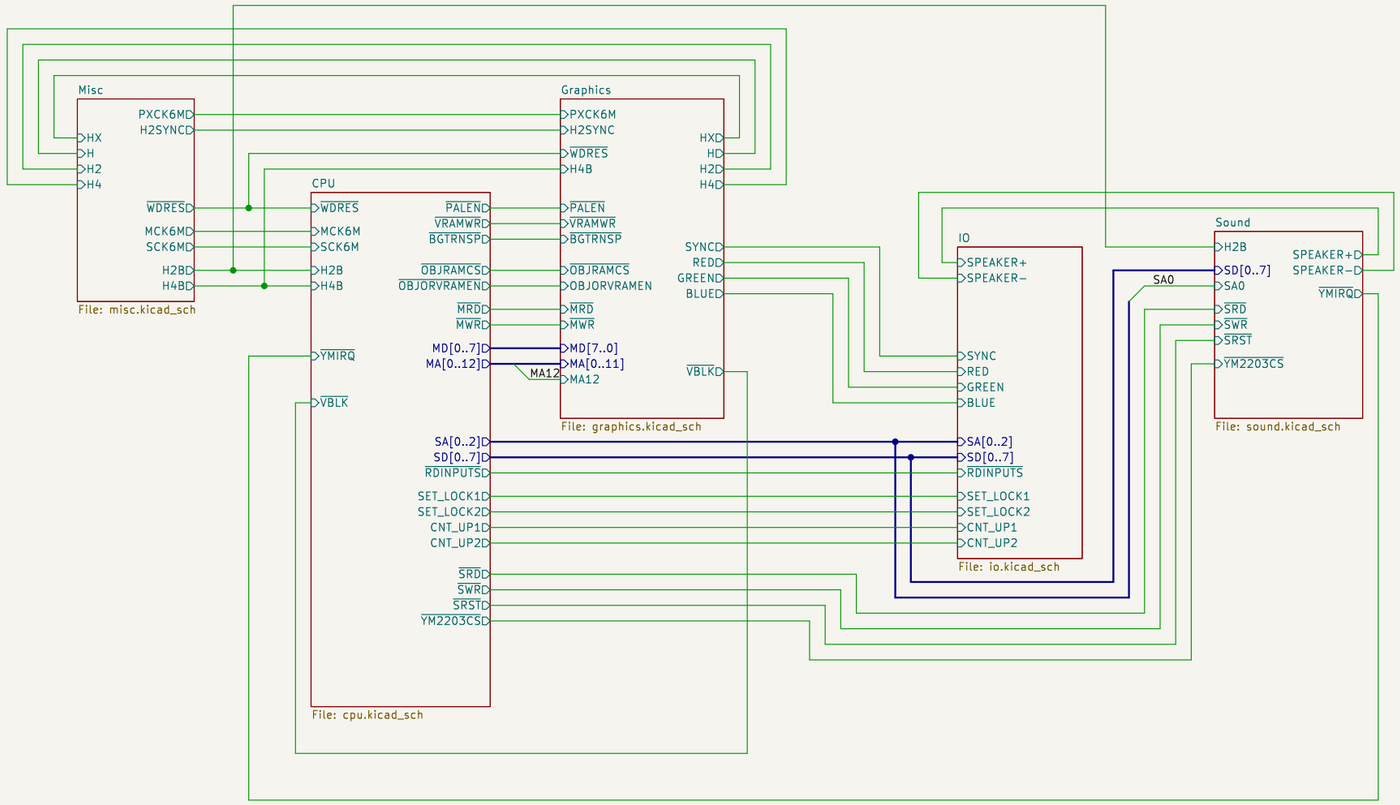

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Sheet: /
File: insectx.kicad_sch

