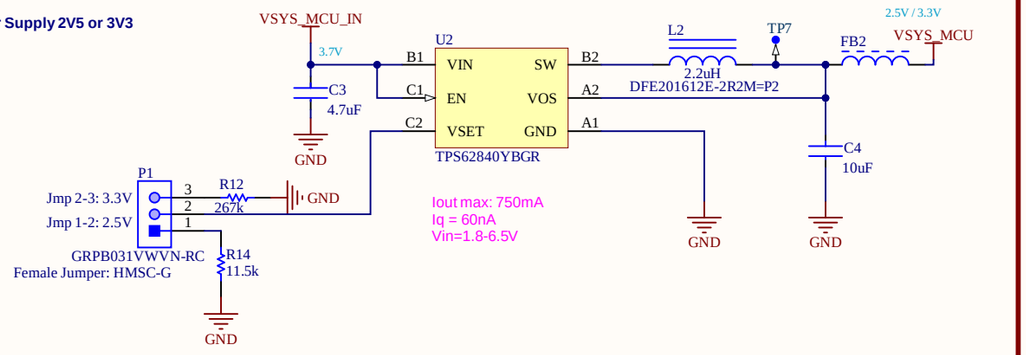
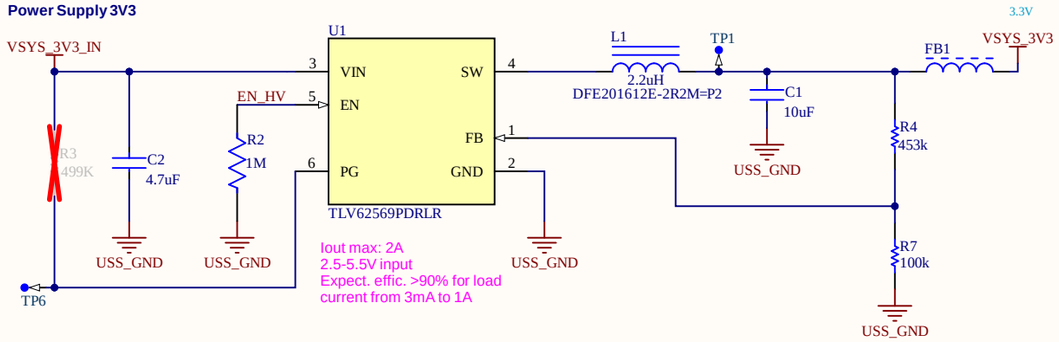
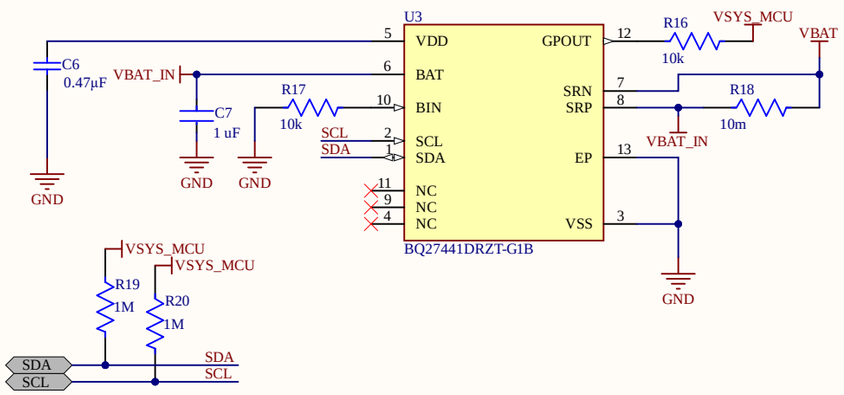
Power Supply 2V5 or 3V3



