

STM32N647X0H3Q dev



Overview

The STM32N647 development board is built around the STM32N647X0H3Q as its core. It offers robust AI computing power and CPU processing capabilities, making it suitable for artificial intelligence and machine hearing/vision application development. Additionally, the board features extensive onboard memory resources, various sensor peripherals, and communication interfaces, making it highly suitable for learning, developing, and validating the STM32N6 series chips.

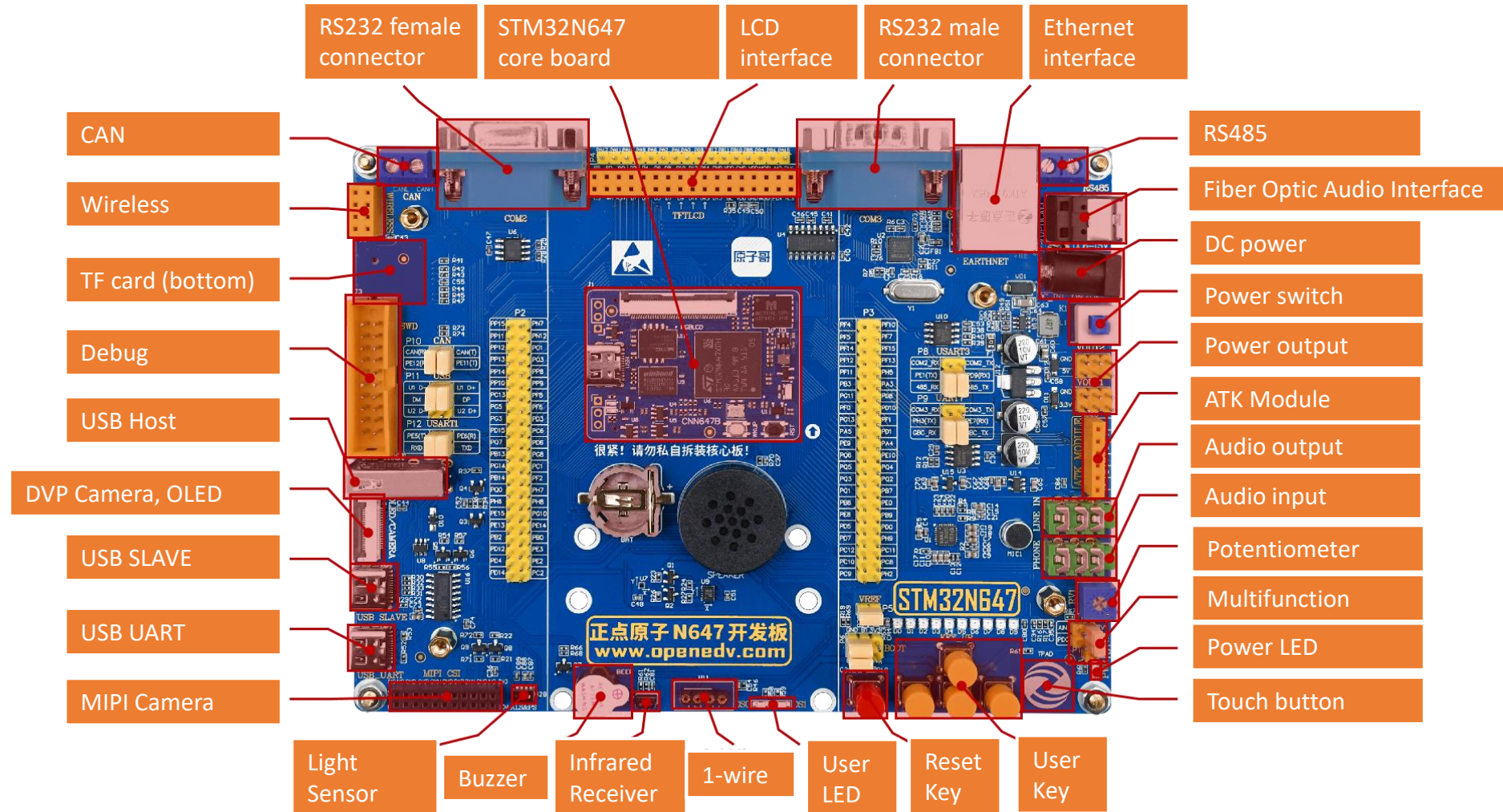
Order Code

Order Code	Brand	Description
E02026-001	ALIENTEK	STM32N647X0H3Q dev



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Base board hardware resource



