QCOM AMR Reference Design

Proof-of-Concept Design: Autonomous Mobile Robot (AMR) with Accurate Indoor Positioning and Navigation

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Building autonomous mobile robots (AMRs) is a complex and challenging task that requires expertise in various domains, including robotics, artificial intelligence, computer vision, and more. These sophisticated machines must possess the ability to accurately perceive their surroundings, precisely localize themselves within their environment, and efficiently plan their trajectories while meticulously avoiding obstacles and adhering to stringent safety constraints. Furthermore, AMRs generate vast quantities of data from their sensors and interactions, necessitating efficient data collection, storage, management, and analysis to support their perception, localization, planning, and other essential functions.

To effectively address these requirements and expedite the development of AMRs, Arrow, Qualcomm, and eInfochips collaborated in creating the **QCOM AMR reference design.** It integrates sensor fusion technology and a triaxial IMU, for safe and effective navigation. STMicroelectronics (STM) motor drivers, coupled with STM power ICs and an ultra-low-power MCU, ensure efficient motion and long battery life. The software stack is built on the Robot Operating System (ROS2) framework. The QCOM AMR reference design accelerates autonomous robot development, backed by Arrow's engineering services for customization and cost-reduction.

Key Enabling Technologies for Indoor Navigation and Mapping

Sensor Fusion - Intel's RealSense and Inertial Measurement Unit (IMU)

Edge Computing - Qualcomm GPU

Algorithms - Visual Simultaneous Localization and Mapping (VSLAM)

Simulation & Scene Creation - Blender, and Gazebo

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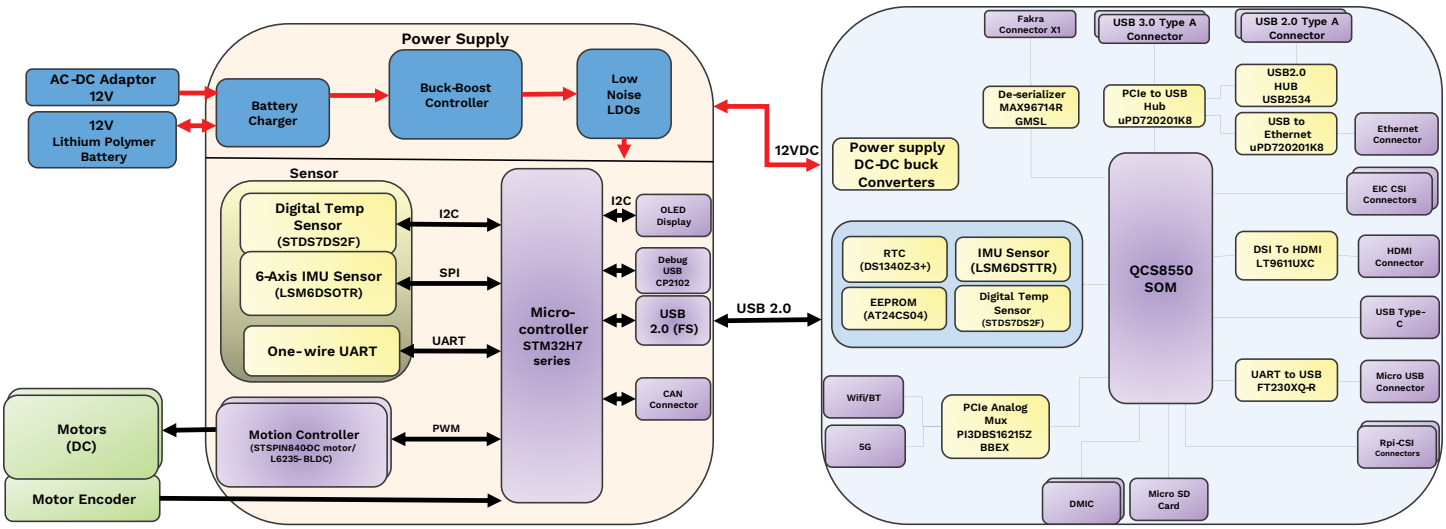
Application Use Cases

This proof-of-concept AMR can be used as a starting point for mobile robot design for use in laboratories, industry, warehousing, and logistics, transportation, shopping, and entertainment applications.

System Block Diagram



Controller Board Processor Board

Product Details:

Product name	Description
QCS8550 SOM	A System-on-Module based on Qualcomm® QCS8550 **RAM:** 8GB to 16GB LPDDR5x **Storage:** 128GB to 1TB UFS3.1
STM32H743VIT6	ARM® Cortex®-M7 STM32H7 Microcontroller IC 32-Bit Single-Core 480MHz 2MB (2M x 8) FLASH 100-LQFP (14x14)
STSPIN840	Compact dual brushed DC motor driver
LSM6DSLTR	Accelerometer, Gyroscope, Temperature, 6 Axis Sensor I2C, SPI Output
STTS751-0DP3F	Temperature Sensor Digital, Local -40°C ~ 125°C 11 b 6-UDFN (2x2)
L9616	Automotive High Speed Can Bus Transceiver
LD39100PUR	Linear Voltage Regulator IC Positive Adjustable 1 Output 1A 6-DFN (3x3)
L7981TR	Buck Switching Regulator IC Positive Adjustable 0.6V 1 Output 3A 8-VFDFN Exposed Pad

Contact Information

Please contact your Arrow FAEs to get access to this reference design:
robotics@einfochips.com

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