

Non optimized, educational sourcecode of realtime filled vectors with calculations performed in drive.
Used assembler: TASM



Executable prg file but on the info screen in VICE enable true drive emulation [3ddrivecalc.zip](#)

```

*= $0801
;simple basic start sys4096
.byte $0c,$08,$0a,$00,$9e,$34,$30,$39,$36,$00,$00,$00,$00

;SPECIAL FOR C&A FAN POLISH MAG
;SIMPLE DRIVECALC VECTORS
;ca-fan.com.pl

;- drive variables
ANGLEX  = $10  ;x,y,z angle
ANGLEY  = $11  ;
ANGLEZ  = $12
ZOOM    = $13  ;zoom factor
KTORYW  = $15  ;actual point in structure
DANA1   = $16  ;for calculations
;-

YPOINT  = $17  ;moment memory
ZPOINT  = $18  ;

ANGX    = $19  ;
ANGY    = $1A  ; offset for add to angle x,y,z
ANGZ    = $1B  ;
;-
SINX    = $1C  ;actual sinus value x,y,z unsigned
SINY    = $1D
SINZ    = $1E

```

```

SINXSIGN = $1F    ;sign of sine x,y,x
SINYSIGN = $20
SINZSIGN = $21

COSX      = $22    ;cosine value unsigned
COSY      = $23
COSZ      = $24

COSXSIGN  = $25    ;sign of cosine
COSYSIGN  = $26
COSZSIGN  = $27

;-
XPRIM     = $28    ;for rotations 3d moment values
YPRIM     = $29
ZPRIM     = $2A

XBIS      = $2B
YBIS      = $2C

XLAST     = $2D
ZLAST     = $2E
;-
SIGN      = $33    ;for multiply sign of result

MNOZNA    = $34    ;data for multiply
MNOZNIK   = $35
LICZEW    = $36    ;actual point in structure

TABX2D    = $50    ;tab of x,y after perspective
TABY2D    = $68

ILEW      = $80    ;how many point in structure
BRYLA     = $81    ;data structure to calculations
;-----
          *= $1000
;-----
;here basic started
          JMP RUNPRG
;-
;send one byte to drive
SENDDRIV
          PHA
          LSR A
          LSR A
          LSR A
          LSR A
          TAX

          BIT $DD00

```

```

        BVC *-3

X4      SEC
        LDA $D012
        SBC #$32
        BCS X4      ;now only on the top and bottom border transfer
        ; AND #$07
        ; BEQ X4

X5      LDA #$03
        STA $DD00
        LDA TABKON,X
        STA $DD00
        LSR A
        LSR A
        AND #$F7
        STA $DD00
        PLA
        AND #$0F
        TAX
        LDA TABKON,X
        STA $DD00
        LSR A
        LSR A
        AND #$F7
        STA $DD00
        LDA #$23
        NOP
        NOP
        NOP
        STA $DD00
        RTS

;-
;nybbles to conversion send and $DD00 save
TABKON  .BYTE $07,$87,$27,$A7,$47,$C7
        .BYTE $67,$E7
        .BYTE $17,$97,$37,$B7,$57,$D7
        .BYTE $77,$F7

;-
;get one byte from drive
POB3    BIT $DD00
        BVC *-3
        SEC
        SEI
RASTER  LDA $D012
        SBC #$32
        BCC POB3A
        AND #$07
        BEQ RASTER

POB3A   LDA #$03

```

```
    STA $DD00
    NOP
    NOP
    NOP
    LDA #$FF
    LDX #$23
    EOR $DD00
    LSR A
    LSR A
    EOR $DD00
    LSR A
    LSR A
    EOR $DD00
    LSR A
    LSR A
    EOR $DD00
    STX $DD00
    RTS

;-
RUNPRG
;soft iinit system
    SEI
    LDA #$37
    STA $01
    JSR $FDA3
    JSR $FF5B
    LDA #$01
    STA $0286
    JSR $E544
;print the info
    LDA #<TEXT
    STA $FB
    LDA #>TEXT
    STA $FC
    LDY #$00

CNTPRINT
    LDA ($FB),Y
    BEQ EXITPRINT
    JSR $FFD2
    INY
    BNE CNTPRINT
    INC $FC
    BNE CNTPRINT

EXITPRINT

    STA $C6
    JSR $FFE4
    BEQ *-3
;wait for key
```

```

;set the vector for drive program in the ram c64
    LDA #<ADSTART
    STA MEW3+1

    LDA #0
    STA MWRT

    LDA #>ADSTART
    STA MEW3+2
    LDA $BA
    CMP #$08
    BCS NOTDRV
    LDA #$08 ;DRIVE NR
    STA $BA
NOTDRV
; ---
;error - drive not present
    LDX #3

MEW    JSR LISTEN
        BCC MEWCNT
        RTS
;memory write continue 3*32 bytes send under $0300 in drive
MEWCNT
        LDY #$05
MEW2   LDA TXMW,Y
        JSR $FFA8
        DEY
        BPL MEW2

        LDY #$20
MEW3   LDA 1000
        JSR $FFA8
        INC MWRT
        INC MEW3+1
        BNE MEW4
        INC MEW3+2

MEW4   DEY
        BNE MEW3
        JSR $FFAE
        DEX
        BNE MEW

;-
        JSR LISTEN
;after memory write memory execute now
        LDY #$04

MEX1   LDA MEX,Y
        JSR $FFA8

