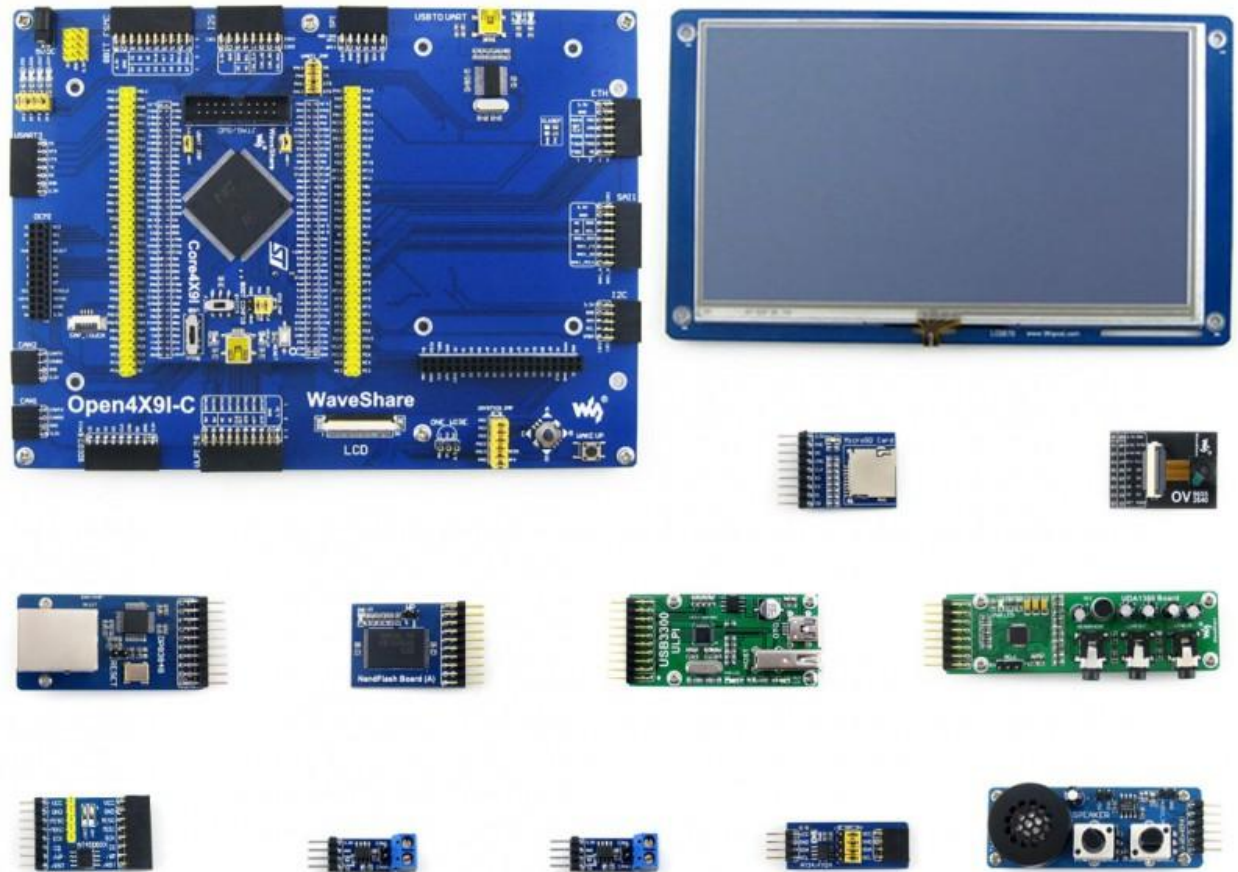


Open429I-C Package B



Introduction

STM32 development board designed for STM32F429I, features the STM32F429IGT6 MCU, and integrates various standard interfaces, pretty easy for peripheral expansions.

[More](#)

Getting Started with modules

We provide various modules for Open429I-C development board aiming to improve your development efficiency. These modules are not only designed for STM32 but also can be used for many other MCU platforms. Let's begin with the demos.

