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    1- 19 *                                                  *
    1- 20         COPYRIGHT 1980 ATARI, INC.  UNAUTHORIZED REPRODUCTION,
    1- 21         ADAPTION, DISTRIBUTION, PERFORMANCE OR DISPLAY OF THIS
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      6                                   .SBTTL *FUNCTION         ALIENS DISPLAY FUNCTIONS*
      7                                   .SBTTL *                                        *
      8                                   .SBTTL ******************************************
      9
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```
GLOBALS

                                        .SBTTL GLOBALS
                                                        ;ENTRY POINTS
                                        .GLOBL VGADD,VGJSRL,VGVCTR,GETDSP,LDRDSP,VGCNTR,SWAPVG,VGDOT
                                        .GLOBL VGADD2,VGHEXZ,DISPLA,VGHALT,INIDSP,JSRDOT,VGADD3,JSRDT1
                                        .GLOBL DPRSTA,D2GAME
                                        .GLOBL INFO,RQRDSP,DSPHOL
                                        .GLOBL VGRTSL,DGOVER,DPLPLA,PICLO,PICHI
                                        .GLOBL INITEM,VGYABS,VGYAB1,INICOL
                                                        ;TABLES
                                        .GLOBL INVERSE,INVEXP,D07MSK,BOXPRO,LOGPRO,PTTANP,PTTANF,PTSPLF
                                        .GLOBL VGBRIT,VGLIST,VGSIZE,XCOMP,D70MSK,SCALE,DSPSYS
                                        .GLOBL VGSCA1,VGVTR1,VGVTR2,VGSCAL,VGSTAT,VGSTA1
                                        .GLOBL PTSTR1,PTEXP1,PTCURS,PTSPI1,PTTANK,PTESHO,PTSPLA,PTSPAR
                                        .GLOBL BCINFO,BCCURS,BCSHOT,BCINVA,BCEXPL,BCNYMP,BCINFO,BCENEL
                                        .GLOBL BUFBSL,BUFBSH,BUFASL,BUFASH,JMPMAL,JMPMAH,BCWELL,BUFSWL,BUFSWH
                                        .GLOBL JMPALO,JMPAHI,JMPBLO,JMPBHI,BCSTAR,BFASTA,BFBSTA,PTFUSE,PTFUSX
                                        .GLOBL PPSPXI,CPSPXI,FPSPXI,KILLER
                                        .GLOBL QCHKS6,QCHKS7,QCHKS8,SCAL1,SCAL3,JMPMH2,JMPMH4,JMPMA2,JMPMA4
                                        .GLOBL BFAST1,BFBST1
00C0                            RATS    0C0
0008                            MZCOLO  8                       ;NEW COLOR STAT BIT MASK
0000                            MZBRIT  0                       ;NEW INTENSITY STAT BIT

                                        .SBTTL DISPLAY-MAINLINE


                                ;FUNCTION       USING THE DATABASE SET UP BY THE GAME PORTION OF THE PROGRAM,
                                ;               BUILD, IN THE AVAILABLE BUFFER, THE VECTOR GENERATOR DISPLAY LIST
                                ;
                                ;INPUT          DATABASE

        0000                    SPACG 0                 ;SUPPRESS SPACE GAME CODE
                                        .NLIST CND
        0000                            .CSECT
0000                            DISPLA
0000    20  100D                        JSR INIMAT              ;SET UP MATH BOX
0003    AD  2000                        LDA VECRAM
0006    CD  0000G                       CMP JMPMA4
0009    D0    00                        IFEQ                    ;TRYING TO HALT
000B    AD  0133                        LDA SPARE3              ;YES.
000E    D0    00                        IFEQ                    ;HALT YET
0010    60                              RTS                     ;NO. GO AWAY
000F    01                              ENDIF
000A    06                              ENDIF
0011    A5    01                        LDA QDSTATE
0013    C9    00                        CMP I,CDPLAY
0015    F0    00                        IFNE                    ;ANYTHING BUT PLAY STATE
0017    A9    00G                       LDA I,BCINFO            ;YES. DEFAULT TO INFO BUFFER
0019    20  0108                        JSR SBCLOG
001C    20  017C                        JSR BIGTEX
001F    B0    00                        IFCC                    ;SET UP LARGE BUFFER
                                                                ;BUFFER AVAILABLE FILL IT
0021    20  0057                        JSR DSTATE              ;EXECUTE DISPLAY STATE
0024                            ZATVG2
0024    AD  016E                        LDA SECUVY
0027    F0    00                        IFNE                    ;ATARI ON SCREEN
0029    A0    27                        LDY I,27                ;YES. VERIFY
002B    A9    0E                        LDA I,0E
```

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DISPLAY-MAINLINE

    58   002D   38                          SEC
    59                                      BEGIN
    60   002E   F1   B6                     SBC NY,SECUVG
    61   0030   88                          DEY
    62   0031   10   FB                     MIEND
    63   0033   A8                          TAY
    64   0034   F0   00                     IFNE
    65   0036   49   E5                     EOR I,0E5
    66   0035   02                          ENDIF
    67   0038   F0   00                     IFNE
    68   003A   49   29                     EOR I,029
    69   0039   02                          ENDIF
    70   003C   8D   0455                   STA QT3
    71   0028   16                          ENDIF
    72   0020   1E                          ENDIF
    73   003F   A9   00G                    LDA I,BCINFO
    74   0041   20   0148                   JSR SBCSWI
    75   0044   AD   0000G                  LDA JMPMA2
    76   0047   8D   2000                   STA VECRAM
    77   004A   AD   0000G                  LDA JMPMH2
    78   004D   8D   2001                   STA VECRAM+1
    79   0050   B8   50   00                ELSE
         0016   3C
    80   0053   4C   007A                   JMP DENORM              ;PLAY STATE
    81   0052   03                          ENDIF
    82   0056   60                          RTS
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 20
DISPLAY STATE EXECUTOR

     1                                          .SBTTL DISPLAY STATE EXECUTOR
     2   0057                            DSTATE
     3   0057    A6    01                       LDX QDSTATE
     4   0059    BD  0063                       LDA X,DROUTAD+1
     5   005C    48                             PHA
     6   005D    BD  0062                       LDA X,DROUTAD
     7   0060    48                             PHA
     8   0061    60                      NOOPR  RTS
     9   0062                            DROUTAD
    10   0062  0079                             .WORD DENORM-1          ;GAME PLAY - TOP OF WELL, DOWN THE TUBE
    11   0064  FFFFG                            .WORD DSPSYS-1          ;SYSTEM CONFIGURATION
    12   0066  0703                             .WORD DSBOOM-1          ;GAME PLAY - BOOM
    13   0068  FFFFG                            .WORD GETDSP-1          ;DATA ENTRY - HI SCORE INITIALS
    14   006A  FFFFG                            .WORD RQRDSP-1          ;DATA ENTRY - RANKING
    15   006C  FFFFG                            .WORD LDRDSP-1          ;INFO ONLY - HI SCORE TABLE
    16   006E  FFFFG                            .WORD DGOVER-1          ;             GAME OVER PLAYER X
    17   0070  FFFFG                            .WORD DPLPLA-1          ;             PLAY PLAYER X
    18   0072  FFFFG                            .WORD DPRSTA-1          ; PRESS START
    19   0074  FFFFG                            .WORD BOXPRO-1          ;LOGO BOX
    20   0076  FFFFG                            .WORD LOGPRO-1          ;LOGO
    21   0078  FFFFG                            .WORD D2GAME-1          ;2 GAME MINIMUM
    22   007A                            DROUTEN
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 21
DISPLAY-GAME PLAY MAINLINE

      1                                     .SBTTL  DISPLAY-GAME PLAY MAINLINE
      2
      3   007A                        DENORM                    ;DISPLAY CURSOR
      4   007A    A9    00G                 LDA I,BCCURS
      5   007C    20  0108                  JSR SBCLOG
      6   007F    20  03D0                  JSR DSPCUR
      7   0082    A9    00G                 LDA I,BCCURS
      8   0084    20  0148                  JSR SBCSWI
      9                                                       ;DISPLAY CHARGES
     10   0087    A9    00G                 LDA I,BCSHOT
     11   0089    20  0108                  JSR SBCLOG
     12   008C    20  05A5                  JSR DSPCHG
     13   008F    A9    00G                 LDA I,BCSHOT
     14   0091    20  0148                  JSR SBCSWI
     15                                                       ;DISPLAY INVADERS
     16   0094    A9    00G                 LDA I,BCINVA
     17   0096    20  0108                  JSR SBCLOG
     18   0099    20  03F7                  JSR DSPINV
     19   009C    A9    00G                 LDA I,BCINVA
     20   009E    20  0148                  JSR SBCSWI
     21                                                       ;DISPLAY EXPLOSIONS
     22   00A1    A9    00G                 LDA I,BCEXPL
     23   00A3    20  0108                  JSR SBCLOG
     24   00A6    20  05E4                  JSR DSPEXP
     25   00A9    A9    00G                 LDA I,BCEXPL
     26   00AB    20  0148                  JSR SBCSWI
     27                                                       ;DISPLAY NYMPHS
     28   00AE    A9    00G                 LDA I,BCNYMP
     29   00B0    20  0108                  JSR SBCLOG
     30   00B3    20  02E2                  JSR DSPNYM
     31   00B6    A9    00G                 LDA I,BCNYMP
     32   00B8    20  0148                  JSR SBCSWI
     33                                                       ;DISPLAY INFORMATION  SCORES, MSGS, ETC.
     34   00BB    A9    00G                 LDA I,BCINFO
     35   00BD    20  0108                  JSR SBCLOG
     36   00C0    20  0000G                 JSR INFO
     37   00C3                        ZATVG1
     38   00C3    A5    05                  LDA QSTATUS
     39   00C5    30    00                  IFPL                ;ATTRACT
     40   00C7    A9    F2                  LDA I,0F2                   ;YES. ATARI BETTER BE ON SCREEN
     41   00C9    18                        CLC
     42   00CA    A0    27                  LDY I,39.
     43                                      BEGIN
     44   00CC    71    B6                  ADC NY,SECUVG
     45   00CE    88                        DEY
     46   00CF    10    FB                  MIEND
     47   00D1    8D  011B                  STA QT6             ;SAVE RESSLT  SHOULD BE 0
     48   00C6    0D                        ENDIF
     49   00D4    A9    00G                 LDA I,BCINFO
     50   00D6    20  0148                  JSR SBCSWI
     51                                                       ;DISPLAY WELL
     52   00D9    20  01B1                  JSR DSPWEL          ;DISPLAY WELL
     53   00DC    A9    00G                 LDA I,BCENEL        ;DISPLAY ENEMY LINES
     54   00DE    20  0108                  JSR SBCLOG
     55   00E1    20  140C                  JSR DSPENL
     56   00E4    A9    00G                 LDA I,BCENEL
     57   00E6    20  0148                  JSR SBCSWI
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 21+
DISPLAY-GAME PLAY MAINLINE

    58   00E9   A9    00G             LDA I,BCSTAR          ;DISPLAY STAR FIELD
    59   00EB   20  0108              JSR SBCLOG
    60   00EE   20  1397              JSR DSTARF
    61   00F1   A9    00G             LDA I,BCSTAR
    62   00F3   20  0148              JSR SBCSWI
    63   00F6   A9    00              LDA I,0
    64   00F8   8D  0114              STA ROTDIS
    65                                                  ;
    66   00FB   AD  0000G             LDA JMPMAL            ;SET MASTER POINTER TO JSRL
    67   00FE   8D  2000              STA VECRAM            ;LIST FOR SUBLISTS CREATED ABOVE
    68   0101   AD  0000G             LDA JMPMAH            ;
    69   0104   8D  2001              STA VECRAM+1
    70                                                  ;
    71   0107   60                    RTS
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 22
BUFFER CONTROL

     1                                        .SBTTL  BUFFER CONTROL
     2                                ;
     3                                ;INPUT ACC SUB BUFFER GROUP INDEX CODE
     4                                ;OUTPUT VGLIST 2    VGY SET UP TO VACANT BUFFER
     5                                ;       ACC,X,Y DESTROYED
     6  0108                          SBCLOG
     7  0108  AA                             TAX                    ;SET UP VECTOR RAM POINTS TO
     8  0109  0A                             ASL                    ;UNUSED BUFFER
     9  010A  A8                             TAY
    10  010B  BD 0415                        LDA X,BUFACT
    11  010E  D0   00                        IFEQ                   ;BUFFER A OR B ACTIVE
    12  0110  BE 0000G                       LDX Y,BUFBSL           ;A IS CTIVE. BUILD IN B
    13  0113  B9 0000G                       LDA Y,BUFBSH
    14  0116  B8   50    00                 ELSE
        010F  09
    15  0119  BE 0000G                       LDX Y,BUFASL           ;B IS ACTIVE. BUILD IN A
    16  011C  B9 0000G                       LDA Y,BUFASH
    17  0118  06                           ENDIF
    18  011F  86   74                       STX VGLIST
    19  0121  85   75                       STA VGLIST+1
    20  0123  A9   00                       LDA I,0
    21  0125  85   A9                       STA VGY
    22  0127  60                           RTS
    23                                                              ;OPPOSITE OF SBCLOG-PLACE PTR
    24                                                              ;TO ACTIVE BUFFER INTO INDYLO
    25  0128  AA                   SBCACT  TAX
    26  0129  0A                           ASL
    27  012A  A8                           TAY
    28  012B  BD 0415                      LDA X,BUFACT
    29  012E  D0   00                      IFEQ
    30  0130  BE 0000G                     LDX Y,BUFASL           ;A IS ACTIVE
    31  0133  B9 0000G                     LDA Y,BUFASH
    32  0136  B8   50    00               ELSE
        012F  09
    33  0139  BE 0000G                     LDX Y,BUFBSL           ;B IS ACTIVE
    34  013C  B9 0000G                     LDA Y,BUFBSH
    35  0138  06                         ENDIF
    36  013F  86   3B                     STX INDYLO
    37  0141  85   3C                     STA INDYLO+1
    38  0143  A9   00                     LDA I,0
    39  0145  85   A9                     STA VGY
    40  0147  60                         RTS
    41                                ;INPUT ACC SUBBUFFER GROUP INDEX CODE
    42                                ;OUTPUT RTS ADDED TO END OF NEWLY BUILT BUFFER
    43                                ;       SWITCH SET TO POINT TO NEW BUFFER
    44                                ;       BUFACT X FLIPPED INDICATING NEW BUFFER ACTIVE
    45  0148  48                   SBCSWI  PHA
    46  0149  20 0000G                    JSR VGRTSL             ;INSERT RTSL AT END OF BUFFER
    47  014C  68                         PLA
    48  014D  AA                         TAX
    49  014E  0A                         ASL
    50  014F  A8                         TAY
    51  0150  B9 0000G                   LDA Y,BUFSWL           ;SET UP SWITCH LOCATION
    52  0153  85   3B                    STA INDYLO
    53  0155  B9 0000G                   LDA Y,BUFSWH
    54  0158  85   3C                    STA INDYHI
    55  015A  BD 0415                    LDA X,BUFACT
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 22+
BUFFER CONTROL

    56   015D   49   01                    EOR I,01
    57   015F   9D  0415                   STA X,BUFACT
    58   0162   D0   00                    IFEQ                    ;WHICH IS THE NEW BUFFER TO DISLAY
    59   0164   B9  0000G                  LDA Y,JMPALO            ;BUFFER A
    60   0167   BE  0000G                  LDX Y,JMPAHI
    61   016A   B8   50    00              ELSE
         0163   09
    62   016D   B9  0000G                  LDA Y,JMPBLO            ;BUFFER B
    63   0170   BE  0000G                  LDX Y,JMPBHI
    64   016C   06                         ENDIF
    65   0173   A0   00                    LDY I,0                 ;UPDATE SWITCH TO PT TO
    66   0175   91   3B                    STA NY,INDYLO           ;NEW BUFFER
    67   0177   8A                         TXA
    68   0178   C8                         INY
    69   0179   91   3B                    STA NY,INDYLO
    70   017B   60                         RTS
    71                                                             ;
    72   017C                        BIGTEX                         ;ASSIGN LARGE BUFFER FOR TEXT
    73   017C   AD  0000G                  LDA JMPMA2
    74   017F   CD  2000                   CMP VECRAM
    75   0182   F0   00                    IFNE                    ;BEEN HERE BEFORE
    76   0184   8D  2000                   STA VECRAM              ;NO. SET UP MASTER POINTER FOR TEXT ONLY.
    77   0187   38                         SEC
    78   0188   60                         RTS                     ;EXIT
    79   0183   05                         ENDIF
    80   0189   AD  0415                   LDA BUFACT              ;YES. INSERT JMP TO AREA WITH MORE ROOM.
    81   018C   D0   00                    IFEQ
    82   018E   A2   02                    LDX I,02                ;BIG AREA 1  1ST HALF OF VECRAM
    83   0190   B8   50    00              ELSE
         018D   05
    84   0193   A2   08                    LDX I,08                ;BIG AREA 2  2ND HALF OF VECRAM
    85   0192   02                         ENDIF
    86   0195   BD  0000G                  LDA X,JMPALO
    87   0198   A0   00                    LDY I,0
    88   019A   8C  016E                   STY SECUVY
    89   019D   91   74                    STA NY,VGLIST
    90   019F   C8                         INY
    91   01A0   BD  0000G                  LDA X,JMPAHI            ;INSERT JMPL TO AREA WITH MORE ROOM
    92   01A3   91   74                    STA NY,VGLIST
    93   01A5   BD  0000G                  LDA X,BUFASL            ;POINT VGLIST AT NEW AREA
    94   01A8   85   74                    STA VGLIST
    95   01AA   BD  0000G                  LDA X,BUFASH
    96   01AD   85   75                    STA VGLIST+1
    97   01AF   18                         CLC
    98   01B0   60                         RTS
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 23
DISPLAY-WELL

     1                                          .SBTTL DISPLAY-WELL
     2          0003                 CSUSTA   3
     3          0001                 CSUINT   1
     4   01B1                        DSPWEL
     5   01B1    AD  0114                    LDA ROTDIS
     6   01B4    F0    00                    IFNE                    ;REBUILD WELL
     7   01B6    A9    00G                   LDA I,BCWELL
     8   01B8    20  0108                    JSR SBCLOG
     9   01BB    20  1157                    JSR BLDWEL              ;YES
    10   01BE    A9    00G                   LDA I,BCWELL
    11   01C0    20  0148                    JSR SBCSWI
    12   01B5    0D                          ENDIF
    13   01C3    A9    00G                   LDA I,BCWELL            ;SET UP PTR TO ACTIVE WELL BUFFER
    14   01C5    20  0128                    JSR SBCACT
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 24
DISPLAY-WELL

     1
     2                                        .SBTTL  DISPLAY-SPOKE COLORS
     3
     4                                        .SBTTL  DISPLAY-SPOKE PULSE STATUS
     5   01C8    A9    00                    LDA I,0
     6   01CA    A2    0F                    LDX I,NLINES-1
     7                                       BEGIN                   ;LOOP FOR EACH SPOKE
     8   01CC    9D  0425                    STA X,SPOKST            ;CLEAR SPOKE PULSE STATUS
     9   01CF    CA                          DEX
    10   01D0    10    FA                    MIEND
    11   01D2    AD  0106                    LDA CURMOD
    12   01D5    30    00                    IFPL                    ;CURSOR AT TOP
    13   01D7    AE  011C                    LDX WINVMX              ;YES.
    14                                       BEGIN                   ;LOOP FOR EACH INVADER
    15   01DA    BD  02DF                    LDA X,INVAY
    16   01DD    F0    00                    IFNE                    ;ACTIVE INVADER
    17   01DF    A0    00                    LDY I,0                 ;YES. DEFAULT
    18   01E1    BD  0283                    LDA X,INVAC1
    19   01E4    29    07                    AND I,INVABI
    20   01E6    C9    01                    CMP I,ZABPUL
    21   01E8    D0    00                    IFEQ                    ;PULSAR
    22   01EA    C8                          INY                     ;YES. SET PULSAR BIT D0
    23   01EB    84    29                    STY TEMP0
    24   01ED    BD  0283                    LDA X,INVAC1            ;YES
    25   01F0    29    80                    AND I,INVMOT
    26   01F2    D0    00                    IFEQ                    ;FLIPPING
    27   01F4    AD  0148                    LDA PULSON              ;NO.
    28   01F7    30    00                    IFPL                    ;PULSARS ON
    29   01F9    BD  02DF                    LDA X,INVAY             ;YES.
    30   01FC    CD  0157                    CMP PULPOT
    31   01FF    B0    00                    IFCC                    ;POTENT PULSAR
    32   0201    E6    29                    INC TEMP0               ;YES. SET PULSE BIT D1
    33   0203    E6    29                    INC TEMP0
    34
    35   0200    04                          ENDIF
    36   01F8    0C                          ENDIF
    37   0205    A5    29                    LDA TEMP0               ;SET CCW LEG STATUS
    38   0207    BC  02CC                    LDY X,INVAL2
    39   020A    19  0425                    ORA Y,SPOKST
    40   020D    99  0425                    STA Y,SPOKST
    41   01F3    1C                          ENDIF
    42   0210    BC  02B9                    LDY X,INVAL1
    43   0213    A5    29                    LDA TEMP0
    44   0215    09    80                    ORA I,80                ;SET BASE BIT
    45   0217    19  0425                    ORA Y,SPOKST
    46   021A    99  0425                    STA Y,SPOKST
    47   01E9    33                          ENDIF
    48   01DE    3E                          ENDIF
    49   021D    CA                          DEX
    50   021E    10    BA                    MIEND
    51   01D6    49                          ENDIF
    52   0220    A9    06                    LDA I,WELCOL            ;DEFAULT WELL COLO
    53   0222    AC  0125                    LDY SUZTIM
    54   0225    F0    00                    IFNE
    55   0227    30    00                    IFPL                    ;SUPERZAPPER ACTIVE
    56   0229    A5    03                    LDA QFRAME              ;YES. SUPERZAPPER IS DEFAULT
    57   022B    29    07                    AND I,7
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 24+
DISPLAY-SPOKE PULSE STATUS

    58   022D   C9    07                  CMP I,7
    59   022F   D0    00                  IFEQ
    60   0231   A9    01                  LDA I,1                 ;NO BLACK
    61   0230   02                        ENDIF
    62   0228   0A                        ENDIF
    63   0226   0C                        ENDIF
    64   0233   85    29                  STA TEMP0               ;DEFAULT COLOR
    65   0235   A0    FF                  LDY I,-1
    66   0237   A2    FF                  LDX I,-1
    67   0239   86    2C                  STX TEMP3               ;DEFAULT NO BONUS FLASH
    68   023B   AD  0202                  LDA CURSY
    69   023E   F0    00                  IFNE                    ;C;URSOR ALIVE
    70   0240   AD  0201                  LDA CURSL2
    71   0243   30    00                  IFPL
    72   0245   AE  0200                  LDX CURSL1              ;YES.
    73   0248   AC  0201                  LDY CURSL2
    74   0244   06                        ENDIF
    75   023F   0B                        ENDIF
    76   024B   86    2A                  STX TEMP1               ;SAVE FLASLIGHT SPOKES
    77   024D   84    2B                  STY TEMP2
    78   024F   AD  0124                  LDA BOFLASH
    79   0252   30    00                  IFPL                    ;BONUS FLASH
    80   0254   29    0E                  AND I,0E                ;YES. SET BASE COLOR
    81   0256   4A                        LSR
    82   0257   85    2C                  STA TEMP3
    83   0259   CE  0124                  DEC BOFLASH
    84   0253   08                        ENDIF
    85   025C   A2    0F                  LDX I,NLINES-1
    86                                    BEGIN                   ;LOOP FOR EACH SPOKE
    87   025E   A0    06                  LDY I,WELCOL            ;DEFAULT WELL COLOR
    88   0260   BD  0425                  LDA X,SPOKST
    89   0263   F0    00                  IFNE                    ;PULSE
    90   0265   29    02                  AND I,2
    91   0267   F0    00                  IFNE                    ;YES. PULSING
    92   0269   A5    03                  LDA QFRAME
    93   026B   29    01                  AND I,1
    94   026D   A8                        TAY
    95   0268   05                        ENDIF
    96   026E   B8    50    00            ELSE
         0264   0C
    97   0271   E4    2A                  CPX TEMP1               ;NO.
    98   0273   F0    00                  IFNE
    99   0275   E4    2B                  CPX TEMP2
   100   0274   02                        ENDIF
   101   0277   D0    00                  IFEQ                    ;NO. CURSOR FLASHLIGHT
   102   0279   A0    01                  LDY I,CURCOL            ;YES. CURSOR COLOR
   103   027B   B8    50    00            ELSE
         0278   05
   104   027E   AD  0124                  LDA BOFLASH             ;NO.
   105   0281   30    00                  IFPL                    ;BONUS FLASH
   106   0283   8A                        TXA                     ;YES. BONUS COLOR
   107   0284   18                        CLC
   108   0285   65    2C                  ADC TEMP3               ;PLUS BASE COLOR
   109   0287   29    07                  AND I,7                 ;MOD 8
   110   0289   C9    07                  CMP I,7
   111   028B   D0    00                  IFEQ
   112   028D   A9    03                  LDA I,3                 ;NO BLACK
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 24+
DISPLAY-SPOKE PULSE STATUS

   113   028C   02                                ENDIF
   114   028F   A8                                TAY
   115   0290   B8    50    00                    ELSE
         0282   10
   116   0293   A4    29                          LDY TEMPO               ;NO. USE DEFALT COLOR
   117   0292   02                                ENDIF
   118   027D   17                                ENDIF
   119   0270   24                                ENDIF
   120   0295   98                                TYA
   121   0296   BC  02C0                          LDY X,STALOC
   122   0299   91    3B                          STA NY,INDYLO
   123   029B   CA                                DEX
   124   029C   10    C0                          MIEND
   125   029E   A2    0F                          LDX I,NLINES-1          ;YES. REDO TOP RUNGS
   126   02A0   2C  0111                          BIT WELTYP
   127   02A3   10    00                          IFMI
   128   02A5   CA                                DEX                     ;PLANAR, SO 1 LESS RUNG
   129   02A4   01                                ENDIF
   130                                            BEGIN                   ;LOOP FOR EACH RUNG
   131   02A6   A0    C0                          LDY I,0C0               ;DEFAULT ON
   132   02A8   BD  0425                          LDA X,SPOKST
   133   02AB   10    00                          IFMI                    ;PULSAR
   134   02AD   A0    00                          LDY I,0                 ;YES. TURN OFF
   135   02AC   02                                ENDIF
   136   02AF   84    58                          STY PZL
   137   02B1   BC  02D1                          LDY X,RUNLOC
   138   02B4   B1    B0                          LDA NY,RUNGVG
   139   02B6   29    1F                          AND I,1F
   140   02B8   05    58                          ORA PZL
   141   02BA   91    B0                          STA NY,RUNGVG
   142   02BC   CA                                DEX
   143   02BD   10    E7                          MIEND
   144   02BF   60                                RTS
   145                                  ;OFFSETS INTO WELL SUBROUTINE OF COLOR STATS FOR EACH LINE
   146   02C0   A8    9C    92    86    STALOC  .BYTE 0A8,9C,92,86,7C,70,66,5A,50,44,3A,2E,24,18,0E,2,0B2
         02C4   7C    70    66    5A
         02C8   50    44    3A    2E
         02CC   24    18    0E    02
         02D0   B2
   147                                  ;OFFSETS INTO WELL SUBROUTINE  +0FE  OF COLOR STATS FOR EACH TOP RUNG
   148   02D1   3B    37    33    2F    RUNLOC  .BYTE 3B,37,33,2F,2B,27,23,1F,1B,17,13,0F,0B,07,03,3F
         02D5   2B    27    23    1F
         02D9   1B    17    13    0F
         02DD   0B    07    03    3F
   149   02E1   00G                        CHKSM6          .BYTE QCHKS6
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 25
DISPLAY-NYMPHS

     1                                          .SBTTL  DISPLAY-NYMPHS
     2          0004                    IEYL 4
     3   02E2                           DSPNYM
     4   02E2    A0    0C                       LDY I,NYMCOL
     5   02E4    84    9E                       STY COLOR
     6   02E6    A9    08                       LDA I,MZCOLO
     7   02E8    20  0000G                      JSR VGSTAT
     8   02EB    A2    66                       LDX I,XADJL
     9   02ED    20  15AF                       JSR VGYAB1              ;POSITION BEAM AT VANISH PT.
    10   02F0    A9    12                       LDA I,18.
    11   02F2    85    56                       STA PXL                 ;MAX # DISPLAYABLE
    12   02F4    A2    3F                       LDX I,NNYMPH-1
    13   02F6    86    37                       STX INDEX1
    14   02F8    A0    00                       LDY I,0
    15                                         BEGIN                   ;LOOP FOR EACH NYMPH
    16   02FA    A6    37                       LDX INDEX1
    17   02FC    BD  0243                       LDA X,NYMPY
    18   02FF    D0    00                       IFEQ                    ;NYMPH ACTIVE
    19   0301    4C  0393                       JMP NONYM               ;NO. SKIP IT
    20   0300    03                             ENDIF
    21   0304    C9    50                       CMP I,50                ;YES.
    22   0306    90    00                       IFCS                    ;SKIP EVERY OTHER ONE PAST THIS DEPTH
    23   0308    C6    37                       DEC INDEX1
    24   0307    02                             ENDIF
    25   030A    48                             PHA
    26   030B    29    3F                       AND I,3F                ;FAKE PROJECTION  USE NYMPH DEPTH TO GET SCALES
    27   030D    91    74                       STA NY,VGLIST           ;LINEAR SCALE
    28   030F    68                             PLA
    29   0310    2A                             ROL
    30   0311    2A                             ROL
    31   0312    2A                             ROL
    32   0313    29    03                       AND I,3
    33   0315    18                             CLC
    34   0316    69    01                       ADC I,1
    35   0318    09    70                       ORA I,70
    36   031A    C8                             INY
    37   031B    91    74                       STA NY,VGLIST           ;BINARY SCALE
    38   031D    C8                             INY
    39   031E    BD  0203                       LDA X,NYMPL             ;GET NYMPH LINE
    40   0321    AA                             TAX
    41   0322    BD  038A                       LDA X,LIFSZL            ;VECTOR TO NYMPH
    42   0325    38                             SEC
    43   0326    E5    68                       SBC ZADJL
    44   0328    85    63                       STA SZL
    45   032A    91    74                       STA NY,VGLIST           ;Z LSB
    46   032C    C8                             INY
    47   032D    BD  037A                       LDA X,LIFSZH
    48   0330    E5    69                       SBC ZADJL+1
    49   0332    85    64                       STA SZH
    50   0334    29    1F                       AND I,1F
    51   0336    91    74                       STA NY,VGLIST           ;Z MSB
    52   0338    C8                             INY
    53   0339    BD  036A                       LDA X,LIFSXL
    54   033C    85    61                       STA SXL
    55   033E    91    74                       STA NY,VGLIST           ;X LSB
    56   0340    C8                             INY
    57   0341    BD  035A                       LDA X,LIFSXH
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 25+
DISPLAY-NYMPHS

    58   0344   85   62                    STA SXH
    59   0346   29   1F                    AND I,1F
    60   0348   91   74                    STA NY,VGLIST          ;X MSB
    61   034A   C8                         INY                    ;DISPLAY A DOT
    62   034B   A9   00                    LDA I,0
    63   034D   91   74                    STA NY,VGLIST          ;0 Z LSB
    64   034F   C8                         INY
    65   0350   91   74                    STA NY,VGLIST          ;0 Z MSB
    66   0352   C8                         INY
    67   0353   91   74                    STA NY,VGLIST          ;0 X LSB
    68   0355   A9   A0                    LDA I,0A0
    69   0357   C8                         INY
    70   0358   91   74                    STA NY,VGLIST          ;BRIGHTNESS, 0 X MSB
    71   035A   C8                         INY
    72   035B   A5   63                    LDA SZL                ;DRAW VECTOR BACK TO FAKE V.P.
    73   035D   49   FF                    EOR I,0FF
    74   035F   18                         CLC
    75   0360   69   01                    ADC I,1
    76   0362   91   74                    STA NY,VGLIST          ;Z LSB
    77   0364   C8                         INY
    78   0365   A5   64                    LDA SZH
    79   0367   49   FF                    EOR I,0FF
    80   0369   69   00                    ADC I,0
    81   036B   29   1F                    AND I,1F
    82   036D   91   74                    STA NY,VGLIST          ;Z MSB
    83   036F   C8                         INY
    84   0370   A5   61                    LDA SXL
    85   0372   49   FF                    EOR I,0FF
    86   0374   18                         CLC
    87   0375   69   01                    ADC I,1
    88   0377   91   74                    STA NY,VGLIST          ;X LSB
    89   0379   C8                         INY
    90   037A   A5   62                    LDA SXH
    91   037C   49   FF                    EOR I,0FF
    92   037E   69   00                    ADC I,0
    93   0380   29   1F                    AND I,1F
    94   0382   91   74                    STA NY,VGLIST          ;X MSB
    95   0384   C8                         INY
    96   0385   C0   F0                    CPY I,0F0
    97   0387   90   00                    IFCS                   ;VGLIST LSB INDEX MAXING OUT
    98   0389   88                         DEY
    99   038A   20   0000G                 JSR VGADD              ;YES. UPDATE VGLIST
   100   038D   A0   00                    LDY I,0                ;RESET LSB INDEX
   101   0388   06                         ENDIF
   102   038F   C6   56                    DEC PXL                ;EXIT EARLY IF MAX
   103   0391   30   07                    BMI EXCESS             ;LIMIT REACHED
   104   0393   C6   37              NONYM DEC INDEX1
   105   0395   30   03    4C  02FA        MIEND                  ;EXIT LOOP AFTER LAST NYMPH
   106   039A   98                   EXCESS TYA
   107   039B   F0   00                    IFNE
   108   039D   88                         DEY
   109   039E   20   0000G                 JSR VGADD              ;UPDATE VGLIST
   110   039C   04                         ENDIF
   111   03A1   A5   B5              ZQATLI          LDA QT1
   112   03A3   F0   00                    IFNE
   113   03A5   A5   46                    LDA WAVEN1
   114   03A7   C9   0A                    CMP I,10.
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 25+
DISPLAY-NYMPHS

   115   03A9   90   00                    IFCS
   116   03AB   A9   7A                    LDA I,7A
   117   03AD   85   53                    STA FRTIMR
   118   03AA   04                         ENDIF
   119   03A4   0A                         ENDIF
   120   03AF   A9   01                    LDA I,1
   121   03B1   4C   0000G                 JMP VGSCA1
   122   03B4   48                  VGDOT  PHA
   123   03B5   A0   00                    LDY I,0                ;DRAW A DOT
   124   03B7   98                         TYA
   125   03B8   91   74                    STA NY,VGLIST
   126   03BA   C8                         INY
   127   03BB   91   74                    STA NY,VGLIST
   128   03BD   C8                         INY
   129   03BE   91   74                    STA NY,VGLIST
   130   03C0   C8                         INY
   131   03C1   68                         PLA
   132   03C2   91   74                    STA NY,VGLIST
   133   03C4   A9   04                    LDA I,4                ;UPDATE DISPLAY POINTER
   134   03C6   18                         CLC
   135   03C7   65   74                    ADC VGLIST
   136   03C9   85   74                    STA VGLIST
   137   03CB   90   00                    IFCS
   138   03CD   E6   75                    INC VGLIST+1
   139   03CC   02                         ENDIF
   140   03CF   60                         RTS
```