```

```
    DEY
    BPL MEX1
    JSR $FFAE
    SEI
    LDA #$23
    STA $DD00

    BIT $DD00
;wait for drive program
    BVS *-3

;OK! now fast send data of all drive code
    INY
    STY $FD
    LDA #<SAVE
    STA $FB
    LDA #>SAVE
    STA $FC
    LDY #$00

SEND
    LDA ($FB),Y
    JSR SENDDRIV
    INY
    BNE SEND
    INC $FC
    INC $FD
    LDA $FD
    CMP #$05
    BNE SEND

;OK program resided in drive now
;-
    JMP DALEJ
;-

LISTEN
    LDA #$00
    STA $90
    LDA $BA
    JSR $FFB1
    LDA #$6F
    JSR $FF93
    LDA $90
    BMI NODRIVE
    CLC
    RTS
NODRIVE SEC
    RTS

;-
TXMW
```

```

        .BYTE $20
        .BYTE 3
MVRT    .BYTE 0
        .TEXT "W-M"

;-
MEX

        .BYTE 3
        .BYTE 0
        .TEXT "E-M"

;-
SIZE1   .BYTE 44

CTECT   .BYTE 0
;
LCFACE  .BYTE 2
WALLS   .BYTE 0,1,1,2,2,3,3,0,255,1 ;TRACE OF DRAWING
        .BYTE 4,5,5,6,6,7,7,4,255,2
COLORS  .BYTE 1,2
POZWALL .BYTE 0
NRFACE  .BYTE 0
;
DALEJ   SEI

        LDY SIZE1 ;value point of cube 44 now
        LDA BRYLAX
        ASL A
        ADC BRYLAX
        TAX

RESIZE

        LDA BRYLAX,X
        PHP
        TYA
        PLP
        BPL NOWEB
        EOR #$FF ;or -44
        CLC
        ADC #$01

NOWEB

        STA BRYLAX,X
        DEX
        BNE RESIZE

        JSR INITMLTCHR ;prepare multicolor chargen
        JSR SENDALL ;send data to drive

;main loop here
LOOPTO

        SEI

```

CALCOS

```
JSR GETROT ;get precalculated data
JSR SENDROT;send operation type calculate again
JSR CLRCHR;clear buffer
```

```
LDA #$00 ;drawing faces from 0 number of face
STA POZWALL
STA NRFACE
```

