WALKIEONE 05E — cellular walkie-talkie (engineering prototype)

05E PROTOTYPE — supplier process approval and physical first-article validation required.

Power

USB-C input, charger and power path, battery, gauge, 3.3 V LDO

File: Power.kicad_sch

Controller

ESP32-S3 controller, buttons, status LED, microphone, debug pads

File: Controller.kicad_sch

Audio

I2S class-D amplifier and speaker

File: Audio.kicad_sch

Modem

SIM7672G-MNGV cellular/GNSS module and its VBAT network

File: Modem.kicad_sch

ModemSupport

modem power switch, PWRKEY/RESET/USB_BOOT drivers, UART translator, USB service mux

File: ModemSupport.kicad_sch

SIM_RF

nano-SIM socket, SIM ESD, LTE and GNSS antenna ports

File: SIM_RF.kicad_sch

Side controls; external NTC removed. See 05E build notes and verification report.

WalkieOne

Sheet: /
File: WalkieOne.kicad_sch

Title: WalkieOne 05E

Size: A4	Date: 2026-10-20	**Rev: 05E prototype**
KiCad E.D.A. 10.0.7		Id: 1/7

WalkieOne 05E — Power: USB-C input, charger and power path, battery, gauge, 3.3 V LDO

05C: U12 DNP: R54 10k to GND holds SUSP low. LTC input enabled without CC/BC/host permission: nominal402mA limit.

Retained U9 provides fast input fault/surge protection; U15 raw-VBUS guard rejects approximately5.27..5.45V rising corners.

After 0V.5.25V can remain rejected until replug:5.0V recovers. USB_PRESENT_N reportsAUX presence, not protected-input validity.

05E: battery-temperature sensing removed by user choice. NTC=GND; VNTC unused. No automatic hot/cold battery charge cutoff.

Prototype exception: ordinary USB pre-enumeration/suspend current rules not met. Suitable live5V source required; no every-port guarantee.

Input-powered VSYS feeds AP2112: cellular-only150mA continuous3V3 budget. No sustainedWiFi. Battery-only thermal/dropout checks required.

GPIO3 staysLOW but has no charging-control effect with U12 DNP. DisconnectUSB before battery service; modemOFF without qualified battery.

J1
USB-C / USB4105-GF-A

D2
ESD122 low-capacitance dual USB ESD

U2
LTC4085-1 4.1V USB power manager

U8
MAX17048 fuel gauge

J3
BATTERY / S2B-PH-SM4-TB(LF)(SN)

U3
3.3V 600mA LDO

U9
TPD1S514-1 USB input protection

U10
FUSB303B Type-C current detection

U11
BQ24392 BC1.2 charger detection

Q4
MMBT3904 isolated host permission

U12
USB charging enable: CC / BC / host

U15
TLV6700 USB voltage guard + presence

Side controls: external NTC removed. See 05E build notes and verification report.

WalkieOne	
Sheet: /Power/	
File: Power.kicad_sch	
Title: WalkieOne 05E / Power	
Size: A1	Date: 2026-10-20
KiCad E.D.A. 10.0.7	**Rev: 05E prototype**
	Id: 2/7

WalkieOne 05E — Controller: ESP32-S3 controller, buttons, status LED, microphone, debug pads

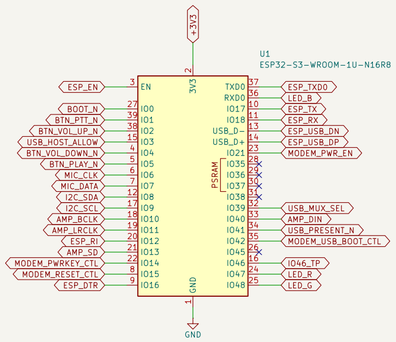
Native USB (IO19/IO20) through the USB mux for flashing/debug; BOOT (IO0) + RESET (EN) buttons retained.

05C: IO3 HOST_ALLOW staysLOW; retained Q4/R52/R53 no longer control charging. IO46 service; IO43 UART0 TX/charger status viaR8.

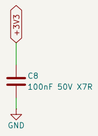
Four user buttons active low with 10k pull-up + 100 nF. RGB LED common anode on 3V3, cathodes via R17–R19 to IO47/IO48/IO44.

PDM mic on IO6 (CLK) / IO7 (DATA). I2S amp on IO10/IO11/IO40, SD_MODE on IO13 with 100k pull-down.

