



The SYN765x is a next-generation device that seamlessly integrates wireless connectivity and compute processing, enabling applications that require multiple wireless technologies and advanced on-chip AI processing.

The SYN765x design emphasizes robust wireless performance, high responsiveness, an improved end-user experience, and low system cost. It incorporates an Arm® Cortex-M52 core and an Arm® Ethos-U55 NPU, enabling advanced capabilities such as AI-based Wi-Fi sensing and keyword detection.

The SYN765x is compatible with the Astra™ software development environment and the MCU SDK, enabling rapid application development. Additionally, the SYN765x SDK includes pre-integrated firmware support for all wireless connectivity options.



Benefits

- **Simplified Design:** Integrated Wi-Fi® 7 + MCU reduces complexity and accelerates time to market.
- **Enhanced End-User Experience:** On-device AI enables local speech recognition, sound event detection, and Wi-Fi presence detection.
- **Versatile Connectivity:** Supports Wi-Fi 7, Bluetooth® LE (BLE) with Channel Sounding, and IEEE 802.15.4 (Thread® & Zigbee®), with Matter®.
- **Robust Security:** Built-in Arm® TrustZone®, PSA Certified Level 3, and Class B compliance.

Applications

- Smart appliances
- Home automation
- Industrial IoT



AI-NATIVE TRIPLE COMBO CONNECTED COMPUTE SoC



MULTI-PROTOCOL CONNECTIVITY: WI-FI 7, BLE, THREAD/ZIGBEE, AND MATTER



AI-ENABLED WI-FI SENSING, BLE CHANNEL SOUNDING, AND SOUND EVENT DETECTION



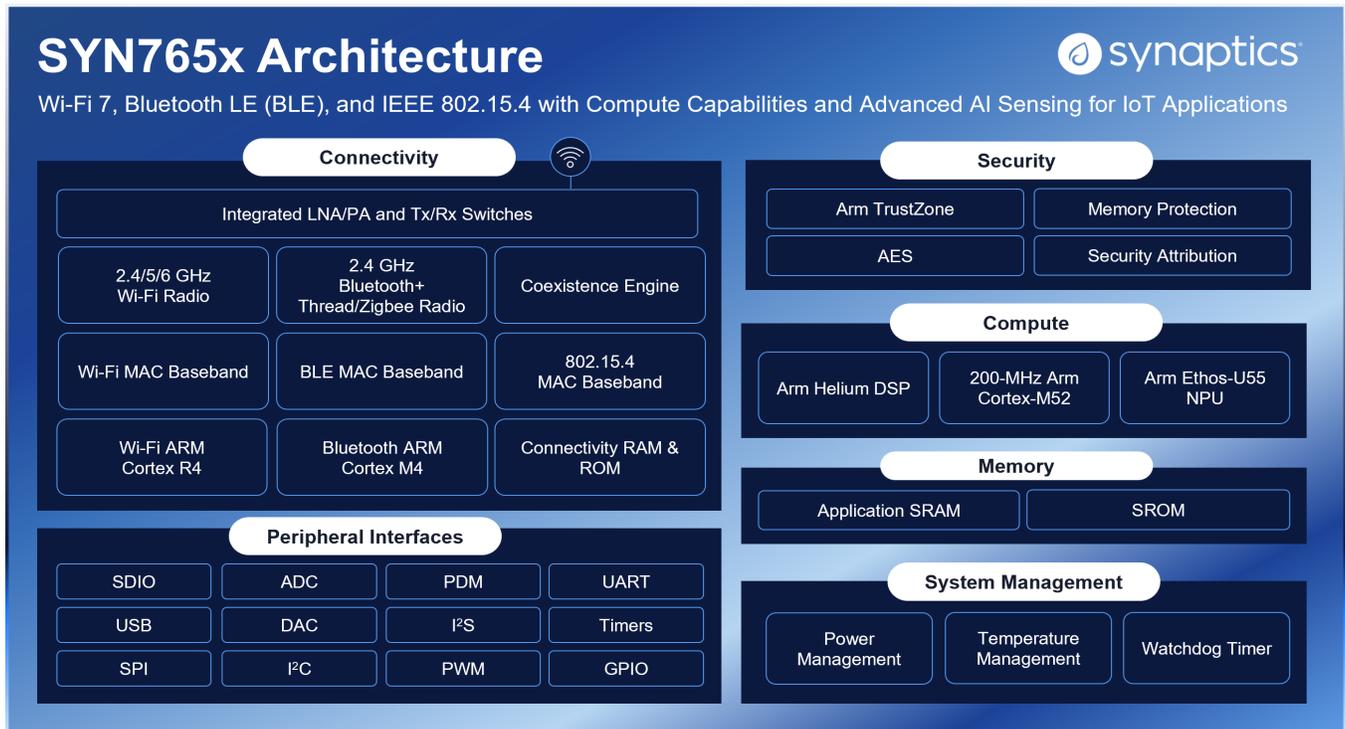
BROAD APPLICATION COVERAGE FROM RESIDENTIAL TO INDUSTRIAL

Features

- Wi-Fi 7 with integrated/optional PAs and LNAs, offering high Tx power and Rx sensitivity.
- Tri-band 1x1 Wi-Fi 7 on 2.4 GHz, 5 GHz, and 6 GHz.
- Integrated Bluetooth 6.0 with Channel Sounding for precise distance measurement.
- Arm Cortex-M52 processor with an ultra-low-power NN accelerator.
- Includes IEEE 802.15.4 radio for Zigbee, and Thread.
- Enables Matter-compliant interoperability.
- Diverse analog and digital peripherals: SDIO, SPI, UART, I²C, PDM, ADC, DAC, PWM, and USB.
- CSI-based sensing detects presence, activity, breathing, gestures, and micro-movements.
- Advanced audio processing enables real-time voice and sound detection.
- Embedded security includes Arm® TrustZone®, AES encryption, SAU, and MPU.
