

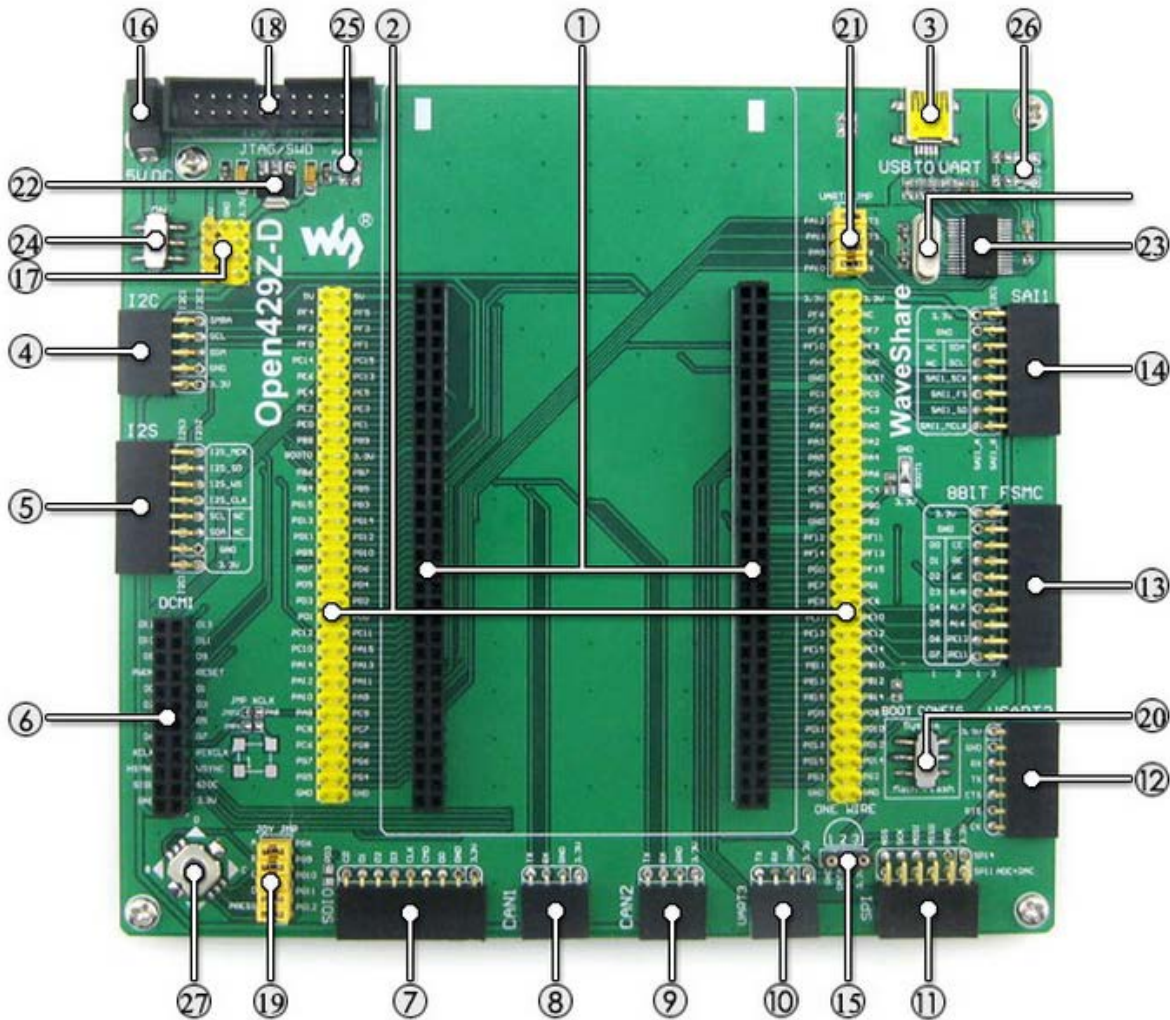
Open429Z-D User Manual

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1. Hardware introduction

1.1. What's on board



[Core interface]

1. **STM32F429I-DISCO socket**
for easily connecting the STM32F429I-DISCO
2. **MCU pins connector**
all the MCU I/O ports are accessible on expansion connectors for further expansion
3. **USB connector**
USB to UART via PL2303 USB TO UART board onboard MCU
4. **I2C1 / I2C2 interface**

[Other interfaces]

16. **5V DC jack**
17. **5V/3.3 V power input/output**
usually used as power output, also common-grounding with other user board
18. **JTAG/SWD interface**
for debugging/programming

[Jumper]

easily connects to I2C peripherals such as I/O expander (PCF8574), FRAM (FM24CLXX), etc.

