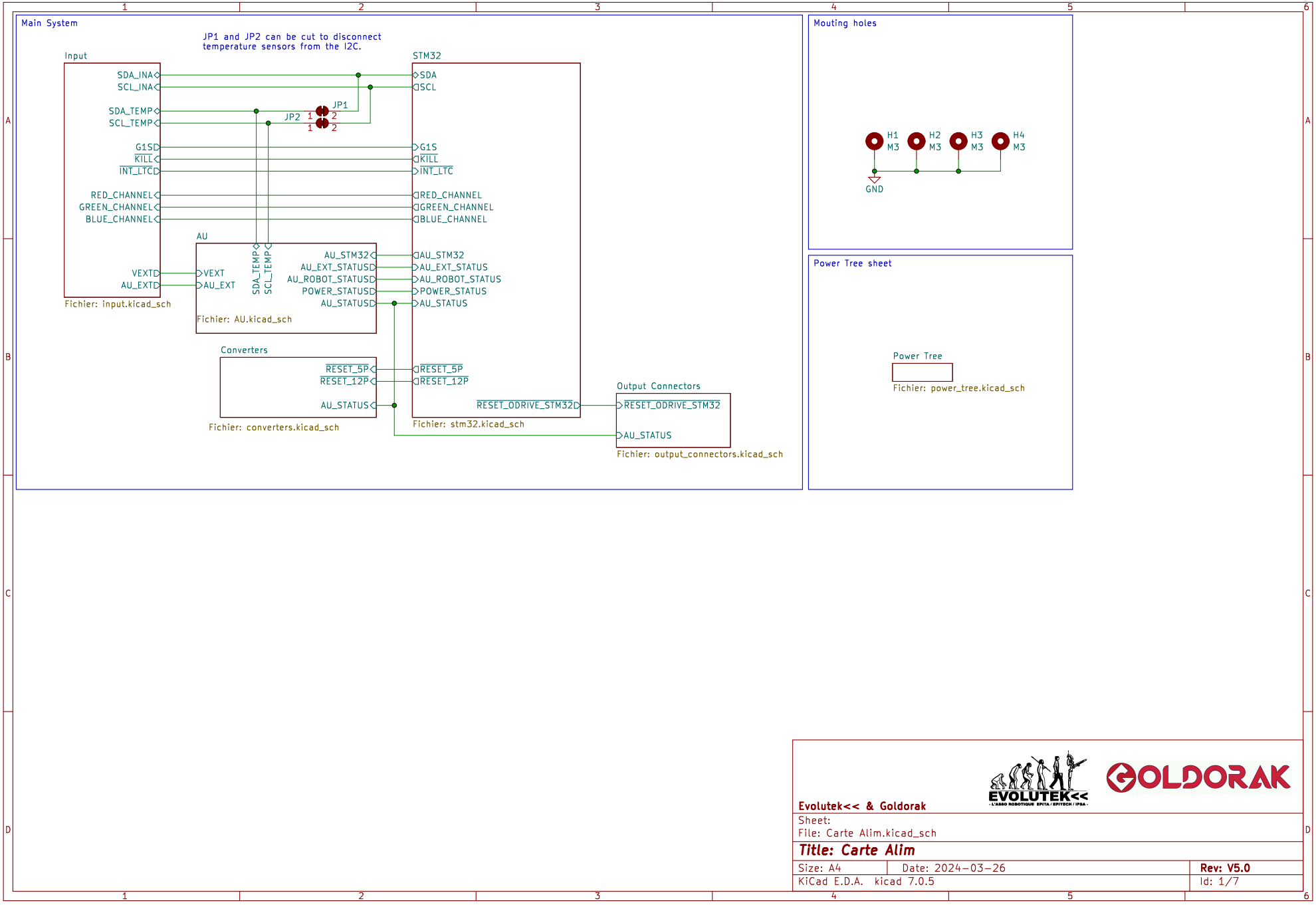

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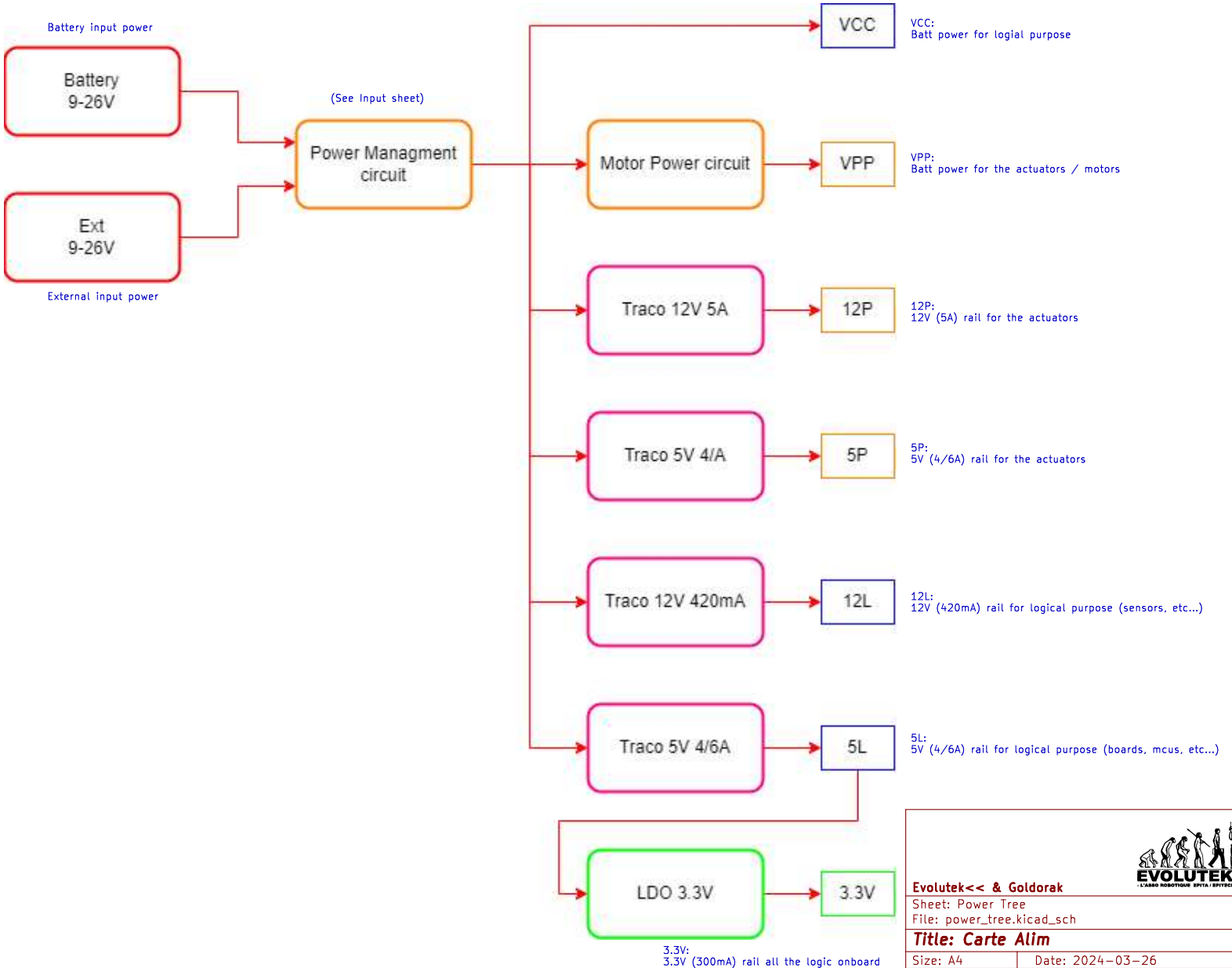
Sheet:

