

0000 = 0080          ORG      $80

0080 = 0001          LD       DS      1
0081 = 0001          HI       DS      1
0082 = 0001          PLOTX    DS      1          ; PLOT X VALUE
0083 = 0001          PLOTY    DS      1          ; PLOT Y VALUE
0084 = 0001          COLOR    DS      1          ; PLOT COLOR
0085 = 0001          DRAWX    DS      1          ; DRAWTO X
0086 = 0001          DRAWY    DS      1          ; DRAWTO Y
0087 = 0001          ACCX     DS      1          ; X ACCUM.
0088 = 0001          ACCY     DS      1          ; Y ACCUM.
0089 = 0001          DELTAX   DS      1          ; DRAW WORK AREA
008A = 0001          DELTAY   DS      1          ; DRAW WORK AREA
008B = 0001          INCX     DS      1          ; DRAW X INCREMENT
008C = 0001          INCY     DS      1          ; DRAW Y INCREMENT
008D = 0001          COUNTR   DS      1          ; DRAWTO COUNTER
008E = 0001          ENDPT    DS      1          ; DRAW ENDPOINT
008F = 0001          HOLD     DS      1          ; WORK AREA
0090 = 0001          XWORK    DS      1
0091 = 0001          YWORK    DS      1
0092 = 0001          GRID     DS      1          ; GRID # WORK
0093 = 0001          OFFSET   DS      1          ; GRID OFFSET
0094 = 0001          PMTIME   DS      1          ; PLAYER MOVE TIMER
0095 = 0001          PLRGRD   DS      1          ; PLAYER GRID#
0096 = 0001          PLRY     DS      1          ; PLAYER Y POS.
0097 = 0001          GRIDNO   DS      1          ; GRID #
0098 = 0001          LAST     DS      1          ; GRID...
0099 = 0001          NEXT     DS      1          ; DIVIDE...
009A = 0001          STEP     DS      1          ; WORK...
009B = 0001          DEST     DS      1          ; AREAS
009C = 0001          VBXHLD   DS      1          ; X HOLD
009D = 0001          PFTIME   DS      1          ; PLAYER FIRE TIMER
009E = 0001          ENDVAL   DS      1          ; WORK AREA
009F = 0001          MISNUM   DS      1          ; MISSILE #
00A0 = 0001          PRFLIP   DS      1          ; PROJ. FLIP FLAG
00A1 = 0001          PRADVT   DS      1          ; PROJ. MOVE TIMER
00A2 = 0001          PRADV1   DS      1          ; PROJ. TIMER

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00A3 = 0001     TIMER    DS      1      ; GENERAL TIMER
00A4 = 0001     INTRFG   DS      1      ; INTRO FLAG
00A5 = 0001     BCDLVL   DS      1      ; LEVEL #
00A6 = 0001     SHCOLR   DS      1      ; CHAR. COLOR
00A7 = 0001     SHOBYT   DS      1      ; CHAR. BYTE POS.
00A8 = 0001     YOFSET   DS      1      ; PLOT Y OFFSET
00A9 = 0001     OBTIM1   DS      1      ; OBJECT MOVE TIMER
00AA = 0001     OBJNUM   DS      1      ; OBJECT #
00AB = 0001     SHAPIX   DS      1      ; OBJ. SHAPE INDEX
00AC = 0001     LENGTH   DS      1      ; OBJ. LENGTH
00AD = 0001     XI       DS      1      ; OBJ. X INCREMENT
00AE = 0001     YI       DS      1      ; OBJ. Y INCREMENT
00AF = 0001     SHAPCT   DS      1      ; OBJ. SHAPE CNT.
00B0 = 0001     HLDGRD   DS      1      ; OBJ. GRID WORK
00B1 = 0001     PAUFLG   DS      1      ; PAUSE FLAG
00B2 = 0001     ZAP      DS      1      ; ZAP FLAG
00B3 = 0001     SAVEX    DS      1      ; WORK AREA
00B4 = 0001     SAVEY    DS      1      ; WORK AREA
00B5 = 0001     FLASHY   DS      1      ; OBJ. FLASH POS.
00B6 = 0001     FLTIME   DS      1      ; FLASH TIME
00B7 = 0001     SP1IX    DS      1      ; PLAYER...
00B8 = 0001     SP2IX    DS      1      ; SHAPE...
00B9 = 0001     SP3IX    DS      1      ; INDEX...
00BA = 0001     SPIX     DS      1      ; AREAS
00BB = 0001     PLTBYT   DS      1      ; PLYR. IMAGE BYTE
00BC = 0001     PSCNT    DS      1      ; PLYR. SHAPE COUNT
00BD = 0001     KILPLR   DS      1      ; KILL PLYR FLAG
00BE = 0001     PAVAIL   DS      1      ; # PROJ. AVAILABLE
00BF = 0001     TRANTM   DS      1      ; TRANSIENT TIMER
00C0 = 0001     DESTLO   DS      1      ; DESTINATION...
00C1 = 0001     DESTHI   DS      1      ; ADDRESS
00C2 = 0001     SHFLIP   DS      1      ; SHORT FLIP FLAG
00C3 = 0001     DESTNM   DS      1      ; SHORT PLYR #
00C4 = 0001     CPYST    DS      1      ; SHORT IMAGE START
00C5 = 0001     DMACT1   DS      1      ; DMA CTRL WORK
00C6 = 0001     GRAC1    DS      1      ; GRAPHICS CTRL WK.
00C7 = 0001     GRIDIX   DS      1      ; GRID INDEX
00C8 = 0001     LIVES    DS      1      ; LIVES LEFT
00C9 = 0001     GRDADJ   DS      1      ; GRID...
00CA = 0001     GRDWK    DS      1      ; DRAW...
00CB = 0001     GRDWK2   DS      1      ; WORK...
00CC = 0001     GRDNUM   DS      1      ; AREAS
00CD = 0001     OBJSPD   DS      1      ; OBJ. SPEED
00CE = 0001     JOYPAD   DS      1      ; STICK/PADDLE
00CF = 0001     CPYCNT   DS      1      ; SHORT COPY CNT.
00D0 = 0001     BONUS    DS      1      ; BONUS VALUE
00D1 = 0001     FIRSOU   DS      1      ; FIRE SOUND COUNT
00D2 = 0001     OBDSOU   DS      1      ; OBJ. DEATH SOUND
00D3 = 0001     MOVSOU   DS      1      ; PLYR MOVE SOUND
00D4 = 0004     PRYHLD   DS      4      ; PROJ. Y HOLDS

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00D8 = 0003 SCORE DS 3 ; SCORE
00DB = 0003 SCODD DS 3 ; SCORE ADD VALUE
00DE = 0001 MISCAD DS 1 ; MISC. SCORE ADD
00DF = 0005 NUMOBJ DS 5 ; OBJECTS LEFT
00E4 = 0001 DIFF DS 1 ; DIFFICULTY ADJUST
00E5 = 0006 OBJPRS DS 6 ; OBJ PRESENT FLAGS

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; -----
; MISCELLANEOUS MEMORY
; -----
;

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= 0000 PMAREA = $0000 ; P/M AREA
= 0300 MISSLS = PMAREA+768
= 0400 PLO = PMAREA+1024
= 0500 PL1 = PMAREA+1280
= 0600 PL2 = PMAREA+1536
= 0700 PL3 = PMAREA+1792
= 0800 DISP = $0800 ; DISPLAY

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;
; -----
; SYSTEM EQUATES
; -----
;

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= 0200 VDSLST = $200 ; DLI VECTOR
= D40A WSYNC = $D40A ; WAIT/SYNC
= 027C PTRIGO = $27C ; PADDLE TRIG.
= 0270 POTO = $270 ; PADDLE 0
= 02FC KEY = $2FC ; KEYBOARD
= D01F CONSOL = $D01F ; CONSOLE BUTTONS
= D407 PMBASE = $D407 ; P/M BASE ADDR
= D20A RANDDM = $D20A ; RANDOM #
= E45C SETVBV = $E45C ; VBLANK SET
= E462 XITVBV = $E462 ; VBLANK EXIT
= 02C8 COLBK = $2C8 ; COLORS
= 02C4 COLPF0 = $2C4
= 02C5 COLPF1 = $2C5
= 02C6 COLPF2 = $2C6
= 02C7 COLPF3 = $2C7
= D201 AUDC1 = $D201 ; AUDIO CONTROL
= D203 AUDC2 = $D203
= D205 AUDC3 = $D205
= D207 AUDC4 = $D207
= D200 AUDF1 = $D200 ; AUDIO FREQUENCY
= D202 AUDF2 = $D202
= D204 AUDF3 = $D204
= D206 AUDF4 = $D206
= D208 AUDCTL = $D208 ; MAIN AUDIO CTRL.
= 026F PRIOR = $026F ; PRIORITY
= 004D ATTRAC = $4D ; ATTRACT MODE
= 022F DMACTL = $22F ; DMA CONTROL

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= 0230      DLISTL =      $230      ; DISP. LIST
= D01D      GRACTL =      $D01D     ; GRAPHICS CTRL.
= D40E      NMIEN  =      $D40E     ; INTERRUPT ENABLE
= 02C0      COLPM0 =      $2C0      ; PLAYER COLORS
= 02C1      COLPM1 =      $2C1
= 02C2      COLPM2 =      $2C2
= 02C3      COLPM3 =      $2C3
= D000      HPDSP0 =      $D000     ; PLAYER POSITIONS
= D001      HPDSP1 =      $D001
= D002      HPDSP2 =      $D002
= D003      HPDSP3 =      $D003
= D004      HPDSM0 =      $D004     ; MISSILE POSITIONS
= D01E      HITCLR =      $D01E     ; COLLISION CLEAR
= D00C      POPL  =      $D00C     ; PLO TO PLAYER COLL.
= 0278      STICK =      $278      ; JOYSTICK
= 0284      STRIG =      $284      ; STICK TRIGGER

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```
00EB = 2000      ORG      $2000
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; -----
; MAIN GAME DISPLAY LIST
; -----

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2000 70F0704E  DLIST  DB      $70,$F0,$70,$4E
2004 0008      DW      DISP
2006 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
200E 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2016 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
201E 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2026 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
202E 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2036 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
203E 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2045 4E        DB      $4E
2046 0010      DW      DISP+$800
2048 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2050 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2058 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2060 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2068 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2070 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2078 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2080 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2088 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2090 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
2098 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
20A0 0E0E0E0E  DB      $E,$E,$E,$E,$E,$E,$E,$E
20A7 8000      DB      $80,$00
20A9 47        DB      $47
20AA 0321      DW      INFOLN

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20AC 41          DB      $41
20AD 0020       DW      DLIST

;
; -----
; TITLE SCREEN DISPLAY LIST
; -----
;
20AF 70707070  TITLDL  DB      $70,$70,$70,$70,$70,$70
20B5 7047       DB      $70,$47
20B7 6321       DW      LASTSC
20B9 707046     DB      $70,$70,$46
20BC 1321       DW      MAGMSG
20BE 7047       DB      $70,$47
20C0 2321       DW      TITLE
20C2 3046       DB      $30,$46
20C4 3321       DW      AUTHOR
20C6 70703046  DB      $70,$70,$30,$46
20CA 4321       CONTRL  DW      JOYMSG
20CC 41          DB      $41
20CD AF20       DW      TITLDL

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;
; -----
; DISPLAY LIST INTERRUPTS
; -----
;
20CF 48          DLI1   PHA          ; SAVE ACCUM
20D0 A5C6       LDA          GRAC1    ; GET GR. CTRL
20D2 8D0AD4     STA          WSYNC    ; WAIT FOR SYNC
20D5 8D1DD0     STA          GRAC1    ; STORE IT
20D8 A5C5       LDA          DMAC1    ; GET AND SAVE
20DA 8D00D4     STA          $D400    ; DMA CTRL
20DD A9E9       LDA          #DLI2&255 ; POINT...
20DF 8D0002     STA          VDSLST   ; TO...
20E2 A920       LDA          #DLI2/256   ; NEXT...
20E4 8D0102     STA          VDSLST+1 ; DLI!
20E7 68         PLA          ; GET ACCUM
20E8 40         RTI          ; AND EXIT!

20E9 48          DLI2   PHA          ; SAVE ACCUM
20EA A90A       LDA          #$0A    ; GET WHITE
20EC 8D0AD4     STA          WSYNC    ; WAIT FOR SYNC
20EF 8D16D0     STA          $D016    ; PUT IN COLOR 0
20F2 A974       LDA          #$74    ; PUT BLUE...
20F4 8D17D0     STA          $D017    ; IN COLOR 1
20F7 A928       LDA          #$28    ; PUT ORANGE...
20F9 8D18D0     STA          $D018    ; IN COLOR 2
20FC A93D       LDA          #$3D    ; SET UP...
20FE 8D00D4     STA          $D400    ; DMA CTRL
2101 68         PLA          ; GET ACCUM.
2102 40         RTI          ; AND EXIT

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;
; -----
; SCREEN MESSAGES
; -----
;

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2103 0000000000 INFOLN DB 0,0,0,0,0,0,0,0
210B 00006C766C DB 0,0,$6C,$76,$6C,0,0,0
2113 212E212C2F MAGMSG DB $21,$2E,$21,$2C,$2F,$27
2119 00232F2D30 DB 0,$23,$2F,$2D,$30,$35
211F 34292E27 DB $34,$29,$2E,$27
2123 000000006C TITLE DB 0,0,0,0,$6C,$69,$76,$65
212B 7769726500 DB $77,$69,$72,$65,0,0,0,0
2133 00A2B90000 AUTHOR DB 0,$A2,$B9,0,0,$B4,$AF
213A AD00A8B5A4 DB $AD,0,$A8,$B5,$A4,$B3
2140 AFAE00 DB $AF,$AE,0
2143 00000000EA JOYMSG DB 0,0,0,0,$EA,$EF,$F9,$F3
214B F4E9E3EB00 DB $F4,$E9,$E3,$EB,0,0,0,0
2153 0000000000 PADMSG DB 0,0,0,0,0,$F0,$E1,$E4
215B E4ECE50000 DB $E4,$EC,$E5,0,0,0,0,0
2163 0000000000 LASTSC DB 0,0,0,0,0,0,0,0
216B 0000000000 DB 0,0,0,0,0,0,0,0

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;
; -----
; PROG START
; -----
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2173 DB LIVE CLD
2174 2065E4 JSR $E465 ; INIT SOUND
2177 A900 LDA #0 ; CLEAR PAGE 0
2179 A27F LDX #127
217B 9580 CPAGE0 STA $80,X
217D CA DEX
217E 10FB ^217B BPL CPAGE0
2180 A901 LDA #1 ; INIT...
2182 85A5 STA BCDLVL ; LEVEL #
2184 85A4 STA INTRFG ; SET INTRO FLAG
2186 A943 LDA #JOYMSG&255 ; DEFAULT...
2188 8DCA20 STA CONTRL ; CONTROL...
218B A921 LDA #JOYMSG/256 ; IS...
218D 8DCB20 STA CONTRL+1 ; STICK!
2190 A900 LDA #0 ; INIT...
2192 8D2F02 STA DMACTL ; DMA
2195 8D0ED4 STA NMEN ; INTERRUPTS
2198 8D08D2 STA AUDCTL ; AUDIO
219B 8D1ED0 STA HITCLR ; COLLISION
219E 8DC802 STA COLBK ; BACKGND COLOR
21A1 A203 LDX #3 ; CLEAR SHORTS
21A3 9D582E CLRSHO STA SHORTF,X
21A6 CA DEX
21A7 10FA ^21A3 BPL CLRSHO

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21A9 A205          LDX      #5          ; ZERO OBJECT...
21AB 9D682E      CLRDED STA      OBDEAD,X      ; CLR DEAD TABLE
21AE CA          DEX
21AF 10FA ^21AB  BPL      CLRDED
21B1 A202          LDX      #2          ; ZERO SCORE
21B3 95D8        CLRSCO STA      SCORE,X
21B5 95DB        STA      SCOADD,X
21B7 CA          DEX
21B8 10F9 ^21B3  BPL      CLRSCO
21BA A207          LDX      #7
21BC 9D0C2E      CLRPRJ STA      PROJAC,X      ; CLEAR PROJ.
21BF CA          DEX
21C0 10FA ^21BC  BPL      CLRPRJ
21C2 A205          LDX      #5
21C4 BD0321      MOVSCO LDA      INFOLN,X      ; COPY SCORE...
21C7 9D6821      STA      LASTSC+5,X      ; TO LAST...
21CA CA          DEX          ; SCORE LINE
21CB 10F7 ^21C4  BPL      MOVSCO
21CD A91D          LDA      #29         ; SET ALL...
21CF A205          LDX      #5          ; OBJECTS TO...
21D1 9D862E      INIOBS STA      OBJSEG,X      ; SEGMENT # 29
21D4 CA          DEX
21D5 10FA ^21D1  BPL      INIOBS
21D7 208D25      JSR      SHOSCO      ; SHOW SCORE
21DA 208A26      JSR      SNDOFF      ; NO SOUNDS
21DD A906          LDA      #6          ; 6 PROJECTILES
21DF 85BE        STA      PAVAIL      ; AVAILABLE
21E1 A902          LDA      #2          ; SET...
21E3 85D0        STA      BONUS       ; BONUS=20000
21E5 85C8        STA      LIVES       ; 2 EXTRA LIVES
21E7 202C26      JSR      SHOLIV      ; SHOW LIVES LEFT
21EA A905          LDA      #5          ; SET UP...
21EC 85B8        STA      SP2IX       ; PLAYER...
21EE A90A        LDA      #10         ; SHAPE...
21F0 85B9        STA      SP3IX       ; INDEXES
21F2 A9AF        LDA      #TITLDL&255 ; POINT TO...
21F4 8D3002      STA      DLISTL      ; TITLE...
21F7 A920          LDA      #TITLDL/256 ; DISPLAY...
21F9 8D3102      STA      DLISTL+1    ; LIST
21FC A0EB        LDY      #VBI&255    ; POINT TO...
21FE A228          LDX      #VBI/256    ; VERTICAL...
2200 A907          LDA      #7          ; BLANK...
2202 205CE4      JSR      SETVBV      ; INTERRUPT
2205 A900          LDA      #PMAREA/256 ; SET UP P/M...
2207 8D07D4      STA      PMBASE      ; BASE ADDRESS
220A 208B2C      JSR      PMCLR       ; CLEAR P/M
220D A974          LDA      #74         ; PUT BLUE...
220F 8DC402      STA      COLPFO      ; IN COLOR 0
2212 A9C4          LDA      #C4         ; PUT GREEN...
2214 8DC502      STA      COLPF1      ; IN COLOR 1

