

Hardware

COLLABORATORS

	TITLE : Hardware		
ACTION	NAME	DATE	SIGNATURE
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REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

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Chapter 1

Hardware

1.1 Hardware

Konstanten

aMaxBytesPerRow	aORb	aORc
aTOd	aXORc	aul
blitReverse	bplCon2ZdBpEn	bplCon2ZdBpSel1
bplCon2ZdBpSel2	bplCon2ZdCtEn	bplcon2ZdBpSel0
cleanme	cleanup	crbInCnt
crbInCntTA	crbInPhi2	crbInTA
dmaAll	hSizeBits	hSizeMask
ir	octant1	octant2
octant3	octant4	octant5
octant6	octant7	octant8
oneDot	pre000ns	pre140ns
pre280ns	pre560ns	sMaxBytesPerRow
sMinBytesPerRow	sud	sul
vSizeBits	vSizeMask	

Variablen

ciaa	ciab	custom
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Typ-Deklarationen

AdkFlagSet	AdkFlags	AudioChannels
AudioInfo	BC0FlagSet	BC0Flags
BC1FlagSet	BC1Flags	BPLC0FlagSet
BPLC0Flags	BPLC3FlagSet	BPLC3Flags
BeamConFlagSet	BeamConFlags	Bltnode
BltnodePtr	CIAA	CIAB
CiaCraFlagSet	CiaCraFlags	CiaCrbFlagSet
CiaCrbFlags	CiaIcrFlagSet	CiaIcrFlags
CiaaPraFlagSet	CiaaPraFlags	CiaaPrbFlagSet
CiaaPrbFlags	CiabPraFlagSet	CiabPraFlags
CiabPrbFlagSet	CiabPrbFlags	←
CollisionControlFlagSet		
CollisionControlFlags	CollisionFlagSet	CollisionFlags
Coord	Custom	DiskFlagSet

DiskFlags	DiskInfo	DmaFlagSet
DmaFlags	IntFlagSet	IntFlags
Pad	PotFlagSet	PotFlags
SerialFlagSet	SerialFlags	SerialInfo
SpriteControlFlagSet	SpriteControlFlags	SpriteControlInfo
SpriteInfo	Sprites	

1.2 TMP:Modula-2/Hardware.def

```
DEFINITION MODULE Hardware; (*$ Implementation:=FALSE *)
(* 10-Mar-1992/cn *)
```

```
FROM SYSTEM IMPORT ADDRESS, BITSET, SHORTSET;
```

```
IMPORT ExecD;
```

```
TYPE
```

```
  AdkFlags = (
    use0v1, use1v2, use2v3, use3vn, use0p1, use1p2, use2p3, use3pn,
    fast, msbSync, wordSync, uartBrk, mfmPrec, preComp0, preComp1,
    adkSet
  );
  AdkFlagSet = SET OF AdkFlags ;
```

```
CONST
```

```
pre000ns= AdkFlagSet {};
pre140ns= AdkFlagSet {preComp0};
pre280ns= AdkFlagSet {preComp1};
pre560ns= AdkFlagSet {preComp0, preComp1};
```

```
TYPE
```

```
  AudioInfo = RECORD
    acptr: ADDRESS;
    aclen: CARDINAL;
    acper: CARDINAL;
    acvol: CARDINAL;
    acdat: CARDINAL;
    acpad: ARRAY [0..1] OF CARDINAL;
  END;
  AudioChannels = ARRAY [0..3] OF AudioInfo ;
```

```
  BC0Flags = (
    nanbnc, nanbc, nabnc, nabc, anbnc, anbc, abnc, abc,
    dest, srcC, srcB, srcA, ash1, ash2, ash4, ash8
  );
  BC0FlagSet = SET OF BC0Flags ;
```

```
CONST
```

```
aORb= BC0FlagSet {abc, anbc, nabnc, abnc, anbnc, nabnc};
aORc= BC0FlagSet {abc, nabnc, abnc, anbc, nanbc, anbnc};
aXORc= BC0FlagSet {nabnc, abnc, nanbc, anbnc};
aTOd= BC0FlagSet {abc, anbc, abnc, anbnc};
```

```
TYPE
```

```
  BC1Flags = (
```

```

    lineMode, desc, fillCarryIn, fillOr, fillXor, ovFlag, signFlag,
    bf7, bf8, bf9, bf10, bf11, bsh1, bsh2, bsh4, bsh8
);
    BC1FlagSet =SET OF   BC1Flags ;

