Power Input

XT60 2+4 Power IN + CAN + KEY

J5 Conn_01x06 — CANH, CANL

F1 40A Fuse — The Fuse are wired externally from the PCB

J6 Conn_01x02 — Solar Pannel MPPT

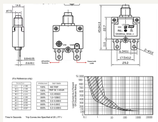
VBUS_CAN_FUSED — F4 10A Fuse — Protect all CAN Bus

R2 R

U3 Generic DC Buck converter: VIN, GND, 5VOUT, GND — 8-80V in, 5V, max 2.1 A Out

+5V, GND

U2 INA228: Vbus, Vin+, Vin−, SDA, SCL, Alert, VS, GND, A1, A0 — C2 100nF — POWERINPUT_ALERT



40A-> 1000 W
-> Heater 600W (max 5 min)
-> Sono (max 300 W peak, 75 W continuous)
-> Phare (max 50W peak, 30 W continuous)
-> Seat + Hand heater (max 200 W, 75 W continous)

Battery continuous 50 A, peak min 150 A -> 1250W, 3750W
so even with motor full (1000 W -> 40A) battery OK
full should not blow even with everything running (time delayer, 150% = 1h)
If fault resulting in a short-circuit,
the fuse should blow in less than 15 seconds (OK for battery)

AUX Power distribution

VBUS — F2 10A Fuse — AUX audio J7 Conn_01x02 — D1 US1M

AUXAUDIO_MOSFET_GATE — Q1 NMOS — 1-2 CHF N-channel 100V 0.012 Ohm 80A — GND

VBUS — AUX USB-C J8 Conn_01x02 — D2 US1M

AUXUSB_MOSFET_GATE — Q2 NMOS — 0.3 CHF N-Channel Power MOSFET, Logic Level, QFET®, 100 V, 10 A, 180 mΩ — GND

Defroster Driver

+3.3V — C1 100nF — U1 INA228: Vbus, Vin+, Vin−, SDA, SCL, Alert, VS, GND, A1, A0 — R1 R

VBUS — F3 40A Fuse — Defroster J9 Conn_01x02 — D3 US1M

DEFROSTER_MOSFET_GATE — Q3 NMOS — 1-2 CHF N-channel 100V 0.012 Ohm 80A — GND

Defroster_ALERT

CAN BUS Power Rail

Conn_01x04 CAN Handle J1 — VBUS_CAN_FUSED, CANH, CANL — Never powered Down so that emergency signal keep blinking — GND

Conn_01x04 CAN Front J2 — VBUS_CAN_FUSED, CANH, CANL — Never powered Down so that emergency signal keep blinking — GND

Conn_01x04 CAN REAR J3 — VBUS_CAN_FUSED, CANH, CANL — Never powered Down so that emergency signal keep blinking — GND

Conn_01x04 CAN Display J4 — VBUS_CAN_FUSED, CANH, CANL — Never powered Down so that soft power button keep working — GND

+3.3V — U6 ESP32-DEVKITC-32D — GND, GND

J2-1 3V3 — J2-2 EN — J2-3 SENSOR_VP — J2-4 SENSOR_VN — J2-5 IO34 — J2-6 IO35 — J2-7 IO32 — J2-8 IO33 — J2-9 IO25 — J2-10 IO26 — J2-11 IO27 — J2-12 IO14 — J2-13 IO12 — J2-14 GND1 — J2-15 IO13 — J2-16 SD2 — J2-17 SD3 — J2-18 CMD — J2-19 EXT_5V

J3-1 GND3 — J3-2 IO23 — J3-3 IO22 — J3-4 TXD0 — J3-5 RXD0 — J3-6 IO21 — J3-7 GND2 — J3-8 IO19 — J3-9 IO18 — J3-10 IO5 — J3-11 IO17 — J3-12 IO16 — J3-13 IO4 — J3-14 IO0 — J3-15 IO2 — J3-16 IO15 — J3-17 SD1 — J3-18 SD0 — J3-19 CLK