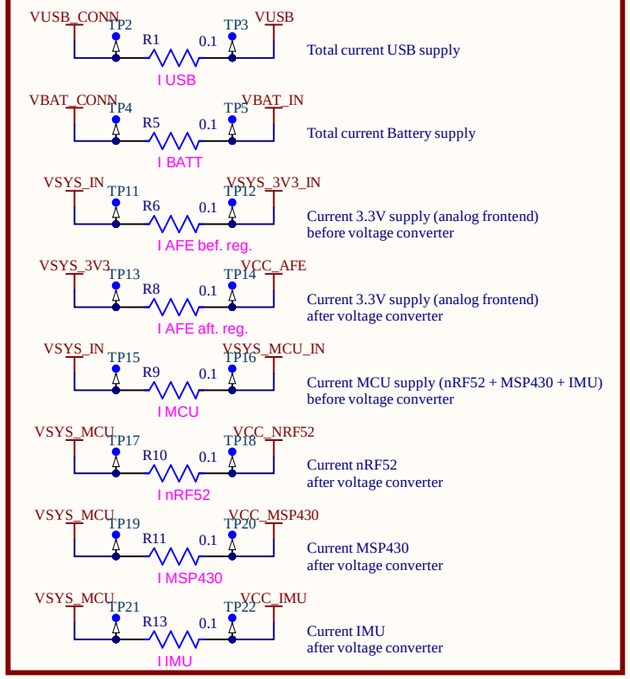
Power Supply 3V3



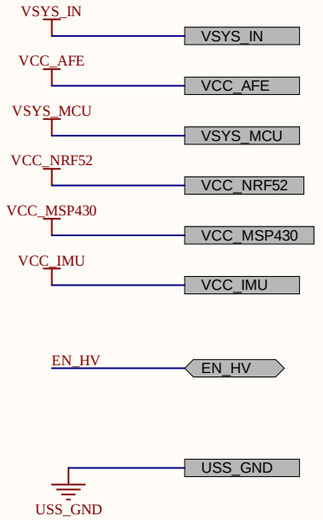
FUEL GAUGE



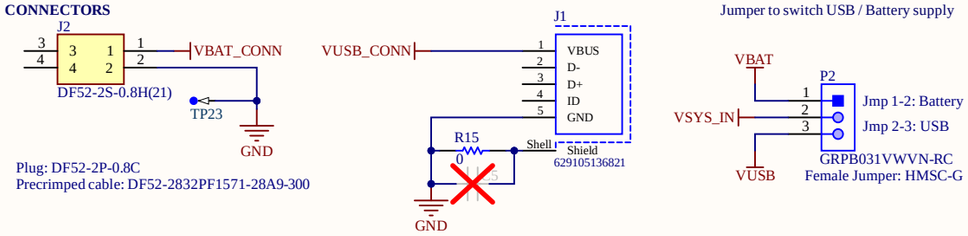
CURRENT MEASUREMENT RESISTORS



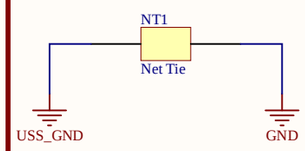
OFF SHEET CONNECTIONS



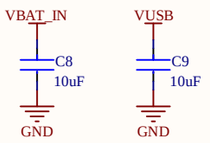
CONNECTORS



Analog / digital GND connection



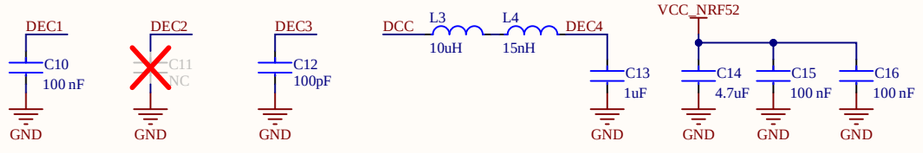
BYPASS SUPPLY



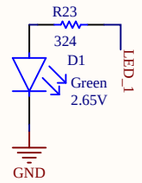
MOUNTING HOLES

ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich			Project: Wearable Ultra Low-Power Ultrasound probe
Drawing number: Rev: v1.2	Format: A3	Laboratory: Integrated Systems Laboratory	Sheet: 00_POWER.SchDoc
Date: 17.01.2025 17:43:26		Drawn by: Sebastian Frey	Page 1 of 6
File: C:\Users\s-fre\Github\wulpus\hw\wulpus_acquisition_pcb\00_POWER.SchDoc			