- Synaptics Smart Co-Ex™ optimizes coexistence of Wi-Fi and Bluetooth in 2.4 GHz.
- Supports FreeRTOS™ and Zephyr® operating systems.

Synaptics 765x Architecture

Wi-Fi 7, Bluetooth LE (BLE), and IEEE 802.15.4 with Compute Capabilities and Advanced AI Sensing for IoT Applications



System Block Diagram



Copyright

Copyright © 2025–2026 Synaptics Incorporated. All rights reserved.

Trademarks

Synaptics®, the Synaptics logo, Astra™, Smart Co-Ex™, and related marks are trademarks or registered trademarks of Synaptics Incorporated. Arm®, Cortex®, Ethos™, and TrustZone® are trademarks or registered trademarks of Arm Limited (or its subsidiaries). Wi-Fi® is a registered trademark of Wi-Fi Alliance®, Bluetooth® is a registered trademark of Bluetooth SIG, Inc. Thread® is a registered trademark of Thread Group. Zigbee® is a registered trademark of Connectivity Standards Alliance. Matter® is a registered trademark of Connectivity Standards Alliance. FreeRTOS™ is a trademark of Amazon Web Services, Inc. Zephyr® is a registered trademark of The Linux Foundation. All other trademarks are the property of their respective owners.

Contact

Visit our website at www.synaptics.com to locate the Synaptics office nearest you.

Notice

Use of the materials may require a license of intellectual property from a third party or from Synaptics. This document conveys no express or implied licenses to any intellectual property rights belonging to Synaptics or any other party. Synaptics may, from time to time and at its sole option, update the information contained in this document without notice.

INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED "AS-IS," AND SYNAPTICS HEREBY DISCLAIMS ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES OF NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS. IN NO EVENT SHALL SYNAPTICS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE OF THE INFORMATION CONTAINED IN THIS DOCUMENT, HOWEVER CAUSED AND BASED ON ANY THEORY OF LIABILITY, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, AND EVEN IF SYNAPTICS WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. IF A TRIBUNAL OF COMPETENT JURISDICTION DOES NOT PERMIT THE DISCLAIMER OF DIRECT DAMAGES OR ANY OTHER DAMAGES, SYNAPTICS' TOTAL CUMULATIVE LIABILITY TO ANY PARTY SHALL NOT EXCEED ONE HUNDRED U.S. DOLLARS.