Ground Control – RockBlock_9604_SMA

Design Notes
==========
2 x SMA only
No patch antenna
No Supercap storage

Date	PCB Version	Iteration	Description
24/09/2026	1A	1	Initial Version

Block Overview

File: Block Overview.kicad_sch

Ground Control

CONFIDENTIAL
Ground Control

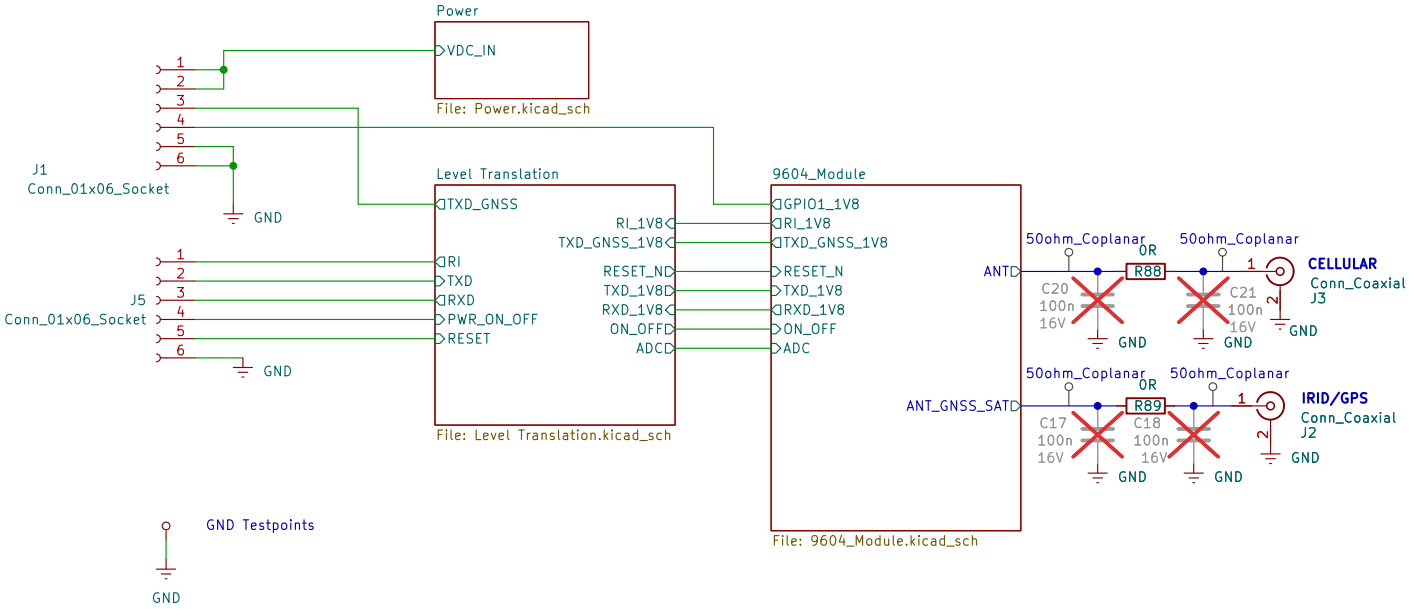
Sheet: RB9604-SMA
File: RB9604-SMA.kicad_sch

Title: RockBlock_9604_SMA

Size: A4	Date: 2026-10-06	**Ver: 1A**	**Itrn: 1**	**Fit Var:**
KiCad E.D.A. 10.0.4				Id: 1/5

VBAT_IN Lipo or Primary cell 3.3–4.4V input
Nominally 3.7 – 4.2V LiPo

PCB Pin Number	Socket Number	Signal
1	J1–1	VDC
2	J1–2	VDC
3	J1–3	TXD_GNSS
4	J1–4	GPIO1 HW SYNC (User NC)
5	J1–5	GND
6	J1–6	GND
7	J5–1	RI
8	J5–2	TXD
9	J5–3	RXD
10	J5–4	PWR_ON_OFF
11	J5–5	RESET
12	J5–6	GND



CONFIDENTIAL
Ground Control

Sheet: Block Overview
File: Block Overview.kicad_sch

Title: RockBlock_9604_SMA

Size: A4	Date: 2026-10-06	**Ver: 1A**	**Itrn: 1**	**Fit Var:**
KiCad E.D.A. 10.0.4				Id: 2/5

