Product Manual - SparkPNT FP

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Product Specifications

Welcome

This is the online product manual for the SparkPNT FP; a high-performance, precision, MFi certified, combination GNSS RTK rover and base station. If this is your first time using the FP, follow check out our Quick Start Guide; otherwise, feel free to jump right into the GNSS Flex module installation. Again, thank you for purchasing our SparkPNT FP!

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How-to install a GNSS Flex module

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A complete overview of the FP and its interfaces

Specifications

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Quickstart Guide

Designed to optimize your on-site workflow and future proof, with an upgradable GNSS receiver.

The SparkPNT FP is a cost-effective, rugged, MFi certified, GNSS RTK surveying unit with a built-in RF transceiver. Unlike other surveying devices, users can install the GNSS receiver of their choice. Later, it can be easily upgraded when GNSS technology improves, for additional capabilities, or just to match the rest of your fleet. The IP67 rated enclosure is constructed with an anodized die-cast magnesium body and a fracture resistant fiberglass dome. This entire kit ships in a hard-sided case to protect your investment. We've even included extra silicon bumpers to facilitate unit identification and repair.

> **INFO**
>
> This unit does not come with a GNSS receiver. A GNSS Flex module can be purchased separately.

Parts List

The SparkPNT FP comes shipped inside a hard-sided carrying case with all the accessories need for users to get right to work. Below, is an overview of all the included parts:

All the parts included in the kit.

The individual components laid outside of the carrying case.

1. Carrying Case
2. SparkPNT FP
3. Silicone bumper set
4. USB-C Cable
5. USB-C Charger (65W)
6. Thread Adapter (1/4" to 5/8")
7. LoRa Antenna (915MHz, 2dBi)

Device Overview

Power

To power on the device, hold the (⏻) power button for a few seconds: the device will illuminate the display and beep once. To power down the device, hold the (⏻) power button for a few seconds: the device will show 'Shutting Down...' and beep three times.

Power button on the front of the device.

Battery

Users can access the USB-C port, under the rubber cover, on the bottom of the device.

- **Battery Charging** - The FP supports standard USB charging and can be charged from nearly any device that has a USB port. A red LED on the front display will turn on during charging and turn off when complete. A fully dead battery will charge in about 24 hours.
- **Battery Capacity** - The FP includes a 7.2V 6.8Ahr (48.96Whr) battery. This should allow the device to run continuously for more than 50 hours, in worst-case conditions.

Status Indicators

There are three LED status indicators on the front of the FP.

The LED status indicators on the FP.

- The GNSS icon ( ) indicates the GNSS pulse-per-second.
  - The green LED will blink once per second when a GNSS fix is achieved.
- The Connection icon ( ) indicates the Bluetooth connection status.
  - The blue LED blinks once per second while waiting for a connection.
  - The blue LED will turn solid once a Bluetooth connection is made.
- The Battery charge LED is located below the power button.
  - The red LED will illuminate when attached to a charger.
  - The LED will turn off when charging is complete.

Installation Steps

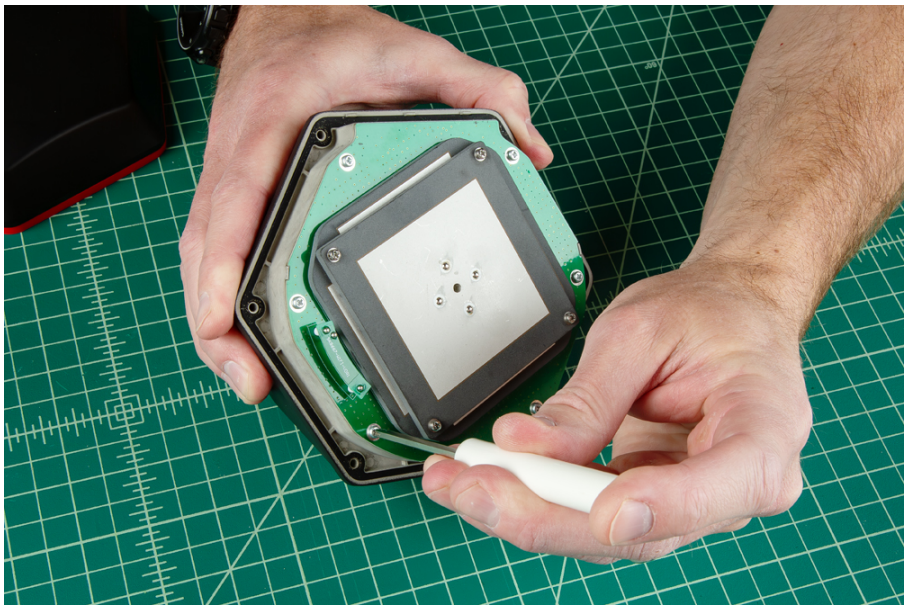
Open the Enclosure

Remove the six Phillips head screws located on the bottom of the FP's antenna cap.

Remove the screws of the enclosure for the antenna cover.

Remove Antenna

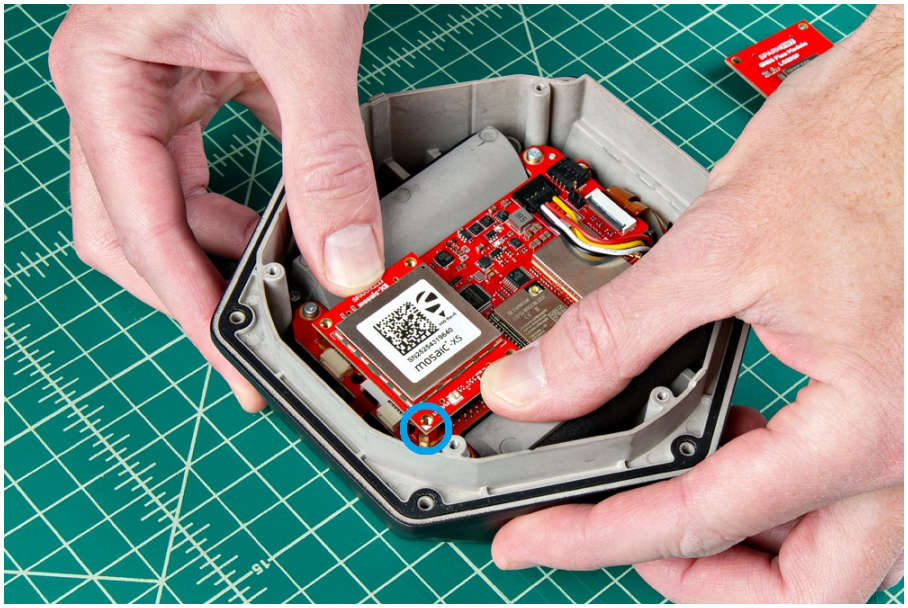
Remove the six Phillips head screws holding the antenna PCB in place. Then, gently and very carefully lift the upper PCB antenna off the enclosure; there are two U.FL cables underneath the antenna. One of the cables is attached to the board underneath.



