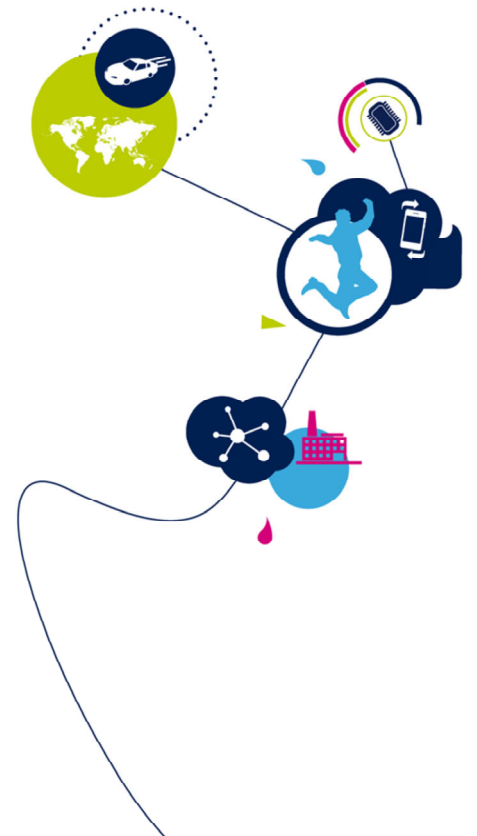


STM32WB55 Nucleo pack

STM32 Nucleo pack

Revision 1.0



Hello, and welcome to the presentation of the STM32WB55 Nucleo pack (P-NUCLEO-WB55). It covers the main features of this 2-board kit enabling the demonstration and testing of many wireless use cases.



- Discover our ultra-low-power wireless communication STM3255 Nucleo pack
 - 2-board kit based on the STM32WB microcontroller
 - USB dongle
 - STM32WB55 Nucleo board
 - Enables a wide diversity of applications
 - Comes with various packaged software examples

Application benefits

- Designed for low-power, wireless communication use cases
- Turnkey demonstration firmware
- Develop your own application

The STM32WB55 Nucleo pack offers everything required for users to get started quickly and develop applications easily. This pack consists of 2 boards both with an STM32WB microcontroller enabling a wide range of wireless applications.

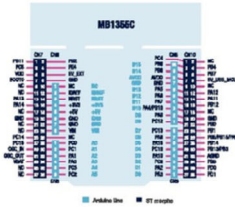
It comes with the comprehensive STM32 software HAL library together with various packaged software examples.

STM32WB55 Nucleo Pack insert card

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STM32WB55 Nucleo Pack Wireless and ultra-low-power BLE 5.0 & IEEE 802.15.4

Preliminary version



NUCLEO BOARD FEATURES

- STM32WB55RCV6 MCU
- PCB antenna and SMA connectors
- Flexible power supply supporting CR2032
- Dual USB Port (Application/debug)
- Multiple USER switch/LEDs
- Supports Arduino™ and ST morpho connectors
- Embedded ST-LINK/V2-1 debugger and programmer
- Arm® Mbed Enabled™

USB DONGLE

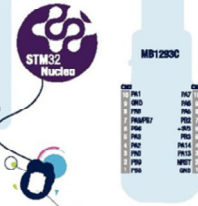
- STM32WB55CGU6 MCU
- PCB antenna and UFL connectors
- Outtable PCB

STM32WB55 FEATURES

- Arm® Cortex®-M4 MCU with 64 MHz/80 DMIPS and dedicated Arm® Cortex®-M0+ radio co-processor at 32 MHz
- **Multi-protocol:** BLE 5.0, 802.15.4, concurrent mode
- 1 Mbyte of Flash memory
- 256 Kbytes of SRAM
- **High RF performances:** RX: -96 dBm/-100 dBm; TX: +6 dBm

Download on the App Store

GET IT ON Google Play



Wireless and ultra-low-power STM32 Nucleo Pack based on STM32WB

GETTING STARTED

- 1/ Plug the Nucleo USB_STLINK connector (P2P Server) and USB dongle (P2P Client) to power sources. On the P2P server, you can see LED-blinking showing it is advertising during 1 minute.
- 2/ Once the P2P client is powered, push the SW1 button to start scanning (Blue LED ON 5s); it then connects automatically to the P2P server.
- 3/ Once connected, the green LED is blinking for each connection interval. The P2P client searches for the P2P service, LEDs & buttons characteristics, and enables notification.
- 4/ Pushing the SW1 button toggles the blue LED on the remote device.
- 5/ Pushing the SW2 button on the Nucleo board changes the connection interval (50 ms, 1 s). The effect is visible directly on the green LED of the Nucleo board.
- 6/ The demo software and several software examples that allow you to use the STM32 Nucleo and USB dongle features are available at www.st.com/stm32nucleo
- 7/ Develop your own applications using available examples.