LOOPCOLOR

```
LDX NRFACE
LDA COLORS,X
STA COLOR
```

LOOPWALL

```
LDA POZWALL
ASL A
TAX
```

```
LDA WALLS,X
BMI ENDSC
```

```
TAY
LDA MTABX2D,Y
CLC
```

```
ADC #64
LSR A ;MULTICOLOR
STA MX1
```

```
LDA MTABY2D,Y
CLC
ADC #64
STA MY1
```

```
INX
LDA WALLS,X
TAY
```

```
LDA MTABX2D,Y
CLC
ADC #64
LSR A ;MULTICOLOR
STA MX2
```

```
LDA MTABY2D,Y
CLC
ADC #64
STA MY2
```

```
JSR DRAW ;DRAW LINE
```



```
        INC POZWALL
        JMP LOOPWALL

ENDSC   INC POZWALL
        INC NRFACE ;counter of faces
        LDA NRFACE
        CMP LCFACE
        BNE LOOPCOLOR

;-
;slow filled routine
        LDX #$00

        LDA #$FF

        EOR $3000,X
        STA $2000,X

        INX
        BNE *-7

        LDA #$FF

        EOR $3100,X
        STA $2100,X

        INX
        BNE *-7

        LDA #$FF

        EOR $3200,X
        STA $2200,X

        INX
        BNE *-7

        LDA #$FF

        EOR $3300,X
        STA $2300,X

        INX
        BNE *-7

        LDA #$FF
        EOR $3400,X
        STA $2400,X
```

```
INX
BNE *-7

LDA #$FF
EOR $3500,X
STA $2500,X

INX
BNE *-7

LDA #$FF
EOR $3600,X
STA $2600,X

INX
BNE *-7

LDA #$FF

EOR $3700,X
STA $2700,X

INX
CPX #$F8
BNE *-9
```

```
;test key for change rotation zoom etc.
```

```
SEI
LDA #$FD
STA $DC00
LDA $DC01
ORA #$80
CMP #$FF
BNE TESTKEY
LDX #$02
STX $DC00
CMP $DC01
BEQ CNTN
```

```
TESTKEY
```

```
LDA #$7F
STA $DC00
LDA $DC01

JMP CHKEY
```

```
CNTN2
```

```
LDA $DC01
```



```
      JSR GETROT
      JSR SENDPAR
      JMP CNTN
CHKEY2
      CMP #$BF    ;F6
      BNE CHKEY3
      DEC MANGLEZ
      JMP SENDKEY

CHKEY3
      CMP #$DF    ;F4
      BNE CHKEY4
      DEC MANGLEY
      JMP SENDKEY

CHKEY4
      CMP #$EF    ;F2
      BNE CHKEY9    ;!!!
      DEC MANGLEX
      JMP SENDKEY

CHKEY5
      LDA $DC01
      CMP #$F7    ;F7
      BNE CHKEY6
      LDA ZOMIK
      CLC
      ADC #$0A
      BCC STOREZOM
      BCS SENDPRM

CHKEY6
      CMP #$BF    ;F5
      BNE CHKEY7
      INC MANGLEZ
      JMP SENDKEY

CHKEY7
      CMP #$DF    ;F3
      BNE CHKEY8
      INC MANGLEY
      JMP SENDKEY

CHKEY8
      CMP #$EF    ;F1
      BNE CHKEY9
      INC MANGLEX
      JMP SENDKEY

CHKEY9
      LDA #$FB
      STA $DC00
      LDA $DC01
      CMP #$7F    ;X
```

```
BNE CHKEY10
LDA MANGLEX
EOR #$FF
CLC
ADC #$01
STA MANGLEX
SENDKEY
LDA $DC01
CMP $DC01
BEQ *-3
JMP SENDPRM
CHKEY10
CMP #$EF ;C
BNE CHKEY10A
LDA CTECT
EOR #"C"
STA CTECT
CMP #"C"
BNE CHKEY10B
JSR CYBER
JMP TEST10B
CHKEY10B
JSR NOCYBER
TEST10B
JMP CNTN2
CHKEY10A
CMP #$FD ;R
BNE CHKEY11
CMP $DC01
BEQ *-3
JSR GETROT
LDA #"Z"
JSR SENDDRIV
JSR SENDPAR
JMP CNTN
CHKEY11
LDA #$FD
STA $DC00
LDA $DC01
CMP #$EF ;Z
BNE CHKEY12
LDA MANGLEZ
EOR #$FF
CLC
ADC #$01
STA MANGLEZ
JMP SENDKEY
CHKEY12
```



```

GETROT2
    JSR POB3
    STA MTABX2D,Y
    JSR POB3
    STA MTABY2D,Y
    INY
    CPY BRYLAX
    BNE GETROT2
    RTS
;--- operation type rotate - calculate again
SENDROT
    LDA #"R"
    JMP SENDDRIV
;---
SENDALL
    LDY #00
SAL2
    LDA MDATA,Y
    JSR SENDDRIV
    INY
    CPY LENOBJ ;length of data
    BNE SAL2
    RTS
;□□□
SENDPAR
    LDY #00
SENDP2
    LDA PARAMS,Y
    JSR SENDDRIV
    INY
    CPY #06
    BNE SENDP2
    RTS
;-----
LENOBJ    .BYTE 32 ;length data
MDATA    .TEXT "W" ;operation type

BRYLAX    .BYTE 8 ;8 point to calculate in structure
;-----
;point of figure x,y,z 8 times
BRYLKA
;---
           X  Y  Z

           .BYTE 50,50,50
           .BYTE 50,$CE,50
           .BYTE $CE,$CE,50
           .BYTE $CE,50,50

           .BYTE 50,50,$CE
           .BYTE 50,$CE,$CE

```

```

        .BYTE $CE,$CE,$CE
        .BYTE $CE,50,$CE
;---
PARAMS  .TEXT "P" ;operation send params for drive

MANGLEX .BYTE 3 ;value angle x,y,z
MANGLEY .BYTE 0
MANGLEZ .BYTE 4
ZOMIK   .BYTE $FF ;zoom factor
        .TEXT "R" ;operation code Read

;data after projections
MTABX2D
        .BYTE $FF,$FF,$FF,$FF,$FF,$FF
        .BYTE $FF,$FF,$FF,$FF,$FF,$FF
        .BYTE $FF,$FF,$FF,$FF,$FF,$FF
        .BYTE $FF,$FF,$FF,$FF,$FF,$FF
MTABY2D
        .BYTE $FF,$FF,$FF,$FF,$FF,$FF
        .BYTE $FF,$FF,$FF,$FF,$FF,$FF
        .BYTE $FF,$FF,$FF,$FF,$FF,$FF
        .BYTE $FF,$FF,$FF,$FF,$FF,$FF
;-----
TBADLN  = $4000 ;TABELS ADDRES

STRTLN  = $3000 ;START OF BUFFER
ENDLN   = $3800 ;END OF BUFFER

VLIN    = $4800 ;vertical line draving
FLIN    = $4D00 ;flat line

BITS    = $E0 ;color of line

DX      = $32 ;delta x,y
DY      = $33

X1      = $2A ;points of lines to drawing
X2      = $2B

Y1      = $2C
Y2      = $2D

VECTR1  = $FB ;vector for read many data (pointer)
;-----
INITMLTCHR

        JSR CLRCHR ;clear chargen
        JSR PREPLINE ;make speedcode drawinig line
        JSR NOCYBER ;no cyber vector presentation