-47 IO, need to shrink

R8 R — CAN_TX, CAN_RX, SDA, SCL, RGBLED_DIN

POT_HANDHEATER_B, POT_HANDHEATER_A, POT_SEATHEATER_B, POT_SEATHEATER_A, POT_SPEED_B, POT_SPEED_A, PAS_B, PAS_A, THROTTLE_INPUT

1 mosfet 40 A
1 mosfet 10 A
9 mosfet 5 A

1 current sensing 40 A
1 current sensing 10 A
4 current sensing 5 A

9 IO for 3 rotatary encoder (A/B + button)

2 IO for PAS
1 IO for Speed Input
2 IO brake sensor switch
1 IO seat sensor switch
1 IO trunk latch switch
5 IO LED
2 IO reverse selector
1 IO defrost button
1 IO cabin light button
1 IO warning button
1 IO brouillard button
1 IO WS2812

AUXAUDIO_MOSFET_GATE, AUXUSB_MOSFET_GATE, DEFROSTER_MOSFET_GATE, HANDHEATER_MOSFET_GATE, SEATHEATER_MOSFET_GATE

LATCH_TRUNK_MOSFET_GATE, INTERRIOR_LIGHT_MOSFET_GATE, BLINKER_LEFT_MOSFET_GATE, BLINKER_RIGHT_MOSFET_GATE, DRL_LEFT_MOSFET_GATE, DRL_RIGHT_MOSFET_GATE

+3.3V — U4 MCP23017_SO — SCL, SDA

SDA, SCK, VDD, INTB, INTA, RESET, A2, A1, A0, VSS

GPB0 Defroster_ALERT — GPB1 HANDHEATER_ALERT — GPB2 SEATHEATER_ALERT — GPB3 POWERINPUT_ALERT — GPB4 POT_HANDHEATER_X — GPB5 POT_SEATDHEATER_X — GPB6 POT_SPEED_X — GPB7 SEAT_INPUT

GPA0 BRAKE_RIGHT_INPUT — GPA1 BRAKE_LEFT_INPUT — GPA2 REVERSE_INPUT — GPA3 FORWARD_INPUT — GPA4 BROUILLARD_INPUT — GPA5 BROUILLARD_LED — GPA6 MAP_LED — GPA7 MAP_INPUT

GND

+3.3V — U5 MCP23017_SO — SCL, SDA

GPB0 WARNING_LED — GPB1 WARNING_INPUT — GPB2 CABLIGHT_LED — GPB3 CABLIGHT_INPUT — GPB4 DEFROST_LED — GPB5 DEFROST_INPUT — GPB6 TRUNK_LED — GPB7 TRUNK_INPUT

GPA0 — GPA1 — GPA2 — GPA3 — GPA4 — GPA5 — GPA6 — GPA7

GND

CAN Transceiver

+3.3V — U7 TJA1051T: TXD, RXD, S, GND, VCC, CANH, CANL — C3 100nF — GND

CAN_TX, CAN_RX, CAN_S — CANH, CANL

Rotary Encoder Dashboard

+3.3V — EncoderSeatHeater — POT_SEATHEATER_A, POT_SEATHEATER_B, POT_SEATDHEATER_X — J15 Conn_01x05 — GND

+3.3V — EncoderHandHeater — POT_HANDHEATER_A, POT_HANDHEATER_B, POT_HANDHEATER_X — J19 Conn_01x05 — GND

+3.3V — EncoderSpeedLimit — POT_SPEED_A, POT_SPEED_B, POT_SPEED_X — J20 Conn_01x05 — GND

to make assembly easier, we use encoder with PCB that aldready have the pullup and everything

Buttons Dashboard

+3.3V — Brouillard button + led — BROUILLARD_LED, BROUILLARD_INPUT — 330 R R5 — 10 K R6 — J17 Conn_01x03 — GND

Reverse button — FORWARD_INPUT, REVERSE_INPUT — J18 Conn_01x03 — GND

either one or none can be pulled LOW, but not both -> Fault condition

Mapping button + led — Use MCP internal pullups — MAP_INPUT — (5V−2V)/10 mA=330 R — MAP_LED — 330 R R9 — J21 Conn_01x04 — GND