Voltages
========

V_INT = 1.8 supplied from module
V_BCKUP_GNSS = Input to module 1.65 to 3.6
VCC = 3.3 to 4.4 input

V_BCKP_GNSS can be supplied from on board 3V3 if the module is in deep sleep or powered off state. 1K is there for current limiting and provides a means of disconnection if needed

9604 Module
========
V_GNSS_BCKP can be left unconnected if not used
VINT = 1V8 supply out from 9604 @ 70mA

9604 Module
============

USB signals Test points reccomended (See Section 3.14 HW DEV Guide)
TXD_GNSS is a 1V8 data output
SDIO Pins are for diagnostic only and TPs added(See Section 3.14 HW DEV Guide)
I2C pins Internal pull-ups to 1V8
PWR_ON has internal active pull up (100K to a 1V2 rail) and should be connected to open drain output.
RESET_N has internal active pull up to 1V8, should be connected to open drain
RTC_GNSS To be connected to 32768 XTAL for improved responsne when powered down
ADC pin can be used to monitor input range 0.25-1.15V, used to monitor main input voltage/battery depletion
ANT_DET unused can be left unconnected
UART HW supports default variant 0 RXD,TXD,CTS,RTS,DTR and RI
DTR is Input, idle high with internal pullup, connected to GND via 0R to force data terminal ready
RTS is Input, idle high with internal pull up, connected to GND via 0R to force ready to send

0603 Link to allow A measurement of module in power down states

Power Indciation
================
When the module is ready this illuminates

Push push style nano sim
==================
Vpp can be left unconnected
Decoupling caps to be placed close to SIM
Sim detect switch is open when no sim and closed (shorted to GND) when sim present.
The GPIO reqires inversion ie high when card inserted and low when removed this is acheved with Q3

Default GPIOs (See 3.8.1 HW manual)
==========
GPIO1 = HW Test signal
GPIO5 = SD_DETECT Unused
Remaining are user selectable

All 1V8 Levels

U1A
Iridium-9604

U1B
Iridium-9604

GND J4
KP13B-SF-PEJ_800_

Y1
OV-7604-C7-32.768KHZ-20PPM-TA-QC

D8
Green LED

Q2 Si2302CDS

Q3 Si2302CDS

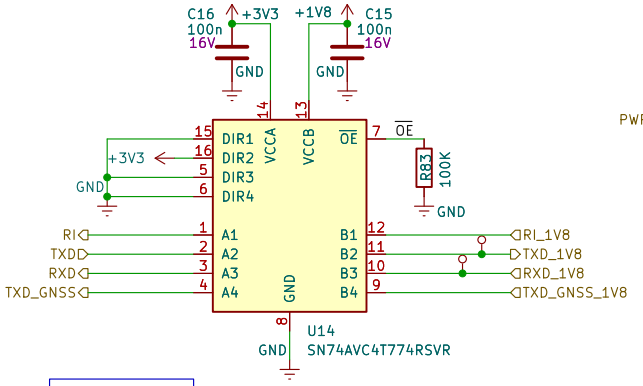
Ground Control
CONFIDENTIAL
Ground Control

Sheet: 9604_Module
File: 9604_Module.kicad_sch

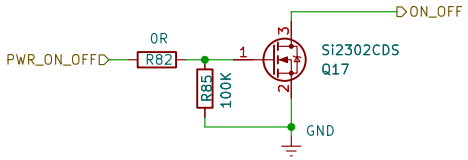
Title: RockBlock_9604_SMA

Size: A4	Date: 2026-10-06	Ver: 1A	Itrn: 1	Fit Var:
KiCad E.D.A. 10.0.4				Id: 3/5

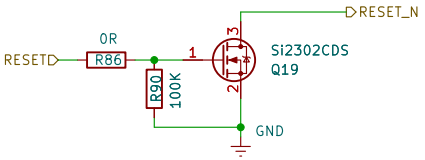
Level Translation
==========
1V8 to 3V3 Only
TXD input, idle high, active low with internal active pullup
RXD output, push-pull, idle high, active low
TXD_GNSS output, push-pull, active high
RI output, push-pull, idle high, active low



