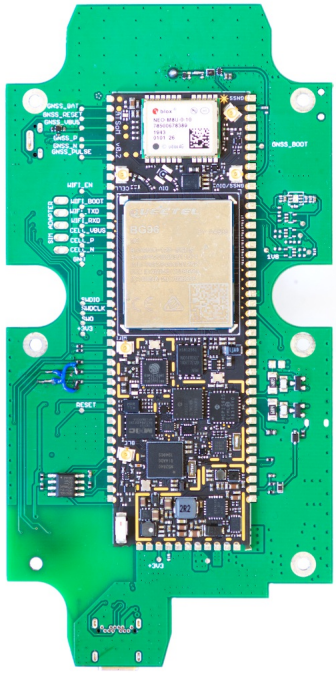
Tracker One(002)

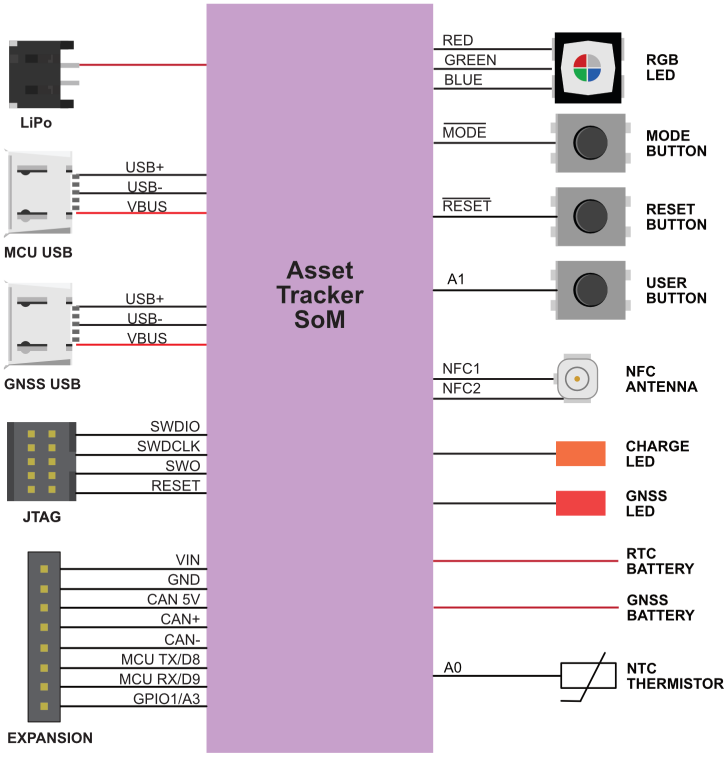
The Tracker One is a ready-to-go Tracker SoM carrier board with optional weatherproof enclosure.

- **Ready to go** with IP67-rated enclosure.
- **GNSS Antenna Onboard:** convenient high-gain GNSS antenna for easy access to GNSS signals.
- **Flexible Power Supply:** easily add asset tracking to most devices. A wide 4.5-30V power supply copes with most power delivery systems. Also accepts 5V supply via USB-C. LiPo battery connector, charge LED, backup battery for GPS and battery-backed RTC. Supports up to 105V when connecting directly to the carrier board.
- **High-precision Thermistor** with accuracy to 1%.
- **Extensible:** IP67-rated M8 connector includes CAN Bus, UART, GPIO, and power for simple expansion.
- **USB-C** for flashing, debugging and power with higher charging rates than Micro-USB or for use without an internal battery.
- **RGB LED** for use as both a user-configurable device as well as Particle status information.
- **Backup Battery** for RTC and GNSS.

