Misc

PXCK6M
H2SYNC

H
HPH90
H2
H4

WDRES
MCK6M
SCK6M
H2B
H4B

File: misc.kicad_sch

CPU

WDRES
MCK6M
SCK6M
H2B
H4B

PALEN
VRAMWR
BGTRNSP
OBJRAMCS
OBJORVRAMEN
MRD
MWR
MD[0..7]
MA[0..12]
MA12

YMIRQ

VBLK

SA[0..2]
SD[0..7]
RDINPUTS
SET_LOCK1
SET_LOCK2
CNT_UP1
CNT_UP2

SRD
SWR
SRST
YM2203CS

File: cpu.kicad_sch

Graphics

PXCK6M
H2SYNC
WDRES
H4B

HD
HPH90
H2
H4

PALEN
VRAMWR
BGTRNSP
OBJRAMCS
OBJORVRAMEN
MRD
MWR
MD[7..0]
MA[0..11]
MA12

SYNC
RED
GREEN
BLUE

VBLK

File: graphics.kicad_sch

IO

SPEAKER+
SPEAKER−

SYNC
RED
GREEN
BLUE

SA[0..2]
SD[0..7]
RDINPUTS
SET_LOCK1
SET_LOCK2
CNT_UP1
CNT_UP2

File: io.kicad_sch

Sound

H2B
SD[0..7]
SA0

SRD
SWR
SRST
YM2203CS

SPEAKER+
SPEAKER−

YMIRQ

File: sound.kicad_sch

SA0

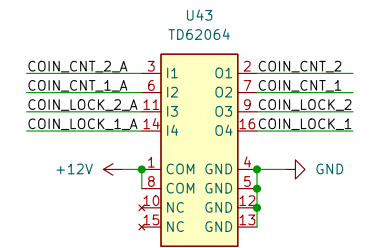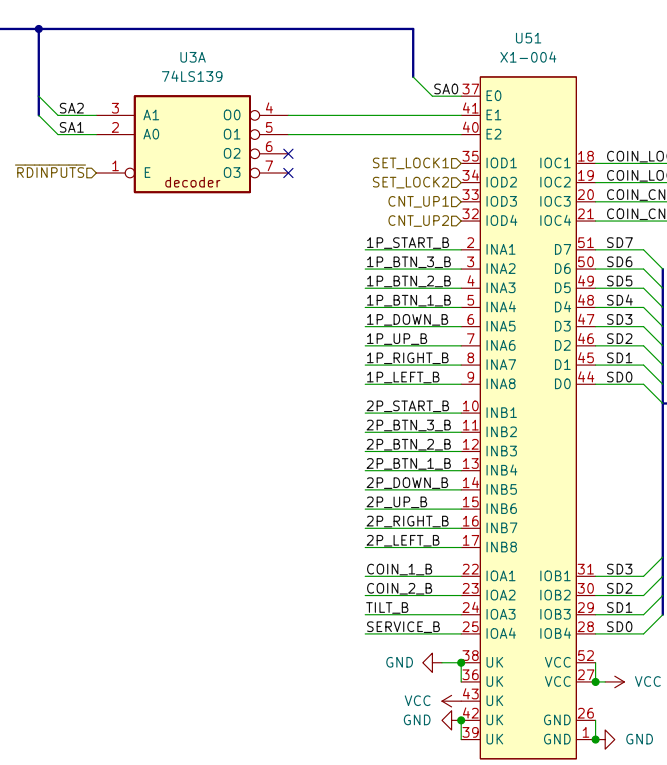
RAM
uPD43256BCZ-B
Not mounted

Shared RAM

U26-B06-12
SWAIT = SBANK1 & /I11 & (/SSHRAMEN + SSHRAMRQ)
MWAIT = (OBJORVRAMEN + I6) & SSHRAMEN
SSHRAMEN = SSHRAMRQ + /MASHRAMRQ & SSHRAMEN
MSHRAMEN = MASHRAMRQ + /SSHRAMRQ & MSHRAMEN
SHRAMCS = MSHRAMRQ & SSHRAMRQ
SHRAMWR = MWR & SSHRAMEN + MASHRAMRQ & SSHRAMRQ + SWR & MSHRAMEN
SSHRAMENB = SSHRAMEN

