IO

▷TRIGGER2{TRIG}
▷TRIGGER1{TRIG}

File: IO.kicad_sch

RP2040 − 1

TRIGGER{TRIG}◁
I2C0{I2C}◁
SPI0{SPI}◁
USB{USB}◁

File: RP2040−1.kicad_sch

RP2040 − 2

▷TRIGGER{TRIG}
▷I2C0{I2C}
▷SPI0{SPI}
▷USB{USB}

File: RP2040−2.kicad_sch

AMP + Speaker Connector

I2S{I2S}◁   ▷I2S{I2S}
I2C1{I2C}◁   ▷I2C{I2C}

File: amp.kicad_sch

L + R Ear Microphone Connectors

L−R−Mic{I2S}▷   ◁I2S{I2S}

File: Mic_Conn.kicad_sch

2xUSB + Power

USB1{USB}◁
USB2{USB}◁

File: usb.kicad_sch

MP1
MP_NPTH_Drill2.7mm

MP2
MP_NPTH_Drill2.7mm

MP3
MP_NPTH_Drill2.7mm

MP4
MP_NPTH_Drill2.7mm

USB

J3
USB4105-GF-A

TP16
D1 PESD5V0X1UB,135
FB1 120Z/2A
PWR_FLAG
R38 0R 22.4A
U11 AP22652W6-7

VBUS	A4
CC1	A5	USB1_CC1 R1 5k1
CC2	B5	USB1_CC2
		R2 5k1
DA+	A6
DA-	A7
DB+	B6	USB1.D_P
DB-	B7	USB1.D_N
SBU1	A8
SBU2	B8
GND	A1	PWR_FLAG
SH	S1

C1 10n
C2 100n
GND GND GND GND GND

IN OUT — USB1_VBUS
EN FAULT — R39 20k
GND ILIM
GND

ILIM set to 1.286A

U5 TPD4E05U06QDQARQ1
USB1_CC1	1
USB1.D_P	2
USB1.D_N	4
USB1_CC2	5
	3
GND

<USB1{USB}

J13
USB4105-GF-A

TP17
D2 PESD5V0X1UB,135
FB2 120Z/2A
PWR_FLAG
R7 0R 22.4A
U15 AP22652W6-7

VBUS	A4
CC1	A5	USB2_CC1 R5 5k1
CC2	B5	USB2_CC2
		R6 5k1
DA+	A6
DA-	A7
DB+	B6	USB2.D_P
DB-	B7	USB2.D_N
SBU1	A8
SBU2	B8
GND	A1
SH	S1