```



```
;now graph init
    LDA #$18
    STA $D018

    LDA $D016
    ORA #$10
    STA $D016

    LDA #$00
    STA $D020
    LDA #$06
    STA $D021

    LDA #$05
    STA $D022

    LDA #$04
    STA $D023

    LDA #$03
    STA $D024

    LDA #$04
    STA $D025
    LDX #$00

FKL
    LDA #$09

    STA $D800,X
    STA $D8E0,X
    LDA #$0A
    STA $D9E0,X
    STA $DA00,X
    STA $DAF8,X

    INX
    BNE FKL

    RTS
;-----
;cyber vector presentation
CYBER

    LDA #$04
    STA $FC
    LDX #$00
    LDA #$04
    STA $FB
    LDA #$00
```

CYBER1

```
STA $0400,X
STA $0500,X
STA $0600,X
STA $06F8,X
INX
BNE CYBER1
```

```
LDX #$02
```

CYBER2

```
TXA
```

```
LDY #$00
```

CYBER3

```
STA ($FB),Y
INY
STA ($FB),Y
CLC
ADC #$10
INY
BCC CYBER3
LDA $FB
CLC
ADC #$28
STA $FD
LDA $FC
ADC #$00
STA $FE
CPX #14
BEQ CYBER5
LDY #$27
```

CYBER4

```
LDA ($FB),Y
STA ($FD),Y
DEY
BPL CYBER4
```

CYBER5

```
LDA $FB
CLC
ADC #$50
STA $FB
LDA $FC
ADC #$00
STA $FC
INX
CPX #15
BNE CYBER2
```

```
RTS
```

```
;L L L L
;prepare view of chargen 128x128
NOCYBER
    LDA #$04
    STA $FC
    LDX #$00
    LDA #$AC
    STA $FB
    LDA #$00

FILED1
    STA $0400,X
    STA $0500,X
    STA $0600,X
    STA $06F8,X
    INX
    BNE FILED1

    LDX #$00

PLAN1
    TXA

    LDY #$00

PLAN2
    STA ($FB),Y
    CLC
    ADC #$10
    INY
    BCC PLAN2
    LDA $FB
    CLC
    ADC #$28
    STA $FB
    LDA $FC
    ADC #$00
    STA $FC
    INX
    CPX #$10
    BNE PLAN1

    LDA $FB
    SEC
    SBC #$28
    STA $FB

    LDA $FC
    SBC #$00
    STA $FC
    LDA #$00
    LDY #$0F
```

```
        STA ($FB),Y
        RTS
;-----
;make speedcode for drawing line
PREPLINE
        LDA #<VLINE
        STA $FB
        LDA #>VLINE
        STA $FC
        LDA #<FLINE
        STA $FD
        LDA #>FLINE
        STA $FE
        LDA #<STRTLN
        STA ADLN1
        STA ADLN1A
        LDA #>STRTLN
        STA ADLN1+1
        STA ADLN1A+1
        LDX #$FF

LOP0PRP
        LDA #<BITS
        STA CELL

LOP1PRP
        LDA #$C8
        STA LINIA1B

        LDY #$00
PREPL1
        LDA LINIA1,Y
        STA ($FB),Y
        INY
        CPY #$13
        BNE PREPL1

        LDY #$00

        LDA #$88
        STA LINIA1B

PREPL2
        LDA LINIA1,Y
        STA ($FD),Y
        INY
        CPY #$13
        BNE PREPL2

        INX
        LDA $FC
```

```

        STA TBADLN+$40,X
        LDA $FE
        STA TBADLN+$80,X

        LDA $FB
        STA TBADLN,X

;LDA $FB
CLC
ADC #$13
STA $FB
STA $FD
BCC PREPL3
INC $FC
INC $FE
PREPL3 LDY CELL
        INY
        STY CELL
        CPY #<BITS+4
        BCC LOP1PRP

        LDA ADLN1
        CLC
        ADC #$80
        STA ADLN1
        STA ADLN1A
        BCC PREPL4
        INC ADLN1+1
        INC ADLN1A+1
PREPL4 LDA ADLN1+1
        CMP #>ENDLN
        BCC LOP0PRP

        RTS
;-----
LINIA1
        TXA
        ADC DY
        BCC LINIA1A

LINIA1B INY
        SBC DX
        BCS LINIA1B
LINIA1A TAX

CELL    = *+1
        LDA $E0

ADLN1   = *+1
        EOR $2000,Y

