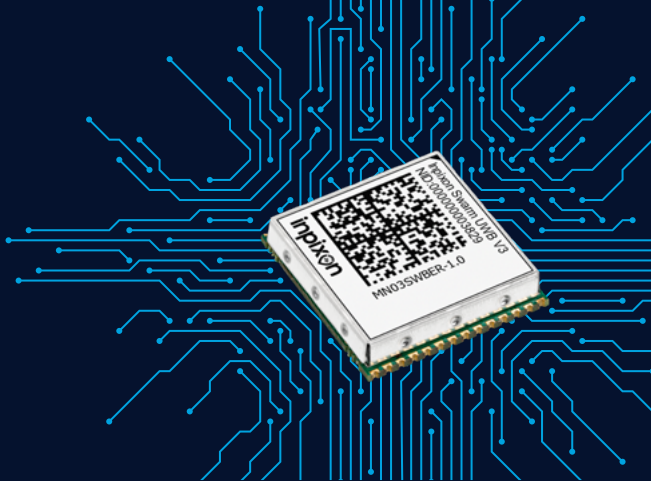
Inpixon Swarm UWB

UWB RTLS Radio and Sensor Module

UWB



Build Custom Location-Aware IoT Devices for Precise, Real-Time Applications

Inpixon Swarm UWB is an integration-ready ultra-wideband transceiver module, eliminating the need for low-level development. With its user-friendly high-level API and seamless integration design, it significantly accelerates time-to-market by a year. The module provides precise real-time location and ranging information, offers an accuracy down to 10 cm. Built with Qorvo's Decawave UWB technology, the Inpixon Swarm UWB module features low-power consumption and a compact form factor with multiple on-board components, including embedded sensors that provide 3D acceleration and temperature readings.

The Inpixon Swarm UWB seamlessly integrates into custom tag and IoT device designs, to power real-time location tracking and distance applications requiring high accuracy, reliability, and deployment scalability. Serving as a building block for your location-aware devices, the Inpixon Swarm UWB can help you reduce development complexity and time-to-market while addressing your unique needs and meeting your functional and compliance requirements.

* Supported through upcoming firmware updates

Inpixon Swarm UWB Highlights:

- Accelerate custom device designs and reduce development complexity and cost with highly integrated pre-built module
  - Integrated MCU, UWB transceiver, 3D accelerometer, temperature sensors, and support for BLE* and NFC*.
- Deliver precise, reliable real-time tracking and ranging applications through UWB technology
  - Accuracy: 10-50 cm, Range: 50m - 80m, customers report even higher ranges
  - UWB: 6 bands with center frequencies between 3.5-6.5 GHz
- Address multiple location-aware use cases with the same device through 3-in-1 technology
  - TDoA real-time location tracking
  - ToF two-way ranging (SDS-TWR)
  - Bi-directional wireless communication
- Create scalable, real-time solutions capable of seamlessly supporting thousands of concurrently tracked tags
- Leverage a miniaturized form factor for seamless integration into hardware designs such as:
  - Wristbands, personnel badges, helmets, asset and vehicle tags
  - Ideal for integration: accommodates easy placement via automated production lines or manual soldering processes
- Accelerate software and application development effortlessly with a user-friendly API — no need for additional RF design or firmware implementation
- Extend battery life with long-lasting battery architecture and four smart energy-saving modes
- Fast and secure device updates facilitated by over-the-air (OTA) firmware flashing
- Future-proofed with BLE* and NFC* capabilities.
  - Execute any Inpixon Swarm API command through BLE*
  - Efficient data collection via BLE*, avoiding UWB channel usage
- Higher range and processing performance

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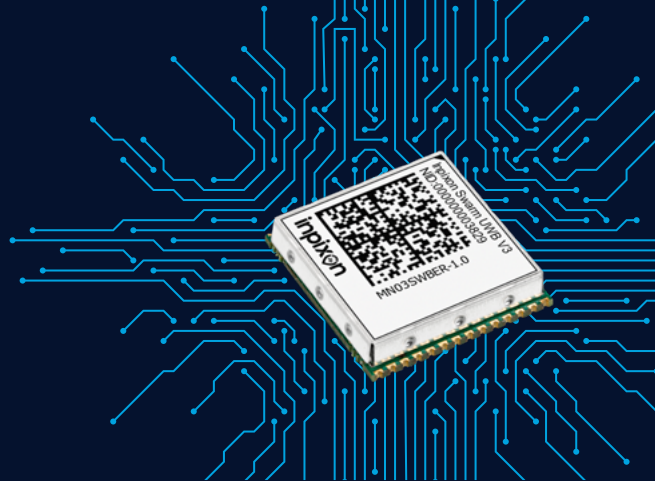

