Open429I-C (HAL) User Manual

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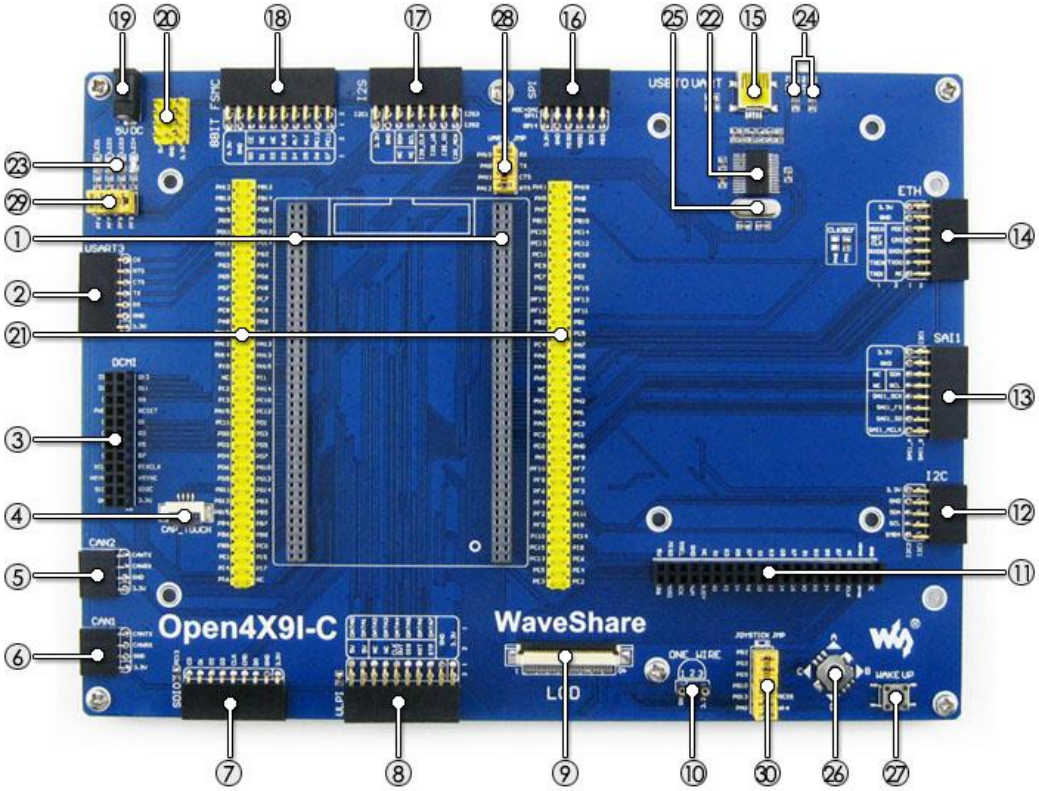
1. OVERVIEW

Open429I-C is an STM32 development board designed for the STM32F429IGT6 microcontroller, consists of the mother board and the MCU core board Core429I.

The Open429I-C supports further expansion with various optional accessory boards for specific application. The modular and open design makes it the ideal for starting application development with STM32 series microcontrollers.

