STM32_Sheet

File: stm32_sheet.kicad_sch

AFE_Sensor_Sheet

File: sensor_sheet.kicad_sch

Features_sheet

File: features_sheet.kicad_sch

Power_And_Connectors_Sheet

File: power_and_connectors.kicad_sch

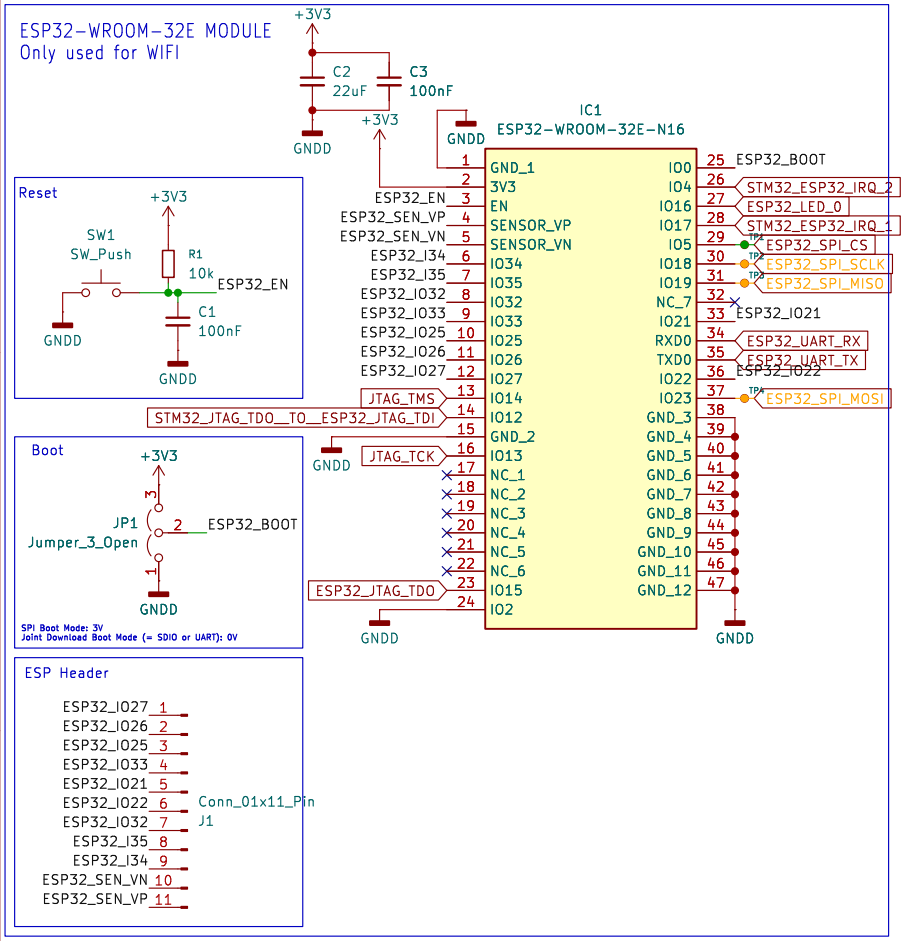
Author: Paul Capgras
Rev 4.0 (= Pre-layout), Rev 4.1 (= Post-layout)