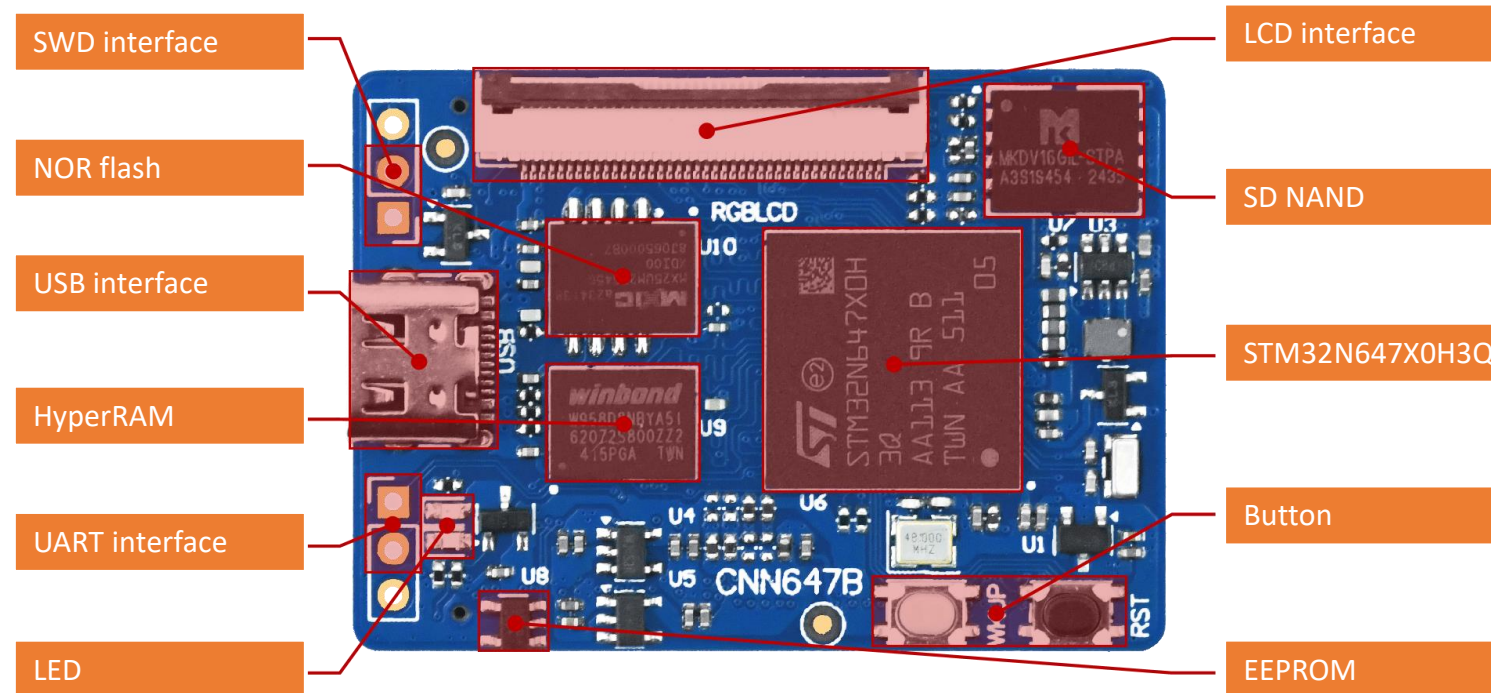
Base board hardware resource

Pin	Hardware	Description
1	STM32N647 core board	Please see details on next slides
2	Debug	It's for MCU online debug and firmware flash
3	Reset Key	Reset of MCU, NOR flash, HyperRAM and external LCD
4	User Key	User programmable button
5	User LED	User programmable LED
6	DC power	DC power input interface (6V~15V)
7	Power switch	Control power supply of board
8	Power output	Power supply for external circuit, 5V and 3.3V
9	Light sensor	Can be used to collect ambient light intensity and proximity distance
10	Infrared Receiver	Used for receiving infrared remote control signals
11	Touch Button	Used to implement capacitive touch key functionality
12	Buzzer	Used to emit fixed alert tones
13	Potentiometer	Used to control the input voltage for ADC
14	USB UART	Used for serial communication with a host computer
15	MIPI Camera	Used to connect to Punctual Atom's MIPI camera module
16	LCD Interface	Used to connect to various sizes and resolutions of Punctual Atom's MCU LCD screen modules (such as 2.8-inch, 3.5-inch, 4.3-inch, 7-inch, etc.)
17	TF Card	Used for connecting TF cards