1.1. WHAT' S ON THE MOTHER BOARD

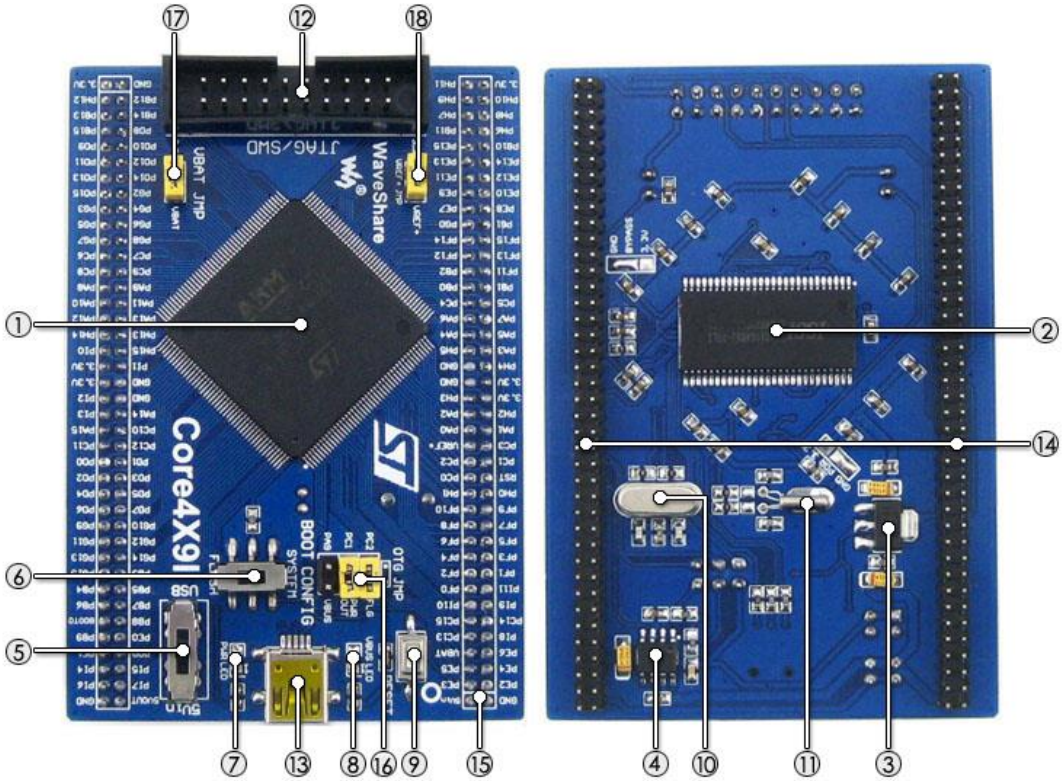


1. **MCU core board connector:** for easily connecting the Core429I
2. **USART3 interface:** easily connects to RS232, RS485, USB TO 232, etc.
3. **DCMI interface:** for connecting camera
4. **Capacitive touch panel interface:** for connecting capacitive touch panel
5. **CAN2 interface:** for connecting CAN modules
6. **CAN1 interface:** for connecting CAN modules
7. **SDIO interface:** for connecting Micro SD module, features much faster access speed rather than SPI
8. **ULPI interface:** for connecting high-speed USB peripheral (the STM32F429I

integrates USB HS controller without any PHY device)

9. **LCD interface 1:** for connecting 7inch LCD
10. **ONE-WIRE interface:** easily connects to ONE-WIRE devices (TO-92 package), such as temperature sensor (DS18B20), electronic registration number (DS2401), etc.
11. **LCD interface 2:** for connecting 4.3inch LCD
12. **I2C2/I2C3 interface:** easily connects to I2C peripherals such as I/O expander (PCF8574), EEPROM (AT24Cxx), etc.
13. **SAI1 interface:** for connecting audio modules like UDA1380 module
14. **Ethernet interface:** for connecting Ethernet modules
15. **USB connector:** USB to UART via the onboard convertor PL2303
16. **SPI1/SPI2 interfaces:**
    a) easily connects to SPI peripherals such as DataFlash (AT45DBxx), SD card, MP3 module, etc.
    b) easily connects to AD/DA modules (SPI1 features AD/DA alternative function)
17. **I2S2/I2S3/I2C1 interface:** easily connects to I2S peripherals such as audio module, etc.
18. **8-bit FMC interface:** easily connects to peripherals such as NandFlash
19. **5V DC jack**
20. **5V/3.3V power input/output:** usually used as power output, also common-grounding with other user board
21. **MCU pins connector:** all the MCU I/O ports are accessible on expansion connectors for further expansion
22. **PL2303:** USB to UART convertor
23. **LEDs:** convenient for indicating I/O status and/or program running state
24. **PL2303 TX-LED / RX-LED**
25. **12MHz crystal:** for PL2303
26. **Joystick:** five positions
27. **WAKE UP button:** used as regular button, and/or wake up the STM32 MCU from sleep
28. **USB to UART jumper**
29. **LED jumper**
    a) short the jumper to connect to default I/Os used in example code
    b) open the jumper to connect to custom I/Os via jumper wires
30. **Button/Joystick jumper**
    a) short the jumper to connect to default I/Os used in example code
    b) open the jumper to connect to custom I/Os via jumper wires