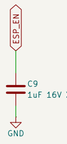
IO38/IO45 unused; no AUX-level signal reaches ESP. IO41 USB_PRESENT_N. Native BOOT+RESET USB service retained.



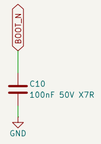
















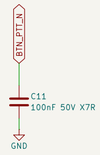




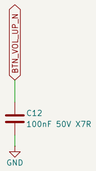




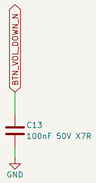






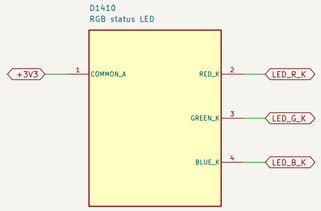






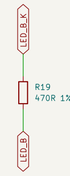


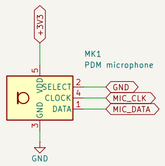


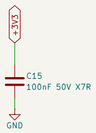




















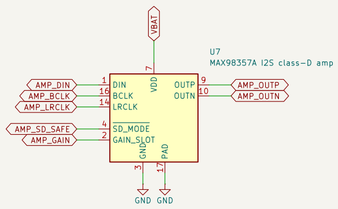


Side controls; external NTC removed. See 05E build notes and verification report.

WalkieOne		
Sheet: /Controller/		
File: Controller.kicad_sch		
Title: WalkieOne 05E / Controller		
Size: A2	Date: 2026-10-20	**Rev: 05E prototype**
KiCad E.D.A. 10.0.7		Id: 3/7

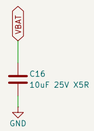
WalkieOne 05E — Audio: I2S class-D amplifier and speaker

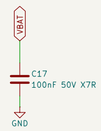
MAX98357A from VBAT with SD_MODE series protection. Gain 9 dB (pin floating); fit R21 for 12 dB. Ferrite + 1 nF on speaker lines.

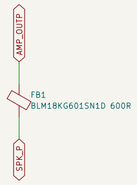




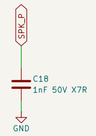














Side controls: external NTC removed. See 05E build notes and verification report.

WalkieOne

Sheet: /Audio/
File: Audio.kicad_sch

Title: WalkieOne 05E / Audio

Size: A2	Date: 2026-10-20	**Rev: 05E prototype**
KiCad E.D.A. 10.0.7		Id: 4/7

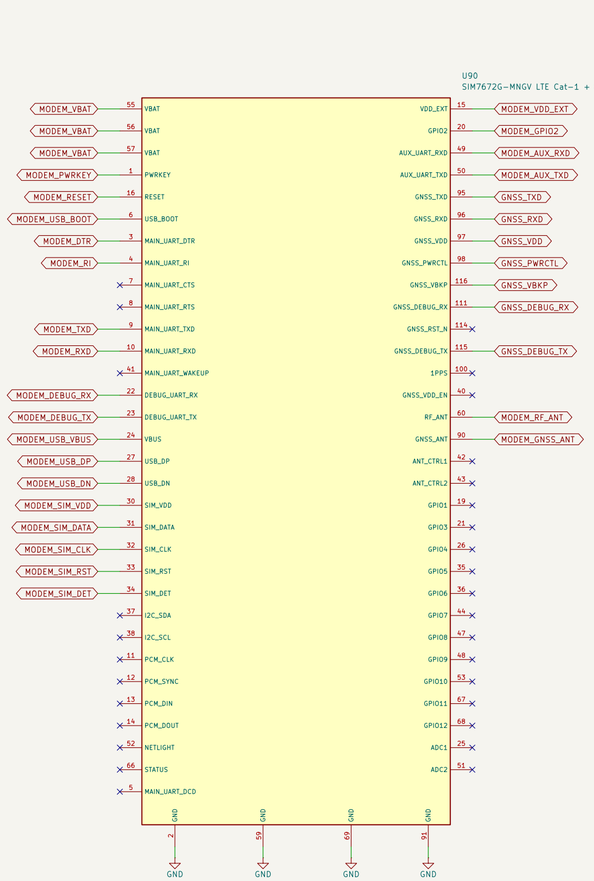
WalkieOne 05E — Modem: SIM7672G-MNGV cellular/GNSS module and its VBAT network