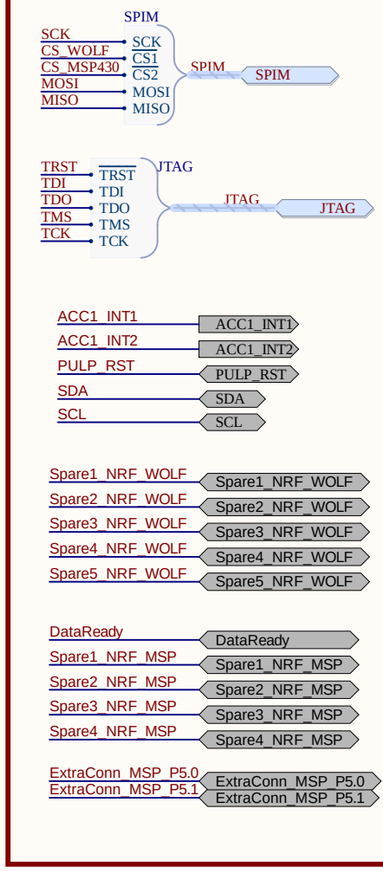
BYPASS CAPS



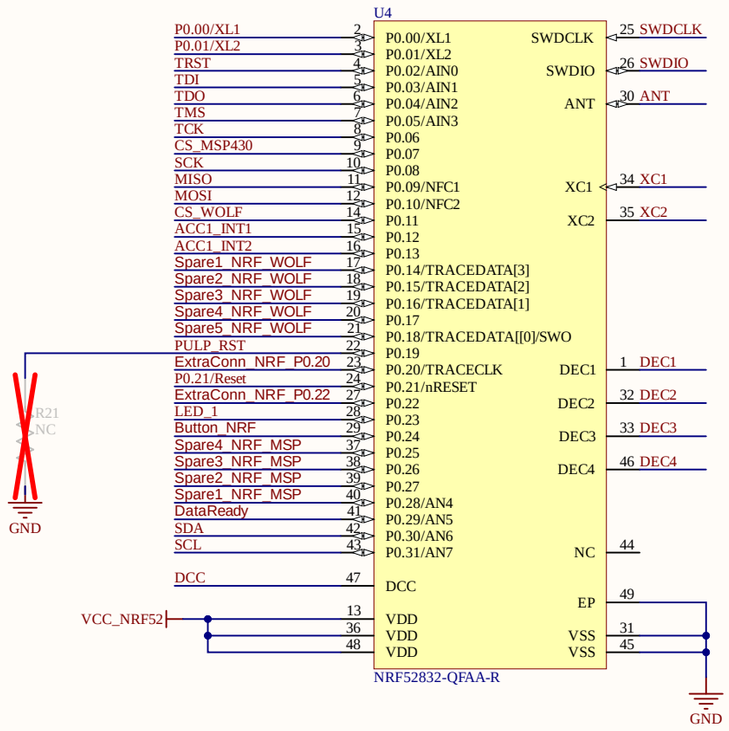
DEBUG LED



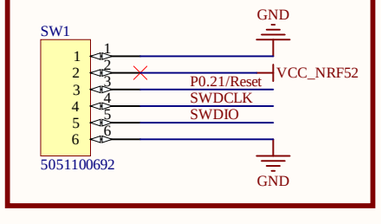
OFF SHEET CONNECTIONS



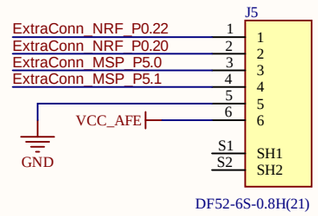
NRF52832 WITH DC/DC AND CHIP ANTENNA



SWD CONNECTOR



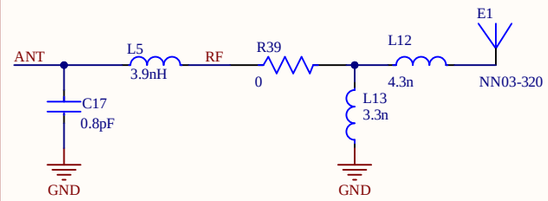
EXTRA CONNECTOR



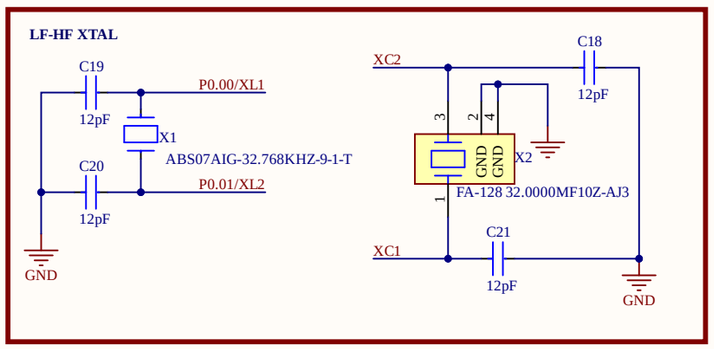
Gives access to:
- VCC AFE 3.3 V
- GND
- Two free GPIOs from the nRF
- Two free GPIOs from the MSP

Plug: DF52-6P-0.8C
Precrimped cable: DF52-2832PF1571-28A9-300

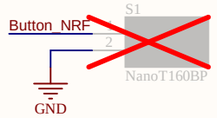
RF Antenna



LF-HF XTAL



Optional button



ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Project:
Wearable Ultra Low-Power Ultrasound probe

Drawing number:	Rev: v1.2	Format:	Laboratory: Integrated Systems Laboratory	Sheet: 01_NRF52.SchDoc	
Date: 17.01.2025	17:43:27	A3	Drawn by: Sebastian Frey	Page 2	of 6
File: C:\Users\s-fre\Github\wulpus\hw\wulpus_acquisition_pcb\01_NRF52.SchDoc					

OFF SHEET CONNECTIONS

VSYS_IN → VSYS_IN
VCC_MSP430 → VCC_MSP430