C6 10n
C7 100n
GND GND GND GND

IN OUT — USB2_VBUS
EN FAULT — R8 20k
GND ILIM
GND

ILIM set to 1.286A

U2 TPD4E05U06QDQARQ1
USB2_CC1	1
USB2.D_P	2
USB2.D_N	4
USB2_CC2	5
	3
GND

<USB2{USB}

Ideal Diodes

USB1_VBUS
C57 10u
GND

Q4 SSM3J332R,LF
D S
G

Q5 BCM857BS-7-F

R32 10k
GND

R56 10k
GND

+5V
PWR_FLAG

USB2_VBUS
C58 10u
GND

Q1 SSM3J332R,LF
D S
G

Q3 BCM857BS-7-F

R9 10k
GND

R10 10k
GND

LEDs

+5V
D5 Green
R37 1k
GND

+3V3
D3 Green
R31 220R
GND

+3V3
D4 Green
R55 220R

+1V8
Q8 PJE138K_R1_00001
G
R33 100k
GND

| USB1_VBUS | 1 | TP6 |
| USB2_VBUS | 1 | TP7 |

| +5V | 1 | TP2 |
| +3V3 | 1 | TP3 |

+1V8 1 TP4

+5V +3V3 +1V8
1
TP5
GND

DC/DC

+5V
U8 AP62301WU-7
C44 10u
GND

R28 0R
GND

VIN	3	SW	2
EN	5	BST	6
GND	1	FB	4

C41 100n
L1 2u2/3.1A
FB3 120Z/2A
+3V3
PWR_FLAG

R29 3k16
R30 1k
GND

C47 22u
C46 22u
GND GND

+5V
U4 AP62301WU-7
C45 10u
GND

R13 0R
GND

VIN	3	SW	2
EN	5	BST	6
GND	1	FB	4

C3 100n
L2 2u2/3.1A
FB5 120Z/2A
+1V8
PWR_FLAG

R14 1kB7
R15 1k
R34 499R
GND

C48 22u
C49 22u
GND GND

Sheet: /2xUSB + Power/
File: usb.kicad_sch
Title: Audio Latency Processing Board
Size: A3   Date: 2025-01-20   Rev: 1.1.0:dfa75
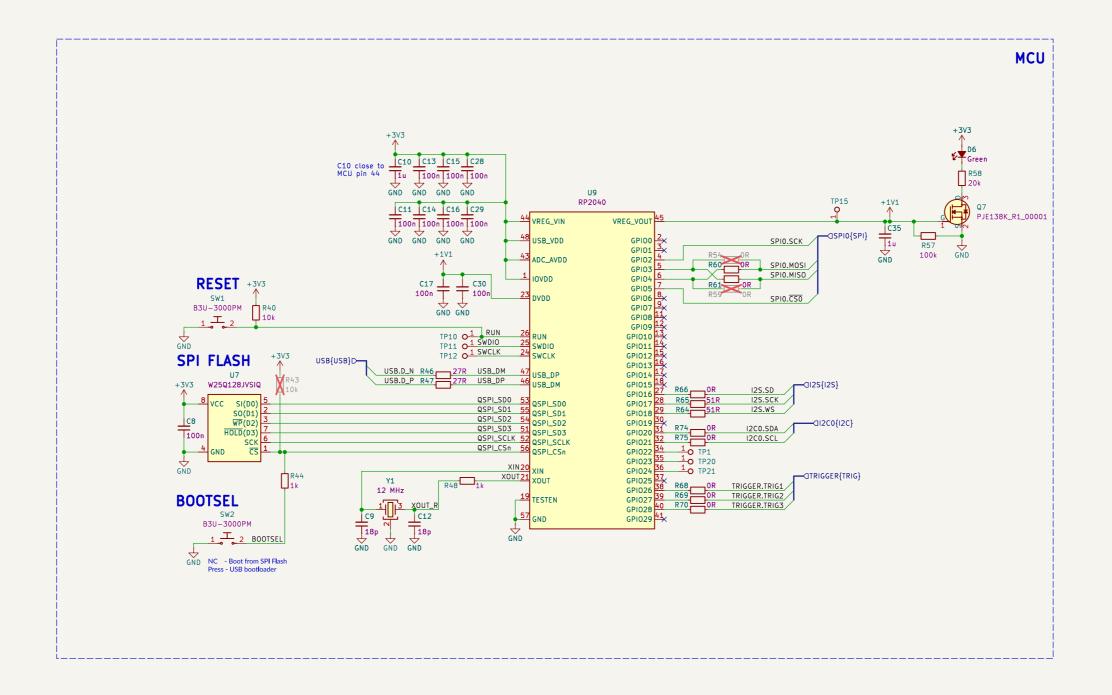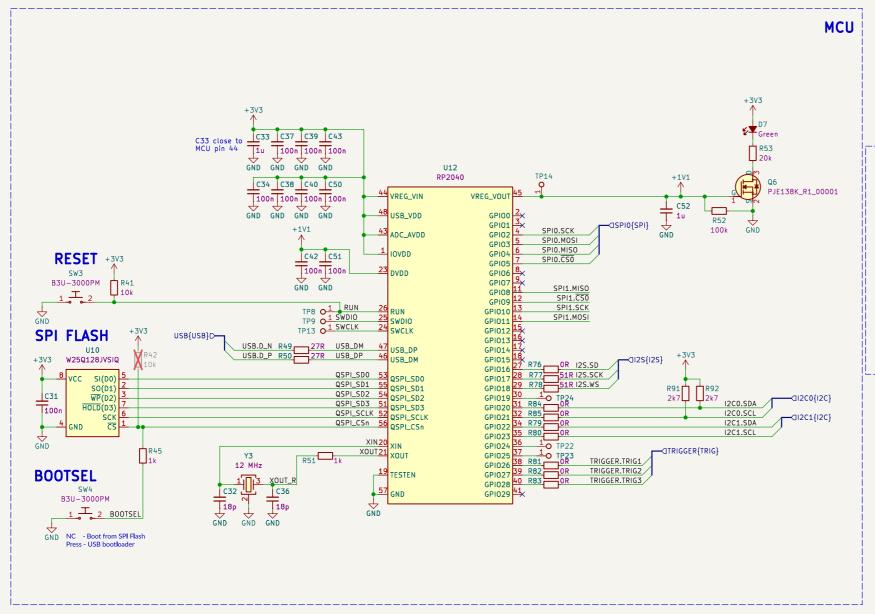KiCad E.D.A. 8.0.7   Id: 2/7