```

```
ADLN1A    = *+1
          STA $2000,Y
;-----
;clear data buffer
CLRCHR
          LDX #$00
          TXA

CLRC2     STA STRTLN,X
          STA STRTLN+$0100,X
          STA STRTLN+$0200,X
          STA STRTLN+$0300,X
          STA STRTLN+$0400,X
          STA STRTLN+$0500,X
          STA STRTLN+$0600,X
          STA STRTLN+$0700,X
          INX
          BNE CLRC2

DRWEX     RTS
;---
;DRAW LINE NOW
DRAW

          LDA COLOR
          AND #$03
          STA BITS+3
          ASL A
          ASL A
          STA BITS+2
          ASL A
          ASL A
          STA BITS+1
          ASL A
          ASL A
          STA BITS

          LDA MY1
          STA Y1
          LDA MY2
          STA Y2
          LDA MX1
          STA X1
          LDA MX2
          STA X2

; LDA X2
          SEC
          SBC X1
          BEQ DRWEX
          BCS STOREDX
```

```
LDX X1
LDY X2
STX X2
STY X1
```

```
LDX Y1
LDY Y2
STX Y2
STY Y1
EOR #$FF
ADC #$01
```

STOREDX

```
STA DX
SEC
LDA Y2
SBC Y1
LDX X1
LDY X2
BCS VERLINE
EOR #$FF
ADC #$01
STA DY
```

```
LDA TBADLN+$80,X
STA ADLIN1+1
```

```
LDA TBADLN+$80,Y
STA VECTR1+1
```

RYSUJE

```
LDA TBADLN,X
STA ADLIN1
LDA TBADLN,Y
STA VECTR1
```

```
LDA #$60
LDY #$00
STA (VECTR1),Y
LDX #$FF
LDY Y1
```

SEI

ADLIN1

```
CLC
= *+1
JSR $1000
LDY #$00
LDA #$8A
STA (VECTR1),Y
RTS
```

VERLINE

STA DY

```

    LDA TBADLN+$40,X
    STA ADLIN1+1

    LDA TBADLN+$40,Y
    STA VECTR1+1

    JMP RYSUJE

; ---
MX1    .BYTE 0
MX2    .BYTE 63
MY1    .BYTE 0
MY2    .BYTE 127
COLOR  .BYTE 3
; ---
TEXT
    .TEXT "WEGI FOR C&A FAN - DRIV"
    .TEXT "ECALC VECTORS"
    .BYTE 13,13,13
    .TEXT "F1/F2 X AXIS ROTATE +/- "
    .BYTE 13
    .TEXT "F3/F4 Y AXIS ROTATE +/- "
    .BYTE 13
    .TEXT "F5/F6 Z AXIS ROTATE +/- "
    .BYTE 13,13
    .TEXT "F7/F8 ZOOM +/- "
    .BYTE 13,13
    .TEXT "X INVERSE X ROTATION"
    .BYTE 13
    .TEXT "Y INVERSE Y ROTATION"
    .BYTE 13
    .TEXT "Z INVERSE Z ROTATION"
    .BYTE 13,13
    .TEXT "B BACK ALL ROTATION"
    .BYTE 13
    .TEXT "0 STOP ROTATION"
    .BYTE 13,13
    .TEXT "R RESET POSITION"
    .BYTE 13
    .TEXT "C CYBER VECTOR SWITCH!"
    .BYTE 13,13,13
    .TEXT "Q TO QUIT OR SPACE "
    .TEXT "KEY TO PAUSE"
    .BYTE 13,13,13
    .TEXT "MADE IN POLAND 2010.01."
    .TEXT "14"
    .BYTE 0

; -----
; ---    START DRIVE CODE
; -----
SAVE

```



```

;-----
DRIVERUN = $0300
        *= DRIVERUN
        .OFFS SAVE-*
OFSETTO = DRIVERUN-SAVE
;-----
ADSTART = SAVE+*-DRIVERUN
;---
STARTER
        SEI
        LDA #$7A
        STA $1802
        JSR SETLINE
        ;delay loop
        JSR $F5E9
        LDX #$05

GTPRG
        JSR READBLOK
        INC ADDR
        DEX
        BNE GTPRG
        JMP RUNLDR

;---
READONE
;GET ONE BYTE FROM C64
        LDY #$FF
        .BYTE $2C

;-
READBLOK LDY #$00
;-
READBT
        LDA #$00
        STA $1800
WTR1   LDA $1800
        BNE *-3
        PHP
        LDA $1800
        ASL A
        PLP
        EOR $1800
        ASL A
        ASL A
        ASL A
        NOP
        NOP
        NOP
        EOR $1800
        ASL A
        NOP
        NOP
        NOP