Ulf Skutnabba, twitter: @skutis77

Sheet: /CPU/
File: cpu.kicad_sch
Title: Insector X – P0-056A
Size: A3   Date: 2022-11-30   Rev:
KiCad E.D.A. kicad 6.0.2+dfsg-1   Id: 2/6
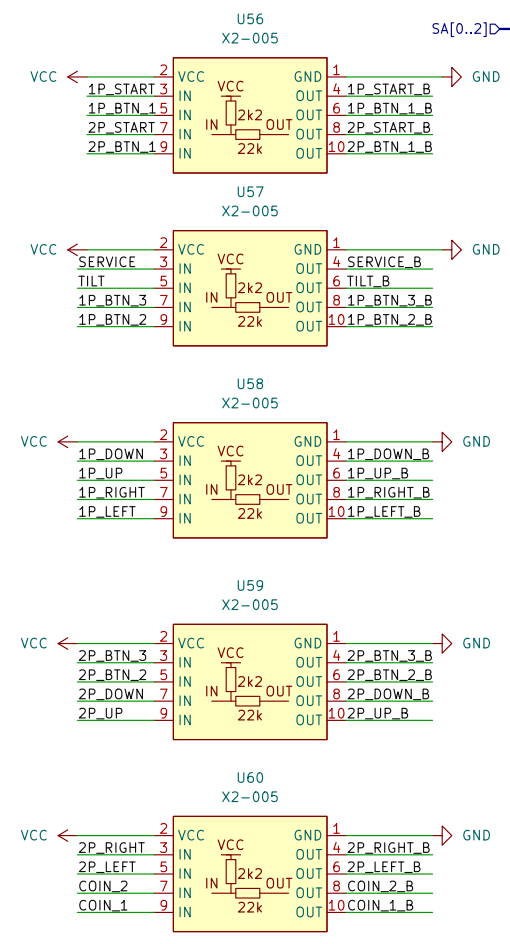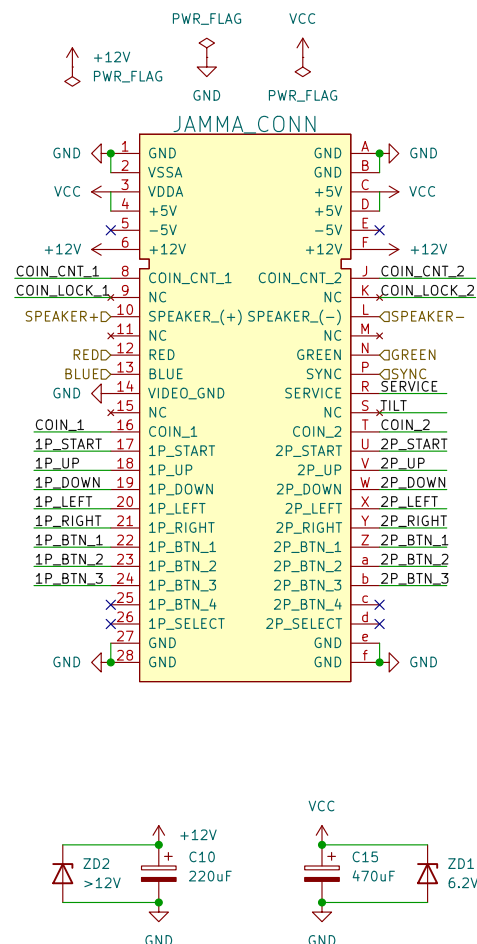
This is a schematic diagram (graphics sheet) for "Insector X – P0-056A".