Left Microphone Connector

+3V3 +1V8

R18
0R

R19
0R

C5
100n

GND

J1
BM05B-SURS-TF(LF)(SN)

1 L-PWR
2
3 L-BCLK
4 L-WS
5 L-DATA
MP

GND

Microphone (SPH0645LM4H-B)
Typ. current: 600µA
Datasheet

R20
0R

L-DATA

R-DATA

L-R-Mic.SD

0R
R21

R22
0R

L-BCLK

R-BCLK

L-R-Mic.SCK

0R
R23

R24
0R

L-WS

R-WS

L-R-Mic.WS

0R
R25

L-R-Mic{I2S}

L-R-Mic.SD
L-R-Mic.SCK
L-R-Mic.WS

Right Microphone Connector

+3V3 +1V8

R4
0R

R3
0R

C4
100n

GND

J2
BM05B-SURS-TF(LF)(SN)

1 R-PWR
2
3 R-BCLK
4 R-WS
5 R-DATA
MP

GND

Microphone (SPH0645LM4H-B)
Typ. current: 600µA
Datasheet

ESD

L-PWR   1
L-BCLK   2
L-WS   4
L-DATA   5
         3

U1
TPD4E05U06QDQARQ1

GND

R-PWR   1
R-BCLK   2
R-WS   4
R-DATA   5
         3

U6
TPD4E05U06QDQARQ1

GND

Debug I2S Connector

+3V3 +1V8

R93
0R

R94
0R

C56
100n

GND

J8
BM05B-SURS-TF(LF)(SN)

1
2
3
4
5
MP

L-R-Mic.SCK
L-R-Mic.WS
L-R-Mic.SD

GND

D13
TPD1E0B04DPYR

D14
TPD1E0B04DPYR

D15
TPD1E0B04DPYR

GND GND GND

MCU

+3V3

C10 close to
MCU pin 44

C10	C13	C15	C28
1u	100n	100n	100n
GND	GND	GND	GND

C11	C14	C16	C29
100n	100n	100n	100n
GND	GND	GND	GND

+1V1

C17	C30
100n	100n
GND	GND

U9
RP2040

VREG_VIN   44
USB_VDD   48
ADC_AVDD   43
IOVDD   1
DVDD   23

VREG_VOUT   45

+1V1

TP15

C35
1u
GND

R57
100k
GND

+3V3

D6
Green

R58
20k

Q7
PJE13BK_R1_00001

GPIO0   2
GPIO1   3
GPIO2   4
GPIO3   5
GPIO4   6
GPIO5   7
GPIO6   8
GPIO7   9
GPIO8   10
GPIO9   11
GPIO10   12
GPIO11   13
GPIO12   14
GPIO13   15
GPIO14   16
GPIO15   17
GPIO16   27
GPIO17   28
GPIO18   29
GPIO19   30
GPIO20   31
GPIO21   32
GPIO22   34
GPIO23   35
GPIO24   36
GPIO25   37
GPIO26   38
GPIO27   39
GPIO28   40
GPIO29   41

R54   0R
R60   0R   SPI0.SCK   QSPI0{SPI}
R61   0R   SPI0.MOSI
R59   0R   SPI0.MISO
                SPI0.CS0

R66   0R   I2S.SD   I2S{I2S}
R65   51R   I2S.SCK
R64   51R   I2S.WS

R74   0R   I2C0.SDA   I2C0{I2C}
R75   0R   I2C0.SCL

TP1
TP20
TP21

R68   0R   TRIGGER.TRIG1 TRIGGER{TRIG}
R69   0R   TRIGGER.TRIG2
R70   0R   TRIGGER.TRIG3

RESET
SW1
B3U-3000PM

+3V3

R40
10k

GND

TP10 RUN   26 RUN
TP11 SWDIO 25 SWDIO
TP12 SWCLK 24 SWCLK

SPI FLASH
U7
W25Q128JVSIQ

+3V3

R43
10k

+3V3

USB{USB}D

USB.D_N R46 27R USB_DM 47 USB_DP
USB.D_P R47 27R USB_DP 46 USB_DM

C8
100n
GND

VCC 8
SI(D0)   5
SO(D1)   2
WP(D2)   3
HOLD(D3) 7
SCK   6
CS   1
GND 4

QSPI_SD0 53 QSPI_SD0
QSPI_SD1 55 QSPI_SD1
QSPI_SD2 54 QSPI_SD2
QSPI_SD3 51 QSPI_SD3
QSPI_SCLK 52 QSPI_SCLK
QSPI_CSn 56 QSPI_CSn