```

```

EOR $1800
ADDR      = *+2
          STA $0300,Y
          STA LASTGET
          ; NOP
          INY
          BNE WTR1
SETLINE
          LDA #$08
          STA $1800
LASTGET   = *+1
          LDA #$00
          RTS

;-----
;REWRITE ON THE SELF ! :)
;-----
;NYBBLES TO CONVERT $1800 SERIAL PORT
BIN2SER   .BYTE $0F,$07,$0D,$05,$0B,$03
          .BYTE $09,$01
          .BYTE $0E,$06,$0C,$04,$0A,$02
          .BYTE $08,$00

;-----
;SEND ONE BYTE TO C64
SENDONE   TAY
          AND #$0F
          TAX
          TYA
          LSR A
          LSR A
          LSR A
          LSR A
          TAY
          SEI
          LDA #$00
          STA $1800
          LDA BIN2SER,X
          LDX $1800
          BNE *-3
          STA $1800
          ASL A
          AND #$0A
          STA $1800
          LDA BIN2SER,Y
          STA $1800
          ASL A
          AND #$0A
          STA $1800
          JMP SETLINE

;-
; STOP ROTATES
ZEROANG

```

```

        LDA #$00
        STA ANGX
        STA ANGY
        STA ANGZ
        RTS

;-
;SLOW MULTIPLY ROUTINE
PROCKA
        BPL LP1
        EOR #$FF
        CLC
        ADC #$01

LP1     STA MNOZNA
        STY MNOZNIK

        LDA #$00
        LDX #$08

LP1A   ROR MNOZNIK
        BCC LP2
        CLC
        ADC MNOZNA

LP2    ROR A
        DEX
        BNE LP1A

        BIT SIGN
        BPL LP3

        EOR #$FF
        CLC
        ADC #$01

LP3    RTS

;-----
ROTATES
        LDX #$02

;-----
; COSINUS ZYX & SIGN COSINUS ZYX
;-----
FINDSINE
;---
        LDA #$00           ;SIGN +
        STA COSXSIGN,X

        LDA ANGLEX,X
        CLC
        ADC ANGX,X

```

```

    STA ANGX,X

    CMP #$40          ;COS ANGLE ZYX
    BCC FINDS3       ;SIGN +
    CMP #$C0
    BCS FINDS2       ;SIGN +
    DEC COSXSIGN,X   ;SIGN -
FINDS2
    CLC              ;ADD QUARTER PERIOD
FINDS3
    ADC #$40         ;TO COS.
    AND #$7F        ;MODULO HALF PERIOD
    TAY
    LDA SINE,Y
    STA COSX,X

;-----
;--- SINUS ZYX
;-----

    LDA ANGX,X      ;ANG IS ALSO SIGN
    AND #$7F        ;LIKE BEFORE
    TAY
    LDA SINE,Y
    STA SINX,X

;---

    DEX
    BPL FINDSINE

;-----
    INX
;-----
ROTPPOINTS
    TXA
    STA LICZEW

    ASL A
    ADC LICZEW
    TAX             ;POINTNR *3
    LDY #$00

    LDA BRYLA,X
    STA XPRIM       ;XPRIM=X
    LDA BRYLA+1,X
    STA YPOINT
    LDA BRYLA+2,X
    STA ZPOINT

;-----
;- Y PRIM
;-----
;IF YOU WANNA TEST ROTATE YOU CAN DELETED ";" CHAR
; LDX ANGLEX
; BNE AXISX

```

```

; LDX YPOINT
; STX YBIS
; JMP STOREZPRIM

```

AXISX

```

LDY SINX
;IN ACC ZPOINT
EOR ANGX
STA SIGN
LDA ZPOINT ;SIN(ANGX)*Z
JSR PROCKA
STA DANA1

LDY COSX
LDA YPOINT ;COS(ANGX)*Y
EOR COSXSIGN

STA SIGN
LDA YPOINT

JSR PROCKA
SEC ;COS(X)*Y - SIN(X)*Z
SBC DANA1 ;SUBSTR.

STA YBIS ;Y PRIM = Y BIS

```

```

;-----
;--- Z PRIM
;-----

```

```

LDY SINX
LDA YPOINT

EOR ANGX
STA SIGN
LDA YPOINT ;SIN(ANGX)*Y
JSR PROCKA
STA DANA1

LDY COSX
LDA ZPOINT ;COS(ANGX)*Z
EOR COSXSIGN

STA SIGN
LDA ZPOINT

JSR PROCKA
CLC ;SIN(X)*Y + COS(X)*Z
ADC DANA1 ;SUM