Key text elements visible on the schematic:

Components and labels:

- U40 74LS245 — buffers — MD[7..0], MD1, MD0, MD7, MD5, MD6, MD4, MD3, MD2 / A0–A7 / B0–B7 / VD1, VD0, VD7, VD6, VD5, VD4, VD3, VD2
- U41 74LS374 — 3-state flip flops — VD1, VD6, VD4, VD2, VD3, VD5, VD7, VD0 / D0–D7 / Q0–Q7 / VDB1, VDB6, VDB4, VDB2, VDB3, VDB5, VDB7, VDB0
- U29D 74LS532 — OBJORVRAMEND, MRDD, H4BD, A→B, CE
- U11A 74LS04 — H4, H2SYNCD
- U11D 74LS04 — MRDD
- U29B 74LS532 — OBJRD
- U42 TMM2063AP_10 — R/W, CS2, CS1, OE — VA11, VA10, VA9, VA8, VA7, VA6, VA5, VA4, VA3, VA2, VA1, VA0, A12, A11, A10, A9, A8, A7, A6, A5, A4, A3, A2, A1, A0 / VD7–VD0 / D7–D0 — OBJRAMCSD, GND, VCC
- U23 74LS245 — buffers — MA3, MA4, MA5, MA2, MA0, MA1 / VA3, VDB2, VA4, VA5, VA2, VA0, VA1 — A→B, CE, H4BD
- U16 74LS157 — S Quad Mux — MA12, VA12 — I0a, I0b, I0c, I0d, Za, Zb, Zc, Zd, I1a, I1b, I1c, I1d, E
- U11E 74LS04 — H2SYNCD, VA12
- U10 74LS374 — VD2, VD3, VD4, VD5, VD0, VD1, VD7, VD6 / D0–D7 / Q0–Q7 / GA7, GA8, GA9, GA10, GA11, GA5, GA6, GA12 — H8, GND
- U33 74LS245 — buffers — MA11, MA10, MA6, MA9, MA7, MA8, VD7, VD6 / MAB11, VA10, VA9, VA8, VA7, VDB7, VDB6 — A→B, CE, H4BD
- U9 74LS174 — VDB1, VDB0, VDB5, VDB4, VDB2, VDB3 / D0–D5 / Q0–Q5 / GA14, GA13, NC?, GA17, GA15, GA16 — Cp, Mr, GND, VCC
- OSC1 12.0000MHz, R1 330, R2 22, VCC
- U24-1 YM3906 — CLK, RD, WR, FLIPX, FLIPY, XC0, DATAEN / D7–D0 / VA0–VA10 / A0–A10 / CHA0–CHA4, H8B, SPBANK2, SPBANK1, WDRES, WDRESD, UK, VSS, A11, VA11, OBJRD, OBJRD — 12M, VBLK, HBLK2, VSYNC, HBLK, UK, HC8–HC0, H8, H4, H2, HPH90, H, GA4, GA3, GA2, GA1, GA0, H8R
- U24-2 YM3909 SETA_X1-002 — BGTRNSPD, CLK, PAL4/TRSP, PAL3, PAL2, PAL1, PAL0, DATAEN, HC8–HC0, COL0–COL8, G2D0–G2D15, GD0–GD15, MA1–MA9, UK, VCC, GND
- U50 X1-006 — MRDD, MWRD, PALEND, MD[7..0], MD0–MD7 (48–63) / D0–D7, DB0–DB7, RGB0–RGB15, COL0–COL8, MA0–MA9
- U45 X1-007 — RGB0–RGB15, R0–R6, G0–G6, B0–B6, PXCK6MD, VBLK, VSYNC, HSYNC, CSYNC, UK, VSS, PXCLK
- R[0..6] resistors: R1 1k, R2 6k, R3 3k, R4 1k5, R5 708, R6 329 — RED / GREEN / BLUE, R0-012
- U54 74LS161 — D0–D3, Q0–Q3, PE, CEP, CET, CP, MR, TC, VCC, GND
- U48C 74LS14 — HBLK, H8, VCC
- C18 330pF
- U2 LH53400 — CE, OE, BYTE, GA0–GA17, A0–A17, Q0–Q15, G2D0–G2D15, VCC, VSS, GND
- U1 LH53400 — CE, OE, BYTE, GA0–GA17, A0–A17, Q0–Q15, GD0–GD15, H8R, VCC, VSS, GND