5. **I2S2 / I2S3 / I2C1 interface**
for connecting I2S peripherals, such as Audio module.
6. **DCMI interface**
for connecting camera module
7. **SDIO interface**
for connecting Micro SD module, features much faster access speed rather than SPI
8. **CAN1 interface**
communicates with accessory boards which feature the CAN device conveniently
9. **CAN2 interface**
communicates with accessory boards which feature the CAN device conveniently
10. **UART3 interface**
easily connects to RS232, RS485, USB TO 232, etc
11. **SPI1/SPI4 + AD/DA interface**
easily connects to SPI peripherals such as DataFlash (AT45DBxx), SD card, MP3 module, etc MP3
SPI1 features AD/DA alternative function, supports connecting AD/DA module as well
12. **UART2 interface**
easily connects to RS232, RS485, USB TO 232, etc
13. **8-bit FSMC interface**
easily connects to peripherals such as NandFlash, Ethernet, etc
14. **SAI1 interface**
for connecting Audio peripherals, such as UDA1380 etc
15. **One-WIRE interface**
easily connects to ONE-WIRE devices (TO-92 package), such as temperature sensor (DS18B20), electronic registration number (DS2401), etc.

16. **Joystick jumper**

short the jumper to connect the joystick to default I/Os used in example code;
open the jumper to connect the joystick to custom I/Os via jumper wires.

17. **BOOT mode switch**

for configuring BOOT0 pin

18. **USB TO UART jumper**

[Components]

16. **AMS1117-3.3**

3.3V voltage regulator

17. **PL2303**

USB to UART MCU

18. **5V DC jack**

19. **Power LED**

20. **UART1 indicator LED**

21. **Joystick**

five positions

2. Demo

- KEIL MDK Version: 4.7
- Programmer/Debugger: STM32F429I-DISCO onboard ST-LINK V2
- Programming/Debugging interface: SWD
- Connect PC to the onboard USB TO UART connector via USB wire
- Serial port settings:

Select a proper COM port	
Baud rate	115200
Data bits	8
Stop bits	1
Parity bits	None
Flow control	None

2.1. ADC+DMA

- ◆ Overview
 - AD acquisition demo
- ◆ Hardware connection



- Connect Analog Test Board to SPI1 (ADC+DAC) connector

- ◆ Operation and result

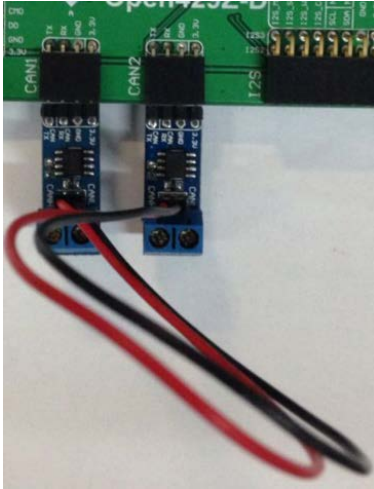
- Rotate the onboard potentiometer, the below message will be printed on the serial debugging assistant:

```

The current AD value = 1.0264V
The current AD value = 1.2319V
The current AD value = 2.6837V
The current AD value = 2.4750V
  