1.2. WHAT' S ON THE CORE429I



1. STM32F429IGT6: the high performance STM32 MCU which features:
   - Core: Cortex-M4 32-bit RISC
   - Feature: single-cycle DSP instructions
   - Operating Frequency: 180MHz, 225 DMIPS/1.25 DMIPS/MHz
   - Operating Voltage: 1.8V-3.6V
   - Package: LQFP176
   - Memories: 1024kB Flash, 256+4kB SRAM
   - MCU communication Interfaces:
     - 6 x SPI, 4 x USART, 4 x UART, 2 x I2S, 1 x SAI, 3 x I2C
     - 1 x FMC, 1 x SDIO, 2 x CAN
     - 1 x LCD-TFT
     - 1 x USB 2.0 HS/FS controller (with dedicated DMA)
     - 1 x USB HS ULPI (external PHY required)
     - 1 x 10/100 Ethernet MAC
     - 1 x 8 to 14-bit camera interface
   - AD & DA converters: 3 x AD (12-bit, 1μs, shares 24 channels); 2 x DA (12-bit)
   - Debugging/Programming: supports JTAG/SWD interfaces, supports IAP
2. IS42S16400J: SDRAM 1 Meg Bits x 16 Bits x 4 Banks (64-MBIT)
3. AMS1117-3.3: 3.3V voltage regulator
4. MIC2075: onboard USB power management device
5. Power supply switch, powered from 5Vin or USB connection
6. Boot mode selection, for configuring BOOT0 pin

7. Power indicator
8. VBUS LED
9. Reset button
10. 8M crystal
11. 32.768K crystal, for internal RTC with calibration
12. JTAG/SWD interface: for debugging/programming
13. USB connector, supports Device and/or Host
14. MCU pins expander, VCC, GND and all the I/O pins are accessible on expansion connectors for further expansion
15. 5Vin pinheader, 5V power supply is required when using USB HOST/OTG
16. USB OTG/HOST jumper
    - short the jumper when using USB OTG/HOST
    - open the jumper to disconnect from related I/O port
17. VBAT selection jumper
    - short the jumper to use system power supply
    - open the jumper to connect the VBAT to external power, such as battery
18. VREF selection jumper
    - short the jumper to connect VREF+ to VCC

open the jumper to connect VREF+ to other custom pin via jumper wire

2. DEMO

- KEIL MDK Version：5.12or above.
- Programmer/Debugger: ST-LINK V2
- Programming/Debugging interface: JTAG/SWD
- Results of demo which based on serial port are 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

Note: All the below Demo results are available when push the reset button after the program has been downloaded.

2.1. LED

- Overview

  IO output demo
- Hardware connection

  Fit all the jumpers LED JMP
- Operation and result

  The LED blinking

2.2. KEY

- Overview

  IO input, output demo

- Hardware connection

  Fit all the jumpers LED JMP and JOYSTICK JMP

- Operation and result

  The LED status will keep changing when push the buttons

2.3. INTERRUPT

- Overview

  GPIO Interrupt demo

- Hardware connection

  Fit all the jumpers LED JMP and JOYSTICK JMP

- Operation and result

  The LED1 status will keep changing when push the buttons

2.4. TIM

- Overview

  Timer demo

- Hardware connection

  Fit all the jumpers LED JMP

- Operation and result

  The LED1 flashing

2.5. PWM

- Overview

  PWM demo

- Hardware connection

  Fit all the jumpers LED JMP

- Operation and result

  The brightness of LED1 keep changing

2.6. USART

- Overview

  Three demos (Roll polling, Interrupt, DMA)

- Hardware connection

  Connect USB TO UART interface to USB port of PC by mini USB cable. This port is connected to USART1 by default, you can also change it by setting jumper UART1 JMP.

2.6.1. USART_PRINTF

- Overview

  Use Roll Polling measure, reconfigure Printf function for data printing.

- Operation and result

  Download codes then press Reset button. Information are printed to UART as below:

  ```
  UART Printf Example: retarget the C library printf function to the UART
  ```

```
welcome to www.waveshere.com !!!

welcome to www.waveshere.com !!!

welcome to www.waveshere.com !!!
```

2.6.2. USART_IT

- Overview

  Use HAL Interrupt measure, UART demo.