```

```

CONST
    oneDot=desc;
    blitReverse=desc;
    aul= BC1FlagSet {fillCarryIn};
    sul= BC1FlagSet {fillOr};
    sud= BC1FlagSet {fillXor};
    octant1=sud;
    octant2= BC1FlagSet {};
    octant3=sul;
    octant4=aul+sud;
    octant5=aul+sul+sud;
    octant6=aul+sul;
    octant7=aul;
    octant8=sul+sud;

```

```

TYPE
    BeamConFlags =(
        hSyncTrue, vSyncTrue, cSyncTrue, cSBlank,
        varCSync, displayPal, displayDual, varBeam,
        varHSync, varVSync, cSBlankEn, lolDis,
        varVBlank, bcf13, bcf14, bcf15
    );
    BeamConFlagSet =SET OF   BeamConFlags ;

    BPLC0Flags =(
        useBPLCon3, ersy, lace, lpen, bp4, bp5, bp6, bp7,
        gaud, color, dblpf, homod, bpu0, bpu1, bpu2, hires
    );
    BPLC0FlagSet =SET OF   BPLC0Flags ;

```

```

CONST
    bplCon2ZdCtEn=0400H;
    bplCon2ZdBpEn=0800H;
    bplcon2ZdBpSel0=1000H;
    bplCon2ZdBpSel1=2000H;
    bplCon2ZdBpSel2=4000H;

```

```

TYPE
    BPLC3Flags =(
        extBlnkEn, extBlkZd, zdClkEn, bpl33, brdnTran, brdnBlk, bpl36, bpl37,
        bpl38, blp39, bpl310, bpl311, bpl312, bpl313, bpl314, bpl315
    );
    BPLC3FlagSet =SET OF   BPLC3Flags ;

```

```

TYPE
    BltnodePtr =POINTER TO   Bltnode ;
    Bltnode =RECORD
        n: BltnodePtr ;
        function:ADDRESS;
        stat:CHAR;
        blitsize:INTEGER;
        beamsync:INTEGER;