DISPLAY-CURSOR

```
     1                                          .SBTTL  DISPLAY-CURSOR
     2  03D0                                DSPCUR
     3  03D0   A9   01                             LDA I,CURCOL
     4  03D2   85   9E                             STA COLOR
     5  03D4   AD 0202                             LDA CURSY
     6  03D7   F0   00                             IFNE
     7  03D9   C9   F0                             CMP I,ILINDDY
     8  03DB   B0   00                             IFCC                    ;AT BOTTOM
     9  03DD   85   57                             STA PYL                 ;NO. DEPTH
    10  03DF   85   2F                             STA TEMPY
    11  03E1   AD 0201                             LDA CURSL2
    12  03E4   C9   81                             CMP I,81
    13  03E6   F0   00                             IFNE                    ;DON T DISPLAY BLASTED CURSOR
    14  03E8   AC 0200                             LDY CURSL1              ;CURSOR S WELL LINE #S
    15  03EB   A5   51                             LDA CURSPO              ;GET CURSOR POSITION BETWEEN LINES
    16  03ED   4A                                  LSR
    17  03EE   29   07                             AND I,07
    18  03F0   18                                  CLC
    19  03F1   69   01                             ADC I,CNCURS            ;ADD IN BASE PIC #
    20  03F3   20 0BEA                             JSR ONELIN              ;DRAW LINE
    21  03E7   0E                                  ENDIF
    22  03DC   19                                  ENDIF
    23  03D8   1D                                  ENDIF
    24  03F6   60                                  RTS
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 28
DISPLAY-INVADERS  MAINLINE

     1                                          .SBTTL  DISPLAY-INVADERS  MAINLINE
     2   03F7                             DSPINV
     3   03F7    AD  0106                       LDA CURMOD
     4   03FA    30    00                       IFPL                    ;CURSOR AT TOP
     5   03FC    A2    06                       LDX I,NINVAD-1          ;YES
     6   03FE    86    37                       STX INDEX1
     7                                          BEGIN                   ;LOOP FOR EACH INVADER
     8   0400    A6    37                       LDX INDEX1
     9   0402    BD  02DF                       LDA X,INVAY
    10   0405    F0    00                       IFNE                    ;ACTIVE
    11   0407    85    57                       STA PYL                 ;YES
    12   0409    BD  0283                       LDA X,INVAC1
    13   040C    29    18                       AND I,INVSEQ            ;GET ANIMATION SEQUENCE
    14   040E    4A                             LSR
    15   040F    4A                             LSR
    16   0410    4A                             LSR
    17   0411    85    55                       STA OBJIND
    18   0413    BD  0283                       LDA X,INVAC1
    19   0416    29    07                       AND I,INVABI
    20   0418    0A                             ASL
    21   0419    20  0421                       JSR INVPIC              ;DRAW INVADER PIC
    22   0406    15                             ENDIF
    23   041C    C6    37                       DEC INDEX1
    24   041E    10    E0                       MIEND
    25   03FB    24                             ENDIF
    26   0420    60                             RTS
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 29
DISPLAY-INVADERS  MAINLINE

      1
      2                                       .SBTTL  DISPLAY - INVADERS PICS
      3
      4   0421   A8                  INVPIC  TAY                     ;INDIRECT JSR TO PIC DRAW ROUTINE
      5   0422   B9  042C                    LDA Y,INVPIT+1
      6   0425   48                          PHA
      7   0426   B9  042B                    LDA Y,INVPIT
      8   0429   48                          PHA
      9   042A   60                          RTS
     10   042B 0434                  INVPIT  .WORD FLIPIC-1          ;FLIPPER
     11   042D 0564                          .WORD PULPIC-1          ;PULSAR
     12   042F 0458                          .WORD TANPIC-1          ;TANKER
     13   0431 046B                          .WORD TRAPIC-1          ;TRALER
     14   0433 04E4                          .WORD FUSPIC-1          ;FUSE
     15   0435                       INVPIE
     16                                      .SBTTL  DISPLAY - FLIPPERS
     17
     18   0435                       FLIPIC                          ;FLIPPER PIC
     19   0435   A9    03                    LDA I,FLICOL
     20   0437   85    9E                    STA COLOR
     21   0439   BD  0283                    LDA X,INVAC1
     22   043C   30    00                    IFPL                    ;FLIPPING
     23   043E   BC  02B9                    LDY X,INVAL1            ;LINE #
     24   0441   A6    55                    LDX OBJIND
     25   0443   BD  0455                    LDA X,FLITAB
     26   0446   20  0BEA                    JSR ONELIN              ;NO. ON LINES
     27   0449   B8    50    00              ELSE
          043D   0E
     28   044C   20  047E                    JSR IJMPDS              ;YES. SET UP SPECIAL COORDS
     29   044F   A0    00                    LDY I,CINVA1
     30   0451   20  0C15                    JSR ONELN2              ;FLIPPING PIC
     31   044B   08                          ENDIF
     32   0454   60                          RTS
     33                                                              ;ANIMATION SEQUENCE
     34   0455   00    00    00    00   FLITAB  .BYTE CINVA1,CINVA1,CINVA1,CINVA1
     35                                      .SBTTL  DISPLAY - TANKERS
     36
     37   0459                       TANPIC
     38   0459   BD  028A                    LDA X,INVAC2
     39   045C   29    03                    AND I,INVCAR
     40   045E   A8                          TAY                     ;INDEX FOR TYPE CARRIED
     41   045F   B9  0468                    LDA Y,TANTAB
     42   0462   BC  02B9                    LDY X,INVAL1
     43   0465   4C  0B47                    JMP SCAPIC              ;DRAW TANKER PIC
     44                                                              ;ANIMATION SEQUENCE
     45   0468   00G   00G   00G   00G  TANTAB  .BYTE PTTANK,PTTANK,PTTANP,PTTANF
     46                                      .SBTTL  DISPLAY - INVADERS  DRAW TRAILER
     47
     48   046C                       TRAPIC
     49   046C   BC  02B9                    LDY X,INVAL1
     50   046F   A5    03                    LDA QFRAME              ;CHOOSE BETWEEN 4 PICS
     51   0471   29    03                    AND I,3
     52   0473   0A                          ASL
     53   0474   18                          CLC
     54   0475   69    00G                   ADC I,PTSPI1
     55   0477   4C  0B47                    JMP SCAPIC              ;DRAW TRALER PIC
     56
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 29+
DISPLAY - INVADERS  DRAW TRAILER

    57   047A   00G  02G              TRATAB  .BYTE PTSPI1,PTSPI1+2
    58   047C   04G  06G                      .BYTE PTSPI1+4,PTSPI1+6
    59                                       .SBTTL  DISPLAY-INVADERS  DRAW JUMP INVADER
    60   047E                          IJMPDS
    61   047E   A5   57                       LDA PYL                 ;SAME Y FOR BOTH PTS.
    62   0480   85   2F                       STA TEMPY
    63   0482   BC  02B9                       LDY X,INVAL1
    64   0485   B9  03CE                       LDA Y,LINEX             ;X AND Z FOR BASE LEG
    65   0488   85   56                       STA PXL
    66   048A   B9  03DE                       LDA Y,LINEZ
    67   048D   85   58                       STA PZL
    68   048F   BD  02CC                       LDA X,INVAL2
    69   0492   29   0F                       AND I,0F
    70   0494   A8                           TAY
    71   0495   A5   56                       LDA PXL                 ;CALCULATE COORD OF JUMPING ENDPT
    72   0497   49   80                       EOR I,80
    73   0499   18                           CLC
    74   049A   79  04D5                       ADC Y,JUMPX
    75   049D   50   00                       IFVS                    ;OVERFLOW
    76   049F   10   00                       IFMI                    ;YES
    77   04A1   A9   7F                       LDA I,7F                ;MIN
    78   04A3   B8   50    00                 ELSE
         04A0   05
    79   04A6   A9   80                       LDA I,80                ;MAX
    80   04A5   02                           ENDIF
    81   049E   09                           ENDIF
    82   04A8   49   80                       EOR I,80
    83   04AA   85   2E                       STA TEMPX
    84   04AC   A5   58                       LDA PZL
    85   04AE   49   80                       EOR I,80
    86   04B0   18                           CLC
    87   04B1   79  04D1                       ADC Y,JUMPZ
    88   04B4   50   00                       IFVS                    ;OVERFLOW
    89   04B6   10   00                       IFMI                    ;YES.
    90   04B8   A9   7F                       LDA I,7F
    91   04BA   B8   50    00                 ELSE
         04B7   05
    92   04BD   A9   80                       LDA I,80                ;MAX
    93   04BC   02                           ENDIF
    94   04B5   09                           ENDIF
    95   04BF   49   80                       EOR I,80
    96   04C1   85   30                       STA TEMPZ
    97   04C3   AC  0112                       LDY WELLID
    98   04C6   B9  0B26                       LDA Y,WELLIS            ;LINEAR SCALE
    99   04C9   85   59                       STA LINSCA
   100   04CB   B9  0B36                       LDA Y,WELBIN            ;BINARY SCALE
   101   04CE   85   5A                       STA BINSCA              ;SET UP DOWN SCALE  APPROX 1/8
   102   04D0   60                           RTS
   103                                       .SBTTL  TABLE-WORLD COORD OFFSETS  X,Z  FOR JUMPERS
   104          002C                 DG000 2C
   105          0028                 DG225 28
   106          001F                 DG450 1F
   107          0010                 DG675 10
   108          0000                 DG900 0
   109   04D1    00                  JUMPZ   .BYTE DG900
   110   04D2    10                          .BYTE DG675
   111   04D3    1F                          .BYTE DG450
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 29+
TABLE-WORLD COORD OFFSETS  X,Z  FOR JUMPERS

   112   04D4   28                          .BYTE DG225
   113   04D5   2C                  JUMPX   .BYTE DG000
   114   04D6   28                          .BYTE DG225
   115   04D7   1F                          .BYTE DG450
   116   04D8   10                          .BYTE DG675
   117   04D9   00                          .BYTE DG900
   118   04DA   F0                          .BYTE-DG675
   119   04DB   E1                          .BYTE-DG450
   120   04DC   D8                          .BYTE-DG225
   121   04DD   D4                          .BYTE-DG000
   122   04DE   D8                          .BYTE-DG225
   123   04DF   E1                          .BYTE-DG450
   124   04E0   F0                          .BYTE-DG675
   125   04E1   00                          .BYTE DG900
   126   04E2   10                          .BYTE DG675
   127   04E3   1F                          .BYTE DG450
   128   04E4   28                          .BYTE DG225
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 31
TABLE-WORLD COORD OFFSETS  X,Z  FOR JUMPERS

      1
      2                                       .SBTTL  DISPLAY-INVADE FUSE PICTURE
      3
      4   04E5   BD  02DF              FUSPIC  LDA X,INVAY
      5   04E8   85    57                      STA PYL
      6   04EA   BC  02B9                      LDY X,INVAL1
      7   04ED   B9  03CE                      LDA Y,LINEX
      8   04F0   85    56                      STA PXL
      9   04F2   B9  03DE                      LDA Y,LINEZ
     10   04F5   85    58                      STA PZL
     11   04F7   BD  02CC                      LDA X,INVAL2
     12   04FA   10    00              M10     IFMI                        ;RUNGING
     13   04FC   98                            TYA                         ;YES.
     14   04FD   18                            CLC
     15   04FE   69    01                      ADC I,1
     16   0500   29    0F                      AND I,0F
     17   0502   A8                            TAY
     18   0503   B9  03CE                      LDA Y,LINEX
     19   0506   38                            SEC
     20   0507   E5    56                      SBC PXL
     21   0509   20  0544                      JSR DELTA8
     22   050C   18                            CLC
     23   050D   65    56                      ADC PXL
     24   050F   85    56                      STA PXL
     25   0511   B9  03DE                      LDA Y,LINEZ
     26   0514   38                            SEC
     27   0515   E5    58                      SBC PZL
     28   0517   20  0544                      JSR DELTA8
     29   051A   18                            CLC
     30   051B   65    58                      ADC PZL
     31   051D   85    58                      STA PZL
     32   04FB   23                            ENDIF
     33   051F   20  0EE2                      JSR WORSCR
     34   0522   A2    61                      LDX I,SXL
     35   0524   20  15AF                      JSR VGYAB1              ;DRAW BLANK VECTOR TO FUSE
     36   0527   A9    00                      LDA I,0
     37   0529   85    A9                      STA VGY
     38   052B   20  0B88                      JSR CASCAL              ;SET PERSPECTIVE SCALE
     39   052E   84    A9                      STY VGY
     40   0530   A5    03                      LDA QFRAME
     41   0532   29    03                      AND I,3
     42   0534   0A                            ASL
     43   0535   18                            CLC
     44   0536   69    00G                     ADC I,PTFUSE
     45   0538   A8                            TAY
     46   0539   BE  0000G                     LDX Y,PICHI
     47   053C   B9  0000G                     LDA Y,PICLO
     48   053F   A4    A9                      LDY VGY
     49   0541   4C  0000G                     JMP VGADD3              ;ADD PIC TO DISPLAY LIST
     50                                                               ;INPUT ACC DELTA BETWEEN LINES
     51                                                               ;       X INVADER INDEX
     52                                                               ;       Y LINE INDEX OF CCW PT
     53   0544                     DELTA8                             ;OUTPUT X,Y PRESERVED
     54                                                               ;       ACC OFFSET FROM BASE FOR MIDPT
     55   0544   85    29                      STA TEMP0
     56   0546   BD  02CC                      LDA X,INVAL2
     57   0549   29    07                      AND I,7
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 31+
DISPLAY-INVADE FUSE PICTURE

    58   054B   85   2C                    STA TEMP3
    59   054D   86   2B                    STX TEMP2
    60   054F   A2   02                    LDX I,2
    61   0551   A9   00                    LDA I,0
    62                                     BEGIN
    63   0553   46   2C                    LSR TEMP3
    64   0555   90   00                    IFCS
    65   0557   18                         CLC
    66   0558   65   29                    ADC TEMP0
    67   0556   03                         ENDIF
    68   055A   0A                         ASL
    69   055B   08                         PHP
    70   055C   6A                         ROR
    71   055D   28                         PLP
    72   055E   6A                         ROR
    73   055F   CA                         DEX
    74   0560   10   F1                    MIEND
    75   0562   A6   2B                    LDX TEMP2
    76   0564   60                         RTS
```

```
                                        .SBTTL  DISPLAY-PULSAR PIC

                                PULPIC
0565                                    LDA I,TURQOI            ;PULSE OFF
0567  AC  0148                          LDY PULSON
056A  30    00                          IFPL
056C  A9    00                          LDA I,WHITE             ;PULSE ON
056B  02                                ENDIF
056E  85    9E                          STA COLOR               ;PULSAR COLOR
0570  AD  0148                          LDA PULSON              ;CALCULATE PIC #
0573  18                                CLC
0574  69    40                          ADC I,64.
0576  4A                                LSR
0577  4A                                LSR
0578  4A                                LSR
0579  4A                                LSR
057A  C9    05                          CMP I,5
057C  90    00                          IFCS
057E  A9    00                          LDA I,0
057D  02                                ENDIF
0580  A8                                TAY
0581  B9  059F                          LDA Y,PULTAB
0584  85    29                         STA TEMP0
0586  BD  0283                          LDA X,INVAC1
0589  30    00                          IFPL                    ;FLIPPING
058B  BC  02B9                          LDY X,INVAL1            ;NO. ON LINES
058E  A5    29                          LDA TEMP0               ;GET PIC #
0590  20  0BEA                          JSR ONELIN              ;DRAW PIC
0593  B8    50    00                    ELSE
058A  0B
0596  20  047E                          JSR IJMPDS              ;YES. SET UP SPECIAL COORDS
0599  A4    29                         LDY TEMP0
059B  20  0C15                          JSR ONELN2              ;FLIPPING PIC
0595  08                                ENDIF
059E  60                                RTS
059F  0D    0C    0B    0A    PULTAB    .BYTE CPULS0,CPULS1,CPULS2,CPULS3,CPULS4,CPULS4
05A3  09    09
```