Development Environment

- KEILMDK Version : 4.7 or above.
- Programmer/Debugger: STM32F429I-DISCOonboard ST-LINK V2
- Programming/Debugging interface:JTAG/SWD
- Results of demo which based on serial portare all checked via onboard PL2303; connect the USB cable to the USB TO UART interface.
- PC's serial port settings:

Baud rate	115200
Data bits	8
Stop bits	1
Parity bits	None
Flow control	None

ADC+DMA

- Overview

AD acquisition demo, DMA transfer

- 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:

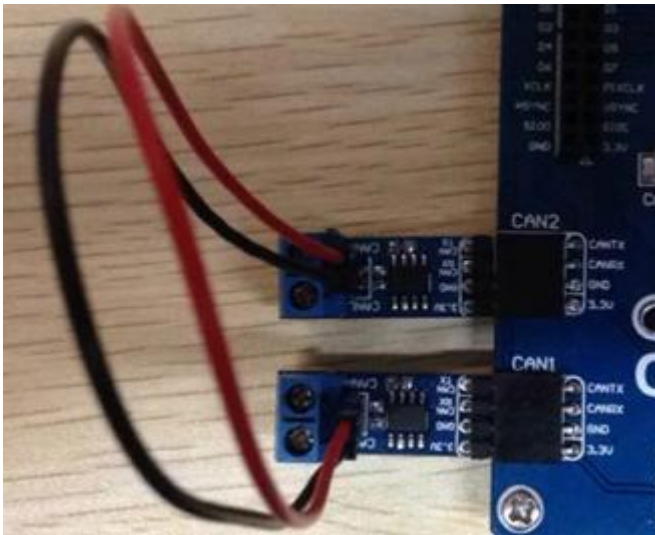
```
*****
The current AD1 value = 2.98V
The current AD2 value = 1.87V
*****
The current AD1 value = 2.86V
The current AD2 value = 1.75V
```

CAN1TO CAN2-NORMAL

- Overview

CAN1 TO CAN2 communication demo

- Hardware connection



Connect the two CAN modules to the onboard CAN1 and CAN2 interface

Connect the two CAN modules via jumper wire (CANL<->CANL, CANH<->CANH)

- 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
Can1 ID 321

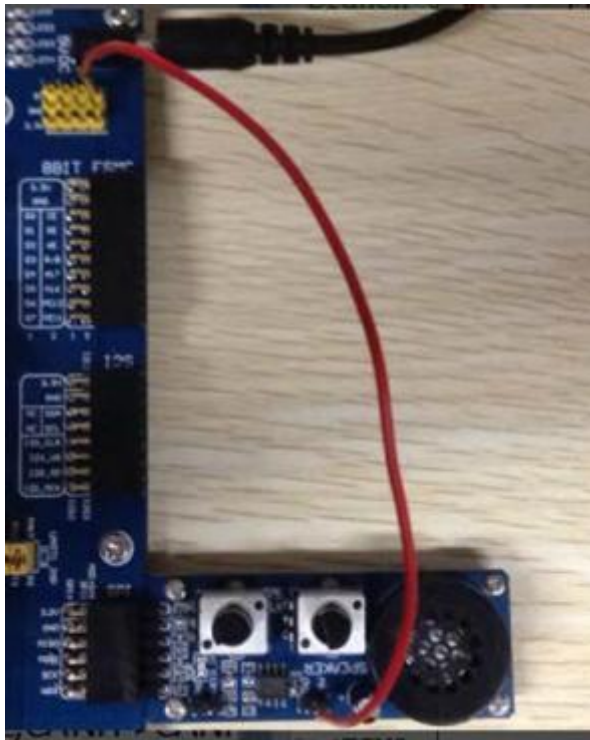
```

DAC

- Overview

DA output demo, output via DMA channel

- 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.

DS18B20

- Overview

Detect the temperature by DS18B20.

- Hardware connection

Connect the DS18B20 to the one-wire socket

- Operation and result

The below information will be printed on the serial debugging assistant

```

SYSCLK: 168M
HCLK: 168M
PCLK1: 42M
PCLK2: 84M
DS18B20 Example
DS18B20's ID: 0x280x76 0xfe 0x49 0x5 0x0 0x0 0x76
Temperature: 0.8°C
Temperature: 85.0°C
Temperature: 28.0°C
  
```

Temperature: 27.93°C

GPIO_LED_KEY

- Overview

IO input, output demo

- Hardware connection

Fit all the jumpers LED JMP (PF6,PF7, PF8, PF9), JOYSTICK JMP.

- Operation and result

TheLED status will keep changing when push the buttons.

I2C

- Overview

Read and write data on E2PROM via I2C protocol

- Hardware connection



Connect the AT24/FM24 Board to the board via I2C connector (I2C1or I2C2, depending on the software configuration).

- Software configuration

Connect the module to I2C1 interface Connect the module to I2C2 interface

```
#define Open_I2C1                // #define Open_I2C1
// #define Open_I2C2            #define Open_I2C2
```

- Operation and result

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