```

```
cleanup:ADDRESS;
END;

CONST
cleanup=40H;
cleanme=cleanup;

TYPE
CollisionControlFlags =(
plane1,plane2,plane3,plane4,plane5,plane6,
enablePlane1,enablePlane2,enablePlane3,
enablePlane4,enablePlane5,enablePlane6,
enableSprite01,enableSprite23,
enableSprite45,enableSprite67
);
CollisionControlFlagSet =SET OF CollisionControlFlags ;
CollisionFlags =(
play1toPlay2,
play1toSprite01,play1toSprite23,play1toSprite45,play1toSprite67,
play2toSprite01,play2toSprite23,play2toSprite45,play2toSprite67,
sprite01toSprite23,sprite01toSprite45,sprite01toSprite67,
sprite23toSprite45,sprite23toSprite67,sprite45toSprite67
);
CollisionFlagSet =SET OF CollisionFlags ;

Coord =RECORD
v,h:SHORTINT;
END;

DiskFlags =(df0,df1,df2,df3,wordEqual,diskWrite,dmaOn,dskByte);
DiskFlagSet =SET OF DiskFlags ;
DiskInfo =RECORD
flags: DiskFlagSet ;
data:SHORTCARD;
END;

DmaFlags =(
aud0,aud1,aud2,aud3,disk,sprite,blitter,copper,
raster,master,blithog,df11,df12,bltnzero,bltdone,dmaSet
);
DmaFlagSet =SET OF DmaFlags ;

CONST
dmaAll= DmaFlagSet {aud0..raster};

TYPE
IntFlags =ExecD. IntFlags ;
IntFlagSet =SET OF IntFlags ;

CONST
hSizeBits=6;
vSizeBits=16-hSizeBits;
hSizeMask=03FH;
vSizeMask=03FFH;

aMaxBytesPerRow=128;
sMinBytesPerRow=128;
```

```
sMaxBytesPerRow=4096;
```

```
TYPE
```

```
  PotFlags =(
    start,pf1,pf2,pf3,pf4,pf5,pf6,pf7,
    datalx,outlx,dataly,outly,datarx,outrx,datary,outry
  );
```

```
  PotFlagSet =SET OF  PotFlags ;
```

```
  SerialFlags =(d8,stop,sf2,rx,tsre,tbe,rbf,ovrun);
```

```
  SerialFlagSet =SET OF  SerialFlags ;
```

```
  SerialInfo =RECORD
```

```
    flags: SerialFlagSet ;
```

```
    data:CHAR;
```

```
END;
```

```
  SpriteControlFlags =(sho,ev8,sv8,sct3,sct4,sct5,sct6,att);
```

```
  SpriteControlFlagSet =SET OF  SpriteControlFlags ;
```

```
  SpriteControlInfo =RECORD
```

```
    ev:SHORTCARD;
```

```
    flags: SpriteControlFlagSet ;
```

```
END;
```

```
  SpriteInfo =RECORD
```

```
    pos:CARDINAL;
```

```
    ctl: SpriteControlInfo ;
```

```
    data:LONGCARD;
```

```
END;
```

```
  Sprites =ARRAY [0..7] OF  SpriteInfo ;
```

```
  Custom =RECORD
```

```
    bltddat:CARDINAL;
```

```
    dmaconr: DmaFlagSet ;
```

```
    vposr:LONGCARD;
```

```
    dskdatr:CARDINAL;
```

```
    joy0dat: Coord ;
```

```
    joy1dat: Coord ;
```

```
    clxdat: CollisionFlagSet ;
```

```
    adkconr: AdkFlagSet ;
```

```
    pot0dat: Coord ;
```

```
    pot1dat: Coord ;
```

```
    potinp: PotFlagSet ;
```

```
    serdatr: SerialInfo ;
```

```
    dskbytr: DiskInfo ;
```

```
    intenar: IntFlagSet ;
```

```
    intreqr: IntFlagSet ;
```

```
    dskpt:ADDRESS;
```

```
    dsklen:CARDINAL;
```

```
    dskdat:CARDINAL;
```

```
    refptr:CARDINAL;
```

```
    vposw:LONGCARD;
```

```
    copcon:BITSET;
```

```
    serdat: SerialInfo ;
```

```
    serper:CARDINAL;
```

```
    potgo: PotFlagSet ;
```

```
    joytest: Coord ;
```

```
    strequ:CARDINAL;
```

```
    strvbl:CARDINAL;
```



```
strhor: CARDINAL;
strlong: CARDINAL;
bltcon0: BC0FlagSet ;
bltcon1: BC1FlagSet ;
bltafwm: BITSET;
bltalwm: BITSET;
bltcpt: ADDRESS;
bltbpt: ADDRESS;
bltapt: ADDRESS;
bltdpt: ADDRESS;
bltsizv: CARDINAL;
pad2d: SHORTCARD;
bltcon0l: SHORTCARD;
bltsizv: CARDINAL;
bltsizh: CARDINAL;
bltcmmod: CARDINAL;
bltbmod: CARDINAL;
bltamod: CARDINAL;
bltdmod: CARDINAL;
pad34: ARRAY [0..3] OF CARDINAL;
bltcdat: CARDINAL;
bltbdat: CARDINAL;
bltadat: CARDINAL;
pad3b: ARRAY [0..2] OF CARDINAL;
deniseid: CARDINAL;
dsksync: CARDINAL;
cop1lc: ADDRESS;
cop2lc: ADDRESS;
copjmp1: CARDINAL;
copjmp2: CARDINAL;
copins: CARDINAL;
diwstrt: Coord ;
diwstop: Coord ;
ddfstrt: Coord ;
ddfstop: Coord ;
dmacon: DmaFlagSet ;
clxcon: CollisionControlFlagSet ;
intena: IntFlagSet ;
intreq: IntFlagSet ;
adkcon: AdkFlagSet ;
aud: AudioChannels ;
bplpt: ARRAY [0..7] OF ADDRESS;
bplcon0: BPLC0FlagSet ;
bplcon1: CARDINAL;
bplcon2: CARDINAL;
bplcon3: BPLC3FlagSet ;
bpl1mod: CARDINAL;
bpl2mod: CARDINAL;
bplhmod: CARDINAL;
pad86: ARRAY [0..0] OF CARDINAL;
bpldat: ARRAY [0..7] OF CARDINAL;
sprpt: ARRAY [0..7] OF ADDRESS;
spr: Sprites ;
color: ARRAY [0..31] OF CARDINAL;
htotal: CARDINAL;
hsstop: CARDINAL;
hbstrt: CARDINAL;
```

```

hbstop: CARDINAL;
vtotal: CARDINAL;
vsstop: CARDINAL;
vbstrt: CARDINAL;
vbstop: CARDINAL;
sprhstrt: CARDINAL;
sprhstop: CARDINAL;
bplhstrt: CARDINAL;
bplhstop: CARDINAL;
hhposw: CARDINAL;
hhposr: CARDINAL;
beamcon0: BeamConFlagSet ;
hsstrt: CARDINAL;
vsstrt: CARDINAL;
hcenter: CARDINAL;
diwhigh: CARDINAL;
END;

VAR
  custom[0DFF000H]: Custom ;

TYPE
  CiaIcrFlags = (ta, tb, alarm, sp, flg, if5, if6, setclr);
  CiaIcrFlagSet = SET OF CiaIcrFlags ;

CONST
  ir = setclr; (* On read setclr has the meaning of ir *)

TYPE
  CiaCraFlags = (
    craStart, craPbon, craOutmode, craRunmode,
    craLoad, craInmode, craSpmode, craTodIn
  );
  CiaCraFlagSet = SET OF CiaCraFlags ;

  CiaCrbFlags = (
    crbStart, crbPbon, crbOutmode, crbRunmode,
    crbLoad, crbInmode0, crbInmodel, crbAlarm
  );
  CiaCrbFlagSet = SET OF CiaCrbFlags ;

CONST
  crbInPhi2 = CiaCrbFlagSet {};
  crbInCnt = CiaCrbFlagSet {crbInmode0};
  crbInTA = CiaCrbFlagSet {crbInmodel};
  crbInCntTA = CiaCrbFlagSet {crbInmode0, crbInmodel};

TYPE
  CiaaPraFlags = (
    overlay, led, dskChange, dskProt, dskTrack0, dskRdy, gamePort0, gamePort1
  );
  CiaaPraFlagSet = SET OF CiaaPraFlags ;

  CiaaPrbFlags = [0..7];
  CiaaPrbFlagSet = SET OF CiaaPrbFlags ;

  CiabPraFlags = (