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2217 A90A          LDA      #$0A      ; PUT WHITE...
2219 8DC602        STA      COLPF2    ; IN COLOR 2
221C A934          LDA      #$34      ; PUT RED...
221E 8DC702        STA      COLPF3    ; IN COLOR 3
2221 A93D          LDA      #$3D      ; SET UP...
2223 8D2F02        STA      DMACTL    ; DMA,
2226 A903          LDA      #3        ; GRAPHICS,
2228 8D1DD0        STA      GRCTL     ; AND
222B A9C0          LDA      #$C0      ; INTERRUPT...
222D 8D0ED4        STA      NMIEN    ; ENABLE
2230 A911          LDA      #$11      ; SET P/M...
2232 8D6F02        STA      PRIOR    ; PRIORITY
2235 A90F          LDA      #$0F      ; PUT WHITE...
2237 8DC102        STA      COLPM1    ; IN PLAYER 1,
223A 8DC202        STA      COLPM2    ; PLAYER 2
223D 8DC302        STA      COLPM3    ; AND 3
2240 A916          LDA      #$16      ; PUT YELLOW...
2242 8DC002        STA      COLPM0    ; IN PLAYER 0

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; -----
;      INTRO SCREEN
; -----

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2245 AD1FD0        INTRO  LDA      CONSOL  ; START KEY...
2248 2901          AND      #1        ; PRESSED?
224A D00A ^2256    BNE      CKSEL     ; NO!
224C AD1FD0        GOCHK  LDA      CONSOL  ; START KEY...
224F 2901          AND      #1        ; RELEASED?
2251 F0F9 ^224C    BEQ      GOCHK     ; NO, WAIT.
2253 4C7B22        JMP      DIGIN     ; GO DIG IN!!
2256 AD1FD0        CKSEL  LDA      CONSOL  ; SELECT KEY...
2259 2902          AND      #2        ; PRESSED?
225B D0E8 ^2245    BNE      INTRO    ; NAW, LOOP BACK.
225D A5CE          LDA      JOYPAD  ; TOGGLE...
225F 18           CLC          ; STICK/PADDLE...
2260 6901          ADC      #1        ; INDICATOR...
2262 2901          AND      #1
2264 85CE          STA      JOYPAD
2266 AA           TAX
2267 BD912F        LDA      JPLO,X    ; AND SHOW...
226A 8DCA20        STA      CONTRL  ; CONTROLLER...
226D BD932F        LDA      JPHI,X    ; MESSAGE...
2270 8DCB20        STA      CONTRL+1 ; ON SCREEN!
2273 A91E          LDA      #30      ; 30 JIFFY...
2275 208326        JSR      WAIT     ; WAIT!
2278 4C4522        JMP      INTRO    ; AND LOOP.

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; -----
;      HERE'S WHERE PROGRAM STARTS
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227B A900          DIGIN  LDA    #DLIST&255      ;POINT TO...
227D 8D3002       STA    DLISTL    ;GAME...
2280 A920          LDA    #DLIST/256      ;DISPLAY...
2282 8D3102       STA    DLISTL+1    ;LIST
2285 A900          LDA    #0          ;NO LONGER IN...
2287 85A4          STA    INTRFG    ;INTRO
2289 A901          FOREVR LDA    #1          ;WE WANT...
228B 8584          STA    COLOR    ;COLOR 1
228D 85B2          STA    ZAP      ;RESET ZAP.
228F 20A12C       JSR    CLRSC    ;CLEAR SCREEN
2292 A5C7          LDA    GRIDIX   ;GET GRID#
2294 2907          AND    #7          ;FIND WHICH...
2296 AA           TAX          ;GRID SHAPE...
2297 BDB42D       LDA    GRDTBL,X    ;TO DRAW...
229A 85CC          STA    GRDNUM   ;AND STORE
229C 203826       JSR    SHOLVL   ;SHOW LEVEL#
229F 209B26       JSR    DRGRID   ;DRAW GRID!
22A2 A5B1          CONWT  LDA    PAUFLG   ;WE PAUSED?
22A4 D0FC ^22A2   BNE    CONWT    ;YUP, LOOP.
22A6 A5BD          LDA    KILPLR   ;PLAYER DEAD?
22A8 F003 ^22AD   BEQ    PLIVE    ;NOPE!
22AA 20AF25       JSR    DECLIV   ;ONE LESS LIFE!
22AD 854D          PLIVE  STA    ATTRAC   ;CANCEL ATTRACT!
22AF A5B6          LDA    FLTIME   ;FLASH GOING?
22B1 D003 ^22B6   BNE    NOFEND   ;YES! STORE...
22B3 8D01D0       STA    HPOSP1   ;FLASH POSITION!
22B6 A5A9          NOFEND LDA    OBTIM1   ;OBJECTS MOVING?
22B8 D075 ^232F   BNE    NOOHAN   ;NOT YET!
22BA A5CD          LDA    OBJSPD   ;RESET MOVE...
22BC 85A9          STA    OBTIM1   ;TIMER

; -----
; COPY OBJECT KILL TABLE
; -----

22BE A205          LDX    #5          ;THIS SECTION
22C0 BD682E       COPDED LDA    OBDEAD,X    ;COPIES THE
22C3 9D6E2E       STA    OBDED2,X    ;OBJECT KILL
22C6 A900          LDA    #0          ;TABLE WHICH IS
22C8 9D682E       STA    OBDEAD,X    ;SET UP BY THE
22CB CA           DEX          ;PROJECTILE
22CC 10F2 ^22C0   BPL    COPDED   ;HANDLER

22CE A5DE          LDA    MISCAD   ;MISC. SCORE?
22D0 F009 ^22DB   BEQ    NOMSCO   ;NO!
22D2 85DC          STA    SCOADD+1    ;SET SCORE ADD...
22D4 205A25       JSR    ADDSCO   ;AND ADD IT!
22D7 A900          LDA    #0          ;THEN RESET THE
22D9 85DE          STA    MISCAD   ;ADD VALUE.

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22DB A205      NOMSCO  LDX      #5      ; THIS SECTION
22DD A900      LDA      #0      ; TALLIES ALL
22DF 15E5      CKOBLV  ORA      OBJPRS,X  ; OBJECTS THAT
22E1 CA        DEX      ; ARE ALIVE
22E2 10FB ^22DF BPL      CKOBLV
22E4 A204      LDX      #4      ; NOW TALLY
22E6 15DF      CKOBWT  ORA      NUMOBJ,X  ; ALL OBJECTS
22E8 CA        DEX      ; THAT ARE NOT
22E9 10FB ^22E6 BPL      CKOBWT  ; ON GRID YET
22EB C900      CMP      #0      ; ANY OBJECTS?
22ED F04D ^233C BEQ      LVLEND  ; NO, END OF LEVEL!

22EF A205      LDX      #5      ; IS OBJECT
22F1 B5E5      GENNOL  LDA      OBJPRS,X  ; PRESENT?
22F3 D031 ^2326 BNE      NXTOGN  ; YES, TRY NEXT.
22F5 AD0AD2    TRYTYP  LDA      RANDOM  ; LET'S TRY TO
22F8 2907      AND      #7      ; START UP A
22FA C905      CMP      #5      ; NEW OBJECT
22FC B0F7 ^22F5 BCS      TRYTYP  ; GET A TYPE
22FE AB        TAY      ; ANY OF THAT
22FF B9DF00    LDA      NUMOBJ,Y  ; TYPE WAITING?
2302 F022 ^2326 BEQ      NXTOGN  ; NO, TRY NEXT
2304 38        SEC      ; DECREMENT #
2305 E901      SBC      #1      ; OF OBJECTS
2307 99DF00    STA      NUMOBJ,Y  ; WAITING.
230A 98        TYA      ; THEN SET
230B 9D742E    STA      OBJTYP,X  ; OBJECT TYPE.
230E AD0AD2    NEWGRD  LDA      RANDOM  ; GET A RANDOM
2311 290F      AND      #OF     ; SUB-GRID
2313 C90F      CMP      #15     ; NUMBER
2315 F0F7 ^230E BEQ      NEWGRD
2317 9D802E    STA      OBJGRD,X  ; AND SAVE IT
231A A91E      LDA      #30     ; PUT OBJECT AT
231C 9D862E    STA      OBJSEG,X  ; FAR END OF GRID
231F A901      LDA      #1      ; SET UP...
2321 9D7A2E    STA      OBJINC,X  ; OBJ. INCREMENT
2324 95E5      STA      OBJPRS,X  ; OBJECT PRESENT
2326 CA        NXTOGN  DEX      ; LOOP BACK TO DO
2327 10C8 ^22F1 BPL      GENNOL  ; NEXT OBJECT

2329 205B23    JSR      OBJHAN  ; HANDLE OBJECTS
232C 202C25    JSR      SHOHAN  ; HANDLE SHORTS

232F AD1FD0      NOOHAN  LDA      CONSOL  ; ANY CONSOLE
2332 C907      CMP      #7      ; KEYS PRESSED?
2334 F003 ^2339 BEQ      JCONWT  ; NOPE!
2336 4C7321    JMP      LIVE    ; YES, RESTART GAME
2339 4CA222    JCONWT  JMP      CONWT  ; INDIRECT JUMP
233C A5C7      LVLEND  LDA      GRIDIX  ; ARE WE ON
233E C93F      CMP      #63     ; GRID #63?

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2340 F016 ^2358      BEQ      NOGRDI   ; YES, DON'T INC!
2342 18             CLC          ; INCREMENT
2343 6901           ADC          #1      ; GRID #
2345 85C7           STA      GRIDIX  ; AND SAVE IT.
2347 2907           AND          #7      ; ADD 2 TO
2349 D004 ^234F     BNE      NODIFI   ; DIFFICULTY IF
234B E6E4           INC          DIFF   ; ON A MULTIPLE
234D E6E4           INC          DIFF   ; OF 8 GRIDS.
234F F8             NODIFI   SED          ; INCREMENT
2350 A5A5           LDA      BCDLVL  ; BCD LEVEL #
2352 18             CLC          ;
2353 6901           ADC          #1      ;
2355 85A5           STA      BCDLVL  ;
2357 D8             CLD          ; NOW GO TO
2358 4C8922        NOGRDI   JMP      FOREVR  ; DRAW NEW GRID.

; -----
; OBJECT HANDLER
; -----

235B A5AA           OBJHAN  LDA      OBJNUM  ; INCREMENT
235D 18             CLC          ; OBJECT #
235E 6901           ADC          #1      ;
2360 C906           CMP          #6      ; DONE?
2362 D005 ^2369     BNE      STONUM  ; NO, CONTINUE.
2364 A9FF           LDA      #$FF   ; RESET
2366 85AA           STA      OBJNUM  ; OBJECT #
2368 60             RTS          ; AND EXIT.
2369 85AA           STONUM  STA      OBJNUM  ; SAVE OBJ #
236B A6AA           OBHLP1  LDX      OBJNUM  ; GET OBJ #
236D B5E5           LDA      OBJPRS,X  ; OBJ PRESENT?
236F F0EA ^235B     BEQ      OBJHAN  ; NO!
2371 BD862E        OBLIVE  LDA      OBJSEG,X  ; WITHIN 2 UNITS
2374 C902           CMP          #2      ; OF RIM?
2376 9039 ^23B1     BCC      NOOBFI  ; YES, DON'T FIRE
2378 AD0AD2         LDA      RANDOM  ; RANDOM CHANCE
237B 290F           AND          #$0F   ; OF SHOOTING
237D D032 ^23B1     BNE      NOOBFI  ; DON'T SHOOT
237F AD0C2E         LDA      PROJAC  ; PROJ. 0 ACTIVE?
2382 D004 ^2388     BNE      TRYPR1  ; YES, IGNORE!
2384 A000           LDY          #0      ; FORCE BRANCH
2386 F007 ^238F     BEQ      STOBFI  ; TO STORE IT
2388 AD0D2E        TRYPR1  LDA      PROJAC+1  ; PROJ. 1 ACTIVE?
238B D024 ^23B1     BNE      NOOBFI  ; YES, NO FIRE
238D A001           LDY          #1      ; SET INDEX
238F BD862E        STOBFI  LDA      OBJSEG,X  ; INITIALIZE
2392 4A             LSR          A          ; PROJECTILE
2393 992C2E         STA      PROJSG,Y  ; SEGMENT #
2396 BD802E         LDA      OBJGRD,X  ; AND
2399 991C2E         STA      PROGRD,Y  ; SUB-GRID #

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239C 0A          ASL      A          ; MULTIPLY
239D 0A          ASL      A          ; BY
239E 0A          ASL      A          ; 16
239F 0A          ASL      A          ; AND
23A0 99242E     STA      PROJGN,Y        ; SAVE INDEX!
23A3 A9FF        LDA      #$FF          ; SET INCREMENT
23A5 99142E     STA      PROINC,Y        ; (TOWARD RIM)
23A8 A915        LDA      #21          ; START THE
23AA 85D1        STA      FIRSOU        ; FIRE SOUND
23AC A901        LDA      #1          ; AND
23AE 990C2E     STA      PROJAC,Y        ; PROJECTILE
23B1 A900        LDA      #0          ; SET COLOR 0
23B3 8584        STA      COLOR        ; TO ERASE OBJECT
23B5 207924     JSR      DRWOBJ        ; AND ERASE IT
23B8 A6AA        LDX      OBJNUM
23BA BD6E2E     LDA      OBDED2,X        ; OBJ DEAD?
23BD F01A ^23D9  BEQ      NOOKIL        ; YES! START
23BF 205526     JSR      FLASH        ; DEATH FLASH
23C2 A6AA        LDX      OBJNUM
23C4 BC742E     LDY      OBJTYP,X        ; GET OBJECT TYPE
23C7 B94E2E     LDA      POINT1,Y        ; GET POINTS
23CA 85DC        STA      SCOADD+1        ; AND READY
23CC B9532E     LDA      POINT2,Y        ; THE SCORE
23CF 85DD        STA      SCOADD+2        ; ADD VALUE
23D1 205A25     JSR      ADDSCO        ; ADD TO SCORE!
23D4 A6AA        LDX      OBJNUM
23D6 4C2724     JMP      KILOBJ        ; THEN KILL OBJ.
23D9 BD862E     LDA      OBJSEG,X        ; INCREMENT
23DC 38          SEC          ; OBJECT'S
23DD FD7A2E     SBC      OBJINC,X        ; SEGMENT
23E0 9D862E     STA      OBJSEG,X        ; POSITION
23E3 3042 ^2427 BMI      KILOBJ        ; PAST RIM!
23E5 C91E        CMP      #30          ; TYPE 3 PAST END?
23E7 D004 ^23ED BNE      NOTOT3        ; NOPE!
23E9 E6E1        INC      NUMOBJ+2        ; START TYPE 2
23EB D03A ^2427 BNE      KILOBJ        ; FORCE BRANCH
23ED C90A        CMP      #10          ; AT TYPE 3 TURN?
23EF D00C ^23FD BNE      OBHLP2        ; NO!
23F1 BD742E     LDA      OBJTYP,X        ; IS IT
23F4 C903        CMP      #3          ; TYPE 3?
23F6 D005 ^23FD BNE      OBHLP2        ; NO!
23F8 A9FF        LDA      #$FF          ; REVERSE OBJECT
23FA 9D7A2E     STA      OBJINC,X        ; INCREMENT
23FD BD742E     LDA      OBJTYP,X        ; IS OBJECT
2400 C902        CMP      #2          ; TYPE 2?
2402 D014 ^2418 BNE      SETHUE        ; NO, SET COLOR
2404 AD0AD2     LDA      RANDOM        ; GET RANDOM
2407 2901        AND      #1          ; DIRECTION
2409 AB          TAY          ; FOR TYPE 2
240A BD802E     LDA      OBJGRD,X        ; AND

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240D 18          CLC          ;ADD OR
240E 792731     ADC          ADDSB1,Y      ;SUBTRACT 1
2411 C90F      CMP          #15          ;PAST LIMIT?
2413 B003 ^2418 BCS          SETHUE      ;YES!
2415 9D802E     STA          OBJGRD,X     ;SAVE NEW POS.
2418 BD742E     SETHUE LDA          OBJTYP,X     ;GET OBJ. TYPE
241B AA        TAX          ;AND GET
241C BD8C2E     LDA          OBJHUE,X     ;COLOR #
241F 8584      STA          COLOR      ;SAVE IT
2421 207924     JSR          DRWOBJ      ;AND DRAW OBJECT!
2424 4C5B23     JMP          OBJHAN      ;DO NEXT ONE

2427 A900      KILOBJ LDA          #0          ;OBJECT IS NO
2429 95E5      STA          OBJPRS,X     ;LONGER ALIVE
242B A915      LDA          #21         ;SET UP
242D 85D2      STA          OBDSOU      ;DEATH SOUND
242F BD862E     LDA          OBJSEG,X     ;CHECK
2432 1042 ^2476 BPL          JOBHAN      ;FOR A
2434 BD802E     LDA          OBJGRD,X     ;COLLISION
2437 C595      CMP          PLRGRD      ;WITH PLAYER
2439 D006 ^2441 BNE          CKSHOR      ;NO HIT
243B A901      LDA          #1          ;HIT,
243D 85BD      STA          KILPLR      ;KILL PLAYER!
243F D035 ^2476 BNE          JOBHAN      ;NEXT OBJECT
2441 BD742E     CKSHOR LDA          OBJTYP,X     ;OBJECT
2444 C901      CMP          #1          ;TYPE 1?
2446 D02E ^2476 BNE          JOBHAN      ;NOPE!
2448 A003      LDY          #3          ;TRY SHORT:
244A B9582E     TRYSHO LDA          SHORTF,Y     ;SHORT AVAILABLE?
244D F005 ^2454 BEQ          INISHO      ;YUP!
244F 88        DEY          ;KEEP...
2450 10F8 ^244A BPL          TRYSHO      ;TRYING!
2452 3022 ^2476 BMI          JOBHAN      ;NO SHORT AVAIL!
2454 BD802E     INISHO LDA          OBJGRD,X     ;MULTIPLY THE
2457 0A        ASL          A          ;OBJECT'S
2458 0A        ASL          A          ;SUB-GRID #
2459 0A        ASL          A          ;BY 16...
245A 0A        ASL          A
245B 18        CLC
245C 6908      ADC          #8          ;AND ADD 8 FOR
245E 995C2E     STA          SHORTX,Y     ;THE SHORT INDEX
2461 A901      LDA          #1          ;SHORT IS
2463 99582E     STA          SHORTF,Y     ;ALIVE!
2466 AD0AD2     LDA          RANDOM      ;RANDOMIZE...
2469 2901      AND          #1          ;SHORT...
246B 99602E     STA          SHORTD,Y     ;DIRECTION
246E AD0AD2     LDA          RANDOM      ;AND THAT...
2471 293F      AND          #$3F        ;DIRECTION'S...
2473 99642E     STA          SHORTT,Y     ;TIME!
2476 4C5B23     JOBHAN JMP          OBJHAN      ;NEXT OBJECT