```
*****I2C Example*****
SYSCLK: 180M
HCLK: 180M
PCLK1: 45M
PCLK2: 90M
EEPROM 24C02 WriteTest
EEPROM 24C02 WriteTest OK
EEPROM 24C02 WriteTest
```

EEPROM 24C02 WriteTest OK

I2S_UDA1380

- Overview

Drive the UDA1380 Board to play music via I2S protocol

- Hardware connection



Connect the UDA1380 Board to the board via I2S interface.

Connect the earphone to the UDA1380 Board via LINEOUT interface

- Operation and result

You should hear music when press the RESET key.

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

```
SYSCLK: 180M
HCLK: 180M
PCLK1: 45M
PCLK2: 90M
Welcome to useUDA1380 I2S test:
WaveDataLength:1003324
Started to Transmission data.
UDA1380 Init OK!
AudioRemSize:370563
AudioRemSize:305028
AudioRemSize:239493
AudioRemSize:173958
AudioRemSize:108423
AudioRemSize: 42888
AudioRemSize: 0
AudioRemSize: 0
Data transmission to complete
Started to Transmission data
```

LCD_4.3INCH

- Overview

The 4.3inch LCD resolution is 272 x480 (Pixel); with stand-alonetouch controller.

LCD display character demo.

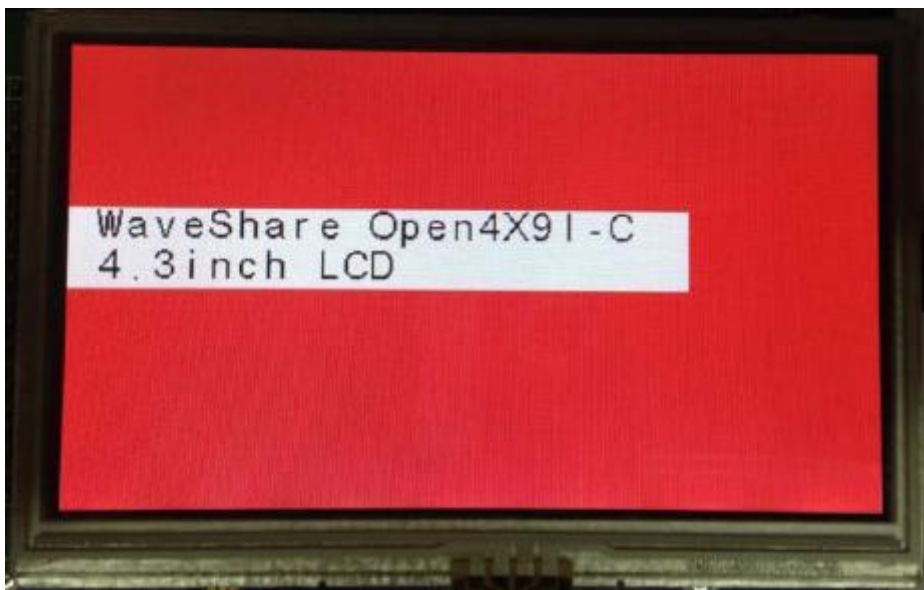
- Hardware connection



Connect the 4.3inch 480x272 Touch LCD (B) to the board via LCDinterface.

- Operation and result

Information display on the LCD:



LCD_7INCH

- Overview

The 7inch Resistive Touch LCD resolution is 800x480 (Pixel).

The 7inch Capacitive Touch LCD is also compatible with this board, the display result is the same.

LCD display character demo.

- Hardware connection



Connect the 7inch Capacitive Touch LCD to the LCD interface 1 using 40PIN FFC wire, and to the Capacitive touch panel interface via 4PIN FFC.

Connect the 7inch Resistive Touch LCD to the board via LCD interface 1 using 40PIN FFC wire.

- Operation and result

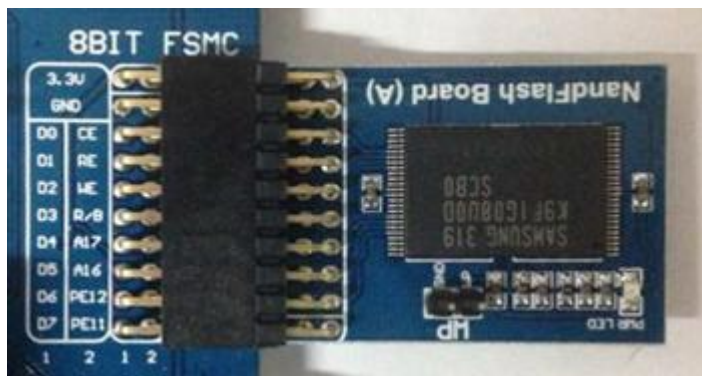
Information display on the LCD

NANDFLASH_SCB0

- Overview

Read and write NAND FLASH via FSMC

- Hardware connection



Connect the Nand Flash Board to the board via 8BIT FSMC interface.

- Operation and result

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