Tag-Ready Design

Featuring an onboard microcontroller unit (MCU), ultra-wideband RF transceiver, 3D accelerometer, UWB, NFC, and temperature sensors, the Inpixon Swarm UWB module significantly reduces design and integration time for a variety of products. With low external components required, you can just add a battery, antenna, and housing, and it is market ready. The module also comes with a comfortable and holistic API command set eliminating firmware implementation needs so there is no need to deal with RF design or low-level chip drivers. The Inpixon Swarm UWB can be operated as a standalone module for lowest possible cost or with an external host controller.

Precise UWB Technology

Inpixon's precise UWB technology helps track assets, personnel and IoT devices in true real-time, with 10-50 cm location accuracy for pinpoint precision - superior to other common positioning technologies. With strong immunity to interference and environmental disturbances, UWB delivers high reliability for performance in harsh, rugged environments, like noisy industrial facilities or deep underground mines.

3-in-1: RTLS, Ranging & Wireless Communication

Custom devices built with Inpixon modules can power concurrent time difference of arrival (TDoA) real-time tracking, autonomous time of flight (ToF) two-way ranging (SDS-TWR) and wireless communication of sensor data all in one device. For ranging applications, real-time distance can be measured between two modules via the Inpixon Swarm UWB's unique two-way ranging feature without the need for additional infrastructure. Concurrent wireless data communication makes it easy to coordinate a swarm of independent radio nodes. This versatility allows for custom RTLS-enabled devices that can power a multitude of location-aware applications.

Dimensions: 22 x 23 x 4.4 mm

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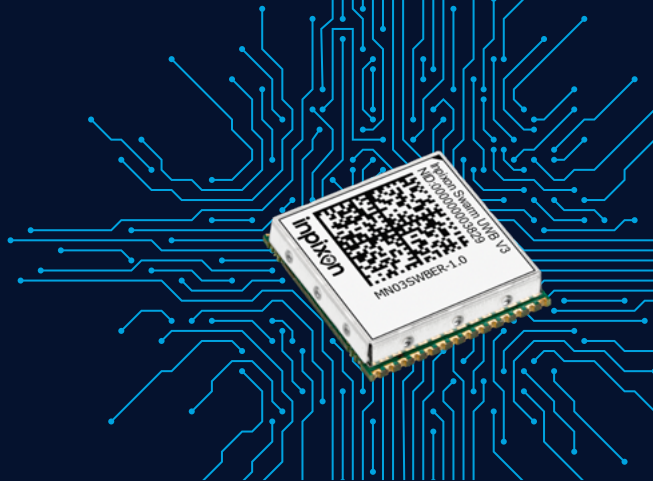


Inpixon Swarm API & Extended Interaces

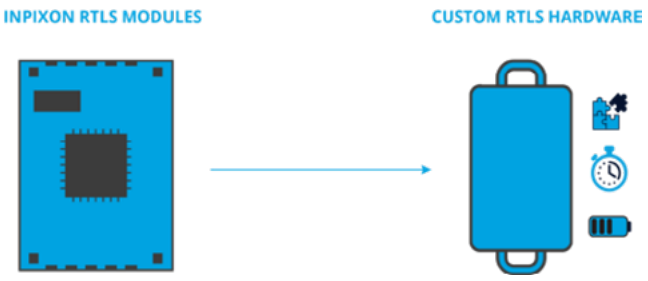
The Inpixon Swarm UWB offers an intuitive API, expediting application development and accommodating three protocols: ASCII and BINARY on the host interface, and AIR for wireless module control. The API seamlessly aligns with the sister product for Chirp, allowing application reuse across RF types. Additionally, BLE* and NFC* introduce new interfaces for API usage and communication with connected devices, paving the way for enhanced security and innovative applications.