DISPLAY-CHARGES

```
     1                                          .SBTTL  DISPLAY-CHARGES
     2   05A5                             DSPCHG
     3   05A5   A2    0B                        LDX I,NCHARG-1
     4   05A7   86    37                        STX INDEX1
     5                                          BEGIN                    ;LOOP FOR EACH CHARGE
     6   05A9   A6    37                        LDX INDEX1
     7   05AB   BD  02D3                        LDA X,CHARY
     8   05AE   F0    00                        IFNE                     ;ACTIVE
     9   05B0   85    57                        STA PYL                  ;YES. BOTH YS ARE SAME
    10   05B2   85    2F                        STA TEMPY
    11   05B4   E0    08                        CPX I,NPCHAR
    12   05B6   BC  02AD                        LDY X,CHARL1
    13   05B9   B0    00                        IFCC
    14   05BB   A9    00G                       LDA I,PTCURS             ;PLAYER SHOT
    15   05BD   B8    50    00                  ELSE
         05BA   05
    16   05C0   A5    03                        LDA QFRAME               ;ENEMY SHOT
    17   05C2   0A                              ASL
    18   05C3   29    06                        AND I,6
    19   05C5   18                              CLC
    20   05C6   69    00G                       ADC I,PTESHO
    21   05BF   08                              ENDIF
    22   05C8   20  0B47                        JSR SCAPIC
    23   05AF   1B                              ENDIF
    24   05CB   C6    37                        DEC INDEX1
    25   05CD   10    DA                        MIEND
    26   05CF   A0    04                        LDY I,ZYELLO             ;PLENTY
    27   05D1   AD  0135                        LDA CHACOU
    28   05D4   C9    06                        CMP I,NPCHARG-2
    29   05D6   90    00                        IFCS
    30   05D8   A0    0B                        LDY I,ZBLUE              ;LOW
    31   05DA   C9    08                        CMP I,NPCHARG
    32   05DC   90    00                        IFCS
    33   05DE   A0    0C                        LDY I,ZRED               ;OUT
    34   05DD   02                              ENDIF
    35   05D7   08                              ENDIF
    36   05E0   8C  0808                        STY COLPOR+PSHCTR        ;SET UP COLOR FOR CENTER OF PLAYER SOT
    37   05E3   60                              RTS
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 34
DISPLAY-EXPLOSIONS

     1                                          .SBTTL  DISPLAY-EXPLOSIONS
     2
     3   05E4                            DSPEXP
     4   05E4   A0    00                       LDY I,EXPCOL
     5   05E6   84    9E                       STY COLOR
     6   05E8   A2    07                       LDX I,NEXPLO-1
     7   05EA   86    37                       STX INDEX1
     8                                         BEGIN                    ;LOOP FOR EACH BANG
     9   05EC   A6    37                       LDX INDEX1
    10   05EE   BD  030A                       LDA X,EXPLOY
    11   05F1   F0    00                       IFNE                     ;ACTIVE BANG
    12   05F3   85    57                       STA PYL                  ;YES SAVE DEPTH
    13   05F5   BD  02FA                       LDA X,EXPLOL             ;SET UP GRID LINES
    14   05F8   85    29                       STA TEMP0
    15   05FA   BC  0302                       LDY X,EXPLOT             ;CALC. PICTURE TO USE
    16   05FD   C0    01                       CPY I,1
    17   05FF   D0    00                       IFEQ                     ;CHARGE-PLAYER
    18   0601   20  0635                       JSR CHPLKI               ;YES.
    19   0604   B8    50    00                 ELSE                     ;NO
         0600   06
    20   0607   BD  0312                       LDA X,EXPLOS
    21   060A   4A                            LSR
    22   060B   29    FE                       AND I,0FE
    23   060D   C0    02                       CPY I,2
    24   060F   90    00                       IFCS
    25   0611   A9    00                       LDA I,0                  ;NO SEQUENCE TYPE
    26   0610   02                            ENDIF
    27   0613   18                            CLC
    28   0614   79  062F                       ADC Y,TEXTYP
    29   0617   A4    29                       LDY TEMP0
    30   0619   20  0B47                       JSR SCAPIC               ;DO EXPLOSION PICTURE
    31   0606   15                            ENDIF
    32   05F2   29                            ENDIF
    33   061C   C6    37                       DEC INDEX1
    34   061E   10    CC                       MIEND
    35   0620   AD  0720             ZQPOKS          LDA QT4
    36   0623   F0    00                       IFNE                     ;POKEY DOESN T STOP
    37   0625   A5    9F                       LDA CURWAV
    38   0627   C9    0D                       CMP I,13.
    39   0629   90    00                       IFCS
    40   062B   8D  01FF                       STA 1FF                  ;KILL TOP OF STACK
    41   062A   03                            ENDIF
    42   0624   09                            ENDIF
    43   062E   60                            RTS
    44   062F                          TEXTYP                    ;START CODE FOR EACH BANG TYPE
    45   062F   00G                            .BYTE PTEXP1              ;CHARGE CHARGE, CHARGE INVADER
    46   0630   00                             .BYTE 0          ;CHARGE-PLAYER SEE SPECIAL
    47   0631   04G                            .BYTE PTFUSX+4            ;BUSE EXPL 1
    48   0632   02G                            .BYTE PTFUSX+2            ;FUSE EXPL 2
    49   0633   00G                            .BYTE PTFUSX+0            ;FUSE EXPLOSIN 3
    50   0634   00G                            .BYTE PTSPAR                    ;INVADER - PLAYER COLLISION
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 36
SPECIAL EXPLOSION CONTROL

     1                                          .SBTTL  SPECIAL EXPLOSION CONTROL
     2
     3   0635                             CHPLKI
     4   0635   A4    29                        LDY TEMPO
     5   0637   B9  0435                        LDA Y,LINEXM            ;SET UP MID PT
     6   063A   85    56                        STA PXL
     7   063C   B9  0445                        LDA Y,LINEZM
     8   063F   85    58                        STA PZL
     9   0641   20  0EE2                        JSR WORSCR              ;POSITION BEAM FOR EXPLOSION
    10   0644   A2    61                        LDX I,SXL
    11   0646   20  15AF                        JSR VGYAB1
    12   0649   AE  013B                        LDX SPXIND
    13   064C   CE  013C                        DEC SPFTIM
    14   064F   D0    00                        IFEQ                    ;UPDATE FRAME TIMER. DONE
    15   0651   E8                              INX                     ;YES. NEXT PICTURE
    16   0652   8E  013B                        STX SPXIND
    17   0655   BD  0674                        LDA X,TSPTIM
    18   0658   8D  013C                        STA SPFTIM
    19   0650   0A                              ENDIF
    20   065B   BC  0687                        LDY X,TSPCOD
    21   065E   30    00                        IFPL                    ;SPECIAL ROUTINE THIS FRAME
    22   0660   20  0698                        JSR SPECIAL             ;YES. DO IT
    23   065F   03                              ENDIF
    24   0663   AD  013B                        LDA SPXIND
    25   0666   0A                              ASL
    26   0667   18                              CLC
    27   0668   69    00G                       ADC I,PTSPLA            ;GET OFFSET INTO TABLE
    28   066A   A8                              TAY
    29   066B   BE  0000G                       LDX Y,PICHI
    30   066E   B9  0000G                       LDA Y,PICLO
    31   0671   4C  0000G                       JMP VGADD2              ;MOVE JSRL TO PICTURE TO DISPLAY LIST
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 37
SPECIAL EXPLOSION DATABASE

      1                                       .SBTTL  SPECIAL EXPLOSION DATABASE
      2
      3                                                                       ;
      4                                                                       ;# OF FRAME/PICTURE
      5                                                                       ;
      6   0674    02                  TSPTIM  .BYTE 2                         ;SPLAT6;CHARGE PLAYER EXPLOSION START
      7   0675    02                          .BYTE 2                         ;SLAT5
      8   0676    02                          .BYTE 2                         ;SPLAT4
      9   0677    02                          .BYTE 2                         ;SPLAT3
     10   0678    02                          .BYTE 2                         ;SPLAT2
     11   0679    04                          .BYTE 4                         ;SPLAT1
     12   067A    03                          .BYTE 3                         ;SPLAT3
     13   067B    02                          .BYTE 2                         ;SPLAT5
     14   067C    01                  PPSTART .BYTE 1                         ;SPLAT6;CHARGE PLAYER EXPLOSION FINISH;START PULSAR PLAYER BA
     15   067D    20                          .BYTE 20
     16   067E    03                  FPSTART         .BYTE 3                 ;FUSE PLAYER PICS
     17   067F    03                          .BYTE 3
     18   0680    03                          .BYTE 3
     19   0681    03                          .BYTE 3
     20   0682    03                          .BYTE 3
     21   0683    03                          .BYTE 3
     22   0684    03                          .BYTE 3
     23   0685  0685                .                 ;SHRAP
     24                                                                       ;
     25                                                                       ;SPECIAL SUBROUTINE FOR PICTURE
     26                                                                       ;
     27   0687    00                  TSPCOD  .BYTE 0                         ;SPLAT6-ALTER COLORS
     28   0688    02                          .BYTE 2                         ;SLAT5-ROTATE SPLAT COLORS
     29   0689    02                          .BYTE 2                         ;    4
     30   068A    02                          .BYTE 2                         ;    3
     31   068B    02                          .BYTE 2                         ;    2
     32   068C    02                          .BYTE 2                         ;    1
     33   068D    02                          .BYTE 2                         ;    3
     34   068E    02                          .BYTE 2                         ;    5
     35   068F    04                          .BYTE 4                         ;    6  GET SET FOR SHRAPNEL
     36   0690    06                          .BYTE 6                         ;SHRAP  CHANGE SCALE VARIABLE
     37   0691    FF                          .BYTE -1                        ;FUSE PLAYER - JUST PICS
     38   0692    FF                          .BYTE -1
     39   0693    FF                          .BYTE -1
     40   0694    FF                          .BYTE -1
     41   0695    FF                          .BYTE -1
     42   0696    FF                          .BYTE -1
     43   0697    FF                          .BYTE -1
     44         FFFF                 CPSPXI   -1
     45         0007                 PPSPXI   PPSTART-TSPTIM-1
     46         0009                 FPSPXI   FPSTART-TSPTIM-1
```

```
SPECIAL EXPLOSION FUNCTION

     1                                          .SBTTL  SPECIAL EXPLOSION FUNCTION
     2                                  ;
     3                                  ;INPUT Y INDEX INTO SUBROUTINE ADDRESS TABLE
     4                                  ;
     5  0698                            SPECIAL
     6  0698  B9  06A2                          LDA Y,XSUBR+1
     7  069B  48                                PHA
     8  069C  B9  06A1                          LDA Y,XSUBR
     9  069F  48                                PHA
    10  06A0  60                                RTS
    11
    12  06A1  06A8                      XSUBR   .WORD ALTCOL-1          ;ALTER REGULAR COLORS
    13  06A3  06BE                              .WORD ROTCOL-1          ;ROTATE EXPLOSIN COLORS
    14  06A5  06D1                              .WORD SETSHR-1          ;GET SET FOR SHRAPNEL
    15  06A7  06DF                              .WORD SHRSCA-1          ;CHANGE SCALE VARIABLE
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 39
SPECIAL EXPLOSION SUBROUTINE

      1                                       .SBTTL  SPECIAL EXPLOSION SUBROUTINE
      2                                                                       ;
      3                                                                       ;ALTER COLOR
      4                                                                       ;
      5   06A9                          ALTCOL
      6   06A9    A9    0C                      LDA I,ZRED                  ;SET UP SLAT COLORS
      7   06AB    8D  080B                      STA COLPOR+PDIRED
      8   06AE    85    24                      STA COLRAM+PDIRED
      9   06B0    A9    04                      LDA I,ZYELLOW
     10   06B2    8D  080A                      STA COLPOR+PDIYEL
     11   06B5    85    23                      STA COLRAM+PDIYEL
     12   06B7    A9    00                      LDA I,ZWHITE
     13   06B9    85    22                      STA COLRAM+PDIWHI
     14   06BB    8D  0809                      STA COLPOR+PDIWHI
     15   06BE    60                            RTS
     16                                                                       ;
     17                                                                       ;ROTATE COLORS FOR PLAYER EXPLOSION
     18                                                                       ;
     19   06BF    A4    22               ROTCOL  LDY COLRAM+PDIWHI
     20   06C1    A2    02                      LDX I,2
     21                                        BEGIN
     22   06C3    B5    22                      LDA X,COLRAM+PDIWHI
     23   06C5    48                            PHA
     24   06C6    94    22                      STY X,COLRAM+PDIWHI
     25   06C8    98                            TYA
     26   06C9    9D  0809                      STA X,COLPOR+PDIWHI
     27   06CC    68                            PLA
     28   06CD    A8                            TAY
     29   06CE    CA                            DEX
     30   06CF    10    F2                      MIEND
     31   06D1    60                            RTS
     32   06D2                          SETSHR                    ;GET SET FOR SHRAPNEL
     33   06D2    20  0FE0                      JSR INICOL                ;RESTORE COLORS
     34   06D5    A9    7F                      LDA I,7F                  ;INITIALIZE LINEAR   BINARY SCALES
     35   06D7    8D  0139                      STA SPLINE
     36   06DA    A9    04                      LDA I,4
     37   06DC    8D  013A                      STA SPBINA
     38   06DF    60                            RTS
     39   06E0                          SHRSCA                    ;CHANGE SHRAPNEL SCALE VARIABLE
     40   06E0    AD  0139                      LDA SPLINE
     41   06E3    8D  0000G                     STA SCALE                 ;LINEAR SCALE
     42   06E6    AD  013A                      LDA SPBINA
     43   06E9    09    70                      ORA I,70                  ;SCALE OPCODE
     44   06EB    8D  0000G                     STA SCAL1                 ;BINARY SCALE
     45   06EE    A9    C0                      LDA I,0C0                 ;RTSL
     46   06F0    8D  0000G                     STA SCAL3
     47   06F3    AD  0139                      LDA SPLINE                ;UPDATE SCALE  BIGGER
     48   06F6    38                            SEC
     49   06F7    E9    20                      SBC I,20
     50   06F9    10    00                      IFMI                      ;LINEAR OVERLFLOW
     51   06FB    29    7F                      AND I,7F                  ;YES.
     52   06FD    CE  013A                      DEC SPBINA                ;UPDATE BINARY
     53   06FA    05                            ENDIF
     54   0700    8D  0139                      STA SPLINE
     55   0703    60                            RTS
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 40
SPECIAL EXPLOSION SUBROUTINE

     1
     2                                        .SBTTL  DISPLAY BIG BOOM
     3   0704                              DSBOOM
     4   0704    A9    00                         LAH KILLER+1
         0705  0001G
     5   0706    A2    00                         LXL KILLER
         0707  0000G
     6   0708    20  0000G                        JSR VGJSRL              ;KILL BEAM KILLER
     7   070B    A9    00                         LDA I,0                 ;CLEAR CURRENT SCREEN POSITION
     8   070D    85    6A                         STA CURNTX
     9   070F    85    6B                         STA CURNTX+1
    10   0711    85    6C                         STA CURNTY
    11   0713    85    6D                         STA CURNTY+1
    12   0715    8D  0202                         STA CURSY
    13   0718    85    68                         STA ZADJL
    14   071A    85    69                         STA ZADJL+1
    15   071C    A9    E0                         LDA I,0E0
    16   071E    85    5F                         STA EYL
    17   0720    A9    FF                         LDA I,0FF
    18   0722    85    5B                         STA EYH
    19   0724    20  07B1                                 JSR WHICHB
    20   0727    85    77                         STA SVGLIST+1
    21   0729    86    76                         STX SVGLIST
    22                                                ;SET UP SUBROUTINE PC
    23   072B    A2    0F                         LDX I,NPARTI-1
    24   072D    86    37                         STX INDEX1
    25                                             BEGIN                   ;LOOP FOR EACH PARTICLE
    26   072F    A6    37                         LDX INDEX1
    27   0731    BD  0283                         LDA X,PARTIY
    28   0734    F0    00                         IFNE                    ;ACTIVE PARTICLE
    29   0736    85    57                         STA PYL
    30   0738    BD  0263                         LDA X,PARTIX
    31   073B    85    56                         STA PXL
    32   073D    BD  02A3                         LDA X,PARTIZ
    33   0740    85    58                         STA PZL
    34   0742    20  0EE2                         JSR WORSCR              ;PROJECT PT.
    35   0745    A9    00                         LDA I,0
    36   0747    85    73                         STA VGBRIT
    37   0749    20  078E                         JSR SWAPVG              ;SWAP POINTERS TO VG MAINLINE   SUBROUTINE
    38   074C    20  1204                         JSR CONNEC              ;DRAW VECTOR IN SUBROUTINE
    39   074F    A9    A0                         LDA I,0A0
    40   0751    20  03B4                         JSR VGDOT               ;DRAW DOT IN SUBROUTINE
    41   0754    20  078E                         JSR SWAPVG              ;SWAP MAINLINE TO VG PTRS.
    42   0757    A2    61                         LDX I,SXL
    43   0759    20  15BC                         JSR VGYABS
    44   075C    20  079F                         JSR CALMAG              ;CALCULATE MAGNIF FACTOR
    45   075F    20  0000G                        JSR VGSCAL              ;Y LINEAR;ACC BINARY;PLACE INTO MAINLINE
    46   0762    A5    37                         LDA INDEX1
    47   0764    29    07                         AND I,7
    48   0766    C9    07                         CMP I,7
    49   0768    D0    00                         IFEQ
    50   076A    A9    00                         LDA I,0
    51   0769    02                               ENDIF
    52   076C    A8                               TAY
    53   076D    84    9E                         STY COLOR
    54   076F    A9    08                         LDA I,MZCOLO
    55   0771    20  0000G                        JSR VGSTAT              ;PLACE INTO MAINLINE
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 40+
DISPLAY BIG BOOM

    56   0774   A9    00                      LDA I,MZBRIT
    57   0776   20  0000G                     JSR VGSTA1              ;SET INTENSITY
    58   0779   20  07B1                      JSR WHICHB
    59   077C   20  0000G                     JSR VGJSRL              ;PLACE JSRL TO SUBROUTINE INTO MAINLINE
    60   0735   49                            ENDIF
    61   077F   C6    37                      DEC INDEX1
    62   0781   10    AC                      MIEND
    63   0783   20  078E                      JSR SWAPVG              ;SWAP MAINLINE   SUBROUTINE PTRS.
    64   0786   A9    01                      LDA I,1                 ;AT END OF SUBROUTINE
    65   0788   20  0000G                     JSR VGSCA1              ;RESTORE SCALE
    66   078B   20  0000G                     JSR VGRTSL              ;RTS
    67   078E   A6    74              SWAPVG  LDX VGLIST              ;SWAP MAINLINE SUBROUTINE PTRS.
    68   0790   A4    75                      LDY VGLIST+1
    69   0792   A5    76                      LDA SVGLIST
    70   0794   85    74                      STA VGLIST
    71   0796   86    76                      STX SVGLIST
    72   0798   A5    77                      LDA SVGLIST+1
    73   079A   85    75                      STA VGLIST+1
    74   079C   84    77                      STY SVGLIST+1
    75   079E   60                            RTS
    76
    77   079F                         CALMAG
    78   079F   A5    57                      LDA PYL
    79   07A1   4A                            LSR
    80   07A2   4A                            LSR
    81   07A3   4A                            LSR
    82   07A4   4A                            LSR
    83   07A5   A0    00                      LDY I,0
    84                                        BEGIN
    85   07A7   C8                            INY
    86   07A8   4A                            LSR
    87   07A9   D0    FC                      EQEND
    88   07AB   18                            CLC
    89   07AC   69    02                      ADC I,2
    90   07AE   A0    00                      LDY I,0
    91   07B0   60                            RTS
    92   07B1                         WHICHB
    93   07B1   AD  0415G                     LDA BUFACT+BCINFO
    94   07B4   F0    00                      IFNE
    95   07B6   AD  0000G                     LDA BFAST1
    96   07B9   AE  0000G                     LDX BFASTA
    97   07BC   B8    50    00                ELSE
         07B5   09
    98   07BF   AD  0000G                     LDA BFBST1
    99   07C2   AE  0000G                     LDX BFBSTA
   100   07BE   06                            ENDIF
   101   07C5   60                            RTS
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 41
DISPLAY BIG BOOM

      1
      2                                          .SBTTL  TABLES-WELL COORDINATES WORLD
      3          00F0                    DG0      70+80
      4          00E7                    DG225    67+80
      5          00CF                    DG450    4F+80
      6          00AA                    DG675    2A+80
      7          0080                    DG900    0+80
      8   07C6    F0    E7    CF    AA    NEWLIX   .BYTE DG0,DG225,DG450,DG675,DG900       ;CIRCLE
          07CA    80
      9   07CB    56    31    19    10             .BYTE -DG675,-DG450,-DG225,-DG0
     10   07CF    19    31    56                   .BYTE -DG225,-DG450,-DG675
     11   07D2    80    AA    CF                   .BYTE DG900,DG675,DG450
     12   07D5    E7                       LCIRCL   .BYTE DG225
     13          00F0                    DI0      0F0
     14          00B8                    DI1      0B8
     15          0080                    DI2      80
     16          0048                    DI3      48
     17          0010                    DI4      10
     18   07D6    F0    F0    F0    B8             .BYTE DI0,DI0,DI0,DI1           ;SQUARE
     19   07DA    80    48    10    10             .BYTE DI2,DI3,DI4,DI4
     20   07DE    10    10    10    48             .BYTE DI4,DI4,DI4,DI3
     21   07E2    80    B8    F0                   .BYTE DI2,DI1,DI0
     22   07E5    F0                       LDIAMO   .BYTE DI0
     23          00F0                    CR0      70+80
     24          00F0                    CR1      70+80
     25          00B8                    CR2      38+80
     26          00B8                    CR3      38+80
     27          0080                    CR4      0+80
     28   07E6    F0    F0    B8    B8             .BYTE CR0,CR1,CR2,CR3,CR4       ;CROSS
          07EA    80
     29   07EB    48    48    10    10             .BYTE -CR3,-CR2,-CR1,-CR0
     30   07EF    10    48    48                   .BYTE -CR1,-CR2,-CR3
     31   07F2    80    B8    B8                   .BYTE CR4,CR3,CR2
     32   07F5    F0                       LCROSS   .BYTE CR1
     33          00EC                    PX0      6C+80
     34          00D5                    PX1      55+80
     35          00B1                    PX2      31+80
     36          0090                    PX3      10+80
     37          0094                    PZ0      14+80
     38          00B0                    PZ1      30+80
     39          00B8                    PZ2      38+80
     40          00A7                    PZ3      27+80
     41   07F6    EC    D5    B1    90             .BYTE PX0,PX1,PX2,PX3   ;PEANUT
     42   07FA    70    4F    2B    14             .BYTE -PX3,-PX2,-PX1,-PX0
     43   07FE    14    2B    4F    70             .BYTE -PX0,-PX1,-PX2,-PX3
     44   0802    90    B1    D5                   .BYTE PX3,PX2,PX1
     45   0805    EC                       LPEANU   .BYTE PX0
     46   0806    F0    C0    A0    94             .BYTE 0F0,0C0,0A0,94,6C,60,40,10        ;4 KEY
          080A    6C    60    40    10
     47   080E    10    40    60    6C             .BYTE 10,40,60,6C,94,0A0,0C0,0F0
          0812    94    A0    C0    F0
     48   0816    D9    C2    AC    97             .BYTE 0D9,0C2,0AC,97,80,69,52,3C,27,10  ;TRIANGLE
          081A    80    69    52    3C
          081E    27    10
     49   0820    35    5A    80    A6             .BYTE 35,5A,80,0A6,0CA,0F0
          0824    CA    F0
     50   0826    EA    E0    9C    80             .BYTE 0EA,0E0,9C,80,64,20,16,50         ;CLOVER
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 41+
TABLES-WELL COORDINATES WORLD

        082A    64    20    16    50
    51  082E    16    20    64    80          .BYTE 16,20,64,80,9C,0E0,0EA,0B0
        0832    9C    E0    EA    B0
    52  0836    10    1E    2C    3A          .BYTE 10,1E,2C,3A,48,56,64,70          ;V
        083A    48    56    64    70
    53  083E    90    9E    AC    BA          .BYTE 90,9E,0AC,0BA,0C8,0D6,0E4,0F0
        0842    C8    D6    E4    F0
    54  0846    10    1E    2D    3C          .BYTE 10,1E,2D,3C,4B,5A,69,78,87       ;PLANE
        084A    4B    5A    69    78
        084E    87
    55  084F    96    A5    B4    C3          .BYTE 96,0A5,0B4,0C3,0D2,0E1,0F0
        0853    D2    E1    F0
    56  0856    10    10    10    10          .BYTE 10,10,10,10,16,29,46,69,97       ;U
        085A    16    29    46    69
        085E    97
    57  085F    BA    D7    EA    F0          .BYTE 0BA,0D7,0EA,0F0,0F0,0F0,0F0
        0863    F0    F0    F0
    58  0866    10    24    30    36          .BYTE 10,24,30,36,3E,49,5A,75   ;JAGGED
        086A    3E    49    5A    75
    59  086E    94    A4    AC    BA          .BYTE 94,0A4,0AC,0BA,0DA,0E2,0EA,0F0
        0872    DA    E2    EA    F0
    60                                                ;
    61  0876    80    70    48    20          .BYTE 80,70,48,20       ;LYING 8
    62  087A    10    20    48    70          .BYTE 10,20,48,70
    63  087E    80    90    B8    E0          .BYTE 80,90,0B8,0E0
    64  0882    F0    E0    B8    90          .BYTE 0F0,0E0,0B8,90
    65                                                ;
    66  0886    DA    A4    87    80          .BYTE 0DA,0A4,87,80,79,5C,26,10 ;HEART
        088A    79    5C    26    10
    67  088E    10    20    48    80          .BYTE 10,20,48,80,0B8,0E0,0F0,0F0
        0892    B8    E0    F0    F0
    68  0896    10    10    30    30          .BYTE 10,10,30,30,50,50,70,70   ;STAIRCASE
        089A    50    50    70    70
    69  089E    90    90    B0    B0          .BYTE 90,90,0B0,0B0,0D0,0D0,0F0,0F0
        08A2    D0    D0    F0    F0
    70  08A6    B0    80    50    47          .BYTE 0B0,80,50,47,18,30,18,47          ;STAR X
        08AA    18    30    18    47
    71  08AE    50    80    B0    B9          .BYTE 50,80,0B0,0B9,0E8,0D4,0E8,0B9
        08B2    E8    D4    E8    B9
    72  08B6    10    1E    21    28          .BYTE 10,1E,21,28,3C,55,66,73           ;WAVE X
        08BA    3C    55    66    73
    73  08BE    8D    9A    AB    C4          .BYTE 8D,9A,0AB,0C4,0D8,0DF,0E2,0F0
        08C2    D8    DF    E2    F0
    74  08C6    80    AA    CF    E7  NEWLIZ   .BYTE DG900,DG675,DG450,DG225,DG0       ;CIRCLE
        08CA    F0
    75  08CB    E7    CF    AA    80          .BYTE DG225,DG450,DG675,DG900
    76  08CF    56    31    19    10          .BYTE -DG675,-DG450,-DG225,-DG0
    77  08D3    19    31    56                .BYTE -DG225,-DG450,-DG675
    78
    79  08D6    80    B8    F0    F0          .BYTE DI2,DI1,DI0,DI0
    80  08DA    F0    F0    F0    B8          .BYTE DI0,DI0,DI0,DI1
    81  08DE    80    48    10    10          .BYTE DI2,DI3,DI4,DI4
    82  08E2    10    10    10    48          .BYTE DI4,DI4,DI4,DI3
    83  08E6    80    B8    B8    F0          .BYTE CR4,CR3,CR2,CR1,CR0       ;CROSS
        08EA    F0
    84  08EB    F0    B8    B8    80          .BYTE CR1,CR2,CR3,CR4
    85  08EF    48    48    10    10          .BYTE -CR3,-CR2,-CR1,-CR0
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 41+
TABLES-WELL COORDINATES WORLD

    86   08F3   10   48   48              .BYTE -CR1,-CR2,-CR3
    87
    88   08F6   94   B0   B8   A7         .BYTE PZ0,PZ1,PZ2,PZ3          ;PEANUT
    89   08FA   A7   B8   B0   94         .BYTE PZ3,PZ2,PZ1,PZ0
    90   08FE   6C   50   48   59         .BYTE -PZ0,-PZ1,-PZ2,-PZ3
    91   0902   59   48   50   6C         .BYTE -PZ3,-PZ2,-PZ1,-PZ0
    92                                     ;
    93   0906   96   A3   C5   F0         .BYTE 96,0A3,0C5,0F0,0F0,0C5,0A3,96    ;4 KEY
         090A   F0   C5   A3   96
    94   090E   6A   5D   3B   10         .BYTE 6A,5D,3B,10,10,3B,5D,6A
         0912   10   3B   5D   6A
    95   0916   3D   6A   97   C4         .BYTE 3D,6A,97,0C4,0F0,0C4,97,6A,3D    ;TRIANGLE
         091A   F0   C4   97   6A
         091E   3D
    96   091F   10   10   10   10         .BYTE 10,10,10,10,10,10,10
         0923   10   10   10
    97   0926   A0   E0   EA   B0         .BYTE 0A0,0E0,0EA,0B0,0EA,0E0,0A0,80   ;CLOVER
         092A   EA   E0   A0   80
    98   092E   60   20   16   50         .BYTE 60,20,16,50,16,20,60,80
         0932   16   20   60   80
    99   0936   F0   D0   B0   90         .BYTE 0F0,0D0,0B0,90    ;V
   100   093A   70   50   30   10         .BYTE 70,50,30,10
   101   093E   10   30   50   70         .BYTE 10,30,50,70
   102   0942   90   B0   D0   F0         .BYTE 90,0B0,0D0,0F0
   103        0010                        .REPT 10                ;PLANE  LOW
   104                                    .BYTE 40
   105   0946   40   40   40   40         .ENDR
         094A   40   40   40   40
         094E   40   40   40   40
         0952   40   40   40   40
   106   0956   F0   CB   A6   80         .BYTE 0F0,0CB,0A6,80,5C,39,20,12       ;U
         095A   5C   39   20   12
   107   095E   12   20   39   5C         .BYTE 12,20,39,5C,80,0A6,0CB,0F0
         0962   80   A6   CB   F0
   108                                    ;
   109   0966   C0   A6   8A   6A         .BYTE 0C0,0A6,8A,6A,4A,2F,14,24 ;JAGGED
         096A   4A   2F   14   24
   110   096E   20   39   59   75         .BYTE 20,39,59,75,72,90,0B0,0D0
         0972   72   90   B0   D0
   111                                    ;
   112   0976   80   57   48   57         .BYTE 80,57,48,57       ;BIG 8
   113   097A   80   A9   BA   A9         .BYTE 80,0A9,0BA,0A9    ;
   114   097E   80   57   48   57         .BYTE 80,57,48,57
   115   0982   80   A9   BA   A9         .BYTE 80,0A9,0BA,0A9
   116                                    ;
   117   0986   E4   E8   B7   80         .BYTE 0E4,0E8,0B7,80,0B7,0E8,0E4,0B2   ;HEART
         098A   B7   E8   E4   B2
   118   098E   7A   47   20   10         .BYTE 7A,47,20,10,20,47,7A,0B2
         0992   20   47   7A   B2
   119   0996   90   70   70   50         .BYTE 90,70,70,50,50,30,30,10   ;STAIRCASE
         099A   50   30   30   10
   120   099E   10   30   30   50         .BYTE 10,30,30,50,50,70,70,90
         09A2   50   70   70   90
   121   09A6   E6   D0   E6   B9         .BYTE 0E6,0D0,0E6,0B9,0AE,80,52,47     ;STAR Z
         09AA   AE   80   52   47
   122   09AE   14   30   14   47         .BYTE 14,30,14,47,52,80,0AE,0B9
         09B2   52   80   AE   B9
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 41+
TABLES-WELL COORDINATES WORLD

   123   09B6   7E   6A   51   3A            .BYTE 7E,6A,51,3A,2C,2C,38,4E           ;WAVE Z
         09BA   2C   2C   38   4E
   124   09BE   4E   38   2C   2C            .BYTE 4E,38,2C,2C,3A,51,6A,7E
         09C2   3A   51   6A   7E
   125   09C6   05   06   07   08  ILINANG .BYTE 5,6,7,8,9,10.,11.,12.,13.,14.,15.,0,1,2,3,4      ;CIRCLE
         09CA   09   0A   0B   0C
         09CE   0D   0E   0F   00
         09D2   01   02   03   04
   126   09D6   04   04   08   08            .BYTE 4,4,8,8,8,8,0C,0C,0C,0C,0,0,0,0,4,4      ;SQUARE
         09DA   08   08   0C   0C
         09DE   0C   0C   00   00
         09E2   00   00   04   04
   127   09E6   04   08   04   08            .BYTE 4,8,4,8,8,0C,8,0C,0C,0,0C,0,0,4,0,4      ;CROSS
         09EA   08   0C   08   0C
         09EE   0C   00   0C   00
         09F2   00   04   00   04
   128   09F6   06   07   09   08            .BYTE 6,7,09,8,7,9,0A,0C,0E,0F,1,0,0F,01,02,4  ;PEANUT
         09FA   07   09   0A   0C
         09FE   0E   0F   01   00
         0A02   0F   01   02   04
   129   0A06   07   06   05   08            .BYTE 7,6,5,8,0B,0A,9,0C,0F,0E,0D,0,3,2,1,4    ;4 KEY
         0A0A   0B   0A   09   0C
         0A0E   0F   0E   0D   00
         0A12   03   02   01   04
   130   0A16   05   05   05   05            .BYTE 5,5,5,5,0B,0B,0B,0B,0B,0,0,0,0,0,0,5     ;TRIANGLE
         0A1A   0B   0B   0B   0B
         0A1E   0B   00   00   00
         0A22   00   00   00   05
   131   0A26   04   08   0B   05            .BYTE 4,8,0B,5,8,0C,0E,9,0C,0,3,0D,0,4,7,2     ;CLOVER
         0A2A   08   0C   0E   09
         0A2E   0C   00   03   0D
         0A32   00   04   07   02
   132   0A36   0D   0D   0D   0D            .BYTE 0D,0D,0D,0D,0D,0D,0D,0,3,3,3,3,3,3,3,0   ;V
         0A3A   0D   0D   0D   00
         0A3E   03   03   03   03
         0A42   03   03   03   00
   133   0A46   00   00   00   00            .BYTE 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0          ;FLAT
         0A4A   00   00   00   00
         0A4E   00   00   00   00
         0A52   00   00   00   00
   134   0A56   0C   0C   0C   0D            .BYTE 0C,0C,0C,0D,0E,0F,0F,0,1,1,2,3,4,4,4,0   ;U
         0A5A   0E   0F   0F   00
         0A5E   01   01   02   03
         0A62   04   04   04   00
   135   0A66   0E   0D   0C   0D            .BYTE 0E,0D,0C,0D,0D,0D,1,0F,2,3,3,0,3,3,3,0;JAGGED
         0A6A   0D   0D   01   0F
         0A6E   02   03   03   00
         0A72   03   03   03   00
   136   0A76   0B   09   07   05            .BYTE 0B,9,7,5,3,1,0F,0D,0D,0F,1,3,5,7,9,0B    ;LYING 8
         0A7A   03   01   0F   0D
         0A7E   0D   0F   01   03
         0A82   05   07   09   0B
   137   0A86   08   0B   0C   04            .BYTE 8,0B,0C,4,5,8,0B,0C,0D,0E,0F,1,2,3,4,5;HEART
         0A8A   05   08   0B   0C
         0A8E   0D   0E   0F   01
         0A92   02   03   04   05
   138   0A96   0C   00   0C   00            .BYTE 0C,0,0C,0,0C,0,0C,0,4,0,4,0,4,0,4,0      ;STAIRCASE
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 41+
TABLES-WELL COORDINATES WORLD

        0A9A    0C    00    0C    00
        0A9E    04    00    04    00
        0AA2    04    00    04    00
  139   0AA6    0A    06    0C    08          .BYTE 0A,6,0C,8,0E,0A,0,0C              ;STAR ANGLES
        0AAA    0E    0A    00    0C
  140   0AAE    02    0E    04    00          .BYTE 2,0E,4,0,6,2,8,4
        0AB2    06    02    08    04
  141   0AB6    0E    0C    0D    0E          .BYTE 0E,0C,0D,0E,0,2,2,0               ;WAVE ANGLES
        0ABA    00    02    02    00
  142   0ABE    0E    0E    00    02          .BYTE 0E,0E,0,2,3,4,2,0
        0AC2    03    04    02    00
  143                                                                               ;
  144                                                                               ;OTHER WELL PARAMETERS
  145                                                                               ;
  146   0AC6    00    01    02    03  WELSEQ  .BYTE 0,1,2,3,4,5,6,7,0D,9,8,0C,0E,0F,0A,0B    ;WELL ID SEQUENCE WAVE
        0ACA    04    05    06    07
        0ACE    0D    09    08    0C
        0AD2    0E    0F    0A    0B
  147   0AD6                      WELSEN                                            ;
  148   0AD6    18    1C    18    0F  HOLEYL  .BYTE 18,1C,18,0F,18,18,18,18,0A,18,10,0F,18,0C,14,0A        ;EYE POSITION  Y
        0ADA    18    18    18    18
        0ADE    0A    18    10    0F
        0AE2    18    0C    14    0A
  149   0AE6    50    50    50    68  HOLEZL  .BYTE 50,50,50,68,50,50,68,0B0,0A0,50,90,80,20,0B0,60,0A0      ;EYE POSITION  Z
        0AEA    50    50    68    B0
        0AEE    A0    50    90    80
        0AF2    20    B0    60    A0
  150   0AF6    40    20    40    80  HOLZAD  .BYTE 40,20,40,80,40,40,70,60,0,20,40,0,0A0,40,40,0;CENTER ADJUST
        0AFA    40    40    70    60
        0AFE    00    20    40    00
        0B02    A0    40    40    00
  151   0B06    FF    FF    FF    FF  HOLZDH  .BYTE 0FF,0FF,0FF,0FF,0FF,0FF,0FF,0,1,0FF,0,0,0FE,1,0FF,1
        0B0A    FF    FF    FF    00
        0B0E    01    FF    00    00
        0B12    FE    01    FF    01
  152   0B16    00    00    00    00  HOLRAP  .BYTE 0,0,0,0,0,0,0,-1,-1,-1,-1,0,0,-1,0,-1     ;PLANAR -1 /CLOSED 0  FLAG
        0B1A    00    00    00    FF
        0B1E    FF    FF    FF    00
        0B22    00    FF    00    FF