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2479 A6AA      DRWOBJ LDX      OBJNUM ; GET OBJECT #
247B BD802E    LDA      OBJGRD,X ; GET SUB-GRID #
247E 0A       ASL      A ; MULTIPLY
247F 0A       ASL      A ; BY 16...
2480 0A       ASL      A
2481 0A       ASL      A
2482 85B0     STA      HLDGRD ; AND SAVE.
2484 BD862E    LDA      OBJSEG,X ; DIVIDE
2487 4A       LSR      A ; SEGMENT BY 2
2488 B015 ^249F BCS      ODDSEG ; PROCESS ODD #
248A 18       CLC      ; IT'S EVEN, ADD
248B 65B0     ADC      HLDGRD ; GRID INDEX
248D AB       TAY      ; PUT IN Y REG.
248E B9A031    LDA      SEGX,Y ; GET OBJECT'S
2491 8582     STA      PLOTX ; X POSITION
2493 85B3     STA      SAVEX ; AND SAVE
2495 B9A032    LDA      SEGY,Y ; GET OBJECT'S
2498 8583     STA      PLOTY ; Y POSITION
249A 85B4     STA      SAVEY ; AND SAVE
249C 4CBB24    JMP      ODDSKP ; SKIP ODD ROUTINE
249F 18       CLC      ; IT'S ODD, ADD
24A0 65B0     ADC      HLDGRD ; GRID INDEX
24A2 AB       TAY      ; PUT IN Y REG.
24A3 B9A031    LDA      SEGX,Y ; GET OBJECT'S
24A6 18       CLC      ; X POS, ADD
24A7 79A131    ADC      SEGX+1,Y ; NEXT X POS.
24AA 6A       ROR      A ; GET AVERAGE
24AB 8582     STA      PLOTX ; PUT IN PLOT X
24AD 85B3     STA      SAVEX ; AND SAVE
24AF B9A032    LDA      SEGY,Y ; GET OBJECT'S
24B2 18       CLC      ; Y POS, ADD
24B3 79A132    ADC      SEGY+1,Y ; NEXT Y POS.
24B6 6A       ROR      A ; GET AVERAGE
24B7 8583     STA      PLOTY ; PUT IN PLOT Y
24B9 85B4     STA      SAVEY ; AND SAVE
24BB A91E     ODDSKP LDA      #30 ; NOW CALCULATE
24BD 38       SEC      ; THE OBJECT'S
24BE FD862E    SBC      OBJSEG,X ; SIZE BASED ON
24C1 4A       LSR      A ; ITS POSITION
24C2 29FE     AND      #$FE ; ON THE GRID
24C4 0A       ASL      A
24C5 0A       ASL      A
24C6 AB       TAY      ; PUT INDEX IN Y
24C7 A200     LDX      #0 ; NOW COPY PART
24C9 B9012F    COPYSZ LDA      SIZTBL,Y ; OF THE SIZE
24CC 9D912E    STA      SIZEWK,X ; TABLE TO A
24CF C8       INY      ; SIZE WORK AREA
24D0 EB       INX      ; THIS TABLE HOLDS
24D1 E008     CPX      #8 ; 8 SIZE VALUES

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24D3 D0F4 ^24C9      BNE      COPYSZ ; BASED ON DIST.
24D5 A6AA           LDX      OBJNUM ; GET OBJECT #
24D7 BD742E        LDA      OBJTYP,X ; AND ITS TYPE
24DA 0A           ASL      A ; AND MULTIPLY
24DB 0A           ASL      A ; BY 8 FOR AN
24DC 0A           ASL      A ; INDEX INTO
24DD 85AB         STA      SHAPIX ; THE SHAPE TABLE
24DF A908         LDA      #8 ; MAX 8 LINES IN
24E1 85AF         STA      SHAPCT ; EACH OBJECT
24E3 A6AB         DOBLP   LDX      SHAPIX ; GET LINE#
24E5 BDB12E        LDA      OBJDIR,X ; & ITS DIRECTION
24E8 AB           TAY      ; A NEGATIVE #
24E9 3040 ^252B    BMI      ENDOBJ ; INDICATES END
24EB B9992E        LDA      PXINC,Y ; GET X INCREMENT
24EE 85AD         STA      XI ; OF LINE,
24F0 B9A12E        LDA      PYINC,Y ; Y INCREMENT
24F3 85AE         STA      YI ; OF LINE,
24F5 BDD92E        LDA      OBJLEN,X ; ABSOLUTE LENGTH
24F8 AB           TAY      ; OF LINE THEN
24F9 B9912E        LDA      SIZEWK,Y ; SCALED LENGTH
24FC 85AC         STA      LENGTH ; AND STORE!
24FE A582         PLOT0B   LDA      PLOTX ; THIS SECTION
2500 18           CLC      ; ADJUSTS THE
2501 65AD         ADC      XI ; X AND Y PLOT
2503 8582         STA      PLOTX ; VALUES...
2505 A583         LDA      PLOTY
2507 18           CLC
2508 65AE         ADC      YI
250A 8583         STA      PLOTY
250C A5AB         LDA      SHAPIX ; DON'T PLOT
250E F003 ^2513    BEQ      NOPLT1 ; FIRST LINE!
2510 20BC2C        JSR      PLOTCL ; PLOT POINT
2513 A583         NOPLT1  LDA      PLOTY ; INCREMENT Y
2515 18           CLC      ; AGAIN TO ADJUST
2516 65AE         ADC      YI ; FOR GR. 7+
2518 8583         STA      PLOTY ; ASPECT RATIO
251A A5AB         LDA      SHAPIX ; DON'T PLOT
251C F003 ^2521    BEQ      NOPLT2 ; FIRST LINE
251E 20BC2C        JSR      PLOTCL ; PLOT POINT
2521 C6AC         NOPLT2  DEC      LENGTH ; END OF LINE?
2523 10D9 ^24FE    BPL      PLOT0B ; NOPE!
2525 E6AB         INC      SHAPIX ; NEXT LINE
2527 C6AF         DEC      SHAPCT ; LAST LINE?
2529 D0B8 ^24E3    BNE      DOBLP ; NOT YET!
252B 60           ENDOBJ   RTS      ; ALL DONE!

```

```

; -----
; SHORT HANDLER
; -----

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252C A203      SHOHAN  LDX      #3          ; MAX. 4 SHORTS
252E BD582E    SHHANL  LDA      SHORTF,X      ; SHORT ALIVE?
2531 F023 ^2556      BEQ      HANNXS    ; NO, DO NEXT
2533 BC602E    LDY      SHORTD,X      ; GET SHORT DIR.
2536 BD5C2E    LDA      SHORTX,X      ; GET X POS.
2539 18        CLC          ; AND ADJUST
253A 792531    ADC      ADDSUB,Y      ; POSITION
253D C9F0      CMP      #240        ; ON GRID?
253F B008 ^2549    BCS      RESSHD    ; NO! DON'T MOVE
2541 9D5C2E    STA      SHORTX,X      ; OK, SAVE POS.
2544 DE642E    DEC      SHORTT,X      ; DIRECTION CHANGE?
2547 100D ^2556    BPL      HANNXS    ; NO!
2549 AD0AD2    RESSHD  LDA      RANDOM    ; GET A RANDOM
254C 293F      AND      #$3F        ; DIRECTION TIME
254E 9D642E    STA      SHORTT,X      ; 0-63 & SAVE
2551 2901      AND      #1          ; RANDOM DIRECTION
2553 9D602E    STA      SHORTD,X      ; 0-1 & SAVE
2556 CA        HANNXS  DEX          ; MORE SHORTS?
2557 10D5 ^252E    BPL      SHHANL    ; YUP!
2559 60        RTS          ; ALL DONE!

```

```

; -----
; ADD TO SCORE
; -----
;

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255A A000      ADDSCO  LDY      #0          ; GET ZERO
255C F8        SED          ; SET DECIMAL MODE
255D A5DA      LDA      SCORE+2    ; THIS SECTION
255F 18        CLC          ; INCREMENTS
2560 65DD      ADC      SCOADD+2    ; THE 3-DIGIT
2562 85DA      STA      SCORE+2    ; SCORE USING
2564 84DD      STY      SCOADD+2    ; THE 3-DIGIT
2566 A5D9      LDA      SCORE+1    ; SCORE ADD
2568 65DC      ADC      SCOADD+1    ; AREA, THEN
256A 85D9      STA      SCORE+1    ; ZEROS OUT
256C 84DC      STY      SCOADD+1    ; THE
256E A5D8      LDA      SCORE      ; SCORE ADD
2570 65DB      ADC      SCOADD      ; AREA USING
2572 85D8      STA      SCORE      ; THE
2574 84DB      STY      SCOADD      ; Y REGISTER.
2576 D8        CLD          ; CLR DECIMAL MODE
2577 208D25    JSR      SHOSCO    ; SHOW SCORE
257A A5D8      LDA      SCORE      ; IS SCORE AT
257C C5D0      CMP      BONUS      ; BONUS LEVEL?
257E D00C ^258C    BNE      NOBONS    ; SORRY!
2580 20A325    JSR      INCLIV    ; BONUS, ADD LIFE!
2583 F8        SED          ; SET DECIMAL
2584 A5D0      LDA      BONUS      ; GET OLD BONUS
2586 18        CLC          ; ADD 20000
2587 6902      ADC      #2          ; TO IT

```



```

2589 D8          CLD          ; CLR DECIMAL
258A 85D0       STA          BONUS ; AND SAVE BONUS
258C 60         NOBONS     RTS          ; FINIS!

;
; -----
; SHOW SCORE
; -----
;

258D A910       SHOSCO    LDA          #$10 ; SET UP COLOR
258F 85A6       STA          SHCOLR ; BYTE FOR SHOW
2591 A200       LDX          #0        ; ZERO X
2593 A000       LDY          #0        ; & Y REGS
2595 B9D800     SSCOLP    LDA          SCORE,Y ; GET SCORE BYTE
2598 204026     JSR          SHOBCD ; SHOW IT
259B E8         INX          ; INCREMENT SHOW
259C E8         INX          ; POS. BY 2
259D C8         INY          ; NEXT SCORE BYTE
259E C003       CPY          #3        ; DONE?
25A0 D0F3 ^2595 BNE          SSCOLP ; NOT YET!
25A2 60         RTS          ; ALL DONE!

;
; -----
; INCREMENT LIVES
; -----
;

25A3 A5C8       INCLIV    LDA          LIVES ; DO WE HAVE
25A5 C905       CMP          #5        ; 5 LIVES NOW?
25A7 F005 ^25AE BEQ          NOMOLV ; YUP, NO INC!
25A9 E6C8       INC          LIVES ; ONE MORE LIFE
25AB 202C26     JSR          SHOLIV ; SHOW IT
25AE 60         NOMOLV    RTS          ; AND EXIT!

;
; -----
; DECREMENT LIVES
; -----
;

25AF 208A26     DECLIV    JSR          SNDOFF ; NO SOUND

;
; -----
; WAIT FOR PROJECTILES TO END
; -----
;

25B2 A207       WAITPD    LDX          #7        ; 8 PROJECTILES
25B4 A900       LDA          #0        ; ZERO TALLY
25B6 1D0C2E     CKPRLV    ORA          PROJAC,X ; CHECK ALL
25B9 CA         DEX          ; PROJECTILES
25BA D0FA ^25B6 BNE          CKPRLV ; FOR ACTIVITY
25BC C900       CMP          #0        ; ANY ACTIVE?
25BE D0F2 ^25B2 BNE          WAITPD ; YES! WAIT MORE!

```

```

;
; -----
; STOP SHORTS
; -----
;

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25C0 A203          LDX      #3          ; 4 SHORTS (0-3)
25C2 9D582E      STPSHO   STA      SHORTF,X      ; TURN OFF
25C5 CA          DEX          ; ALL OF 'EM
25C6 10FA ^25C2  BPL      STPSHO   ; LOOP UNTIL DONE

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```

;
; -----
; PUT OBJECTS AT END OF GRID
; -----
;

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25C8 A900          LDA      #0          ; ERASE
25CA 8584          STA      COLOR      ; COLOR
25CC A905          LDA      #5          ; ERASE ALL 6
25CE 85AA          STA      OBJNUM     ; OBJECTS
25D0 207924      ERSOBJ   JSR      DRWOBJ   ; ERASE IT!
25D3 A6AA          LDX      OBJNUM     ; GET OBJECT #
25D5 A91E          LDA      #30         ; PLACE AT
25D7 9D862E      STA      OBJSEG,X    ; SEG #30
25DA A901          LDA      #1          ; SET UP MOVE
25DC 9D7A2E      STA      OBJINC,X    ; INCREMENT
25DF AD0AD2      RNDDBG   LDA      RANDOM   ; GET RANDOM
25E2 290F          AND      #OF         ; SUB-GRID #
25E4 C90F          CMP      #OF         ; 0-14
25E6 F0F7 ^25DF   BEQ      RNDDBG
25E8 9D802E      STA      OBJGRD,X
25EB C6AA          DEC      OBJNUM     ; MORE OBJECTS?
25ED 10E1 ^25D0  BPL      ERSOBJ   ; YEAH, DO 'EM
25EF A90F          LDA      #OF         ; SHOW PLAYER
25F1 8DC002      STA      COLPMO    ; DEATH HERE
25F4 8D01D2      STA      AUDC1     ; START SOUND
25F7 AD0AD2      MOREWT  LDA      RANDOM   ; SET RANDOM
25FA 291F          AND      #1F        ; DEATH SOUND
25FC 8D00D2      STA      AUDF1     ; FREQUENCY
25FF A906          LDA      #6         ; WAIT 0.1 SEC
2601 208326      JSR      WAIT
2604 CEC002      DEC      COLPMO    ; DEC BRIGHTNESS
2607 ADC002      LDA      COLPMO    ; NOW SET
260A 8D01D2      STA      AUDC1     ; DEATH VOLUME
260D D0E8 ^25F7   BNE      MOREWT
260F A5C8          LDA      LIVES     ; MORE LIVES?
2611 F014 ^2627  BEQ      DEAD      ; NO MORE LIFE!
2613 C6C8          DEC      LIVES     ; ONE LESS LIFE
2615 202C26      JSR      SHOLIV   ; SHOW IT
2618 A93C          LDA      #60        ; WAIT 1 SEC
261A 208326      JSR      WAIT
261D A900          LDA      #0          ; RESET PLAYER
261F 85BD          STA      KILPLR   ; KILL FLAG

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2621 A916          LDA    #$16    ; AND
2623 8DC002       STA    COLPMO   ; PLAYER COLOR
2626 60           RTS          ; AND EXIT!
2627 68           DEAD     PLA          ; ALL DEAD, PULL
2628 68           PLA          ; RETURN ADDR.
2629 4C7321       JMP     LIVE    ; AND RESTART GAME

```

```

;
; -----
; SHOW LIVES
; -----
;

```

```

262C A990          SHOLIV  LDA    #$90    ; SELECT DISPLAY
262E 85A6         STA    SHCOLR  ; COLOR
2630 A5C8         LDA    LIVES   ; GET LIVES
2632 A207         LDX    #7      ; 7TH CHAR ON LINE
2634 204026       JSR    SHOBCD  ; SHOW IT!
2637 60           RTS          ; AND EXIT

```

```

;
; -----
; SHOW LEVEL
; -----
;

```

```

2638 A050          SHOLVL  LDY    #$50    ; SELECT DISPLAY
263A 84A6         STY    SHCOLR  ; COLOR
263C A5A5         LDA    BCDLVL  ; GET LEVEL#
263E A20E         LDX    #14    ; 14TH CHAR

```

```

;
; -----
; BCD CHAR DISPLAY
; -----
;

```

```

2640 85A7          SHOBCD  STA    SHOBYT  ; SAVE CHARACTER
2642 290F         AND    #$0F    ; GET NUM 1
2644 05A6         ORA    SHCOLR  ; ADD COLOR
2646 9D0421       STA    INFOLN+1,X ; SHOW IT
2649 A5A7         LDA    SHOBYT  ; GET CHAR.
264B 4A           LSR    A        ; SHIFT RIGHT
264C 4A           LSR    A        ; TO GET
264D 4A           LSR    A        ; NUM 2
264E 4A           LSR    A
264F 05A6         ORA    SHCOLR  ; ADD COLOR
2651 9D0321       STA    INFOLN,X ; SHOW IT
2654 60           RTS          ; AND EXIT!

```

```

;
; -----
; FLASH OBJECT WHEN DEAD
; -----
;

```

```

2655 A4B5          FLASH   LDY    FLASHY  ; GET Y POS.
2657 A900         LDA    #0      ; GET READY TO

```

```

2659 A20E          LDX      #14      ; CLEAR OLD FLASH
265B 990005      CLFLSH  STA      PL1,Y    ; ZERO OUT EACH
265E C8          INY          ; BYTE OF FLASH
265F CA          DEX          ; DONE YET?
2660 D0F9 ^265B  BNE      CLFLSH  ; NO, LOOP.
2662 A5B3          LDA      SAVEX   ; GET OBJECT'S
2664 18          CLC          ; X POS. AND
2665 693D          ADC      #61     ; ADD 61 FOR
2667 8D01D0       STA      HPOSP1  ; FLASH HORIZ.
266A A5B4          LDA      SAVEY   ; GET Y POS AND
266C 18          CLC          ; ADD 26 FOR
266D 691A          ADC      #26     ; FLASH VERT.
266F AB          TAY          ; POSITION
2670 84B5          STY      FLASHY  ; AND SAVE
2672 A20D          LDX      #13     ; FLASH = 14 BYTES
2674 BD402E       SEFLSH  LDA      FLBYTE,X  ; GET IMAGE
2677 990005      STA      PL1,Y    ; PUT IN PLAYER 1
267A C8          INY          ; NEXT P/M BYTE
267B CA          DEX          ; NEXT IMAGE BYTE
267C 10F6 ^2674  BPL      SEFLSH  ; LOOP.
267E A901          LDA      #1      ; SET FLASH
2680 85B6          STA      FLTIME  ; DURATION
2682 60          RTS          ; ALL DONE!

```

