Industrial-grade ultra wideband SoC for high precision tags and anchors

The Trimension SR048 is an industrial grade UWB SoC delivering robust, high precision ranging for tags and anchors. Paired with NXP's MCX MCUs, it streamlines omlox® based positioning designs.

Target applications

- Real-time location systems (RTLS)
- Industrial asset tracking
- Indoor mapping/auto-mapping
- Factory automation
- Building automation

Features

- Industrial-grade UWB SoC
- Designed to support high-precision industrial tags and anchors
- Seamless integration with MCX MCUs accelerates development
- omlox Core Zone ready solution delivered in combination with MCX W72

NXP's Trimension SR048 industrial-grade UWB SoC enables high-accuracy positioning across multiple UWB ranging modes, including Time Difference of Arrival (TDoA), Reconstructed Time of Flight (RToF) and Time-shift Time-of-Flight (TsToF). Its low-power architecture and broad operating temperature range (-40 °C to 115 °C) support compact, battery powered UWB enabled anchors, tags and smart industrial devices. Seamless integration with NXP's MCX W72 MCU accelerates development of UWB enabled solutions.

Localization with uplink TDoA

- **High precision UWB positioning**
  UWB's fine-ranging capabilities enable precise location for a wide range of use cases, including asset tracking, indoor positioning and device-to-device communication.

- **Uplink Time Difference of Arrival (UL-TDoA)**
  In UL-TDoA, the tag (mobile or asset device) transmits a simple uplink signal that is received by multiple synchronized anchors. Each anchor records the arrival timestamp, and the location engine calculates the tag's position based on the differences between these timestamps.

- **Tag-side energy efficiency**
  Because the tag only transmits a brief UWB burst and the anchors handle all processing, UL-TDoA minimizes tag-side power consumption. Ideal for compact, battery-powered industrial tags.

- **Scalable for dense deployments**
  A single uplink transmission can be received by many anchors simultaneously, enabling large-scale tracking of assets or workers in complex environments such as factories, warehouses, stadiums and other industrial RTLS deployments.

- **Compatible with open industrial RTLS standards**
  UL-TDoA is a core component of open standards such as omlox, enabling multi-vendor interoperability and simplifying deployment of standards-based industrial location systems.

Importance of a system solution

Delivering the Trimension SR048 as part of a complete, application-ready system solution represents a major step in NXP's industrial UWB

strategy. This approach accelerates development, ensures out-of-the-box interoperability and simplifies deployment of standards-based RTLS infrastructures. By combining hardware and application-ready software in a unified platform, NXP reduces integration complexity and helps customers deliver scalable, reliable industrial solutions faster.

System benefits

- Integrated two-chip solution

  – Trimension SR048 UWB transceiver+MCX W72 MCU

- Application-ready software reduces integration and certification effort

- Industrial-grade performance suited for demanding environments

- Accelerates development of omlox-compatible RTLS devices

  – Supports omlox uplink/downlink TDoA and device-level interoperability for RTLS infrastructures

- Application-ready platform enabling autonomous operation without a host in certain configurations

Taking the system solution approach one step further, in collaboration with SynchronicIT and Flowcate, NXP has developed the omlox Starter Kit. Designed to streamline evaluation, prototyping and adoption of omlox-based RTLS, the omlox Starter Kit is ready to use straight out of the box, supported by software updates to enable extended features and functionalities.

omlox starter kit contents

SynchronicIT devices

- 5 UWB tags/wearables

  – NXP Trimension SR048 and MCX W72 based dual chip solution for FiRa and omlox applications

  – Certified ready to use white-label tag for omlox Core Zone

  – Cortex-M33 core for user applications using Zephyr RTOS

  – Rich set of sensors aimed at location-aware applications

  – 50 x 41 x 15 mm

- 4 UWB anchors

  – NXP Trimension SR048 and MCX W72 based dual-radio solution for omlox applications

  – NXP Trimension SR250 for FiRa applications including 3D-ranging and UWB radar

  – PoE or power over USB-C (no power supply, no PoE switch provided)

  – Pre-certified white label satellite for omlox core zone

  – Rich set of sensors aimed at location-aware applications

  – Wi-Fi6 dual-band-BLE

  – Rain-proof

  – 75 x 140 x 25 mm

SynchronicIT software

- omlox Core Zone V2.1 for NXP MCX W72/Trimension SR048

- Realtime location engine (1-Y license, Auto-topology included)

Flowcate

- DeepHub® spatial data processing middleware

- Optional: operated Master Edge Linux Anchor with FRDM i.MX93/94

- Optional: DeepHub Analytics Suite for Spatial Insights

Actively driving the UWB ecosystem

NXP actively drives the UWB ecosystem, having pioneered UWB for ranging and radar and offering one of the industry's broadest portfolios through its Trimension solutions for mobile, industrial, IoT and automotive applications. As a founding member of the FiRa Consortium and an active contributor to industry groups such as omlox, the CCC and the CSA, NXP plays a leading role in defining interoperability standards, expanding the UWB ecosystem and enabling state of the art UWB-enabled devices.