File: Carte Alim.kicad_sch

Title: Carte Alim

Size: A4	Date: 2024-03-26	**Rev: V5.0**
KiCad E.D.A. kicad 7.0.5		Id: 1/7



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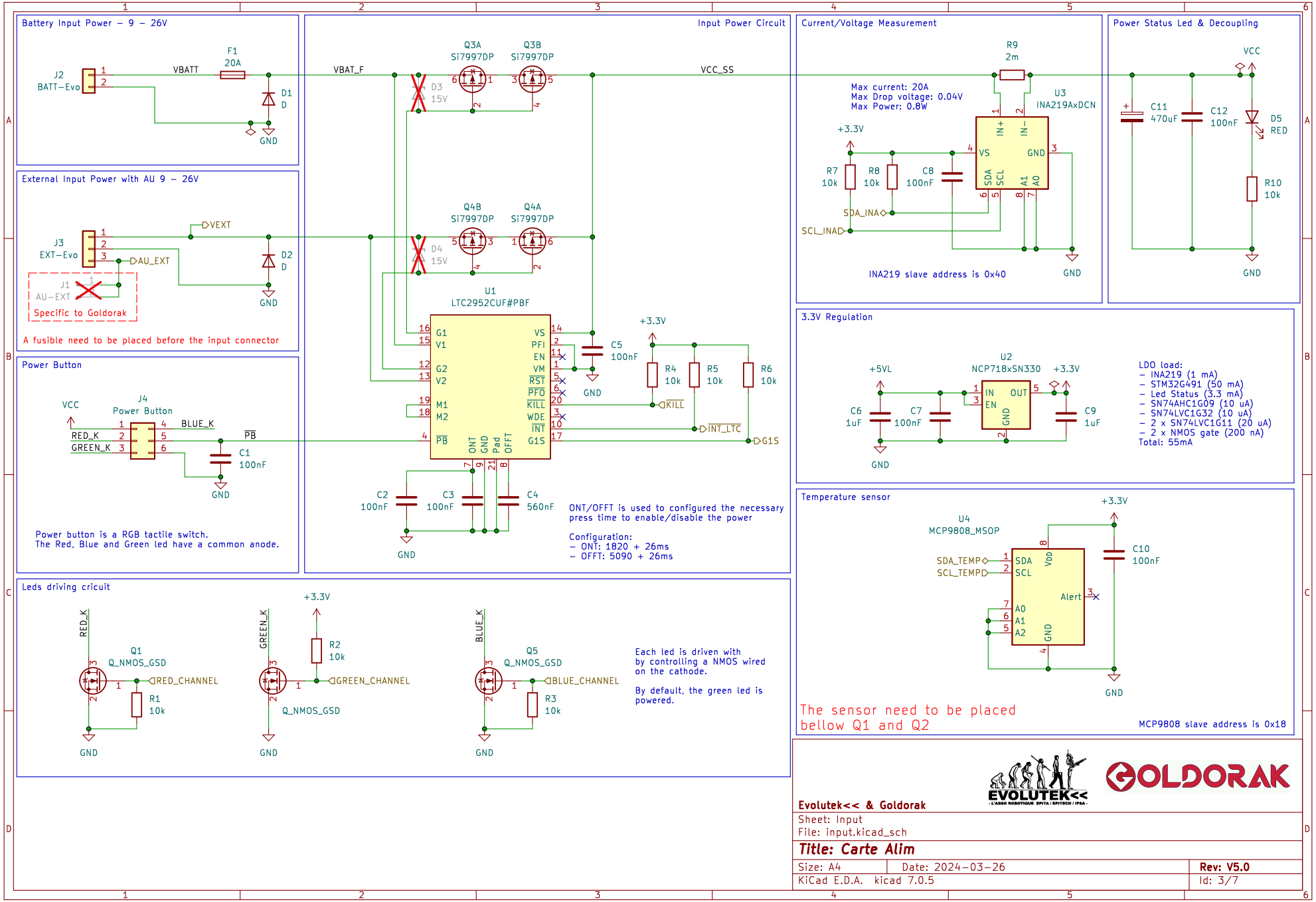
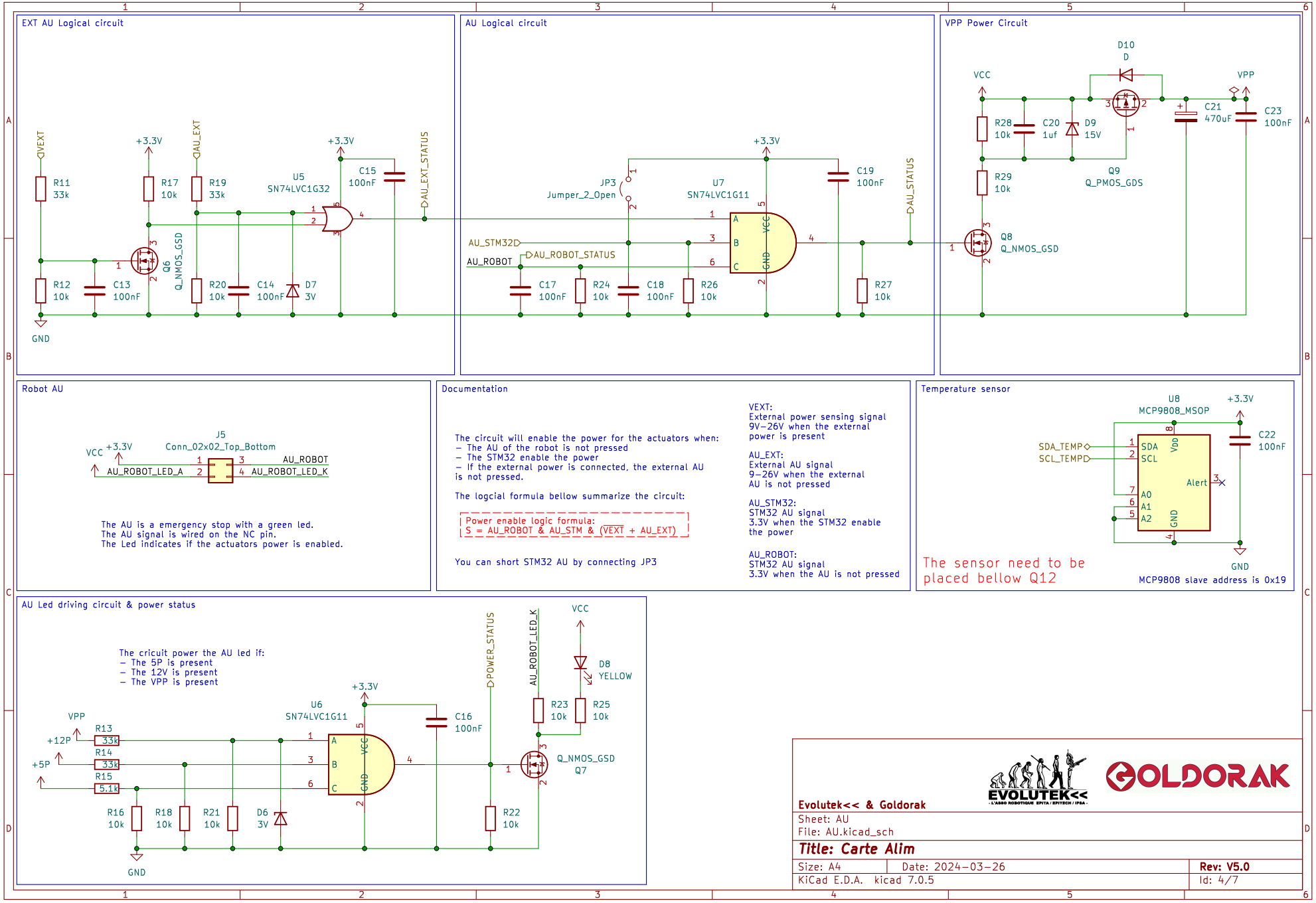
Sheet: Power Tree