```

STOREZPRIM

```

        STA ZPRIM
;-----
;--- X BIS
;-----
        ; LDX ANGLE
        ; BNE AXISY
        ; LDX XPRIM
        ; STX XBIS
        ; JMP STOREZLAST
AXISY
        LDY COSY
        LDA XPRIM
        EOR COSYSIGN
        STA SIGN
        LDA XPRIM      ;COS(ANGY)*X'
        JSR PROCKA
        STA DANA1

        LDY SINY
        LDA ZPRIM      ;SIN(ANGY)*Z'
        EOR ANGY
        STA SIGN
        LDA ZPRIM

        JSR PROCKA

                ;COS(Y)*X' + SIN(Y)*Z'
        CLC
        ADC DANA1      ;SUM

        STA XBIS
;-----
;--- Z BIS = Z LAST
;-----

        LDY SINY
        LDA XPRIM
        EOR ANGY
        STA SIGN
        LDA XPRIM      ;SIN(ANGY)*X'
        JSR PROCKA
        STA DANA1

        LDY COSY
        LDA ZPRIM      ;COS(ANGY)*Z'
        EOR COSYSIGN

        STA SIGN
        LDA ZPRIM

        JSR PROCKA

```

```

SEC
        ;SIN(Y)*X' - COS(Y)*Z'

SBC DANA1 ;SUBSTR.

STOREZLAST
        ;!!!RULE FOR Z OBSERV.
CLC
ADC #$80
TAY
LDA ZDIV,Y
STA ZLAST ;ZBIS = ZLAST
;-----
;--- X LAST
;-----
; LDA YBIS
; LDX ANGLEZ
; BNE AXISZ
; LDX XBIS
; STX XLAST
; JMP GETYLAST
AXISZ
LDY SINZ
LDA YBIS
EOR ANGZ
STA SIGN
LDA YBIS ;SIN(ANGZ)*Y' '
JSR PROCKA
STA DANA1

LDY COSZ
LDA XBIS ;COS(ANGZ)*X' '
EOR COSZSIGN
STA SIGN
LDA XBIS

JSR PROCKA
SEC
        ;SIN(Z)*Y' ' - COS(Z)*X' '

SBC DANA1 ;SUBSTR.
STA XLAST
;-----
;--- Y LAST
;-----
LDY SINZ
LDA XBIS
EOR ANGZ
STA SIGN
LDA XBIS ;SIN(ANGZ)*X
JSR PROCKA

```

```

    STA DANA1

    LDY COSZ
    LDA YBIS      ;COS(ANGZ)*Y
    EOR COSZSIGN
    STA SIGN
    LDA YBIS

    JSR PROCKA
    CLC          ;SIN(Z)*X + COS(Z)*Y
    ADC DANA1   ;SUM

GETYLAST
    ;TAY          ;YLAST
;-----
PRSPCT
;---
    LDY ZLAST
    EOR ZLAST   ;LOSE ACC
    STA SIGN
    EOR ZLAST   ;RECALL ACC

    JSR PROCKA
    LDY ZOOM
    CPY #$FC   ;ZOOM FACTOR =1?
    BCS STOREY2D
    STA SIGN
    TAX        ;ONLY FOR BPL/BMI
    JSR PROCKA

STOREY2D
    LDX LICZEW
    STA TABY2D,X
;-----
    LDY ZLAST
    LDA XLAST
    EOR ZLAST  ;LOSE ACC
    STA SIGN
    EOR ZLAST  ;RECALL ACC

PERSP4
    JSR PROCKA
    LDY ZOOM
    CPY #$FC
    BCS STOREX2D
    STA SIGN
    TAX
    JSR PROCKA

STOREX2D
    LDX LICZEW
    STA TABX2D,X

CNTROT

```



```

        INX
        CPX ILEW
        BEQ RTPSEX
        JMP ROTPOINTS
RTPSEX
        RTS
;-----
SINE
        .BYTE $00,$06,$0C,$12,$19,$1F
        .BYTE $25,$2B,$31,$38,$3E,$44
        .BYTE $4A,$50,$56,$5C,$61,$67
        .BYTE $6D,$73,$78,$7E,$83,$88
        .BYTE $8E,$93,$98,$9D,$A2,$A7
        .BYTE $AB,$B0,$B5,$B9,$BD,$C1
        .BYTE $C5,$C9,$CD,$D1,$D4,$D8
        .BYTE $DB,$DE,$E1,$E4,$E7,$EA
        .BYTE $EC,$EE,$F1,$F3,$F4,$F6
        .BYTE $F8,$F9,$FB,$FC,$FD,$FE
        .BYTE $FE,$FF,$FF,$FF,$FF,$FF
        .BYTE $FF,$FF,$FE,$FE,$FD,$FC
        .BYTE $FB,$F9,$F8,$F6,$F4,$F3
        .BYTE $F1,$EE,$EC,$EA,$E7,$E4
        .BYTE $E1,$DE,$DB,$D8,$D4,$D1
        .BYTE $CD,$C9,$C5,$C1,$BD,$B9
        .BYTE $B5,$B0,$AB,$A7,$A2,$9D
        .BYTE $98,$93,$8E,$88,$83,$7E
        .BYTE $78,$73,$6D,$67,$61,$5C
        .BYTE $56,$50,$4A,$44,$3E,$38
        .BYTE $31,$2B,$25,$1F,$19,$12
        .BYTE $0C,$06
;-----
RUNLDR
;-----
;MAIN LOOP IN DRIVE

        LDA #$00
        STA ADDR
ZERUJOBR
        JSR ZEROANG

MAINLOOP
        JSR READONE
        CMP #"Z"
        BEQ ZERUJOBR ;ZEROANG
        CMP #"P"
        BNE MLP2
        LDX #$00      ;GETPARAMS

MLP1
        JSR READONE
        STA ANGLEX,X
        INX

