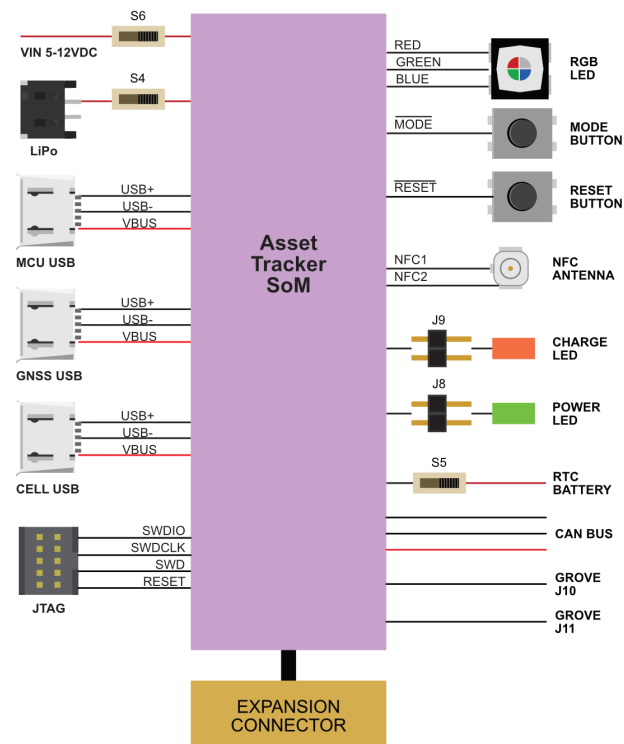


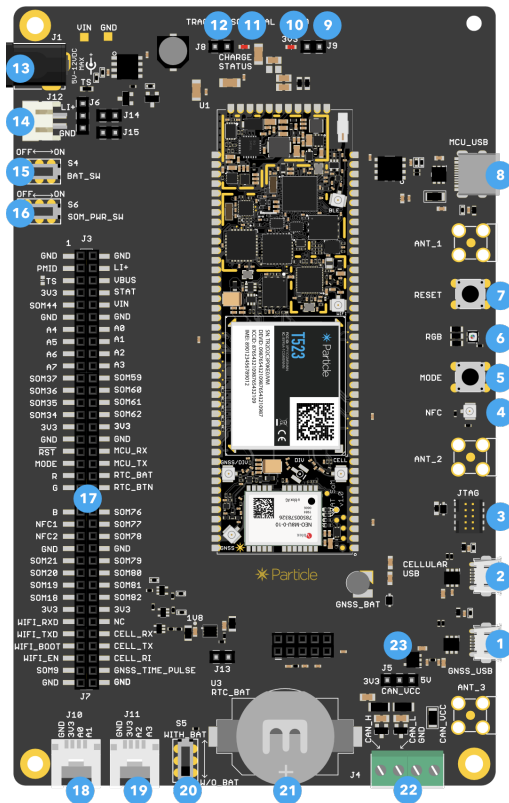
# Tracker SoM Evaluation Board<sup>(001)</sup>

This is a breakout board for Particle's Tracker SoM. The Tracker SoM Cellular GNSS module is a castellated system-on-a-module that can either be reflow soldered to your own custom base board, or can be used in this evaluation board, or the carrier board.

# Block Diagram



# Description



Num ID		Description
1	GNSS USB	u-blox GNSS USB connection
2	CELL USB	Quectel cellular modem USB connection
3	JTAG	JTAG/SWD debugging connector for nRF52 MCU
4	NFC	NFC antenna connection for NFC tag feature
5	MODE	MODE button
6	RGB	RGB status LED
7	RESET	RESET button
8	MCU USB	nRF52 MCU USB-C for debugging or power.
9	J8	3V3 LED jumper. Normally installed, remove to disable 3V3 LED.
10	3V3 LED	Power LED, indicates 3.3V supply is enabled.
11	STAT LED	Charge status indicator.
12	J9	STAT LED jumper. Normally installed, remove to disable STAT LED.
13	VIN	External power 5-12 VDC
14	LiPo	JST-PH connector for LiPo battery
15	S4	Battery switch
16	S6	SoM power switch
17		Expansion connector
18	J10	Grove connector (A0, A1 or I2C)
19	J11	Grove connector (A2, A3)
20	S5	RTC battery switch
21	RTC battery	Optional battery
22	J4	CAN data connection and 3.3V power output
23	J5	CAN power jumper (selects 3.3V or 5V)

## POWERING THE TRACKER SOM EVALUATION BOARD

---

There are several options for powering the evaluation board:

The **MCU USB** connector. If using a laptop with a 500 mA USB port, you should also use the LiPo battery. With a 2A tablet charger, you can power only by USB.