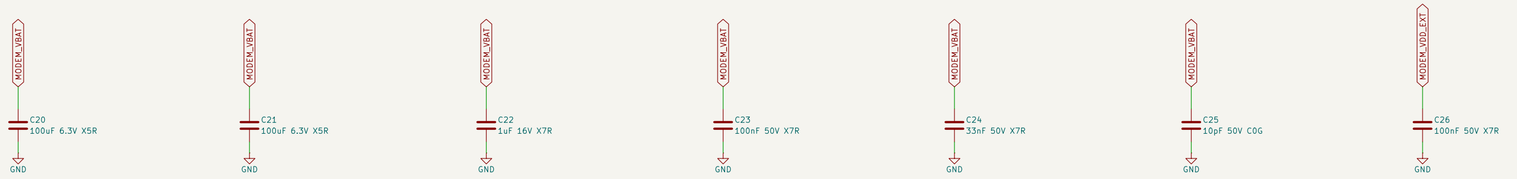
VBAT 3.4–4.2 V from the battery through U4. >=200 uF bulk + 10p/33n/0.1u/1u at the pins; VBAT trace >= 2 mm.

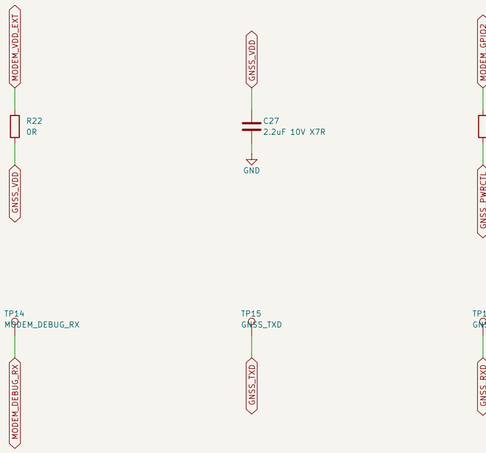
VDD_EXT (1.8 V, 50 mA) powers the translator B side and GNSS_VDD; it is disabled in PSM; do not assume every LTE sleep turns it off.

GNSS: GNSS_VDD <- VDD_EXT (R22), PWRCTL <- GPIO2 via 10k (R23), VBKP <- 3V3 (R24), AUX UART looped to GNSS UART via 1k (R25/R26).

Test pads per SIMCom: USB_BOOT, DEBUG_UART, GNSS UART/DEBUG, GND. STATUS/NETLIGHT/PCM/I2C/GPIO/ADC open.







Side controls; external NTC removed. See 05E build notes and verification report.

WalkieOne

Sheet: /Modem/
File: Modem.kicad_sch

Title: WalkieOne 05E / Modem

Size: A2	Date: 2026-10-20	**Rev: 05E prototype**
KiCad E.D.A. 10.0.7		Id: 5/7

WalkieOne 05E — ModemSupport: modem power switch, PWRKEY/RESET/USB_BOOT drivers, UART translator, USB service mux

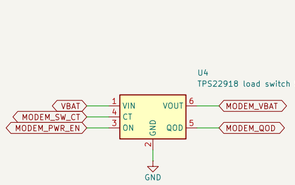
U4 TPS22918: CT capacitor to GND; ON from IO21 (100k pull-down); 4.7R pulse-rated resistor from QOD to VOUT. Deselect modem USB, then wait at least 3 s off before re-power; CT 1 nF limits inrush.

Q1-Q3 open-collector drivers per SIMCom reference (4.7k/47k). Recovery: USB_BOOT low -> apply VBAT -> PWRKEY -> select mux to modem.

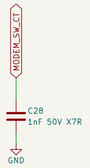
U5 TXU0204: ESP TX/DTR -> modem RXD/DTR; modem TXD/RI -> ESP RX/RI. No RTS/CTS (max 460800 baud).

U6 TS3USB221E: after BQ24392 data isolation, ESP is default, modem is S=1. Modem VBUS sense uses protected input through 1k + 4.7 V zener.

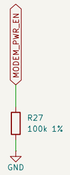
05C: charge input remains enabled during modem USB service. Keep modemOFF without a qualified battery; verify service current and VBUS sequence.