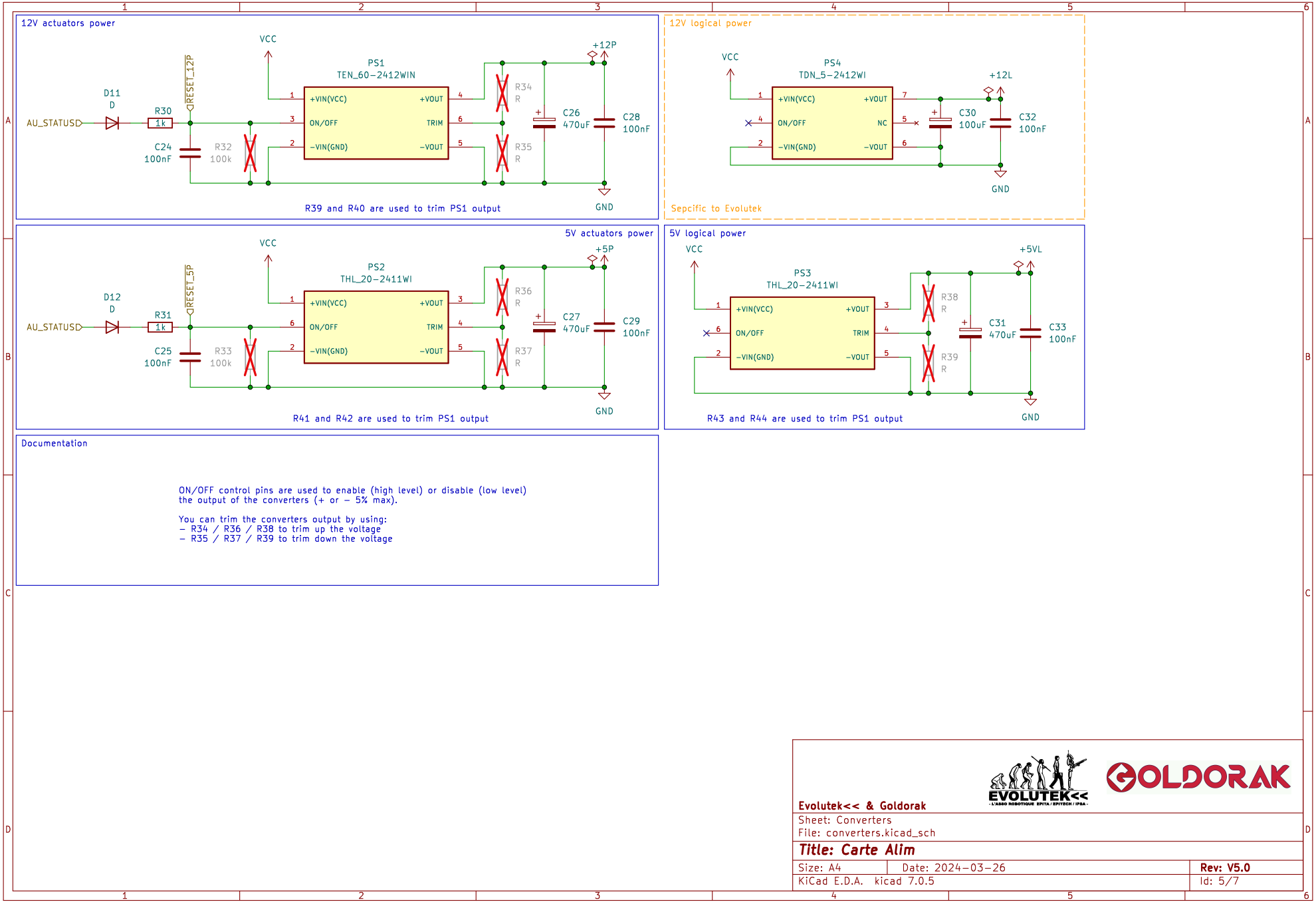
File: power_tree.kicad_sch

Title: Carte Alim

Size: A4	Date: 2024-03-26	**Rev: V5.0**
KiCad E.D.A. kicad 7.0.5		Id: 2/7


Battery Input Power – 9 – 26V
J2
BATT–Evo
VBATT
F1
20A
D1
D
GND
External Input Power with AU 9 – 26V
J3
EXT–Evo
VEXT
AU_EXT
D2
D
J1
AU–EXT
Specific to Goldorak
GND
A fusible need to be placed before the input connector
Power Button
VCC
J4
Power Button
RED_K
GREEN_K
BLUE_K
PB
C1
100nF
GND
Power button is a RGB tactile switch.
The Red, Blue and Green led have a common anode.
Input Power Circuit
VBAT_F
VCC_SS
Q3A
Si7997DP
Q3B
Si7997DP
D3
15V
Q4B
Si7997DP
Q4A
Si7997DP
D4
15V
U1
LTC2952CUF#PBF
G1
V1
G2
V2
M1
M2
PB
ONT
GND
Pad
OFFT
VS
PFI
EN
VM
RST
PFO
KILL
WDE
INT
G1S
C5
100nF
+3.3V
R4
10k
R5
10k
R6
10k
KILL
INT_LTC
G1S
C2
100nF
C3
100nF
C4
560nF
GND
ONT/OFFT is used to configured the necessary press time to enable/disable the power
Configuration:
– ONT: 1820 + 26ms
– OFFT: 5090 + 26ms
Current/Voltage Measurement
R9
2m
Max current: 20A
Max Drop voltage: 0.04V
Max Power: 0.8W
U3
INA219AxDCN
+3.3V
R7
10k
R8
10k
C8
100nF
IN+
IN–
VS
GND
SDA
SCL
A1
A0
SDA_INA
SCL_INA
INA219 slave address is 0x40
GND
Power Status Led & Decoupling
VCC
C11
470uF
C12
100nF
D5
RED
R10
10k
GND
3.3V Regulation
+5VL
U2
NCP718xSN330
+3.3V
IN
OUT
EN
GND
C6
1uF
C7
100nF
C9
1uF
GND
LDO load:
– INA219 (1 mA)
– STM32G491 (50 mA)
– Led Status (3.3 mA)
– SN74AHC1G09 (10 uA)
– SN74LVC1G32 (10 uA)
– 2 x SN74LVC1G11 (20 uA)
– 2 x NMOS gate (200 nA)
Total: 55mA
Temperature sensor
U4
MCP9808_MSOP
+3.3V
SDA_TEMP
SCL_TEMP
SDA
SCL
Vdd
Alert
A0
A1
A2
GND
C10
100nF
GND
The sensor need to be placed bellow Q1 and Q2
MCP9808 slave address is 0x18
Leds driving cricuit
RED_K
Q1
Q_NMOS_GSD
RED_CHANNEL
R1
10k
GND
GREEN_K
+3.3V
R2
10k
GREEN_CHANNEL
Q_NMOS_GSD
GND
BLUE_K
Q5
Q_NMOS_GSD
BLUE_CHANNEL
R3
10k
GND
Each led is driven with by controlling a NMOS wired on the cathode.
By default, the green led is powered.
EVOLUTEK<<
L'ASSO ROBOTIQUE EPITA / EPITECH / IPSA
GOLDORAK
Evolutek<< & Goldorak
Sheet: Input
File: input.kicad_sch
Title: Carte Alim
Size: A4
Date: 2024–03–26
Rev: V5.0
KiCad E.D.A. kicad 7.0.5
Id: 3/7