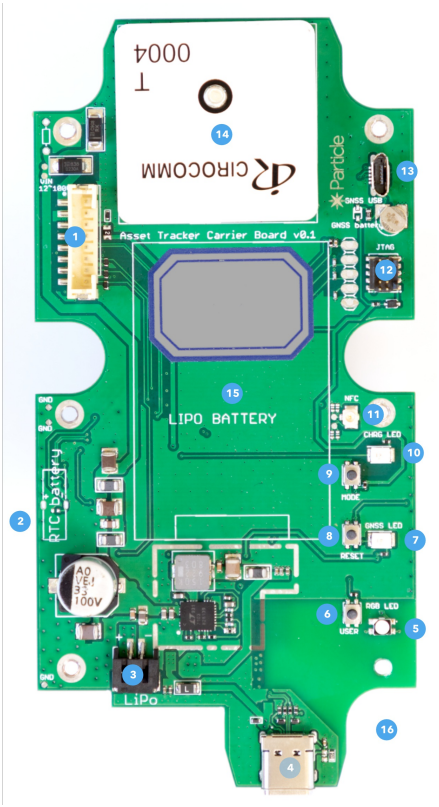

0004
CIROCOMM
Particle
Asset Tracker Carrier Board v0.1
LIPO BAT
CHRG LED
GNSS LED
RGB LED
RESET
MODE



Block Diagram



Description

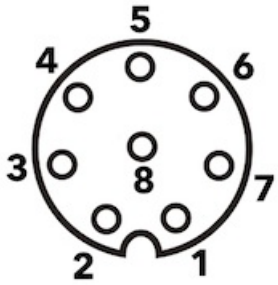


Num	ID	Description
1	J1	Power and I/O connector
2		RTC Battery
3		LiPo Connector
4		MCU USB-C
5		RGB Status LED
6	USER	User Button
7	GNSS LED	GNSS Status LED
8	RESET	RESET Button
9	MODE	MODE button
10	CHRG	LiPo charge status LED
11		NFC
12		JTAG/SWD debugging connector for nRF52 MCU
13	GNSS USB	u-blox GNSS USB connection (Micro USB)
14		GNSS Antenna
15		LiPo Battery
16		Tracker SoM (on back side)

POWER AND I/O CONNECTOR (M8)

M8 Pin	Function	Function	Function	I/O
1	VIN[3]			I
2	GND			
3	CAN 5V[4]		CAN_PWR	O
4	CAN+			IO[2]
5	CAN-			IO[2]
6	Serial1 TX	Wire3 SCL	GPIO D9	IO[1]
7	Serial1 RX	Wire3 SDA	GPIO D8	IO[1]
8	Analog A3		GPIO D3	IO[1]

The IP67 M8, 8-pin, male pins with threaded barrel connector is accessible from the outside of the enclosure.



View as looking into the M8 connector on the outside of the enclosure.

[1]MCU GPIO is limited to 3.3V maximum.

[2]CAN Bus specifications can be found in the Tracker SoM datasheet. CAN Bus termination is provided on the carrier board.

[3]4.5 to 30 VDC when using the M8 connector. 4.5 - 105 VDC when connecting directly to the board.

[4]5V, 400 mA maximum. Controlled by the CAN_PWR GPIO.

The connector on the carrier board itself is is a JST B8B-PH-SM4-TB(LF)(SN), 8-position, 2mm pitch, male pins, shrouded. The mating connector is the JST PHR-8. The female sockets are available plain, with leads, and in pre-manufactured ribbon cable formats.

ADDITIONAL PERIPHERALS

Signal	Device OS	Description
THERM	A0	NTC Thermistor
USER	A1	USER button
GNSS_LOCK	A2	GNSS lock indicator
GPIO1	A3	GPIO on power and I/O connector
MCU TX	TX	MCU serial TX, GPIO D9, Wire3 SCL
MCU RX	RX	MCU serial RX, GPIO D8, Wire3 SDA

Note: While the USER button exists inside the Tracker One, the Tracker One is a sealed unit and opening it will void the warranty and may affect certifications, thus it is not practical to use. It can be used with the Tracker Carrier Board.

POWERING THE TRACKER CARRIER BOARD

There are several options for powering the carrier board:

The **MCU USB** connector (USB-C). If using a laptop with a USB-A to USB-C cable and a 500 mA USB port, you should also use the LiPo battery. With an true USB-C port and cable, or a 2A tablet charger, you can power only by USB.

The **VIN** connector (5-30 VDC on the M8 connector, or 4.5 to 105 VDC to the B8B-PH connector on the board). This is useful with an external power supply.

The **LiPo** connector. This is typically used with a LiPo battery.

USB CONNECTORS

There are two USB connectors on the carrier 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.

LED INDICATORS

The **RGB LED** default behavior is to display cellular signal quality:

- Red blinking: Attempting to connect to the cellular network
- Red: poor cellular signal
- Yellow: average cellular signal
- Green: good cellular signal

It will fast blink when connecting to the cellular network, and slow blink when connecting to the Particle cloud.

Alternatively the LED can be configured to the typical Particle color scheme (blinking green, blinking cyan, breathing cyan) via device or cloud configuration. Custom device firmware can provide other color schemes if desired.

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

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

The **GNSS** LED indicates the GNSS fix status:

- Blinking (1 Hz): Attempting to get a GNSS fix
- On: Has a GNSS fix.

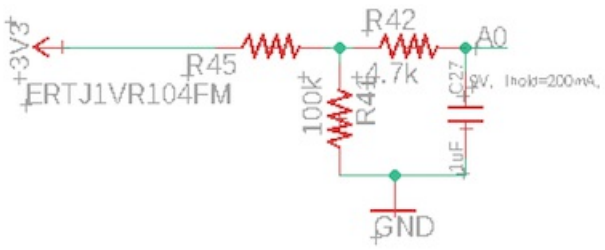
Tracker One Schematics

Will be provided at a later date.

Peripheral Details

THERMISTOR

The Tracker Carrier Board contains a 100K NTC thermistor, connected to A0. It is a Panasonic ERT-J1VR104FM connected high-side.



It can be read using the getTemperature() API.