```

SYSCLK: 180M
HCLK: 180M
PCLK1: 45M
PCLK2: 90M
Welcome to use NANDFLASH modules
*****
Nand Flash ID = EC,F1, 00, 95 Type = K9F1G08U0B
Written to the number of:
1 2 3 4 5 6 7 8 9 ab c d e f 10 11 12

```

OV2640

- Overview

The development board communicates with the PC via Ethernet

- Hardware connection



Connect the OV2640 Camera Board to the onboard DCMI interface

Unzip OV2640-Test-Tool.7z and run the software.

- Operation and result

Press WAKE UP button, the software captured below picture:



SAI

- Overview

Drive the UDA1380 Board to play music via SAI interface

- Hardware connection



Connect UDA1380 Board to the board via SAI1 interface.

Connect the earphone to the UDA1380 Board via LINEOUT connector.

- Operation and result

You should hear music when press the RESET key.

SD_FATFS

- Overview

Read and write SD card, SD card is FAT file system.

- Hardware connection



Connect the Micro SD Storage Board to the board via SDIO interface.

Insert the SD card to the Micro SD Storage Board socket.

- Operation and result

Message will be printed on the serial debugging assistant.

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

SDIO Example: retarget the C library printf function to the SDIO

```
disk_initialize:0
f_mount:0
finfo.fname:stm32.txt
finfo.lfname:
Content:
STM32f429IGT6
finfo.fname:WAVESH~1.TXT
finfo.lfname:waveshare.txt
Content:
www.waveshare.net
```

SDIO

- Overview

Read and write SD card.

- Hardware connection



Connect the Micro SD Storage Board to the board via SDIO interface.

Insert the SD card to the Micro SD Storage Board socket.

- Operation and result

Message will be printed on the serial COM port.

```
USART Printf Example: retarget the C library printf function to the USART
SYSCLK: 180M
HCLK: 180M
PCLK1: 45M
PCLK2: 90M
Warning: this program may erase all the TF card data. Make sure you have
backed up. Press "y" to continue.
```

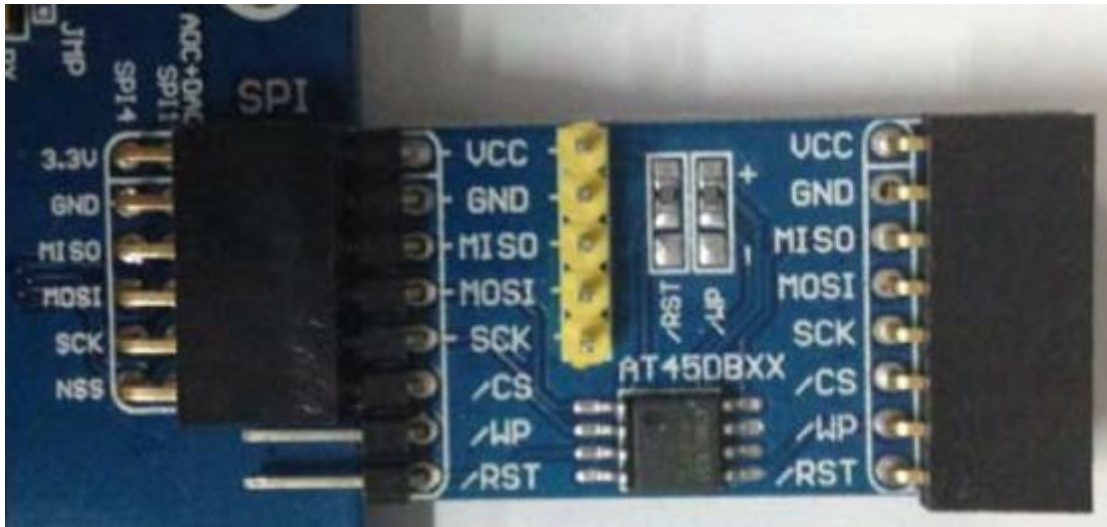
```
01. -----SD_Init Status:42
    Initialize SD card successfully!
02. -----SD_GetCardInfoStatus:42
    Get SD card information successfully!
```

SPI

- Overview

Drive the AT45DBXX DataFlash Board via SPI interface

- Hardware connection



Connect the AT45DBXX Data Flash Board via SPI connector. (SPI1 or SPI4, depends on the software configuration)

- Software connection

Connect the module to SPI1 interface Connect the module to SPI4 interface