```

2.2. CAN1 TO CAN2-Normal

- ◆ Overview
 - CAN demo
- ◆ Hardware connection
 - ◆ Hardware connection



- Connect the two CAN modules to the onboard CAN interfaces

-
- ◆ Operation and result
 - You may see the below result on the serial debugging assistant:

```

SYSCLK: 168M
HCLK: 168M
PCLK1: 42M
PCLK2: 84M
CAN Printf Example: Press the USER key observations
CAN2 Receive Data
CAN2 ID 123
CAN2_DATA0 34
CAN2_DATA1 a2
CAN2_DATA2 d8
CAN2_DATA3 42
CAN2_DATA4 a1
CAN2_DATA5 44
CAN2_DATA6 a4
CAN2_DATA7 69
CAN1 Receive Data
  
```

2.3. DAC

- ◆ Overview
 - DAC demo
- ◆ Hardware connection



- Connect the Analog Test Board to the SPI1 (ADC+DAC) connector
- Connect the Analog Test Board onboard 5V interface to the board onboard 5V interface via jumper wire.

- ◆ Operation and result
 - You may hear sound from the Analog Test Board

2.4. DS18B20

- ◆ Overview
 - DS18B20 demo
- ◆ Hardware connection
 - Connect the DS18B20 module to the one-wire connector
- ◆ Operation and result
 - The below information will be printed on the serial debugging assistant

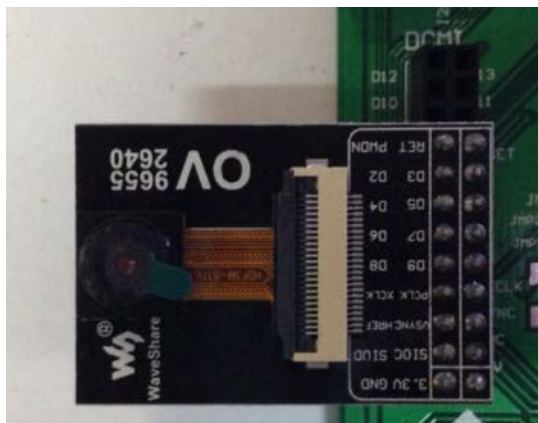
```

*****
DS18B20's ID :0x28 0x76 0xfe 0x49 0x5 0x2 0x0 0x20 Temperature:8 °C
Temperature:30 °C
Temperature:29 °C
Temperature:30 °C
Temperature:29 °C
Temperature:30 °C
Temperature:29 °C
Temperature:30 °C

```

2.5. OV2640

- ◆ Overview
 - Camera OV2640 demo
- ◆ Hardware connection



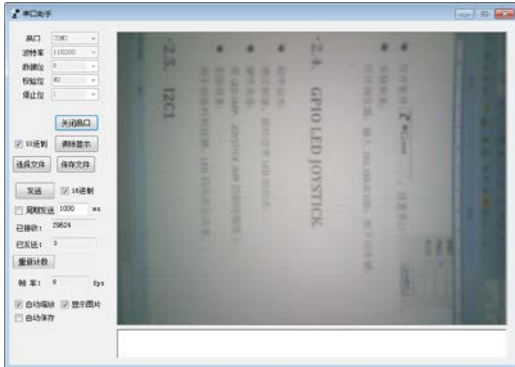
- Connect the OV2640 Camera Board to the onboard DCMMI connector

Launch the serial debugging assistant, configuring the data as below:

COM: COM3
 Baud rate: 115200
 Data bits: 8
 Parity bits: NO
 Stop bits: 1

◆ Operation and result:

Press “user” key, the captured image displayed on the serial debugging assistant:



2.6. GPIO_Key

◆ Overview

joystick demo

◆ Hardware connection

Short the JOYSTICK JMP on board

◆ Operation and result

Press the joystick, message will be printed on the serial debugging assistant accordingly.

2.7. I2C

◆ Overview

I2C EEPROM demo

◆ Hardware connection



➤ Connect the AT24/FM24 Board to the board via I2C connector (I2C1 or I2C2, depending on the software configuration).