```

; -----
; TIME DELAY
; -----

```

```

2683 85A3          WAIT    STA      TIMER   ; SET TIMER
2685 A5A3          WAITLP  LDA      TIMER   ; TIMER = 0?
2687 D0FC ^2685  BNE      WAITLP  ; NOPE!
2689 60          RTS          ; TIMER FINISHED!

```

```

; -----
; TURN SOUNDS OFF
; -----

```

```

268A A900          SNDOFF  LDA      #0      ; ZERO OUT:
268C 85D1          STA      FIRSOU  ; FIRE SOUND
268E 85D2          STA      OBDSOU  ; OBJ DEATH SOUND
2690 85D3          STA      MOVSOU  ; PLYR MOVE SOUND
2692 A207          LDX      #7      ; ZERO ALL:
2694 9D00D2       SNDOF2  STA      AUDF1,X  ; AUDIO REGISTERS
2697 CA          DEX          ;
2698 10FA ^2694  BPL      SNDOF2  ;
269A 60          RTS          ; AND EXIT

```

```

; -----
; DRAW GRID
; -----

```

```

269B A901      DRGRID LDA    #1      ; TELL INTERRUPT
269D 85A4      STA    INTRFG ; IT'S INTRO
269F 208A26    JSR    SNDOFF ; TURN OFF SOUND
26A2 A920      LDA    #$20   ; TURN OFF TOP
26A4 85C5      STA    DMAC1   ; OF SCREEN BY
26A6 A900      LDA    #0      ; SHUTTING OFF
26A8 85C6      STA    GRAC1   ; DMA & GRAPHICS
26AA A203      LDX    #3      ; TURN OFF SHORTS
26AC 9D582E    CLSHRT STA    SHORTF,X
26AF CA        DEX
26B0 10FA ^26AC BPL    CLSHRT
26B2 A207      LDX    #7      ; TURN OFF
26B4 9D0C2E    CLPRJC STA    PROJAC,X ; ALL PROJECTILES
26B7 CA        DEX
26B8 10FA ^26B4 BPL    CLPRJC
26BA 208B2C    JSR    PMCLR   ; CLEAR P/M AREA
26BD 8593      STA    OFFSET ; ZERO OFFSET
26BF A906      LDA    #6      ; SET 6 PROJECT.
26C1 85BE      STA    PAVAIL ; AVAILABLE
26C3 A5C7      LDA    GRIDIX ; GET GRID #
26C5 4A       LSR    A      ; DIVIDE
26C6 4A       LSR    A      ; BY
26C7 4A       LSR    A      ; 8
26C8 AA       TAX      ; LOAD APPROPRIATE
26C9 BDBC2D    LDA    COTBL,X ; GRID COLOR
26CC 8DC402    STA    COLPFO
26CF BDC42D    LDA    C1TBL,X ; OBJECT COLOR 1
26D2 8DC502    STA    COLPF1
26D5 BDCC2D    LDA    C2TBL,X ; OBJECT COLOR 2
26D8 8DC602    STA    COLPF2
26DB BDA92E    LDA    OBSTBL,X ; OBJECT SPEED
26DE 85CD      STA    OBJSPD
26E0 A5C7      LDA    GRIDIX ; GET GRID
26E2 2907      AND    #7      ; SHAPE INDEX
26E4 AA       TAX      ; LOAD:
26E5 BDD42D    LDA    OBCNT0,X ; TYPE 0
26E8 85DF      STA    NUMOBJ ; OBJECT COUNT
26EA BDDC2D    LDA    OBCNT1,X ; TYPE 1
26ED 85E0      STA    NUMOBJ+1 ; OBJECT COUNT
26EF BDE42D    LDA    OBCNT2,X ; TYPE 2
26F2 85E1      STA    NUMOBJ+2 ; OBJECT COUNT
26F4 BDEC2D    LDA    OBCNT3,X ; TYPE 3
26F7 85E2      STA    NUMOBJ+3 ; OBJECT COUNT
26F9 BDF42D    LDA    OBCNT4,X ; TYPE 4
26FC 85E3      STA    NUMOBJ+4 ; OBJECT COUNT
26FE A204      LDX    #4      ; ADJUST ALL
2700 B5DF      DIFFAD LDA    NUMOBJ,X ; OBJECT COUNTS
2702 18       CLC      ; BY ADDING
2703 65E4      ADC    DIFF    ; DIFFICULTY

```

```

2705 95DF          STA      NUMOBJ,X          ;AND SAVE
2707 CA           DEX
2708 10F6 ^2700   BPL      DIFFAD
270A A5CC         LDA      GRDNUM ; GET GRID #
270C 0A           ASL      A          ; MULTIPLY
270D 0A           ASL      A          ; BY 16
270E 0A           ASL      A
270F 0A           ASL      A
2710 85C9         STA      GRDADJ ; SAVE
2712 85CA         STA      GRDWK  ; SAVE
2714 AA           TAX
2715 A910         LDA      #16      ; LOAD 16 BYTES
2717 85CB         STA      GRDWK2
2719 BD952F       GRDLIN LDA      CX,X      ; GET CLOSE X
271C 8582         STA      PLOTX
271E BDF52F       LDA      CY,X      ; GET CLOSE Y
2721 8583         STA      PLOTY
2723 BD5530       LDA      FX,X      ; GET FAR X
2726 8585         STA      DRAWX
2728 BDB530       LDA      FY,X      ; GET FAR Y
272B 8586         STA      DRAWY
272D ADC402       LDA      COLPFO ; INVISIBLE?
2730 F006 ^2738   BEQ      NOGRD1 ; YES, DON'T DRAW
2732 20BC2C       JSR      PLOTCL ; PLOT CLOSE POINT
2735 201F2D       JSR      DRAW      ; DRAW TO FAR
2738 C6CB         NOGRD1 DEC      GRDWK2 ; CONTINUE DRAWING
273A F007 ^2743   BEQ      GRDBO1 ; UNTIL ALL 16
273C E6CA         INC      GRDWK  ; LINES ARE DONE
273E A6CA         LDX      GRDWK
2740 4C1927       JMP      GRDLIN
2743 A6C9         GRDBO1 LDX      GRDADJ ; NOW DRAW 15
2745 86CA         STX      GRDWK  ; CLOSE GRID
2747 A90F         LDA      #15      ; BORDER LINES
2749 85CB         STA      GRDWK2
274B BD952F       GRDBL1 LDA      CX,X      ; GET CLOSE X
274E 8582         STA      PLOTX
2750 BDF52F       LDA      CY,X      ; GET CLOSE Y
2753 8583         STA      PLOTY
2755 BD962F       LDA      CX+1,X    ; NEXT CLOSE X
2758 8585         STA      DRAWX
275A 18           CLC          ; FIND POINT
275B 6582         ADC      PLOTX    ; BETWEEN THEM
275D 6A           ROR          A
275E 8590         STA      XWORK   ; AND SAVE IT!
2760 BDF62F       LDA      CY+1,X    ; NEXT CLOSE Y
2763 8586         STA      DRAWY
2765 18           CLC          ; FIND POINT
2766 6583         ADC      PLOTY    ; BETWEEN THEM
2768 6A           ROR          A
2769 8591         STA      YWORK   ; AND SAVE IT!

```

```

276B A90F          LDA      #15      ; SET UP A WORK
276D 38           SEC           ; AREA TO HOLD
276E E5CB          SBC      GRDWK2   ; THE POINTS
2770 8592          STA      GRID     ; BETWEEN LINES
2772 20BE28        JSR      GRIDSV   ; AND SAVE THEM
2775 ADC402         LDA      COLPFO  ; INVISIBLE GRID?
2778 F006 ^2780    BEQ      NOGRD2  ; YES, DON'T DRAW
277A 20BC2C        JSR      PLOTCL  ; PLOT CLOSE POINT1
277D 201F2D        JSR      DRAW     ; DRAW TO POINT 2
2780 C6CB          NOGRD2 DEC      GRDWK2   ; MORE LINES?
2782 F007 ^278B    BEQ      GRDBO2  ; NO!
2784 E6CA          INC      GRDWK   ; INCREMENT TO
2786 A6CA          LDX      GRDWK   ; NEXT LINE
2788 4C4B27        JMP      GRDBL1   ; AND LOOP
278B A6C9          GRDBO2 LDX      GRDADJ  ; NOW DRAW 15
278D 86CA          STX      GRDWK   ; FAR GRID
278F A90F          LDA      #15      ; BORDER LINES
2791 85CB          STA      GRDWK2
2793 8593          STA      OFFSET  ; AND SET OFFSET
2795 BD5530        GRDBL2 LDA      FX,X    ; GET FAR X
2798 8582          STA      PLOTX
279A BDB530        LDA      FY,X    ; GET FAR Y
279D 8583          STA      PLOTY
279F BD5630        LDA      FX+1,X  ; NEXT FAR X
27A2 8585          STA      DRAWX
27A4 18           CLC           ; AND FIND
27A5 6582          ADC      PLOTX   ; MIDPOINT
27A7 6A           ROR      A        ; BETWEEN THEM
27A8 8590          STA      XWORK   ; AND SAVE IT!
27AA BDB630        LDA      FY+1,X  ; NEXT FAR Y
27AD 8586          STA      DRAWY
27AF 18           CLC           ; AND FIND
27B0 6583          ADC      PLOTY   ; MIDPOINT
27B2 6A           ROR      A        ; BETWEEN THEM
27B3 8591          STA      YWORK   ; AND SAVE IT!
27B5 A90F          LDA      #15      ; USE THE SAME
27B7 38           SEC           ; WORK AREA
27B8 E5CB          SBC      GRDWK2   ; TO HOLD THE
27BA 8592          STA      GRID     ; MIDPOINTS
27BC 20BE28        JSR      GRIDSV   ; AND SAVE THEM
27BF ADC402         LDA      COLPFO  ; INVISIBLE GRID?
27C2 F006 ^27CA    BEQ      NOGRD3  ; YES, DON'T DRAW
27C4 20BC2C        JSR      PLOTCL  ; PLOT FAR POINT 1
27C7 201F2D        JSR      DRAW     ; DRAW TO POINT 2
27CA C6CB          NOGRD3 DEC      GRDWK2   ; MORE LINES?
27CC F007 ^27D5    BEQ      GENCOO  ; NO!
27CE E6CA          INC      GRDWK   ; INCREMENT TO
27D0 A6CA          LDX      GRDWK   ; NEXT LINE
27D2 4C9527        JMP      GRDBL2   ; AND LOOP

```

```

;-----
;
; NOW GENERATE COORDINATE TABLE
;
; THIS SECTION BUILDS THE SEGX,
; SEGY, RIMX AND RIMY TABLES.
; THE SEGX&Y TABLES ARE POINTS
; UP AND DOWN THE GRID FOR PRO-
; JECTILES AND OBJECTS. THE
; RIMX&Y TABLES ARE FOR THE
; POSITIONING OF SHORTS.
;-----

```

```

27D5 A900          GENCOO LDA      #0
27D7 8597          STA      GRIDNO
27D9 AA           DIVCTL TAX
27DA BDA031        LDA      SEGX,X ; SET UP SEGWK
27DD 8D8F31        STA      SEGWK ; WITH END
27E0 BDAF31        LDA      SEGX+15,X ; COORDINATES
27E3 8D9F31        STA      SEGWK+16
27E6 207728        JSR      DIVIDE ; DIVIDE SEGWK
27E9 A697          LDX      GRIDNO
27EB A000          LDY      #0
27ED B98F31        COPY1  LDA      SEGWK,Y ; COPY SEGWK
27F0 9DA031        STA      SEGX,X ; TABLE TO SEGX
27F3 EB           INX
27F4 CB           INY
27F5 C010          CPY      #16
27F7 D0F4 ^27ED    BNE      COPY1
; NOW THE Y COORDS
27F9 A697          LDX      GRIDNO
27FB BDA032        LDA      SEGY,X ; SET UP SEGWK
27FE 8D8F31        STA      SEGWK ; WITH END
2801 BDAF32        LDA      SEGY+15,X ; COORDINATES
2804 8D9F31        STA      SEGWK+16
2807 207728        JSR      DIVIDE ; DIVIDE SEGWK
280A A697          LDX      GRIDNO
280C A000          LDY      #0
280E B98F31        COPY2  LDA      SEGWK,Y ; COPY SEGWK
2811 9DA032        STA      SEGY,X ; TABLE TO SEGY
2814 EB           INX
2815 CB           INY
2816 C010          CPY      #16
2818 D0F4 ^280E    BNE      COPY2

```

```

;-----
;
; NOW GENERATE RIM COORDINATES
;-----

```

```

281A A697          LDX      GRIDNO
281C BDA033        LDA      RIMX,X ; SET UP SEGWK

```



```

281F 8D8F31      STA      SEGWK      ; WITH END
2822 BDAF33      LDA      RIMX+15,X      ; COORDINATES
2825 8D9F31      STA      SEGWK+16
2828 207728      JSR      DIVIDE      ; DIVIDE SEGWK
282B A697         LDX      GRIDNO
282D A000         LDY      #0
282F B98F31      COPY3   LDA      SEGWK,Y      ; COPY SEGWK
2832 9DA033      STA      RIMX,X      ; TABLE TO RIMX
2835 E8          INX
2836 C8          INY
2837 C010        CPY      #16
2839 D0F4 ^282F  BNE      COPY3
                ; NOW THE RIM Y COORDS
283B A697         LDX      GRIDNO
283D BDA034      LDA      RIMY,X      ; SET UP SEGWK
2840 8D8F31      STA      SEGWK      ; WITH END
2843 BDAF34      LDA      RIMY+15,X      ; COORDINATES
2846 8D9F31      STA      SEGWK+16
2849 207728      JSR      DIVIDE      ; DIVIDE SEGWK
284C A697         LDX      GRIDNO
284E A000         LDY      #0
2850 B98F31      COPY4   LDA      SEGWK,Y      ; COPY SEGWK
2853 9DA034      STA      RIMY,X      ; TABLE TO RIMY
2856 E8          INX
2857 C8          INY
2858 C010        CPY      #16
285A D0F4 ^2850  BNE      COPY4
285C A597         LDA      GRIDNO      ; DO ALL 15
285E 18         CLC          ; GRID LINES
285F 6910        ADC      #16
2861 8597         STA      GRIDNO
2863 C9F0         CMP      #240      ; ALL DONE?
2865 F003 ^286A  BEQ      ENDDVC    ; YOU BET!
2867 4CD927      JMP      DIVCTL    ; LOOP BACK!
286A A93D         ENDDVC  LDA      #$3D      ; RESTART
286C 85C5         STA      DMAC1    ; THE DISPLAY
286E A903         LDA      #$03      ; AFTER GRID
2870 85C6         STA      GRAC1    ; IS DRAWN
2872 A900         LDA      #0        ; NO MORE
2874 85A4         STA      INTRFG   ; INTRO STATUS
2876 60          RTS          ; FINIS!

```

```

-----
:
: DIVIDE SEGWK TABLE
:

```

```

: THIS ROUTINE EXAMINES THE FIRST
: AND LAST BYTES IN THE SEGWK
: TABLE AND FILLS THE BYTES IN
: BETWEEN WITH AN EVEN TRANSITION
: FROM ONE ENDPOINT TO THE OTHER
:

```

```

; -----
2877 A910      DIVIDE  LDA      #16
2879 859A      STA      STEP
287B 8599      STA      NEXT
287D 4A        LSR      A
287E 859B      STA      DEST
2880 A900      DIVLP2  LDA      #0
2882 8598      STA      LAST
2884 A698      DIVLP1  LDX      LAST
2886 BD8F31    LDA      SEGWK,X
2889 A699      LDX      NEXT
288B 18        CLC
288C 7D8F31    ADC      SEGWK,X
288F 6A        ROR      A
2890 A69B      LDX      DEST
2892 9D8F31    STA      SEGWK,X
2895 A598      LDA      LAST
2897 18        CLC
2898 659A      ADC      STEP
289A 8598      STA      LAST
289C 659A      ADC      STEP
289E C911      CMP      #17
28A0 B00C ^28AE BCS      NOSTEP
28A2 8599      STA      NEXT
28A4 A59B      LDA      DEST
28A6 18        CLC
28A7 659A      ADC      STEP
28A9 859B      STA      DEST
28AB 4C8428    JMP      DIVLP1
28AE A59A      NOSTEP  LDA      STEP
28B0 4A        LSR      A
28B1 859A      STA      STEP
28B3 8599      STA      NEXT
28B5 4A        LSR      A
28B6 F005 ^28BD  BEQ      ENDDIV
28B8 859B      STA      DEST
28BA 4C8028    JMP      DIVLP2
28BD 60        ENDDIV  RTS

; -----
; GRID COORDINATE SAVE
; -----
28BE A592      GRIDSV  LDA      GRID
28C0 0A        ASL      A      ; *2
28C1 0A        ASL      A      ; *4
28C2 0A        ASL      A      ; *8
28C3 0A        ASL      A      ; *16
28C4 18        CLC      ; ADD THE

```

```

28C5 6593          ADC      OFFSET    ; OFFSET VALUE
28C7 AA           TAX          ; SAVE IN INDEX
28C8 A590         LDA      XWORK     ; GET X WORK
28CA 9DA031       STA      SEGX,X    ; AND SAVE
28CD A591         LDA      YWORK     ; GET Y WORK
28CF 9DA032       STA      SEGY,X    ; AND SAVE
28D2 A593         LDA      OFFSET    ; DON'T CONTINUE
28D4 D014 ^28EA   BNE      SAVEND    ; IF OFFSET >0
28D6 A582         LDA      PLOTX    ; GET PLOTX
28D8 9DA033       STA      RIMX,X    ; AND SAVE
28DB A583         LDA      PLOTY    ; GET PLOTY
28DD 9DA034       STA      RIMY,X    ; AND SAVE
28E0 A585         LDA      DRAWX    ; GET DRAWX
28E2 9DAF33       STA      RIMX+15,X ; AND SAVE
28E5 A586         LDA      DRAWY    ; GET DRAWY
28E7 9DAF34       STA      RIMY+15,X ; AND SAVE
28EA 60           SAVEND   RTS          ; ALL DONE!