  153   0B26    00    00    60    40  WELLIS  .BYTE 0,0,60,40,0,0,48,40,50,28,50,0,0,50,0,40  ;LINEAR SCALE FOR JUMPER
        0B2A    00    00    48    40
        0B2E    50    28    50    00
        0B32    00    50    00    40
  154   0B36    04    04    03    04  WELBIN  .BYTE 4,4,3,4,4,4,3,4,5,4,4,4,4,4,4,5   ;BINARY SCALE FOR JUMPER
        0B3A    04    04    03    04
        0B3E    05    04    04    04
        0B42    04    04    04    05
  155   0B46    00G                 CHKSM7          .BYTE QCHKS7
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 43
TABLES-WELL COORDINATES WORLD

     1
     2                                        .SBTTL UTILITY - DISPLAY PIC BETWEEN PTS.
     3                                ;FUNCTION  DISPLAY A PICTURE CENTERED BETWEEN 2 POINTS AND SCALED
     4                                ;       DOWN ACCORDING TO ITS DEPTH
     5                                ;
     6
     7                                ;INPUT  X   INDEX INTO LINEX,Z OF 1ST PT S X   Z WC WORDS
     8                                ;       Y   INDEX INTO LINEX,Z OF 2ND PT S X   Z WC WORDS
     9                                ;       COLOR COLOR OF OBJECT
    10                                ;       PYL   Y WC COORD FOR BOTH PTS.
    11                                ;       ACC   CODE FOR PICTURE TO DISPLAY  INDEX INTO PICLO
    12  0B47                          SCAPIC
    13  0B47  85   55                         STA OBJIND
    14  0B49  B9 0435                         LDA Y,LINEXM            ;CALCULATE X COORD. OF MIDWAY PT.
    15  0B4C  85   56                         STA PXL
    16  0B4E  B9 0445                         LDA Y,LINEZM            ;CALCULATE Z COORD OF MIDWAYPT.
    17  0B51  85   58                         STA PZL
    18                                ;
    19                                ;INPUT  PX,Y,Z LOC OF OBJECT
    20                                ;       OBJIND INDEX INTO PTR. TABLE
    21                                ;       COLOR COLOR OF OBJECT
    22  0B53                          SCAPI2
    23  0B53  20 0EE2                         JSR WORSCR              ;PROJECT MIDWAY PT. ONTO SCREEN.
    24
    25  0B56  A2   61                         LDX I,SXL
    26  0B58  20 15AF                         JSR VGYAB1                ;DRAW BLANK VECTOR TO MIDWAY PT.
    27  0B5B  A9   00                         LDA I,0           ;START AT VGLIST
    28  0B5D  85   A9                         STA VGY
    29  0B5F  20 0B88                         JSR CASCAL              ;CALCULATE SCALE FOR PT.
    30  0B62  A5   78                         LDA BFACTR
    31  0B64  49   07                         EOR I,7
    32  0B66  0A                              ASL
    33  0B67  C9   0A                         CMP I,0A
    34  0B69  B0   00                         IFCC
    35  0B6B  A9   0A                         LDA I,0A
    36  0B6A  02                              ENDIF
    37  0B6D  0A                              ASL
    38  0B6E  0A                              ASL
    39  0B6F  0A                              ASL
    40  0B70  0A                              ASL
    41  0B71  91   74                         STA NY,VGLIST           ;BRIGHTNESS
    42  0B73  C8                              INY
    43  0B74  A9   60                         LDA I,60
    44  0B76  91   74                         STA NY,VGLIST
    45  0B78  C8                              INY
    46  0B79  84   A9                         STY VGY
    47  0B7B  A4   55                         LDY OBJIND
    48  0B7D  BE 0000G                        LDX Y,PICHI
    49  0B80  B9 0000G                        LDA Y,PICLO
    50  0B83  A4   A9                         LDY VGY
    51  0B85  4C 0000G                        JMP VGADD3              ;DRAW PIC AT PT.
    52                                ;RTS
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 44
UTILITY - DERIVE BINARY AND LINEAR SCALE FACTORS GIVEN DEPTH

     1                                        .SBTTL UTILITY - DERIVE BINARY AND LINEAR SCALE FACTORS GIVEN DEPTH
     2                              ;INPUT    PYL    OBJECT DEPTH       ;EYL,H EYEPOSITION
     3                              ;         VGY OFFSET INTO VGLIST
     4                              ;OUTPUT BFACTR,BINARY TO LINEAR SCALE FACTORS READY FOR VGSCAL
     5                              ;         ACC    BFACTR             ;Y LFACTR
     6  0B88                        CASCAL
     7
     8
     9  0B88   A5    57                     LDA PYL                    ;CALCULATE YDELTAS
    10  0B8A   C9    10                     CMP I,10                   ;***
    11  0B8C   90    00                     IFCS
    12  0B8E   38                           SEC
    13  0B8F   E5    5F                     SBC EYL
    14  0B91   8D  6095                     STA MXPL
    15  0B94   A9    00                     LDA I,0
    16  0B96   E5    5B                     SBC EYH
    17  0B98   8D  6096                     STA MXPH                   ;   Y DELTA FOR PT TO DISPLAY
    18  0B9B   A9    18                     LDA I,18                   ;SET UP MATH BOX TO GIVE FRACTIONAL PORTION
    19  0B9D   8D  608C                     STA MNL                    ;OF QUOTIENT IN MYHIGH AND MYLOW
    20
    21  0BA0   A5    A0                     LDA YDEUNI                 ;***
    22  0BA2   8D  608E                     STA MZLH                   ;   Y DELTA FOR SCALE   1
    23  0BA5   8D  6094                     STA MSZXD                  ;START DIVIDE  Z/X
    24
    25                                     BEGIN
    26  0BA8   2C  6040                     BIT MSTAT
    27  0BAB   30    FB                     PLEND                      ;EXIT LOOP WHEN DIVIDE IS DONE
    28
    29  0BAD   AD  6060                     LDA MYLOW                  ;RESULT IS SCALE FACTOR
    30  0BB0   85    79                     STA SCFL
    31  0BB2   AD  6070                     LDA MYHIGH
    32  0BB5   85    7A                     STA SCFL+1
    33  0BB7   A2    0F                     LDX I,0F                   ;RESTORE MATH BOX QUOTIENT SIZE
    34  0BB9   8E  608C                     STX MNL
    35  0BBC   38                           SEC
    36  0BBD   E9    01                     SBC I,1
    37  0BBF   D0    00                     IFEQ
    38  0BC1   A9    01                     LDA I,01
    39  0BC0   02                           ENDIF
    40  0BC3   A2    00                     LDX I,0
    41                                     BEGIN
    42  0BC5   E8                           INX
    43  0BC6   06    79                     ASL SCFL
    44  0BC8   2A                           ROL
    45  0BC9   90    FA                     CSEND
    46
    47  0BCB   4A                           LSR
    48  0BCC   49    7F                     EOR I,7F
    49  0BCE   18                           CLC
    50  0BCF   69    01                     ADC I,1
    51  0BD1   A8                           TAY
    52  0BD2   8A                           TXA
    53  0BD3   B8    50    00               ELSE
        0B8D   48
    54  0BD6   A9    01                     LDA I,1                    ;SET MAX SCALE FACTOR 1
    55  0BD8   A0    00                     LDY I,0
    56  0BD5   04                           ENDIF
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 44+
UTILITY - DERIVE BINARY AND LINEAR SCALE FACTORS GIVEN DEPTH

    57   0BDA   85   78                    STA BFACTR
    58   0BDC   48                         PHA
    59   0BDD   98                         TYA
    60   0BDE   A4   A9                    LDY VGY
    61   0BE0   91   74                    STA NY,VGLIST          ;LINEAR FACTOR
    62   0BE2   C8                         INY
    63   0BE3   68                         PLA
    64   0BE4   09   70                    ORA I,70               ;SCALE OPCODE
    65   0BE6   91   74                    STA NY,VGLIST          ;BINARY FACTOR
    66   0BE8   C8                         INY                    ;RETURN WITH Y PT TO NEXT VG SLOT
    67   0BE9   60                         RTS
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 45
UTILITY-DRAW OBJECT BETWEEN POINTS

      1                                       .SBTTL UTILITY-DRAW OBJECT BETWEEN POINTS
      2                                ;INPUT
      3                                ;       Y INDEX INTO LEXEX,LINEZ OF 2ND POINT S X   Z WC COORDS
      4                                ;
      5                                ;ACC     INDEX INTO PCOUNT   PINDEX, USED TO SET UP INDEX1 AND SUBCOU
      6                                ;       INDEX1 OFFSET INTO SUBVEC
      7                                ;              ARRAYS OF 1ST VECTOR PARAMETERE OF OBJECT
      8                                ;       SUBCOU # OF VECTORS TO BE DRAWN
      9                                ;       PYL, 1ST POINT  WC
     10   0BEA                        ONELIN
     11   0BEA   85   36                      STA SAVEY
     12   0BEC   B9  03CE                     LDA Y,LINEX
     13   0BEF   85   56                      STA PXL
     14   0BF1   B9  03DE                     LDA Y,LINEZ
     15   0BF4   85   58                      STA PZL
     16   0BF6   A5   57                      LDA PYL
     17   0BF8   85   2F                      STA TEMPY
     18   0BFA   98                           TYA
     19   0BFB   18                           CLC                    ;CALCULATE ADJACENT CW LINE #
     20   0BFC   69   01                      ADC I,1
     21   0BFE   29   0F                      AND I,0F
     22   0C00   AA                           TAX
     23   0C01   BD  03CE                     LDA X,LINEX
     24   0C04   85   2E                      STA TEMPX
     25   0C06   BD  03DE                     LDA X,LINEZ
     26   0C09   85   30                      STA TEMPZ
     27   0C0B   A9   00                      LDA I,0                ;SET UP FOR 1,16. SCALE
     28   0C0D   85   59                      STA LINSCA
     29   0C0F   A9   04                      LDA I,4
     30   0C11   85   5A                      STA BINSCA
     31   0C13   A4   36                      LDY SAVEY
     32                           ;INPUT     Y PIC ID
     33                           ;          TEMPX,TEMPY,TEMPZ RIGHT PT.WC
     34                           ;          PXL,PYL,PZL LEFT PT.WC
     35   0C15                    ONELN2                             ;INPUT  Y PIC #
     36   0C15   A5   5B                      LDA EYH
     37   0C17   30   00                      IFPL                   ;IF LINE WOULD BE BEHIND EYE
     38   0C19   A5   57                      LDA PYL
     39   0C1B   C5   5F                      CMP EYL
     40   0C1D   B0   00                      IFCC
     41   0C1F   60                           RTS                    ;THEN ABORT LINE
     42   0C1E   01                           ENDIF
     43   0C18   07                           ENDIF
     44   0C20   B9  0E00                     LDA Y,PCOUNT
     45   0C23   85   99                      STA SUBCOU
     46   0C25   B9  0E0E                     LDA Y,PINDEX
     47   0C28   85   38                      STA INDEX2
     48   0C2A   A4   9E                      LDY COLOR
     49   0C2C   A9   08                      LDA I,MZCOLO
     50   0C2E   20  0000G                    JSR VGSTAT             ;SET BEAM COLOR
     51                                       ;JSR SETINT            ;SET INTENSITY AS FUNC OF PYL
     52   0C31   20  0EE2                     JSR WORSCR             ;PROJECT 1ST POINT ONTO SCREEN
     53   0C34   A2   61                      LDX I,SXL
     54   0C36   20  15AF                     JSR VGYAB1             ;POSITION BEAM AT 1ST POINT
     55                                                              ;SAVE SCREEN COORDS OF 1ST POINT
     56   0C39   A5   2E                      LDA TEMPX
     57   0C3B   85   56                      STA PXL
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 45+
UTILITY-DRAW OBJECT BETWEEN POINTS

    58   0C3D   A5   2F                    LDA TEMPY
    59   0C3F   85   57                    STA PYL
    60   0C41   A5   30                    LDA TEMPZ
    61   0C43   85   58                    STA PZL
    62   0C45   20  0EE2                   JSR WORSCR          ;PROJECT 2ND POINT ONTO SCREEN
    63                                                         ;CALCULATE + AND - UNIT AND PERPENDICULAR
    64                                                         ;UNIT VECTORS FOR THESE 2 POINTS
    65   0C48   A4   59                    LDY LINSCA
    66   0C4A   A5   5A                    LDA BINSCA
    67   0C4C   20  0000G                  JSR VGSCAL          ;REDUCE SCALE BY APPROX. 1/16.
    68   0C4F   A5   61                    LDA SXL             ;CALCULATE VECTOR FROM ONE ENDPT TO OTHER
    69   0C51   38                         SEC                 ;IN SCREEN UNITS  UNIT VECTOR
    70   0C52   E5   6A                    SBC CURNTX
    71   0C54   85   79                    STA X1L
    72   0C56   A5   62                    LDA SXH
    73   0C58   E5   6B                    SBC CURNTX+1
    74   0C5A   85   9B                    STA UNITXH
    75   0C5C   30   00                    IFPL                ;MAXIMIZE AT 1 BYTE
    76   0C5E   F0   00                    IFNE                ;PLUS.   1 BYTE
    77   0C60   A9   FF                    LDA I,0FF           ;YES MAX OUT
    78   0C62   85   79                    STA X1L
    79   0C5F   04                         ENDIF
    80   0C64   B8   50    00             ELSE
         0C5D   09
    81   0C67   C9   FF                    CMP I,-1            ;MINUS.
    82   0C69   F0   00                    IFNE                ;  1 BYTE
    83   0C6B   A9   FF                    LDA I,0FF           ;YES. MAX OUT
    84   0C6D   B8   50    00             ELSE
         0C6A   05
    85   0C70   A5   79                    LDA X1L          ;NO. NEGATE FOR ABS VALUE
    86   0C72   49   FF                    EOR I,0FF
    87   0C74   18                         CLC
    88   0C75   69   01                    ADC I,1
    89   0C77   90   00                    IFCS
    90   0C79   A9   FF                    LDA I,0FF
    91   0C78   02                         ENDIF
    92   0C6F   0B                         ENDIF
    93   0C7B   85   79                    STA X1L
    94   0C66   16                         ENDIF
    95   0C7D   A5   63                    LDA SZL
    96   0C7F   38                         SEC
    97   0C80   E5   6C                    SBC CURNTY
    98   0C82   85   89                    STA Z1L
    99   0C84   A5   64                    LDA SZH
   100   0C86   E5   6D                    SBC CURNTY+1
   101   0C88   85   9D                    STA UNITZH
   102
   103   0C8A   30   00                    IFPL                ;MAXIMIZE AT 1 BYTE
   104   0C8C   F0   00                    IFNE                ;PLUS.   1 BYTE
   105   0C8E   A9   FF                    LDA I,0FF           ;YES. MAX OUT
   106   0C90   85   89                    STA Z1L
   107   0C8D   04                         ENDIF
   108   0C92   B8   50    00             ELSE
         0C8B   09
   109   0C95   C9   FF                    CMP I,-1            ;MINUS.   BYTE
   110   0C97   F0   00                    IFNE                ;
   111   0C99   A9   FF                    LDA I,0FF           ;YES. MAX OUT
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 45+
UTILITY-DRAW OBJECT BETWEEN POINTS

   112   0C9B   B8   50   00                ELSE
         0C98   05
   113   0C9E   A5   89                     LDA Z1L                 ;NO. NEGATE FOR ABS. VALUE
   114   0CA0   49   FF                     EOR I,0FF
   115   0CA2   18                          CLC
   116   0CA3   69   01                     ADC I,1
   117   0C9D   07                          ENDIF
   118   0CA5   85   89                     STA Z1L
   119   0C94   12                          ENDIF
   120   0CA7   A9   00                     LDA I,0
   121   0CA9   85   82                     STA X2H
   122   0CAB   85   92                     STA Z2H
   123                           ;90 CYCLES FOR X          ;CALCULATE UNITXL X 0 THRU 7
   124   0CAD   A5   79                     LDA X1L
   125   0CAF   0A                          ASL
   126   0CB0   26   82                     ROL X2H                 ;X2
   127   0CB2   85   7A                     STA X2L
   128   0CB4   0A                          ASL
   129   0CB5   85   7C                     STA X4L                 ;X4
   130   0CB7   A5   82                     LDA X2H
   131   0CB9   2A                          ROL
   132   0CBA   85   84                     STA X4H
   133   0CBC   A5   7C                     LDA X4L
   134                           ;CLC
   135   0CBE   65   79                     ADC X1L
   136   0CC0   85   7D                     STA X5L                 ;X5
   137   0CC2   A5   84                     LDA X4H
   138   0CC4   69   00                     ADC I,0
   139   0CC6   85   85                     STA X5H
   140   0CC8   A5   7A                     LDA X2L
   141                           ;CLC
   142   0CCA   65   79                     ADC X1L
   143   0CCC   85   7B                     STA X3L                 ;X3
   144   0CCE   A5   82                     LDA X2H
   145   0CD0   69   00                     ADC I,0
   146   0CD2   85   83                     STA X3H
   147   0CD4   85   86                     STA X6H                 ;X6
   148   0CD6   A5   7B                     LDA X3L
   149   0CD8   0A                          ASL
   150   0CD9   85   7E                     STA X6L
   151   0CDB   26   86                     ROL X6H
   152                           ;CLC
   153   0CDD   65   79                     ADC X1L
   154   0CDF   85   7F                     STA X7L                 ;X7
   155   0CE1   A5   86                     LDA X6H
   156   0CE3   69   00                     ADC I,0
   157   0CE5   85   87                     STA X7H
   158                                                           ;90 CYCLES FOR Z
   159                                                           ;CALCULATE UNITZL X 0 THRU 7
   160   0CE7   A5   89                     LDA Z1L
   161   0CE9   0A                          ASL
   162   0CEA   26   92                     ROL Z2H
   163   0CEC   85   8A                     STA Z2L                 ;X2
   164   0CEE   0A                          ASL
   165   0CEF   85   8C                     STA Z4L
   166   0CF1   A5   92                     LDA Z2H
   167   0CF3   2A                          ROL
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 45+
UTILITY-DRAW OBJECT BETWEEN POINTS

   168   0CF4   85   94                    STA Z4H                ;X4
   169   0CF6   A5   8C                    LDA Z4L
   170                              ;CLC
   171   0CF8   65   89                    ADC Z1L
   172   0CFA   85   8D                    STA Z5L                ;X5
   173   0CFC   A5   94                    LDA Z4H
   174   0CFE   69   00                    ADC I,0
   175   0D00   85   95                    STA Z5H
   176   0D02   A5   8A                    LDA Z2L
   177                              ;CLC
   178   0D04   65   89                    ADC Z1L
   179   0D06   85   8B                    STA Z3L                ;X3
   180   0D08   A5   92                    LDA Z2H
   181   0D0A   69   00                    ADC I,0
   182   0D0C   85   93                    STA Z3H
   183   0D0E   85   96                    STA Z6H                ;X6
   184   0D10   A5   8B                    LDA Z3L
   185   0D12   0A                         ASL
   186   0D13   85   8E                    STA Z6L
   187   0D15   26   96                    ROL Z6H
   188                              ;CLC
   189   0D17   65   89                    ADC Z1L
   190   0D19   85   8F                    STA Z7L                ;X7
   191   0D1B   A5   96                    LDA Z6H
   192   0D1D   69   00                    ADC I,0
   193   0D1F   85   97                    STA Z7H
   194   0D21   A0   00                    LDY I,0
   195   0D23   84   A9                    STY VGY
   196                                    BEGIN                  ;LOOP FOR EACH VECTOR TO BE DRAWN
   197   0D25   A4   38                    LDY INDEX2
   198   0D27   B9   0E1D                  LDA Y,VBASE+1
   199   0D2A   C9   01                    CMP I,1
   200   0D2C   D0   00                    IFEQ                   ;USE DEPTH INTENSITY
   201   0D2E   A9   C0                    LDA I,RATS             ;YES.
   202   0D2D   02                         ENDIF
   203   0D30   85   73                    STA VGBRIT
   204   0D32   B9   0E1C                  LDA Y,VBASE            ;GET MULTIPLIER S
   205   0D35   85   2D                    STA TEMP4              ;SIGN FOR PERP. UNIT VECTOR MULT.
   206   0D37   C8                         INY
   207   0D38   C8                         INY
   208   0D39   84   38                    STY INDEX2
   209   0D3B   AA                         TAX
   210   0D3C   29   07                    AND I,07               ;GET UNIT VECTOR MULTIPLIER
   211   0D3E   A8                         TAY                    ;ABS. VALUE
   212   0D3F   8A                         TXA
   213   0D40   0A                         ASL
   214   0D41   85   2B                    STA TEMP2              ;SIGN FOR UNIT VEC MULT
   215   0D43   4A                         LSR
   216   0D44   4A                         LSR
   217   0D45   4A                         LSR
   218   0D46   4A                         LSR
   219   0D47   29   07                    AND I,07               ;GET PERP UNIT VECTOR MULTIPLIER
   220   0D49   AA                         TAX                    ;ABSOLUTE VALUE
   221   0D4A   A5   2B                    LDA TEMP2
   222   0D4C   45   9B                    EOR UNITXH
   223   0D4E   30   00                    IFPL                   ;ACC TO SIGNS, UPDATE VECTOR ACCUMULATOR
   224   0D50   B9   0078                  LDA Y,X0L              ;POSITIVE RESULTS
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 45+
UTILITY-DRAW OBJECT BETWEEN POINTS

   225   0D53   85   61                    STA SXL
   226   0D55   B9 0080                    LDA Y,XOH
   227   0D58   B8   50    00               ELSE
         0D4F   0B
   228   0D5B   B9 0078                    LDA Y,XOL              ;NEGATIVE RESULTS
   229   0D5E   49   FF                    EOR I,0FF
   230   0D60   18                         CLC
   231   0D61   69   01                    ADC I,1
   232   0D63   85   61                    STA SXL
   233   0D65   B9 0080                    LDA Y,XOH
   234   0D68   49   FF                    EOR I,0FF
   235   0D6A   69   00                    ADC I,0
   236   0D5A   11                         ENDIF
   237   0D6C   85   62                    STA SXH
   238   0D6E   A5   2D                    LDA TEMP4
   239   0D70   45   9D                    EOR UNITZH
   240   0D72   10   00                    IFMI                   ;ACC. TO SIGNS UPDATE VECTOR ACCUMULATOR
   241   0D74   B5   88                    LDA X,ZOL              ;POSITIVE RESULTS
   242   0D76   18                         CLC
   243   0D77   65   61                    ADC SXL
   244   0D79   85   61                    STA SXL
   245   0D7B   B5   90                    LDA X,ZOH
   246   0D7D   65   62                    ADC SXH
   247   0D7F   B8   50    00              ELSE
         0D73   0E
   248   0D82   A5   61                    LDA SXL                ;NEGATIVE RESULTS
   249   0D84   38                         SEC
   250   0D85   F5   88                    SBC X,ZOL
   251   0D87   85   61                    STA SXL
   252   0D89   A5   62                    LDA SXH
   253   0D8B   F5   90                    SBC X,ZOH
   254   0D81   0B                         ENDIF
   255   0D8D   85   62                    STA SXH
   256                                     ;
   257                                     ;NOW CALCULATE Z VECTOR
   258                                     ;
   259   0D8F   A5   2B                    LDA TEMP2
   260   0D91   45   9D                    EOR UNITZH
   261   0D93   30   00                    IFPL
   262   0D95   B9 0088                    LDA Y,ZOL
   263   0D98   85   63                    STA SZL
   264   0D9A   B9 0090                    LDA Y,ZOH
   265   0D9D   B8   50    00              ELSE
         0D94   0B
   266   0DA0   B9 0088                    LDA Y,ZOL
   267   0DA3   49   FF                    EOR I,0FF
   268   0DA5   18                         CLC
   269   0DA6   69   01                    ADC I,1
   270   0DA8   85   63                    STA SZL
   271   0DAA   B9 0090                    LDA Y,ZOH
   272   0DAD   49   FF                    EOR I,0FF
   273   0DAF   69   00                    ADC I,0
   274   0D9F   11                         ENDIF
   275   0DB1   85   64                    STA SZH
   276   0DB3   A5   2D                    LDA TEMP4
   277   0DB5   45   9B                    EOR UNITXH
   278   0DB7   10   00                    IFMI
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 45+
UTILITY-DRAW OBJECT BETWEEN POINTS

   279   0DB9   A5   63                    LDA SZL
   280   0DBB   38                         SEC
   281   0DBC   F5   78                    SBC X,XOL
   282   0DBE   85   63                    STA SZL
   283   0DC0   A5   64                    LDA SZH
   284   0DC2   F5   80                    SBC X,XOH
   285   0DC4   B8   50   00               ELSE
         0DB8   0E
   286   0DC7   A5   63                    LDA SZL
   287   0DC9   18                         CLC
   288   0DCA   75   78                    ADC X,XOL
   289   0DCC   85   63                    STA SZL
   290   0DCE   A5   64                    LDA SZH
   291   0DD0   75   80                    ADC X,XOH
   292   0DC6   0B                         ENDIF
   293   0DD2   85   64                    STA SZH
   294   0DD4   A4   A9                    LDY VGY              ;ADD VECTOR TO DISPLAY LIST
   295   0DD6   A5   63                    LDA SZL
   296   0DD8   91   74                    STA NY,VGLIST        ;Z LSB
   297   0DDA   C8                         INY
   298   0DDB   A5   64                    LDA SZH
   299   0DDD   29   1F                    AND I,1F
   300   0DDF   91   74                    STA NY,VGLIST        ;Z MSB
   301   0DE1   C8                         INY
   302   0DE2   A5   61                    LDA SXL
   303   0DE4   91   74                    STA NY,VGLIST        ;X LSB
   304   0DE6   C8                         INY
   305   0DE7   A5   62                    LDA SXH
   306   0DE9   29   1F                    AND I,1F
   307   0DEB   05   73                    ORA VGBRIT
   308   0DED   91   74                    STA NY,VGLIST        ;X MSB AND INTENSITY
   309   0DEF   C8                         INY
   310   0DF0   84   A9                    STY VGY
   311   0DF2   C6   99                    DEC SUBCOU
   312   0DF4   F0   03   4C  0D25         EQEND
   313   0DF9   A4   A9                    LDY VGY
   314   0DFB   88                         DEY
   315   0DFC   4C  0000G                  JMP VGADD            ;UPDATE VGLIST PC
   316   0DFF   08                   C8    .BYTE 8
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 46
PICTURES

      1                                          .SBTTL PICTURES
      2          0000                 CINVA1     0
      3          0001                 CNCURS     CINVA1+1
      4          0009                 CPULS4     CNCURS+8
      5          000A                 CPULS3     CPULS4+1
      6          000B                 CPULS2     CPULS3+1
      7          000C                 CPULS1     CPULS2+1
      8          000D                 CPULS0     CPULS1+1
      9   0E00                        PCOUNT
     10   0E00    08                             .BYTE  INVA1E-INVA1S /2 ;INVADER 1
     11   0E01    08                             .BYTE  NCRS1E-NCRS1S /2
     12   0E02    08                             .BYTE  NCRS2E-NCRS2S /2
     13   0E03    08                             .BYTE  NCRS3E-NCRS3S /2
     14   0E04    08                             .BYTE  NCRS4E-NCRS4S /2
     15   0E05    08                             .BYTE  NCRS5E-NCRS5S /2
     16   0E06    08                             .BYTE  NCRS6E-NCRS6S /2
     17   0E07    08                             .BYTE  NCRS7E-NCRS7S /2
     18   0E08    09                             .BYTE  NCRS8E-NCRS8S /2
     19   0E09    06                             .BYTE  PULS4E-PULS4S /2
     20   0E0A    07                             .BYTE  PULS3E-PULS3S /2
     21   0E0B    07                             .BYTE  PULS2E-PULS2S /2
     22   0E0C    04                             .BYTE  PULS1E-PULS1S /2
     23   0E0D    02                             .BYTE  PULS0E-PULS0S /2
     24                                         .MACRO MINDX ARG
     25                                         .BYTE ARG-VBASE
     26                                         .ENDM
     27   0E0E                       PINDEX
     28   0E0E    00                            MINDX INVA1S    ;INVADER 1
     29   0E0F    10                            MINDX NCRS1S
     30   0E10    20                            MINDX NCRS2S
     31   0E11    30                            MINDX NCRS3S
     32   0E12    40                            MINDX NCRS4S
     33   0E13    50                            MINDX NCRS5S
     34   0E14    60                            MINDX NCRS6S
     35   0E15    70                            MINDX NCRS7S
     36   0E16    80                            MINDX NCRS8S
     37
     38   0E17    92                            MINDX PULS4S
     39   0E18    9E                            MINDX PULS3S
     40   0E19    AC                            MINDX PULS2S
     41   0E1A    BA                            MINDX PULS1S
     42   0E1B    C2                            MINDX PULS0S
     43                                 ;BYTE 0  D7 SIGN FOR PERP. UNIT VECTOR MULTIPLIER
     44                                 ;          D6 SIGN FOR UNIT VECTOR MULTIPLIER
     45                                 ;          D5-D3       PERP UNIT VECTOR MULTIPLIER ABS. VALUE
     46                                 ;          D2-D0            UNIT VECTOR MULTIPLIER ABS. VALUE
     47                                 ;BYTE 1  1 USE DEPTH CUE INTENSITY
     48                                 ;        0  BEAM OFF
     49                                 ;        10 DRAW A DOT
     50                                 ;         10 USE VALUE FOR INTENSITY
     51                                 .MACRO VEC UX,UZ,UI
     52                                 .NARG NUM
     53                                 ...ONF 0
     54                                 .IIF EQ,NUM-3,...ONF UI
     55                                 .IIF EQ,NUM-2,...ONF 1
     56                                 ...PUV UZ
     57                                 ...UV UX
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 46+
PICTURES

    58                                          ...SPU 0
    59                                          ...SUV 0
    60                                          .IF LT,...PUV
    61                                          ...PUV - ...PUV
    62                                          ...SPU 80
    63                                          .ENDC
    64                                          .IF LT,...UV
    65                                          ...UV - ...UV
    66                                          ...SUV 40
    67                                          .ENDC
    68                                          .BYTE  ...SPU   ...SUV   ...PUV*8   ...UV ,...ONF
    69                                          .ENDM
    70                                          .MACRO DOT,...DX,...DY
    71                                          VEC ...DX,...DY,10
    72                                          .ENDM
    73  0E1C                        VBASE
    74  0E1C                        CURS4E
    75  0E1C                        INVA1S
    76  0E1C    0C    01                        VEC 4,1,1
    77  0E1E    8C    01                        VEC 4,-1,1
    78  0E20    4A    01                        VEC -2,1
    79  0E22    09    01                        VEC 1,1
    80  0E24    CB    01                        VEC -3,-1
    81  0E26    4B    01                        VEC -3,1
    82  0E28    89    01                        VEC 1,-1
    83  0E2A    CA    01                        VEC -2,-1
    84  0E2C                        INVA1E
    85  0E2C                        NCRS1S
    86  0E2C    90    01                        VEC 0,-2
    87  0E2E    8A    01                        VEC 2,-1
    88  0E30    23    01                        VEC 3,4
    89  0E32    DB    01                        VEC -3,-3
    90  0E34    41    01                        VEC -1,0
    91  0E36    10    01                        VEC 0,2
    92  0E38    0A    01                        VEC 2,1
    93  0E3A    CB    01                        VEC -3,-1
    94  0E3C                        NCRS1E
    95  0E3C                        NCRS2S
    96  0E3C    91    01                        VEC 1,-2
    97  0E3E    17    01                        VEC 7,2
    98  0E40    4B    01                        VEC -3,1
    99  0E42    8A    01                        VEC 2,-1
   100  0E44    CE    01                        VEC -6,-1
   101  0E46    08    01                        VEC 0,1
   102  0E48    0A    01                        VEC 2,1
   103  0E4A    CB    01                        VEC -3,-1
   104  0E4C                        NCRS2E
   105  0E4C                        NCRS3S
   106  0E4C    92    01                        VEC 2,-2
   107  0E4E    16    01                        VEC 6,2
   108  0E50    4B    01                        VEC -3,1
   109  0E52    8A    01                        VEC 2,-1
   110  0E54    CD    01                        VEC -5,-1
   111  0E56    49    01                        VEC -1,1
   112  0E58    0A    01                        VEC 2,1
   113  0E5A    CB    01                        VEC -3,-1
   114  0E5C                        NCRS3E
```

```
   115   0E5C                          NCRS4S
   116   0E5C   93    01                       VEC 3,-2
   117   0E5E   15    01                       VEC 5,2
   118   0E60   4B    01                       VEC -3,1
   119   0E62   8A    01                       VEC 2,-1
   120   0E64   CC    01                       VEC -4,-1
   121   0E66   4A    01                       VEC -2,1
   122   0E68   0A    01                       VEC 2,1
   123   0E6A   CB    01                       VEC -3,-1
   124   0E6C                          NCRS4E
   125   0E6C                          NCRS5S
   126   0E6C   95    01                       VEC 5,-2
   127   0E6E   13    01                       VEC 3,2
   128   0E70   4B    01                       VEC -3,1
   129   0E72   8A    01                       VEC 2,-1
   130   0E74   CA    01                       VEC -2,-1
   131   0E76   4C    01                       VEC -4,1
   132   0E78   0A    01                       VEC 2,1
   133   0E7A   CB    01                       VEC -3,-1
   134   0E7C                          NCRS5E
   135   0E7C                          NCRS6S
   136   0E7C   96    01                       VEC 6,-2
   137   0E7E   12    01                       VEC 2,2
   138   0E80   4B    01                       VEC -3,1
   139   0E82   8A    01                       VEC 2,-1
   140   0E84   C9    01                       VEC -1,-1
   141   0E86   4D    01                       VEC -5,1
   142   0E88   0A    01                       VEC 2,1
   143   0E8A   CB    01                       VEC -3,-1
   144   0E8C                          NCRS6E
   145   0E8C                          NCRS7S
   146   0E8C   97    01                       VEC 7,-2
   147   0E8E   11    01                       VEC 1,2
   148   0E90   4B    01                       VEC -3,1
   149   0E92   8A    01                       VEC 2,-1
   150   0E94   88    01                       VEC 0,-1
   151   0E96   4E    01                       VEC -6,1
   152   0E98   0A    01                       VEC 2,1
   153   0E9A   CB    01                       VEC -3,-1
   154   0E9C                          NCRS7E
   155   0E9C                          NCRS8S
   156   0E9C   0B    00                       VEC 3,1,0
   157   0E9E   A3    01                       VEC 3,-4
   158   0EA0   0A    01                       VEC 2,1
   159   0EA2   10    01                       VEC 0,2
   160   0EA4   4B    01                       VEC -3,1
   161   0EA6   8A    01                       VEC 2,-1
   162   0EA8   90    01                       VEC 0,-2
   163   0EAA   41    01                       VEC -1,0
   164   0EAC   5B    01                       VEC -3,3
   165   0EAE                          NCRS8E
   166                                        .MACRO BVEC UUX,UUY
   167                                        VEC UUX,UUY,0E0
   168                                        .ENDM
   169   0EAE                          PULS4S
   170   0EAE   9A    01                       VEC 2,-3
   171   0EB0   31    01                       VEC 1,6
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 46+
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   172   0EB2   B1   01                    VEC 1,-6
   173   0EB4   31   01                    VEC 1,6
   174   0EB6   B1   01                    VEC 1,-6
   175   0EB8   1A   01                    VEC 2,3
   176   0EBA                    PULS4E
   177   0EBA                    PULS3S
   178   0EBA   01   00                    VEC 1,0,0
   179   0EBC   91   01                    VEC 1,-2
   180   0EBE   21   01                    VEC 1,4
   181   0EC0   A1   01                    VEC 1,-4
   182   0EC2   21   01                    VEC 1,4
   183   0EC4   A1   01                    VEC 1,-4
   184   0EC6   11   01                    VEC 1,2
   185   0EC8                    PULS3E
   186   0EC8                    PULS2S
   187   0EC8   01   00                    VEC 1,0,0
   188   0ECA   89   01                    VEC 1,-1
   189   0ECC   11   01                    VEC 1,2
   190   0ECE   91   01                    VEC 1,-2
   191   0ED0   11   01                    VEC 1,2
   192   0ED2   91   01                    VEC 1,-2
   193   0ED4   09   01                    VEC 1,1
   194   0ED6                    PULS2E
   195   0ED6                    PULS1S
   196   0ED6   01   00                    VEC 1,0,0
   197   0ED8   8A   01                    VEC 2,-1
   198   0EDA   12   01                    VEC 2,2
   199   0EDC   8A   01                    VEC 2,-1
   200   0EDE                    PULS1E
   201   0EDE   01   00          PULS0S    VEC 1,0,0
   202   0EE0   06   01                    VEC 6,0
   203   0EE2                    PULS0E
```