◆ Software configuration

The module connect to I2C1 connector	The module connect to I2C2 connector
<pre>#define Open_I2C1 //#define Open_I2C2</pre>	<pre>//#define Open_I2C1 #define Open_I2C2</pre>

◆ Operation and result

➤ The below information will be printed on the serial debugging assistant:

```
*****
EEPROM 24C02 Write Test
EEPROM 24C02 Write Test OK
EEPROM 24C02 Read Test
EEPROM 24C02 Read Test OK
```

2.8. I2S_UDA1380

- ◆ Overview
 - I2S_UDA1380 demo
- ◆ Hardware connection



- Connect the UDA1380 Board to the board via I2S connector.
- Connect the earphone to the UDA1380 Board via LINEOUT connector

- ◆ Operation and result
 - You should hear music when press the RESET key

2.9. NandFlash_SCB0

- ◆ Overview
 - NandFlash demo
- ◆ Hardware connection



- Connect the NandFlash Board to the board via I2C2 connector.

- ◆ Operation and result
 - The below information will be printed on the serial debugging assistant:

```
SYSCLK:180M
MCLK:180M
PCLK1:45M
PCLK2:90M
Welcome to use NAND FLASH modules
*****
Nand Flash ID = EC, F1, 00, 95 Type = K9F1G08U0B

Written to the number of:
0 1 2 3 4 5 6 7 8 9 a b c d e f 10 11 12 13 14 15 16 17 18 1
9 1a 1b 1c 1d 1e 1f 20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d
2e 2f 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f 40 41 42
3 44 45 46 47 48 49 4a 4b 4c 4d 4e 4f 50 51 52 53 54 55 56 57
58 59 5a 5b 5c 5d 5e 5f 60 61 62 63 64 65 66 67 68 69 6a 6b 6c
d 6e 6f 70 71 72 73 74 75 76 77 78 79 7a 7b 7c 7d 7e 7f 80 81
82 83 84 85 86 87 88 89 8a 8b 8c 8d 8e 8f 90 91 92 93 94 95 96
7 98 99 9a 9b 9c 9d 9e 9f a0 a1 a2 a3 a4 a5 a6 a7 a8 a9 aa ab
```


2.10. SAI

- ◆ Overview
SAI demo
- ◆ Hardware connection



- Connect UDA1380 Board to the board via SAI1 connector.
- Connect the earphone to the UDA1380 Board via LINEOUT connector.

- ◆ Operation and result
You should hear music when press the RESET key.

2.11. SD_FatFS

- ◆ Overview
SD_FatFS demo
- ◆ Hardware connection



- Connect the Micro SD Storage Board to the board via SDIO connector.
Insert the SD card to the Micro SD Storage Board socket.

- ◆ Operation and result
Message will be printed on the serial debugging assistant.

2.12. SDIO

- ◆ Overview
SDIO demo
- ◆ Hardware connection



- Connect the Micro SD Storage Board to the board via SDIO connector. Insert the SD card to the Micro SD Storage Board socket.

- ◆ Operation and result
Message will be printed on the serial debugging assistant.

2.13. SPI

- ◆ Overview
SPI demo
- ◆ Hardware connection



- Connect the AT45DBXX DataFlash Board via SPI connector. (SPI1 or SPI4, depending on the software configuration)

- ◆ Software connection

Module connect to SPI1 connector	Module connect to SPI4 connector
<code>#define Open_SPI1</code> <code>//#define Open_SPI4</code>	<code>//#define Open_SPI1</code> <code>#define Open_SPI4</code>

- ◆ Operation and result
Info/messages printed on the serial debugging assistant:

```

SYSCLK: 180M
HCLK: 180M
PCLK1: 45M
PCLK2: 90M

Welcome to WaveShare STM32F4 series MCU Board Open429Z-D
SPI is ready!
AT45DBXX had been Init!
AT45DBXX ID is 0xf 0x24 0x0 0x0

FLASH AT45DBXX Write Test:
 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41
42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62
63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104
105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
    
```

2.14. USART

- ◆ Overview
USART demo
- ◆ Hardware connection
- ◆ Operation and result

Info/messages printed on the serial debugging assistant:

```
Waveshare!  
Waveshare!  
Waveshare!
```

3. Version update records

Version	Modification	Date	Author
V1.0	Initial Release	2014/05/17	Waveshare team