Title: Insector X – P0–056A

Size: A3	Date: 2022–12–06	**Rev:**
KiCad E.D.A. 8.0.4		Id: 1/6

U26-B06-12

$\overline{SWAIT}$ = i9 & ~i11 & (~$\overline{SSHRAMEN}$ + $\overline{SSHRAMRQ}$)
$\overline{MWAIT}$ = $\overline{OBJORVRAMEN}$ & $\overline{SSHRAMEN}$ + i6 & $\overline{SSHRAMEN}$
$\overline{SSHRAMEN}$ = $\overline{SSHRAMRQ}$ + ~$\overline{MSHRAMRQ}$ & $\overline{SSHRAMEN}$
$\overline{MSHRAMEN}$ = $\overline{MSHRAMRQ}$ + ~$\overline{SSHRAMRQ}$ & $\overline{MSHRAMEN}$
$\overline{SHRAMCS}$ = $\overline{MSHRAMRQ}$ & $\overline{SSHRAMRQ}$
$\overline{SHRAMWR}$ = $\overline{MWR}$ & $\overline{SSHRAMEN}$ + $\overline{MSHRAMRQ}$ & $\overline{SSHRAMRQ}$ + $\overline{SWR}$ & $\overline{MSHRAMEN}$
$\overline{SSHRAMENB}$ = $\overline{SSHRAMEN}$

Inputs i7 and i8 have been set to logical 1 in the equations.

U36-B06-101

~$\overline{PALEN}$ = MA9 & MA10 & MA11 & MA12 & MA13 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$
~$\overline{VRAMWR}$ = MA9 & MA10 & MA11 & MA12 & ~MA13 & ~MA14 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$
~$\overline{BGTRNSP}$ = MA9 & MA10 & MA11 & MA12 & ~MA13 & MA14 & ~MA15 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ & $\overline{MWR}$
~$\overline{BNKSW}$ = MA9 & MA10 & MA11 & MA12 & ~MA13 & $\overline{MA14}$ & MA15 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ & ~$\overline{MWR}$
~$\overline{OBJCODELO}$ = MA9 & MA10 & ~MA11 & ~MA12 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$
~$\overline{OBJCODEHI}$ = MA9 & MA10 & ~MA11 & MA12 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$
~$\overline{MSHRAMRQ}$ = MA9 & MA10 & MA11 & ~MA12 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$
~$\overline{OBJORVRAMEN}$ = MA9 & MA10 & MA11 & MA12 & ~MA13 & (~MA15 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ + ~MA14 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$) +
MA9 & MA10 & ~MA11 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$

U35-B53-12

$\overline{MRA16}$ = MA15 & MBSWD2
$\overline{MRA15}$ = MA15 & MBSWD1
~$\overline{MRA14}$ = MA15 & ~MBSWD0 + ~$\overline{MA15}$ & ~$\overline{MA14}$
~$\overline{MROMCS}$ = ~$\overline{MA15}$ & $\overline{MA14}$ & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ & ~MBSWD2 & MBSWD1 +
~MA14 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ & ~MBSWD2 & MBSWD1 +
~MA15 & $\overline{MA14}$ & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ & MBSWD2 +
~MA15 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ & ~MBSWD1 +
~MA14 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ & MBSWD2
~$\overline{MRAMCS}$ = $\overline{MA15}$ & ~MA14 & ~$\overline{MMREQ}$ & $\overline{MRFSH}$ & ~MBSWD2 & ~MBSWD1
o17 = $\overline{OBJCODELO}$ & ~H4B
o18 = $\overline{OBJCODEHI}$ & ~H4B
$\overline{OBJRAMCS}$ = $\overline{OBJCODELO}$ & $\overline{OBJCODEHI}$ & ~H4B

U25-B06-13

~$\overline{SROMCS}$ = ~SA14 & ~SA13 & ~$\overline{SMREQ}$ & $\overline{SRFSH}$ + ~SA15 & SA14 & ~$\overline{SMREQ}$ & $\overline{SRFSH}$ + ~SA15 & ~SA14 & ~$\overline{SMREQ}$ & $\overline{SRFSH}$
~$\overline{SSHRAMRQ}$ = SA15 & SA14 & SA13 & ~SA12 & ~$\overline{SMREQ}$ & $\overline{SRFSH}$ + SA15 & SA14 & ~SA13 & SA12 & ~$\overline{SMREQ}$ & $\overline{SRFSH}$
~$\overline{SBNKSW}$ = SA15 & ~SA14 & SA13 & ~SA12 & ~$\overline{SWR}$ & ~$\overline{SMREQ}$ & $\overline{SRFSH}$
~$\overline{YM2203CS}$ = SA15 & ~SA14 & SA13 & SA12 & ~$\overline{SMREQ}$ & $\overline{SRFSH}$
~$\overline{RDINPUTS}$ = SA15 & SA14 & ~SA13 & ~$\overline{SA12}$ & ~$\overline{SMREQ}$ & $\overline{SRFSH}$
~o17 = SA15 & SA14 & SA13 & SA12 & ~$\overline{SMREQ}$ & $\overline{SRFSH}$
SRA13 = SA15 & SBANK0 + ~SA15 & SA13
SRA14 = SA15 & SBANK1 + ~SA15 & SA14

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Sheet: /CPU/		
File: cpu.kicad_sch		
Title: Insector X – P0–056A		
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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.