Buses: MD[7..0], VD[0..7], VDB[0..7], MA[0..11], MA[0..9], VA[0..11], GA[0..4], GA[5..17], G2D[0..15], GD[0..15], R[0..6], G[0..6], B[0..6]

Note text:
"U23 and U33 use a modified version of LS245 in order to avoid errors during ERC. This happens when GND is connected to a tri-state input."
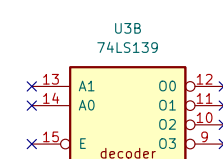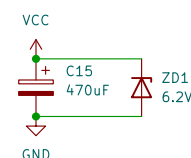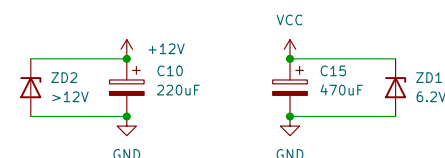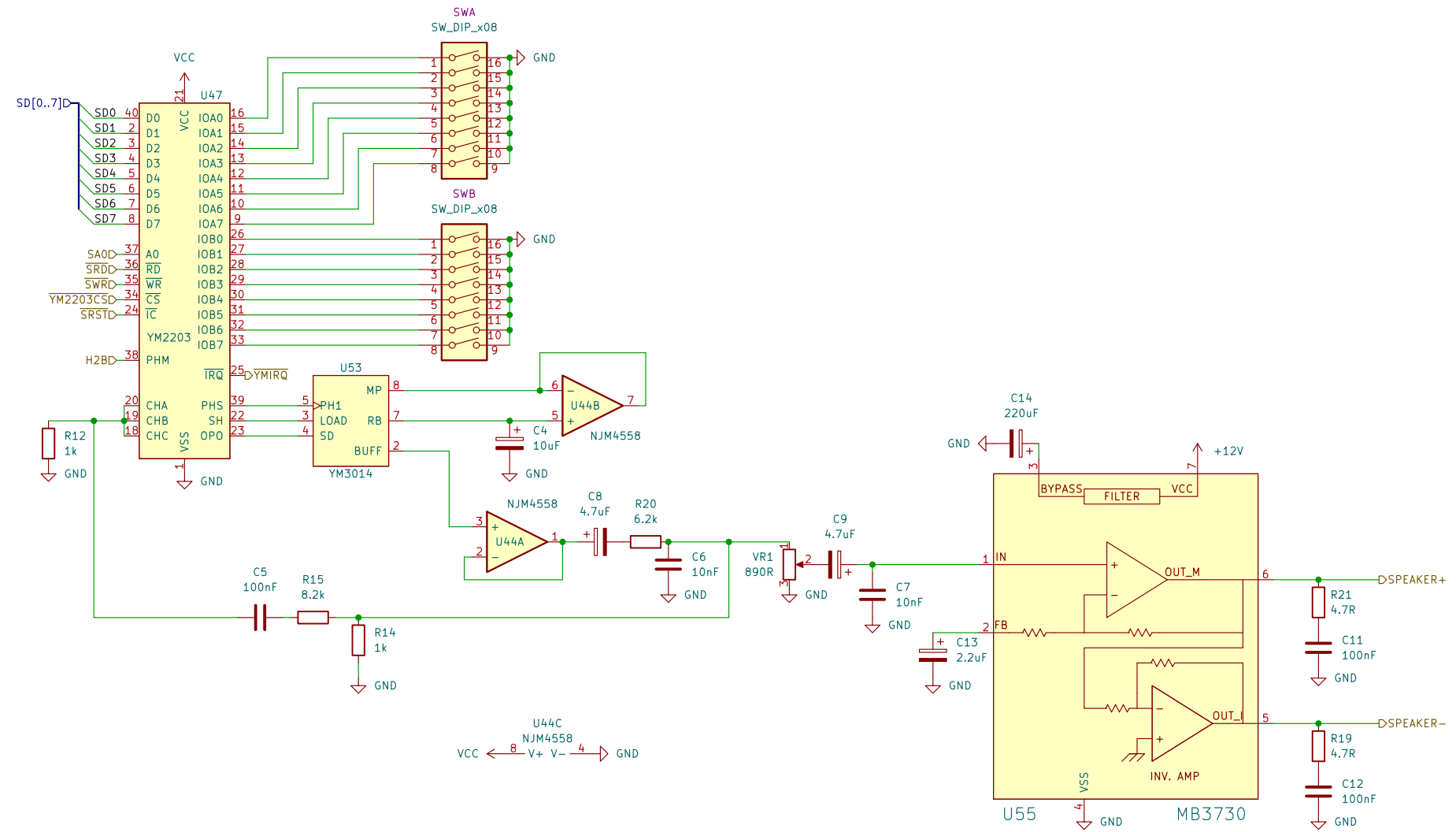
The I/O direction of each port in X1-004 is
probably determined by connecting the pins
36,38,39, 42 and 43 to VCC and GND accordingly.