- Operation and result

  Download codes then press Reset button. With Serial assistance software, it require to you input 10 characters, it will send and echo (for example, input string Open4x9i-C)

```
****UART-Hyperterminal communication based on IT ****

 Enter 10 characters using keyboard :

Open4x9I-C

 Example Finished
```

2.6.3. USART_DMA

- Overview

  Use HAL DMA measure, UART demo.

- Operation and result

  Download codes then press Reset button. Information are printed as below:

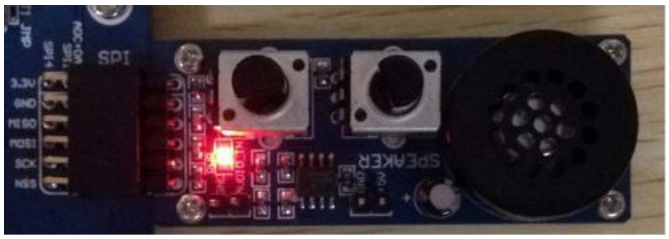
```
**** UART-Hyperterminal communication based on DMA ***

     WaveShare Open4X9I-C Board
```

2.7. 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:

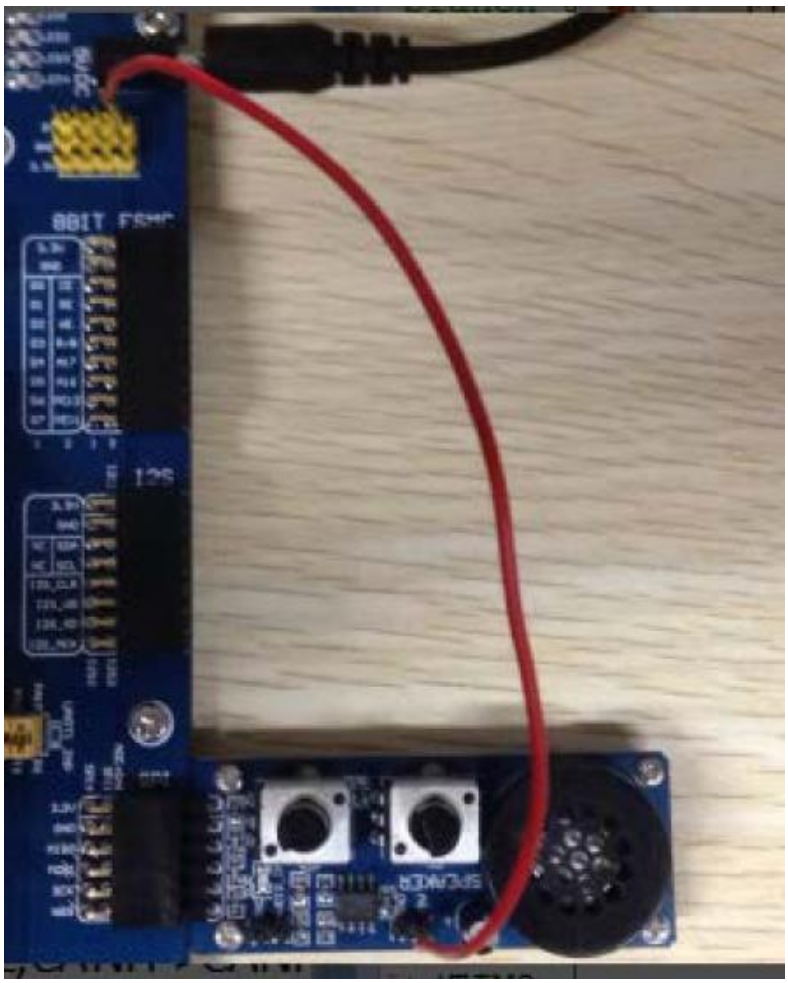
```
******** ADC DMA Example ********
 AD1 value = 3.298V
 AD2 value = 1.647V
******** ADC DMA Example ********
 AD1 value = 3.298V
 AD2 value = 1.647V
```

2.8. 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.