SYSTEM REQUIREMENTS

- Windows® OS (7, 8, 10), Linux® 64-bit or macOS®
- USB Type-A to Micro-B cable

DEVELOPMENT TOOLCHAINS

- Keil® MDK-ARM®
- IAR® EWARM®
- GCC-based IDEs
- Arm® Mbed™ online

EMBEDDED SOFTWARE

STM32CubeWB MCU Package including LL & HAL drivers, BLE & Thread libraries, RTOS, USB & Touch sensing.

SOFTWARE TOOLS

- STM32CubeMX
- STM32CubeMonitorRF
- STM32CubeProg

Notes:
1. On Windows® only

STANDARD PROTOCOL



By using or installing (or applying) this evaluation kit, you accept all the terms of the EVALUATION PRODUCT LICENSE AGREEMENT available at www.st.com/legal

APPLICATIONS STORE



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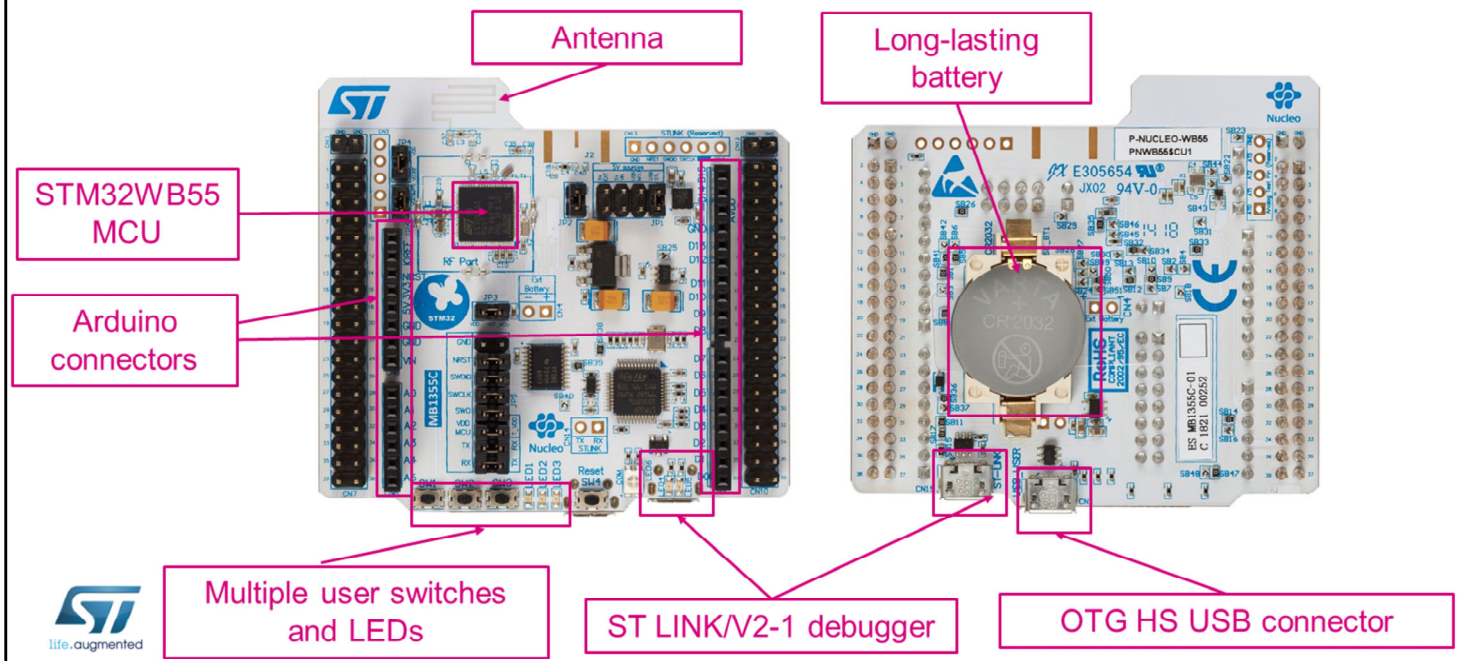
SPH05568C05

Order code: P-NUCLEO-WB55

This are the front and back sides of the STM32WB55 Nucleo Pack insert card.