R44
1k

XIN 20 XIN
XOUT 21 XOUT

Y1
12 MHz

R48 1k

XOUT_R

19 TESTEN

57 GND
GND

C9
18p
GND

C12
18p
GND

BOOTSEL
SW2
B3U-3000PM

BOOTSEL

GND

NC   - Boot from SPI Flash
Press - USB bootloader

MCU

U12
RP2040

C33 close to
MCU pin 44

+3V3

| C33 | C37 | C39 | C43 |
| 1u | 100n | 100n | 100n |
GND GND GND GND

| C34 | C38 | C40 | C50 |
| 100n | 100n | 100n | 100n |
GND GND GND GND

+1V1

| C42 | C51 |
| 100n | 100n |
GND GND

VREG_VIN 44
USB_VDD 48
ADC_AVDD 43
IOVDD 1
DVDD 23

VREG_VOUT 45

TP14

+1V1
C52 1u
GND
R52 100k
GND

+3V3
D7 Green
R53 20k

Q6
PJE13BK_R1_00001

RESET

SW3
B3U-3000PM

+3V3
R41 10k
GND

RUN 26 RUN
TP8
SWDIO 25 SWDIO
TP9
SWCLK 24 SWCLK
TP13

USB{USB}
USB.D_N R49 27R USB_DP 47 USB_DP
USB.D_P R50 27R USB_DM 46 USB_DM

SPI FLASH

U10
W25Q128JVSIQ

+3V3
R42 10k

+3V3
8 VCC   SI(D0) 5
        SO(D1) 2
        WP(D2) 3
       HOLD(D3) 7
C31   SCK 6
100n 4 GND   CS 1
GND
R45 1k

BOOTSEL

SW4
B3U-3000PM

BOOTSEL
GND

NC   - Boot from SPI Flash
Press - USB bootloader

QSPI_SD0 53 QSPI_SD0
QSPI_SD1 55 QSPI_SD1
QSPI_SD2 54 QSPI_SD2
QSPI_SD3 51 QSPI_SD3
QSPI_SCLK 52 QSPI_SCLK
QSPI_CSn 56 QSPI_CSn

Y3
12 MHz
R51 1k
XIN 20 XIN
XOUT 21 XOUT
XOUT_R

C32 18p
C36 18p
GND GND GND

TESTEN 19 TESTEN
GND 57 GND
GND

GPIO0 2
GPIO1 3
GPIO2 4
GPIO3 5
GPIO4 6
GPIO5 7
GPIO6 8
GPIO7 9
GPIO8 11
GPIO9 12
GPIO10 13
GPIO11 14
GPIO12 15
GPIO13 16
GPIO14 17
GPIO15 18
GPIO16 27
GPIO17 28
GPIO18 29
GPIO19 30
GPIO20 31
GPIO21 32
GPIO22 34
GPIO23 35
GPIO24 36
GPIO25 37
GPIO26 38
GPIO27 39
GPIO28 40
GPIO29 41

SPI0.SCK
SPI0.MOSI
SPI0.MISO
SPI0.CS0
SPI0{SPI}

SPI1.MISO
SPI1.CS0
SPI1.SCK
SPI1.MOSI

R76 0R I2S.SD I2S{I2S}
R77 51R I2S.SCK
R78 51R I2S.WS

+3V3
R91 2k7 R92 2k7

R84 0R TP24
R85 0R
R79 0R
R80 0R

I2C0.SDA I2C0{I2C}
I2C0.SCL
I2C1.SDA I2C1{I2C}
I2C1.SCL

R81 0R TP23
R82 0R
R83 0R

TRIGGER.TRIG1 TRIGGER{TRIG}
TRIGGER.TRIG2
TRIGGER.TRIG3

SPI RAM

IS66WVS4M8BLL-104NLI

+3V3

SPI1.MOSI 5 SI/SIO0   VDD 8
SPI1.MISO 2 SO/SIO1
           3 SIO2
           7 SIO3
SPI1.SCK   6 CLK
SPI1.CS0   1 CS   VSS 4