2.9. I2C-AT24C02

- Overview

Read and write data on E2PROM via I2C protocol

- Hardware connection

Connect the AT24/FM24 Board to the board via I2C1 connector.

- Operation and result

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

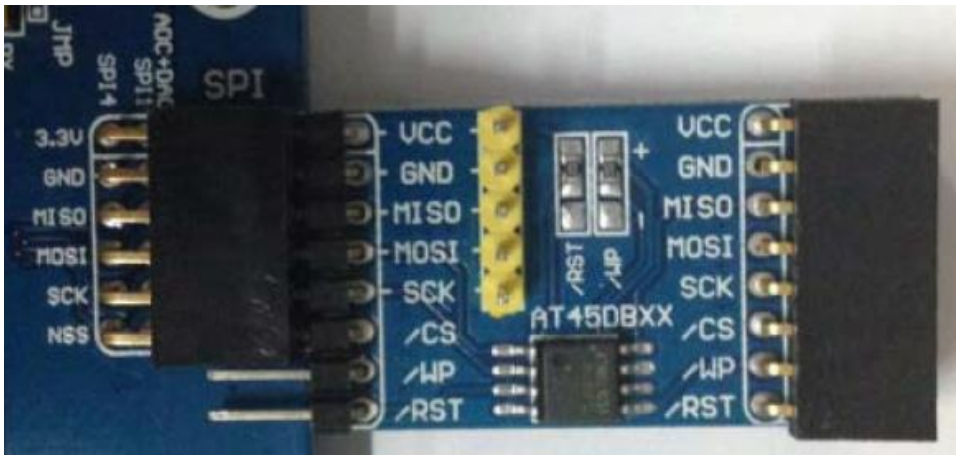
```
**************I2C Example*******************************

 EEPROM 24C02 Write Test OK

 EEPROM 24C02 Read Test OK
```

2.10. SPI-AT45DBXX

- Overview

Drive the AT45DBXX DataFlash Board via SPI interface

- Hardware connection



Connect the AT45DBXX DataFlash Board via SPI1 connector

- Operation and result

  Information are printed on the serial assistant:

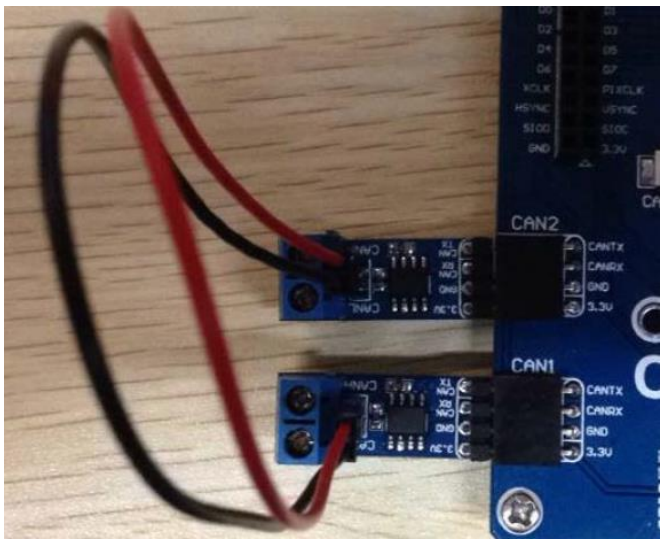
```
****** SPI Example *****

AT45DBXX ID is 0x1F   0x24   0x00   0x00

FALSH AT45DBXX Write Test:

   0    1    2    3    4   ..... 255

FALSH AT45DBXX Read Test:

  0    1    2    3    4   ..... 255
```

2.11. CAN

- 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

  Information are printed to serial assistant:

```
**** This is CAN test program ****

StdId : 123

RxMsg : CAN Test



StdId : 123

RxMsg : CAN Test
```

2.12. DS18B20

- Overview

  Temperature detecting demo

- Hardware connection

  Connect DS18B20 to OneWire interface

- Operation and result

  Information are printed to serial assistant

```
DS18B20 Example !!!!

Temperate:  24.0 ℃

Temperate:  24.0 ℃
```

2.13. RTC

- Overview

  RTC demo (STM32 internet RTC)

