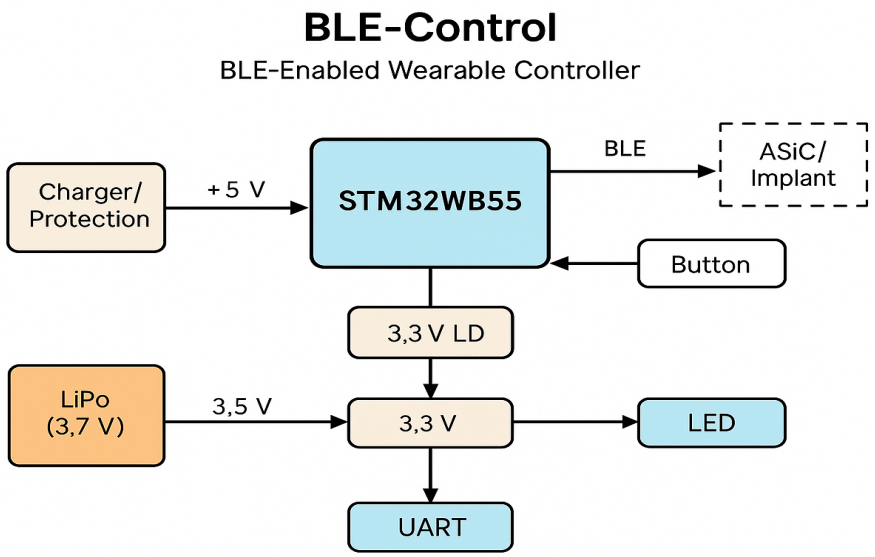
BLE-Control — BLE-Enabled Wearable Controller

BLE-Control is a compact, low-power BLE-enabled wearable controller designed to interface with an external device or implant via Bluetooth Low Energy. This project demonstrates end-to-end hardware design with firmware integration points, suitable for medical, wearable, or embedded control applications.

■ System Block Diagram



■ Hardware Overview

MCU: STM32WB55CGU6 (BLE 5.0 + Cortex-M4) **Battery System:** Single-cell LiPo with charger IC **Regulation:** 3.3 V LDO with low-Iq and enable control **User Interface:** Tactile button and LED **Debug:** USB-CDC or UART for diagnostics **Interfaces:** GPIO/I²C/SPI for expansion Full schematic and layout files can be found in the Hardware folder of the GitHub repository.

■ Firmware Features (MVP)

BLE advertising under custom name: BLE-Control UART debug output LED blink status Button-triggered events Low-power STOP/SLEEP modes (planned)

■ Repo Structure

BLE-Control/ ■■■ Hardware/ → Schematic, PCB, block diagram ■■■ Firmware/ → STM32CubeIDE project, BLE logic ■■■ Report/ → System overview PDF (this file) ■■■ README.md → Project summary ■■■ LICENSE

■■ Tools Used

Altium Designer (v20.2) — schematic & PCB layout STM32CubeIDE — BLE firmware project LTspice (optional) — power simulations GitHub Pages — documentation hosting

■ Status

✔ Block diagram complete ✔ Repo structure in place ✘ Schematic WIP ✘ Firmware: BLE + LED + UART ✘ Report draft