Remove the screws holding the embedded antenna.

Install GNSS Flex Module

Install the GNSS Flex module. Be careful to note the alignment of the boards as the header pins are symmetric. The alignment indicator on the GNSS Flex module *(circled below)*, should be pointing away from the display/user interface. Once inserted, screws can be added to hold the module in place.



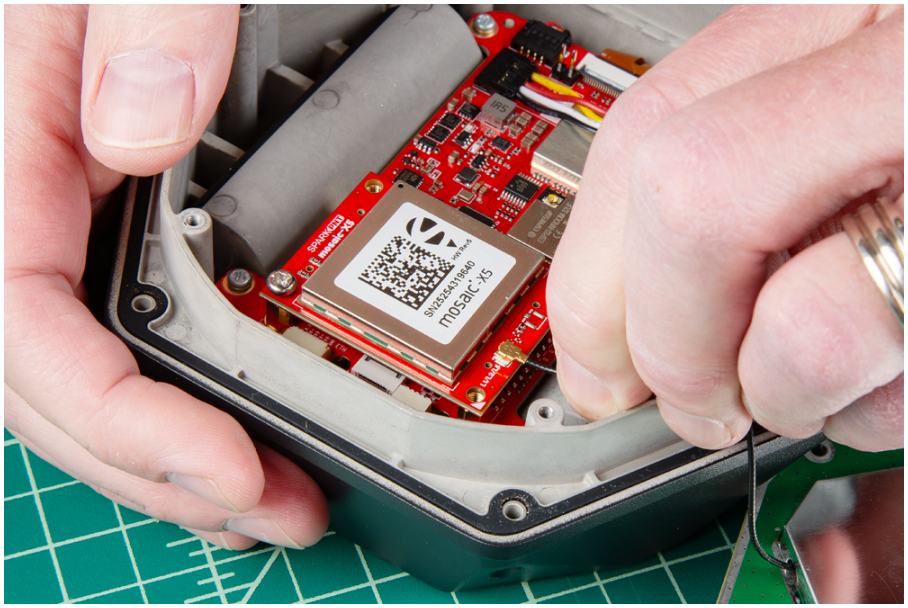
Replace the GNSS Flex module.

TIP

- Ensure the position of the alignment indicator on the GNSS Flex module, is pointing away from the display interface.

Reattach Antenna and Cover

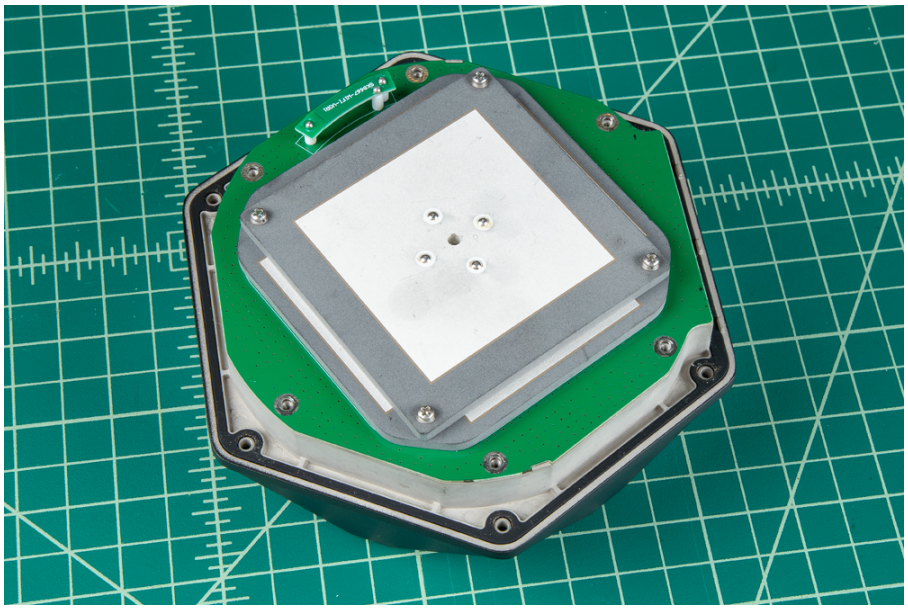
Once installed, connect the U.FL cables from the antenna element to the mainboard and GNSS Flex module.



Reconnect the U.FL cable to the GNSS Flex module.

> **INFO**
>
> - The U.FL cable for the GNSS antenna will lead directly to the large metal cover of the antenna element.
> - The U.FL cable for the WiFi/BLE antenna will lead directly to the PCB of the antenna element.

All that is left, is to secure the antenna and cover with the screws that were removed earlier. Make sure that the PCB of the antenna element align directly with the edges of the enclosure.



The antenna element aligned with the enclosure.

TIP

- Don't forget to attach the silicone bumper with the enclosure's cover.
- Be careful when threading these screws back into the cover. Over tightening or cross threading the screws into their holes, can strip out the screw head or eventually weaken the material fastening the screw.