- Operation and result

  Information are printed to serial assistant (You can change time by modifying MX_RTC_Init function in rtc.c file)

```
2015/09/08
18:50:00


2015/09/08
18:50:01
```

2.14. MCU_TEMPERATURE

- Overview

  Temperature of STM32 board measuring demo

- Operation and result

  Information are printed to serial assistant:

```
MCU Temperature : 32.6℃
MCU Temperature : 32.6℃
MCU Temperature : 32.6℃
```

2.15. IWDG

- Overview

  Independent watchdog demo

- Operation and result

  Information are printed to serial assistant:

```
***** WaveShare Open7XXI-C Board *****
 Refreshes the IWDG !!!
 Refreshes the IWDG !!!     Refreshes the IWDG !!!
```

2.16. WWDG

- Overview

  Windows watchdog demo

- Operation and result

  Information are printed to serial assistant

```
***** WaveShare Open7XXI-C Board *****
 waveshare.net !!!
 waveshare.net !!!
 waveshare.net !!!
```

2.17. RNG

- Overview

  Random numbers generate demo

- Operation and result

  Information are printed to serial assistant

```
Random 32bit Numbers : 0x3664130B !!!
Random 32bit Numbers : 0xFF7D82B4 !!!
Random 32bit Numbers : 0xD1BAFF04 !!!
Random 32bit Numbers : 0xAAC48854 !!!
```

2.18. CRC

- Overview

  CRC demo

- Operation and result

  Information are printed to serial assistant

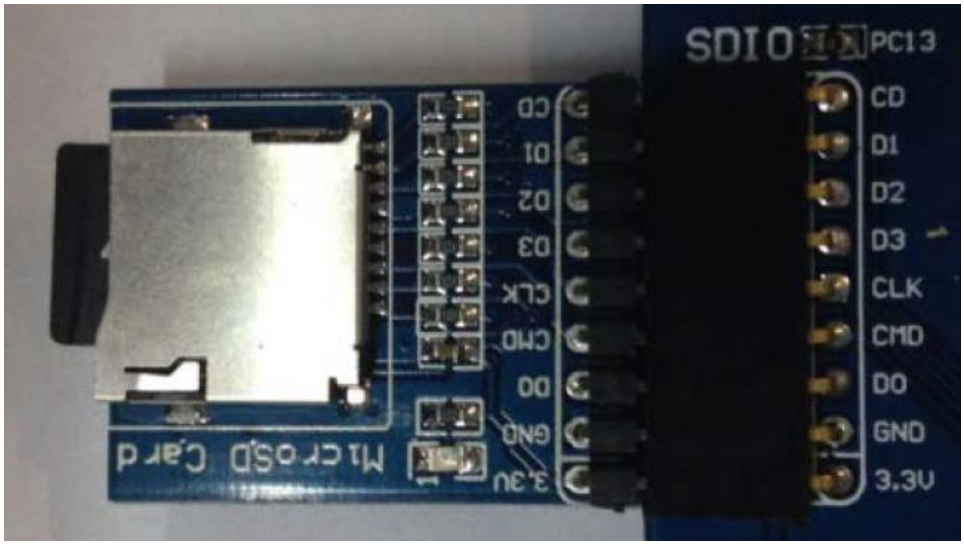
  ```
  ****** CRC Test Example *****

   CRC right value
  ```

2.19. SDIO

- Overview

  Read SD card information demo

- Hardware connection



  Connect Micro SD Storage Board to SDIO interface.

  Insert SD card to Micro SD Storage Board

- Operation and result

  Information are printed to serial assistant (Note that this demo may erase all the data of TF card, please backup the data before you use it):

```
Warning: this program may erase all the TF card data.
 Make sure you have backed up. Press 'y' to continue.


 Initialize SD card successfully!


 SD card information!
 CardCapacity  : 8053063680
 CardBlockSize  : 512
 RCA            : 2
 CardType       : 2


 Enable wide bus operation successfully!


 Write block successfully!
00:0x15151515  01:0x15151515 ..... 7f:0x15151515


 Read block successfully!
00:0x15151515  01:0x15151515 ..... 7f:0x15151515
 Erase block successfully!
```

```
Read block successfully!

00:0xffffffff 01:0xffffffff ..... 7f: 0xffffffff
```

2.20. FATFS

- Overview

  Read SD card information via FATFS

- Hardware connection

  Connect Micro SD Storage Board to SDIO interface.