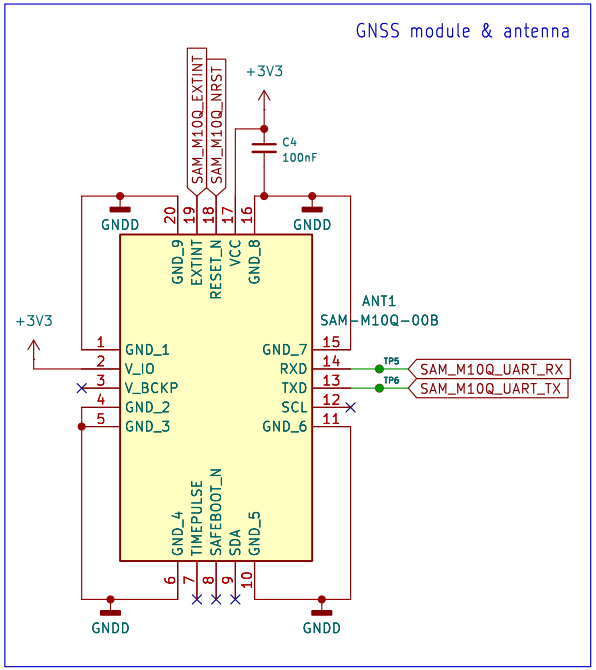
Company: LNIS

Sheet: /
File: Toxic_Detection_v4.0.kicad_sch

Title: Toxic_Detection_PCB

Size: A4	Date: 2026-02-12	**Rev: 4.1**
KiCad E.D.A. 9.0.7		Id: 1/5





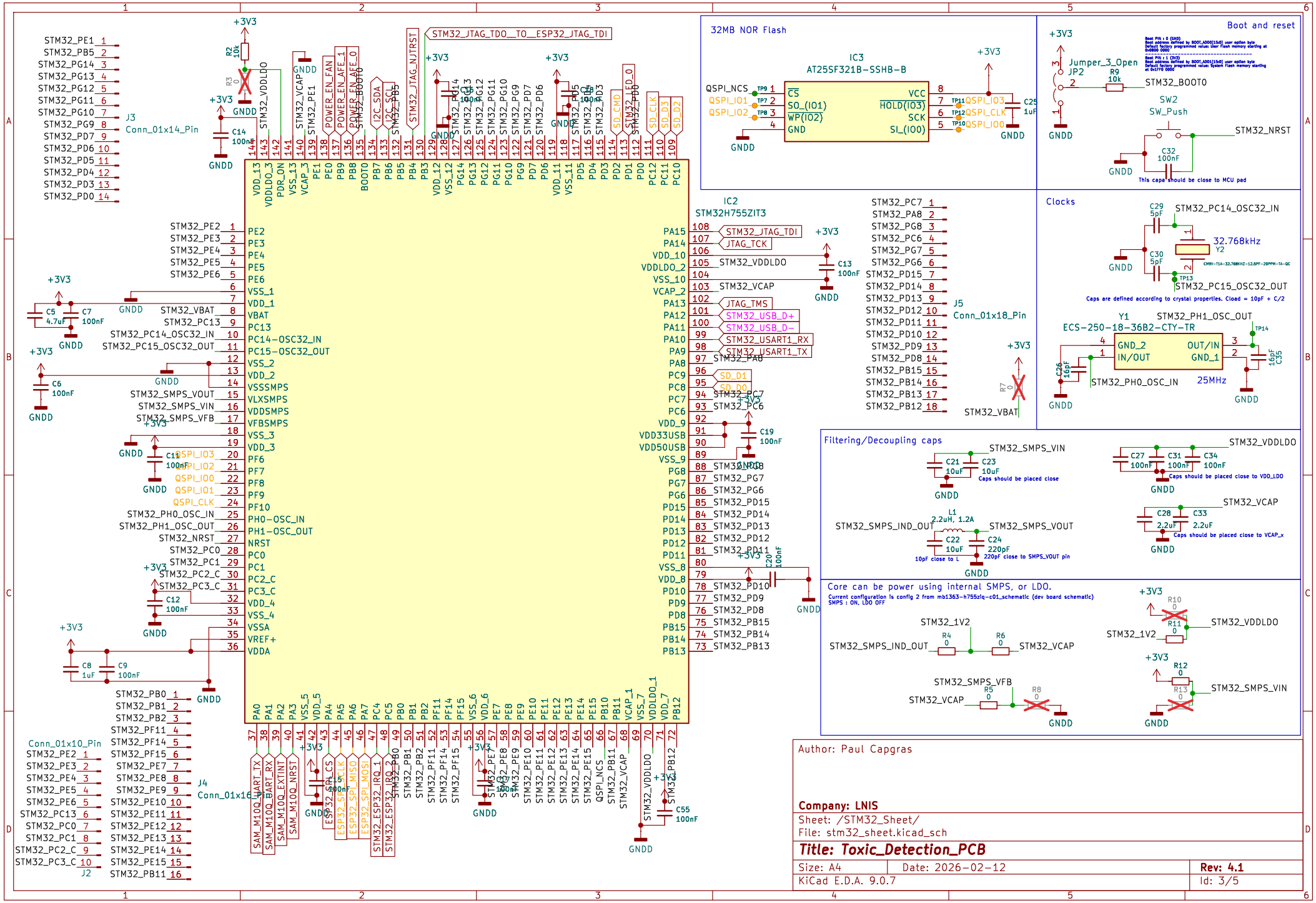
Author: Paul Capgras

Company: LNIS

Sheet: /Features_sheet/
File: features_sheet.kicad_sch

Title: Toxic_Detection_PCB

Size: A4	Date: 2026-02-12	**Rev: 4.1**
KiCad E.D.A. 9.0.7		Id: 2/5


32MB NOR Flash
IC3
AT25SF321B-SSHB-B
Boot and reset
Clocks
IC2
STM32H755ZIT3
J3
Conn_01x14_Pin
J4
Conn_01x16_Pin
J2
Conn_01x10_Pin
J5
Conn_01x18_Pin
Filtering/Decoupling caps
Core can be power using internal SMPS, or LDO.
Author: Paul Capgras
Company: LNIS
Sheet: /STM32_Sheet/
File: stm32_sheet.kicad_sch
Title: Toxic_Detection_PCB
Size: A4
Date: 2026-02-12
Rev: 4.1
KiCad E.D.A. 9.0.7
Id: 3/5

AFE connectors

+5V_AFE_0

J6
79107-7205

AFE_0_PT B1 — B1 A1 — A1
AFE_0_OP_2 B2 — B2 A2 — A2 AFE_0_OP_1
AFE_0_OP_4 B3 — B3 A3 — A3 AFE_0_OP_3
AFE_0_OP_6 B4 — B4 A4 — A4 AFE_0_OP_5
B5 — B5 A5 — A5
AFE_0_OP_8 B6 — B6 A6 — A6 AFE_0_OP_7

GNDA

TBD protection on the VDD outputs?

+5V_AFE_1

J7
79107-7205

AFE_1_PT B1 — B1 A1 — A1
AFE_1_OP_2 B2 — B2 A2 — A2 AFE_1_OP_1
AFE_1_OP_4 B3 — B3 A3 — A3 AFE_1_OP_3