Product Manuals

With your GNSS Flex module installed, please proceed to the associated product manual

SparkPNT FPL

Product manual for the installed LG290P GNSS Flex module

SparkPNT FPL-T

Product manual for the installed LG290P & IM19 GNSS Flex module

SparkPNT FPM

Product manual for the installed mosaic-X5 GNSS Flex module

SparkPNT FPM-T

Product manual for the installed mosaic-X5 & IM19 GNSS Flex module

SparkPNT FPX

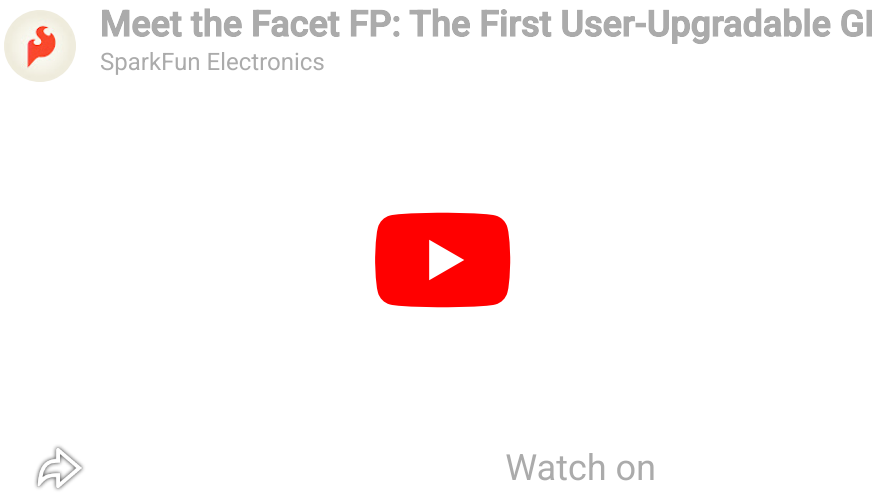
Product manual for the installed ZED-X20P GNSS Flex module

SparkPNT FPX-T

Product manual for the installed ZED-X20P & IM19 GNSS Flex module

Equipment Overview

The SparkPNT FP is a cost-effective, rugged, MFi certified, GNSS RTK surveying unit. Unlike other high-precision RTK surveying devices, users can install the GNSS receiver of their choice. Later, it can be easily upgraded to meet your performance requirements, match the capabilities of your fleet, or when GNSS technology improves. The FP provides Bluetooth and WiFi connectivity to any mobile device, including Apple iOS devices with its MFi certification. We have also included a built-in 1W 915MHz LoRa radio, to transmit/receive RTK corrections directly with other line-of-sight units up to 16km (>10mi) away.



- When it comes to fleet management, configuring another device is as simple as swapping out the SD card; gone are the days of needing to copy/paste credentials and settings.
- To start surveying positions, simply pair with the FP on any smartphone or tablet, open your preferred GIS app, and access their NTRIP corrections service using the internet/cellular connection of your mobile device.
- The SparkPNT FP can also operate as a base station, to broadcast RTCM corrections and function as an NTRIP Caster/Server.
    - When working on a tight deadline, users can also implement our `Base Assist` function to automatically configure the base station's position in minutes. Great for scenarios, where only relatively accuracte measurements are required and not the absolute accuracy of their global position; such as surveying the layout of a building.
    - Using its WiFi capabilities, users can configure the FP to operate as an NTRIP Caster/Server on a local WiFi network, be used as an access point, or even connect to another SparkPNT

device directly using the WiFi 2.4GHz transceiver, great for regions where the 915MHz radio can't be utilized.

This is all housed in an IP67 rated enclosure and constructed with an anodized die-cast magnesium body and a fracture resistant fiberglass dome. The entire kit ships in a hard-sided case with all the accessories needed to start work. We've even included extra silicon bumpers to facilitate unit identification and repair.

> **INFO**
>
> This unit does not come with a GNSS receiver. A GNSS Flex module can be purchased separately.

Parts List

The SparkPNT FP comes shipped inside a hard-sided carrying case with all the accessories need for users to get right to work. Below, is an overview of all the included parts:

All the parts included in the kit.

The individual components laid outside of the carrying case.

1. Carrying Case
2. SparkPNT FP
3. Silicone bumper set
4. USB-C Cable
5. USB-C Charger (65W)
6. Thread Adapter (1/4" to 5/8")
7. LoRa Antenna (915MHz, 2dBi)

Carrying Case

The FP comes with a hard-sided case that includes two holes for pad locks (with shackles up to **6mm** in diameter) to keep your equipment secure.

The hard-sided carrying case.

> **TIP**
>
> We recommend limiting the shackle diameter to less than **6mm**; a 1/4" (6.35mm) shackle will not fit without modifying the case.

Product Overview

The FP features a rugged water-proof enclosure, NGS calibrated survey-grade GNSS antenna, high-capacity battery, threaded mount point, large graphic display, and various external connector. The user interface features a 1" display, two user buttons, and two status LEDs. Users can find connectors on the bottom of the device that allow for data logging and external data connections.

Enclosure

The FP features a die-cast magnesium body with a fracture resistant fiberglass dome. The enclosure is IP67 rated and is waterproof to 1 meter, for up to 30 minutes.

The enclosure of the FP.

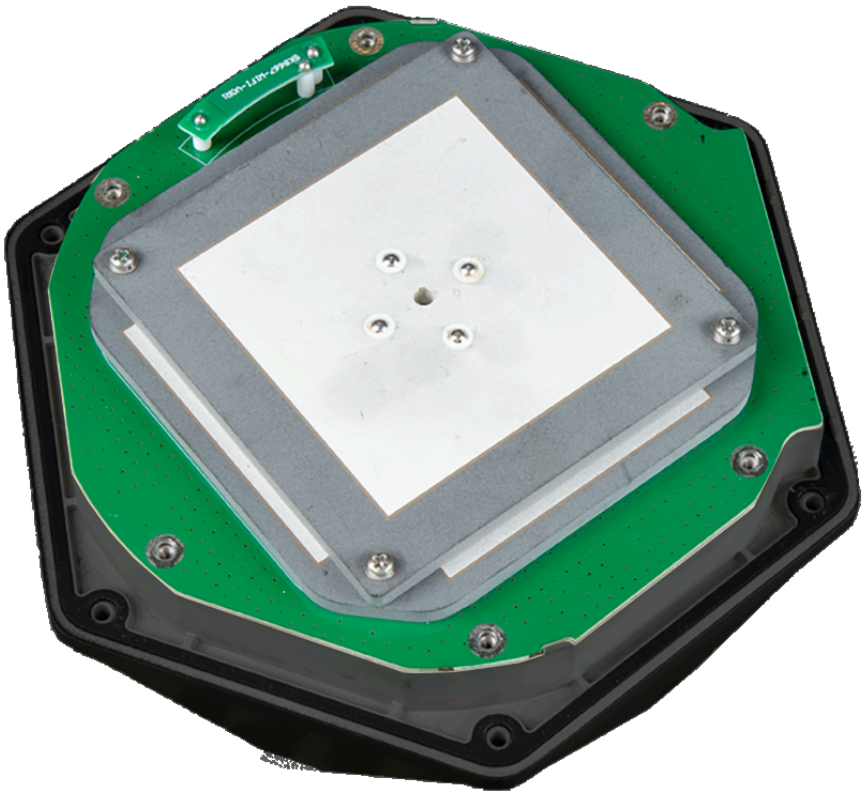
WARNING

The device should not be considered IP67 waterproof if the LoRa antenna is attached or any of the ports on the bottom are exposed. The rubber covers need to be fully seated, cover for the JST/SD card slot attached, and the TNC connector capped for the enclosure to qualify for the IP67 ingress protection rating.