; -----
; VERTICAL BLANK ROUTINE
; -----

28EB A9CF          VBI      LDA      #DLI1&255    ; POINT TO
28ED 8D0002       STA      VDSLST ; FIRST
28F0 A920         LDA      #DLI1/256    ; DISPLAY LIST
28F2 8D0102       STA      VDSLST+1    ; INTERRUPT
28F5 D8           CLD          ; CLR DECIMAL MODE
28F6 A5A9         LDA      OBTIM1    ; THIS SECTION
28F8 F002 ^28FC   BEQ      NOOBTD    ; PROCESSES
28FA C6A9         DEC      OBTIM1    ; ALL TIMERS
28FC A5A3          NOOBTD LDA      TIMER
28FE F002 ^2902   BEQ      NOTIMR    ;
2900 C6A3          NOTIMR DEC      TIMER
2902 A5B6          NOFTIM LDA      FLTIME
2904 F002 ^2908   BEQ      NOFTIM    ;
2906 C6B6          NOFTIM DEC      FLTIME
2908 A5BD          NOFTIM LDA      KILPLR ; PLAYER DEAD?
290A F003 ^290F   BEQ      CHKINT    ; NO, CONTINUE!
290C 4C002B       JMP      VBCONT    ; SKIP PLAYER STUFF
290F A5A4          CHKINT LDA      INTRFG ; IN INTRO?
2911 F003 ^2916   BEQ      NOTINT    ; NO, CONTINUE!
2913 4C62E4       JMP      XITVBV    ; EXIT IF INTRO
2916 ADFC02       NOTINT  LDA      KEY      ; GET KEYBOARD
2919 C91C          NOTINT  CMP      #$1C    ; PAUSE (ESC)?
291B D009 ^2926   BNE      CKZAP    ; NO, CHECK ZAP
291D A5B1         LDA      PAUFLG    ; GET PAUSE FLAG
291F 49FF         EOR      #$FF    ; AND FLIP
2921 85B1         STA      PAUFLG    ; AND STORE
2923 4C5229       JMP      ENDKEY    ; DONE W/KEY
2926 C921         CKZAP   CMP      #$21    ; SPACE BAR?

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```

2928 D028 ^2952      BNE      ENDKEY ; NAW, DONE W/KEY
292A A5B2           LDA      ZAP      ; USED ZAP YET?
292C F024 ^2952      BEQ      ENDKEY ; YES, NO ZAP
292E C6B2           DEC      ZAP      ; ZAP NOW USED
2930 A205           LDX      #5       ; TIME TO KILL
2932 A901           LDA      #1       ; ALL OBJECTS
2934 9D682E        ZAPOBJ   STA      OBDEAD,X
2937 CA            DEX
2938 10FA ^2934      BPL      ZAPOBJ
293A A203           LDX      #3       ; AND KILL
293C BD582E        ZAPSHO   LDA      SHORTF,X ; ALL SHORTS
293F F00E ^294F      BEQ      NOSKIL
2941 A5DE           LDA      MISCAD ; ALSO SET
2943 F8            SED      ; MISCELLANEOUS
2944 18            CLC      ; SCORE ADD
2945 6904           ADC      #4       ; FOR 400 POINTS
2947 85DE           STA      MISCAD ; FOR EACH SHORT
2949 D8            CLD
294A A900           LDA      #0       ; KILL
294C 9D582E        STA      SHORTF,X ; SHORT
294F CA            NOSKIL  DEX
2950 10EA ^293C      BPL      ZAPSHO
2952 A900           ENDKEY   LDA      #0       ; CLEAR
2954 8DFC02        STA      KEY      ; KEYPRESS.
2957 A5B1           LDA      PAUFLG ; PAUSED?
2959 F011 ^296C      BEQ      NOPAU   ; NO, CONTINUE
295B A900           LDA      #0       ; TURN OFF
295D 8D01D2        STA      AUDC1   ; ALL SOUNDS
2960 8D03D2        STA      AUDC2   ; DURING
2963 8D05D2        STA      AUDC3   ; THE
2966 8D07D2        STA      AUDC4   ; PAUSE
2969 4C62E4        JMP      XITVBV  ; THEN EXIT
296C A5D1           NOPAU   LDA      FIRSOU  ; FIRE SOUND ON?
296E F010 ^2980      BEQ      NOFSND ; NO!
2970 C6D1           DEC      FIRSOU ; DEC COUNTER
2972 A6D1           LDX      FIRSOU ; PUT IN INDEX
2974 BD3E31        LDA      FIRFRQ,X ; GET FREQUENCY
2977 8D02D2        STA      AUDF2
297A BD2931        LDA      FIRCTL,X ; GET CONTROL
297D 8D03D2        STA      AUDC2
2980 A5D2           NOFSND  LDA      OBDSOU  ; OBJ DEATH SOUND?
2982 F010 ^2994      BEQ      NOOSND ; NO!
2984 C6D2           DEC      OBDSOU ; DEC COUNTER
2986 A6D2           LDX      OBDSOU ; PUT IN INDEX
2988 BD6831        LDA      OBDFRQ,X ; GET FREQUENCY
298B 8D04D2        STA      AUDF3
298E BD5331        LDA      OBDCTL,X ; GET CONTROL
2991 8D05D2        STA      AUDC3
2994 A5D3           NOOSND  LDA      MOVSOU  ; MOVE SOUND?
2996 F010 ^29A8      BEQ      CYCCOL  ; NO!

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```

2998 C6D3          DEC      MOVSOU ; DEC COUNTER
299A A6D3          LDX      MOVSOU ; PUT IN INDEX
299C BD8631       LDA      MOVFRQ,X ; GET FREQUENCY
299F 8D06D2       STA      AUDF4
29A2 BD7D31       LDA      MOVCTL,X ; GET CONTROL
29A5 8D07D2       STA      AUDC4
29A8 ADC202       CYCCOL LDA      COLPM2 ; CYCLE
29AB 18           CLC      ; PLAYER 2
29AC 6910         ADC      #16 ; COLOR
29AE 8DC202       STA      COLPM2 ; SAVE IN P/M 2
29B1 8DC302       STA      COLPM3 ; AND IN P/M 3
29B4 29FC         AND      #$FC ; ALSO PUT IN
29B6 8DC702       STA      COLPF3 ; PF3 FOR MISSILES
29B9 C6BF         DEC      TRANTM ; TRANSIENT TIME
29BB D017 ^29D4   BNE      NOTRAN ; NO CHANGE
29BD AD902E       LDA      OBJHUE+4 ; FLIP
29C0 D004 ^29C6   BNE      TRAN1 ; TRANSIENT
29C2 A902         LDA      #2 ; HUE
29C4 D002 ^29C8   BNE      STOTRN ; TO EITHER
29C6 A900         TRAN1 LDA      #0 ; 0 OR 2
29C8 8D902E       STOTRN STA      OBJHUE+4
29CB AD0AD2       LDA      RANDOM
29CE 091F         ORA      #$1F ; RESET
29D0 293F         AND      #$3F ; THE
29D2 85BF         STA      TRANTM ; TRANSIENT TIME
29D4 E6BC         NOTRAN INC      PSCNT ; INC PLYR TIMER
29D6 A5BC         LDA      PSCNT ; READY TO
29D8 C903         CMP      #3 ; CHANGE SHAPE?
29DA D00A ^29E6   BNE      NOPSIN ; NOT YET!
29DC A900         LDA      #0 ; BETTER RESET
29DE 85BC         STA      PSCNT ; INDEX
29E0 E6B7         INC      SP1IX ; AND INCREMENT
29E2 E6B8         INC      SP2IX ; ALL SHAPE
29E4 E6B9         INC      SP3IX ; INDEXES!
29E6 A59D         NOPSIN LDA      PFTIME ; SEE IF WE'RE
29E8 F005 ^29EF   BEQ      FIRE ; READY TO CHECK
29EA C69D         DEC      PFTIME ; IF PLAYER IS
29EC 4C312A       JMP      CHKPMV ; SHOOTING
29EF A904         FIRE   LDA      #4 ; RESET FIRE
29F1 859D         STA      PFTIME ; TIMER
29F3 A5CE         LDA      JOYPAD ; USING STICK?
29F5 F006 ^29FD   BEQ      RDSTRG ; YES!
29F7 AD7C02       LDA      PTRIGO ; GET PADL TRIGGER
29FA 4C002A       JMP      CMPTRG ; CHECK IT
29FD AD8402       RDSTRG LDA      STRIG ; GET STICK TRIGGER
2A00 D02F ^2A31   CMPTRG BNE      CHKPMV ; NOT FIRING!
2A02 A5BE         LDA      PAVAIL ; ANY PROJ AVAIL?
2A04 F02B ^2A31   BEQ      CHKPMV ; NO!
2A06 A207         LDX      #7 ; FIND AN
2A08 BDOC2E       PRSCAN LDA      PROJAC,X ; AVAILABLE

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2A0B F003 ^2A10      BEQ      GOTPRN ; PROJECTILE
2A0D CA              DEX
2A0E D0F8 ^2A08      BNE      PRSCAN
2A10 C6BE              GOTPRN DEC      PAVAIL ; 1 LESS AVAILABLE
2A12 A901              LDA      #1 ; IT'S NOW
2A14 9D0C2E           STA      PROJAC,X ; ACTIVE
2A17 A915              LDA      #21 ; START UP
2A19 85D1              STA      FIRSOU ; FIRE SOUND
2A1B A900              LDA      #0 ; INITIALIZE
2A1D 9D2C2E           STA      PROJSG,X ; SEGMENT # TO 0
2A20 A595              LDA      PLRGRD ; SET UP
2A22 9D1C2E           STA      PROGRD,X ; PROJ GRID#
2A25 0A              ASL      A ; AND
2A26 0A              ASL      A ; MULTIPLY
2A27 0A              ASL      A ; BY 16
2A28 0A              ASL      A
2A29 9D242E           STA      PROJGN,X ; FOR INDEX
2A2C A901              LDA      #1 ; INITIALIZE
2A2E 9D142E           STA      PROINC,X ; PROJ INCREMENT
2A31 A5CE              CHKPMV LDA      JOYPAD ; USING STICK?
2A33 F00F ^2A44      BEQ      GOSTIK ; YES!
2A35 AD7002           LDA      POTO ; GET PADDLE
2A38 4A              LSR      A ; DIVIDE BY
2A39 4A              LSR      A ; 16 TO GET
2A3A 4A              LSR      A ; USABLE VALUE
2A3B 4A              LSR      A
2A3C C90F              CMP      #15 ; > 14?
2A3E 3022 ^2A62      BMI      STOPOS ; NO, GO STORE
2A40 A90E              LDA      #14 ; MAX. IS 14
2A42 D01E ^2A62      BNE      STOPOS ; AND GO STORE
2A44 A594              GOSTIK LDA      PMTIME ; READY FOR STICK?
2A46 F005 ^2A4D      BEQ      RDSTIK ; YES!
2A48 C694              DEC      PMTIME ; DEC TIMER
2A4A 4C002B           JVBC    JMP      VBCONT ; JMP TO CONTINUE
2A4D A902              RDSTIK LDA      #2 ; RESET STICK TIMER
2A4F 8594              STA      PMTIME ; TO 2 JIFFIES
2A51 AE7802           LDX     STICK ; GET STICK
2A54 A595              LDA      PLRGRD ; GET PLYR GRID #
2A56 18              CLC
2A57 7DFC2D           ADC     STKADD,X ; DIRECTION INC
2A5A 3004 ^2A60      BMI      SAMPOS ; IF <0 REJECT
2A5C C90F              CMP      #15 ; IF <15...
2A5E D002 ^2A62      BNE      STOPOS ; USE IT!
2A60 A595              SAMPOS LDA      PLRGRD ; GET GRID#
2A62 C595              STOPOS CMP      PLRGRD ; SAME AS LAST?
2A64 F006 ^2A6C      BEQ      NOPSTO ; YES, DON'T STORE
2A66 A209              LDX     #9 ; START UP
2A68 86D3              STX     MOVSOU ; MOVE SOUND
2A6A 8595              STA      PLRGRD ; SAVE GRID#
2A6C 0A              NOPSTO ASL      A ; MULTIPLY

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2A6D 0A          ASL      A          ; BY 16 FOR
2A6E 0A          ASL      A          ; POSITION
2A6F 0A          ASL      A          ; INDEX
2A70 AA          TAX
2A71 ADOCD0      LDA      POPL
2A74 290C        AND      #$0C       ; HIT P2/P3?
2A76 F007 ^2A7F BEQ      NOHSHO     ; NO!
2A78 A901        LDA      #1         ; OOPS! HIT SHORT!
2A7A 85BD        STA      KILPLR    ; KILL PLAYER
2A7C 4C852C      JMP      VBEND      ; AND EXIT VBLANK
2A7F BDA031      LDA      NOHSHO   ; GET PLAYER'S
2A82 18          CLC
2A83 693D        ADC      #61        ; ADJUST FOR P/M
2A85 8D00D0      STA      HPOSPO    ; AND SAVE
2A88 A496        LDY      PLRY      ; HOLD OLD Y POS
2A8A BDA032      LDA      SEGY,X    ; GET NEW Y POS
2A8D 18          CLC
2A8E 6920        ADC      #32        ; BY ADDING 32
2A90 8596        STA      PLRY      ; SET Y POS
2A92 A900        LDA      #0         ; CLEAR OUT
2A94 A20F        LDX      #15        ; OLD PLAYER
2A96 99F803      STA      CLRPS     ; IMAGE
2A99 C8          INY
2A9A CA          DEX
2A9B 10F9 ^2A96 BPL      CLRPS
2A9D A90F        LDA      #15        ; NOW COPY
2A9F 85BA        STA      SPIX      ; 16-BYTE
2AA1 A900        LDA      SPLLOOP   ; PLAYER IMAGE
2AA3 85BB        STA      PLTBYT   ; TO PLAYER 0
2AA5 A5B7        LDA      SP1IX
2AA7 290F        AND      #15
2AA9 AA          TAX
2AAA A5BA        LDA      SPIX
2AAC DD712F        CMP      SPTBL,X
2AAF 900B ^2ABC  BCC      NOSP1
2AB1 DD812F        CMP      EPTBL,X
2AB4 B006 ^2ABC  BCS      NOSP1
2AB6 AA          TAX
2AB7 BD412F        LDA      PN1,X     ; GET IMAGE 1
2ABA 85BB        STA      PLTBYT   ; AND SAVE
2ABC A5B8        LDA      NOSP1    ;
2ABE 290F        AND      #15
2AC0 AA          TAX
2AC1 A5BA        LDA      SPIX
2AC3 DD712F        CMP      SPTBL,X
2AC6 900D ^2AD5  BCC      NOSP2
2AC8 DD812F        CMP      EPTBL,X
2ACB B008 ^2AD5  BCS      NOSP2
2ACD AA          TAX
2ACE BD512F        LDA      PN2,X

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2AD1 05BB          ORA      PLTBYT  ;ADD IMAGE 2
2AD3 85BB          STA      PLTBYT  ;AND SAVE
2AD5 A5B9          NOSP2   LDA      SP3IX
2AD7 290F          AND      #15
2AD9 AA            TAX
2ADA A5BA          LDA      SPIX
2ADC DD712F        CMP      SPTBL,X
2ADF 900D ^2AEE   BCC      NOSP3
2AE1 DD812F        CMP      EPTBL,X
2AE4 B008 ^2AEE   BCS      NOSP3
2AE6 AA            TAX
2AE7 BD612F        LDA      PN3,X
2AEA 05BB          ORA      PLTBYT  ;ADD IMAGE 3
2AEC 85BB          STA      PLTBYT  ;AND SAVE
2AEE A596          NOSP3   LDA      PLYR
2AF0 18            CLC
2AF1 65BA          ADC      SPIX
2AF3 38            SEC
2AF4 E908          SBC      #8
2AF6 AB            TAY
2AF7 A5BB          LDA      PLTBYT  ;GET IMAGE BYTE
2AF9 990004        STA      PLO,Y   ;PUT IN P/M AREA
2AFC C6BA          DEC      SPIX    ;MORE IMAGE?
2AFE 10A1 ^2AA1   BPL      SPLOOP  ;YES!
2B00 A5A2          VBCONT  LDA      PRADV1 ;ADVANCE PROJ?
2B02 F005 ^2B09   BEQ      SETPRA  ;YES!
2B04 C6A2          DEC      PRADV1 ;NO, DEC TIMER
2B06 4C0F2B        JMP      FLIPIT  ;GO FLIP DISPLAY
2B09 E6A1          SETPRA  INC      PRADVT
2B0B A901          LDA      #1     ;SET ADVANCE
2B0D 85A2          STA      PRADV1 ;TIMER

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*-----*
* THIS SECTION FLIP-FLOPS THE 4
* MISSILES IN ORDER TO ALLOW THE
* DISPLAY OF 8 PROJECTILES. AS
* A RESULT, SOME FLICKER CAN BE
* OBSERVED.
*-----*

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2B0F E6A0          FLIPIT  INC      PRFLIP  ;INC FLIP INDEX
2B11 A5A0          LDA      PRFLIP  ;GET INDEX
2B13 2901          AND      #1     ;MAKE 0/1
2B15 AB            TAY          ;SAVE IN Y
2B16 B9362E        LDA      PREND,Y ;GET # OF LAST
2B19 859E          STA      ENDVAL  ;PROJECTILE
2B1B BE342E        LDX      PRSTRT,Y ;GET # OF FIRST
2B1E 869C          STX      VBXHLD  ;PROJECTILE
2B20 A903          LDA      #3     ;START W/MISSILE
2B22 859F          STA      MISNUM  ;NUMBER 3