Scalability

The Inpixon Swarm UWB enables scalable solutions with Inpixon RTLS deployments that support thousands of concurrently tracked entities, evolving deployment needs, and a wide range of use cases. Leveraging high-accuracy technology, the Inpixon Swarm UWB achieves centimeter-level accuracy in demanding scenarios. Its precise ranging capability enhances safety and and productivity in logistics, factories, recycling and mining.

Long-Battery Life & Smart Power Consumption

Featuring a durable battery architecture and four energy-saving modes, the Inpixon Swarm UWB module effortlessly adjusts to diverse requirements, extending battery life.



Firmware Over-The-Air (FOTA)

The Inpixon Swarm UWB module is wirelessly configurable, allowing management through both serial interface and over-the-air (OTA). With minimal maintenance requirements, features can be efficiently and securely added through FOTA, streamlining the update process and eliminating the need for flashing via serial UART interfaces.

Compact Form Factor for Custom Tags, Wearable & Device Designs

Inpixon Swarm UWB seamlessly integrates into wearable IoT devices, spanning wristbands, visitor badges, belt clips, and mining helmets. Alternatively, it can be incorporated into tags affixed to various assets like heavy mining equipment, forklifts, pallets, medical devices, or valuable items prone to theft. Unlock a multitude of location intelligence use cases, including asset tracking, worker safety, proximity alerts, visitor management, and vehicle collision avoidance, among others.

Embedded Movement & Temperature Sensing

Operated through an API, the on-board MEMS sensor detects 3D acceleration and temperature changes, enhancing location data and providing transparent performance insights.

* Supported through upcoming firmware updates

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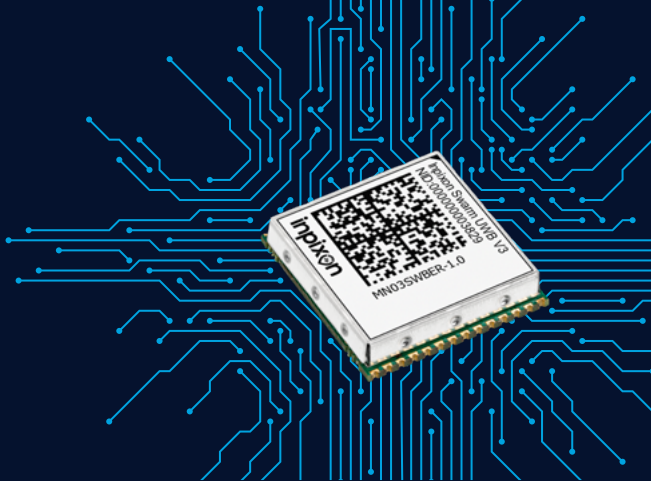
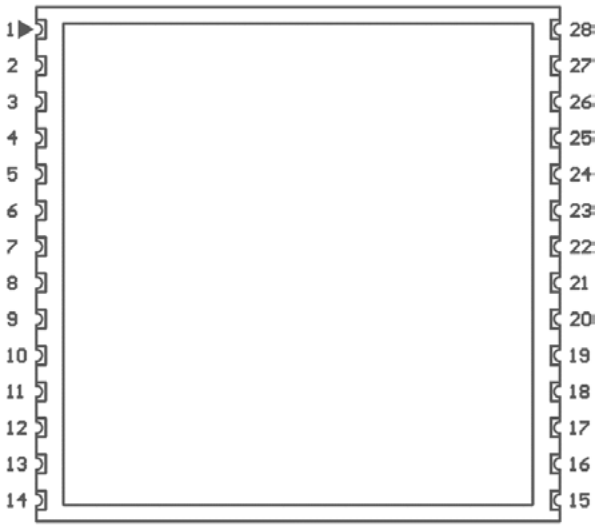


Inpixon Swarm UWB Pin Description

Pin No.	Pin Name
1	Reserved
2	Reserved
3	GND
4	Reserved
5	GND
6	Reserved
7	VIN
8	GND
9	A_MODE
10	/NRST
11	MOD_EN
12	USART1_TX
13	3V3
14	Reserved
15	Reserved
16	GND
17	RF_PORT
18	GND
19	USART1_RX
20	GND
21	ADC_IN
22	DIO_0
23	DIO_1
24	DIO_2
25	DIO_3
26	TX_ON
27	DIV_COEX
28	Reserved

Module Dimension & Pin Assignment



Inpixon Swarm UWB Dev Board

Kickstart your evaluation of prospective development projects with the Inpixon Swarm UWB Dev Board. Experience all the functionalities of the Inpixon Swarm UWB module via full configurability, GPIO ports, LEDs, antennas, and jumpers, as well our ready-to-use Inpixon Swarm API.

