Adjustable probe offset

BNC connector
Farnell 2293737
Cable shield isolated from
chassis & USB_VGND

J1
Amphenol 031-5431-10RFX

C1
100n

R1
10

AC pass

J2
Amphenol 031-5431-10RFX

R2
50k

R3
50k

R4
1k

R5
5k

DC offset adjust

RV1
5k

C2
100n

U1
LMP7731

R6
1k

U2
OPA322
or TLV9061

L1

R7
10

C3
100n

C4
100n
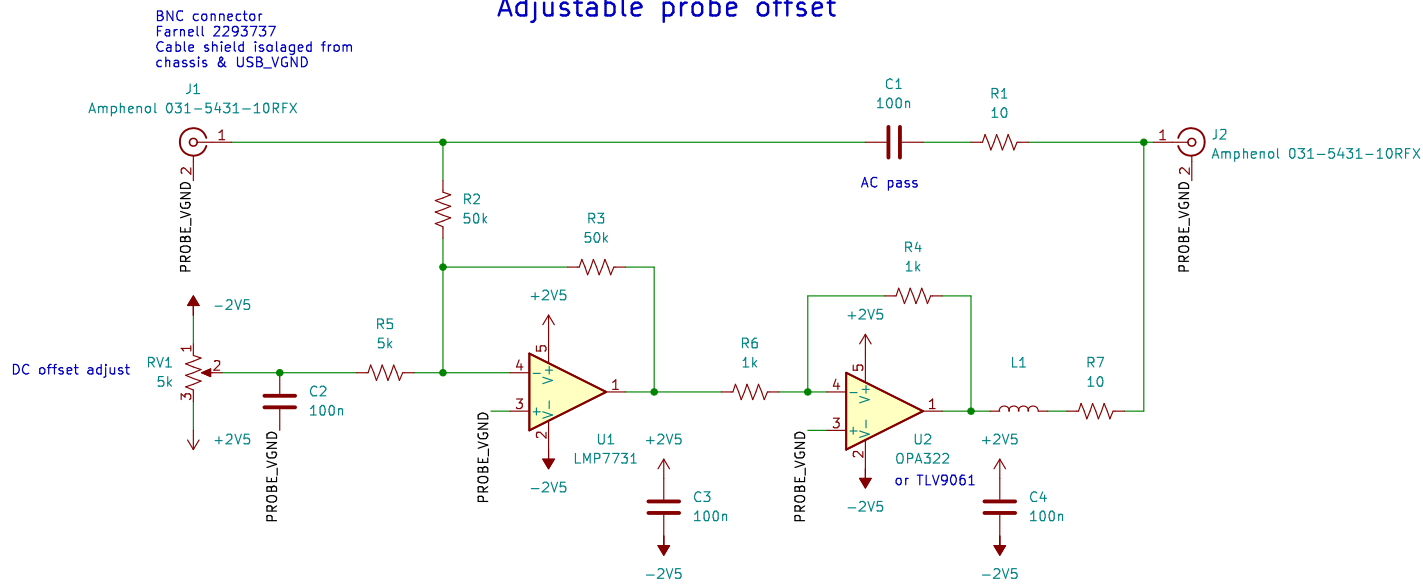
+/- 2.5V power supply & battery charge

TP1
V_UNREG

TP2
+V_BATCHG

3PDT switch - Multicomp 1M31

TP3
+V_BAT

U3
ADP7142AUJZ-2.5   Not @ LCSC

TP4
+2V5

TP5
+2V5

SW1A
SW_3PDT_x3

BT1
BATTERY-18650

SW1C
SW_3PDT_x3

TP6
PROBE_VGND

C5
4.7u

C6
100n

30mV dropout
10uVrms noise

C7
4.7u

C8
100n

TP7
PROBE_VGND

PROBE_VGND

R9
3.3k

PROG

STAT

CHARGE_STAT

U4
MCP73213T-A6SI/MF

8.4V float voltage (-A6S)

350mA charge
current

C9
4.7u

BT2
BATTERY-18650

SW1B
SW_3PDT_x3

TP8
-V_BAT

C10
4.7u

C11
100n

U5
ADP7182AUJZ-2.5

50mV dropout
18uVrms noise

C12
4.7u

C13
100n

TP9
-2V5

TP10
-2V5

TP11
USB_VGND

TP12
USB_VGND

USB_VGND

Indicator LEDs

USB_VBUS

D4
PDO2

D5
PDO3

U7
LM334M

LM334 reduces LED noise
to ~30nV/sqrt(Hz)

V_UNREG

R17
1k

R18
1k

R20
33R

2mA set

D1
CHARGE

R8
1k

USB_PDO2

USB_PDO3

D3
POWER

PROBE_VGND

CHARGE_STAT

Power input, USB-PD trigger

F1
MINISMDC050F-2 24V 500mA 150ms

J3
Barrel_Jack

D2A
PMEG4005CT

V_UNREG

USB_VGND

TP13   TP14
USB_VREG2V7 USB_VREG1V2

USB_VREG2V7

USB_VREG1V2

C14
1u

C15
1u

USB_VGND

Q1
IRLML9301

D2B
PMEG4005CT

USB_VBUS

R10
100k

R12
100

C18
100n

R11
1k

D6
D22V0S1U2WS-7

V_UNREG

R16
22k

Note USB_VGND likely linked
to chassis when USB cable connected

J5
USB_C_Receptacle

F2
MINISMDC050F-2 24V 500mA 150ms

TP15
USB_VBUS

USB_VBUS

D7
D22V0S1U2WS-7

C16
4.7u

C17
1u

USB_VGND

U6
STUSB4500QTR

RESET

CC1
CC1DB

CC2
CC2DB

VBUS_VS_DISCH

SCL

SDA

ALERT

ADDR0

ADDR1

GND

VDD

VSYS

VREG_1V2

VREG_2V7

VBUS_EN_SNK

POWER_OK2

POWER_OK3

DISCH

A_B_SIDE

ATTACH

GPIO

USB_RST

USB_CC1

USB_CC2

USB_PDO2

USB_PDO3

USB_SCL

USB_SDA

USB_VGND

JP1

JP2

USB_CC1

USB_CC2

D8
ESDA25W

TP16
USB_VGND

STUSB4500 programming

R14   R15
10k   10k

J4
Programming

I2C_PULLUP

USB_SCL

USB_SDA

USB_RST

R13
10k

USB_VGND

D9   D10
ESDA25W ESDA25W

Programming

STUSB4500 must be programmed once
to request 9/15/20V from PD source

https://github.com/blinken/power-rail-probe
Sheet: /
File: low-noise-power-probe.kicad_sch
Title: Low-noise power rail probe

| Size: A3 | Date: 2023-07-30 | **Rev: 1.0** |
| KiCad E.D.A. | kicad 6.0.11+dfsg-1 | Id: 1/1 |