

User Guide

N32H497ZGL7_EVB Development Board Hardware User Guide

Introduction

The purpose of this document is to enable users to quickly familiarise themselves with the N32H497ZGL7_EVB development board, understand its functionality, usage instructions, and precautions, thereby facilitating MCU debugging and development based on the board.

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1 Hardware Development Instructions

1.1 Brief

The N32H497ZGL7_EVB development board is designed for prototyping National Semiconductor Corporation's high-performance 32-bit N32H49x series chips. This document provides a detailed description of the N32H497ZGL7_EVB development board's functionality, usage instructions, and important considerations.

1.2 Development board functions

The development board's primary MCU chip is the N32H497ZGL7, housed in an LQFP144 pin package. All functional interfaces are exposed for convenient customer development. Additionally, power supply and GND points are distributed across the board to facilitate debugging.

The primary functional interfaces are as follows:

Table 1-1 Primary functional interfaces

| No. | Interface | Interface Number | Description |
|-----|-------------|------------------|--------------|
| 1 | USB COMM | J4 | Mini USB 连接器 |
| 2 | USB DEBUG | J183 | NS-Link 调试 |
| 3 | USB OTG | J62 | USB OTG 升级 |
| 4 | USB TO UART | J54 | USB 转串口 |
| 5 | DC JACK | J59 | 12V DC 供电 |
| 6 | JTAG | J95 | JTAG 接口 |
| 7 | SWD | J101 | SWD 接口 |
| 8 | DVP | J61 | DVP 接口 |
| 9 | AUDIO CODE | J19 | 音频接口 |
| 10 | ETH | Y3 | 以太网接口 |
| 11 | LCD | J14 | LCD 接口 |

| | | | |
|----|----------------------|---------|---------------|
| 12 | SDIO(WIFI) | J76 | SDIO 接口 |
| 13 | BLE | J45 | BLE 接口 |
| 14 | ISO-7816 | J49 | ISO-7816 接口 |
| 15 | SPI | J102 | SPI 接口 |
| 16 | UART | J22 | UART 接口 |
| 17 | I2C | J69 | I2C 接口 |
| 18 | DHT11 | J60 | 温湿度传感器接口 |
| 19 | DAC | J63&J38 | DAC 接口 |
| 20 | CAN | J10&J17 | CAN 接口 |
| 21 | RS485 | J11 | RS485 接口 |
| 22 | LIN_PHY | J23&J24 | LIN 接口 |
| 23 | NSLINK_SWD/JTAG/UART | J3 | NSLINK 信号 |
| 24 | MCU IO | J28、J50 | 118 个 GPIO 管脚 |

In addition to the interfaces listed above, the pin definitions for the chip's comparators, ADCs, and general-purpose GPIOs can be found in the corresponding pin descriptions within the user manual. For modules on the development board such as the three-in-one environmental sensor, attitude sensor, infrared module, digital microphone, EEPROM, XSPI_PSRAM, XSPI_FLASH, SPI FLASH, and SDRAM, please refer to the relevant schematics and PCB documentation for the full-featured board.

