Measurement Chain

Sensor Interface — J4 — M12 5-pin
Low Pass Filter
Instrumentation Amplifier — AD8421 (U6)
Variable Gain Amplifier — MCP41U83 (U7)
Delta-Sigma ADC — ADS127L02 (U9)

IC1 MAX6126 — NR, IN, GND, GNDS, OUTF, OUTS, I.C._1, I.C._2
OPA188 (U8)

Q3 AO3401A, Q5 AO3401A, Q2 AO3400A, Q4 AO3400A
Excitation(10v), Excitation(5v)

+5V, +10V, +5.5V, +3.3V
R37 10kΩ, R38 10kΩ
C34 0.1uF, C13 0.1uF, C14 0.1uF
R16 10kΩ, R17 10kΩ, R18 100 Ω
C12 3.3uF, C15 0.1uF
C19 0.1uF, C22 0.1uF
Rg, Vs, Ref, VREF
R19 4.7kΩ, R21 10kΩ, R20 4.99kΩ
C16 4.7uF, C17 0.33uF, C18 0.47uF, C20 0.1uF
C18 10pF
Vss, P0A, P0W, P0B, Vdd, SDA, SCK, A0

ADC: REFP, REFN, AVDD1, AVDD2, VCM, AINP, AINN, ΔΣ ADC, Wideband Filters, Low Latency Filters, SPI, DRDY, START, RESET, CS, SCLK, SDI, SDO, Control Logic, IOVDD, GND, AVSS, CAPA, CAPD, DGND, Osc, Mux, CLK
C21 0.1uF, C12 10uF, C21 0.1uF, C20 10uF
C19 10nF
VCC 3V3

SPI FLASH MEMORY

W25Q128JVS (U3)
R9 10kΩ, R8 10kΩ
C9 100 nF
VCC — CS, CLK, DI/IO0, DO/IO1, WP/IO2, HOLD_RESET/IO3, GND

Battery Management System

USB_C Charging port — J1
Complete Linear Charge Management Controller — MCP73223
VBUS, CC1, CC2, SHIELD, GND
SMF5V0A — unidirectional tvs diode — D1
C1 10 uF, C2 1uF
R1 5.1kΩ, R2 5.1kΩ, R3 500kΩ
VIN, VSS, PROG, VOUT, STATS1, STATS2
Connector BT1 — V_Bat, GND
V_BAT Li-Po Battery
R15 100kΩ, R14 200kΩ — Battery Monitor
D2 Bi-color LED
VCC 3V3

Switch ON/OFF

MOC 8102 Optocoupler — U1
R24 1.2kΩ, R25 10kΩ, R22 100kΩ
SW2 SW_Push

Power Regulation

10V Excitation — +10V
5V Excitation — +5V
Li-Po Battery — BT1 — V_Bat, GND
R23 1kΩ, Q6 AO3401A, R11 100kΩ
D3 D_Schottky, L1 4.7 uH
C3 10uF, R4 71.4 kΩ, R5 10 kΩ
U2 TPS61170 — SW, FB, GND, VIN, CTRL, COMP
U11 TPS61099 — VOUT, FB, GND, SW, VIN, EN
C4 10uF, R6 40 kΩ, R7 10 kΩ, L2 4.7uH, C5 10uF

Buck_Convertor2 — TPS62130
C7 10uF, C29 0.1uF, C52 3.3nF
L6 2.2uH
EN, SS/TR, DEF, FSW, VIN, SW, VOS, PG, FB, GND
R49 100 kΩ, R28 31.25 kΩ, R29 10 kΩ
VCC +3V3
C31 10uF

L2 4.7 uH
U12 TPS61089 — SW, BOOT, FSW, VIN, EN, VCC, VOUT, GND, FB, COMP, ILIM
D6 D_Schottky
+5V5
R50 301kΩ, C53 0.1uF
C30 22uF, C55 22uF, C56 22uF
R26 4.87 kΩ, R27 10 kΩ, R52 17.4kΩ, R51 127kΩ
C28 10uF, C54 2.2uF, C57 22uF, C58 22uF

VCC +3V3
Analog Supply

Processing Unit + LCD Connection

ESP32-P4 (U4)
GPIO1/ADC ... GPIO23/ADC, VDD_LP, VDD_HP_0, VDD_IO_0
GPIO0/ADC, CHIP_PU, VDD_BAT, VDD_ANA, XTAL_P, XTAL_N, GPIO54/ADC, GPIO53/ADC, GPIO52/ADC, GPIO51/ADC, GPIO50/ADC, GPIO49/ADC, VDD_HP_3, GPIO48, GPIO47, GPIO46, GPIO45, GPIO44, VDD_IO_5, GPIO43, GPIO42, GPIO41, GPIO40, GPIO39, EN_DCDC
FB_DCDC, VDD_DCDC, VDD_HP_2, VDD_LDO, VDDO_4, VDDO_3, VDDO_PSRAM, VDDO_FLASH, GPIO38, GPIO37, GPIO36, VDD_PSRAM_1, GPIO35, GPIO34, GPIO33, GPIO32, VDD_IO_4, GPIO31, GPIO30, VDD_PSRAM_0, GPIO29, GPIO28, GPIO27/ADC/USB, GPIO26/ADC/USB, NC, GPIO25/ADC/USB
FLASH_CS, FLASH_Q, FLASH_WP, VDD_FLASH_IO, FLASH_HOLD, FLASH_CK, FLASH_D, DSL_REXT, DSL_DATAN1, DSL_DATAP1, DSL_CLKN, DSL_CLKP, DSL_DATAN0, VDD_MIPLDPHY, DSL_DATAP0, CSL_DATAN0, CSL_DATAP0, CSL_CLKN, CSL_CLKP, CSL_DATAN1, CSL_DATAP1, CSL_REXT, USB_DM, USB_DP, VDD_USBPHY, GPIO24/ADC/USB
MIPI DSI/CSI
USB_DM, USB_DP
R13 100kΩ, R12 100kΩ — Excitation(5v), Excitation(10v)
R35 10kΩ, R36 10kΩ — Interrupt
R10 20kΩ, C8 10uF
VCC 3V3

U5 TouchScreen/SPI Touch Controller
RESET, CS, RD, WR, RS(D/C), DB7, DB6, DB5, DB4, DB3, DB2, DB1, DB0, VCC, LED_K, LED_A, T_IRQ, T_CS, T_DIN, T_DO, T_CLK, GND
Display BACK LIGHT CONTROL — AO3400A Q1
+5V5

J2 USB_A — VBUS, D+, D-, GND, Shield
USB-A MODULE
VCC 3V3

Group 02
Innovatest
Sheet: /
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Title: Mobile Force Verification Unit
Size: A3
Date: 2025-11-29
KiCad E.D.A. 9.0.3
Rev: 0.6
Id: 1/5

Sheet: /Measurement Chain/
File: measurement-chain.kicad_sch

Title:

Size: A4 | Date: | Rev:
KiCad E.D.A. 9.0.3 | Id: 4/5

Sheet: /Processing + Display/
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Size: A4   Date:

KiCad E.D.A. 9.0.3

Rev:

Id: 5/5