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2B24 BD0C2E      PROJLP  LDA      PROJAC,X          ; IS PROJ. ACTIVE?
2B27 D003 ^2B2C          BNE      GOTPRJ      ; YOU BET.
2B29 4CE32B          JMP      CKPEND      ; TRY ANOTHER
2B2C A69F          GOTPRJ  LDX      MISNUM      ; GET MISSILE #
2B2E B4D4          LDY      PRYHLD,X     ; GET LAST POSITION
2B30 B9FF02          LDA      MISSLS-1,Y   ; ERASE OLD
2B33 3D3C2E          AND      MISLOF,X     ; PROJECTILE
2B36 99FF02          STA      MISSLS-1,Y   ; IMAGE
2B39 B90003          LDA      MISSLS,Y
2B3C 3D3C2E          AND      MISLOF,X
2B3F 990003          STA      MISSLS,Y
2B42 B90103          LDA      MISSLS+1,Y
2B45 3D3C2E          AND      MISLOF,X
2B48 990103          STA      MISSLS+1,Y
2B4B A69C          LDX      VBXHLD
2B4D A5A1          LDA      PRADVT      ; READY TO
2B4F 2901          AND      #1          ; ADVANCE PROJ?
2B51 D00A ^2B5D          BNE      NOPADV      ; NOT YET
2B53 BD2C2E          LDA      PROJSG,X    ; GET PROJ SEG#
2B56 18           CLC              ; AND
2B57 7D142E          ADC      PROINC,X    ; ADD INCREMENT
2B5A 9D2C2E          STA      PROJSG,X    ; THEN SAVE
2B5D BD142E          NOPADV  LDA      PROINC,X    ; ENEMY SHOT?
2B60 3043 ^2BA5          BMI      NOOHCK     ; NO OBJ HIT CHECK
2B62 A005          LDY      #5
2B64 B9682E          OBKILP LDA      OBDEAD,Y    ; ALREADY DEAD?
2B67 D039 ^2BA2          BNE      NXTOCK     ; YES!
2B69 B9E500          LDA      OBJPRS,Y   ; OBJECT THERE?
2B6C F034 ^2BA2          BEQ      NXTOCK     ; NO!
2B6E B9742E          LDA      OBJTYP,Y   ; TRANSIENT?
2B71 C904          CMP      #4
2B73 D005 ^2B7A          BNE      NOTRNC     ; NO!
2B75 AD902E          LDA      OBJHUE+4   ; INVISIBLE?
2B78 F028 ^2BA2          BEQ      NXTOCK     ; YES!
2B7A B9802E          NOTRNC LDA      OBJGRD,Y   ; SAME GRID #
2B7D DD1C2E          CMP      PROGRD,X   ; AS PROJ?
2B80 D020 ^2BA2          BNE      NXTOCK     ; NO!
2B82 B9862E          LDA      OBJSEG,Y   ; SAME SEG #
2B85 4A           LSR      A
2B86 38           SEC
2B87 FD2C2E          SBC      PROJSG,X   ; AS PROJ?
2B8A F004 ^2B90          BEQ      HITOBJ
2B8C C9FE          CMP      #254
2B8E 9012 ^2BA2          BCC      NXTOCK     ; NO!
2B90 B9742E          HITOBJ LDA      OBJTYP,Y   ; RESISTOR?
2B93 F008 ^2B9D          BEQ      CGPRDR     ; YES!
2B95 A901          LDA      #1          ; KILL OBJECT
2B97 99682E          STA      OBDEAD,Y
2B9A 4CF02B          JMP      KILLPR     ; AND PROJ.
2B9D A9FF          CGPRDR LDA      #$FF     ; PROJ NOW HEADING

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2B9F 9D142E          STA      PROINC,X          ;FOR PLAYER!
2BA2 88             NXTOCK  DEY              ;NEXT OBJECT
2BA3 10BF ^2B64     BPL      OBKILP          ;MORE TO DO!
2BA5 BD2C2E          NOOHCK  LDA      PROJSG,X      ;IS PROJ SEG# =0?
2BA8 F046 ^2BF0     BEQ      KILLPR          ;YES, KILL IT!
2BAA C910           CMP      #16             ;=16?
2BAC F042 ^2BF0     BEQ      KILLPR          ;YES, KILL IT!
2BAE 18            CLC
2BAF 7D242E         ADC      PROJGN,X        ;GRID INDEX
2BB2 AA           TAX
2BB3 BDA031         LDA      SEGX,X          ;X COORD
2BB6 BCA032         LDY      SEGY,X          ;AND Y COORD
2BB9 18           CLC
2BBA 6940          ADC      #64             ;X COORD FOR
2BBC A69F          LDX      MISNUM          ;P/M HORIZ
2BBE 9D04D0        STA      HPOSMO,X        ;AND SAVE
2BC1 98           TYA
2BC2 18           CLC
2BC3 6920          ADC      #32             ;Y COORD FOR
2BC5 A8           TAY
2BC6 94D4          STY      PRYHLD,X        ;AND SAVE.
2BC8 B9FF02         LDA      MISSLS-1,Y      ;NOW DRAW
2BCB 1D382E        ORA      MISLON,X        ;PROJECTILE IN
2BCE 99FF02         STA      MISSLS-1,Y      ;NEW POSITION
2BD1 B90003         LDA      MISSLS,Y
2BD4 1D382E        ORA      MISLON,X
2BD7 990003         STA      MISSLS,Y
2BDA B90103         LDA      MISSLS+1,Y
2BDD 1D382E        ORA      MISLON,X
2BE0 990103         STA      MISSLS+1,Y
2BE3 C69F          CKPEND  DEC      MISNUM    ;NEXT MISSILE #
2BE5 C69C          DEC      VBXHLD         ;NEXT PROJ.
2BE7 A69C          LDX      VBXHLD
2BE9 E49E          CPX      ENDVAL        ;DONE?
2BEB F026 ^2C13     BEQ      SHORTS         ;YES!
2BED 4C242B        JMP      PROJLP         ;DO NEXT PROJ.
2BF0 A900          KILLPR  LDA      #0          ;KILL PROJ.
2BF2 9D0C2E        STA      PROJAC,X
2BF5 E002          CPX      #2             ;ENEMY PROJ?
2BF7 9002 ^2BFB     BCC      NOAVIN         ;YES DON'T INC
2BF9 E6BE          INC      PAVAIL         ;ANOTHER AVAIL
2BFB BD2C2E          NOAVIN  LDA      PROJSG,X      ;SEGMENT 0?
2BFE D010 ^2C10     BNE      NOKILP         ;NO!
2C00 BD142E         LDA      PROINC,X        ;TOWARD RIM?
2C03 100B ^2C10     BPL      NOKILP         ;NO!
2C05 BD1C2E         LDA      PROGRD,X        ;SAME GRID...
2C08 C595          CMP      PLRGRD         ;AS PLAYER?
2C0A D004 ^2C10     BNE      NOKILP         ;NO!
2C0C A901          LDA      #1             ;THE PLAYER
2C0E 85BD          STA      KILPLR        ;IS DEAD!

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2C10 4CE32B      NOKILP JMP      CKPEND ;NEXT PROJ.

;-----
; THIS SECTION HANDLES SHORTS.
; 2 PLAYERS ARE USED TO SHOW A
; MAXIMUM OF 4 SHORTS, SO SOME
; FLICKER MAY BE OBSERVED.
;-----

2C13 E6C2      SHORTS INC      SHFLIP ; TOGGLE FLIP
2C15 A5C2      LDA      SHFLIP ; MASK FLIP
2C17 4A        LSR      A        ; TO EITHER
2C18 2901      AND      #1       ; 0 OR 1
2C1A AB        TAY      ; PUT IN Y
2C1B B92331    LDA      CPYSTN,Y ; AND GET IMAGE
2C1E 85C4      STA      CPYST    ; TO USE (+/X)
2C20 A5C2      LDA      SHFLIP ; GET FLIP,
2C22 2901      AND      #1       ; MASK AND
2C24 AB        TAY      ; PUT IN Y
2C25 A907      LDA      #PL3/256 ; PUT PLAYER 3
2C27 85C1      STA      DESTHI ; IN DESTINATION
2C29 A900      LDA      #PL3&255 ; ADDRESS
2C2B 85C0      STA      DESTLO ; HI & LO
2C2D A901      LDA      #1       ; SET DEST #
2C2F 85C3      STA      DESTNM
2C31 B91531    LDA      SHSTRT,Y ; GET START
2C34 859C      STA      VBXHLD ; SHORT #
2C36 A900      SHORLP LDA      #0
2C38 A6C3      LDX      DESTNM
2C3A BC1731    LDY      SHYHLD,X ; GET LAST INDEX
2C3D A209      LDX      #9        ; NOW ERASE
2C3F 91C0      ERSSHO STA      (DESTLO),Y ; PREVIOUS
2C41 C8        INY      ; SHORT
2C42 CA        DEX
2C43 10FA ^2C3F BPL      ERSSHO
2C45 A69C      LDX      VBXHLD
2C47 BD582E    LDA      SHORTF,X ; SHORT ALIVE?
2C4A F02E ^2C7A BEQ      NXTSHO ; NO!
2C4C BD5C2E    LDA      SHORTX,X ; GET INDEX OF
2C4F AA        TAX      ; SHORT'S POS.
2C50 BDA033    LDA      RIMX,X ; GET X COORD
2C53 BCA034    LDY      RIMY,X ; AND Y COORD
2C56 18        CLC
2C57 693E      ADC      #62     ; ADJUST X
2C59 A6C3      LDX      DESTNM ; GET PLAYER#
2C5B 9D02D0    STA      HPOSP2,X ; AND STORE
2C5E 98        TYA
2C5F 18        CLC
2C60 691C      ADC      #28     ; ADJUST Y
2C62 9D1731    STA      SHYHLD,X ; SAVE IT

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2C65  A8          TAY
2C66  A6C4        LDX      CPYST
2C68  A904        LDA      #4
2C6A  85CF        STA      CPYCNT
2C6C  BD1931      SHOCOP  LDA      SHOIMG,X      ; NOW COPY
2C6F  91C0        STA      (DESTLO),Y      ; SHORT IMAGE
2C71  C8         INY          ; TO P/M
2C72  91C0        STA      (DESTLO),Y      ; AREA
2C74  C8         INY
2C75  CA         DEX
2C76  C6CF        DEC      CPYCNT
2C78  10F2 ^2C6C  BPL      SHOCOP
2C7A  C6C3        NXTSHO  DEC      DESTNM      ; MORE?
2C7C  3007 ^2C85  BMI      VBEND      ; NO, EXIT!
2C7E  C6C1        DEC      DESTHI      ; NEXT PLAYER
2C80  E69C        INC      VBXHLD
2C82  4C362C     JMP      SHORLP      ; LOOP BACK.
2C85  8D1ED0     VBEND   STA      HITCLR      ; CLEAR COLLISION
2C88  4C62E4     JMP      XITVBV      ; VBI DONE! (WHEW!)

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; -----
; CLEAR PLAYER-MISSILES
; -----

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2C8B  A900        PMCLR  LDA      #0          ; PUT 255
2C8D  AA         TAX          ; ZEROS IN
2C8E  9D0003      PMCLP  STA      MISSLS,X      ; EACH P/M
2C91  9D0004      STA      PLO,X        ; AREA
2C94  9D0005      STA      PL1,X
2C97  9D0006      STA      PL2,X
2C9A  9D0007      STA      PL3,X
2C9D  CA         DEX
2C9E  D0EE ^2C8E  BNE      PMCLP
2CA0  60         RTS          ; FINIS!

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; -----
; CLEAR SCREEN
; -----

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2CA1  A908        CLRSC  LDA      #DISP/256      ; INITIAL
2CA3  8581        STA      HI          ; DISPLAY
2CA5  A900        LDA      #DISP&255      ; ADDRESS
2CA7  8580        STA      LO          ; WORK AREA
2CA9  A214        LDX      #20          ; CLEAR 20 GROUPS
2CAB  A000        CLRSC2  LDY      #0          ; OF 256 BYTES
2CAD  98         TYA          ; (5120 BYTES)
2CAE  9180        CLRSC3  STA      (LO),Y
2CB0  88         DEY
2CB1  D0FB ^2CAE  BNE      CLRSC3
2CB3  CA         DEX
2CB4  D001 ^2CB7  BNE      CLRSC4

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2CB6 60          RTS
2CB7 E681        CLRSC4 INC      HI
2CB9 4CAB2C     JMP      CLRSC2

*
* -----
* GR. 7+ PLOTTER ROUTINE
* (SEE A.N.A.L.O.G. #11)
* -----
*

2CBC A583        PLOTCL LDA     PLOTY  ;MULT. Y BY 32:
2CBE 0A          ASL     A
2CBF 8580        STA     LO
2CC1 A900        LDA     #0
2CC3 2A          ROL     A
2CC4 8581        STA     HI      ;*2
2CC6 0680        ASL     LO
2CC8 2681        ROL     HI      ;*4
2CCA 0680        ASL     LO
2CCC 2681        ROL     HI      ;*8
2CCE 0680        ASL     LO
2CD0 2681        ROL     HI      ;*16
2CD2 0680        ASL     LO
2CD4 2681        ROL     HI      ;*32
2CD6 A900        LDA     #DISP&255 ;ADD THE DISPLAY
2CD8 18          CLC          ;ADDRESS TO GET
2CD9 6580        ADC     LO      ;THE ACTUAL
2CDB 8580        STA     LO      ;ADDRESS OF THE
2CDD A908        LDA     #DISP/256 ;BYTE THAT WILL
2CDF 6581        ADC     HI      ;BE ALTERED FOR
2CE1 8581        STA     HI      ;THE PLOT.
2CE3 A582        LDA     PLOTX  ;MASK PLOTX FOR
2CE5 2903        AND     #3      ;PLOT INDEX,
2CE7 AA          TAX          ;PLACE IN X.
2CE8 A582        LDA     PLOTX  ;GET PLOTX AND
2CEA 4A          LSR     A      ;DIVIDE
2CEB 4A          LSR     A      ;BY 4,
2CEC 85A8        STA     YOFSET
2CEE AB          TAY
2CEF B180        LDA     (LO),Y
2CF1 3D172D     AND     BMASK2,X
2CF4 DD1B2D     CMP     COLOR1,X
2CF7 F015 ^2D0E BEQ     PABORT
2CF9 A484        LDY     COLOR  ;GET COLOR
2CFB BD172D     LDA     BMASK2,X  ;AND MASK OFF
2CFE 390F2D     AND     COLORS,Y  ;PIXEL POSITION
2D01 858F        STA     HOLD  ;SAVE IT,
2D03 BD132D     LDA     BMASK1,X  ;MASK OFF PIXEL
2D06 A4A8        LDY     YOFSET  ;OF THE ADDRESS
2D08 3180        AND     (LO),Y  ;TO BE ALTERED
2D0A 058F        ORA     HOLD  ;SET THE PLOT

```

```

2D0C 9180          STA      (LO),Y ;BITS AND STORE!
2D0E 60            PABORT  RTS      ;FINIS!

;
; -----
; PLOT MASK TABLES
; -----

2D0F 0055AAFF      COLORS  DB      $00,$55,$AA,$FF
2D13 3FCFF3FC      BMASK1  DB      $3F,$CF,$F3,$FC
2D17 C0300C03      BMASK2  DB      $C0,$30,$0C,$03
2D1B 40100401      COLOR1  DB      $40,$10,$04,$01

;
; -----
; DRAW HANDLER
; -----

2D1F A586          DRAW    LDA      DRAWY
2D21 C583          CMP      PLOTY ; IS DRAWY>PLOTY?
2D23 900B ^2D30    BCC      YMINUS ; NO!
2D25 38           SEC      ; SUBTRACT
2D26 E583          SBC      PLOTY ; PLOTY FROM DRAWY
2D28 858A          STA      DELTAY ; AND SAVE DIFFERENCE.
2D2A A901          LDA      #1 ; Y INCREMENT
2D2C 858C          STA      INCY ; = 1 (DOWN)
2D2E D00B ^2D3B    BNE      XVEC ; BRANCH!
2D30 A583          YMINUS LDA      PLOTY ; SUBTRACT
2D32 38           SEC      ; DRAWY
2D33 E586          SBC      DRAWY ; FROM PLOTY
2D35 858A          STA      DELTAY ; AND SAVE DIFFERENCE.
2D37 A9FF          LDA      #255 ; Y INCREMENT
2D39 858C          STA      INCY ; = -1 (UP)
2D3B A585          XVEC   LDA      DRAWX ; IS DRAWX
2D3D C582          CMP      PLOTX ; > PLOTX?
2D3F 900B ^2D4C    BCC      XMINUS ; NO!
2D41 38           SEC      ; SUBTRACT
2D42 E582          SBC      PLOTX ; PLOTX FROM DRAWX
2D44 8589          STA      DELTAX ; AND SAVE DIFFERENCE.
2D46 A901          LDA      #1 ; X INCREMENT
2D48 858B          STA      INCX ; IS 1 (RIGHT)
2D4A D00B ^2D57    BNE      VECSET ; BRANCH!
2D4C A582          XMINUS LDA      PLOTX ; SUBTRACT
2D4E 38           SEC      ; DRAWX FROM
2D4F E585          SBC      DRAWX ; PLOTX
2D51 8589          STA      DELTAX ; AND SAVE DIFFERENCE.
2D53 A9FF          LDA      #255 ; X INCREMENT
2D55 858B          STA      INCX ; IS -1 (LEFT)
2D57 A900          VECSET LDA      #0 ; ZERO OUT:
2D59 8588          STA      ACCY ; Y ACCUMULATOR
2D5B 8587          STA      ACCX ; X ACCUMULATOR
2D5D A589          LDA      DELTAX ; IS DELTAX>

```

```

2D5F C58A          CMP    DELTAY ; DELTAY?
2D61 900A ^2D6D   BCC    YMAX   ; NO!
2D63 858D          STA    COUNTR ; SAVE DELTAX
2D65 858E          STA    ENDPT  ; IN COUNTR, ENDPT.
2D67 4A           LSR    A       ; DIVIDE BY 2 AND
2D68 8588          STA    ACCY   ; STORE IN Y ACCUM.
2D6A 4C762D       JMP    DRAWGO ; START DRAW
2D6D A58A          LDA    DELTAY ; DELTAY LARGER,
                YMAX   ; STORE IT IN
2D6F 858D          STA    COUNTR ; COUNTR, ENDPT.
2D71 858E          STA    ENDPT  ; DIVIDE BY 2 AND
2D73 4A           LSR    A       ; STORE IN X ACCUM.
2D74 8587          STA    ACCX   ; STORE IN X ACCUM.

```