AFE_1_OP_6 B4 — B4 A4 — A4 AFE_1_OP_5
B5 — B5 A5 — A5
AFE_1_OP_8 B6 — B6 A6 — A6 AFE_1_OP_7

GNDA

ADC_CH2 1
ADC_CH3 2
ADC_CH4 3
ADC_CH5 4
ADC_CH6 5
ADC_CH7 6

J8
Conn_01x06_Pin

ADC

IC4
ADS7828E_2K5

AFE_0_OP_1 1 — CH0
AFE_0_OP_2 2 — CH1
AFE_0_OP_3 3 — CH2
AFE_0_OP_4 4 — CH3
AFE_0_OP_5 5 — CH4
AFE_0_OP_6 6 — CH5
AFE_0_OP_7 7 — CH6
AFE_0_OP_8 8 — CH7

+VDD 16 — +5V
SDA 15 — I2C_SDA_5V
SCL 14 — I2C_SCL_5V
A1 13 — GNDA
A0 12 — +5V
COM 11 — GNDA
REF_IN_/_REFOUT 10 — C36 100nF — GNDA
GND 9 — GNDA

C39 100nF — GNDA

Address: 10010(00) – 0x48

IC5
ADS7828E_2K5

AFE_1_OP_1 1 — CH0
AFE_1_OP_2 2 — CH1
AFE_1_OP_3 3 — CH2
AFE_1_OP_4 4 — CH3
AFE_1_OP_5 5 — CH4
AFE_1_OP_6 6 — CH5
AFE_1_OP_7 7 — CH6
AFE_1_OP_8 8 — CH7

+VDD 16 — +5V
SDA 15 — I2C_SDA_5V
SCL 14 — I2C_SCL_5V
A1 13 — +5V
A0 12 — GNDA
COM 11 — C37 100nF — GNDA
REF_IN_/_REFOUT 10 — GNDA
GND 9 — GNDA

C40 100nF — GNDA

Address: 10010(01) – 0x49

IC6
ADS7828E_2K5

AFE_0_PT 1 — CH0
AFE_1_PT 2 — CH1
ADC_CH2 3 — CH2
ADC_CH3 4 — CH3
ADC_CH4 5 — CH4
ADC_CH5 6 — CH5
ADC_CH6 7 — CH6
ADC_CH7 8 — CH7

+VDD 16 — +5V
SDA 15 — I2C_SDA_5V
SCL 14 — I2C_SCL_5V
A1 13 — +5V
A0 12 — GNDA
COM 11 — C38 100nF — GNDA
REF_IN_/_REFOUT 10 — GNDA
GND 9 — GNDA