  Insert SD card to Micro SD Storage Board

- Operation and result

  Information are printed to serial assistant. (make sure FATFS file system is available in your SD card)

```
****** FatFs Example ******


 mount sucess!!!
```

```
open file sucess!!!

write file sucess!!!

Write Data : This is STM32 working with FatFs

close sucess!!!

open file sucess!!!

read sucess!!!

Write Data : This is STM32 working with FatFs

close sucess!!!

FatFs is working well!!!
```

2.21. DCMI-OV2640

- Overview

  Camera demo

- Hardware connection

Connect OV2640 Camera Board to DCMI interface

Open camera-test.exe software (Included in Software folder), choose correct COM port and configure as codes

- Operation and result

  Press WAKE UP button, software start to capture image (You can change resolution by modifying OV2640_320x240_JPEG in ov2640.c file)

2.22. I2S-WM8960

- Overview

  Drive WM8960 Audio Board to play music by I2S protocol

- Hardware connection

  Connect WM8960 Audio Board to I2S interface

  Connect earphone to earphone jack of WM8960 Audio Board, or connect Speaker to WM8960 Audio Board.

- Operation and result

  Download codes then press RESET button to play music

2.23. SAI-WM8960

- Overview

  Use WM8960 Audi Board to play music from TF card via SAI interface

- Hardware connection

  Connect WM8960 Audio Board to SAI1 interface

  Connect earphone to earphone jack of WM8960 Audio Board, or connect Speaker to WM8960 Audio Board.

  Insert SD card to Micro Storage Board, then connect Micro Storage Board to SDMMC interface. WAV files are save in root directory of SD card

- Operation and result

  Press RESET button, audios are playing. You can use Joystick button to control playing: Press for Pause/Restore, Left(C) for last file, Right(B) to next file.

2.24. SAI-WM8960 RECORD

- Overview

  Use WM8960 Audi Board to record audio and save to TF card via SAI interface

- Hardware connection

  Connect WM8960 Audio Board to SAI1 interface

  Connect earphone to earphone jack of WM8960 Audio Board, or connect Speaker to WM8960 Audio Board.

Insert SD card to Micro Storage Board, then connect Micro Storage Board to SDMMC interface. WAV files are save in root directory of SD card

- Operation and result

  Press RESET button, the file name which is going to recorded is printed. Press Joystick button begin recording. Then you can speaker to MIC onboard, the audio echo to earphone or speaker. During recording, you can press Joystick button to Pause/Restore. Long press Joystick for about 1-2s to stop recording. After recording, you can insert the SD card to PC and play audio in PC or use the playing demo

2.25. FSMC-NANDFLASH

- Overview

  Read and write NAND FLASH via FSMC

- Hardware connection

Connect NandFlash Board to the 8BIT FSMC interface

- Operation and result

  Information are printed serial assistant

```
***** NandFlash Example ******

Nand Flash ID = 0xEC,0xF1,0x00,0x95    Type = K9F1G08U0B

Written to the number of:

0x00 0x01 0x02 0x03 ……0xFF

Read several:

0x00 0x01 0x02 0x03 ……0xFF



NandFlash Read Write Test OK
```

2.26. FSMC-SDRAM

- Overview

  Read/write SDRAM via FSMC

- Operation and result

  Information are printed to serial assistant:

```
****** SDRAM example !!! ******



/* Write data to the SDRAM memory */

00:0xA244250F    01:0xA2442510 …… FF:0xA244260E



/* Read back data from the SDRAM memory */

00:0xA244250F    01:0xA2442510 …… FF:0xA244260E



 SDRAM Test OK
```

2.27. LDTC

- Overview

  LCD display demo. This demo has three projects for 4.3inch 480x272, 7inch 800x600 and 7inch 1024x600 separately

- Hardware connection

Connect 4inch 480x272 Touch LCD (B) to LCD interface

Connect 7inch 800x600 or 7inch 1024x600 LCD to LCD1 interface by 40PIN FFC, then connect 4PIN FFC to capacitive touch interface

(Note: You can only connect one LCD one time)

- Operation and result

  Image are displayed on LCD

2.28. DMA2D

- Overview

  LCD display demo. This demo has three projects for 4.3inch 480x272, 7inch 800x600 and 7inch 1024x600 separately.