```
#define Open_SPI1                      // #define Open_SPI1
// #define Open_SPI4                  #define Open_SPI4
```

- result

Info/messages printed on the serial debugging assistant:

```
SYSCLK: 180M
HCLK: 180M
PCLK1: 45M
PCLK2: 90M
Welcome toWaveShare STM32F4 series MCU Board Open429Z-D
SPI is ready!
AT45DBXX had been Init!
AT45DBXX ID is 0x1f0x24 0x0 0x0
FLASH AT45DBXX Write Test:
0 1 2 3 4 5 6 7 8 9 10 11 12
```

STEMWIN_RTOS

- Overview

Stemwin interface display based on system RTOS.

- Hardware connection

Connect the 4.3inch 480x272 Touch LCD (B) to the board via LCD interface 2.

- Operation and result

The GUI interface displayed on the LCD.

TOUCH_RES_LCD4.3

- Overview

Touch the screen first, click the three times the calibration point [+] to finish the screen calibration.

Then you can draw any line on the screen.

- Hardware connection

Connect the 4.3inch 480x272 Touch LCD (B) to the board via LCD interface 2.

- Operation and result

You can draw any line on the screen.

TOUCH_RES_LCD7

- Overview

Tap the Adjust area to start calibration, and then tap the calibration dot [+] five times to finish the screen calibration.

Then you can draw any line on the screen.

- Hardware connection



Connect the 7inch Resistive Touch LCD to the board via the LCD interface 1 using 40PIN FFC wire.

- Operation and result

Information displayed on the LCD screen.



TOUCH_CAP_LCD7

- Overview

The LCD will display touch position of your finger. The maximum touch point of this capacitive screen is 5.

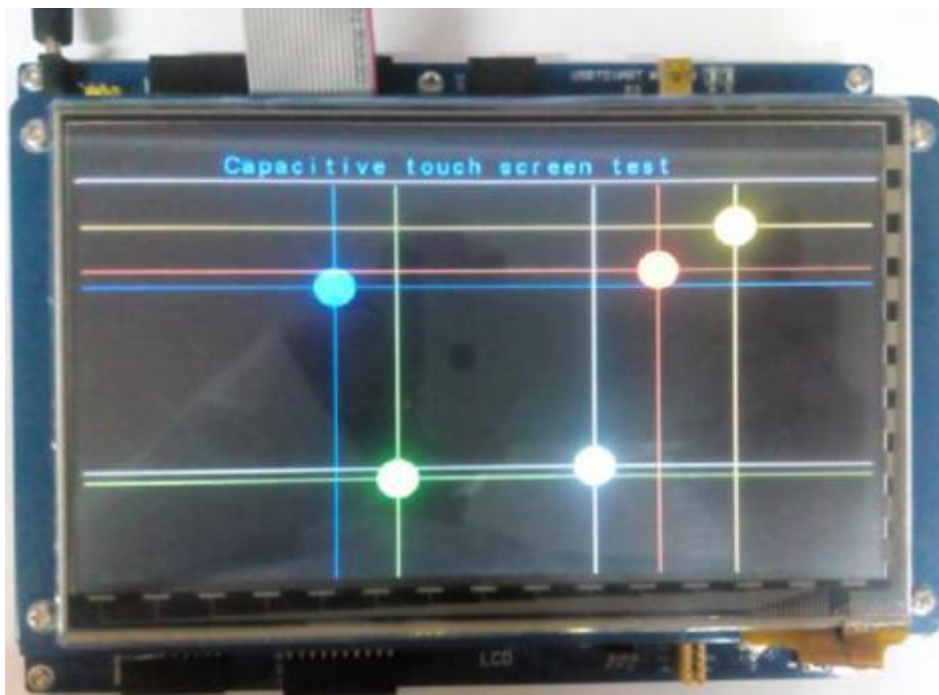
- Hardware connection

Connect the 7inch Capacitive Touch LCD to the on board LCD interface 1 via 40PIN FFC cable. Connect the on board CAP_TOUCH interface and the LCD 4PIN interface via 4PIN FFC cable.



- Operation and result

Information displayed on the LCD screen. (Below is five point touch result)



uCOSII 2.9

- Overview

LED demo based on uCos II

- Operation and result

Plug in the jumper on LED and JOYSTICK.Press the key to change the LED status, the below information willbe printed on the serial debugging assistant.