The data interfaces on the bottom of the FP, covered for the IP67 rating.

GNSS Antenna

Underneath its fiberglass dome, the FP features a specially tuned multi-frequency (L1/L2/L5) GNSS antenna combined with a 2.4GHz BT/WiFi antenna.



The primary L1, L2, L5 ceramic antenna inside the FP.

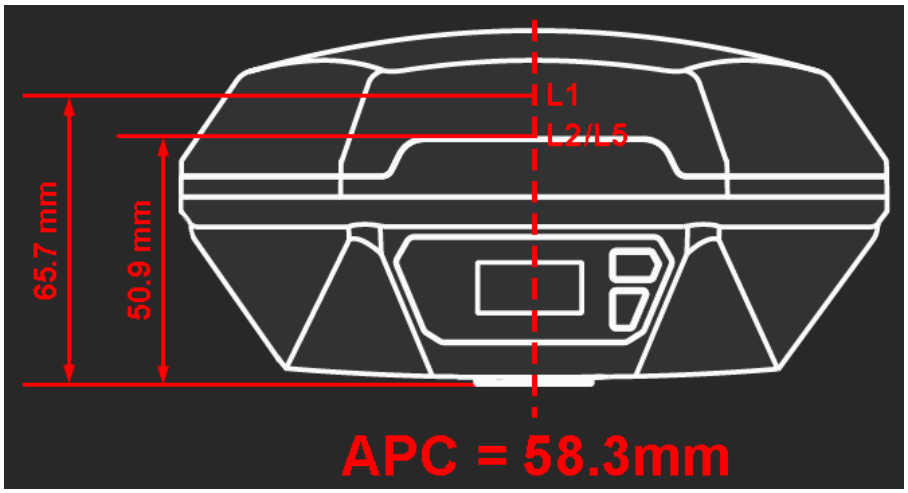
> **TIP**
>
> Don't forget that GNSS signals are fairly weak and can't penetrate buildings or dense vegetation. The GNSS antenna should have an unobstructed view of the sky.

Antenna and North Reference Points

The threaded mounting point at the bottom of the device serves as the device's ARP (antenna reference point). Additionally, the display serves as the device's NRP (north reference point). The FP

has been calibrated by the NGS and the ANTEX and ANTINFO files are available. The distance between the ARP on the FP to the L1 APC (antenna phase center) is **65.7mm** and **50.9mm** to the L2/L5 APC; with an average of **58.3mm**.

The antenna reference point and north reference point on the FP.



The antenna phase center distances, in regards to the FP's antenna reference point.

Mount Point

The bottom of the FP features a standard 5/8"-11 TPI threaded mount point. This is commonly found on surveying equipment and is compatible with most surveying poles. For additional mounting options (ie, camera camera mounts and tripods), the kit includes a 1/4" adapter.

The 5/8"-11 TPI threaded insert on the base of the FP.

> **INFO**
>
> The center of the threaded insert, on the plane of the device's base, serves at the ARP (antenna reference point) for the device.

Power

To power on the device, hold the (⏻) power button for a few seconds: the device will illuminate the display and beep once. To power down the device, hold the (⏻) power button for a few seconds: the device will show 'Shutting Down...' and beep three times.

Power button on the front of the device.

Battery and Charging

Users can access the USB-C port, under the rubber cover, on the bottom of the device.

- **Battery Charging** - The FP supports standard USB charging and can be charged from nearly any device that has a USB port. A red LED on the front display will turn on during charging and turn off when complete. A fully dead battery will charge in about 24 hours.

- **Battery Capacity** - The FP includes a 7.2V 6.8Ahr (48.96Whr) battery. This should allow the device to run continuously for more than 50 hours, in worst-case conditions.

OLED Display

The user interface features a 1" high-contrast OLED display, three status LED indicators, and two user buttons. The OLED display is used to display a variety of status indicators and provide a means to navigate the configuration menu.

The OLED display on the FP.

> **INFO**
>
> The user interface also serves at the NRP (north reference point) for the device.

Buttons

There are two user buttons that can be used to turn the FP on /off or navigate the menus displayed on the OLED screen.

- Power the device on or off:
  - Hold the (⏻) power button for a few seconds: the device will illuminate the display and beep once. To power down the device, hold the (⏻) power button for a few seconds: the device will show 'Shutting Down...' and beep three times.
- Navigate menu:

- Open menu: From the main screen, press the (Fn) function button once to open the navigation menu.
- Move down/next option: Press the (Fn) function button navigate down to the next option on the menu of the OLED display.
- Select option/navigate into the sub-menu: Press the (⏻) power button to select an option or navigate into its sub-menu.

The buttons on the front of the device.

Power Button

To power the device on or off, hold the (⏻) power button down for more than 3 seconds. When the device powers on, it will beep once; whereas, the device will beep three times when it powers down. When navigating the menu on the OLED display, the power button is used to select or navigate into the sub-menu an option.

Power button on the front of the device.

Function Button

The (Fn) function button is used to navigate the menu on the OLED display. Pressing the button, moves the selected menu option to the option below it.

Function button on the front of the device.

Indicators

The FP also features three LED status indicators and an internal buzzer for audio feedback to the user.

Status LEDS

There are three LED status indicators on the front of the FP.

The LED status indicators on the FP.

- The GNSS icon ( ) indicates the GNSS pulse-per-second.
  - The green LED will blink once per second when a GNSS fix is achieved.
- The Connection icon ( ) indicates the Bluetooth connection status.
  - The blue LED blinks once per second while waiting for a connection.
  - The blue LED will turn solid once a Bluetooth connection is made.
- The Battery charge LED is located below the power button.
  - The red LED will illuminate when attached to a charger.
  - The LED will turn off when charging is complete.