GND

AMP

+3V3 **+5V**

R35 0R   R36 0R

SPKVDD → PWR_FLAG

SPKVDD has to be > than AVDD

+3V3 **+1V8** **+1V8**

IOVDD   DVDD   AVDD

IOVDD

R17 10k

AMP_NRST

SPKVDD

C23 100n   C22 22u 25V   IOVDD

C18 10u   C19 100n   DVDD

C20 10u   C21 100n

GND   GND   GND

IOVDD

R11 2k7   R12 2k7

I2C Addr: 0x18

I2C{I2C}

I2C.SDA
I2C.SCL

R26 0R
R27 0R

Short AIN if not used.

R16 0R

U3
TAS2505IRGER

Pin	Signal		Pin	Signal

- 10 SPKVDD
- 22 IOVDD
- 23 DVDD
- 2 RST
- 4 AINR
- 3 AINL
- 20 SDA
- 19 SCL
- 18 GPIO
- 16 MCLK
- 14 WCLK
- 13 DIN
- 15 BCLK
- 17 MISO
- 1 SPI_SEL
- 21 SCLK

- 7 AVDD
- 12 SPKP
- 9 SPKM
- 5 HPOUT
- 8 LDO_SEL
- EP
- 25 SPKVSS
- 6 AVSS
- 24 DVSS

AVDD   C24 100n   C25 22u 25V

GND

AMP_NRST

SPK_P
SPK_M

50M_CLK

HPOUT

+1V8

Y2
ECS-1612MV-500-CN-TR
50 MHz

C27 100n

4 VDD   OUT 3   50M_CLK
1 EN
2 GND

GND

I2S{I2S}

I2S.WS
I2S.SD
I2S.SCK

GND   GND

Speaker Connector

2.6 W (4Ω, 5.5 V)
1.7 W (8 Ω, 5.5 V)

SPK_M 1
SPK_P 2
       MP   J12
SM02B-SRSS-TB(LF)(SN)

GND

Headphones 3.5mm Jack

HPOUT

C26 47u

3
2
1
J5
SJ-3523-SMT-TR

GND

Debug I2C Connector

+3V3

I2C.SDA
I2C.SCL

1
2
3
4
MP
J10
SM04B-SRSS-TB(LF)(SN)

GND

D8   D9
TPD1E0B04DPYR   TPD1E0B04DPYR

GND   GND

Debug I2S Connector

+3V3 **+1V8**

R89 0R   R90 0R

C53 100n

GND

1
2
3
4
5
MP
J9
BM05B-SURS-TF(LF)(SN)

I2S.SCK
I2S.WS
I2S.SD

GND

D11   D10   D12
TPD1E0B04DPYR   TPD1E0B04DPYR   TPD1E0B04DPYR

GND   GND   GND

External Triggers

+3V3

TRIGGER1{TRIG}

TRIGGER1.TRIG1
TRIGGER1.TRIG2
TRIGGER1.TRIG3

J6
SM06B-SRSS-TB(LF)(SN)

1
2
3
4
5
6

TP18 MP

GND

+3V3

C54
100n

GND

+3V3

TRIGGER2{TRIG}

TRIGGER2.TRIG1
TRIGGER2.TRIG2
TRIGGER2.TRIG3

J7
SM06B-SRSS-TB(LF)(SN)

1
2
3
4
5
6

TP19 MP

GND

+3V3

C55
100n

GND

Trigger

TRIGGER1.TRIG1   R86   OR   TRIGGER2.TRIG1
TRIGGER1.TRIG2   R87   OR   TRIGGER2.TRIG2
TRIGGER1.TRIG3   R88   OR   TRIGGER2.TRIG3

ESD

U14
TPD4E05U06QDDQARQ1

+3V3

TRIGGER1.TRIG1   1
TRIGGER1.TRIG2   2
TRIGGER1.TRIG3   4
                  5
                  3

GND

U13
TPD4E05U06QDDQARQ1

+3V3

TRIGGER2.TRIG1   1
TRIGGER2.TRIG2   2
TRIGGER2.TRIG3   4
                  5
                  3

GND