1.3 Development board layout

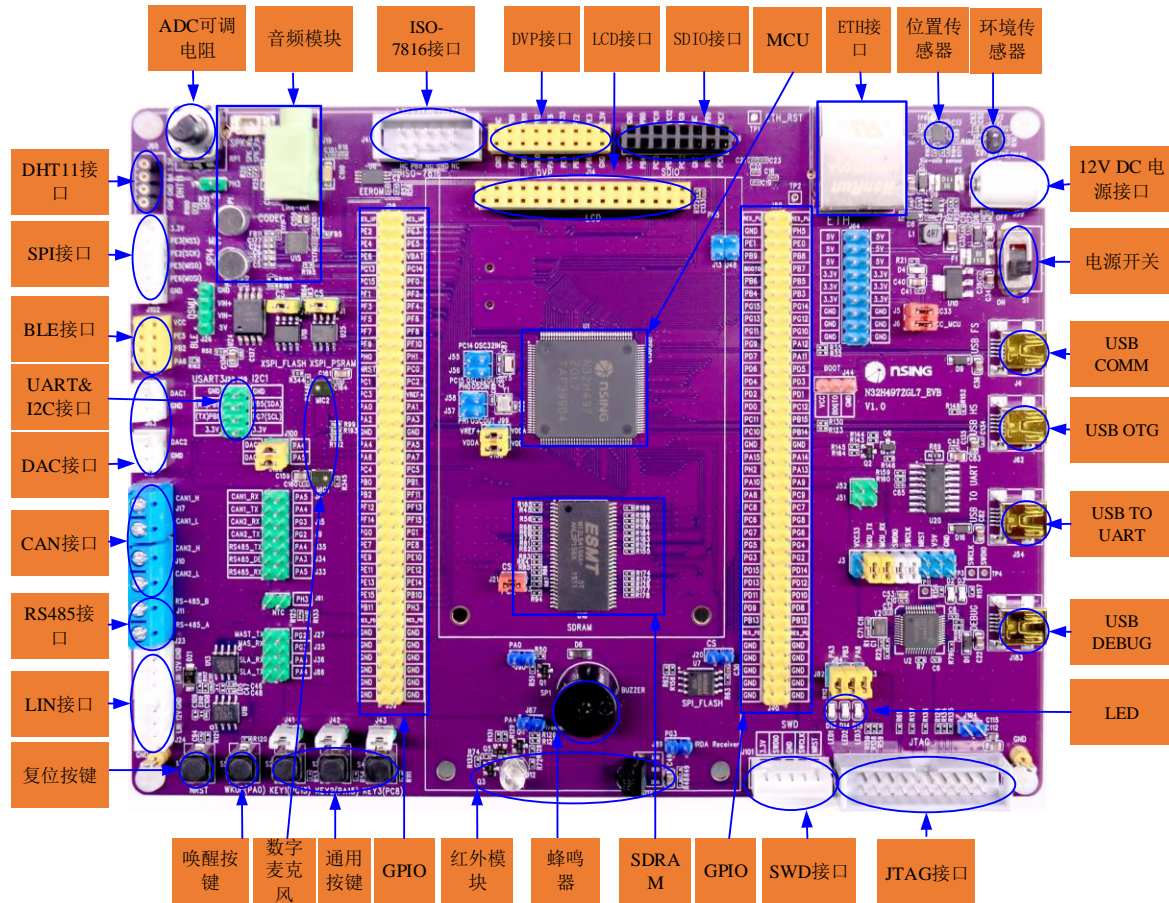


Figure 1-1 Development board Top-layer layout

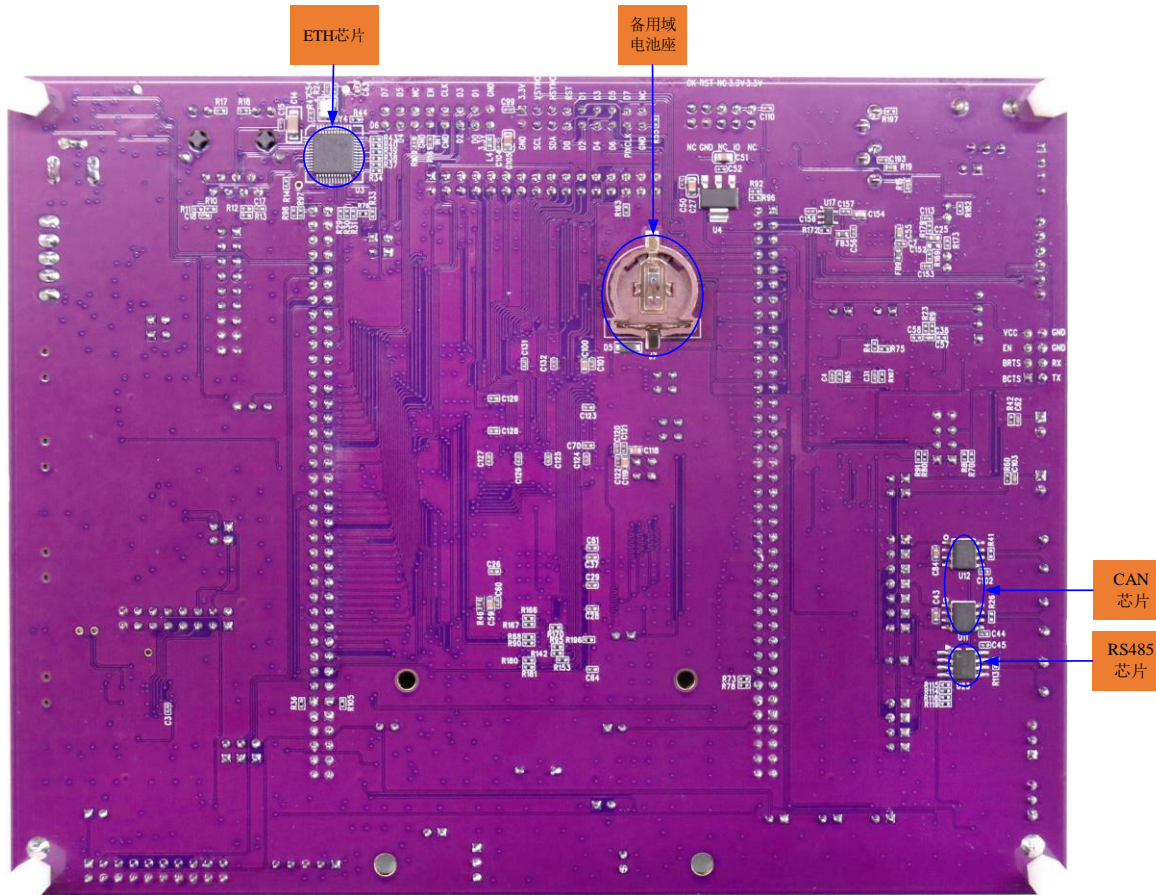


Figure 1-2 Development board Bottom-layer layout

1) Development Board Power Supply

The development board features six power supply methods: 1) DCJACK interface power supply, input voltage range 9–12V; 2) USB FS interface 5V power supply; 3) USB DEBUG interface 5V power supply; 4) USB HS interface 5V power supply; 5) USB TO UART interface 5V power supply; 6) On-board battery holder VBAT supplying 3V to the backup power domain. The 12V input via DCJACK is converted to 5V by an LDO regulator. This 5V supply, along with the other four 5V power sources, is controlled by switch S1. After passing through switch S1, the power input is converted to 3.3V via the LDO. This voltage then splits into two paths: one exclusively powers the MCU (selected via jumper J6), while the other supplies the remaining functional modules (selected via jumper J5). When power is supplied, the corresponding power indicator LEDs D11 (5V supply) and D4 (3.3V supply) illuminate.

2) NSLINK Interface

The NSLINK interface (J3) facilitates program download and debugging, supporting two download modes: JTAG and SWD. It also incorporates a virtual serial port, selectable via jumper J3.

3) JTAG and SWD Interfaces

The development board features an on-board JTAG interface (J95) and an SWD interface (J101).

4) DVP Interface

The development board incorporates a DVP interface (J61) supporting camera functionality.

5) RS485 Interface

The development board incorporates an RS485 interface (J11), with UART5 undergoing level conversion via the RS485 interface chip (SP3485EEN). To enable the RS485 interface, jumpers J33, J34, and J35.

6) CAN Interface

The development board incorporates two CAN interfaces. CAN1 and CAN2 are converted via a CAN transceiver (TJA1042T) to two CAN interfaces: J10 and J17. To enable the CAN interface, connect the corresponding jumpers: CAN1 (J9, J15) and CAN2 (J2, J8).

7) LIN Interface

The development board incorporates one LIN interface: MASTER_LIN (J23) and SLAVE_LIN (J24). To utilise the LIN interface, connect the corresponding jumpers J25, J27, J36, and J86.

8) DAC Interface