The **VIN** connector (5-12 VDC). This is useful with an external power supply. Switch **S6** is the power switch.

The **LiPo** connector. This is typically used with a LiPo battery. Use switch **S4** to enable the battery.

## USB CONNECTORS

---

There are three USB connectors on the evaluation board, however you most commonly will only use the **MCU USB** connector.

The **MCU USB** connector is connected to the nRF52 MCU and can be used for Serial debugging, flashing code, and setup by USB. It can also power the AssetTracker SoM. If using a laptop with a 500 mA USB port, you should also use the LiPo battery. With a 2A tablet charger, you can power only by USB.

The **GNSS USB** connector is connected to the u-blox NEO-M8U GNSS. It can be used for firmware upgrades or with the u-blox u-center application.

The **CELL USB** connector is connected to the Quectel cellular modem. It can be used for firmware upgrades.

## LED INDICATORS

---

The **STAT** LED indicates the charge status:

- Off: Not charging or no power
- On: Charging
- Blinking: Charge fault
- Flickering: No battery

Jumper **J9** disconnects the charge status LED.

The **3V3** LED indicates that the 3.3V MCU power supply is enabled. Jumper **J8** disconnects the power LED.

**CAN CONNECTOR**

---

The four-position screw terminal connector (J4) allows connection to CAN bus devices.

Pin	Label	Description
1	CAN_H	CAN Bus H or +
2	CAN_L	CAN Bus L or -
3	GND	Ground
4	CAN_VCC	3.3V or 5V

The CAN bus connection includes the 120 ohm termination resistor and ESD protection.

The CAN\_VCC jumper (J5) allows the selection of the voltage on the CAN connector.

- Left position: 3.3V
- Right position: 5V

The 5V power supply is powered by a boost converter and can be turned on and off by software.

## EXPANSION CONNECTOR

Left Description	Left	Right	Right Description
Ground	GND	GND	Ground
PMIC power out	PMID	LI+	LiPo battery
PMIC thermistor	TS	VBUS	nRF52 USB power
3.3V Out	3V3	STAT	PMIC charge status
Unused	SOM44	VIN	Power input 5-12V
Ground	GND	GND	Ground
A4, D4, SPI MOSI	A4	A0	A0, D0, Wire SDA
A5, D5, SPI MISO	A5	A1	A1, D1, Wire SCL
A6, D6, SPI SCK	A6	A2	A2, D2, SerialI CTS
A7, D7, SS, WKP	A7	A3	A3, D3, SerialI RTS
Unused	SOM37	SOM59	Unused
Unused	SOM36	SOM60	Unused
Unused	SOM35	SOM61	Unused
Unused	SOM34	SOM62	Unused
3.3V Out	3V3	3V3	3.3V Out
Ground	GND	AGND	Analog Ground
RESET button	RESET	MCU_RX	SerialI RX, GPIO D9
MODE button	MODE	MCU_TX	SerialI TX, GPIO D8
RGB Status LED Red	R	RTC_BAT	RTC battery
RGB Status LED Green	G	RTC_BTN	RTC wake button
RGB Status LED Blue	B	SOM76	Unused
NFC Tag Antenna	NFC1	SOM77	Unused
NFC Tag Antenna	NFC2	SOM78	Unused
Unused	SOM21	SOM79	Unused
Unused	SOM20	SOM80	Unused
Unused	SOM19	SOM81	Unused
Unused	SOM18	SOM82	Unused
3.3V Out	3V3	3V3	3.3V Out
ESP32 Serial RX	WIFI_RXD	NC	
ESP32 Serial TX	WIFI_TXD	CELL_RX	Cellular serial RX
ESP32 boot mode	WIFI_BOOT	CELL_TX	Cellular serial TX
ESP32 enable	WIFI_EN	CELL_RI	Cellular ring indicator
Unused	SOM9	GNSS_TIME_PULSE	GNSS time pulse or fix indicator
Ground	GND	GND	Ground