```
SYSCLK: 180M
HCLK: 180M
PCLK1: 45M
PCLK2: 90M
KEY Center
KEY D
KEY B
KEY A
KEY C
KEY Center
```

USART

- Overview

USART port communication demo

- Operation and result

Connect the USB TO UART port to PC with USB-mini cable. The port is connected to USART1 by default but it can be changed by setting jumper UART1 JMP. Message will be printed on the COM port.

```
USART Printf Example: retarget the C library printf function to the USART
SYSCLK: 180M
HCLK: 180M
PCLK1: 45M
PCLK2: 90M
```

USBFS

- USBFS request to short the OTG JMP and open the UART1 jumper.

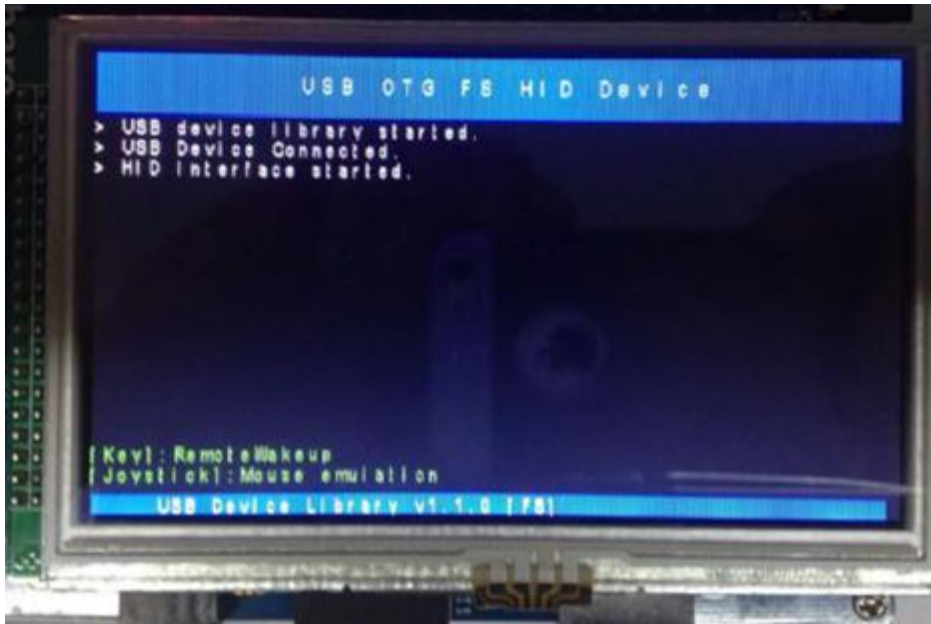
Display with 4.3 inch LCD	Display with 7 inch LCD
Connect 4.3inch 480x272 Touch LCD (B) to the board via LCD interface 2. Modify stm32f429i_discovery_lcd.h: <pre>#define inch_4 //#define inch_7</pre>	Connect the 7inch Capacitive Touch LCD to the on board LCD interface 1 via 40PIN FFC cable. Connect the on board CAP_TOUCH interface and the LCD 4PIN interface via 4PIN FFC cable. OR Connect the 7inch Resistive Touch LCD to the board via the LCD interface 1 using 40PIN FFC wire. Modify stm32f429i_discovery_lcd.h: <pre>//#define inch _4 #define inch_7</pre>

USBFS Examples (USB_Device_Examples-HID)

- Overview

FS USB device HID demo. USB device (mouse) will appear on the PC.

- Hardware connection



Connect an USB wire to the PC via Mini USB interface.

Connect the LCD to the board via LCD interface.

- Operation and result

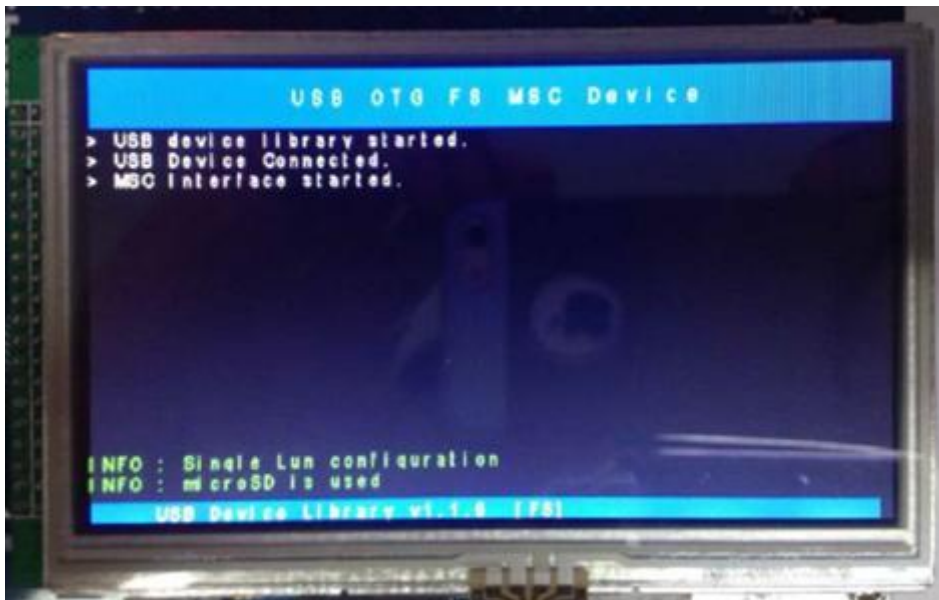
USB device appear on the PC, press the joystick to control the movement of the cursor.

USB FS Examples (USB_Device_Examples-MSC)

- Overview

FS USB device MSC demo. “USB Mass storage device” will appear on the computer Device Manager.

- Hardware connection



Connect the Micro SD Storage Board to the board via SDIO interface.

Insert the SD card to the Micro SD Storage Board socket.

Connect an USB wire to the PC via Mini USB interface.

Connect the LCD to the board via LCD interface.

- Operation and result

“USB Mass storage device” will appear on the computer Device Manager, the SD card appears as a removable hard drive on the PC.

USBFS Examples (USB_Device_Examples-VCP)

- Overview

FS USB device VCP demo. “STMicroelectronics Virtual COM Port” will appear on the computer Device Manager.

- Hardware connection



Connect an USB wire to the PC via Mini USB interface.

Connect the LCD to the board via LCD interface.

- Operation and result