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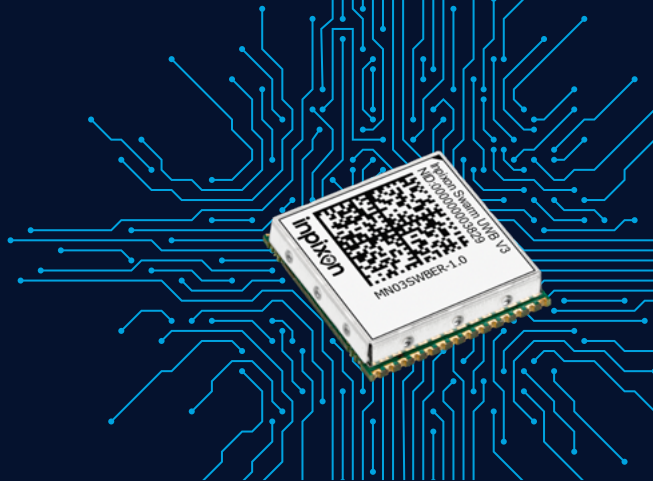

Applications

Inpixon's Swarm UWB helps you build tailored location-aware tags, wearables and IoT devices to power a wide array of use cases in many different environments.

Example Verticals: Industry 4.0, Mining, Healthcare

Potential Applications:

- **RTLS:** Asset & personnel tracking, process automation, geofencing, maintenance and repair tracking, and more.
- **TWR:** Collision avoidance systems, proximity detection, contact tracing and more.

Ordering Information

Order No.	Description
MN03SWBER	Inpixon Swarm UWB
BN03SWBEP	Inpixon Swarm UWB Dev Board

Sales Inquiries

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USA/Americas/Pacific: +1 (408) 702-2167
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New Customer?

Inpixon's Swarm UWB empowers you to create customized location-aware tags, wearables, and IoT devices for a diverse range of use cases in various environments.

Benefit from unparalleled support to swiftly launch your solution into the market. Our robust API design eliminates the need for low-level coding, reflecting our commitment to simplicity. Unlock the potential of your indoor data.

Specifications

Key Frequency Bands	6 bands with fc from 3.5 to 6.5 GHz
Data Rates	110 kbps, 850 kbps, 6.8 Mbps
Packet Size	up to 103 Bytes
TOA Capture Accuracy	< 0.33 ns (10 cm)
Ranging Distance	max 50 m - 80 m
MCU Type	Arm Cortex M4
Transmit Power Density	-41.3 dBm/MHz (Channel 5 6.5 GHz)
RF Sensitivity @ 110 Kbps*	-106 dBm typ.
RF sensitivity @ 6.8 Mbps*	-94 dBm typ.
RF Interface	50 Ω RF port (for external antenna)
Host Interface (UART)	115 kbps to 1 Mbps**
Power Supply	3.3 V – 5.5 V
Active Power Consumption TX	max. 90 mA
Active Power Consumption RX	max. 150 mA
Power Consumption in Sleep Mode	6.5 mA (transceiver disabled, all peripherals on)
Power Consumption in Snooze Mode	max. 7 µA (transceiver disabled, all peripherals off, wake-up by timer)
Power Consumption in Nap Mode	20 µA - max. 500 µA (peripherals configuration dependent)
Power Consumption in Deep-Sleep Mode	< 3 µA (device completely disabled)
Operating Temperature Range	-30 – +85 °C
Dimensions	22 x 23 x 4.4 mm
Weight	4 g

*Mode Dependent **Discrete value selection in [Baud]: 115200; 230400; 250000; 460800; 921600; 1000000*