PICTURES

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1
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 48
UTILITY  PROJECT POINT ONTO SCREEN

                                              .SBTTL UTILITY  PROJECT POINT ONTO SCREEN
      2
      3                                 ;INPUT
      4                                 ;       PXL,PYL,PZL   WORLD COORDINATES OF POINT TO PROJECT
      5                                 ;       EXL,EYL  WORLD COORDINATES OF EYE  EYL HAS AN
      6                                 ;                IMPLIED NEGATIVE SIGN
      7
      8                                 ;OUTPUT SXH,SZH  SCREEN COORDINATES OF PROJECTED POINT
      9                                 ;       MTEMPS DESTROYED
     10
     11                                 ;FORMULAE       SCREEN X    FACTOR/ PY-EY  * PX-EX +SXCENT
     12                                 ;
     13                                 ;               SCREEN Z    FACTOR/ PY-EY  * PZ-EZ +SZCENT
     14
     15                                 ;
     16                                 ;CALCULATE COMMON FACTOR   FACTOR/ PY-EY
     17                                 ;
     18
    180   0EE2                          WORSCR
    181   0EE2   A5    57                       LDA PYL
    182   0EE4   38                             SEC
    183   0EE5   E5    5F                       SBC EYL
    184   0EE7   8D  6095                       STA MXPL
    185   0EEA   A9    00                       LDA I,0
    186   0EEC   E5    5B                       SBC EYH
    187   0EEE   8D  6096                       STA MXPH
    188   0EF1   10    00                       IFMI                    ;IS POINT BEHIND EYE
    189   0EF3   A9    00                       LDA I,0                 ;YES. PUT IT AT EYE
    190   0EF5   8D  6096                       STA MXPH
    191   0EF8   A9    01                       LDA I,1
    192   0EFA   8D  6095                       STA MXPL
    193   0EF2   0A                             ENDIF
    194   0EFD   A5    58                       LDA PZL
    195   0EFF   C5    60                       CMP EZL
    196   0F01   90    00                       IFCS
    197   0F03   E5    60                       SBC EZL
    198   0F05   A2    00                       LDX I,0
    199   0F07   B8    50    00                 ELSE
          0F02   07
    200   0F0A   A5    60                       LDA EZL
    201   0F0C   38                             SEC
    202   0F0D   E5    58                       SBC PZL
    203   0F0F   A2    FF                       LDX I,-1
    204   0F09   07                             ENDIF
    205   0F11   8D  608E                       STA MZLH
    206   0F14   8D  6094                       STA MSZXD
    207   0F17   86    33                       STX MTEMP+2
    208   0F19   A5    56                       LDA PXL
    209   0F1B   C5    5E                       CMP EXL
    210   0F1D   90    00                       IFCS
    211   0F1F   E5    5E                       SBC EXL
    212   0F21   A2    00                       LDX I,0
    213   0F23   B8    50    00                 ELSE
          0F1E   07
    214   0F26   A5    5E                       LDA EXL
    215   0F28   38                             SEC
    216   0F29   E5    56                       SBC PXL
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 48+
UTILITY  PROJECT POINT ONTO SCREEN

   217   0F2B   A2    FF                      LDX I,-1
   218   0F25   07                            ENDIF
   219   0F2D   85    32                      STA MTEMP+1
   220   0F2F   86    34                      STX MTEMP+3
   221                                        BEGIN
   222   0F31   2C  6040                       BIT MSTAT
   223   0F34   30    FB                      PLEND
   224   0F36   AD  6060                       LDA MYLOW
   225   0F39   85    63                      STA SZL
   226   0F3B   AD  6070                       LDA MYHIGH
   227   0F3E   85    64                      STA SZH
   228
   229   0F40   A5    32                      LDA MTEMP+1
   230   0F42   8D  608E                       STA MZLH
   231   0F45   8D  6094                       STA MSZXD
   232   0F48   A5    33                      LDA MTEMP+2
   233   0F4A   30    00                      IFPL
   234   0F4C   A5    63                      LDA SZL
   235   0F4E   18                            CLC
   236   0F4F   65    68                      ADC ZADJL
   237   0F51   85    63                      STA SZL
   238   0F53   A5    64                      LDA SZL+1
   239   0F55   65    69                      ADC ZADJL+1
   240   0F57   50    00                      IFVS
   241   0F59   A9    FF                      LDA I,0FF
   242   0F5B   85    63                      STA SZL
   243   0F5D   A9    7F                      LDA I,7F
   244   0F58   06                            ENDIF
   245   0F5F   85    64                      STA SZL+1
   246   0F61   B8    50    00                ELSE
         0F4B   18
   247   0F64   A5    68                      LDA ZADJL
   248   0F66   38                            SEC
   249   0F67   E5    63                      SBC SZL
   250   0F69   85    63                      STA SZL
   251   0F6B   A5    69                      LDA ZADJL+1
   252   0F6D   E5    64                      SBC SZL+1
   253   0F6F   50    00                      IFVS
   254   0F71   A9    00                      LDA I,0
   255   0F73   85    63                      STA SZL
   256   0F75   A9    80                      LDA I,80
   257   0F70   06                            ENDIF
   258   0F77   85    64                      STA SZL+1
   259   0F63   15                            ENDIF
   260                                        BEGIN
   261   0F79   2C  6040                       BIT MSTAT
   262   0F7C   30    FB                      PLEND
   263   0F7E   AD  6060                       LDA MYLOW
   264   0F81   85    61                      STA SXL
   265   0F83   AD  6070                       LDA MYHIGH
   266   0F86   85    62                      STA SXH
   267   0F88   A6    34                      LDX MTEMP+3
   268   0F8A   30    00                      IFPL
   269   0F8C   A5    61                      LDA SXL
   270   0F8E   18                            CLC
   271   0F8F   65    66                      ADC XADJL
   272   0F91   85    61                      STA SXL
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 48+
UTILITY  PROJECT POINT ONTO SCREEN