```

;
;
;
;

```

```

-----
NOW WE START THE ACTUAL
DRAWTO FUNCTION!
-----

```

```

2D76 A58D          DRAWGO LDA    COUNTR ; IF COUNTR=0...
2D78 F039 ^2DB3   BEQ    DRWEND ; NO DRAW!
2D7A A588          BEGIN  LDA    ACCY   ; ADD DELTAY
2D7C 18           CLC    ; TO Y ACCUMULATOR
2D7D 658A          ADC    DELTAY
2D7F 8588          STA    ACCY
2D81 C58E          CMP    ENDPT  ; AT ENDPOINT YET?
2D83 900E ^2D93   BCC    BEGIN2 ; NO, GO DO X.
2D85 A588          LDA    ACCY   ; SUBTRACT ENDPT
2D87 38           SEC    ; FROM Y ACCUMULATOR
2D88 E58E          SBC    ENDPT
2D8A 8588          STA    ACCY
2D8C A583          LDA    PLOTY  ; AND INCREMENT
2D8E 18           CLC    ; THE Y POSITION!
2D8F 658C          ADC    INCY
2D91 8583          STA    PLOTY
2D93 A587          BEGIN2 LDA    ACCX   ; ADD DELTAX TO
2D95 18           CLC    ; X ACCUMULATOR
2D96 6589          ADC    DELTAX
2D98 8587          STA    ACCX
2D9A C58E          CMP    ENDPT  ; AT ENDPOINT YET?
2D9C 900E ^2DAC   BCC    PLOTIT  ; NO, GO PLOT.
2D9E A587          LDA    ACCX   ; SUBTRACT ENDPT
2DA0 38           SEC    ; FROM X ACCUMULATOR
2DA1 E58E          SBC    ENDPT
2DA3 8587          STA    ACCX
2DA5 A582          LDA    PLOTX  ; AND INCREMENT
2DA7 18           CLC    ; PLOT X
2DA8 658B          ADC    INCX
2DAA 8582          STA    PLOTX
2DAC 20BC2C       PLOTIT JSR    PLOTCL ; PLOT THE POINT!
2DAF C68D          DEC    COUNTR ; MORE TO DRAW?

```



```

2E4E 0202000101 POINT1 DB      $02,$02,$00,$01,$01
2E53 5000500050 POINT2 DB      $50,$00,$50,$00,$50

;          SHORT DATA

2E58 = 0004      SHORTF DS      4
2E5C = 0004      SHORTX DS      4
2E60 = 0004      SHORTD DS      4
2E64 = 0004      SHORTT DS      4

;          OBJECT DATA

2E68 = 0006      OBDEAD DS      6
2E6E = 0006      OBDED2 DS      6
2E74 = 0006      OBJTYP DS      6
2E7A = 0006      OBJINC DS      6
2E80 = 0006      OBJGRD DS      6
2E86 = 0006      OBJSEG DS      6
2E8C 0203020302 OBJHUE DB      2,3,2,3,2
2E91 0000000000 SIZEWK DB      0,0,0,0,0,0,0,0
2E99 000001FF01 PXINC  DB      0,0,1,$FF,1,$FF,1,$FF
2EA1 FF010000FF PYINC  DB      $FF,1,0,0,$FF,1,1,$FF
2EA9 120F0E0C  OBSTBL DB      18,15,14,12
2EAD 0B0A0907          DB      11,10,9,7
2EB1 0403010200 OBJDIR DB      4,3,1,2,0,5,$FF,0
2EB9 0405000600          DB      4,5,0,6,0,$FF,0,0
2EC1 0005060407          DB      0,5,6,4,7,1,$FF,0
2EC9 0600030102          DB      6,0,3,1,2,7,$FF,0
2ED1 0406050705          DB      4,6,5,7,5,6,4,$FF
2ED9 0307070707 OBJLEN DB      3,7,7,7,7,7,0,0
2EE1 0307070707          DB      3,7,7,7,7,0,0,0
2EE9 0303030303          DB      3,3,3,3,3,7,0,0
2EF1 0203030303          DB      2,3,3,3,3,3,0,0
2EF9 0101010301          DB      1,1,1,3,1,1,3,0
2F01 0000000000 SIZTBL DB      0,0,0,0,0,1,1,1
2F09 0000000101          DB      0,0,0,1,1,2,2,2
2F11 0000010101          DB      0,0,1,1,1,2,2,2
2F19 0001010202          DB      0,1,1,2,2,2,2,3
2F21 0001010202          DB      0,1,1,2,2,2,3,3
2F29 0102020202          DB      1,2,2,2,2,2,3,3
2F31 0102020203          DB      1,2,2,2,3,3,3,4
2F39 0102020303          DB      1,2,2,3,3,3,4,4

;          PLAYER SHAPES

2F41 1010101010 PN1     DB      $10,$10,$10,$10,$10,$10,$10,$10
2F49 0B0B0B0B0B          DB      $0B,$0B,$0B,$0B,$0B,$0B,$0B,$0B
2F51 0000000080 PN2     DB      $00,$00,$00,$00,$80,$40,$20,$10
2F59 0B04020100          DB      $0B,$04,$02,$01,$00,$00,$00,$00
2F61 0000010102 PN3     DB      $00,$00,$01,$01,$02,$02,$04,$0B

```

```
2F69 1020404080          DB      $10,$20,$40,$40,$80,$80,$00,$00
```

```
          ;      SHAPE START/END POINTS
```

```
2F71 0001020304  SPTBL  DB      0,1,2,3,4,5,6,7
2F79 0807060504  DB      8,7,6,5,4,3,2,1
2F81 11100F0E0D  EPTBL  DB      17,16,15,14,13,12,11,10
2F89 090A0B0C0D  DB      9,10,11,12,13,14,15,16
```

```
          ;      JOYSTICK/PADDLE MESSAGE POINTERS
```

```
2F91 4353          JPLO   DB      JOYMSG&255,PADMSG&255
2F93 2121          JPHI   DB      JOYMSG/256,PADMSG/256
```

```
          ;GRID DATA TABLES
```

```
2F95 0E0E0E0E0E  CX      DB      14,14,14,14,14,14,14,14
2F9D 1A2733404B          DB      26,39,51,64,75,88,100,113
2FA5 0E0E0E0E0E          DB      14,14,14,14,14,14,14,14
2FAD 0E0E0E0E0E          DB      14,14,14,14,14,14,14,14
2FB5 0E141A2026          DB      14,20,26,32,38,43,49,59
2FBD 454E54595F          DB      69,78,84,89,95,101,107,113
2FC5 715840270E          DB      113,88,64,39,14,14,14,27
2FCD 1B0E0E0E27          DB      27,14,14,14,39,64,88,113
2FD5 0E0E0E0E0E          DB      14,14,14,14,14,29,43,58
2FDD 4654627171          DB      70,84,98,113,113,113,113,113
2FE5 716A647171          DB      113,106,100,113,113,100,82,65
2FED 30200E0E0E          DB      48,32,14,14,14,14,14,14
```

```
2FF5 1222344658  CY      DB      18,34,52,70,88,105,123,141
2FFD 8D8D8D8D8D          DB      141,141,141,141,141,141,141,141
3005 1219222A32          DB      18,25,34,42,50,58,67,75
300D 535B646C74          DB      83,91,100,108,116,125,133,141
3015 12273B5065          DB      18,39,59,80,101,121,141,141
301D 8D8D796550          DB      141,141,121,101,80,59,39,18
3025 1212121212          DB      18,18,18,18,18,35,53,71
302D 596A7C8D8D          DB      89,106,124,141,141,141,141,141
3035 1231506F8D          DB      18,49,80,111,141,132,123,114
303D 727B848D6F          DB      114,123,132,141,111,80,49,18
3045 8D6E503D26          DB      141,110,80,61,38,18,18,18
304D 1212122B44          DB      18,18,18,43,68,92,117,141
```

```
3055 3737373737  FX      DB      55,55,55,55,55,55,55,55
305D 3A3C3E4042          DB      58,60,62,64,66,68,70,73
3065 3737373737          DB      55,55,55,55,55,55,55,55
306D 3737373737          DB      55,55,55,55,55,55,55,55
3075 37393A3B3B          DB      55,57,58,59,59,60,61,63
307D 4143444545          DB      65,67,68,69,69,70,71,73
3085 4944403C37          DB      73,68,64,60,55,55,55,57
```

```

308D 393737373C      DB      57,55,55,55,60,64,68,73
3095 3737373737      DB      55,55,55,55,55,58,61,63
309D 4143464949      DB      65,67,70,73,73,73,73,73
30A5 4948464949      DB      73,72,70,73,73,70,67,64
30AD 3D3A373737      DB      61,58,55,55,55,55,55,55

30B5 43474A4D51      FY      DB      67,71,74,77,81,84,87,90
30BD 5A5A5A5A5A      DB      90,90,90,90,90,90,90,90
30C5 3C3E414447      DB      60,62,65,68,71,73,76,78
30CD 515356595C      DB      81,83,86,89,92,94,97,99
30D5 43494D5054      DB      67,73,77,80,84,88,90,90
30DD 5A5A585450      DB      90,90,88,84,80,77,73,67
30E5 4343434343      DB      67,67,67,67,67,71,74,77
30ED 5053565A5A      DB      80,83,86,90,90,90,90,90
30F5 434A50565A      DB      67,74,80,86,90,89,87,86
30FD 5657595A56      DB      86,87,89,90,86,80,74,67
3105 5A55504B47      DB      90,85,80,75,71,67,67,67
310D 434343494E      DB      67,67,67,73,78,82,86,90

3115 0002          SHSTRT DB      0,2
3117 = 0002      SHYHLD DS      2
3119 8850205088    SHOIMG DB      $88,$50,$20,$50,$88
311E 2020F82020    DB      $20,$20,$F8,$20,$20
3123 0409          CPYSTN DB      4,9

3125 02FE          ADDSUB DB      2,$FE ;ADD/SUB. 2
3127 01FF          ADDSB1 DB      1,$FF ;ADD/SUB. 1

;          SOUND DATA

3129 00A1A1A2A2    FIRCTL DB      $00,$A1,$A1,$A2,$A2,$A3
312F A3A4A4A5A5      DB      $A3,$A4,$A4,$A5,$A5,$A6
3135 A6A7A7A8A8      DB      $A6,$A7,$A7,$A8,$A8,$A9
313B A9AAAA          DB      $A9,$AA,$AA
313E 00C2A6B498    FIRFRQ DB      0,194,166,180,152,166
3144 8A987C8A6E      DB      138,152,124,138,110,124
314A 606E526044      DB      96,110,82,96,68,82
3150 364428          DB      54,68,40

3153 0041414242    OBDCTL DB      $00,$41,$41,$42,$42,$43
3159 4344444545      DB      $43,$44,$44,$45,$45,$46
315F 4647474848      DB      $46,$47,$47,$48,$48,$49
3165 494A4A          DB      $49,$4A,$4A
3168 0050287850    OBDFRQ DB      0,80,40,120,80,160
316E 78C8A0F0C8      DB      120,200,160,240,200,24
3174 F040186840      DB      240,64,24,104,64,144
317A 68CC90          DB      104,204,144

317D 00A1A1A2A2    MOVCTL DB      $00,$A1,$A1,$A2,$A2,$A3
3183 A3A4A4          DB      $A3,$A4,$A4

```

```

3186 00141E141E MOVFRQ DB 0,20,30,20,30,20,30,20,30
; DATA TABLES
318F = 0011 SEGWK DS 17
31A0 = 0100 SEGX DS 256
32A0 = 0100 SEGY DS 256
33A0 = 0100 RIMX DS 256
34A0 = 0100 RIMY DS 256