Buzzer

The FP also includes an internal buzzer that provides audio feedback for the user. The following prompts are provided:

- Power On: Beep once
- Power Off: Beep three times
- On versions that have tilt, the buzzer will beep periodically when tilt compensation is active.

Data/Communication Connections

There are multiple data and communication connectors on the bottom of the FP: microSD card slot, locking JST data interface, Lemo-compatible data interface, USB-C, and TNC. The microSD card slot and JST connector are both enclosed under the same cover.

The data and communication interfaces on the bottom of the FP.

> **⚠ WARNING**
>
> The device should not be considered as IP67 waterproof if the LoRa antenna is attached or any of the ports on the bottom are exposed. The rubber covers need to be fully seated, cover for the JST/SD card slot secured, and the TNC connector capped for the enclosure to qualify for the IP67 ingress protection rating.

USB Connector

Users can access the USB-C port under the rubber cover on the bottom of the FP.

- In most cases, the USB-C post will be accessed to charge the battery. The FP supports PD charging up to 10W; this allows a fully discharged FP to be charged to 100% in a few hours.
- For more advanced users, this port can be utilized to configure the FP, update the device and GNSS receiver firmware, and/or retrieve a diagnosis report for troubleshooting.

Users can access the USB-C port under the rubber cover on the bottom of the FP.

- The USB-C port is most commonly accessed to charge the battery. The FP supports standard USB charging and can be charged from nearly any device that has a USB port. A red LED on the front display will turn on during charging and turn off when complete. A fully dead battery will charge in about 24 hours.
- For more advanced users, this port can be utilized to configure the FP, update the device and GNSS receiver firmware, and/or retrieve a diagnosis report for troubleshooting.

> **TIP**
>
> Don't forget to fully close the rubber cover. The enclosure's IP67 ingress rating *(waterproof to 1 meter, for up to 30 minutes)*, is only valid when the all the covers are sealed.

microSD Card

The microSD card slot and JST-GH connector are covered under the same access port. To access these interfaces, unscrew and remove the cover piece. Users can insert a µSD card that is formatted with `FAT32` for cards up to 32GB, or `exFat` for cards up to 512GB. The SD card can be used to transfer user profiles between devices, log data points, and store diagnostic reports.

The SD card slot on the bottom of the FP.

Lemo Connector

The 5-pin Lemo-style locking connector is provided to connect the SparkPNT FP using RS232 level serial. The connector is compatible with the interface cable. This cable can be left permanently attached allowing the device to be deployed remotely while maintaining a connection for data retrieval and device configuration. The unit remains IP66 waterproof (protected against jets of water in all directions) but cannot be submerged with this cover open.

The Lemo-style connector on the bottom of the FP.

> **TIP**
>
> The pin connections from the SparkPNT FP to the wires in the interface cable are listed below:
>
> - Red: `VIN` (**6VDC to 20VDC**)
> - Yellow: `RX` - RTCM and configuration data into the device in RS232 serial.
> - White: `TX` - NMEA and RTCM data output from the device in RS232 serial.
> - Black: `GND`

JST Connector

The JST interface allows communication over low-voltage TTL serial. This can be useful for connecting external high-power radios or embedded systems.

> **NOTE**
>
> The JST connector is not recommended for long term installations as it allows water penetration. Use the Lemo-compatible connection for a waterproof connection.

The JST-GH connector on the bottom of the FP.

TIP

The pin connections from the SparkPNT FP to the JST wires in the JST-GHR cable are listed below:

- Red: `VIN` (**3.3VDC**)
- Green: `TX` - NMEA and RTCM data output from the device in TTL serial.
- Orange: `RX` - RTCM and configuration data into the device in TTL serial.
- Black: `GND`

The connector pinout on the FP.

TNC Connector

The built-in LoRa radio is primarily utilized to transmit and receive RTCM corrections. For the 1W LoRa transceiver to function, users need to connect the 2dBi 915MHz whip antenna to the TNC connector on the bottom of the FP and enable the radio setting. Running the radio *without* the antenna will not harm the unit, but ti is not recommended. When not in use, the rubber cover should be replaced on the connector to maintain the IP67 ingress rating of the enclosure.

The TNC connector on the bottom of the FP.

The antenna screws on, finger tight, and can be used pointing straight down or at an angle as needed.

Specifications

> **INFO**
>
> This unit does not come with a GNSS receiver. A GNSS Flex module can be purchased separately.

Below are the full specifications for this device:

- Antenna
  - L1, L2, L5, L6
    - Gain: ≥2.3dBi
    - APC (NGS Calibrated ANTEX ANTINFO):
      - L1: 65.7mm
      - L2/L5: 50.9mm
      - Average: 58.3mm
  - WiFi, BLE
    - 2.4GHz
- Enclosure
  - Ingress Protection: IP67 (1m of water for 30 minutes)
  - Materials: Magnesium body w/ fiberglass dome
  - Dual button menu system
  - Three LED indicators
  - USB-C port
  - microSD for data logging
  - TNC for 1W LoRa Radio
  - 5-pin Lemo-compatible connector for RS232 communication
  - 4-pin JST connector for TTL communication
- Battery
  - Specs: 7.2V 6800mAh (48.96Whr)
  - Charging: 2W maximum
  - Run Time: 50hrs

- Dimensions: 71 x 71 x 147mm (2.8 x 2.8 x 5.8in)
- Weight: 423g (0.93 lbs)

Installation Guide

These are instructions for installing a GNSS Flex module in the SparkPNT FP.