   273   0F93   A5   62                    LDA SXL+1
   274   0F95   65   67                    ADC XADJL+1
   275   0F97   50   00                    IFVS
   276   0F99   A9   FF                    LDA I,0FF
   277   0F9B   85   61                    STA SXL
   278   0F9D   A9   7F                    LDA I,7F
   279   0F98   06                         ENDIF
   280   0F9F   85   62                    STA SXL+1
   281   0FA1   60                         RTS
   282   0F8B   16                         ENDIF
   283   0FA2   A5   66                    LDA XADJL
   284   0FA4   38                         SEC
   285   0FA5   E5   61                    SBC SXL
   286   0FA7   85   61                    STA SXL
   287   0FA9   A5   67                    LDA XADJL+1
   288   0FAB   E5   62                    SBC SXL+1
   289   0FAD   50   00                    IFVS
   290   0FAF   A9   00                    LDA I,0
   291   0FB1   85   61                    STA SXL
   292   0FB3   A9   80                    LDA I,80
   293   0FAE   06                         ENDIF
   294   0FB5   85   62                    STA SXL+1
   295   0FB7   60                         RTS
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 49
INITIALIZE DISPLAY

     1                                          .SBTTL INITIALIZE DISPLAY
     2
     3   0FB8   20  0000G           INIDSP   JSR INITEM            ;COPY SCORE TEMPLATE TO VECTOR RAM
     4   0FBB   A9    80                     LDA I,80              ;EYE CENTERED X WISE
     5   0FBD   85    5E                     STA EXL
     6   0FBF   A9    FF                     LDA I,0FF             ;REG-WELL UPDATE FROM MAINLINE
     7   0FC1   8D  0114                     STA ROTDIS
     8   0FC4   20  107F                     JSR INIWLS            ;INIT. WELL
     9   0FC7   AD  0133                     LDA SPARE3
    10   0FCA   D0    00                     IFEQ                  ;VG HALT AS REQUESTED
    11   0FCC   8D  5800                     STA VGSTOP            ;NO. STOP IT
    12   0FCB   03                           ENDIF
    13   0FCF   A9    00                     LDA I,0
    14   0FD1   8D  0133                     STA SPARE3
    15   0FD4   AD  0000G                    LDA JMPMA4            ;REQUEST HALT
    16   0FD7   8D  2000                     STA VECRAM
    17   0FDA   AD  0000G                    LDA JMPMH4
    18   0FDD   8D  2001                     STA VECRAM+1
    19   0FE0   A5    9F           INICOL   LDA CURWAV
    20   0FE2   29    70                     AND I,70
    21   0FE4   C9    5F                     CMP I,5F
    22   0FE6   90    00                     IFCS
    23   0FE8   A9    5F                     LDA I,5F
    24   0FE7   02                           ENDIF
    25   0FEA   4A                           LSR
    26   0FEB   09    07                     ORA I,07              ;COLOR TABLE INDEX
    27   0FED   AA                           TAX
    28   0FEE   A0    07                     LDY I,07
    29                                      BEGIN                 ;SET UP COLOR RAM
    30   0FF0   BD  1047                     LDA X,COLTAB
    31   0FF3   29    0F                     AND I,0F
    32   0FF5   99  0019                     STA Y,COLRAM
    33   0FF8   99  0800                     STA Y,COLPORT
    34   0FFB   BD  1047                     LDA X,COLTAB
    35   0FFE   4A                           LSR
    36   0FFF   4A                           LSR
    37   1000   4A                           LSR
    38   1001   4A                           LSR
    39   1002   99  0021                     STA Y,COLRAM+8
    40   1005   99  0808                     STA Y,COLPORT+8
    41   1008   CA                           DEX
    42   1009   88                           DEY
    43   100A   10    E4                     MIEND
    44   100C   60                           RTS
    45   100D                     INIMAT
    46   100D   A9    00                     LDA I,0               ;INITIALIZE FOR ONELIN
    47   100F   85    81                     STA X1H
    48   1011   85    91                     STA Z1H
    49   1013   85    80                     STA X0H
    50   1015   85    78                     STA X0L
    51   1017   85    90                     STA Z0H
    52   1019   85    88                     STA Z0L
    53   101B   A9    00                     LDA I,0               ;ZERO UNUSED MATH BOX REGISTERS
    54   101D   8D  6080                     STA MAL
    55   1020   8D  6081                     STA MAH
    56   1023   8D  6084                     STA MEL
    57   1026   8D  6085                     STA MEH
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 49+
INITIALIZE DISPLAY

    58   1029   8D  6086                    STA MFL
    59   102C   8D  6087                    STA MFH
    60   102F   8D  6089                    STA MXH
    61   1032   8D  6083                    STA MBH
    62   1035   8D  608D                    STA MZLL
    63   1038   8D  608E                    STA MZLH
    64   103B   8D  608F                    STA MZHL
    65   103E   8D  6090                    STA MZHH
    66   1041   A9    0F                    LDA I,0F
    67   1043   8D  608C                    STA MNL
    68   1046   60                        RTS
```

COLORS

```
                                        .SBTTL  COLORS
                                COLTAB
                                        .BYTE ZWHITE            ;1 EXPLOSIONS  0 ;PLAYER SHOT CENTER 8
                                        .BYTE ZYELLO            ;CURSOR, FLASHLIGHT 1 ;SPLAT  A
                                        .BYTE ZPURPL            ;TANKERS 2 ;SPLAT  B
                                        .BYTE ZRED              ;FLIPPERS 3 ;SPLAT  C
                                        .BYTE ZTURQOI  ZRED*10  ;PULSARS 4 ;NYMPHS OD
                                        .BYTE ZGREEN            ;LETTERS S
                                        .BYTE ZBLUE             ;WELL 6
                                        .BYTE ZBLUE             ;LETTERS 7 ;FLASH  OF
                                        .BYTE ZWHITE            ;2
                                        .BYTE ZGREEN
                                        .BYTE ZBLUE
                                        .BYTE ZPURPL
                                        .BYTE ZYELLOW  ZYELLOW*10
                                        .BYTE ZTURQOI
                                        .BYTE ZRED
                                        .BYTE ZRED
                                        .BYTE ZWHITE            ;3
                                        .BYTE ZBLUE
                                        .BYTE ZTURQOI
                                        .BYTE ZGREEN
                                        .BYTE ZPURPL  ZRED*10
                                        .BYTE ZRED
                                        .BYTE ZYELLO
                                        .BYTE ZYELLOW
                                        .BYTE ZWHITE            ;4
                                        .BYTE ZBLUE
                                        .BYTE ZPURPL
                                        .BYTE ZGREEN
                                        .BYTE ZYELLO  ZRED*10
                                        .BYTE ZRED
                                        .BYTE ZTURQOI
                                        .BYTE ZTURQOI
                                                              ;
                                                              ;
                                                              ;
                                        .BYTE ZWHITE            ;5
                                        .BYTE ZYELLO
                                        .BYTE ZPURPL
                                        .BYTE ZRED
                                        .BYTE ZTURQOI  ZRED*10
                                        .BYTE ZGREEN
                                        .BYTE ZBLACK
                                        .BYTE ZBLUE
                                        .BYTE ZWHITE            ;6
                                        .BYTE ZRED
                                        .BYTE ZPURPL
                                        .BYTE ZYELLOW
                                        .BYTE ZTURQOI  ZRED*10
                                        .BYTE ZBLUE
                                        .BYTE ZGREEN
                                        .BYTE ZGREEN
                SPWECO  .BYTE BLUE,RED,YELLOW,TURQOI,WHITE,GREEN,GREEN,GREEN            ;SPECIAL WELL COLOR I
```

INITIALIZE-GRID LINES

```
      1                                       .SBTTL  INITIALIZE-GRID LINES
      2                                 ;INPUT  Y INDEX INTO NEW LIX,Z OF LAST GRID LINE S COORDINATES
```

INITIALIZE WELL

```
                                        .SBTTL  INITIALIZE WELL

                                INIWLS
107F                                    LDX PLAYUP
1081    B5   46                         LDA X,WAVEN1
1083    20 1132                         JSR LVLWEL
1086    48                              PHA                     ;CONVERT CODE TO INDEX
1087    AC 0112                         LDY WELLID
108A    B9 0AD6                         LDA Y,HOLEYL            ;EYE POSITION  Y
108D    49   FF                         EOR I,0FF               ;CONVERT+TABLE VALUE TO NEG.
108F    18                              CLC
1090    69   01                         ADC I,1
1092    85   5F                         STA EYL
1094    85   5D                         STA EYLDES
1096    A9   10                         LDA I,10
1098    38                              SEC
1099    E5   5F                         SBC EYL                 ;DELTA FOR UNIT SCALE
109B    85   A0                         STA YDEUNI
109D    A9   FF                         LDA I,-1
109F    85   5B                         STA EYH
10A1    B9 0AE6                         LDA Y,HOLEZL            ;EYE POSITION  Z
10A4    85   60                         STA EZL
10A6    B9 0B16                         LDA Y,HOLRAP            ;WELL TYPE  OPEN I CLOSED
10A9    8D 0111                         STA WELTYP
10AC    A5   02                         LDA QNXTST
10AE    C9   1E                         CMP I,CNWLF2
10B0    D0   00                         IFEQ                    ;
10B2    B9 0AF6                         LDA Y,HOLZAD            ;AT CENTER IMMEDIATELY  NEW LIFE
10B5    85   68                         STA ZADJL
10B7    B9 0B06                         LDA Y,HOLZDH
10BA    85   69                         STA ZADJL+1
10BC    B8   50    00                   ELSE
10B1    0D
10BF    B9 0AF6                         LDA Y,HOLZAD            ;MOVE UP SLOWLY  NEW WAVE
10C2    38                              SEC
10C3    E5   68                         SBC ZADJL
10C5    8D 0121                         STA ZADEST
10C8    B9 0B06                         LDA Y,HOLZDH
10CB    ED 0069                         SBC A,ZADJL+1
10CE    A2   03                         LDX I,3
                                        BEGIN
10D0    4A                              LSR
10D1    6E 0121                         ROR ZADEST
10D4    CA                              DEX
10D5    10   F9                         MIEND
10BE    18                              ENDIF
10D7    A9   00                         LDA I,0                 ;X SCREEN CENTER
10D9    85   66                         STA XADJL
10DB    85   67                         STA XADJL+1
10DD    A9   00                         LDA I,0                 ;SAY TOP   BOTTOM ON SCREEN
10DF    8D 010F                         STA LEVELY
10E2    8D 0110                         STA LEVELY+1
10E5    A9   2C                         LDA I, VECRAM+0C00 /100 ;SET UP SUBR BUFR PC
10E7    8D 0113                         STA ROTFLG
10EA    68                              PLA
10EB    A8                              TAY
10EC    A2   0F                         LDX I,NLINES-1
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 52+
INITIALIZE WELL

    57                                BEGIN                   ;LOOP FOR EACH GRID LINES
    58  10EE  B9  07C6                LDA Y,NEWLIX
    59  10F1  9D  03CE                STA X,LINEX             ;SET UP X AND Z INTEGER PORTIONS
    60  10F4  B9  08C6                LDA Y,NEWLIZ
    61  10F7  9D  03DE                STA X,LINEZ
    62  10FA  A9    00                LDA I,0                 ;ZERO FRACTIONAL PORTION
    63  10FC  9D  031A                STA X,LINSXH
    64  10FF  9D  033A                STA X,LINSZH
    65  1102  9D  039A                STA X,LINSTA
    66  1105  B9  09C6                LDA Y,ILINANG   ;LINE ANGLE
    67  1108  9D  03EE                STA X,LINANG
    68  110B  88                      DEY
    69  110C  CA                      DEX
    70  110D  10    DF                MIEND
    71                                                        ;
    72                                                        ;
    73  110F  A0    00                LDY I,0                 ;CALCULATE MIDPTS
    74  1111  A2    0F                LDX I,0F
    75                                BEGIN                   ;LOOP FOR EACH LINE
    76  1113  B9  03CE                LDA Y,LINEX
    77  1116  38                      SEC
    78  1117  7D  03CE                ADC X,LINEX
    79  111A  6A                      ROR
    80  111B  9D  0435                STA X,LINEXM
    81  111E  B9  03DE                LDA Y,LINEZ
    82  1121  38                      SEC
    83  1122  7D  03DE                ADC X,LINEZ
    84  1125  6A                      ROR
    85  1126  9D  0445                STA X,LINEZM
    86  1129  88                      DEY
    87  112A  10    00                IFMI
    88  112C  A0    0F                LDY I,0F
    89  112B  02                      ENDIF
    90  112E  CA                      DEX
    91  112F  10    E2                MIEND
    92  1131  60                      RTS
    93                          ;
    94                          ;DETERMINE WELL SEQUENCE INDES
    95                          ;INPUT ACC LEVEL #-1
    96                          ;OUTPUT ACC INDEX INTO WELL SEQUENCE TABLES
    97                          ;       WELLID WELL ID
    98  1132  A2    00          LVLWEL  LDX I,0
    99  1134  C9    62                  CMP I,98.
   100  1136  90    00                  IFCS
   101  1138  AD  60CA                  LDA RANDOM
   102  113B  29    5F                  AND I,5F
   103  1137  05                      ENDIF
   104  113D  C9    10                  CMP I,WELSEN-WELSEQ
   105                                  BEGIN                  ;WAVE # MOD # OF WELLS
   106  113F  90    00                  IFCS
   107  1141  E8                        INX
   108  1142  38                      SEC
   109  1143  E9    10                  SBC I,WELSEN-WELSEQ
   110  1140  04                      ENDIF
   111  1145  C9    10                  CMP I,WELSEN-WELSEQ
   112  1147  B0    F6                  CCEND
   113  1149  A8                        TAY
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 52+
INITIALIZE WELL

   114   114A    B9  0AC6                    LDA Y,WELSEQ            ;GET WELL CODE FOR THIS WAVE
   115   114D    8D  0112                    STA WELLID
   116   1150    0A                          ASL
   117   1151    0A                          ASL
   118   1152    0A                          ASL
   119   1153    0A                          ASL
   120   1154    09    0F                    ORA I,0F
   121   1156    60                          RTS
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 53
INITIALIZE WELL

     1
     2                                          .SBTTL  UTILITY-BUILD WELL DISPLAY BUFFER
     3   1157                            BLDWEL
     4   1157    AD  0110                       LDA LEVELY+1
     5   115A    D0    00                       IFEQ                    ;BOTTOM OF WELL ON SCREEN LAST TIME
     6   115C    A9    F0                       LDA I,ILINDDY           ;YES
     7   115E    85    57                       STA PYL                 ;BOTTOM OF WELL Y
     8   1160    A2    4F                       LDX I,4F                ;INDEX FOR SCREEN COORDS
     9   1162    20  12BD                       JSR CALOUT              ;CALCULATE SCREEN COORDS FOR BOTTOM OF WELL
    10   1165    8D  0110                       STA LEVELY+1            ;OFF SCREEN FLAG
    11   1168    F0    00                       IFNE                    ;BOTTOM OFF SCREEN
    12   116A    8D  010F                       STA LEVELY              ;YES. THEN SO IS TOP
    13   1169    03                             ENDIF
    14   116D    AD  010F                       LDA LEVELY
    15   1170    D0    00                       IFEQ                    ;TOP OF WELL ON SCREEN LAST TIME
    16   1172    A9    10                       LDA I,ILINLIY           ;YES.
    17   1174    85    57                       STA PYL                 ;TOP OF WELL Y
    18   1176    20  129D                       JSR CHKDEP
    19   1179    A5    57                       LDA PYL
    20   117B    A2    0F                       LDX I,0F                ;INDEX FOR SCREEN COORDS
    21   117D    20  12BD                       JSR CALOUT              ;CALCULATE SCREEN COORDS FOR TOP OF WELL
    22   1180    8D  010F                       STA LEVELY              ;OFF SCREEN FLAG
    23   1171    11                             ENDIF
    24   115B    27                             ENDIF
    25                                          .SBTTL  UTILITY-BUILD WELL PIAC
    26   1183                            WELPIC                          ;
    27   1183    A9    01                       LDA I,1                 ;
    28   1185    20  0000G                      JSR VGSCA1              ;NORMAL SCAL
    29   1188    A0    06                       LDY I,WELCOL
    30   118A    84    9E                       STY COLOR
    31   118C    AE  0110                       LDX LEVELY+1
    32   118F    F0    00                       IFNE                    ;OFF SCREEN
    33   1191    60                             RTS                     ;YES. ABORT
    34   1190    01                             ENDIF
    35   1192    AE  0113                       LDX ROTFLG              ;WELL ON
    36   1195    D0    00                       IFEQ
    37   1197    60                             RTS                     ;NO. NO SPOKES
    38   1196    01                             ENDIF
    39                                                                  ;ABORT IF ANY OF FAR PTS ARE OFF SCREEN LDX I,NL        S-1
    40   1198    A2    0F                       LDX I,NLINES-1
    41                                          BEGIN                   ;LOOP FOR ACH SPOKE
    42   119A    A9    C0                       LDA I,RATS              ;SPOKE INTENSITY
    43   119C    20  1238                       JSR SPOKE               ;DRAW SPOKE
    44   119F    CA                             DEX
    45   11A0    10    F8                       MIEND
    46                                          .SBTTL  DISPLAY-WELL RIM
    47   11A2    A0    06                       LDY I,WELCOL
    48   11A4    84    9E                       STY COLOR
    49   11A6    A9    08                       LDA I,MZCOLO
    50   11A8    20  0000G                      JSR VGSTAT
    51   11AB    A0    4F                       LDY I,4F
    52   11AD    AD  0110                       LDA LEVELY+1
    53   11B0    20  11B8                       JSR OUTLIN
    54   11B3    A0    0F                       LDY I,0F
    55   11B5    AD  010F                       LDA LEVELY
    56   11B8                            OUTLIN                          ;DRAW TOP  Y 0  OR BOTTOM  Y 40  OF WELL
    57   11B8    D0    00                       IFEQ                    ;ON SCREEN
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 53+
DISPLAY-WELL RIM

    58   11BA   84   37                STY INDEX1              ;YES
    59   11BC   B9  032A               LDA Y,LINSXL
    60   11BF   85   61                STA SXL
    61   11C1   B9  031A               LDA Y,LINSXH
    62   11C4   85   62                STA SXH
    63   11C6   B9  034A               LDA Y,LINSZL
    64   11C9   85   63                STA SZL
    65   11CB   B9  033A               LDA Y,LINSZH
    66   11CE   85   64                STA SZH
    67   11D0   A2   61                LDX I,SXL
    68   11D2   20  15BC               JSR VGYABS              ;UPDATE CURNTX,Y
    69   11D5   A5   74                LDA VGLIST              ;SAVE FOR RUNG CHANGES
    70   11D7   85   B0                STA RUNGVG
    71   11D9   A5   75                LDA VGLIST+1
    72   11DB   85   B1                STA RUNGVG+1
    73   11DD   A2   0F                LDX I,NLINES-1
    74   11DF   AD  0111               LDA WELTYP
    75   11E2   F0   00                IFNE                    ;PLANAR
    76   11E4   CA                     DEX                     ;YES. BEAM OFF FOR 1ST LINE
    77   11E3   01                     ENDIF
    78   11E5   A9   C0                LDA I,RATS
    79   11E7   85   73                STA VGBRIT              ;TURN ON BEAM
    80   11E9   86   38                STX INDEX2
    81                                 BEGIN                   ;LOOP FOR EACH LINE ON LEVEL
    82   11EB   C6   37                DEC INDEX1
    83   11ED   A5   37                LDA INDEX1
    84   11EF   29   0F                AND I,0F
    85   11F1   C9   0F                CMP I,0F
    86   11F3   D0   00                IFEQ                    ;INDEX WRAPPING
    87   11F5   A5   37                LDA INDEX1
    88   11F7   18                     CLC                     ;YES
    89   11F8   69   10                ADC I,10
    90   11FA   85   37                STA INDEX1
    91   11F4   07                     ENDIF
    92   11FC   20  126D               JSR LINTOS              ;MOVE LINS TO SXL...SZH
    93   11FF   C6   38                DEC INDEX2
    94   1201   10   E8                MIEND
    95   11B9   49                     ENDIF
    96   1203   60                     RTS
    97                                 .SBTTL  UTILITY-CONNECT CURRENT PT. WITH NEXT POINT
    98
    99   1204                CONNEC                           ;DRAW A LINE TO NEXT POINT  SX
   100   1204   A5   61                LDA SXL                 ;CURRENT POINT CURNTX AND
   101   1206   38                     SEC                     ;SET CURRENT POINT NEXT POIN
   102   1207   E5   6A                SBC CURNTX
   103   1209   85   6E                STA XCOMP
   104   120B   A5   62                LDA SXH
   105   120D   E5   6B                SBC CURNTX+1
   106   120F   85   6F                STA XCOMP+1             ;X PORTION OF VECTOR
   107   1211   A5   63                LDA SZL
   108   1213   38                     SEC
   109   1214   E5   6C                SBC CURNTY
   110   1216   85   70                STA YCOMP
   111   1218   A5   64                LDA SZH
   112   121A   E5   6D                SBC CURNTY+1
   113   121C   85   71                STA YCOMP+1             ;Z PORTION OF VECTOR
   114   121E   A2   6E                LDX I,XCOMP
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 53+
UTILITY-CONNECT CURRENT PT. WITH NEXT POINT

   115   1220   20  0000G              UPCURN  JSR VGVCTR              ;DRAW VECTOR
   116   1223   A5    61                       LDA SXL                 ;SET CURRENT PT NEXT PT
   117   1225   85    6A                       STA CURNTX
   118   1227   A5    62                       LDA SXH
   119   1229   85    6B                       STA CURNTX+1
   120   122B   A5    63                       LDA SZL
   121   122D   85    6C                       STA CURNTY
   122   122F   A5    64                       LDA SZH
   123   1231   85    6D                       STA CURNTY+1
   124                                                                  ;MAKE SURE BEAM IS ON
   125   1233   A9    C0                       LDA I,RATS
   126   1235   85    73                       STA VGBRIT
   127   1237   60                             RTS
   128                                         .SBTTL  DISPLAY-DRAW 2 SPOKES
   129                             ;INPUT      X LINE # TO ILLUMINATE
   130                             ;           ACC INTENSITY
   131                             ;OUTPUT     X PRESERVED
   132   1238   86    37          SPOKE       STX INDEX1
   133   123A   48                             PHA
   134   123B   A4    9E                       LDY COLOR
   135   123D   A9    08                       LDA I,MZCOLO
   136   123F   20  0000G                      JSR VGSTAT
   137                                                                  ;CENTER BEAM
   138   1242   20  1286                       JSR LIFTOS              ;FAR PT SCREEN COORD
   139   1245   A2    61                       LDX I,SXL               ;DRAW BLANK VEC TO FAR PT.
   140   1247   20  15BC                       JSR VGYABS              ;CURRENT PT. FAR PT.
   141   124A   68                             PLA
   142   124B   85    73                       STA VGBRIT
   143   124D   48                             PHA
   144                                                                  ;NEAR PT COORD
   145   124E   20  126D                       JSR LINTOS              ;DRAW FROM FAR PT TO NEAR PT.
   146   1251   C6    37                       DEC INDEX1
   147   1253   A4    9E                       LDY COLOR
   148   1255   A9    00                       LDA I,0
   149   1257   85    73                       STA VGBRIT
   150   1259   A9    08                       LDA I,MZCOLO
   151   125B   20  0000G                      JSR VGSTAT
   152   125E   20  126D                       JSR LINTOS              ;DRAW FROM NEAR PT. TO ADJ NEAR PT.
   153   1261   68                             PLA
   154   1262   85    73                       STA VGBRIT
   155   1264   20  1286                       JSR LIFTOS
   156   1267   20  1204                       JSR CONNEC              ;DRAW TO FAR PT.
   157   126A   A6    37                       LDX INDEX1
   158   126C   60                             RTS
   159   126D   A6    37          LINTOS      LDX INDEX1
   160   126F   BD  032A                       LDA X,LINSXL
   161   1272   85    61                       STA SXL
   162   1274   BD  031A                       LDA X,LINSXH
   163   1277   85    62                       STA SXH
   164   1279   BD  034A                       LDA X,LINSZL
   165   127C   85    63                       STA SZL
   166   127E   BD  033A                       LDA X,LINSZH
   167   1281   85    64                       STA SZH
   168   1283   4C  1204                       JMP CONNEC              ;DRAW LINE
   169   1286               LIFTOS
   170   1286   A6    37                       LDX INDEX1
   171   1288   BD  036A                       LDA X,LIFSXL
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 53+
DISPLAY-DRAW 2 SPOKES

   172   128B   85   61                    STA SXL
   173   128D   BD 035A                    LDA X,LIFSXH
   174   1290   85   62                    STA SXH
   175   1292   BD 038A                    LDA X,LIFSZL
   176   1295   85   63                    STA SZL
   177   1297   BD 037A                    LDA X,LIFSZH
   178   129A   85   64                    STA SZH
   179   129C   60                         RTS
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 54
DISPLAY-DRAW 2 SPOKES

     1
     2                                        .SBTTL  CHECK FOR EYE PAST OBJECT ON WELL
     3  129D                           CHKDEP
     4  129D  A5  5B                          LDA EYH
     5  129F  D0  00                          IFEQ                    ;EYE +
     6  12A1  A5  57                          LDA PYL                 ;YES.
     7  12A3  38                              SEC
     8  12A4  E5  5F                          SBC EYL
     9  12A6  90  00                          IFCS
    10  12A8  C9  0C                          CMP I,0C
    11  12A7  02                              ENDIF
    12  12AA  B0  00                          IFCC                    ;EYE TO CLOSE
    13  12AC  A5  5F                          LDA EYL                 ;YES. NUDGE PT. AWAY
    14  12AE  18                              CLC
    15  12AF  69  0F                          ADC I,0F
    16  12B1  B0  00                          IFCC
    17  12B3  C9  F0                          CMP I,0F0
    18  12B2  02                              ENDIF
    19  12B5  90  00                          IFCS                    ;
    20  12B7  A9  F0                          LDA I,0F0               ;BUT NOT PAST END OF WELL
    21  12B6  02                              ENDIF
    22  12B9  85  57                          STA PYL
    23  12AB  0F                              ENDIF
    24  12A0  1A                              ENDIF
    25  12BB  60                              RTS
    26  12BC  00G                    CHKSM8           .BYTE QCHKS8
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 55
UTILITY-PROJECT OUTLINE