Pixel clock PXCK6M: f = 6MHz

Horizontal sync and blanking signals have a period of 64us and frequency 15.625kHz.
Pixels / horizontal line = 64us x 6MHz = 384 pixels.

Vertical sync and blanking signals have a period of 16.896ms and a frequency of 59.1856Hz.
Vertical lines = 16.896ms x 15.625kHz = 264 lines.

The composite SYNC signal is a wired and of $\overline{HSYNC}$ and $\overline{VSYNC}$

	$\overline{HBLK}$	$\overline{HBLK2}$	$\overline{HSYNC}$
Active pixels	320	256	352
Blank pixels	64	128	32

	$\overline{VBLK}$	$\overline{VSYNC}$
Active lines	224	256
Blank lines	40	8

	$\overline{HBLK2}$–$\overline{HBLK}$	$\overline{HBLK}$–$\overline{HSYNC}$	$\overline{VBLK}$–$\overline{VSYNC}$
Front porch	32	4	16
Back porch	32	28	24

When $\overline{VSYNC}$ goes low there is a delay of 60 pixels (10us x 6MHz) from $\overline{HSYNC}$ going high. It is the same delay when $\overline{VSYNC}$ goes high.

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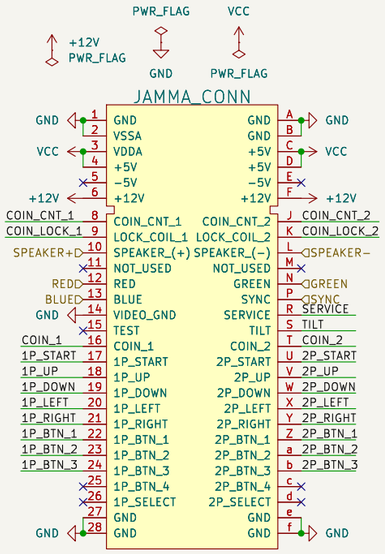
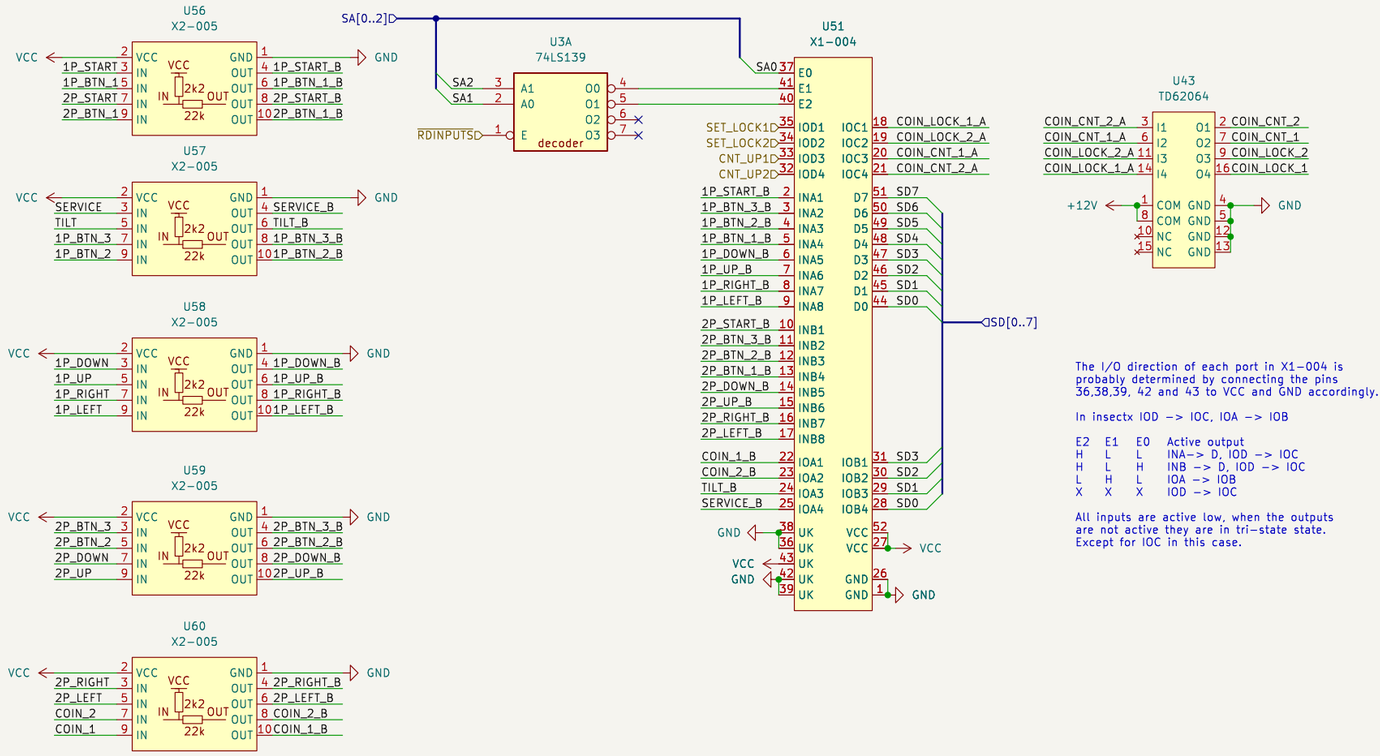
Sheet: /Graphics/
File: graphics.kicad_sch