C41 100nF — GNDA

Address: 10010(10) – 0x4A

LEVEL SHIFTER

+3V3 — 4K — R14 — I2C_SDA — 2 — Q1 BSS138-G — 3 — R16 4K — +5V — I2C_SDA_5V
1

+3V3 — 4K — R15 — I2C_SCL — 2 — Q2 BSS138-G — 3 — R17 4K — +5V — I2C_SCL_5V
1

Design credit: https://cdn.sparkfun.com/datasheets/BreakoutBoards/Logic_Level_Bidirectional.pdf

Author: Paul Capgras

Company: LNIS

Sheet: /AFE_Sensor_Sheet/
File: sensor_sheet.kicad_sch

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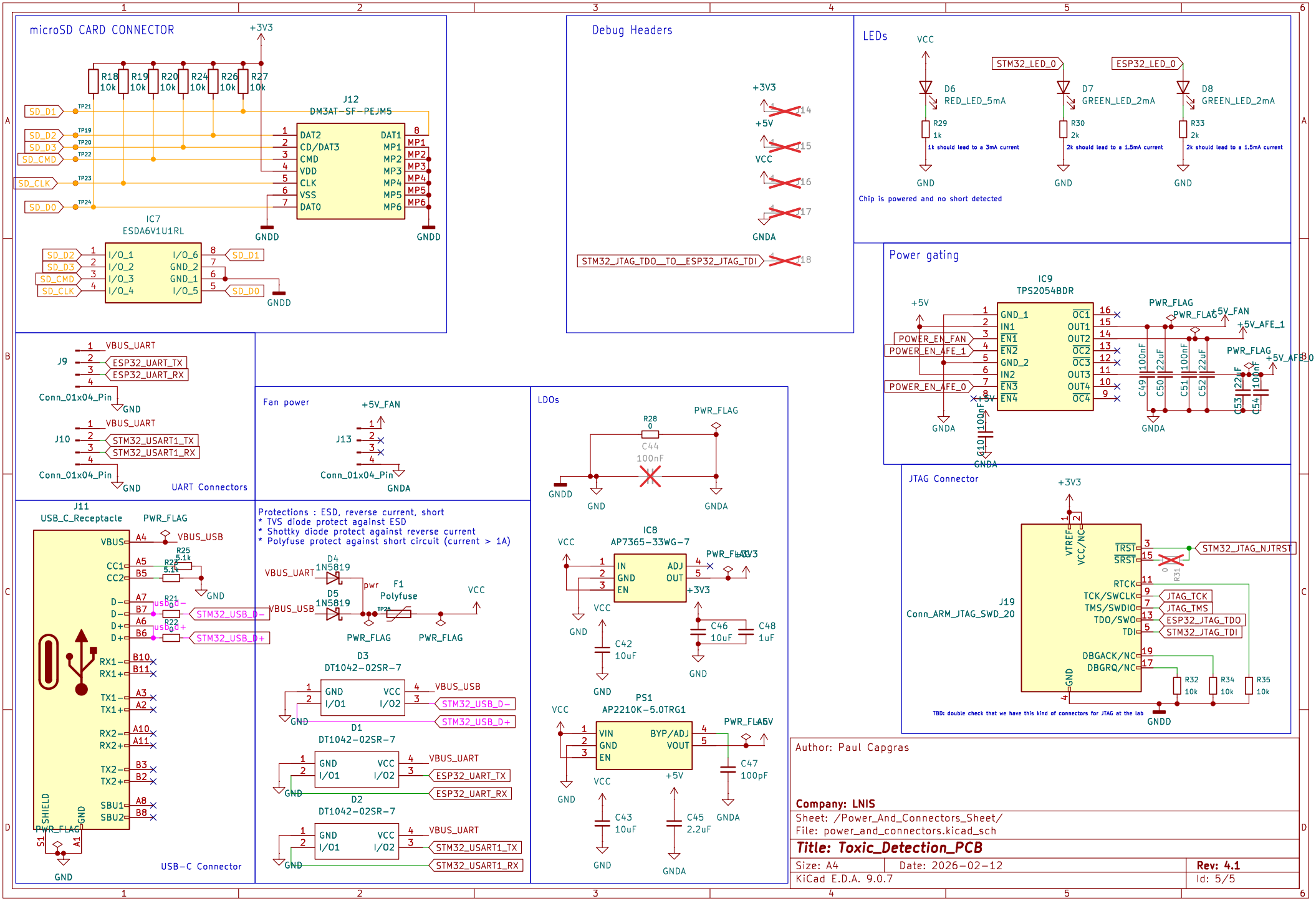
KiCad E.D.A. 9.0.7		Id: 4/5