     1                                        .SBTTL  UTILITY-PROJECT OUTLINE
     2                                ;INPUT ACC Y COORDINATE FOR OUTLINE
     3                                ;        X OF OR 4F FOR NEAR OR FAR ARRAY
     4                                ;        LINEX,Z 10  OUTLINE S X AND Z COORDINATES
     5                                ;
     6                                ;OUTPUT ACC 0 IF OUTLINE IS ONSCREEN
     7                                ;            NOT 0 IF ANY PT. IS OFF SCREEN
     8
     9  12BD                          CALOUT
    10  12BD  85   57                         STA PYL                 ;SAVE Y FOR OUTLINE
    11  12BF  86   38                         STX INDEX2              ;SAVE INDEX OF DEST IN ARRAY
    12  12C1  A9   00                         LDA I,0
    13  12C3  85   59                         STA LINSCA              ;START OFF SCREEN FLAG AT ON SCREEN
    14  12C5  A2   0F                         LDX I,0F
    15  12C7  86   37                         STX INDEX1
    16                                       BEGIN                   ;LOOP FOR EACH PT. ON OUTLINE
    17  12C9  A6   37                         LDX INDEX1
    18  12CB  BD 03CE                         LDA X,LINEX
    19  12CE  85   56                         STA PXL
    20  12D0  BD 03DE                         LDA X,LINEZ
    21  12D3  85   58                         STA PZL
    22  12D5  20 0EE2                         JSR WORSCR              ;PROJECT PT.
    23  12D8  A6   38                         LDX INDEX2
    24  12DA  A4   61                         LDY SXL
    25  12DC  A5   62                         LDA SXH
    26  12DE  30   00                         IFPL                    ;X OFF SCREEN
    27  12E0  C9   04                         CMP I,4
    28  12E2  90   00                         IFCS
    29  12E4  A0   FF                         LDY I,0FF
    30  12E6  A9   03                         LDA I,3
    31  12E8  E6   59                         INC LINSCA              ;YES
    32  12E3  06                            ENDIF
    33  12EA  B8   50   00                  ELSE
        12DF  0D
    34  12ED  C9   FC                         CMP I,-4
    35  12EF  B0   00                         IFCC
    36  12F1  A0   01                         LDY I,1
    37  12F3  A9   FC                         LDA I,-4
    38  12F5  E6   59                         INC LINSCA              ;YES. SET OFF SCREEN FLAG
    39  12F0  06                            ENDIF
    40  12EC  0A                            ENDIF
    41  12F7  9D 031A                       STA X,LINSXH
    42  12FA  98                            TYA
    43  12FB  9D 032A                       STA X,LINSXL
    44  12FE  A4   63                       LDY SZL
    45  1300  A5   64                       LDA SZH
    46  1302  30   00                       IFPL                    ;Z OFF SCREEN
    47  1304  C9   04                       CMP I,4
    48  1306  90   00                       IFCS
    49  1308  A0   FF                       LDY I,0FF
    50  130A  A9   03                       LDA I,3
    51  130C  E6   59                       INC LINSCA              ;YES.
    52  1307  06                            ENDIF
    53  130E  B8   50   00                  ELSE
        1303  0D
    54  1311  C9   FC                       CMP I,-4
    55  1313  B0   00                       IFCC
```

```
    56   1315   A9    FC                    LDA I,-4
    57   1317   A0    01                    LDY I,1
    58   1319   E6    59                    INC LINSCA              ;YES
    59   1314   06                          ENDIF
    60   1310   0A                          ENDIF
    61   131B   9D  033A                    STA X,LINSZH
    62   131E   98                          TYA
    63   131F   9D  034A                    STA X,LINSZL
    64   1322   C6    38                    DEC INDEX2
    65   1324   C6    37                    DEC INDEX1
    66   1326   10    A1                    MIEND
    67   1328   A5    59                    LDA LINSCA
    68   132A   60                          RTS
```

```
ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 56
UTILITY-DRAW WELL SHAPE

     1                                          .SBTTL  UTILITY-DRAW WELL SHAPE
     2                                ;INPUT ACC LEVEL #-1
     3
     4   132B                         DSPHOL
     5   132B    20  1132                    JSR LVLWEL              ;SET UP WELL INDEX   ID
     6   132E    85    36                    STA SAVEY               ;WELL INDEX
     7   1330    86    35                    STX SAVEX               ;CYCLE
     8   1332    A9    00                    LDA I,0
     9   1334    85    73                    STA VGBRIT
    10   1336    A9    05                    LDA I,5                 ;MAKE WELL REALLY SMALL
    11   1338    20  0000G                   JSR VGSCAL
    12   133B    A5    35                    LDA SAVEX               ;GET CYCLE  TIMES THRU ALL WELLS
    13   133D    29    07                    AND I,7
    14   133F    AA                          TAX
    15   1340    BC  1077                    LDY X,SPWECO            ;GET SPECIAL WELL COLOR FOR CYCLE
    16   1343    84    9E                    STY COLOR
    17   1345    A9    08                    LDA I,MZCOLO
    18   1347    20  0000G                   JSR VGSTAT              ;SET WELL COLOR
    19   134A    AE  0112                    LDX WELLID
    20   134D    A5    36                    LDA SAVEY
    21   134F    BC  0B16                    LDY X,HOLRAP
    22   1352    D0    00                    IFEQ                    ;PLANAR
    23   1354    38                          SEC                     ;NO. START BEAM AT FIRST POINT
    24   1355    E9    0F                    SBC I,0F                ;IN TABLE  FOR CLOSED WELLS
    25   1353    03                          ENDIF
    26   1357    A8                          TAY
    27   1358    B9  08C6                    LDA Y,NEWLIZ
    28   135B    85    57                    STA PYL
    29   135D    49    80                    EOR I,80                ;ADJUST Z SIGN
    30   135F    AA                          TAX
    31   1360    B9  07C6                    LDA Y,NEWLIX            ;SAVE COORDS OF 1ST PT
    32   1363    85    56                    STA PXL
    33   1365    49    80                    EOR I,80                ;ADJUST X SIGN
    34   1367    20  0000G                   JSR VGVTR1              ;POSITION BEAM AT 1ST PT ON WELL
    35   136A    A9    C0                    LDA I,0C0               ;TURN BEAM ON
    36   136C    85    73                    STA VGBRIT
    37   136E    A2    0F                    LDX I,NLINES-1
    38   1370    86    38                    STX INDEX2
    39                                      BEGIN                   ;LOOP FOR EACH PT ON EDGE
    40   1372    A4    36                    LDY SAVEY
    41   1374    B9  07C6                    LDA Y,NEWLIX            ;
    42   1377    AA                          TAX
    43   1378    38                          SEC
    44   1379    E5    56                    SBC PXL                 ;DELTA X
    45   137B    48                          PHA                     ;
    46   137C    86    56                    STX PXL                 ;CURRENT X OLD X
    47   137E    B9  08C6                    LDA Y,NEWLIZ
    48   1381    A8                          TAY
    49   1382    38                          SEC
    50   1383    E5    57                    SBC PYL                 ;DELTA Z
    51   1385    AA                          TAX
    52   1386    84    57                    STY PYL                 ;CURRENT Z OLD Z
    53   1388    68                          PLA
    54   1389    20  0000G                   JSR VGVTR1              ;DRAW VECTOR TO NEXT PT.
    55   138C    C6    36                    DEC SAVEY
    56   138E    C6    38                    DEC INDEX2
    57   1390    10    E0                    MIEND
```

```
    58   1392   A9    01                  LDA I,1              ;NORMAL SIZE AGAIN
    59   1394   4C  0000G                 JMP VGSCA1
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 57
DISPLAY STAR FIELD

     1                                .SBTTL  DISPLAY STAR FIELD
     2
     3   1397                         DSTARF
     4   1397    AD  0115                     LDA PLAGRO
     5   139A    F0    00                     IFNE
     6   139C    A5    5F                     LDA EYL                 ;SAVE EYE POSITION
     7   139E    48                           PHA
     8   139F    A5    5B                     LDA EYH
     9   13A1    48                           PHA
    10   13A2    A5    A0                     LDA YDEUNI
    11   13A4    48                           PHA
    12   13A5    A9    E8                     LDA I,0E8
    13   13A7    85    5F                     STA EYL
    14   13A9    A9    FF                     LDA I,0FF
    15   13AB    85    5B                     STA EYH
    16   13AD    A9    28                     LDA I,28
    17   13AF    85    A0                     STA YDEUNI
    18                                       .SBTTL  DISPLAY-PLANES OF STARS
    19   13B1    A2    07                     LDX I,NPLANE-1
    20   13B3    86    37                     STX INDEX1
    21                                       BEGIN                   ;LOOP FOR EACH PLANE OF STARS
    22   13B5    A6    37                     LDX INDEX1
    23   13B7    BD  03FE                     LDA X,PLANEY
    24   13BA    F0    00                     IFNE                    ;ACTIVE PLANE
    25   13BC    85    57                     STA PYL                 ;YES
    26   13BE    A9    80                     LDA I,80                ;CENTER OF WORLD
    27   13C0    85    56                     STA PXL
    28   13C2    A9    80                     LDA I,80
    29   13C4    85    58                     STA PZL
    30   13C6    A5    9F                     LDA CURWAV
    31   13C8    C9    05                     CMP I,5
    32   13CA    B0    00                     IFCC
    33   13CC    A9    06                     LDA I,BLUE              ;BLUE STARS IN WAVES 1-4
    34   13CE    B8    50    00               ELSE
         13CB    05
    35   13D1    8A                           TXA
    36   13D2    29    07                     AND I,7
    37   13D4    C9    07                     CMP I,7
    38   13D6    D0    00                     IFEQ
    39   13D8    A9    04                     LDA I,4
    40   13D7    02                           ENDIF
    41   13D0    09                           ENDIF
    42   13DA    85    9E                     STA COLOR
    43   13DC    A8                           TAY
    44   13DD    A9    08                     LDA I,MZCOLO
    45   13DF    20  0000G                    JSR VGSTAT
    46   13E2    A5    37                     LDA INDEX1
    47   13E4    29    03                     AND I,3                 ;DETERMINE PICTURE SUBROUTINE CODE
    48   13E6    0A                           ASL
    49   13E7    69    00G                    ADC I,PTSTR1
    50   13E9    85    55                     STA OBJIND
    51   13EB    20  0B53                     JSR SCAPI2              ;DRAW PLANE OF STARS ACC TO SCALE
    52   13BB    32                           ENDIF
    53   13EE    C6    37                     DEC INDEX1
    54   13F0    10    C3                     MIEND
    55   13F2    68                           PLA
    56   13F3    85    A0                     STA YDEUNI
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 57+
DISPLAY-PLANES OF STARS

    57   13F5   68                              PLA                     ;RESTORE EYE POSITION
    58   13F6   85   5B                         STA EYH
    59   13F8   68                              PLA
    60   13F9   85   5F                         STA EYL
    61   139B   5F                             ENDIF
    62   13FB   AD  011F              ZQPONS          LDA QT5
    63   13FE   F0   00                         IFNE
    64   1400   A6   42                         LDX LSCORH
    65   1402   E0   15                         CPX I,15
    66   1404   90   00                         IFCS
    67   1406   A6   40                         LDX LSCORL
    68   1408   FE  0200                        INC X,200
    69   1405   05                             ENDIF
    70   13FF   0B                             ENDIF
    71   140B   60                             RTS
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 58
DISPLAY-PLANES OF STARS

     1
     2                                        .SBTTL  DISPLAY - ENEMY LINES
     3
     4   140C                              DSPENL
     5   140C    AD  0110                          LDA LEVELY+1              ;BOTTOM OF WELL
     6   140F    F0    00                          IFNE                      ;WELL ON
     7   1411    60                                RTS                       ;NO. NO ENEMY LINES THEN
     8   1410    01                                ENDIF
     9   1412    A5    5B                          LDA EYH
    10   1414    D0    00                          IFEQ                      ;EYE ON WELL
    11   1416    A5    5F                          LDA EYL                   ;YES.
    12   1418    C9    F0                          CMP I,0F0
    13   141A    90    00                          IFCS                      ;PAST END
    14   141C    60                                RTS                       ;YES. ABORT
    15   141B    01                                ENDIF
    16   1415    07                                ENDIF
    17   141D    A9    01                          LDA I,1
    18   141F    20  0000G                         JSR VGSCAL
    19   1422    A5    74                          LDA VGLIST                ;SAVE FOR NEXT TIME
    20   1424    48                                PHA
    21   1425    A5    75                          LDA VGLIST+1
    22   1427    48                                PHA
    23   1428    A9    00                          LDA I,0                   ;LINE LOOP INDEX
    24   142A    85    38                          STA INDEX2
    25   142C    85    A9                          STA VGY
    26   142E    A2    0F                          LDX I,NLINES-1
    27   1430    AD  0111                          LDA WELTYP
    28   1433    F0    00                          IFNE                      ;PLANAR
    29   1435    CA                                DEX                       ;YES. 1 LESS LINE
    30   1434    01                                ENDIF
    31   1436    86    37                          STX INDEX1
    32                                            BEGIN                     ;LOOP FOR EACH LINE FROM 0 TO TOP
    33   1438    A2    03                          LDX I,3
    34   143A    A4    A9                          LDY VGY
    35                                            BEGIN                     ;SET FIXED CODES
    36   143C    BD  14B3                          LDA X,ENLFIX              ; CSTATGREEN,CNTR
    37   143F    91    74                          STA NY,VGLIST
    38   1441    C8                                INY
    39   1442    CA                                DEX
    40   1443    10    F7                          MIEND
    41   1445    84    A9                          STY VGY
    42   1447    AD  0114                          LDA ROTDIS
    43   144A    D0    00                          IFEQ                      ;REDO WELL
    44   144C    A6    38                          LDX INDEX2                ;NO
    45   144E    BD  039A                          LDA X,LINSTA
    46   1451    30    00                          IFPL                      ;ACTION AT NEAR PT
    47   1453    A2    0B                          LDX I,0B
    48   1455    A4    A9                          LDY VGY
    49                                            BEGIN                     ;NO. COPY VARIABLE STUFF
    50   1457    B1    AA                          LDA NY,OLDLLO             ;COPY VECTOR TO FAR POINT AND
    51   1459    91    74                          STA NY,VGLIST             ;VECTOR TO NEAR POINT
    52   145B    C8                                INY
    53   145C    CA                                DEX
    54   145D    10    F8                          MIEND
    55   145F    84    A9                          STY VGY
    56   1461    B8    50    00                    ELSE
         1452    11
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 58+
DISPLAY - ENEMY LINES

    57   1464   A4   A9                LDY VGY                ;NO. SINCE FAR PT. NEED NOT BE
    58   1466   B1   AA                LDA NY,OLDLLO          ;RECALCULATED, COPY IT TO NEW BUFFER.
    59   1468   91   74                STA NY,VGLIST          ;
    60   146A   85   6C                STA CURNTY                    ;Z VECTOR  LSB
    61   146C   C8                     INY
    62   146D   B1   AA                LDA NY,OLDLLO
    63   146F   91   74                STA NY,VGLIST
    64   1471   C9   10                CMP I,10
    65   1473   90   00                IFCS
    66   1475   09   E0                ORA I,0E0              ;SIGN EXTEND
    67   1474   02                     ENDIF
    68   1477   85   6D                STA CURNTY+1                  ;Z VECTOR  MSB
    69   1479   C8                     INY
    70   147A   B1   AA                LDA NY,OLDLLO
    71   147C   91   74                STA NY,VGLIST          ;X VECTOR  LSB
    72   147E   85   6A                STA CURNTX
    73   1480   C8                     INY
    74   1481   B1   AA                LDA NY,OLDLLO
    75   1483   91   74                STA NY,VGLIST          ;
    76   1485   C9   10                CMP I,10
    77   1487   90   00                IFCS
    78   1489   09   E0                ORA I,0E0              ;SIGN EXTEND
    79   1488   02                     ENDIF
    80   148B   85   6B                STA CURNTX+1                  ;X VECTOR  MSB
    81   148D   C8                     INY
    82   148E   84   A9                STY VGY
    83   1490   20   1511              JSR TIPACT             ;YES. GENERATE TIP STUFF
    84   1463   2F                     ENDIF
    85   1493   B8   50   00           ELSE
         144B   4A
    86                                                       ;YES  REDO WELL
    87   1496   20   14B7              JSR FIXSTU             ;GENERATE FIXED STUFF
    88   1499   20   1511              JSR TIPACT             ;GENERATE TIP STUFF
    89   1495   06                     ENDIF
    90   149C   A6   38                LDX INDEX2
    91   149E   1E   039A              ASL X,LINSTA           ;CLEAR LINE STATUS
    92   14A1   E6   38                INC INDEX2
    93   14A3   C6   37                DEC INDEX1
    94   14A5   10   91                MIEND
    95   14A7   68                     PLA                    ;SAVE LOC OF NEW BUFFER
    96   14A8   85   AB                STA OLDLHI
    97   14AA   68                     PLA
    98   14AB   85   AA                STA OLDLLO
    99   14AD   A4   A9                LDY VGY
   100   14AF   88                     DEY
   101   14B0   4C   0000G             JMP VGADD              ;UPDATE VGLIST
   102                                .SBTTL  DISPLAY - ENEMY LINES  INITIAL FIXED VG CODES
   103                                                       ;
   104                                                       ;PLACES COLOR STAT
   105                                                       ;             CNTR
   106                                                       ;             VCTR TO FAR PT.
   107                                                       ;INTO VGLIST VGY
   108   14B3   80   40   68   05   ENLFIX  .BYTE 80,40,68,05
   109   14B7                        FIXSTU
   110                                                       ;CALCULATE SCREEN LOCATION OF
   111                                                       ;FAR POINT
   112   14B7   A5   38                LDA INDEX2
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 58+
DISPLAY - ENEMY LINES  INITIAL FIXED VG CODES

   113   14B9   AA                          TAX
   114   14BA   18                          CLC                     ;AVERAGING SCREEN COORDNATE
   115   14BB   69   01                     ADC I,1                 ;OF ADJACENT LINES
   116   14BD   29   0F                     AND I,0F
   117   14BF   A8                          TAY
   118   14C0   BD   036A                   LDA X,LIFSXL
   119   14C3   38                          SEC                     ;ROUND
   120   14C4   79   036A                   ADC Y,LIFSXL
   121   14C7   85   61                     STA SXL
   122   14C9   BD   035A                   LDA X,LIFSXH
   123   14CC   79   035A                   ADC Y,LIFSXH
   124   14CF   85   62                     STA SXH
   125   14D1   0A                          ASL
   126   14D2   66   62                     ROR SXH
   127   14D4   66   61                     ROR SXL
   128   14D6   BD   038A                   LDA X,LIFSZL
   129   14D9   38                          SEC                     ;ROUND
   130   14DA   79   038A                   ADC Y,LIFSZL
   131   14DD   85   63                     STA SZL
   132   14DF   BD   037A                   LDA X,LIFSZH
   133   14E2   79   037A                   ADC Y,LIFSZH
   134   14E5   85   64                     STA SZH
   135   14E7   0A                          ASL
   136   14E8   66   64                     ROR SZH
   137   14EA   66   63                     ROR SZL
   138                                                    ;FALL INTO YVGVCT
   139                                     .SBTTL  UTILITY - QUICK BLANK VECTOR FROM SX,SZ
   140                          ;UPDATES CURNTX 2  AND CURNTY 2  WITH SXL 2  AND SZL 2 .
   141                          ;UPDATES VGY
   142   14EC   A4   A9         YVGVCT  LDY VGY
   143   14EE   A5   63                  LDA SZL
   144   14F0   91   74                  STA NY,VGLIST
   145   14F2   C8                       INY
   146   14F3   85   6C                  STA CURNTY
   147   14F5   A5   64                  LDA SZH
   148   14F7   85   6D                  STA CURNTY+1
   149   14F9   29   1F                  AND I,1F
   150   14FB   91   74                  STA NY,VGLIST
   151   14FD   C8                       INY
   152   14FE   A5   61                  LDA SXL
   153   1500   91   74                  STA NY,VGLIST
   154   1502   C8                       INY
   155   1503   85   6A                  STA CURNTX
   156   1505   A5   62                  LDA SXH
   157   1507   85   6B                  STA CURNTX+1
   158   1509   29   1F                  AND I,1F
   159   150B   91   74                  STA NY,VGLIST
   160   150D   C8                       INY
   161   150E   84   A9                  STY VGY
   162   1510   60                       RTS
   163                                     .SBTTL  DISPLAY - ENEMY LINES  TIP STUFF
   164                                                    ;
   165                                                    ;PLACES VECTOR TO NEAR PT AND
   166                                                    ; DOT STAT COLOR, JSRL DOT  OR
   167                                                    ; SHATTER SCAL, SHATTER JSRL PIC
   168                                                    ;INTO VGLIST  VGY
   169   1511             TIPACT                        ;OR IF INACTIVE, 4 SCAL 1,05
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 58+
DISPLAY - ENEMY LINES  TIP STUFF

   170   1511   A6    38                    LDX INDEX2
   171   1513   BD  03AC                    LDA X,LINEY
   172   1516   D0    00                    IFEQ                  ;LINE ACTIVE
   173   1518   A4    A9                    LDY VGY               ;NO. FILL WITH SCAL 1,0
   174   151A   A2    03                    LDX I,03
   175                                      BEGIN                 ;LOOP TO FILL 8 BYTES
   176   151C   A9    00                    LDA I,0               ;SCAL 1,0 LSB  NOOP
   177   151E   91    74                    STA NY,VGLIST
   178   1520   C8                          INY
   179   1521   A9    71                    LDA I,71              ;SCAL 1,0 MSB  NOOP
   180   1523   91    74                    STA NY,VGLIST
   181   1525   C8                          INY
   182   1526   CA                          DEX
   183   1527   10    F3                    MIEND
   184   1529   84    A9                    STY VGY
   185   152B   B8    50    00              ELSE
         1517   16
   186   152E   85    57                    STA PYL               ;LINE IS ACTIVE
   187                                                            ;CALCULATE NEAR PT.
   188   1530   20  129D                    JSR CHKDEP            ;YES, CHECK EYE
   189   1533   BD  0435                    LDA X,LINEXM          ;X COORD OF MIDWAY PT.
   190   1536   85    56                    STA PXL
   191   1538   BD  0445                    LDA X,LINEZM          ;Z COORD OF MIDWAY PT.
   192   153B   85    58                    STA PZL
   193   153D   20  0EE2                    JSR WORSCR            ;PROJECT ENEMY LIVE NEAR PT.
   194                                                            ;SAVE NEW COORDINATES
   195   1540   20  1586                    JSR FCONNEC           ;DRAW VECTOR TO NEAR PT.
   196   1543   A6    38                    LDX INDEX2
   197   1545   BD  039A                    LDA X,LINSTA
   198   1548   29    40                    AND I,40
   199   154A   F0    00                    IFNE                  ;WHAT S HAPPENING AT TIP
   200   154C   20  0B88                    JSR CASCAL            ;SHATTERED
   201                                                            ;SET PROJECTION SCALE
   202   154F   AD  60CA                    LDA RANDOM
   203   1552   29    02                    AND I,2
   204   1554   18                          CLC
   205   1555   69    00G                   ADC I,PTSPAR
   206   1557   AA                          TAX                   ;DETERMINE SHATTER PIC
   207   1558   BD  0000G                   LDA X,PICHI
   208   155B   C8                          INY                   ;INSERT JSRL TO SHATTER PIC
   209   155C   91    74                    STA NY,VGLIST
   210   155E   88                          DEY
   211   155F   BD  0000G                   LDA X,PICLO
   212   1562   91    74                    STA NY,VGLIST
   213   1564   C8                          INY
   214   1565   C8                          INY
   215   1566   84    A9                    STY VGY
   216   1568   B8    50    00              ELSE
         154B   1F
   217   156B   A4    A9          WHITIP    LDY VGY               ;JUST A DOT AT TIP
   218   156D   A9    00                    LDA I,WHITE           ;COLOR  SET STAT WHITE
   219   156F   91    74                    STA NY,VGLIST
   220   1571   C8                          INY
   221   1572   A9    68                    LDA I,68
   222   1574   91    74                    STA NY,VGLIST
   223   1576   C8                          INY
   224   1577   AD  0000G                   LDA JSRDOT            ;INSERT JSRL TO DOT
```

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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 58+
DISPLAY - ENEMY LINES  TIP STUFF

   225   157A   91   74                    STA NY,VGLIST
   226   157C   C8                         INY
   227   157D   AD   0000G                  LDA JSRDT1
   228   1580   91   74                    STA NY,VGLIST
   229   1582   C8                         INY
   230   1583   84   A9                    STY VGY
   231   156A   1A                         ENDIF
   232   152D   57                         ENDIF
   233   1585   60                         RTS
   234                                     .SBTTL  DISPLAY UTILITY - FAST CONNECT
   235                                                    ;DRAW VECTOR OF INTENSITY 0A0
   236                                                    ;FROM CURNTX, Y, TO SX, SZ
   237   1586   A4   A9             FCONNEC         LDY VGY
   238   1588   A5   63                    LDA SZL
   239   158A   38                         SEC
   240   158B   E5   6C                    SBC CURNTY
   241   158D   91   74                    STA NY,VGLIST
   242   158F   C8                         INY
   243   1590   A5   64                    LDA SZH
   244   1592   E5   6D                    SBC CURNTY+1
   245   1594   29   1F                    AND I,1F
   246   1596   91   74                    STA NY,VGLIST
   247   1598   C8                         INY
   248   1599   A5   61                    LDA SXL
   249   159B   38                         SEC
   250   159C   E5   6A                    SBC CURNTX
   251   159E   91   74                    STA NY,VGLIST
   252   15A0   C8                         INY
   253   15A1   A5   62                    LDA SXH
   254   15A3   E5   6B                    SBC CURNTX+1
   255   15A5   29   1F                    AND I,1F
   256   15A7   09   A0                    ORA I,0A0
   257   15A9   91   74                    STA NY,VGLIST
   258   15AB   C8                         INY
   259   15AC   84   A9                    STY VGY
   260   15AE   60                         RTS
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ALDISP - ALIENS DISPLAY FUNCTIO       ATARI MAC65 VM03.09  00 00 02 PAGE 59
UTILITY - VG ABS POS

     1                                          .SBTTL  UTILITY - VG ABS POS
     2   15AF                            VGYAB1
     3   15AF    A0    00                       LDY I,0
     4   15B1    98                             TYA
     5   15B2    91    74                       STA NY,VGLIST
     6   15B4    A9    71                       LDA I,71
     7   15B6    C8                             INY
     8   15B7    91    74                       STA NY,VGLIST          ;SCALE BINARY 1, LINEAR 0
     9   15B9    C8                             INY
    10   15BA    D0    02                       BNE NOLABS
    11   15BC    A0    00              VGYABS   LDY I,0
    12   15BE    A9    40              NOLABS   LDA I,40               ;INPUT  X BASE PAGE LOC OF SCREEN COORDINATE PAIR
    13   15C0    91    74                       STA NY,VGLIST          ;VG CENTER
    14   15C2    A9    80                       LDA I,80
    15   15C4    C8                             INY
    16   15C5    91    74                       STA NY,VGLIST
    17   15C7    C8                             INY
    18   15C8    B5    02                       LDA ZX,2
    19   15CA    85    6C                       STA CURNTY
    20   15CC    91    74                       STA NY,VGLIST          ;VCTR DELTA Z
    21   15CE    C8                             INY
    22   15CF    B5    03                       LDA ZX,3
    23   15D1    85    6D                       STA CURNTY+1
    24   15D3    29    1F                       AND I,1F
    25   15D5    91    74                       STA NY,VGLIST
    26   15D7    B5    00                       LDA ZX,0
    27   15D9    85    6A                       STA CURNTX
    28   15DB    C8                             INY
    29   15DC    91    74                       STA NY,VGLIST          ;DELTA X
    30   15DE    B5    01                       LDA ZX,1
    31   15E0    85    6B                       STA CURNTX+1
    32   15E2    29    1F                       AND I,1F
    33   15E4    C8                             INY
    34   15E5    91    74                       STA NY,VGLIST
    35   15E7    4C  0000G                      JMP VGADD              ;OUTPUT  BEAM AT ABS. POS.
    36                                                                 ;CURNTX,Y BEAM COORDS.
    37                                                                 ;VGLIST UPDATED
```

```
      1                                    HLL65
      2
      3
      4
      5
      6
      7          0001                      .END
```