Title: Insector X – P0–056A

Size: A3	Date: 2022–12–06	Rev:
KiCad E.D.A. 8.0.4		Id: 3/6





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.

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Sheet: /IO/
File: io.kicad_sch

Title: Insector X – P0-056A

Size: A3	Date: 2022-12-06	**Rev:**
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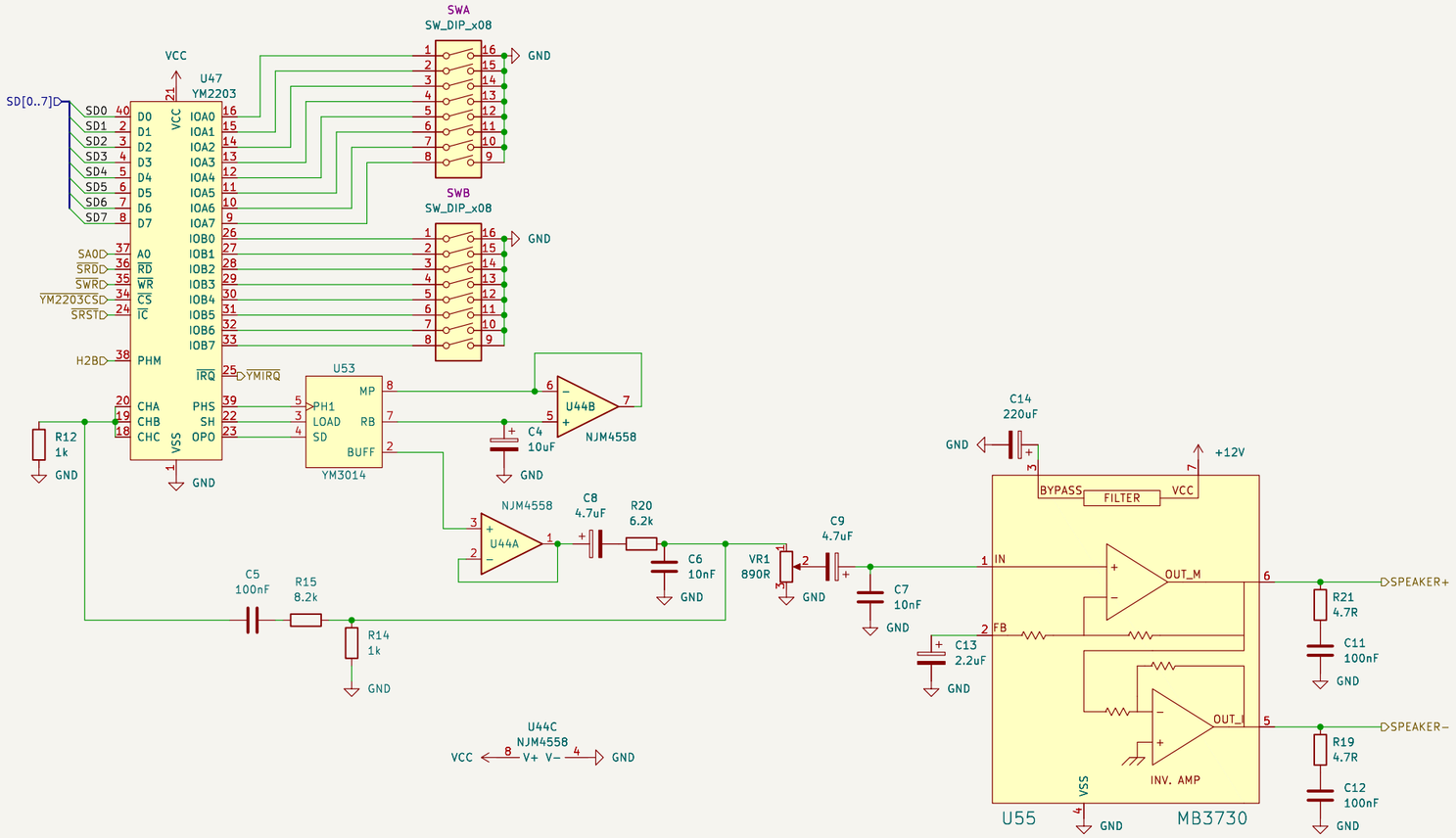