# Basic Setup

The basic setup for the Tracker SoM Eval Board to be operational is shown below:

- Plug the cellular antenna into the U.FL connector labeled **CELL** on the SoM. Remember never to power up this board without the antenna being connected. There is potential to damage the transmitter of the cellular module if no antenna is connected.
- Connect power the **MCU USB** (8), **VIN** (13), or a LiPo battery (14).
- Turn on the appropriate power switches (15 and/or 16).





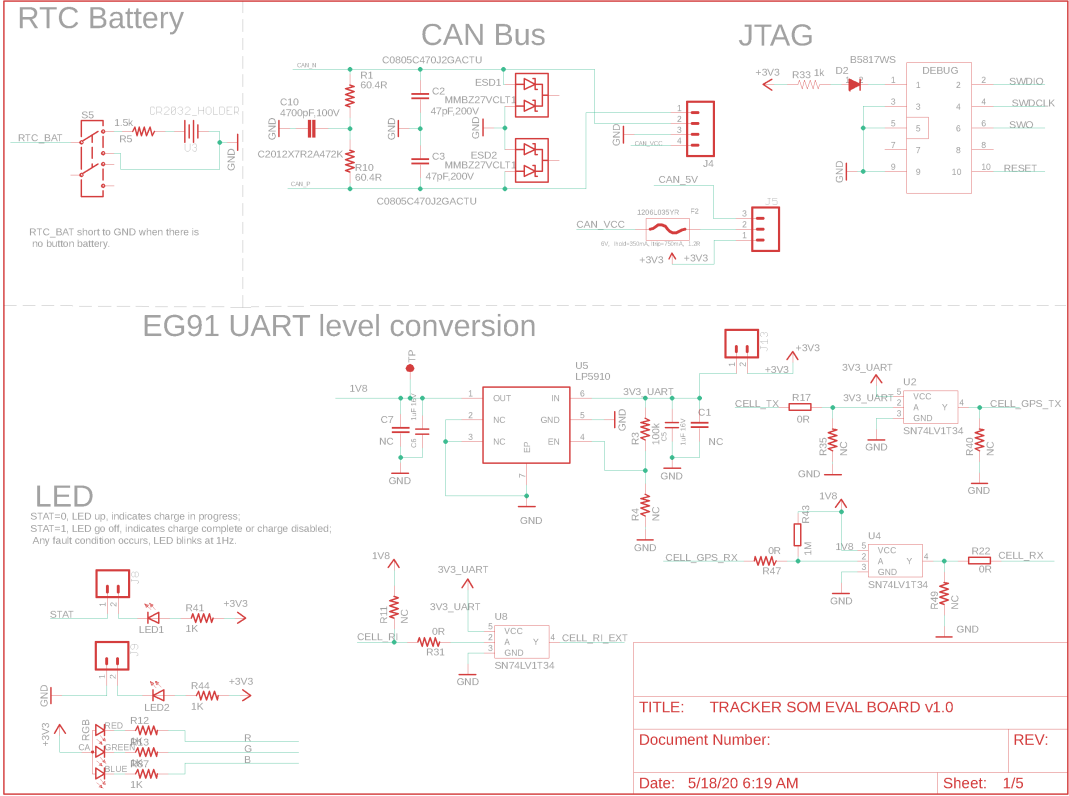
[illegible]