Open the Enclosure

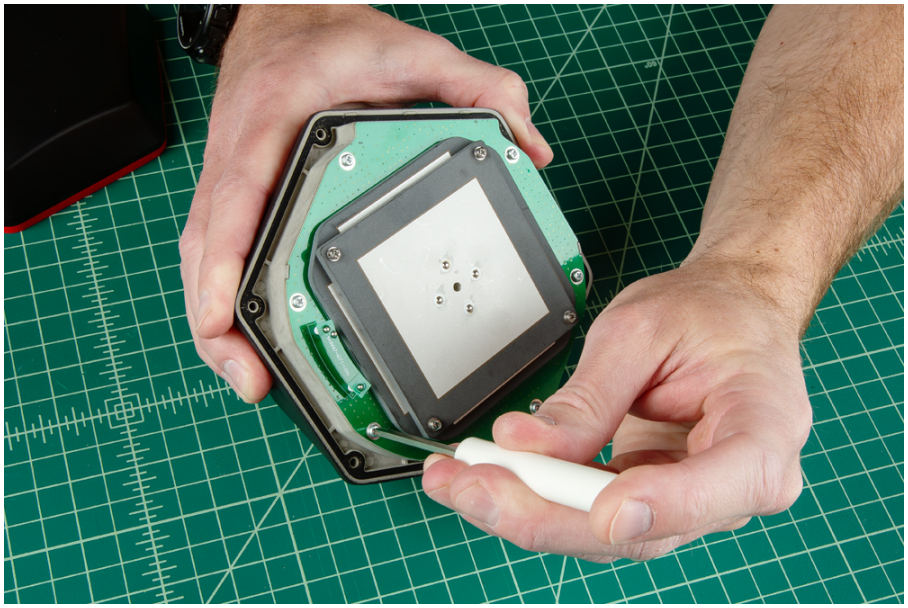
The FP can be opened by removing the six Phillips head screws located on the bottom of the enclosure's antenna cap.

Remove the screws of the enclosure for the antenna cover.

Once unscrewed, the plastic cover should come right off, exposing the ceramic GNSS and WiFi/BLE antennas underneath.

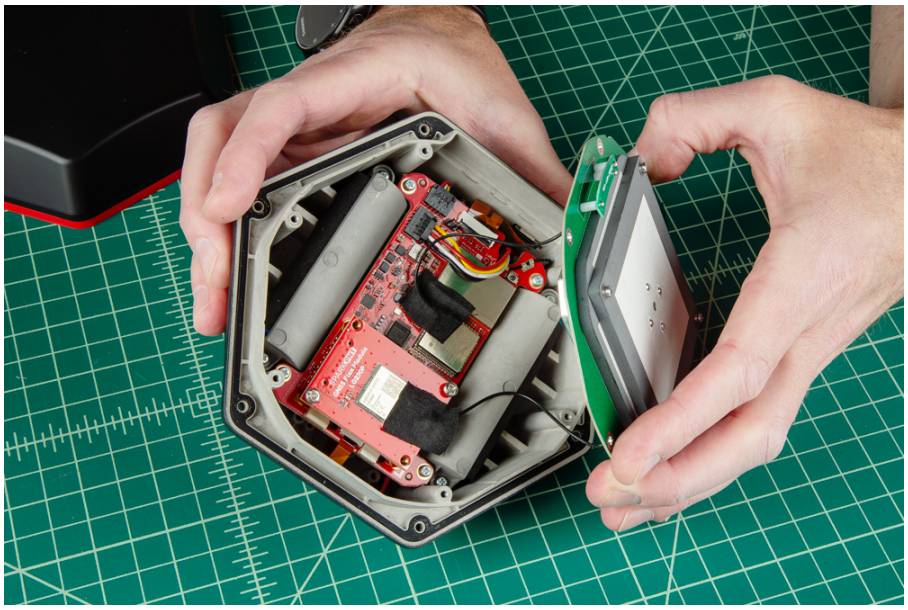
Remove the Antenna Stackup

Once the antenna cover is removed, users can access the six Phillips head screws holding the antenna PCB in place.



Remove the screws holding the embedded antenna.

With the screws removed, gently and very carefully lift the upper PCB antenna off the enclosure; there are two U.FL cables underneath the antenna. One of the cables is attached to the board underneath; it can be disconnected for better access to the space below.



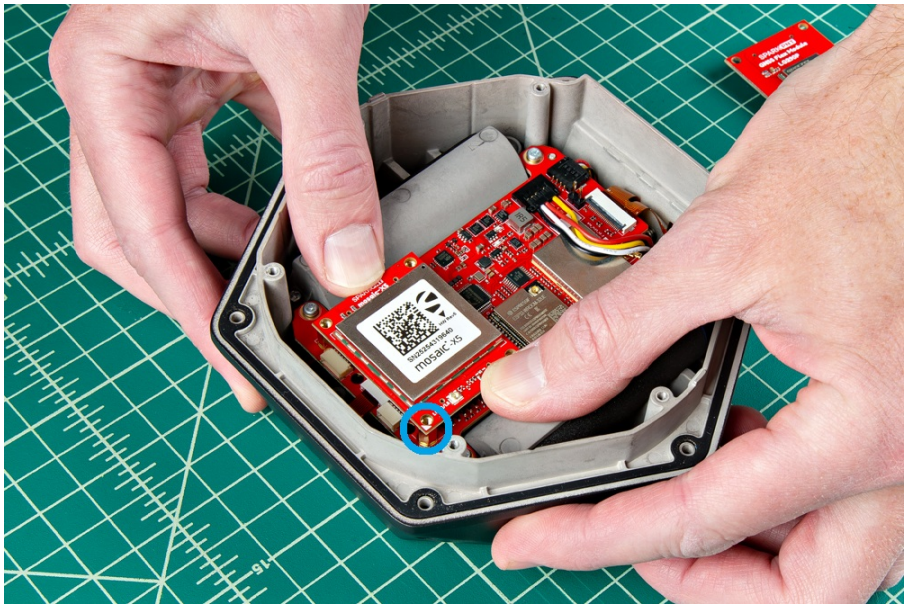
Carefully, lift the PCB off the enclosure.

TIP

Be careful removing the PCB as one of the U.FL cables is attached to other components.

Install the GNSS Flex Module

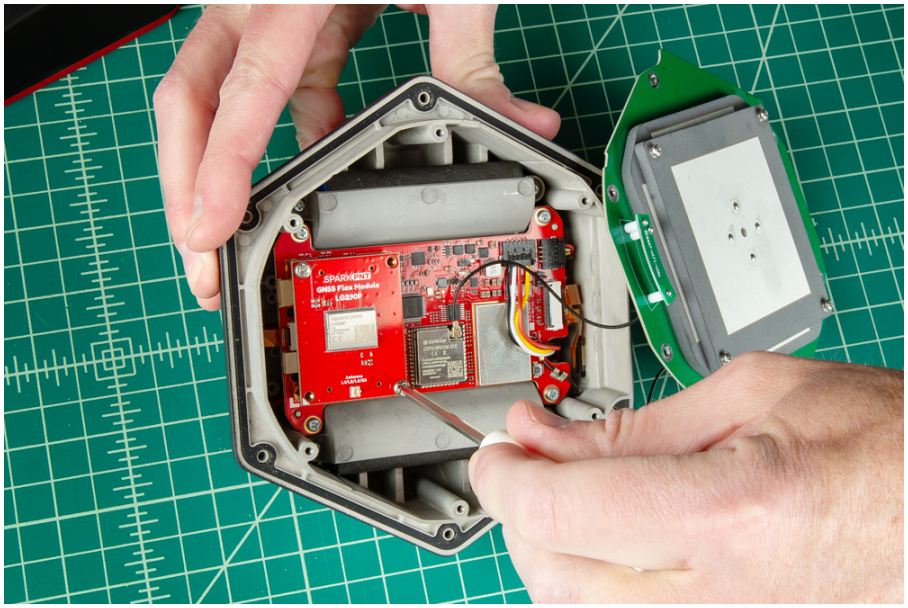
Attach the new GNSS Flex module. Be careful to note the alignment of the boards as the header pins are symmetric. The alignment indicator on the GNSS Flex module *(circled below)*, should be pointing away from the display/user interface.