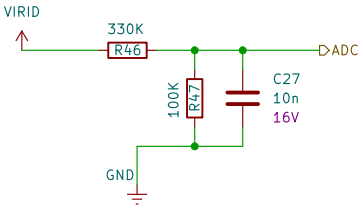
DIR L = B to A
DIR H = A to B



ON_OFF signal. It is intended for this pin to be driven by open drain, open collector or contact switch.
A low on this pin for a valid time period is one of the ways to wake up or switch on the module.
1.5S Low triggers a graceful switch off.
0.1-1S low pulse triggers switch on.
Note the unit is also switched on when power is applied
Q17 inverts so the input is logic high to perform the switch on function



RESET_N Signal internally pulled up, pull low for min 100mS to reset.
The signal inverted by FET Q19 so a 100mS high pulse is needed at the connector



The ADC only accepts a range of 1.15 to 0.25V.
The 100K//330K potential divider scales this and can monitor VIRID

Ground Control

CONFIDENTIAL
Ground Control

Sheet: Level Translation				
File: Level Translation.kicad_sch				
Title: RockBlock_9604_SMA				
Size: A4	Date: 2026-10-06	**Ver: 1A**	**Itrn: 1**	**Fit Var:**
KiCad E.D.A. 10.0.4			Id: 4/5	

3.3 to 4.5 Vin DC input must be capable of 3.8A peak current.
Tolerant down to 3.0V

SIP32440DBDN EFUSE Protection

ILIM set 5A to give 25% headroom over the 7% tolerance
RSET=0.6/5×20600= 2472R RILIM = 2.49 kΩ, 1% gives 4.96A

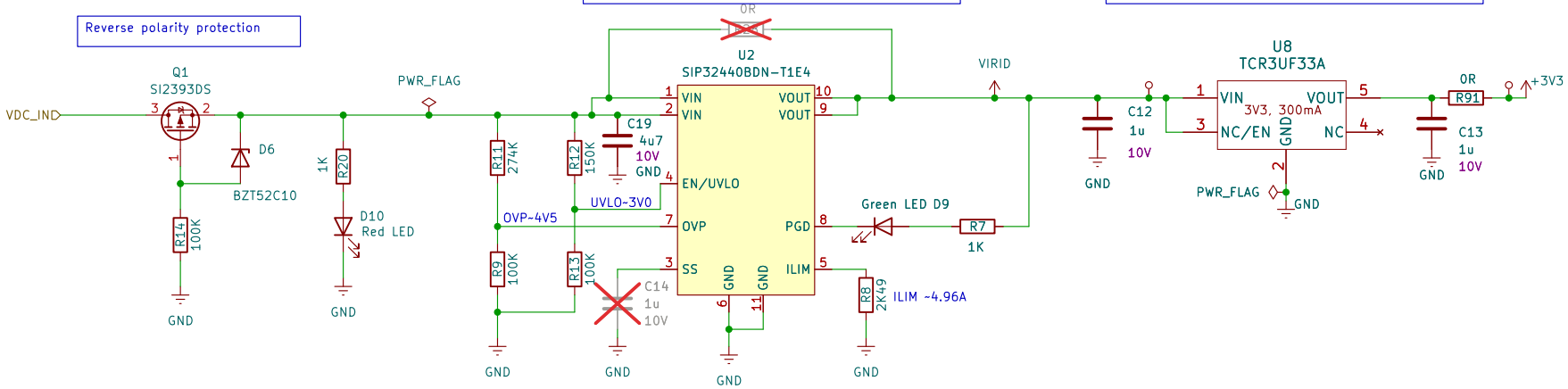
UVLO target is 3V
VUVLO=1.2(1+RBOT/RTOP) so a convinient pair is 150K top and 100K bottom
VUVLO=1.2(1+1.5)=3.0V use 150K top and 100K bottom

OVP target is 4.5V
This gives margin below 4.6V max and above 4.2V
OVP=1.2(1+100/274)=4.488V so RTOP is 274K and RBOT is 100K

IQ 340uA, 5uA Shutdown
To fully disable U2 to acheive 5uA shutdown current, remove R12 and Fit R28

Local 3V3 supply always on when VBAT_IN are supplied
IQ < 1uA

Reverse polarity protection



Ground Control

CONFIDENTIAL
Ground Control

Sheet: Power
File: Power.kicad_sch

Title: RockBlock_9604_SMA

Size: A4	Date: 2026-10-06	**Ver: 1A**	**Itrn: 1**	**Fit Var:**
KiCad E.D.A. 10.0.4				Id: 5/5