```

```

prtrBusy,prtrPOut,prtrSel,comDSR,comCTS,comCD,comRTS,comDTR
);
CiabPraFlagSet =SET OF CiabPraFlags ;

CiabPrbFlags =(
dskStep,dskDirec,dskSide,dskSel0,dskSel1,dskSel2,dskSel3,dskMotor
);
CiabPrbFlagSet =SET OF CiabPrbFlags ;

Pad =ARRAY [0..253] OF SHORTSET;
CIAA =RECORD
pra: CiaaPraFlagSet ; pad0: Pad ;
prb: CiaaPrbFlagSet ; pad1: Pad ;
ddra: CiaaPraFlagSet ; pad2: Pad ;
ddrb: CiaaPrbFlagSet ; pad3: Pad ;
talo:SHORTCARD; pad4: Pad ;
tahi:SHORTCARD; pad5: Pad ;
tblo:SHORTCARD; pad6: Pad ;
tbhi:SHORTCARD; pad7: Pad ;
todlow:SHORTCARD; pad8: Pad ;
todmid:SHORTCARD; pad9: Pad ;
todhi:SHORTCARD; pad10: Pad ;
unusedreg:SHORTSET; pad11: Pad ;
sdr:SHORTSET; pad12: Pad ;
icr: CiaIcrFlagSet ; pad13: Pad ;
cra: CiaCraFlagSet ; pad14: Pad ;
crb: CiaCrbFlagSet ;
END;
CIAB =RECORD
pra: CiabPraFlagSet ; pad0: Pad ;
prb: CiabPrbFlagSet ; pad1: Pad ;
ddra: CiabPraFlagSet ; pad2: Pad ;
ddrb: CiabPrbFlagSet ; pad3: Pad ;
talo:SHORTCARD; pad4: Pad ;
tahi:SHORTCARD; pad5: Pad ;
tblo:SHORTCARD; pad6: Pad ;
tbhi:SHORTCARD; pad7: Pad ;
todlow:SHORTCARD; pad8: Pad ;
todmid:SHORTCARD; pad9: Pad ;
todhi:SHORTCARD; pad10: Pad ;
unusedreg:SHORTSET; pad11: Pad ;
sdr:SHORTSET; pad12: Pad ;
icr: CiaIcrFlagSet ; pad13: Pad ;
cra: CiaCraFlagSet ; pad14: Pad ;
crb: CiaCrbFlagSet ;
END;

VAR
ciaa[0BFE001H]: CIAA ;
ciab[0BFD000H]: CIAB ;

END Hardware.
```