“STMicroelectronics Virtual COM Port” will appear on the computer Device Manager.

USB FS Examples (USB_Host_Device_Examples-DRD)

- Overview

FS USB host and device demo. You can toggle the board between host and device.

- Hardware connection



Connect the LCD to the board via LCD interface.

- Operation and result

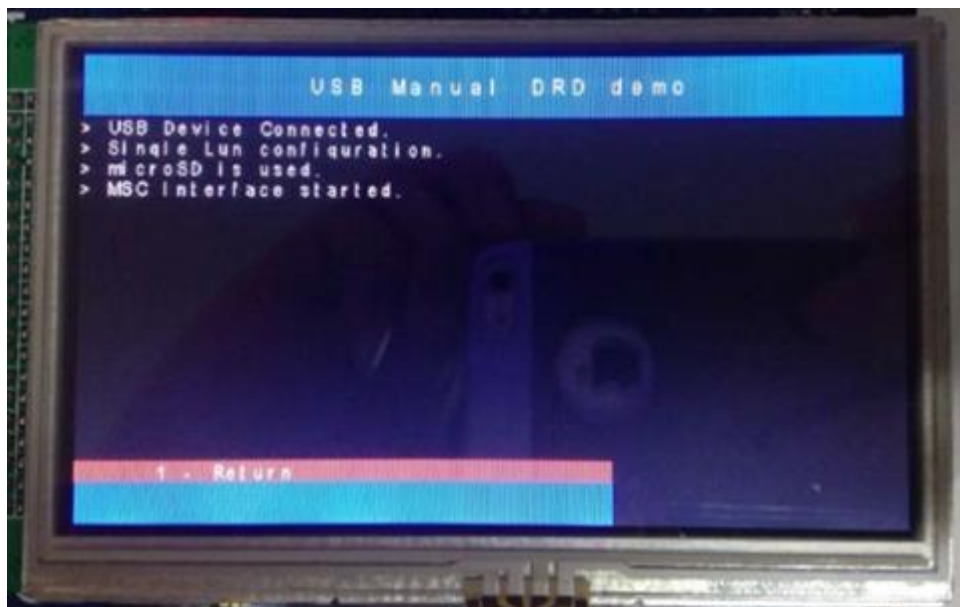
Choose host or device via joystick:

Host:



Connect an USB flash driver (with BMP picture inside) to the board through an USB OTG cable.

Device:



Connect the Micro SD Storage Board to the board via SDIO interface.

Insert the SD card to the Micro SD Storage Board socket.

Connect an USB wire to the PC via Mini USB interface. "USB Mass storage device" will appeared on the computer Device Manager, the SD card appears as a removable hard drive on the PC.

USB FS Examples (USB_Host_Examples-HID)

- Overview

FS USB host HID demo, the board will recognize and use mouse.

- Hardware connection



Connect a USB mouse to the on board USB interface through an USB OTG cable

Connect the LCD to the board via LCD interface.

- Operation and result

The green dot on the LCD will move following the mouse.

USB FS Examples (USB_Host_Examples-MSC)

- Overview

FS USB host MSC demo , the board will recognize and use USB memory device.

- Hardware connection



Connect an USB flash driver (with BMP picture inside) to the board through an USB OTG cable.

Connect the LCD to the board via LCD interface.

- Operation and result

The document name will be listed on the LCD, bmp picture will display on the LCD.

USBHS

USBHS Examples (USB_Device_Examples-HID)

- Overview

HS USB device HID demo. USB device (mouse) will appear on the PC.

- Hardware connection



Insert the USB3300 to the ULPI socket

Connect the USB3300 to the PC via USB cable.

- Operation and result

Control the PC cursor via joystick.

USB HS Examples (USB_Device_Examples-MSC)

- Overview

HS USBdevice MSC demo. “STMicroelectronics Virtual COM Port” will appear on the computer Device Manager.

- Hardware connection



Insert the USB3300 to the ULPI socket

Connect the Micro SD Storage Board to the board via SDIO interface.

Insert the SD card to the Micro SD Storage Board socket.

Connect the USB3300 to the PC via USB cable.

- Operation and result
- “USB Mass storage device” will appear on the computer Device Manager, the SD card appears as a removable hard drive on the PC.