CH0_IN → CH0_IN
CH0_OUT → CH0_OUT
CH1_IN → CH1_IN
CH1_OUT → CH1_OUT
TxPwr → TxPwr
RxPwr → RxPwr
RxEn → RxEn

Switch_CLR → Switch_CLR
Switch_CLK → Switch_CLK
Switch_D_IN → Switch_D_IN
Switch_D_OUT → Switch_D_OUT
Switch_LE → Switch_LE

Spare1_MSP_AFE → Spare1_MSP_AFE
Spare2_MSP_AFE → Spare2_MSP_AFE
Spare3_MSP_AFE → Spare3_MSP_AFE
Spare4_MSP_AFE → Spare4_MSP_AFE

EN_HV → EN_HV
DataReady → DataReady
Spare1_NRF_MSP → Spare1_NRF_MSP
Spare2_NRF_MSP → Spare2_NRF_MSP
Spare3_NRF_MSP → Spare3_NRF_MSP
Spare4_NRF_MSP → Spare4_NRF_MSP
Spare5_NRF_MSP → Spare5_NRF_MSP

ExtraConn_MSP_P5.0 → ExtraConn_MSP_P5.0
ExtraConn_MSP_P5.1 → ExtraConn_MSP_P5.1

SPIM: SCK→SCK, CS_WOLF→CS1, CS_MSP430→CS2, MOSI→MOSI, MISO→MISO → SPIM → SPIM

USS_GND → USS_GND

BYPASS CAPS

VCC_MSP430 → L11 600 Ohm → PVCC
PVCC: C22 33uF, C23 1nF, C30 33uF, C31 1nF → USS_GND
VCC_MSP430 → L8 600 Ohm → C24 1uF, C27 100 nF → AVCC1 → USS_GND
VCC_MSP430 → L9 600 Ohm → C25 1uF, C28 100 nF → DVCC1 → GND
VCC_MSP430 → L10 600 Ohm → C26 1uF, C29 100 nF → DVCC3 → GND