Base board hardware resource

Pin	Hardware	Description
18	USB HOST	USB 2.0 interface supporting low-speed, full-speed, and high-speed modes. Supports USB Host mode
19	USB SLAVE	USB 2.0 interface supporting low-speed, full-speed, and high-speed modes. Supports both USB Host and USB Device modes
20	Ethernet Interface	Used for Ethernet connection, supporting up to Fast Ethernet (100M)
21	CAN Interface	Used for CAN communication
22	RS485 Interface	Used for RS485 communication
23	RS232 Male Connector	Used for RS232 communication
24	RS232 Female Connector	Used for RS232 communication
25	Wireless	Used to connect ALIENTEK WIRELESS and other SPI modules
26	DVP Camera/OLED Interface	Used to connect ALIENTEKOV5640 camera, OLED display, and other modules
27	1-Wire Interface	Used to connect ALIENTEK DHT11, DS18B20, and other sensors
28	Multi-function	Supports PWM DAC, ADC, touch buttons, and other functions
29	Audio Input	Used for audio Line-in input
30	Audio Output	Used for audio output
31	ATK MODULE	Used to connect ALIENTEK ATK MODULE
32	Fiber Optic Audio Interface	Used for audio input

Core board hardware resource



Core board hardware resource

Pin	Hardware	Description
1	STM32N647X0H3Q	ST's high-performance MCU based on ARM Cortex-M55 - 800MHz main frequency - Built-in 4.2MB SRAM - Built-in 600 GOPS Neural-ART accelerator - Built-in NeoChrom GPU, JPEG codec, and H.264 encoder
2	NOR flash	Capacity: 32MB, Octo SPI interface
3	HyperRAM	Capacity: 32MB, HyperBus interface
4	SD NAND	Capacity: 16Gb, 4-bit SD interface
5	EEPROM	Capacity: 2Kb, I2C interface
6	LED	- Blue LED: Power indicator - Red LED: User indicator
7	Button	- Black button: Reset button (functions for MCU, NOR Flash, HyperRAM, and external LCD) - White button: User button
8	LCD interface	- Used to connect Punctual Atom RGB LCD screen modules of various sizes and resolutions (e.g., 4.3-inch, 7-inch, 10.1-inch)
9	USB interface	- USB 2.0 interface, supports Low-Speed, Full-Speed, and High-Speed modes - Supports USB Host and USB Device modes
10	SWD interface	- Can be used for online debugging and firmware burning of the MCU
11	Uart interface	- Can be used for data communication with a host computer or other serial devices

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STM32N6 introduction

The STM32N6 series is ST's first high-performance STM32 MCU with integrated AI accelerator. Based on the ARM Cortex-M55 core running at up to 800MHz, it represents a high-performance MCU series and is the first to introduce Arm Helium vector processing technology, adding DSP capabilities to standard CPUs.

The STM32N6 incorporates an AI accelerator powered by ST's independently developed neural processing unit (ST Neural-ART accelerator™). Designed for energy-efficient edge AI applications, it operates at clock frequencies up to 1GHz with computational performance reaching 600 GOPS, enabling real-time neural network inference for computer vision and audio applications.

Embedded Memories 4.2 MB Contiguous RAM - BOOT 128 KB 8 KB Backup RAM 4 KB Debug RAM	Arm® Cortex®-M55 800 MHz TrustZone® MVE ST Neural-ART accelerator 600 Gops 	Connectivity 3x FDCAN 2x USB2.0 D/H HS + HS PHY 1x UCPD controller 3x I²C + 2x I3C (SDR) 5x UART, 5x USART 6x SPI (incl. 4x I2S) 1x ULP UART 1x Gbit ethernet with TSN
External memory interfaces - Hexa-SPI - Octo-SPI - Flexible memory controller (PSRAM, SDRAM, NOR, NAND, TFT-LCD) 2x SD/SDIO/MMC	System 96-bit unique ID - Watchdogs - Cyclic redundancy - Check (CRC) - XTAL & internal osc	Audio - SPDIF-RX/TX 2x SAI 1x MDF (6 filters) 1x ADF filter (with SAD)
Graphics - Chrom-ART™ accelerator - Chrom-GRC™ - NeoChrom GPU accelerator - LTDC/TFT-LCD Display controller	Security - Security boot - Secure RTC - Analog true RNG - Crypto/Hash - Tampering - OTP fuses 8 KB	Analog - Digital temperature sensor 2x 12-bit ADC 5 MSPS
Multimedia - H.264 encoder - JPEG codec	Camera pipeline - MIPI CSI-2, 2 lanes Camera I/F Parallel 16-bit with PSSI - Image signal processor	Timers/Control 2x 16-bit motor control PWM synchronized AC timers 12x 16-bit timers 5x 16-bit LP timers 4x 32-bit advanced timers

Revision History

Date	Revision	Change description
30/10/2025	1.0	Initial release