“STMicroelectronics Virtual COM Port” will appear on the computer Device Manager. Short the TX and RX of the UART3 on the board, launch the serial debugging assistant, the software can receive the data sent by itself.

USB HS Examples (USB_Host_Examples-MSC)

- Overview

HS USB host MSC demo. The board will recognize and use USB memory device.

- Hardware connection



Insert the USB3300 to the ULPI socket

Connect the USB flash driver to the USB3300 via USB interface.

- Operation and result

The USB flash driver information will appear on the serial debugging assistant, the documents name will be displayed when press the User key.

ETH EXAMPLES

- Overview

The board and the PC connect via the Ethernet interface demo.

ETH demo requests to copy the echotool.exe under ETH\Tool\PC_Software to the C disk root directory.

- Hardware connection



The Ethernet wire connects to the ETH interface and the PC.

- PCIP setting

Configure the IP of both the PC and the module on the same network.

Use the below IP address:

☒ Use the following IP address:	
IP address:	192 . 168 . 1 . 11
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	192 . 168 . 1 . 1

- Operation and result

Program path:

ETH\STM32F4x7_ETH_LwIP_V1.0.0\Project\Standalone\httpserver\MDK-ARM

Open the browser, enter <http://192.168.1.10/>



STM32F4x7 Webserver Demo **Based on the lwIP TCP/IP stack**

Home page	Led control	ADC status bar
---------------------------	-----------------------------	--------------------------------

Click LED control to control the LED.

Resource

- [User Manual](#)
- [Schematic](#)
- [Demo](#)

STM32 Software

IDE

- [Keil MDK](#)
- [STM32CubeMX](#)

Programmers

- [Flash Loader for ISP](#)
- [STVP](#)
- [STM32 ST LINK Utility](#)

USB Driver

- [PL2303 Windows Driver](#)
- [ST-Link V2 USB Driver](#)
- [Virtual COM Port Driver](#)

Other Software

- [Stlinkupgrade](#)
- [TCP UDP Debugger](#)
- [IpTool](#)
- [EMWToolBox_Setup](#)
- [BonjourSetup](#)
- [SecureCRT](#)
- [Camera test](#)
- [BusHound](#)

STM32F4 Datasheets

- [STM32F405 STM32F407-Datasheet.pdf](#)
- [STM32F427 STM32F429-Datasheet.pdf](#)
- [STM32F437 STM32F439-Datasheet.pdf](#)
- [STM32F4-Reference.pdf](#)

STM32 Documents

IAP Source

- [stm32f4 IAP USART](#)
- [stm32f4 IAP ETH](#)

ST libraries

- [STM32F4xx_DSP_StdPeriph_Lib.7z](#)
- [STM32F4_Eeprom_Emulation.7z](#)
- [STM32F417_ETH_SSL.7z](#)
- [STM32_I2C_CPAL.7z](#)

UCOS Source

- [UCGUI3.90_Source.zip](#)

Support



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