U5 — MSP430FR5043IRGCT

AVCC1	1	AVCC1	
DVCC1	18	DVCC1	
DVCC3	49	DVCC3	
PVCC	56	PVCC	
PVCC	57	PVCC	
	3	P1.0_UCA1CLK_TA1.0_A0_C0_VREF-_VeREF-	
	4	P1.1_UCA1STE_TA4.0_A1_C1_VREF+_VeREF+	
TP8 MOSI	19	P1.2_UCA1SIMO_UCA1TXD_TA1.0_A8_C8	
TP9 MISO	20	P1.3_UCA1SOMI_UCA1RXD_TA1.1_A9_C9	
	25	P1.4_TB0.4_UCB0STE_A2_C2	
LED_MSP430	26	P1.5_TB0.5_UCB0CLK_A3_C3	
RxPwr	23	P1.6_UCA3STE_UCB0SIMO_UCB0SDA	
	24	P1.7_USSTRG_UCA3CLK_UCB0SOMI_UCB0SCL	
TP10 SCK	21	P2.0_UCA1CLK_UCA3SIMO_UCA3TXD	
CS_MSP430	22	P2.1_UCA1STE_UCA3SOMI_UCA3RXD	
EN_HV	2	P2.2_COUT_UCA0CLK_A14_C14	
	27	P3.1_TA1CLK_TB0.1_MTIF_OUT_IN	
	50	P3.3_MCLK_TB0.3_XPB1	
	51	P3.4_SMCLK_DMAE0	
	52	P3.5_ACLK_COUT	
DataReady	28	P4.0_RTCCLK_TA4.1_MTIF_PIN_EN	
Spare1_NRF_MSP	29	P4.1_UCA0CLK_TB0.4_UCA3SOMI_UCA3RXD	
Spare2_NRF_MSP	30	P4.2_UCA0STE_TB0.5_UCA3SIMO_UCA3TXD	
Spare3_NRF_MSP	31	P4.3_UCA0SIMO_UCA0TXD	
Spare4_NRF_MSP	32	P4.4_UCA0SOMI_UCA0RXD	
ExtraConn_MSP_P5.0	34	P5.0_TB0.0_UCA2SIMO_UCA2TXD	
ExtraConn_MSP_P5.1	35	P5.1_TB0.1_UCA2SOMI_UCA2RXD	
Button_MSP	36	P5.2_TB0.2_UAC2CLK	
Switch_CLR	37	P5.3_TB0.3_UCA2STE	
Switch_CLK	38	P5.4_TA0.0_UCB1CLK_TA4.0	
Switch_D_IN	39	P5.5_TA4.1_UCB1SIMO_UCB1SDA	
Switch_D_OUT	40	P5.6_TB0OUTH_UCB1SOMI_UCB1SCL	
Switch_LE	41	P5.7_TA0.2_UCB1STE	
RxEn	42	P6.0_TA0CLK_COUT	
Spare4_MSP_AFE	47	P6.2_TB0CLK	
Spare1_MSP_AFE	43	P6.4_MCLK	
Spare2_MSP_AFE	44	P6.5_SMCLK	
Spare3_MSP_AFE	45	P6.6_ACLK	
TxPwr	46	P7.0_TA1.0_TA1.2_XPB0	
		PJ.0_UAC2CLK_SRSCG1_DMAE0_C10_TDO	13 JTAG_TDO
		PJ.1_UCA2STE_SRSCG0_TA4CLK_C11_TDI_TCLK	14 JTAG_TDI
		PJ.2_UCA2SIMO_UCA2TXD_SROSCOFF_TB0OUTH_C12_TMS	15 JTAG_TMS
		PJ.3_UCA2SOMI_UCA2RXD_SRCPUOFF_TB0.6_C13_TCK	16 JTAG_TCK
		PJ.4_LFXIN	6 LFXIN
		PJ.5_LFXOUT	7 LFXOUT
		PJ.6_HFXIN_USSXT_BOUT	9 HFXIN
		PJ.7_HFXOUT	10 HFXOUT
		CH0_IN	60 CH0_IN
		CH0_OUT	59 CH0_OUT
		CH1_IN	53 CH1_IN
		CH1_OUT	54 CH1_OUT
		USSXTIN	62 USSXTIN
		TEST_SBWCLK	11 JTAG_TEST
		RST _NMI_SBWTDIO_N	12 JTAG_RESET
		USSXTOUT	63 USSXTOUT
		EP	65 → GND
		AVSS1	64
		AVSS2	5
		AVSS3	8 → USS_GND
		AVSS4	61
		DVSS1	17
		DVSS2	33
		DVSS3	48 → GND
		PVSS	55
		PVSS	58 → USS_GND