The development board incorporates two DAC interfaces (J63, J12). When utilising the DAC interfaces, connect the corresponding jumpers J100 and J105.

9) ADC Interface

The development board incorporates an on-board ADC potentiometer. When using the ADC, connect the corresponding jumper J18. Additionally, the board features an on-board NTC thermistor R125 for ADC sampling; connect the corresponding jumper J91 when in use.

10) SPI, UART, I2C Interfaces

The development board incorporates SPI (J102), UART (J22), and I2C (J69) interfaces.

11) BLE Bluetooth Interface

The development board incorporates a BLE Bluetooth interface (J45).

12) Temperature and Humidity Sensor Interface

The development board incorporates a DHT11 temperature and humidity sensor interface, pin J60.

13) CODEC

The development board incorporates an audio module (WM8904), supporting an electret microphone, analogue audio input (LINE_IN), analogue audio output (LINE_OUT), and direct connection to an external 8Ω speaker (BTL).

14) ISO-7816 Interface

The development board incorporates an ISO-7816 interface (J49).

15) SDIO Interface

The development board incorporates an SDIO interface (J76).

16) Attitude Sensor

The development board incorporates a high-performance 6-axis MEMS motion tracking device U6 (ICM-42670).

17) Triple-in-one Environmental Sensor

The development board incorporates an environmental sensor module U21 (AP3216C).

18) Digital Microphones

The development board incorporates two digital microphones: MIC1 and MIC2.

19) ETH

The development board employs an Ethernet chip (DM9162EP) which outputs via RMII to the RJ45 interface Y3. The Ethernet chip is located on the BOTTOM layer at pin number U3, while the RJ45

interface resides on the TOP layer.

20) EEROM, SDRAM

The development board incorporates an EEROM chip U8 (AT24C02) and an SDRAM chip U16 (M12L64164A-5TG2C). Both EEROM and SDRAM chips reside on the board's top layer. When utilising relevant modules, consult the schematic to connect corresponding jumpers.

21) SPI_FLASH, XSPI_FLASH, XSPI_PSRAM

The development board incorporates one SPI_FLASH chip U7 (W25Q128JVSQTR), one XSPI_FLASH chip U18 (P25Q40HA-SSH-IT), and one XSPI_PSRAM chip U25 (APS1604M-3SQR-SN). All SPI_FLASH, XSPI_FLASH, and XSPI_PSRAM components reside on the TOP layer. When utilising relevant modules, refer to the schematic to connect corresponding jumpers.