STM32WB Nucleo Board

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This is the STM32WB55 Nucleo board. It offers several connectors for power and 2 USB peripherals. Multiple user switches and LEDs are also available.

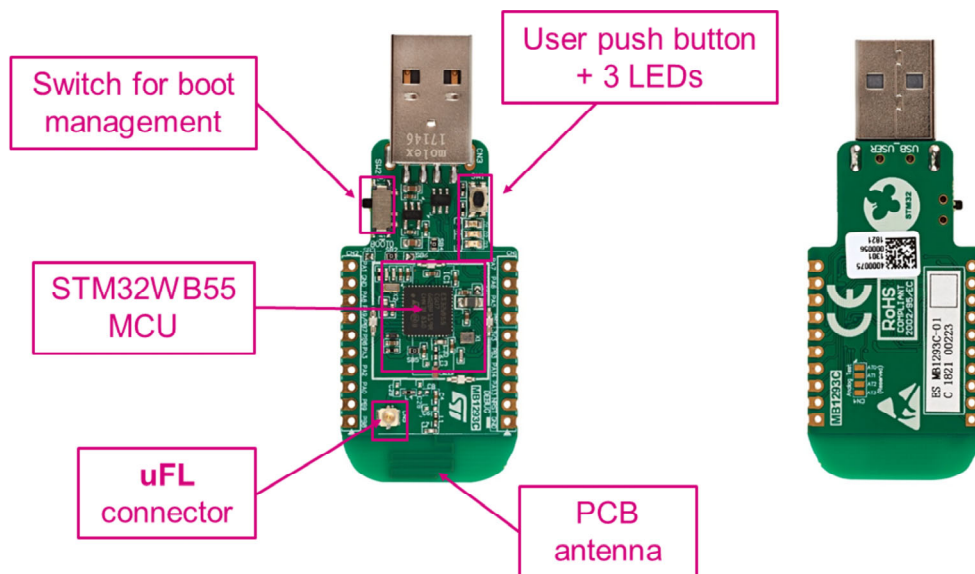
Support for Arduino connectivity ensures unlimited expansion capabilities with a large choice of specialized add-on boards.

It also embeds a debugger that helps you develop and test your own applications from the existing examples.

The STM32WB55 Nucleo board has many power supply options, either through the ST-LINK USB connector, a long-lasting battery cell or via external sources.

STM32WB Dongle

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This is the STM32WB USB dongle. It is a 2-layer PCB with a user push button and three user LEDs.

This dongle can interact with the STM32WB55 Nucleo board demonstrating the support of the main adopted GATT-based profiles and services.

Key features

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- STM32WB55 microcontroller on both boards
 - Arm® Cortex®-M4 core @ 64 MHz / 80 DMIPS
 - Arm® Cortex®-M0+ core @ 32 MHz
 - 1 Mbyte of Flash memory + 256 Kbytes of RAM
 - Support multiple wireless protocols: BLE 5.0 and IEEE 802.15.4 Concurrent mode
 - High RF performance:
 - BLE RX sensitivity: -96 dBm
 - 802.15.4 RX sensitivity: -100 dBm
 - TX: + 6 dBm
- The Bluetooth range on STM32WB55 microcontrollers is intended to be 10 m in normal working conditions, and up to 100 m in an open field with up to 8 simultaneous connections.

ARM

Cortex
Low-Power Leadership from ARM



Each board has an STM32WB55 microcontroller. This device embeds a powerful and ultra-low-power radio module compliant with the Bluetooth® Low Energy (BLE) specification v5.0 and with the IEEE 802.15.4 standard. The Bluetooth® range can be up to 100 meters in an open field with up to eight simultaneous connections.