R24 1M, R25 1M → USS_GND

DEBUG LED

R27 324 → LED_MSP430 → D2 Green 2.65V → GND

Optional button

Button_MSP → S2 NanoT160BP → GND

LF-HF XTAL

C32 12pF, R26 22 → HFOUT
X3 FY0800018 8MHz: GND, GND
C34 12pF → HFXIN
GND
C37 12pF → LFXOUT
X4 ABS07-32.768KHZ-9-T 32.768kHz
C38 12pF → LFXIN
GND

USSXTAL

C33 12pF, R28 22 → USSXTOUT
Y1 AWSCR-8.00CV-T 8MHz
C36 12pF → USSXTIN
USS_GND

JTAG CONNECTOR

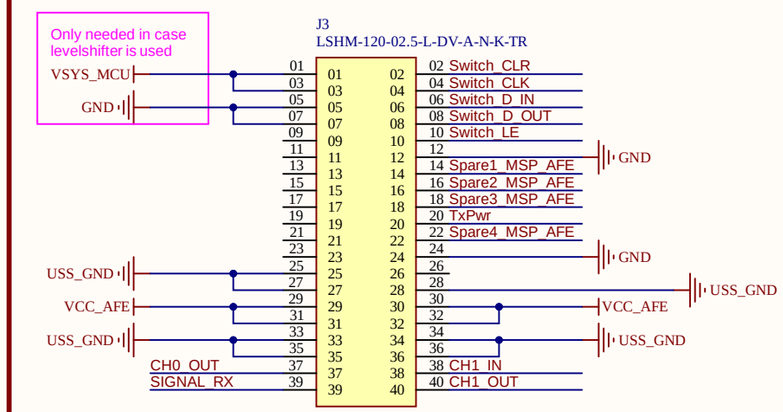
PJ1 5051100892: 8 JTAG_TEST, 7 JTAG_RESET, 6 JTAG_TDI, 5 JTAG_TDO, 4 JTAG_TMS, 3 JTAG_TCK, 2 VCC_MSP430, 1 GND
VCC_MSP430 → R29 47k → JTAG_RESET → C35 1nF → GND

ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

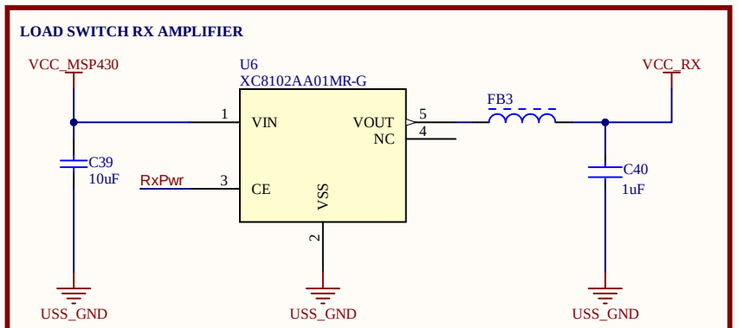
Project: Wearable Ultra Low-Power Ultrasound probe

Drawing number:	Rev: v1.2	Format: A3	Laboratory: Integrated Systems Laboratory
Date: 17.01.2025 17:43:27			Drawn by: Sebastian Frey
File: C:\Users\s-fre\Github\wulpus\hw\wulpus_acquisition_pcb\02_MSP430.SchDoc			Sheet: 02_MSP430.SchDoc Page 3 of 6