Replace the GNSS Flex module.

> **TIP**
>
> Ensure the position of the alignment indicator on the GNSS Flex module, is pointing away from the display interface.

Once inserted, screws can be added to hold the module in place.

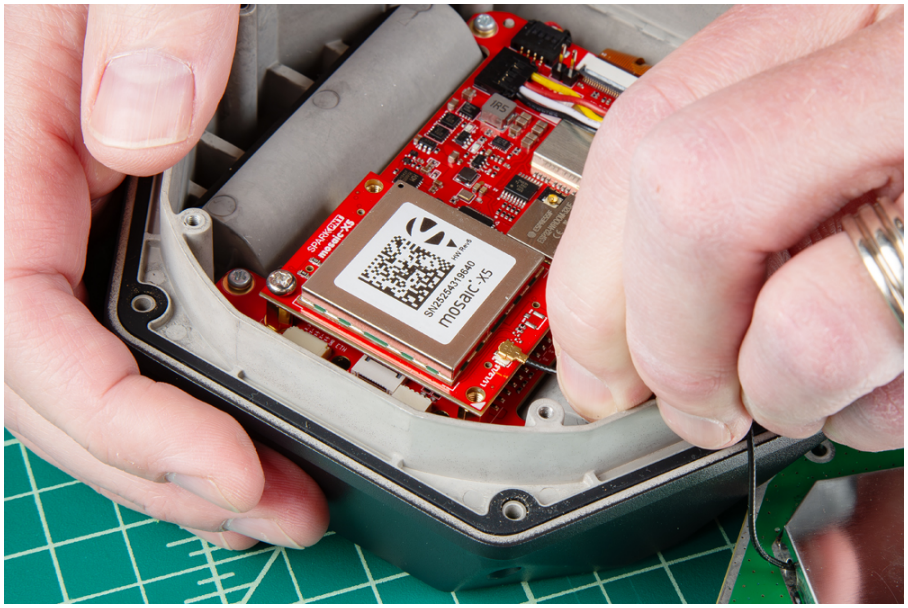


Add screws to hold the GNSS Flex module in place.

> **TIP**
>
> Be careful when threading these screws back in. Over tightening or cross threading the screws into their holes, can strip out the screw head or eventually weaken the material fastening the screw.

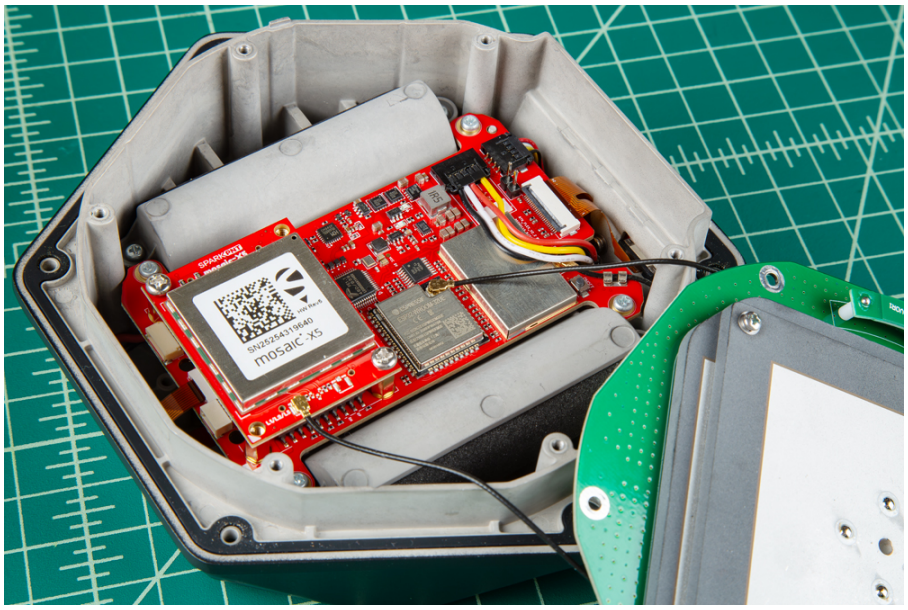
Connect the Antenna

Once you have replaced all the necessary components, reconnect the U.FL cables from the antenna element to the mainboard and GNSS Flex module.



Reconnect the U.FL cable to the GNSS Flex module.

The U.FL cable for the GNSS antenna that comes from the large metal cover of the antenna element, needs to be connected to the GNSS Flex module. Meanwhile, the U.FL cable for the WiFi/BLE antenna that is attached directly to the PCB of the antenna element, should be connected to the mainboard.