Demonstration SW

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- Demonstration software available with the STM32WB55 Nucleo pack.
 - Based on the BlueNRG-MS software stack
 - Supports multiple roles simultaneously, and can act at the same time as Bluetooth LE sensor and hub device.
 - Supports the main adopted GATT-based profiles
 - Main application runs on the Arm® Cortex®-M4 core while the RF wireless stack runs on the Arm® Cortex®-M0+core.
- Latest versions of the demonstration source code are available at www.st.com/stm32nucleo .
- Comprehensive free software libraries and additional examples available with the STM32Cube package
- Support for a wide range of integrated development environments (IDE) including IAR™, Keil and GCC-based IDEs like Atollic® TrueSTUDIO®



The STM32WB55 Nucleo pack runs demonstration software based on the BlueNRG-MS software stack. It supports multiple roles simultaneously and can act at the same time as Bluetooth LE sensor and a hub device.

The Arm® Cortex®-M4 core controls the BlueNRG-MS software and manages the main part of the application while the Arm® Cortex®-M0+ core runs the RF BLE stack.

Once paired, the dongle and the Nucleo board interact using specific profiles and services.

The latest versions of the demonstration source code and associated documentation can be downloaded at www.st.com/stm32nucleo.

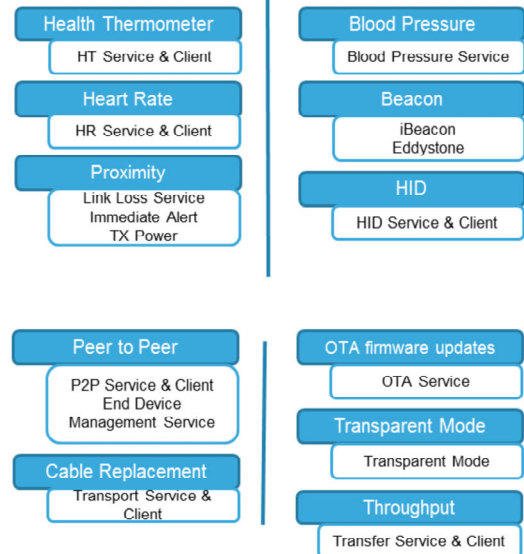
- This presentation summarizes the GATT-based applications developed for STM32WB and supported in the STM32Cube firmware library.

- BT SIG GATT-based applications**

- Beacon
- Blood Pressure
- Health Thermometer
- Heart Rate
- Human Interface Device (HID)
- Proximity

- Proprietary GATT-based applications**

- Cable Replacement
- Data Throughput
- P2P Server – P2P Client – P2P Router
- Over-the-air (OTA) firmware updates
- Transparent Mode – Direct Test Mode



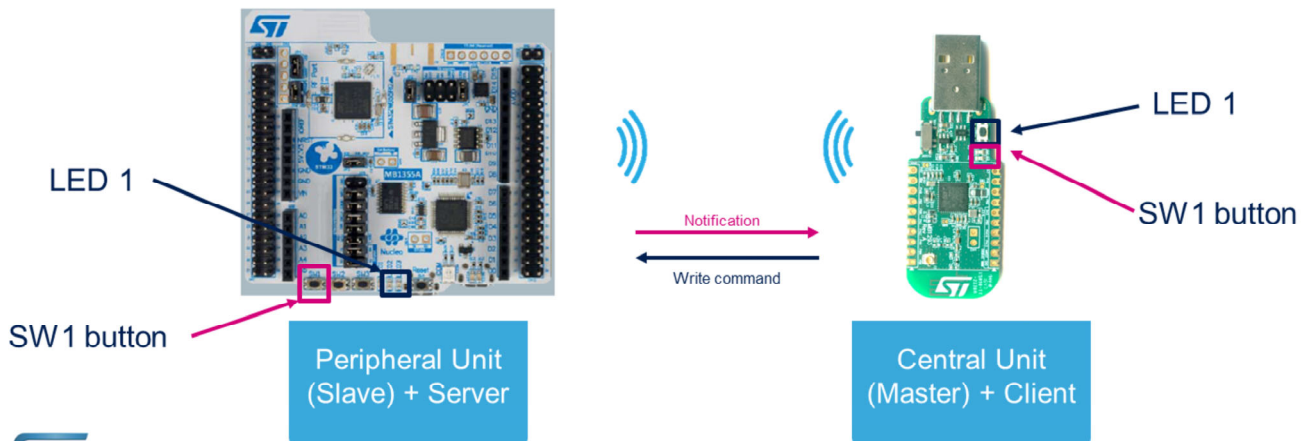
This slide summarizes the GATT-based applications developed for the STM32WB microcontroller and supported by the STM32Cube Firmware library.