EXT AU Logical circuit
VEXT
R11
33k
+3.3V
R17
10k
AU_EXT
R19
33k
U5
SN74LVC1G32
+3.3V
C15
100nF
AU_EXT_STATUS
R12
10k
C13
100nF
Q6
Q_NMOS_GSD
R20
10k
C14
100nF
D7
3V
GND
AU Logical circuit
JP3
Jumper_2_Open
U7
SN74LVC1G11
+3.3V
C19
100nF
AU_STATUS
AU_STM32
AU_ROBOT
AU_ROBOT_STATUS
C17
100nF
R24
10k
C18
100nF
R26
10k
R27
10k
VPP Power Circuit
D10
D
VCC
VPP
R28
10k
C20
1uf
D9
15V
C21
470uF
C23
100nF
R29
10k
Q9
Q_PMOS_GDS
Q8
Q_NMOS_GSD
Robot AU
J5
Conn_02x02_Top_Bottom
VCC
+3.3V
AU_ROBOT_LED_A
AU_ROBOT
AU_ROBOT_LED_K
The AU is a emergency stop with a green led.
The AU signal is wired on the NC pin.
The Led indicates if the actuators power is enabled.
Documentation
The circuit will enable the power for the actuators when:
– The AU of the robot is not pressed
– The STM32 enable the power
– If the external power is connected, the external AU is not pressed.
The logcial formula bellow summarize the circuit:
Power enable logic formula:
S = AU_ROBOT & AU_STM & (VEXT + AU_EXT)
You can short STM32 AU by connecting JP3
VEXT:
External power sensing signal
9V–26V when the external power is present
AU_EXT:
External AU signal
9–26V when the external AU is not pressed
AU_STM32:
STM32 AU signal
3.3V when the STM32 enable the power
AU_ROBOT:
STM32 AU signal
3.3V when the AU is not pressed
Temperature sensor
U8
MCP9808_MSOP
+3.3V
C22
100nF
SDA_TEMP
SCL_TEMP
SDA
SCL
Vdd
Alert
A0
A1
A2
GND
The sensor need to be placed bellow Q12
MCP9808 slave address is 0x19
AU Led driving circuit & power status
The cricuit power the AU led if:
– The 5P is present
– The 12V is present
– The VPP is present
VPP
+12P
+5P
R13
33k
R14
33k
R15
5.1k
U6
SN74LVC1G11
+3.3V
C16
100nF
POWER_STATUS
AU_ROBOT_LED_K
VCC
D8
YELLOW
R23
10k
R25
10k
Q_NMOS_GSD
Q7
R16
10k
R18
10k
R21
10k
D6
3V
R22
10k
GND
Evolutek<< & Goldorak
Sheet: AU
File: AU.kicad_sch
Title: Carte Alim
Size: A4
Date: 2024–03–26
Rev: V5.0
KiCad E.D.A. kicad 7.0.5
Id: 4/7