22) LCD

The development board incorporates a 4.3-inch LCD display interface, with the connector situated on the TOP layer at pin J14.

23) Infrared Module and Buzzer

The development board features an infrared transmitter circuit and an integrated infrared receiver. The infrared transmitter LED is located on the TOP layer at pin D12, while the integrated infrared receiver is positioned on the TOP layer at pin U14. The development board incorporates a single buzzer, situated on the TOP layer at pin number SP1. When utilising the infrared module, jumper caps J87 and J89 must be connected; when using the buzzer, jumper cap J90 must be connected.

24) LED & KEY

The development board incorporates three LEDs for development and debugging purposes, located on the TOP layer at pin numbers D13, D14, and D15. To utilise the LEDs, connect the corresponding jumper pins J82, J84, and J83. Additionally, the development board incorporates five mechanical buttons on the TOP layer: one reset button (S7), one wake-up button (S5), and three general-purpose buttons (S2, S3, S4). When using the general-purpose buttons, connect the corresponding jumper pins J41, J42, and J43.

25) GPIO Ports

118 independent GPIO ports, capable of multiplexing with other functional pins. For details, refer to the DS_N32H49x Series Data Manual.

1.4 Development Board Jumper Instructions

Table 1-2 Development Board Jumper Specifications

| No. | jumper position | Jumper function | Instructions for use |
|-----|-----------------|------------------------------|---|
| 1 | J5 | 3.3V Power Supply Selection | Power supply for all functional modules except the MCU must be connected. |
| 2 | J6 | 3.3V Power Supply Selection | Power supply for the MCU must be connected via this jumper cap. |
| 3 | J48、J13 | ETH Clock Selection | This jumper cap must be connected when using Ethernet functionality. |
| 4 | J44 | BOOT0 Pull-Up/Down Selection | Connect left pull-up, right pull-down. |
| 5 | J3 | NS_Link Jumper | Select the desired download method according to the silk screen markings. |
| 6 | J20 | SPI_Flash_CS | This jumper cap must be connected when using SPI_Flash. |
| 7 | J47 | XSPI_Flash_CS | This jumper cap must be connected when using XSPI_Flash. |
| 8 | J1 | XSPI_PSRAM_CS | This jumper must be connected when using XSPI_PSRAM. |
| 9 | J21 | SDRAM_CS | This jumper must be connected when using SDRAM. |
| 10 | J2、J8、J9、J15 | CAN Interface | This jumper must be connected when using the CAN interface. |
| 11 | J33、J34、J35 | RS485 Interface | This jumper must be connected when using the RS485 interface. |
| 12 | J25、J27、J36、J86 | LIN Interface | This jumper must be connected when using the LIN interface. |
| 13 | J41、J42、J43 | Mechanical Pushbuttons | This jumper must be connected when using mechanical buttons. |
| 14 | J82、J83、J84 | LED Indicators | This jumper must be connected when using the LED indicator. |

| | | | |
|----|-----------|-------------------------|---|
| 15 | J90 | Buzzer | This jumper must be connected when using the buzzer. |
| 16 | J87、J89 | Infrared Module | Connect this jumper when using the infrared module. |
| 17 | J18 | ADC Adjustable Resistor | This jumper must be connected when using the ADC adjustable resistor. |
| 18 | J91 | ADC NTC Thermistor | This jumper must be connected when using the ADC NTC thermistor. |
| 19 | J100、J105 | DAC Module | This jumper must be connected when using the DAC. |
| 20 | J51、J52 | USB to UART | This jumper must be connected when using the USB to UART module. |

1.5 Development board schematic

The schematic diagram for the N32H497ZGL7_EVB is detailed in the PDF file N32H497ZGL7_EVB_V1.0.pdf.

MC peripheral component specifications:

- 1) VCC_MCU: Place two capacitors near pin VDD (144-pin), rated at 10uF and 0.1uF respectively. Place 0.1uF capacitors near all other VDD power pins.
- 2) VDDA: VDDA is the analogue power supply, providing power to the ADC, DAC, and COMP. It is recommended to place one 0.1uF and one 10uF capacitor near the VDDA input pin.
- 3) VREF+: VREF+ is the reference voltage, providing reference levels for ADC and DAC. When VREF+ uses the internal reference source VREFBUF, it is recommended to place one 0.1uF and one 1uF capacitor near the VREF+ pin. When VREF+ is externally powered, it is recommended to place a 0.1uF capacitor and a 10uF capacitor near the VREF+ pin.

2 Historical versions

| Version | date | Remark |
|---------|------------|-----------------|
| V1.0 | 2025-12-12 | Create document |
| | | |
| | | |

3 statement

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