These applications range from sensor applications like measuring heart rates or blood pressure to communication applications such as peer-to-peer connectivity or over-the-air updates.

STM32WB P2P Demo (Out Of Box)

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- Peer-to-Peer connections and data exchanges between two STM32WB MCUs
 - One server device, which broadcasts
 - One client device, which scans for services and characteristics



Note: The server and the client can be a Nucleo Board or a USB Dongle

This peer-to-peer demo uses both the Nucleo board and the dongle.

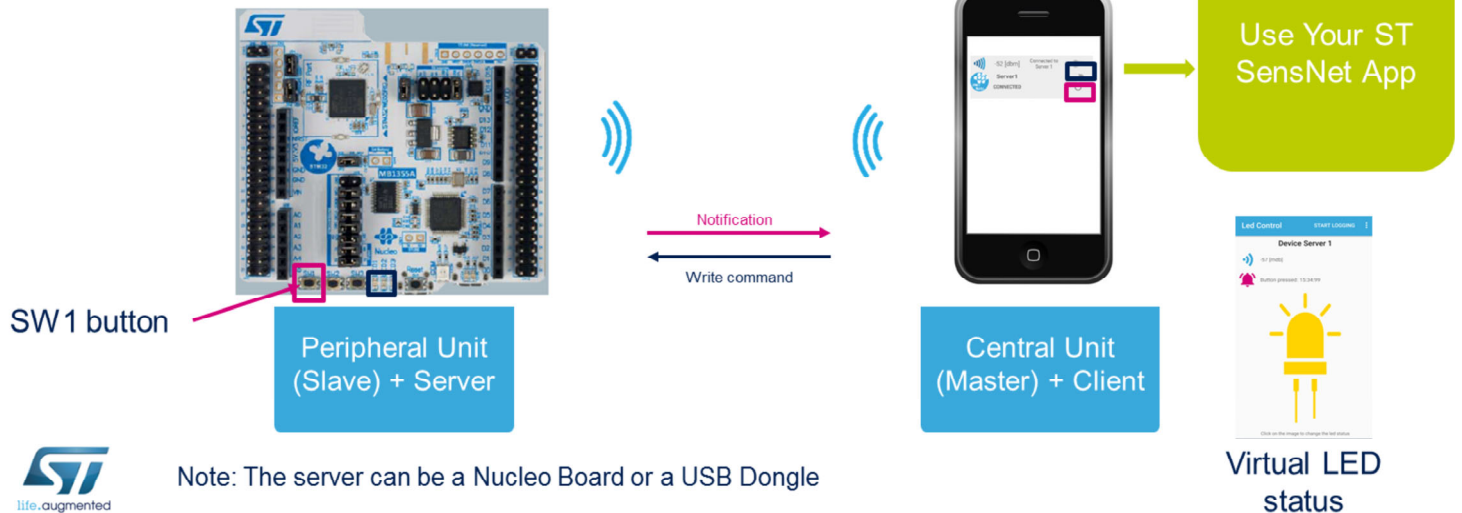
- At start-up, the Nucleo board, acting as a P2P server, broadcasts its presence for 60 seconds.
- At start-up, the dongle, acting as a P2P client, starts scanning for a P2P server.
- Once the P2P client detects the P2P server, it connects to it.
- Once paired to the P2P server, the P2P client loads its associated P2P services as well as the characteristics of any available LEDs and buttons. It also enables notifications.
- Press the SW1 button on one device to toggle the LED 1 on the other device.

Smartphone P2P Demo

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- Peer-to-Peer connections and data exchanges between an STM32WB MCU and a Smartphone Application

- One server device, which broadcasts
- One smartphone, acting as a client



This peer-to-peer connection and data exchange demo uses the Nucleo board and a smartphone.

- At start-up, the Nucleo board, acting as a P2P server, broadcasts its presence for 60 seconds.
- Launch the ST SensNet application on the smartphone and click “Start scanning”.
- Once the smartphone, acting as a P2P client, detects the P2P server, it connects to it.
- Once paired, the application main menu appears on the smartphone.
- Press the SW1 button on the Nucleo board to toggle the virtual LED status on the smartphone.

- Refer to www.st.com
 - Ordering information
 - Getting started manual, user manual and application notes
 - Board schematics
 - Application development environment support
 - Demonstration firmware sources



For more information on the STM32WB55 Nucleo pack, go to www.st.com. You can also watch our videos on our YouTube channel.

Thank you.