12V actuators power
VCC
PS1
TEN_60-2412WIN
+12P
D11
D
R30
1k
RESET_12P
AU_STATUSD
C24
100nF
R32
100k
+VIN(VCC)
ON/OFF
-VIN(GND)
+VOUT
TRIM
-VOUT
R34
R
R35
R
C26
470uF
C28
100nF
GND
R39 and R40 are used to trim PS1 output
12V logical power
VCC
PS4
TDN_5-2412WI
+12L
+VIN(VCC)
ON/OFF
-VIN(GND)
+VOUT
NC
-VOUT
C30
100uF
C32
100nF
GND
Sepcific to Evolutek
5V actuators power
VCC
PS2
THL_20-2411WI
+5P
D12
D
R31
1k
RESET_5P
AU_STATUSD
C25
100nF
R33
100k
+VIN(VCC)
ON/OFF
-VIN(GND)
+VOUT
TRIM
-VOUT
R36
R
R37
R
C27
470uF
C29
100nF
GND
R41 and R42 are used to trim PS1 output
5V logical power
VCC
PS3
THL_20-2411WI
+5VL
+VIN(VCC)
ON/OFF
-VIN(GND)
+VOUT
TRIM
-VOUT
R38
R
R39
R
C31
470uF
C33
100nF
GND
R43 and R44 are used to trim PS1 output
Documentation
ON/OFF control pins are used to enable (high level) or disable (low level)
the output of the converters (+ or - 5% max).
You can trim the converters output by using:
- R34 / R36 / R38 to trim up the voltage
- R35 / R37 / R39 to trim down the voltage
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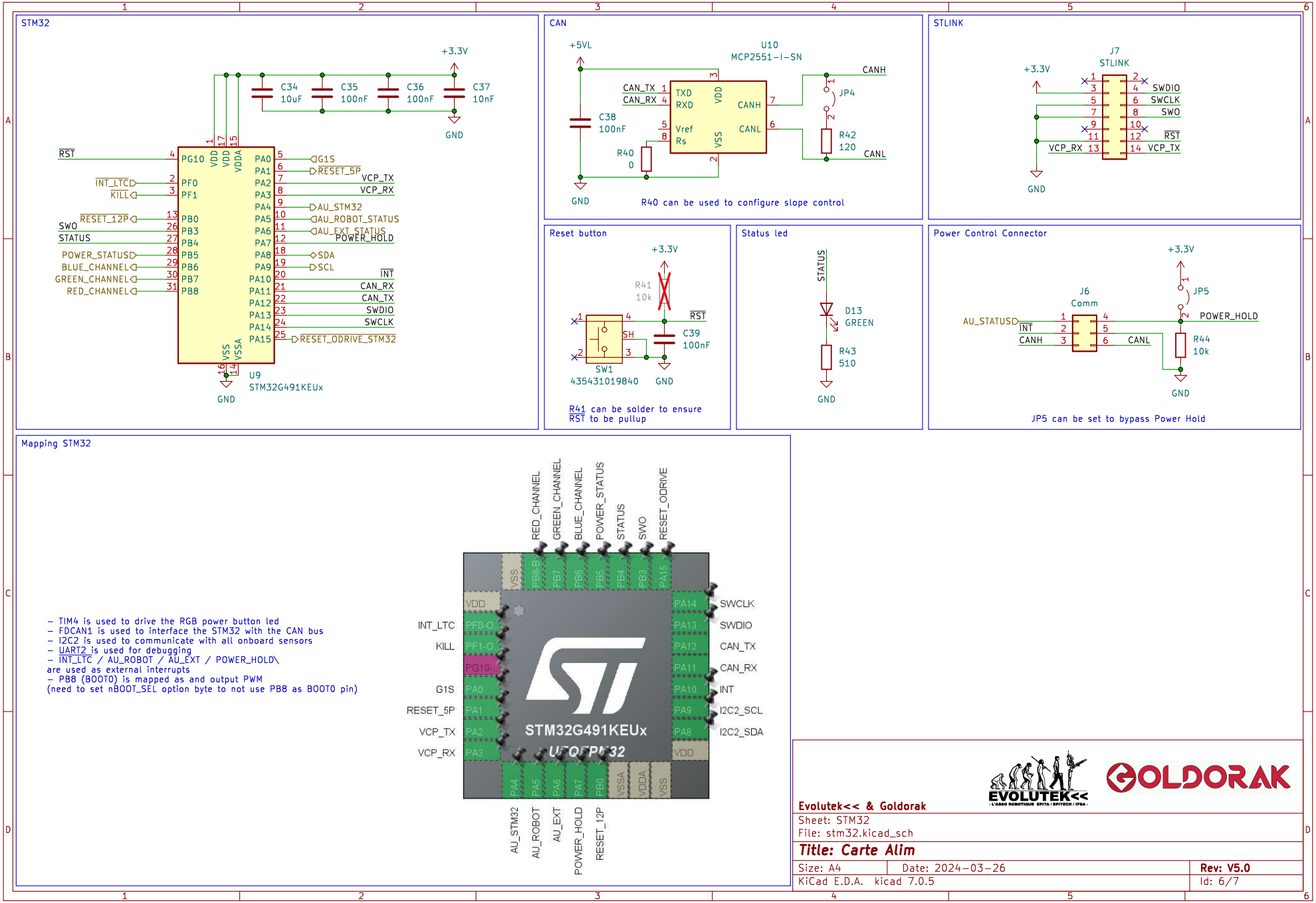
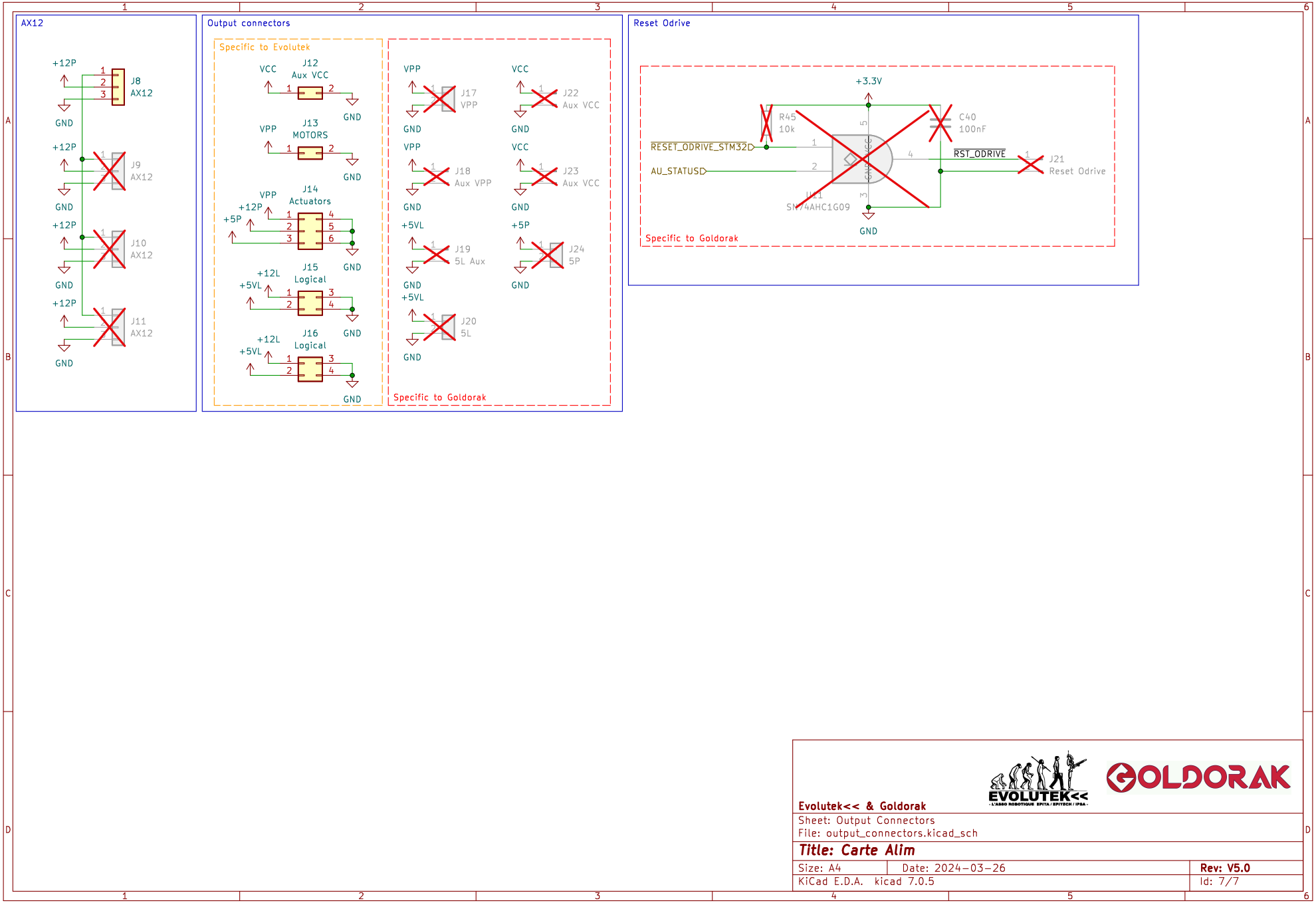
Sheet: Converters
File: converters.kicad_sch
Title: Carte Alim
Size: A4
Date: 2024-03-26
Rev: V5.0
KiCad E.D.A. kicad 7.0.5
Id: 5/7