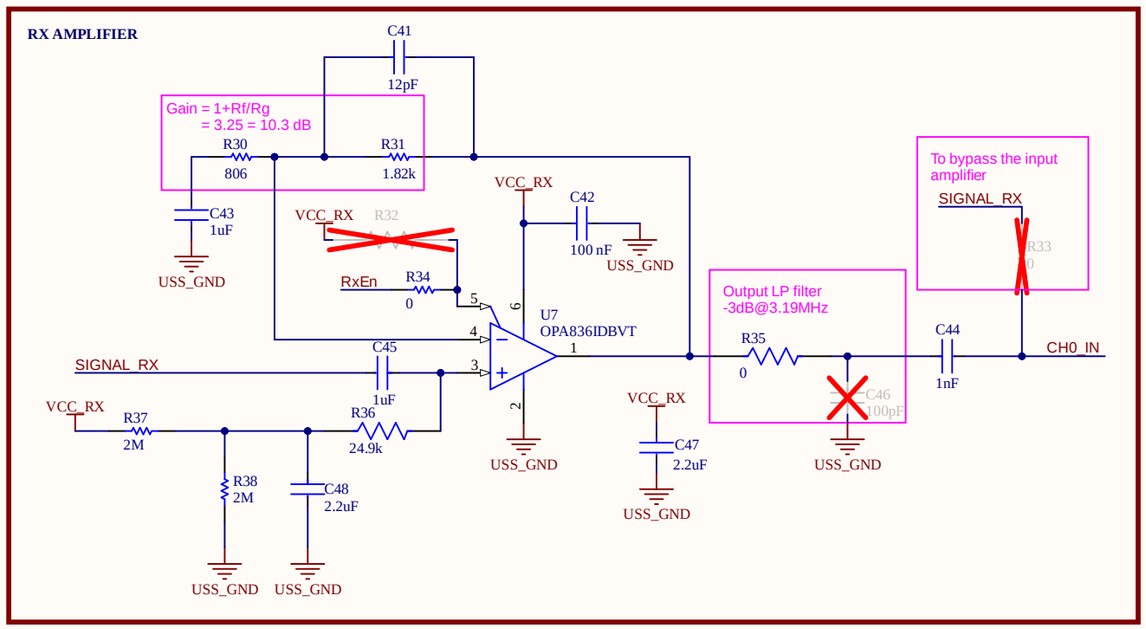
CONNECTOR AFE PCB



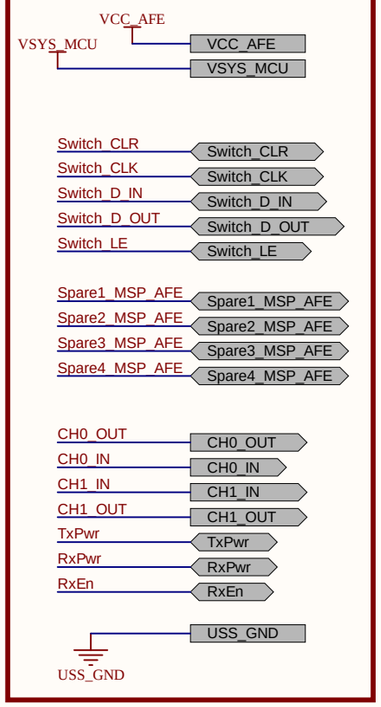
LOAD SWITCH RX AMPLIFIER



RX AMPLIFIER



OFF SHEET CONNECTIONS

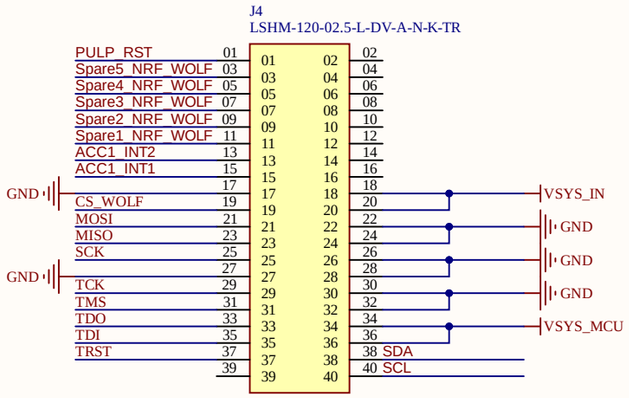


Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

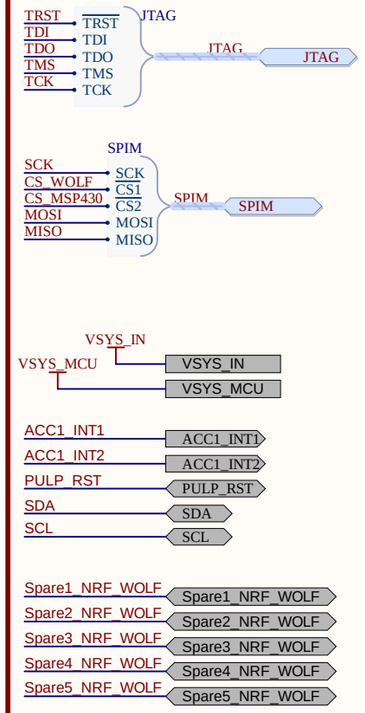
Project: Wearable Ultra Low-Power Ultrasound probe

Drawing number:	Rev: v1.2	Format: A3	Laboratory: Integrated Systems Laboratory	Sheet: 03_MSP430_AFE.SchDoc
Date: 17.01.2025 17:43:27			Drawn by: Sebastian Frey	Page 4 of 6
File: C:\Users\s-fre\Github\wulpus\hw\wulpus_acquisition_pcb\03_MSP430_AFE.SchDoc				

CONNECTOR MR WOLF PCB



OFF SHEET CONNECTIONS

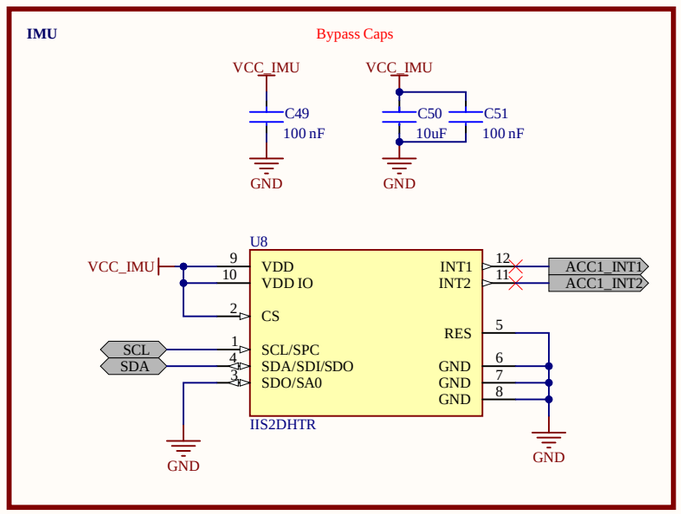


Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Project:

Wearable Ultra Low-Power Ultrasound probe

Drawing number:	Rev: v1.2	Format:	Laboratory: Integrated Systems Laboratory	Sheet: 04_MR_WOLF.SchDoc	
Date: 17.01.2025 17:43:27		A3	Drawn by: Sebastian Frey	Page 5	of 6
File: C:\Users\s-fre\Github\wulpus\hw\wulpus_acquisition_pcb\04_MR_WOLF.SchDoc					



ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich			Project: Wearable Ultra Low-Power Ultrasound probe	
Drawing number:	Rev: v1.2	Format: A3	Laboratory: Integrated Systems Laboratory	Sheet: 05_IMU.SchDoc
Date: 17.01.2025 17:43:27			Drawn by: Sebastian Frey	Page 6 of 6
File: C:\Users\s-fre\Github\wulpus\hw\wulpus_acquisition_pcb\05_IMU.SchDoc				