```

```

        CPX #$04
        BNE MLP1
        BEQ MAINLOOP

MLP2    CMP #"R"      ;ROTATE3D
        BNE MLP3
        JSR ROTATES
        LDA $1C00 ;blink
        EOR #$08
        STA $1C00
        LDX #$00
        STX LICZEW
        ;send data after projection

MLP2A   LDA TABX2D,X
        JSR SENDONE
        LDX LICZEW
        LDA TABY2D,X
        JSR SENDONE
        INC LICZEW
        LDX LICZEW
        CPX ILEW
        BNE MLP2A
        BEQ MAINLOOP

MLP3    CMP #"W"
        BNE RESET
        JSR READONE
        STA ILEW
        ASL A
        CLC
        ADC ILEW
        STA DANA1
        LDX #$00

MLP3A   JSR READONE
        STA BRYLA,X
        INX
        CPX DANA1
        BNE MLP3A
        BEQ MAINLOOP

RESET   JMP ($FFFC)

;-----
;CODES:
;Z - ZEROANG
;P - GET 3 PARAMS
;R - ROTATE3D AND SEND 2D
;W - WRITE DATA OF OBJECT
;-----
ZDIV

```

```
. BYTE $EB, $EB, $EB, $EB, $EB, $EB
. BYTE $EB, $EB, $EB, $EB, $EB, $EA
. BYTE $EA, $EA, $EA, $EA, $EA, $EA
. BYTE $EA, $EA, $EA, $E9, $E9, $E9
. BYTE $E9, $E9, $E9, $E9, $E9, $E9
. BYTE $E8, $E8, $E8, $E8, $E8, $E8
. BYTE $E8, $E8, $E8, $E7, $E7, $E7
. BYTE $E7, $E7, $E7, $E7, $E7, $E6
. BYTE $E6, $E6, $E6, $E6, $E6, $E6
. BYTE $E5, $E5, $E5, $E5, $E5, $E5
. BYTE $E5, $E4, $E4, $E4, $E4, $E4
. BYTE $E4, $E3, $E3, $E3, $E3, $E3
. BYTE $E3, $E2, $E2, $E2, $E2, $E2
. BYTE $E2, $E1, $E1, $E1, $E1, $E1
. BYTE $E0, $E0, $E0, $E0, $E0, $DF
. BYTE $DF, $DF, $DF, $DE, $DE, $DE
. BYTE $DE, $DD, $DD, $DD, $DD, $DC
. BYTE $DC, $DC, $DC, $DB, $DB, $DB
. BYTE $DB, $DA, $DA, $DA, $D9, $D9
. BYTE $D9, $D9, $D8, $D8, $D8, $D7
. BYTE $D7, $D7, $D6, $D6, $D6, $D5
. BYTE $D5, $D4, $D4, $D4, $D3, $D3
. BYTE $D2, $D2, $D2, $D1, $D1, $D0
. BYTE $D0, $CF, $CF, $CE, $CE, $CD
. BYTE $CD, $CC, $CC, $CB, $CB, $CA
. BYTE $CA, $C9, $C8, $C8, $C7, $C6
. BYTE $C6, $C5, $C4, $C4, $C3, $C2
. BYTE $C1, $C1, $C0, $BF, $BE, $BD
. BYTE $BC, $BB, $BB, $BA, $B9, $B8
. BYTE $B7, $B5, $B4, $B3, $B2, $B1
. BYTE $AF, $AE, $AD, $AB, $AA, $A9
. BYTE $A7, $A5, $A4, $A2, $A0, $9E
. BYTE $9C, $9B, $98, $96, $94, $92
. BYTE $8F, $8D, $8A, $87, $84, $81
. BYTE $81, $81, $81, $81, $81, $81
. BYTE $81, $81, $81, $81, $81, $81
. BYTE $81, $81, $81, $81, $81, $81
. BYTE $81, $81, $81, $81, $81, $81
. BYTE $81, $81, $81, $81, $81, $81
. BYTE $81, $81, $81, $81, $81, $81
. BYTE $81, $81, $81, $81, $7F, $7F
. BYTE $7F, $7F, $7F, $7F, $7F, $7F
. BYTE $7F, $7F, $7F, $7F
```

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