STM32
+3.3V
C34 10uF
C35 100nF
C36 100nF
C37 10nF
GND
RST
INT_LTC
KILL
RESET_12P
SWO
STATUS
POWER_STATUS
BLUE_CHANNEL
GREEN_CHANNEL
RED_CHANNEL
PG10
PF0
PF1
PB0
PB3
PB4
PB5
PB6
PB7
PB8
VDD
VDDA
VSS
VSSA
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
G1S
RESET_5P
VCP_TX
VCP_RX
AU_STM32
AU_ROBOT_STATUS
AU_EXT_STATUS
POWER_HOLD
SDA
SCL
INT
CAN_RX
CAN_TX
SWDIO
SWCLK
RESET_ODRIVE_STM32
U9
STM32G491KEUx
CAN
+5VL
U10
MCP2551-I-SN
CAN_TX
CAN_RX
TXD
RXD
Vref
Rs
VDD
VSS
CANH
CANL
C38 100nF
R40 0
JP4
R42 120
R40 can be used to configure slope control
STLINK
J7
STLINK
+3.3V
SWDIO
SWCLK
SWO
RST
VCP_RX
VCP_TX
GND
Reset button
+3.3V
R41 10k
RST
C39 100nF
SW1
4354310198 40
GND
R41 can be solder to ensure RST to be pullup
Status led
STATUS
D13 GREEN
R43 510
GND
Power Control Connector
+3.3V
JP5
J6
Comm
AU_STATUSD
INT
CANH
CANL
POWER_HOLD
R44 10k
GND
JP5 can be set to bypass Power Hold
Mapping STM32
- TIM4 is used to drive the RGB power button led
- FDCAN1 is used to interface the STM32 with the CAN bus
- I2C2 is used to communicate with all onboard sensors
- UART2 is used for debugging
- INT_LTC / AU_ROBOT / AU_EXT / POWER_HOLD\ are used as external interrupts
- PB8 (BOOT0) is mapped as and output PWM (need to set nBOOT_SEL option byte to not use PB8 as BOOT0 pin)
RED_CHANNEL
GREEN_CHANNEL
BLUE_CHANNEL
POWER_STATUS
STATUS
SWO
RESET_ODRIVE
INT_LTC
KILL
G1S
RESET_5P
VCP_TX
VCP_RX
SWCLK
SWDIO
CAN_TX
CAN_RX
INT
I2C2_SCL
I2C2_SDA
AU_STM32
AU_ROBOT
AU_EXT
POWER_HOLD
RESET_12P
STM32G491KEUx
UFQFPN32
EVOLUTEK<<
GOLDORAK
Evolutek<< & Goldorak
Sheet: STM32
File: stm32.kicad_sch
Title: Carte Alim
Size: A4
Date: 2024-03-26
Rev: V5.0
KiCad E.D.A. kicad 7.0.5
Id: 6/7



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Sheet: Output Connectors

File: output_connectors.kicad_sch

Title: Carte Alim

Size: A4	Date: 2024-03-26	**Rev: V5.0**
KiCad E.D.A. kicad 7.0.5		Id: 7/7