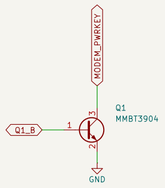


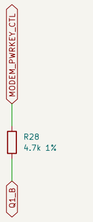


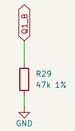


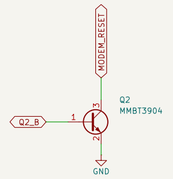




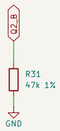


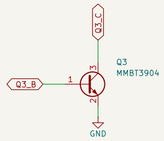




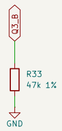


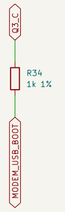


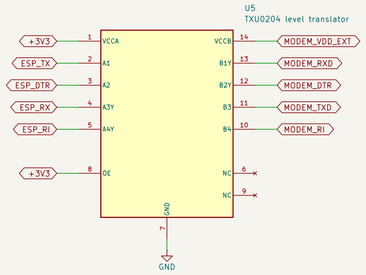




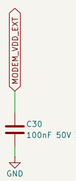


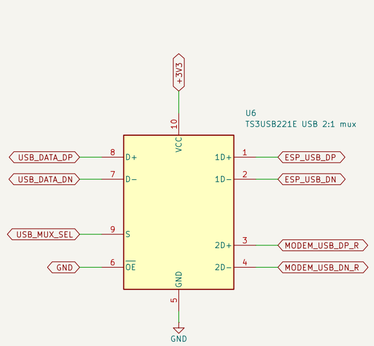




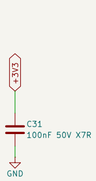






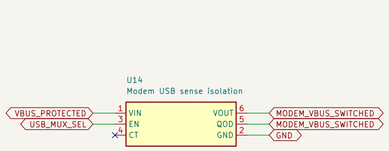


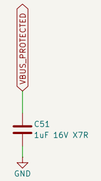


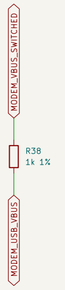














Side controls: external NTC removed. See 05E build notes and verification report.

WalkieOne

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File: ModemSupport.kicad_sch

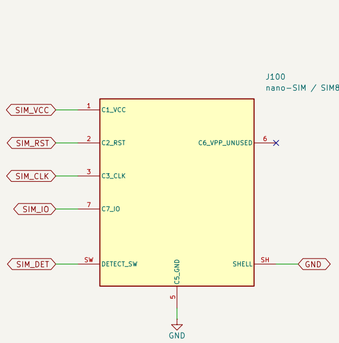
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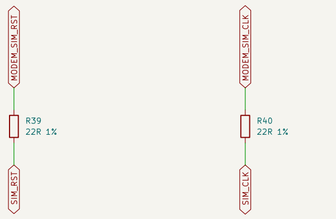
Size: A2	Date: 2026-10-20	**Rev: 05E prototype**
KiCad E.D.A. 10.0.7		Id: 6/7

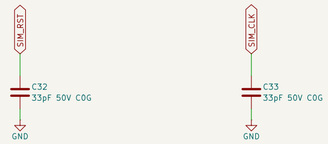
WalkieOne 05E — SIM_RF: nano-SIM socket, SIM ESD, LTE and GNSS antenna ports

SIM per SIMCom Fig. 20/21: 22 ohm series, 33 pF, ESDA6V1-5SC6 at the socket, 1 uF + 100 nF on SIM_VDD.

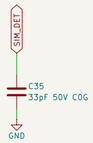
LTE and GNSS: 0 ohm series + DNP shunts (pi). GNSS DC-block C40 fitted; bias-T L1/R46/C43 DNP for an active antenna.

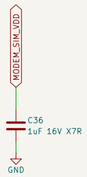


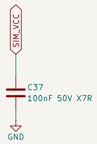


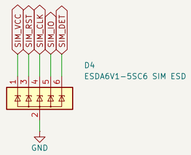


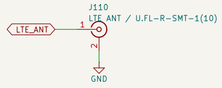


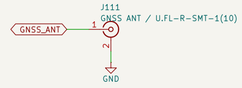










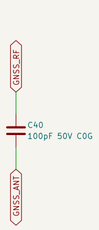


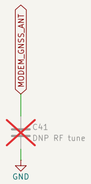




















Side controls: external NTC removed. See 05E build notes and verification report.

WalkieOne

Sheet: /SIM_RF/
File: SIM_RF.kicad_sch

Title: WalkieOne 05E / SIM_RF

Size: A2	Date: 2026-10-20	**Rev: 05E prototype**
KiCad E.D.A. 10.0.7		Id: 7/7