microSD CARD CONNECTOR
+3V3
R18 10k
R19 10k
R20 10k
R24 10k
R26 10k
R27 10k
J12
DM3AT-SF-PEJM5
SD_D1
SD_D2
SD_D3
SD_CMD
SD_CLK
SD_D0
DAT2
CD/DAT3
CMD
VDD
CLK
VSS
DAT0
DAT1
GNDD
IC7
ESDA6V1U1RL
I/O_1
I/O_2
I/O_3
I/O_4
I/O_6
GND_2
GND_1
I/O_5
Debug Headers
+3V3
+5V
VCC
GNDA
STM32_JTAG_TDO__TO__ESP32_JTAG_TDI
LEDs
VCC
STM32_LED_0
ESP32_LED_0
D6
RED_LED_5mA
D7
GREEN_LED_2mA
D8
GREEN_LED_2mA
R29 1k
R30 2k
R33 2k
1k should lead to a 3mA current
2k should lead to a 1.5mA current
2k should lead to a 1.5mA current
GND
Chip is powered and no short detected
Power gating
IC9
TPS2054BDR
+5V
POWER_EN_FAN
POWER_EN_AFE_1
POWER_EN_AFE_0
GND_1
IN1
EN1
EN2
GND_2
IN2
EN3
EN4
OC1
OUT1
OUT2
OC2
OC3
OUT3
OUT4
OC4
PWR_FLAG
+5V_FAN
+5V_AFE_1
+5V_AFE_0
C49 100nF
C50 22uF
C51 100nF
C52 22uF
C53 22uF
C54 100nF
C10 100nF
GNDA
J9
Conn_01x04_Pin
ESP32_UART_TX
ESP32_UART_RX
VBUS_UART
J10
STM32_USART1_TX
STM32_USART1_RX
UART Connectors
Fan power
J13
+5V_FAN
LDOs
R28 0
C44 100nF
PWR_FLAG
GNDD
IC8
AP7365-33WG-7
IN
GND
EN
ADJ
OUT
+3V3
C42 10uF
C46 10uF
C48 1uF
PS1
AP2210K-5.0TRG1
VIN
BYP/ADJ
VOUT
+5V
C43 10uF
C45 2.2uF
C47 100pF
JTAG Connector
J19
Conn_ARM_JTAG_SWD_20
VTREF
VCC/NC
TRST
SRST
RTCK
TCK/SWCLK
TMS/SWDIO
TDO/SWO
TDI
DBGACK/NC
DBGRQ/NC
STM32_JTAG_NJTRST
JTAG_TCK
JTAG_TMS
ESP32_JTAG_TDO
STM32_JTAG_TDI
R31 0
R32 10k
R34 10k
R35 10k
TBD: double check that we have this kind of connectors for JTAG at the lab
J11
USB_C_Receptacle
PWR_FLAG
VBUS
CC1
CC2
D-
D+
RX1-
RX1+
TX1-
TX1+
RX2-
RX2+
TX2-
TX2+
SBU1
SBU2
SHIELD
VBUS_USB
R25 5.1k
R26 5.1k
R21 usb0-
R22 usb0+
STM32_USB_D-
STM32_USB_D+
USB-C Connector
Protections : ESD, reverse current, short
* TVS diode protect against ESD
* Shottky diode protect against reverse current
* Polyfuse protect against short circuit (current > 1A)
D4 1N5819
D5 1N5819
F1 Polyfuse
pwr
D3 DT1042-02SR-7
D1 DT1042-02SR-7
D2 DT1042-02SR-7
GND
I/O1
I/O2
ESP32_UART_TX
ESP32_UART_RX
STM32_USART1_TX
STM32_USART1_RX
Author: Paul Capgras
Company: LNIS
Sheet: /Power_And_Connectors_Sheet/
File: power_and_connectors.kicad_sch
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KiCad E.D.A. 9.0.7
Id: 5/5