35A0 END LIVE

```

no ERRORS, 411 Labels, \$20FA free.

ACCX	0087	1#27	38/53	39/16	39/39	39/42	39/45	39/48
ACCY	0088	1#28	38/52	39/10	39/25	39/28	39/31	39/34
ADDSB1	3127	13/ 6	43#31					
ADDSCO	255A	9/52	12/29	16#30				
ADDSUB	3125	16/11	43#30					
ATTRAC	004D	3#53	9/28					
AUDC1	D201	3#43	18/37	18/45	28/32			
AUDC2	D203	3#44	28/33	28/44				
AUDC3	D205	3#45	28/34	28/52				
AUDC4	D207	3#46	28/35	29/10				
AUDCTL	D208	3#51	6/48					
AUDF1	D200	3#47	18/40	20/47				
AUDF2	D202	3#48	28/42					
AUDF3	D204	3#49	28/50					
AUDF4	D206	3#50	29/ 8					
AUTHOR	2133	5/20	6#17					
BCDLVL	00A5	2# 7	6/39	11/14	11/17	19/29		
BEGIN	2D7A	39#25	39/55					
BEGIN2	2D93	39/30	39#39					
BMASK1	2D13	37/51	38#13					
BMASK2	2D17	37/44	37/48	38#14				
BONUS	00D0	2#50	7/33	16/48	16/52	17/ 6		
COTBL	2DBC	21/30	40#17					
C1TBL	2DC4	21/32	40#19					
C2TBL	2DCC	21/34	40#21					
CGPRDR	2B9D	33/50	33#54					
CHKINT	290F	27/42	27#44					
CHKPMV	2A31	29/42	29/50	29/52	30#24			
CKOBLV	22DF	10# 7	10/ 9					
CKOBWT	22E6	10#11	10/13					
CKPEND	2BE3	33/ 7	34#35	34/55				
CKPRLV	25B6	17#49	17/51					

CKSEL	2256	8/30	8#35				
CKSHOR	2441	13/25	13#29				
CKZAP	2926	27/49	27#54				
CLFLSH	265B	20# 6	20/ 9				
CLPRJC	26B4	21#18	21/20				
CLRDED	21AB	7# 6	7/ 8				
CLRPRJ	21BC	7#15	7/17				
CLRPS	2A96	31#26	31/29				
CLRSC	2CA1	9/15	36#43				
CLRSC2	2CAB	36#48	37/ 7				
CLRSC3	2CAE	36#50	36/52				
CLRSC4	2CB7	36/54	37# 6				
CLRSCO	21B3	7#10	7/13				
CLRSHO	21A3	6#52	6/54				
CLSHRT	26AC	21#14	21/16				
CMPTRG	2A00	29/48	29#50				
COLBK	02C8	3#38	6/50				
COLOR	00B4	1#24	9/13	12/17	13/13	18/19	37/47
COLOR1	2D1B	37/45	38#15				
COLORS	2D0F	37/49	38#12				
COLPF0	02C4	3#39	7/52	21/31	22/26	23/10	23/45
COLPF1	02C5	3#40	7/54	21/33			
COLPF2	02C6	3#41	8/ 6	21/35			
COLPF3	02C7	3#42	8/ 8	29/17			
COLPM0	02C0	4# 8	8/22	18/36	18/43	18/44	19/ 6
COLPM1	02C1	4# 9	8/18				
COLPM2	02C2	4#10	8/19	29/11	29/14		
COLPM3	02C3	4#11	8/20	29/15			
CONSOL	D01F	3#33	8/28	8/31	8/35	10/48	
CONTRL	20CA	5#22	6/42	6/44	8/45	8/47	
CONWT	22A2	9#23	9/24	10/52			
COPDED	22C0	9#42	9/47				
COPY1	27ED	24#27	24/32				
COPY2	280E	24#42	24/47				
COPY3	282F	25#11	25/16				
COPY4	2850	25#26	25/31				
COPYSZ	24C9	14#50	14/55				
COUNTR	00BD	1#33	39/ 7	39/13	39/23	39/54	
CPAGE0	217B	6#35	6/37				
CPYCNT	00CF	2#49	36/ 8	36/15			
CPYST	00C4	2#38	35/20	36/ 6			
CPYSTN	3123	35/19	43#28				
CX	2F95	22/18	22/39	22/43	42#21		
CY	2FF5	22/20	22/41	22/49	42#35		
CYCCOL	29A8	28/54	29#11				
DEAD	2627	18/48	19# 8				
DECLIV	25AF	9/27	17#41				
DELTA	00B9	1#29	38/41	38/48	38/54	39/41	
DELTAY	00BA	1#30	38/26	38/33	38/55	39/12	39/27
DEST	009B	1#47	26/11	26/20	26/30	26/33	26/41

DESTHI	00C1	2#35	35/25	36/19					
DESTLO	00C0	2#34	35/27	35/36	36/10	36/12			
DESTNM	00C3	2#37	35/29	35/33	35/49	36/17			
DIFF	00E4	3# 9	11/11	11/12	21/54				
DIFFAD	2700	21#52	22/ 7						
DIGIN	227B	8/34	9# 6						
DISP	0800	3#22	4/29	4/39	36/43	36/45	37/28	37/32	
DIVCTL	27D9	24#19	25/38						
DIVIDE	2877	24/24	24/39	25/ 8	25/23	26# 7			
DIVLP1	2884	26#14	26/34						
DIVLP2	2880	26#12	26/42						
DLI1	20CF	5#30	27/27	27/29					
DLI2	20E9	5/36	5/38	5#43					
DLIST	2000	4#28	5/ 6	9/ 6	9/ 8				
DLISTL	0230	3#55	7/41	7/43	9/ 7	9/ 9			
DMAC1	00C5	2#39	5/34	21/10	25/40				
DMACTL	022F	3#54	6/46	8/10					
DOBLP	24E3	15#14	15/48						
DRAW	2D1F	22/29	23/13	23/48	38#21				
DRAWGO	2D76	39/11	39#23						
DRAWX	0085	1#25	22/23	22/44	23/29	27/17	38/36	38/47	
DRAWY	0086	1#26	22/25	22/50	23/35	27/19	38/21	38/32	
DRGRID	269B	9/22	21# 6						
DRWEND	2DB3	39/24	40# 6						
DRWOBJ	2479	12/18	13/14	14# 6	18/22				
ENDDIV	28BD	26/40	26#43						
ENDDVC	286A	25/37	25#39						
ENDKEY	2952	27/53	27/55	28/ 7	28#27				
ENDOBJ	252B	15/17	15#49						
ENDPT	008E	1#34	39/ 8	39/14	39/29	39/33	39/43	39/47	
ENDVAL	009E	1#50	32/50	34/38					
EPTBL	2F81	31/40	31/51	32/13	42#11				
ERSOBJ	25D0	18#22	18/34						
ERSSH0	2C3F	35#36	35/39						
FIRCTL	3129	28/43	43#35						
FIRE	29EF	29/40	29#43						
FIRFRQ	313E	28/41	43#39						
FIRSOU	00D1	2#51	12/13	20/43	28/37	28/39	28/40	30/12	
FLASH	2655	12/22	19#53						
FLASHY	00B5	2#23	19/53	20/18					
FLBYTE	2E40	20/20	40#51						
FLIPIT	2B0F	32/32	32#45						
FLTIME	00B6	2#24	9/29	20/26	27/38	27/40			
FOREVR	2289	9#12	11/19						
FX	3055	22/22	23/24	23/28	42#48				
FY	30B5	22/24	23/26	23/34	43#11				
GENCOO	27D5	23/50	24#17						
GENNOL	22F1	10#18	10/43						
GOCHEK	224C	8#31	8/33						
GOSTIK	2A44	30/25	30#35						

GOTPRJ	2B2C	33/ 6	33# 8					
GOTPRN	2A10	29/55	30# 8					
GRAC1	00C6	2#40	5/31	21/12	25/42			
GRACTL	D01D	4# 6	5/33	8/12				
GRDADJ	00C9	2#43	22/13	22/35	23/19			
GRDBL1	274B	22#39	23/18					
GRDBL2	2795	23#24	23/53					
GRDBO1	2743	22/31	22#35					
GRDBO2	278B	23/15	23#19					
GRDLIN	2719	22#18	22/34					
GRDNUM	00CC	2#46	9/20	22/ 8				
GRDTBL	2DB4	9/19	40#12					
GRDWK	00CA	2#44	22/14	22/32	22/33	22/36	23/16	23/17
		23/20	23/51	23/52				
GRDWK2	00CB	2#45	22/17	22/30	22/38	23/ 7	23/14	23/22
		23/42	23/49					
GRID	0092	1#38	23/ 8	23/43	26/49			
GRIDIX	00C7	2#41	9/16	10/53	11/ 8	21/25	21/38	
GRIDNO	0097	1#43	24/18	24/25	24/34	24/40	24/53	25/ 9
		25/18	25/24	25/32	25/35			
GRIDSV	28BE	23/ 9	23/44	26#49				
HANNXS	2556	16/ 7	16/16	16#22				
HI	0081	1#21	36/44	37/ 6	37/19	37/21	37/23	37/25
		37/27	37/33	37/34				
HITCLR	D01E	4#17	6/49	36/22				
HITOBJ	2B90	33/46	33#49					
HLDGRD	00B0	2#18	14/12	14/17	14/27			
HOLD	00BF	1#35	37/50	37/54				
HPOSM0	D004	4#16	34/20					
HPOSP0	D000	4#12	31/18					
HPOSP1	D001	4#13	9/31	20/13				
HPOSP2	D002	4#14	35/50					
n HPOSP3	D003	4#15						
INCLIV	25A3	16/50	17#30					
INCX	008B	1#31	38/43	38/50	39/51			
INCY	008C	1#32	38/28	38/35	39/37			
INFOLN	2103	4/54	6#10	7/19	19/39	19/46		
INIOBS	21D1	7#25	7/27					
INISH0	2454	13/34	13#38					
INTRFG	00A4	2# 6	6/40	9/11	21/ 7	25/44	27/44	
INTRO	2245	8#28	8/37	8/50				
JCONWT	2339	10/50	10#52					
JOBHAN	2476	13/22	13/28	13/31	13/37	13#54		
JOYMSG	2143	5/22	6#20	6/41	6/43	42/16	42/17	
JOYPAD	00CE	2#48	8/38	8/42	29/45	30/24		
JPHI	2F93	8/46	42#17					
JPLO	2F91	8/44	42#16					
n JVBC	2A4A	30#38						
KEY	02FC	3#32	27/47	28/28				
KILLPR	2BF0	33/53	34/ 9	34/11	34#41			

KILOBJ	2427	12/31	12/36	12/40	13#17			
KILPLR	00BD	2#31	9/25	13/27	18/54	27/41	31/13	34/54
LAST	0098	1#44	26/13	26/14	26/22	26/25		
LASTSC	2163	5/14	6#24	7/20				
LENGTH	00AC	2#14	15/25	15/44				
LIVE	2173	6#31	10/51	19/10	44/15			
LIVES	00C8	2#42	7/34	17/30	17/33	18/47	18/49	19/18
LD	0080	1#20	36/46	36/50	37/16	37/20	37/22	37/24
		37/26	37/30	37/31	37/43	37/53	37/55	
LVLEND	233C	10/15	10#53					
MAGMSG	2113	5/16	6#12					
MISCAD	00DE	3# 7	9/49	9/54	28/17	28/21		
MISLOF	2E3C	33/11	33/14	33/17	40#47			
MISLON	2E38	34/27	34/30	34/33	40#46			
MISNUM	009F	1#51	32/54	33/ 8	34/19	34/35		
MISSLS	0300	3#17	33/10	33/12	33/13	33/15	33/16	33/18
		34/26	34/28	34/29	34/31	34/32	34/34	36/31
MOREWT	25F7	18#38	18/46					
MOVCTL	317D	29/ 9	43#53					
MOVFRQ	3186	29/ 7	43#55					
MOVSCO	21C4	7#19	7/22					
MOVSOU	00D3	2#53	20/45	28/53	28/55	29/ 6	30/52	
NEWGRD	230E	10#32	10/35					
NEXT	0099	1#45	26/ 9	26/16	26/29	26/38		
NMIEN	D40E	4# 7	6/47	8/14				
NOAVIN	2BFB	34/44	34#46					
NOBONS	258C	16/49	17# 7					
NODIFI	234F	11/10	11#13					
NOFEND	22B6	9/30	9#32					
NOFSND	2980	28/38	28#45					
NOFTIM	2908	27/39	27#41					
NOGRD1	2738	22/27	22#30					
NOGRD2	2780	23/11	23#14					
NOGRD3	27CA	23/46	23#49					
NOGRDI	2358	10/55	11#19					
NOHSHO	2A7F	31/11	31#15					
NOKILP	2C10	34/47	34/49	34/52	34#55			
NOMOLV	25AE	17/32	17#35					
NOMSCO	22DB	9/50	9#55					
NOOBF1	23B1	11/39	11/42	11/48	12#16			
NOOBTD	28FC	27/33	27#35					
NOOHAN	232F	9/33	10#48					
NOOHCK	2BA5	33/28	34# 8					
NOOKIL	23D9	12/21	12#32					
NOOSND	2994	28/46	28#53					
NOPADV	2B5D	33/22	33#27					
NOPAU	296C	28/30	28#37					
NOPLT1	2513	15/35	15#37					
NOPLT2	2521	15/42	15#44					
NOPSIN	29E6	29/33	29#39					

NOPST0	2A6C	30/50	30#54					
NOSKIL	294F	28/16	28#25					
NOSP1	2ABC	31/39	31/41	31#45				
NOSP2	2AD5	31/50	31/52	32# 7				
NOSP3	2AEE	32/12	32/14	32#19				
NOSTEP	28AE	26/28	26#35					
NOTIMR	2902	27/36	27#38					
NOTINT	2916	27/45	27#47					
NOTOT3	23ED	12/38	12#41					
NOTRAN	29D4	29/19	29#30					
NOTRNC	2B7A	33/36	33#39					
NUMOBJ	00DF	3# 8	10/11	10/25	10/29	12/39	21/42	21/44
		21/46	21/48	21/50	21/52	21/55		
NXTOCK	2BA2	33/31	33/33	33/38	33/41	33/48	34# 6	
NXTOGN	2326	10/19	10/26	10#42				
NXTSH0	2C7A	35/42	36#17					
OBCNT0	2DD4	21/41	40#26					
OBCNT1	2DDC	21/43	40#27					
OBCNT2	2DE4	21/45	40#28					
OBCNT3	2DEC	21/47	40#29					
OBCNT4	2DF4	21/49	40#30					
OBCTL	3153	28/51	43#44					
OBDEAD	2E68	7/ 6	9/42	9/45	28/11	33/30	33/52	41#17
OBDED2	2E6E	9/43	12/20	41#18				
OBDFRQ	3168	28/49	43#48					
OBDSOU	00D2	2#52	13/20	20/44	28/45	28/47	28/48	
n OBHLP1	236B	11#34						
OBHLP2	23FD	12/42	12/45	12#48				
OBJDIR	2EB1	15/15	41#29					
OBJGRD	2E80	10/36	11/53	12/54	13/ 9	13/23	13/38	14/ 7
		18/32	33/39	41#21				
OBJHAN	235B	10/45	11#25	11/36	13/15	13/54		
OBJHUE	2E8C	13/12	29/20	29/25	33/37	41#23		
OBJINC	2E7A	10/40	12/34	12/47	18/27	41#20		
OBJLEN	2ED9	15/22	41#34					
OBJNUM	00AA	2#12	11/25	11/31	11/33	11/34	12/19	12/23
		12/30	14/ 6	15/ 6	18/21	18/23	18/33	
OBJPRS	00E5	3#10	10/ 7	10/18	10/41	11/35	13/18	33/32
OBJSEG	2E86	7/25	10/38	11/37	11/50	12/32	12/35	13/21
		14/13	14/43	18/25	33/42	41#22		
OBJSPD	00CD	2#47	9/34	21/37				
OBJTYP	2E74	10/31	12/24	12/43	12/48	13/10	13/29	15/ 7
		33/34	33/49	41#19				
OBKILP	2B64	33#30	34/ 7					
n OBLIVE	2371	11#37						
OBSTBL	2EA9	21/36	41#27					
OBTIM1	00A9	2#11	9/32	9/35	27/32	27/34		
ODDSEG	249F	14/15	14#26					
ODDSKP	24BB	14/25	14#41					
OFFSET	0093	1#39	21/22	23/23	26/55	27/11		

POPL	D00C	4#18	31/ 9						
PABORT	2D0E	37/46	38# 6						
PADMSG	2153	6#22	42/16	42/17					
PAUFLG	00B1	2#19	9/23	27/50	27/52	28/29			
PAVAIL	00BE	2#32	7/31	21/24	29/51	30/ 8	34/45		
PFTIME	009D	1#49	29/39	29/41	29/44				
PL0	0400	3#18	31/26	32/26	36/32				
PL1	0500	3#19	20/ 6	20/21	36/33				
PL2	0600	3#20	36/34						
PL3	0700	3#21	35/24	35/26	36/35				
PLIVE	22AD	9/26	9#28						
PLOTCL	2CBC	15/36	15/43	22/28	23/12	23/47	37#14	39/53	
PLOTIT	2DAC	39/44	39#53						
PLOT0B	24FE	15#26	15/45						
PLOTX	00B2	1#22	14/20	14/33	15/26	15/29	22/19	22/40	
		22/46	23/25	23/31	27/13	37/35	37/38	38/37	
		38/40	38/45	39/49	39/52				
PLDTY	00B3	1#23	14/23	14/39	15/30	15/33	15/37	15/40	
		22/21	22/42	22/52	23/27	23/37	27/15	37/14	
		38/22	38/25	38/30	39/35	39/38			
PLRGRD	0095	1#41	13/24	30/15	30/42	30/48	30/49	30/53	
		34/51							
PLRY	0096	1#42	31/19	31/23	32/19				
PLTBYT	00BB	2#29	31/33	31/44	31/55	32/ 6	32/17	32/18	
		32/25							
PMAREA	0000	3#16	3/17	3/18	3/19	3/20	3/21	7/48	
PMBASE	D407	3#34	7/49						
PMCLP	2C8E	36#31	36/37						
PMCLR	2C8B	7/50	21/21	36#29					
PMTIME	0094	1#40	30/35	30/37	30/40				
PN1	2F41	31/43	41#50						
PN2	2F51	31/54	41#52						
PN3	2F61	32/16	41#54						
POINT1	2E4E	12/25	40#55						
POINT2	2E53	12/27	41# 6						
POTO	0270	3#31	30/26						
PRADV1	00A2	1#54	32/29	32/31	32/35				
PRADVT	00A1	1#53	32/33	33/20					
PREND	2E36	32/49	40#45						
PRFLIP	00A0	1#52	32/45	32/46					
PRIOR	026F	3#52	8/16						
PROGRD	2E1C	11/54	30/16	33/40	34/50	40#41			
PROINC	2E14	12/11	30/23	33/25	33/27	33/55	34/48	40#40	
PROJAC	2E0C	7/15	11/43	11/47	12/15	17/49	21/18	29/54	
		30/10	32/55	34/42	40#39				
PROJGN	2E24	12/ 9	30/21	34/13	40#42				
PROJLP	2B24	32#55	34/40						
PROJSG	2E2C	11/52	30/14	33/23	33/26	33/45	34/ 8	34/46	
		40#43							
PRSCAN	2A08	29#54	30/ 7						

PRSTRT	2E34	32/51	40#44					
PRYHLD	00D4	2#54	33/ 9	34/25				
PSCNT	00BC	2#30	29/30	29/31	29/35			
PTRIGO	027C	3#30	29/47					
PXINC	2E99	15/18	41#25					
PYINC	2EA1	15/20	41#26					
RANDOM	D20A	3#35	10/20	10/32	11/40	12/51	13/48	13/51
		16/17	18/28	18/38	29/26			
RDSTIK	2A4D	30/36	30#39					
RDSTRG	29FD	29/46	29#49					
RESSHD	2549	16/13	16#17					
RIMX	33A0	24/54	25/ 6	25/12	27/14	27/18	35/45	44#12
RIMY	34A0	25/19	25/21	25/27	27/16	27/20	35/46	44#13
RNDOBG	25DF	18#28	18/31					
SAMPOS	2A60	30/45	30#48					
SAVEND	28EA	27/12	27#21					
SAVEX	00B3	2#21	14/21	14/34	20/10			
SAVEY	00B4	2#22	14/24	14/40	20/14			
SCDADD	00DB	3# 6	7/11	9/51	12/26	12/28	16/34	16/36
		16/38	16/40	16/42	16/44			
SCORE	00D8	2#55	7/10	16/32	16/35	16/37	16/39	16/41
		16/43	16/47	17/17				
SEFLSH	2674	20#20	20/24					
SEGWK	318F	24/21	24/23	24/27	24/36	24/38	24/42	24/55
		25/ 7	25/11	25/20	25/22	25/26	26/15	26/18
		26/21	44# 9					
SEGX	31A0	14/19	14/29	14/31	24/20	24/22	24/28	27/ 8
		31/15	34/15	44#10				
SEGY	32A0	14/22	14/35	14/37	24/35	24/37	24/43	27/10
		31/20	34/16	44#11				
SETHUE	2418	12/50	13/ 8	13#10				
SETPRA	2B09	32/30	32#33					
SETVBV	E45C	3#36	7/47					
SHAPCT	00AF	2#17	15/13	15/47				
SHAPIX	00AB	2#13	15/11	15/14	15/34	15/41	15/46	
SHCOLR	00A6	2# 8	17/14	19/17	19/28	19/38	19/45	
SHFLIP	00C2	2#36	35/14	35/15	35/21			
SHHANL	252E	16# 6	16/23					
SHOBCD	2640	17/18	19/20	19#36				
SHOBYT	00A7	2# 9	19/36	19/40				
SHOCOP	2C6C	36# 9	36/16					
SHOHAN	252C	10/46	15#55					
SHOIMG	3119	36/ 9	43#26					
SHOLIV	262C	7/35	17/34	18/50	19#16			
SHOLVL	2638	9/21	19#27					
SHORLP	2C36	35#32	36/21					
SHORTD	2E60	13/50	16/ 8	16/21	41#12			
SHORTF	2E58	6/52	13/33	13/47	16/ 6	18/10	21/14	28/15
		28/24	35/41	41#10				
SHORTS	2C13	34/39	35#14					

SHORTT	2E64	13/53	16/15	16/19	41#13				
SHORTX	2E5C	13/45	16/ 9	16/14	35/43	41#11			
SHOSCO	258D	7/28	16/46	17#13					
SHSTRT	3115	35/30	43#24						
SHYHLD	3117	35/34	35/54	43#25					
SIZEWK	2E91	14/51	15/24	41#24					
SIZTBL	2F01	14/50	41#39						
SNDOF2	2694	20#47	20/49						
SNDOFF	268A	7/29	17/41	20#42	21/ 8				
SP1IX	00B7	2#25	29/36	31/34					
SP2IX	00B8	2#26	7/37	29/37	31/45				
SP3IX	00B9	2#27	7/39	29/38	32/ 7				
SPIX	00BA	2#28	31/31	31/37	31/48	32/10	32/21	32/27	
SFLOOP	2AA1	31#32	32/28						
SPTBL	2F71	31/38	31/49	32/11	42# 9				
SSCOLP	2595	17#17	17/23						
STEP	009A	1#46	26/ 8	26/24	26/26	26/32	26/35	26/37	
STICK	0278	4#19	30/41						
STKADD	2DFC	30/44	40#34						
STOBF1	238F	11/46	11#50						
STONUM	2369	11/29	11#33						
STOPOS	2A62	30/32	30/34	30/47	30#49				
STOTRN	29C8	29/23	29#25						
STPSHO	25C2	18#10	18/12						
STRIG	0284	4#20	29/49						
TIMER	00A3	1#55	20/33	20/34	27/35	27/37			
TITLDL	20AF	5#12	5/24	7/40	7/42				
TITLE	2123	5/18	6#15						
TRAN1	29C6	29/21	29#24						
TRANM	00BF	2#33	29/18	29/29					
TRYPR1	2388	11/44	11#47						
TRYSHO	244A	13#33	13/36						
TRYTYP	22F5	10#20	10/23						
VBCONT	2B00	27/43	30/38	32#29					
VBEND	2C85	31/14	36/18	36#22					
VBI	28EB	7/44	7/45	27#27					
VBXHLD	009C	1#48	32/52	33/19	34/36	34/37	35/31	35/40	
		36/20							
VDSLST	0200	3#28	5/37	5/39	27/28	27/30			
VECSET	2D57	38/44	38#51						
WAIT	2683	8/49	18/42	18/52	20#33				
WAITLP	2685	20#34	20/35						
WAITPD	25B2	17#47	17/53						
WSYNC	D40A	3#29	5/32	5/45					
XI	00AD	2#15	15/19	15/28					
XITVBV	E462	3#37	27/46	28/36	36/23				
XMINUS	2D4C	38/38	38#45						
XVEC	2D3B	38/29	38#36						
XWORK	0090	1#36	22/48	23/33	27/ 7				
YI	00AE	2#16	15/21	15/32	15/39				

YMAX	2D6D	39/ 6	39#12		
YMINUS	2D30	38/23	38#30		
YOFFSET	00A8	2#10	37/41	37/52	
YWORK	0091	1#37	22/54	23/39	27/ 9
ZAP	00B2	2#20	9/14	28/ 6	28/ 8
ZAPOBJ	2934	28#11	28/13		
ZAPSHD	293C	28#15	28/26		