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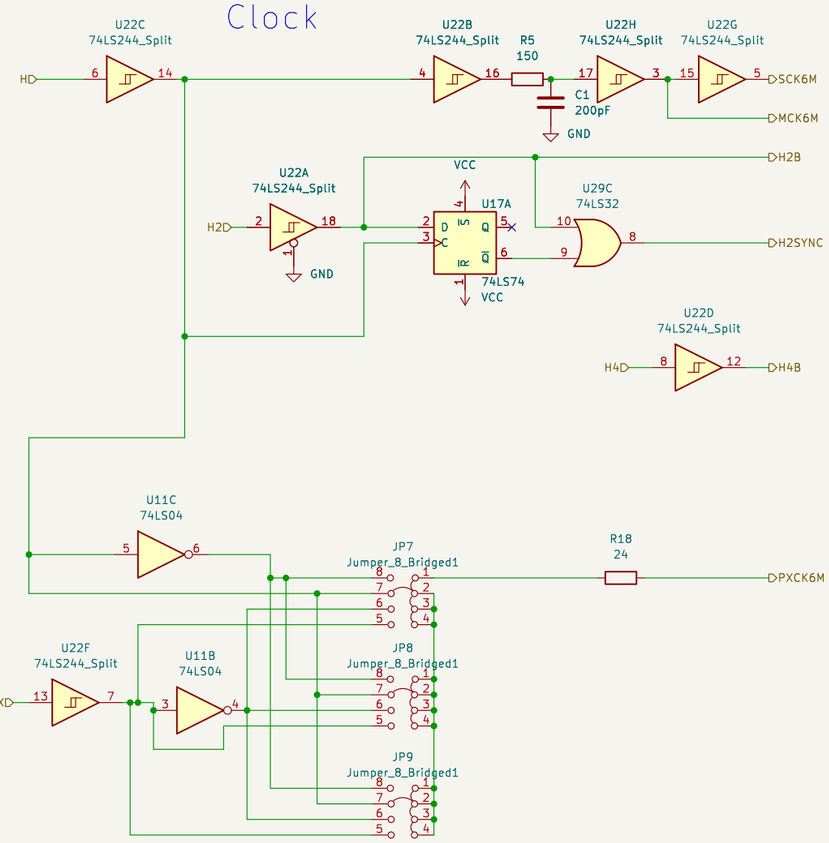
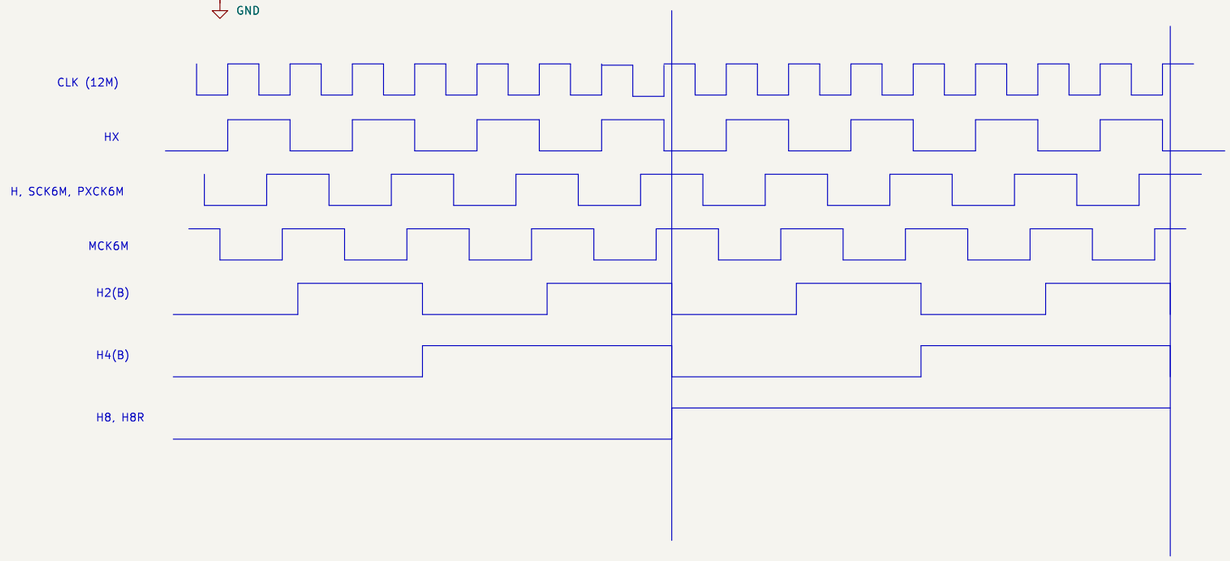
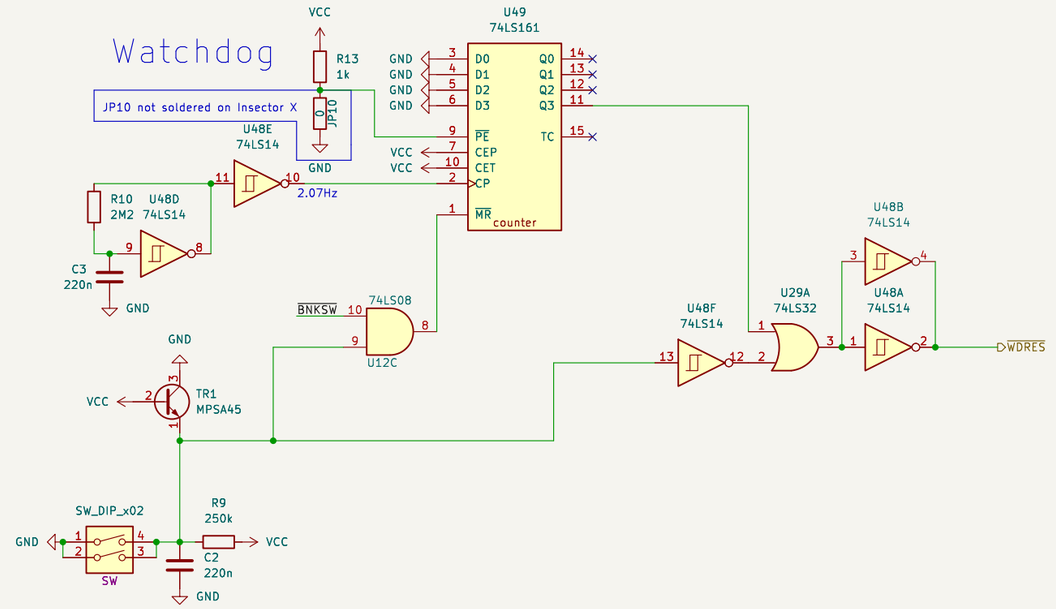
Sheet: /Sound/			
File: sound.kicad_sch			
Title: Insector X – P0–056A			
Size: A3	Date: 2022–12–06		**Rev:**
KiCad E.D.A. 8.0.4			Id: 5/6

Clock





Watchdog



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Sheet: /Misc/ File: misc.kicad_sch		
Title: Insector X – P0–056A		
Size: A3	Date: 2022–12–06	**Rev:**
KiCad E.D.A. 8.0.4		Id: 6/6