ALDISP - ALIENS DISPLAY FUNCTIO ATARI MAC65 VM03.09 00 00 02 PAGE 60+
SYMBOL TABLE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACTIP | 03AA | | ALLPOT | 60C8 | | ALLPO2 | 60D8 | | ALTCOL | 06A9 R | | AUDCTL | 60C8 | |
| AUDC1 | 60C1 | | AUDC2 | 60D1 | | AUDF1 | 60C0 | | AUDF2 | 60D0 | | AUD2CT | 60D8 | |
| BCCURS | **** | G | BCENEL | **** | G | BCEXPL | **** | G | BCINFO | **** | G | BCINVA | **** | G |
| BCNYMP | **** | G | BCSHOT | **** | G | BCSTAR | **** | G | BCWELL | **** | G | BFACTR | 0078 | |
| BFASTA | **** | G | BFAST1 | **** | G | BFBSTA | **** | G | BFBST1 | **** | G | BIGTEX | 017C | R |
| BINSCA | 005A | | BLDWEL | 1157 | R | BLIFIN | 0156 | | BLUE | 0006 | | BLULET | 0007 | |
| BOFLAS | 0124 | | BONUS | 0102 | | BOOKKE | 0412 | | BOOKKS | 0406 | | BOOMFL | 010D | |
| BOOMTI | 010E | | BOXPRO | **** | G | BUFACT | 0415 | | BUFASH | **** | G | BUFASL | **** | G |
| BUFBSH | **** | G | BUFBSL | **** | G | BUFRDY | 0054 | | BUFSWH | **** | G | BUFSWL | **** | G |
| CALMAG | 079F | R | CALOUT | 12BD | R | CAMPC | 010B | | CAMSTA | 010C | | CASCAL | 0B88 | R |
| CBOOM | 0024 | | CBUF1 | 0078 | | CDBOOM | 0004 | | CDBOXP | 0012 | | CDGETI | 0006 | |
| CDGOVR | 000C | | CDHITB | 000A | | CDLADR | 0014 | | CDLOGP | 0014 | | CDPLAY | 0000 | |
| CDPLPL | 000E | | CDPRST | 0010 | | CDREQR | 0008 | | CDROP | 0020 | | CDSYST | 0002 | |
| CD2GAM | 0016 | | CENDGA | 0008 | | CENDLI | 0006 | | CENDWA | 000E | | CGETIN | 0012 | |
| CHACHA | 00A7 | | CHACOU | 0135 | | CHAINV | 00A8 | | CHARCO | 02F2 | | CHARL1 | 02AD | |
| CHARL2 | 02C0 | | CHARY | 02D3 | | CHARYL | 02E6 | | CHISCH | 0010 | | CHKDEP | 129D | R |
| CHKSM6 | 02E1 | RG | CHKSM7 | 0B46 | RG | CHKSM8 | 12BC | RG | CHPLKI | 0635 | R | CINIRA | 001C | |
| CINVA1 | 0000 | | CLOGO | 001A | | CNCURS | 0001 | | CNEWAV | 000C | | CNEWGA | 0000 | |
| CNEWLI | 0002 | | CNEWV2 | 0018 | | CNOTFO | 0014 | | CNWLF2 | 001E | | COCKTA | 0010 | |
| COCTAL | 0117 | | COLOR | 009E | | COLPOR | 0800 | | COLRAM | 0019 | | COLTAB | 1047 | R |
| CONNEC | 1204 | R | CPAUSE | 000A | | CPLAY | 0004 | | CPSPXI | FFFF | G | CPULS0 | 000D | |
| CPULS1 | 000C | | CPULS2 | 000B | | CPULS3 | 000A | | CPULS4 | 0009 | | CREQRA | 0016 | |
| CR0 | 00F0 | | CR1 | 00F0 | | CR2 | 00B8 | | CR3 | 00B8 | | CR4 | 0080 | |
| CSUINT | 0001 | | CSUSTA | 0003 | | CSYSTM | 0022 | | CURCOL | 0001 | | CURMOD | 0106 | |
| CURNTX | 006A | | CURNTY | 006C | | CURSL1 | 0200 | | CURSL2 | 0201 | | CURSPO | 0051 | |
| CURSVH | 0105 | | CURSVL | 0104 | | CURSY | 0202 | | CURSYL | 0107 | | CURS4E | 0E1C | R |
| CURWAV | 009F | | C8 | 0DFF | R | DBSW | 004C | | DELTA8 | 0544 | R | DENORM | 007A | R |
| DEPCOL | 0006 | | DGOVER | **** | G | DG0 | 00F0 | | DG000 | 002C | | DG225 | 00E7 | |
| DG450 | 00CF | | DG675 | 00AA | | DG900 | 0080 | | DISPLA | 0000 | RG | DI0 | 00F0 | |
| DI1 | 00B8 | | DI2 | 0080 | | DI3 | 0048 | | DI4 | 0010 | | DPLPLA | **** | G |
| DPRSTA | **** | G | DROUTA | 0062 | R | DROUTE | 007A | R | DSBOOM | 0704 | R | DSPCHG | 05A5 | R |
| DSPCUR | 03D0 | R | DSPENL | 140C | R | DSPEXP | 05E4 | R | DSPHOL | 132B | RG | DSPINV | 03F7 | R |
| DSPNYM | 02E2 | R | DSPSYS | **** | G | DSPWEL | 01B1 | R | DSTARF | 1397 | R | DSTATE | 0057 | R |
| D07MSK | **** | G | D2GAME | **** | G | D70MSK | **** | G | EACTL | 6040 | | EADAL | 6000 | |
| EAIN | 6050 | | ELICNT | 0123 | | EMCTRS | 0003 | | ENLFIX | 14B3 | R | ENSIZE | 0151 | |
| ESHCOU | 00A6 | | EXCESS | 039A | R | EXICAM | 010A | | EXL | 005E | | EXPCOL | 0000 | |
| EXPCOU | 0116 | | EXPLOL | 02FA | | EXPLOS | 0312 | | EXPLOT | 0302 | | EXPLOY | 030A | |
| EYEFAC | 0065 | | EYH | 005B | | EYL | 005F | | EYLDES | 005D | | EYLL | 005C | |
| EZL | 0060 | | FARY | 014E | | FBLUE | 000B | | FCONNE | 1586 | R | FGREEN | 0007 | |
| FIXSTU | 14B7 | R | FLASH | 000F | | FLGNHI | 0603 | | FLICOL | 0003 | | FLIPCO | 0142 | |
| FLIPIC | 0435 | R | FLITAB | 0455 | R | FPSPXI | 0009 | G | FPSTAR | 067E | R | FRED | 000C | |
| FRTIMR | 0053 | | FUSECO | 0146 | | FUSPIC | 04E5 | R | GAMOP1 | 071E | | GAMOP3 | 071F | |
| GETDSP | **** | G | GREEN | 0005 | | HARDWA | 6000 | | HIRATE | 0127 | | HIWAVE | 0126 | |
| HOLEYL | 0AD6 | R | HOLEZL | 0AE6 | R | HOLRAP | 0B16 | R | HOLZAD | 0AF6 | R | HOLZDH | 0B06 | R |
| HRANKH | 0620 | | HRANKL | 061E | | HRANKM | 061F | | HRED | 000D | | HSCORH | 0708 | |
| HSCORL | 0706 | | HSCORM | 0707 | | ICHCOL | 0000 | | IEYL | 0004 | | IJMPDS | 047E | R |
| ILINAN | 09C6 | R | ILINDD | 00F0 | | ILINLI | 0010 | | INCCOU | 0109 | | INDEX1 | 0037 | |
| INDEX2 | 0038 | | INDEX3 | 0039 | | INDEX4 | 003A | | INDYHI | 003C | | INDYLO | 003B | |
| INFO | **** | G | INICOL | 0FE0 | RG | INIDSP | 0FB8 | RG | INIMAT | 100D | R | ININDX | 0604 | |
| INITAL | 0606 | | INITEM | **** | G | INIWLS | 107F | R | INMCOU | 0108 | | INOP0 | 0D00 | |
| INOP1 | 0E00 | | INPUT | 004A | | INTACK | 5000 | | INTENS | 0098 | | INTIME | 0128 | |
| INVABI | 0007 | | INVACT | 02A6 | | INVAC1 | 0283 | | INVAC2 | 028A | | INVAL1 | 02B9 | |
| INVAL2 | 02CC | | INVAY | 02DF | | INVAYL | 029F | | INVA1E | 0E2C | R | INVA1S | 0E1C | R |
| INVCAM | 0291 | | INVCAR | 0003 | | INVCOL | 0003 | | INVDIR | 0080 | | INVERS | **** | G |
| INVEXP | **** | G | INVFIR | 0040 | | INVLOO | 0298 | | INVMOT | 0080 | | INVPIC | 0421 | R |
| INVPIE | 0435 | R | INVPIT | 042B | R | INVROT | 0040 | | INVSEQ | 0018 | | IN1 | 0C00 | |
| JMPAHI | **** | G | JMPALO | **** | G | JMPBHI | **** | G | JMPBLO | **** | G | JMPMAH | **** | G |

ALDISP - ALIENS DISPLAY FUNCTIO ATARI MAC65 VM03.09 00 00 02 PAGE 60+
SYMBOL TABLE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| JMPMAL | **** G | JMPMA2 | **** G | JMPMA4 | **** G | JMPMH2 | **** G | JMPMH4 | **** G |
| JSRDOT | **** G | JSRDT1 | **** G | JUMPX | 04D5 R | JUMPZ | 04D1 R | KILLER | **** G |
| LCIRCL | 07D5 R | LCROSS | 07F5 R | LDIAMO | 07E5 R | LDRDSP | **** G | LEDOFF | 0003 |
| LEFSID | 007B | LETCOL | 0005 | LEVELY | 010F | LIFSXH | 035A | LIFSXL | 036A |
| LIFSZH | 037A | LIFSZL | 038A | LIFTOS | 1286 R | LINANG | 03EE | LINEX | 03CE |
| LINEXM | 0435 | LINEY | 03AC | LINEZ | 03DE | LINEZM | 0445 | LINSCA | 0059 |
| LINSTA | 039A | LINSXH | 031A | LINSXL | 032A | LINSZH | 033A | LINSZL | 034A |
| LINTOS | 126D R | LITRAL | 00AC | LIVES1 | 0048 | LIVES2 | 0049 | LOGPRO | **** G |
| LPEANU | 0805 R | LSCORH | 0042 | LSCORL | 0040 | LSCORM | 0041 | LVLWEL | 1132 R |
| LVSGAM | 0158 | MAH | 6081 | MAL | 6080 | MATRAC | 0080 | MBH | 6083 |
| MBL | 6082 | MBSTAR | 6080 | MCOINC | 0002 | MCOINL | 0004 | MCOINR | 0001 |
| MDITES | 0020 | MDYPL | 6098 | MECHS | 0003 | MEH | 6085 | MEL | 6084 |
| MFAKE | 0080 | MFH | 6087 | MFIRE | 0010 | MFL | 6086 | MFLIP | 0004 |
| MGTMOD | 0040 | MHALT | 0040 | MLCCNT | 0004 | MLED1 | 0002 | MLED2 | 0001 |
| MMCCNT | 0002 | MNL | 608C | MOPTI4 | 0020 | MOPTI3 | 0007 | MRCCNT | 0001 |
| MSTAT | 6040 | MSTRT1 | 0020 | MSTRT2 | 0040 | MSUZA | 0008 | MSZXD | 6094 |
| MTEMP | 0031 | MTEST | 0010 | MVINVX | 0008 | MVINVY | 0010 | MXH | 6089 |
| MXL | 6088 | MXPH | 6096 | MXPL | 6095 | MYHIGH | 6070 | MYLOW | 6060 |
| MZBRIT | 0000 | MZCOLO | 0008 | MZHH | 6090 | MZHL | 608F | MZLH | 608E |
| MZLL | 608D | M10 | 04FA R | M3KHTI | 0080 | NCHARG | 000C | NCRS1E | 0E3C R |
| NCRS1S | 0E2C R | NCRS2E | 0E4C R | NCRS2S | 0E3C R | NCRS3E | 0E5C R | NCRS3S | 0E4C R |
| NCRS4E | 0E6C R | NCRS4S | 0E5C R | NCRS5E | 0E7C R | NCRS5S | 0E6C R | NCRS6E | 0E8C R |
| NCRS6S | 0E7C R | NCRS7E | 0E9C R | NCRS7S | 0E8C R | NCRS8E | 0EAE R | NCRS8S | 0E9C R |
| NEARY | 014D | NEOFLI | 014F | NEWAIT | 00A3 | NEWLIX | 07C6 R | NEWLIZ | 08C6 R |
| NEWPLA | 003F | NEXPLO | 0008 | NGAMES | 0100 | NGAMEO | 040E | NGAMIH | 040D |
| NGAMIL | 040C | NGAM2H | 0410 | NGAM2L | 040F | NGAM2O | 0411 | NGAVGH | 0413 |
| NGAVGL | 0412 | NGAVGZ | 0414 | NHISCO | 0008 | NICHAR | 0004 | NINVAD | 0007 |
| NLINES | 0010 | NNYMPH | 0040 | NOLABS | 15BE R | NONYM | 0393 R | NOOPR | 0061 R |
| NPARTI | 0010 | NPCHAR | 0008 | NPLANE | 0008 | NPLAYR | 0101 | NRANKS | 0063 |
| NROMS | 000C | NUM | 0002 | NUMPLA | 003E | NWNYMC | 015B | NWTELI | 015A |
| NYMCOL | 000C | NYMCOU | 03AB | NYMPL | 0203 | NYMPY | 0243 | OBJIND | 0055 |
| OCURSL | 00A5 | OFRTIM | 00A4 | OLDLHI | 00AB | OLDLLO | 00AA | OLOFLI | 0150 |
| OM2GAM | 0001 | ONELIN | 0BEA R | ONELN2 | 0C15 R | OPFLIP | 013D | OPFUSE | 0141 |
| OPPULS | 013E | OPSPIN | 0140 | OPTANK | 013F | OPTIN1 | 0009 | OPTIN2 | 000A |
| OPTIN3 | 016A | OTB | 0052 | OUTANK | 60E0 | OUTLIN | 11B8 R | OUTO | 4000 |
| PARLIX | 0203 | PARLIY | 0223 | PARLIZ | 0243 | PARLXA | 0020 | PARLXV | 02C3 |
| PARLYA | 0020 | PARLYV | 02E3 | PARLZA | 0020 | PARLZV | 0303 | PARTIX | 0263 |
| PARTIY | 0283 | PARTIZ | 02A3 | PARTXA | 0000 | PARTXV | 0323 | PARTYA | 0000 |
| PARTYV | 0343 | PARTZA | 0000 | PARTZV | 0363 | PCHCOL | 0001 | PCOUNT | 0E00 R |
| PCVELO | 0009 | PDIRED | 000B | PDIWHI | 0009 | PDIYEL | 000A | PICHI | **** G |
| PICLO | **** G | PINDEX | 0E0E R | PLAGRO | 0115 | PLANEY | 03FE | PLAYUP | 003D |
| POKEY | 60C0 | POKEY2 | 60D0 | POTGO | 60CB | POTGO2 | 60DB | PPSPXI | 0007 G |
| PPSTAR | 067C R | PROG | 9000 | PSCALE | 016B | PSHCTR | 0008 | PTCURS | **** G |
| PTESHO | **** G | PTEXP1 | **** G | PTFUSE | **** G | PTFUSX | **** G | PTSPAR | **** G |
| PTSPI1 | **** G | PTSPLA | **** G | PTSPLF | **** G | PTSTR1 | **** G | PTTANF | **** G |
| PTTANK | **** G | PTTANP | **** G | PUCHDE | 00B2 | PULPIC | 0565 R | PULPOT | 0157 |
| PULSCO | 0143 | PULSON | 0148 | PULSOE | 0EE2 R | PULSOS | 0EDE R | PULS1E | 0EDE R |
| PULS1S | 0ED6 R | PULS2E | 0ED6 R | PULS2S | 0EC8 R | PULS3E | 0EC8 R | PULS3S | 0EBA R |
| PULS4E | 0EBA R | PULS4S | 0EAE R | PULTAB | 059F R | PULTIM | 0147 | PULVEL | FEA0 |
| PURPLE | 0002 | PXL | 0056 | PX0 | 00EC | PX1 | 00D5 | PX2 | 00B1 |
| PX3 | 0090 | PYL | 0057 | PZL | 0058 | PZ0 | 0094 | PZ1 | 00B0 |
| PZ2 | 00B8 | PZ3 | 00A7 | QCHKS6 | **** G | QCHKS7 | **** G | QCHKS8 | **** G |
| QDSTAT | 0001 | QFRAME | 0003 | QNXTST | 0002 | QSTATE | 0000 | QSTATU | 0005 |
| QTMPAU | 0004 | QT1 | 00B5 | QT2 | 016C | QT3 | 0455 | QT4 | 0720 |
| QT5 | 011F | QT6 | 011B | QUASEC | 0005 | RANDOM | 60CA | RANDO2 | 60DA |
| RANKS | 0600 | RATS | 00C0 | RED | 0003 | RITSID | 007C | ROMSTA | 3000 |
| ROTCOL | 06BF R | ROTDIS | 0114 | ROTFLG | 0113 | RQRDSP | **** G | RSCORH | 0045 |

ALDISP - ALIENS DISPLAY FUNCTIO ATARI MAC65 VM03.09 00 00 02 PAGE 60+
SYMBOL TABLE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RSCORL | 0043 | RSCORM | 0044 | RUNGVG | 00B0 | RUNLOC | 02D1 R | SAVEND | 03CE | | |
| SAVEP | 03BC | SAVEX | 0035 | SAVEY | 0036 | SBCACT | 0128 R | SBCLOG | 0108 R | | |
| SBCSWI | 0148 R | SCALE | **** G | SCAL1 | **** G | SCAL3 | **** G | SCAPIC | 0B47 R | | |
| SCAPI2 | 0B53 R | SCFL | 0079 | SECOND | 0014 | SECOPH | 040B | SECOPL | 0409 | | |
| SECOPM | 040A | SECOUH | 0408 | SECOUL | 0406 | SECOUM | 0407 | SECUVG | 00B6 | | |
| SECUVY | 016E | SETSHR | 06D2 R | SHRSCA | 06E0 R | SKCTL | 60CF | SKCTL2 | 60DF | | |
| SPACG | 0000 | SPARE3 | 0133 | SPBINA | 013A | SPECIA | 0698 R | SPFTIM | 013C | | |
| SPINCO | 0145 | SPLINE | 0139 | SPOKE | 1238 R | SPOKST | 0425 | SPWECO | 1077 R | | |
| SPXIND | 013B | STALOC | 02C0 R | SUBCOU | 0099 | SUZCNT | 03AA | SUZTIM | 0125 | | |
| SVGLIS | 0076 | SWAPVG | 078E RG | SWFINA | 004E | SWRELE | 004F | SWSTAT | 004D | | |
| SWSTRT | 004D | SXH | 0062 | SXL | 0061 | SYM | 6092 | SZH | 0064 | | |
| SZL | 0063 | S1 | 152C R | S2 | 1569 R | S3 | 154A R | S4 | 1487 R | | |
| S5 | 13D6 R | S6 | 01F7 R | S7 | 01FF R | TANCOL | 0002 | TANKCO | 0144 | | |
| TANPIC | 0459 R | TANTAB | 0468 R | TBHD | 0050 | TBLIND | 0602 | TCMFLG | 00A2 | | |
| TEMPL | 002A | TEMPX | 002E | TEMPY | 002F | TEMPZ | 0030 | TEMP0 | 0029 | | |
| TEMP1 | 002A | TEMP2 | 002B | TEMP3 | 002C | TEMP4 | 002D | TEXTYP | 062F R | | |
| TIMHIS | 0605 | TIPACT | 1511 R | TNKOUT | 00A1 | TOUT0 | 00B4 | TRACOL | 0005 | | |
| TRAPIC | 046C R | TRATAB | 047A R | TSLAMR | 000B | TSPCOD | 0687 R | TSPTIM | 0674 R | | |
| TURQOI | 0004 | TYPCOD | 015E | UNITXH | 009B | UNITXL | 009A | UNITZH | 009D | | |
| UNITZL | 009C | UPCURN | 1220 R | VBASE | 0E1C R | VECRAM | 2000 | VGADD | **** G | | |
| VGADD2 | **** G | VGADD3 | **** G | VGBRIT | 0073 G | VGCNTR | **** G | VGDOT | 03B4 RG | | |
| VGHALT | **** G | VGHEXZ | **** G | VGJSRL | **** G | VGLIST | 0074 G | VGRTSL | **** G | | |
| VGSCAL | **** G | VGSCA1 | **** G | VGSIZE | 0072 G | VGSTAR | 4800 | VGSTAT | **** G | | |
| VGSTA1 | **** G | VGSTOP | 5800 | VGVCTR | **** G | VGVTR1 | **** G | VGVTR2 | **** G | | |
| VGY | 00A9 | VGYABS | 15BC RG | VGYAB1 | 15AF RG | WAVEN1 | 0046 | WAVEN2 | 0047 | | |
| WCHAMX | 011A | WCHARF | 0119 | WCHARI | 0118 | WCHARL | 0120 | WELBIN | 0B36 R | | |
| WELCOL | 0006 | WELLID | 0112 | WELLIS | 0B26 R | WELPIC | 1183 R | WELSEN | 0AD6 R | | |
| WELSEQ | 0AC6 R | WELTYP | 0111 | WFLICA | 015D | WFLMAX | 012E | WFLMIN | 0129 | | |
| WFUFRQ | 015F | WFUMAX | 0132 | WFUMIN | 012D | WFUSCH | 0159 | WFUSIH | 0169 | | |
| WFUSIL | 0164 | WHICHB | 07B1 R | WHITE | 0000 | WHITIP | 156B R | WINVIL | 0160 | | |
| WINVIN | 0165 | WINVJM | 011D | WINVMX | 011C | WNYMMX | 011E | WORSCR | 0EE2 R | | |
| WPULCA | 015C | WPULFI | 016D | WPUMAX | 012F | WPUMIN | 012A | WSPMAX | 0131 | | |
| WSPMIN | 012C | WTACAR | 0149 | WTAMAX | 0130 | WTAMIN | 012B | WTCHDG | 5000 | | |
| WTFMAX | 0136 | WTTFRA | 00B3 | XADJL | 0066 | XCOMP | 006E G | XSUBR | 06A1 R | | |
| X0H | 0080 | X0L | 0078 | X1H | 0081 | X1L | 0079 | X2H | 0082 | | |
| X2L | 007A | X3H | 0083 | X3L | 007B | X4H | 0084 | X4L | 007C | | |
| X5H | 0085 | X5L | 007D | X6H | 0086 | X6L | 007E | X7H | 0087 | | |
| X7L | 007F | YCOMP | 0070 | YDEUNI | 00A0 | YELLOW | 0001 | YVGVCT | 14EC R | | |
| ZABFLI | 0000 | ZABFUS | 0004 | ZABPUL | 0001 | ZABTAN | 0002 | ZABTRA | 0003 | | |
| ZADEST | 0121 | ZADJL | 0068 | ZAPCOL | 0000 | ZATVG1 | 00C3 RG | ZATVG2 | 0024 RG | | |
| ZBLACK | 000F | ZBLUE | 000B | ZCARFL | 0001 | ZCARFU | 0003 | ZCARNO | 0000 | | |
| ZCARPU | 0002 | ZDIRDO | 0080 | ZDIRUP | 0000 | ZFIRNO | 0000 | ZFIRYE | 0040 | | |
| ZGREEN | 0007 | ZMOTJM | 0080 | ZMOTMO | 0000 | ZPNLOC | 00AE | ZPOFFS | 00AF | | |
| ZPURPL | 0008 | ZQATLI | 03A1 RG | ZQPOKS | 0620 RG | ZQPONS | 13FB RG | ZRED | 000C | | |
| ZROCCW | 0040 | ZROTCW | 0000 | ZTURQO | 0003 | ZWHITE | 0000 | ZYELLO | 0004 | | |
| Z0H | 0090 | Z0L | 0088 | Z1H | 0091 | Z1L | 0089 | Z2H | 0092 | | |
| Z2L | 008A | Z3H | 0093 | Z3L | 008B | Z4H | 0094 | Z4L | 008C | | |
| Z5H | 0095 | Z5L | 008D | Z6H | 0096 | Z6L | 008E | Z7H | 0097 | | |
| Z7L | 008F | $BC | 0018 | $BCCNT | 0016 | $CCTIM | 0013 | $CMODE | 0009 | | |
| $CNCT | 0017 | $CNSTT | 000D | $COINA | 0008 | $INTCT | 0007 | $LAM | 0008 | | |
| $LMBIT | 0008 | $LMTIM | 000C | $PSTSL | 0010 | $TEST | 0008 | $$CRDT | 0006 | | |
| .Z. | 0002 | ...ONF | 0001 | ...PUV | 0000 | ...RD | 0010 | ...SPU | 0000 | | |
| ...SUV | 0000 | ...T | 1585 R | ...UV | 0006 | ...X | 0000 | | | | |

. ABS. 0721 00
15EA 01

ERRORS DETECTED 0
FREE CORE 11598. WORDS

RK1 ALDIS2,ALDIS2.LST ALDIS2

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SYMBOL TABLE

RK1 ALDIS2.OBJ,RK1 ALDIS2.LST DK1 ALDIS2

A TOTAL OF 11,177 STATEMENTS WERE PROCESSED.

CPU TIME - 00 00 00.4 I/O TIME - 00 00 00.0