**CONN\_20X2\_ZHU**

Pin	Function	Pin	Function	Pin	Function
1	GND	21	CELL_GPS_RX	31	GND
2	GND	22	WIFI_RXD	32	MCU_RX
3	4.FMUS	23	WIFI_TXD	33	MCU_TX
4	4.FMUS	24	WIFI_BOOT	34	RESET
5	5.TS	25	WIFI_EN	35	MODE
6	5.TS	26	WIFI_EN	36	R
7	8.3V3	27	SOM9	37	RTC_RX
8	8.3V3	28	SOM9	38	RTC_TX
9	9.SOM44	29	GND	39	G
10	9.SOM44	30	GND	40	G
11	12.GND	31	GND		
12	12.GND	32	MCU_RX		
13	13.A0	33	MCU_TX		
14	14.A4	34	RESET		
15	15.A5	35	MODE		
16	16.A6	36	R		
17	17.A6	37	RTC_RX		
18	18.A7	38	RTC_TX		
19	19.A7	39	G		
20	20.SOM37	40	G		
21	21.SOM37				
22	22.SOM36				
23	23.SOM36				
24	24.SOM36				
25	25.SOM35				
26	26.SOM35				
27	27.SOM34				
28	28.SOM34				
29	30.3V3				
30	30.3V3				
31	31.GND				
32	32.GND				
33	33.GND				
34	34.GND				
35	35.GND				
36	36.GND				
37	37.GND				
38	38.GND				
39	39.GND				
40	40.GND				

**CONN\_15X2\_ZHU**

Pin	Function	Pin	Function
1	SOM76	11	SOM80
2	SOM77	12	SOM81
3	SOM78	13	SOM82
4	SOM79	14	SOM82
5	SOM80	15	SOM82
6	SOM81	16	SOM82
7	SOM82	17	SOM82
8	SOM82	18	SOM82
9	SOM82	19	SOM82
10	SOM82	20	SOM82
11	SOM82	21	SOM82
12	SOM82	22	SOM82
13	SOM82	23	SOM82
14	SOM82	24	SOM82
15	SOM82	25	SOM82
16	SOM82	26	SOM82
17	SOM82	27	SOM82
18	SOM82	28	SOM82
19	SOM82	29	SOM82
20	SOM82	30	SOM82
21	SOM82	31	SOM82
22	SOM82	32	SOM82
23	SOM82	33	SOM82
24	SOM82	34	SOM82
25	SOM82	35	SOM82
26	SOM82	36	SOM82
27	SOM82	37	SOM82
28	SOM82	38	SOM82
29	SOM82	39	SOM82
30	SOM82	40	SOM82



## Design Files

The Tracker SoM Evaluation board is open-source and the Eagle CAD design files are available in Github:

<https://github.com/particle-iot/tracker-hardware>

# Mechanical specifications

To be provided at a later date.

**DIMENSIONS AND WEIGHT**

---

Parameter	Value	Units
Width	97	mm
Length	164	mm
Thickness	14	mm
Weight		g

Weight will be provided at a later date.

# Product Handling

## ESD PRECAUTIONS

---

The Tracker SoM contains highly sensitive electronic circuitry and is an Electrostatic Sensitive Device (ESD). Handling an module without proper ESD protection may destroy or damage it permanently. Proper ESD handling and packaging procedures must be applied throughout the processing, handling and operation of any application that incorporates the module. ESD precautions should be implemented on the application board where the B series is mounted. Failure to observe these precautions can result in severe damage to the module!

## CONNECTORS

---

The U.FL antenna connectors are not designed to be constantly plugged and unplugged. The antenna pin is static sensitive and you can destroy the radio with improper handling. A tiny dab of glue (epoxy, rubber cement, liquid tape or hot glue) on the connector can be used securely hold the plug in place.

## DISPOSAL

---



This device must be treated as Waste Electrical & Electronic Equipment (WEEE) when disposed of.

Any WEEE marked waste products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. For proper treatment, recovery and recycling; please take all WEEE marked waste to your Local Authority Civic waste site, where it will be accepted free of charge. If all consumers dispose of Waste Electrical & Electronic Equipment correctly, they will be helping to save valuable resources and preventing any potential negative effects upon human health and the environment of any hazardous materials that the waste may contain.

## Revision history

Revision	Date	Author	Comments
pre1	31 Mar 2020	RK	Preview Release
pre2	12 May 2020	RK	Added partial dimensions
001	29 Jun 2020	RK	First release