Latch Trunk button + led — Use MCP internal pullups — TRUNK_INPUT — (5V−2V)/10 mA=330 R — TRUNK_LED — 330 R R10 — J22 Conn_01x04 — GND

Defrost button + led — Use MCP internal pullups — DEFROST_INPUT — (5V−2V)/10 mA=330 R — DEFROST_LED — 330 R R11 — J23 Conn_01x04 — GND

CabinLighting button + led — Use MCP internal pullups — CABLIGHT_INPUT — (5V−2V)/10 mA=330 R — CABLIGHT_LED — 330 R R12 — J24 Conn_01x04 — GND

Warning button + led — Use MCP internal pullups — WARNING_INPUT — (5V−2V)/10 mA=330 R — WARNING_LED — 330 R R13 — J25 Conn_01x04 — GND

PAS + Throttle INPUT

+5V — THROTTLE_INPUT — Speed Input 5 V J11 Conn_01x03 — GND

+5V — PAS_A, PAS_B — PAS 5-12 V J16 Conn_01x04 — GND

Blinker + Seat & Hand Warmer Brake + seat sensor

VBUS — Latch Trunk Interrior Lightnint — 5A MAX — J12 Conn_01x04

LATCH_TRUNK_MOSFET_GATE — Q7 NMOS — INTERRIOR_LIGHT_MOSFET_GATE — Q4 NMOS — 0.3 CHF N-Channel Power MOSFET, Logic Level, QFET®, 100 V, 10 A, 180 mΩ — GND

VBUS — 5A MAX (more likely 1A max) — Rear-view left (LED + blinker) — J13 Conn_01x03

DRL_LEFT_MOSFET_GATE — Q8 NMOS — BLINKER_LEFT_MOSFET_GATE — Q5 NMOS — 0.3 CHF N-Channel Power MOSFET, Logic Level, QFET®, 100 V, 10 A, 180 mΩ — GND

VBUS — 5A MAX (more likely 1A max) — Rear-view right (LED + blinker) — J14 Conn_01x03

DRL_RIGHT_MOSFET_GATE — Q9 NMOS — BLINKER_RIGHT_MOSFET_GATE — Q6 NMOS — 0.3 CHF N-Channel Power MOSFET, Logic Level, QFET®, 100 V, 10 A, 180 mΩ — GND

+3.3V — U8 INA228: Vbus, Vin+, Vin−, SDA, SCL, Alert, GND, VS, A1, A0 — C4 100nF — R7 R — D11 US1M — SEATHEATER_ALERT

Seat Heater + Seat Sensor — J26 — use pullup — SEAT_INPUT — SEATHEATER_MOSFET_GATE — Q10 NMOS — 0.3 CHF N-Channel Power MOSFET, Logic Level, QFET®, 100 V, 10 A, 180 mΩ — GND

+3.3V — U9 INA228: Vbus, Vin+, Vin−, SDA, SCL, Alert, GND, VS, A1, A0 — C5 100nF — R8 R — D12 US1M — HANDHEATER_ALERT

Handle Heater + Brake Sensor J27 — BRAKE_LEFT_INPUT — use pullup — BRAKE_RIGHT_INPUT — HANDHEATER_MOSFET_GATE — Q11 NMOS — 0.3 CHF N-Channel Power MOSFET, Logic Level, QFET®, 100 V, 10 A, 180 mΩ — GND

+5V — RGBLED_DIN — D4 WS2812B — D5 WS2812B — D6 WS2812B — D7 WS2812B — D8 WS2812B — D9 WS2812B — D10 WS2812B — D13 WS2812B — D14 WS2812B — DIN, DOUT, VDD, VSS — GND

RGB backlight

IMU 10 DOF

https://de.aliexpress.com/item/1005008076581555.html
GY-91 MPU-9250 and BMP280 10 DOF

+5V — J10 Conn_01x08

VIN — should in theory also work with 3V3 but if LDO is cheap, we have issue...
3V3 — untouched, internal LDO
GND
SCL
SDA
SDO/SA0 — untouched, to change MPU9250 I2C address
NCS — untouched, for MPU9250 SPI mode
CSB — untouched, used to set BMP to SPI mode

GND

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