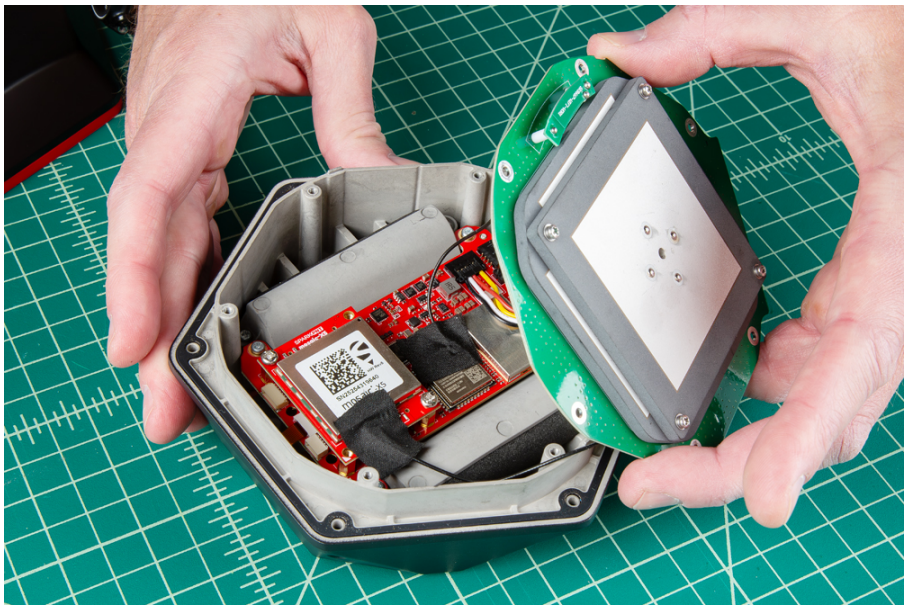


U.FL cables attached to the FP.

NOTE

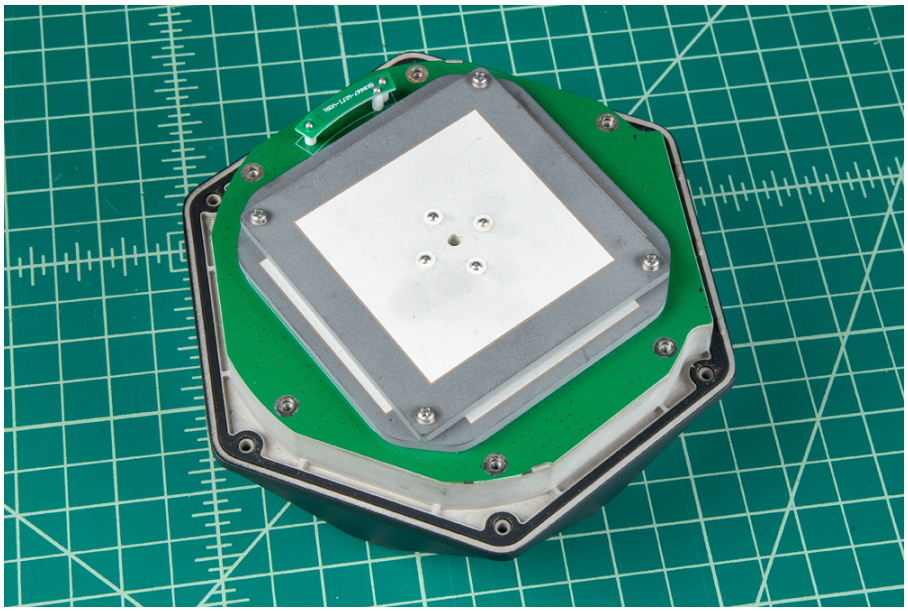
> The U.FL connectors are held in place with a piece of gaffer's tape. Carefully connect the U.FL cable, users may want to use a U.FL tool to avoid damaging the connection.

After the cables have been connected, replace the tape that was removed. Another piece can be added to the GNSS Felx module, but is not necessary; this just helps keep the cables in place.



U.FL cables attached to the FP.

The PCB of the antenna element is cut to align directly with the edges of the enclosure



The antenna element aligned with the enclosure.

Secure Antenna and Enclosure

All that is left, is to secure the antenna and the enclosure cover with the screws that were removed earlier.

Attach the antenna cover to the enclosure.

TIP

- Don't forget to attach the silicone bumper with the enclosure's cover.
- Be careful when threading these screws back into the cover. Over tightening or cross threading the screws into their holes, can strip out the screw head or eventually weaken the material fastening the screw.

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SparkPNT FPM-T

Product manual for the installed mosaic-X5 & IM19 GNSS Flex module

SparkPNT FPX

Product manual for the installed ZED-X20P GNSS Flex module

SparkPNT FPX-T

Product manual for the installed ZED-X20P & IM19 GNSS Flex module

Support

Technical Support

A beginner's guide to get your device up and running

Warranty and Returns

A full listing of our terms of service, warranty, returns process, etc.

Technical Resources

Reference documentation and product specifications for technical users

Technical Support

If you need technical assistance or more information on a product that is not working as you expected, please head over to our SparkPNT Forum. Feel free to check out our troubleshooting tips, below, for some suggestions on common topics.

> **ACCOUNT REGISTRATION REQUIRED**
>
> On your first visit to our forum, you'll need to create a Forum Account to post questions.

Order and Shipping Issues

If your order was damaged, misplace, or is missing any parts, please email our support team at `support@sparkpnt.com`. However, if your order was placed through one of our distributors please contact them first to resolve any issues.

> **INFO**
>
> For damaged or missing parts, please include a picture of your package's condition on arrival or inside the case, showing missing items to help expedite the process.

Warranty and Returns

Terms of Service

Returns Proccess

Technical Resources

Reference Documents

The latest firmware and technical documentation for the device

Product Specifications

The hardware specifications for the device

Reference Documents

Latest Firmware

- RTK Everywhere Firmware

Technical Documentation

The following datasheets, manuals, and documents are available for the SparkPNT FP:

- RTK Everywhere Firmware - Product Manual

Product Specifications

> **INFO**
>
> This unit does not come with a GNSS receiver. A GNSS Flex module can be purchased separately.

Below are the full specifications for this device:

- Antenna
  - L1, L2, L5, L6
    - Gain: ≥2.3dBi
    - APC (NGS Calibrated ANTEX ANTINFO):
      - L1: 65.7mm
      - L2/L5: 50.9mm
      - Average: 58.3mm
  - WiFi, BLE
    - 2.4GHz
- Enclosure
  - Ingress Protection: IP67 (1m of water for 30 minutes)
  - Materials: Magnesium body w/ fiberglass dome
  - Dual button menu system
  - Three LED indicators
  - USB-C port
  - microSD for data logging
  - TNC for 1W LoRa Radio
  - 5-pin Lemo-compatible connector for RS232 communication
  - 4-pin JST connector for TTL communication
- Battery
  - Specs: 7.2V 6800mAh (48.96Whr)
  - Charging: 2W maximum
  - Run Time: 50hrs
- Dimensions: 71 x 71 x 147mm (2.8 x 2.8 x 5.8in)

- Weight: 423g (0.93 lbs)