In insectx IOD -> IOC, IOA -> IOB

E2	E1	E0	Active output
H	L	L	INA-> D, IOD -> IOC
H	L	H	INB -> D, IOD -> IOC
L	H	L	IOA -> IOB
X	X	X	IOD -> IOC

All inputs are active low, when the outputs
are not active they are in tri-state state.
Except for IOC in this case.

Ulf Skutnabba, twitter: @skutis77

Sheet: /IO/
File: io.kicad_sch

Title: Insector X – P0-056A

Size: A3   Date: 2022-11-30   Rev:

KiCad E.D.A. kicad 6.0.2+dfsg-1   Id: 4/6

Clock

U22C 74LS244_Split
HPH90 — 6 ⊐ 14

U22B 74LS244_Split
4 ⊐ 16

R5 150

C1 200pF
GND

U22H 74LS244_Split
17 ⊐ 3

U22G 74LS244_Split
15 ⊐ 5 — SCK6M
— MCK6M

U22A 74LS244_Split
H2 — 2 ⊐ 18

VCC

U17A 74LS74
2 D Q 5
3 Q̄ 6
CLR / PRE
VCC

H2B

U29C 74LS32
10
9 ⊐ 8 — H2SYNC

U22D 74LS244_Split
H4 — 8 ⊐ 12 — H4B

U11C 74LS04
5 ⊐ 6

JP7 Jumper_8_Bridged1
8 1
7 2
6 3
5 4

R18 24 — PXCK6M

U22F 74LS244_Split
H — 13 ⊐ 7

U11B 74LS04
3 ⊐ 4

JP8 Jumper_8_Bridged1
8 1
7 2
6 3
5 4

JP9 Jumper_8_Bridged1
8 1
7 2
6 3
5 4

U22E 74LS244_Split
11 ⊐ 9
GND

Watchdog

VCC
R13 1k

JP10 not soldered on Insector X

JP10

U49 74LS161
GND 3 D0 Q0 14
GND 4 D1 Q1 13
GND 5 D2 Q2 12
GND 6 D3 Q3 11
9 PE̅ TC 15
VCC 7 CEP
VCC 10 CET
2 CP
1 MR̅
counter

U48E 74LS14
11 ⊐ 10
GND
2.07Hz

R10 2M2

U48D 74LS14
9 ⊐ 8

C3 220n
GND

BNKSW
74LS08
10
9 ⊐ 8
U12C

GND
TR1 MPSA45
2
1 3
VCC

SW_DIP_x02
GND 1 6
2 5
3 4
VCC
SW

R9 250k
C2 220n
GND

U48F 74LS14
13 ⊐ 12

U29A 74LS32
1
2 3

U48B 74LS14
3 ⊐ 4

U48A 74LS14
1 ⊐ 2 — WDRES

Timing diagram:

CLK (12M)
H
HPH90, PXCK6M, MCLK, SCLK
H2(B)
H4(B)
H8, H8R