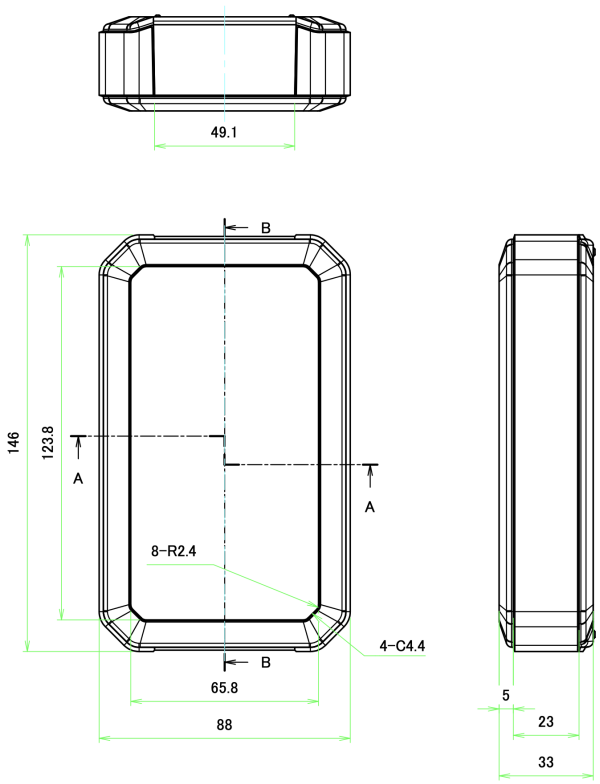
Mechanical specifications

DIMENSIONS AND WEIGHT

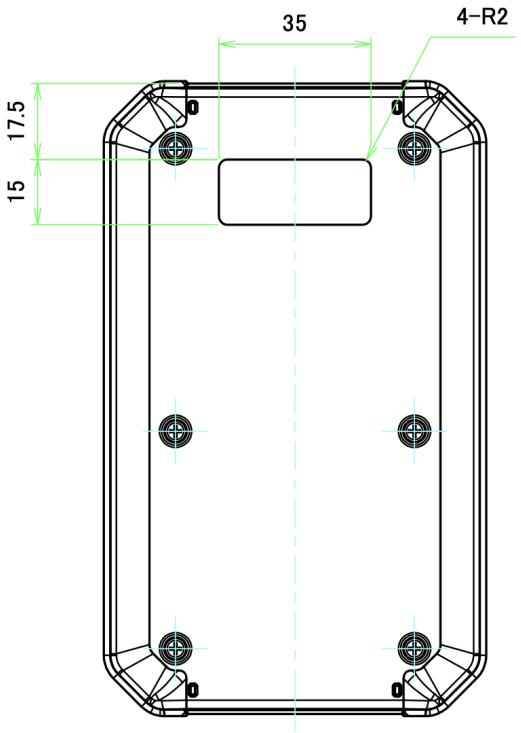
Parameter	Value	Units
Width	88	mm
Length (case only)	146	mm
Length (including M8 connector)	154	mm
Thickness	33	mm
Weight		g

Weight will be provided at a later date.

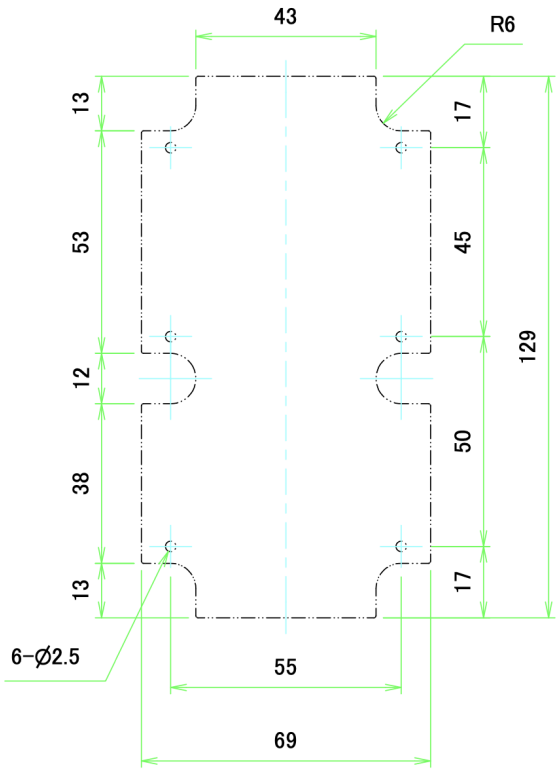
Case Dimensions (mm):



Bottom:



Maximum Carrier Board Dimensions (mm):



Note: The Tracker Carrier Board has a smaller bottom tab to provide space for the M8 connector.

Ordering Information

SKU	Description	Packaging
ONE402M	Tracker One LTE M1/2G (NorAm), [x1]	Each
ONE523M	Tracker One LTE CAT1/3G/2G (Europe), [x1]	Each
TCAR	Tracker Carrier Board, [x1]	Each

Revision history

Revision	Date	Author	Comments
pre1	20 Apr 2020	RK	Preview Release1
pre2	12 May 2020	RK	Added partial dimensions
001	29 Jun 2020	RK	First release
002	30 Jun 2020	RK	CAN 5V is limited to 400 mA, not 500 mA