- Hardware connection

  Save as section 2.27.

- Operation and result

  Two images are displayed on LCD and moving.

Display effect for 4.3inch 480x272 LCD

Display effect for 7inch LCD

2.29. LCD_DISPLAY

- Overview

  LCD display string demo. This demo has three projects for 4inch 480x272, 7inch 800x480 and 7inch 1024x600 separately

- Hardware connection

  Same as Section 2.27.

- Operation and result

Strings are displayed on LCD

2.30. TOUCH

- Overview

Touch demo. This demo include three projects for 4.3inch 480x272, 7inch 800x600 separately.

4.3inch LCD is resistive screen, 7inch LCD is capacitive screen.

2.30.1.TOUCH 4.3INCH 480X272

- Hardware connection

Connect 4.3inch 480x272 Touch LCD (B) to LCD interface

- Operation and result

Download codes. First calibrating: press + triple to finish calibrating. After

calibrating, it enter Paint mode, you can drawing on LCD

2.30.2.TOUCH 7INCH 800X480

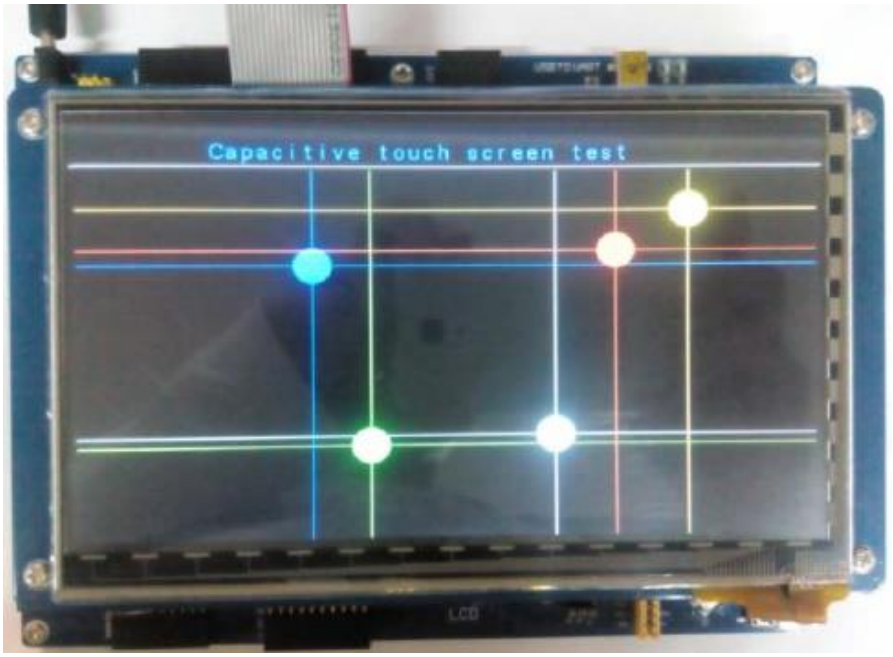
- Hardware connection

  Connect 7inch LCD to LCD interface by 40PIN FFC, connect touch interface of

  7inch LCD to touch interface by 4PIN FFC

- Operation and result

  It supports up to 5-points touching.



2.31. STEMWIN

- Overview

  STemWin interface demo

- Hardware connection

  You can connect 4.3inch 480x272, 7inch 800x480 or 7inch 1024x600 for different projects.

- Operation and result

  LCD will display STemWin demo and graphic interfaces

2.32. USB FS

- Overview

  USB FS demo

- Hardware connection

  Short the OTG JMP and remove UART1 jumper before using

  Connect 7inch 1024x600 LCD to Open board

2.32.1.USB FS DEVICE (CDC_STANDALONE)

- Overview

  FS USB device CDC demo.

- Hardware connection

  Connect Mini USB interface to PC by mini USB cable

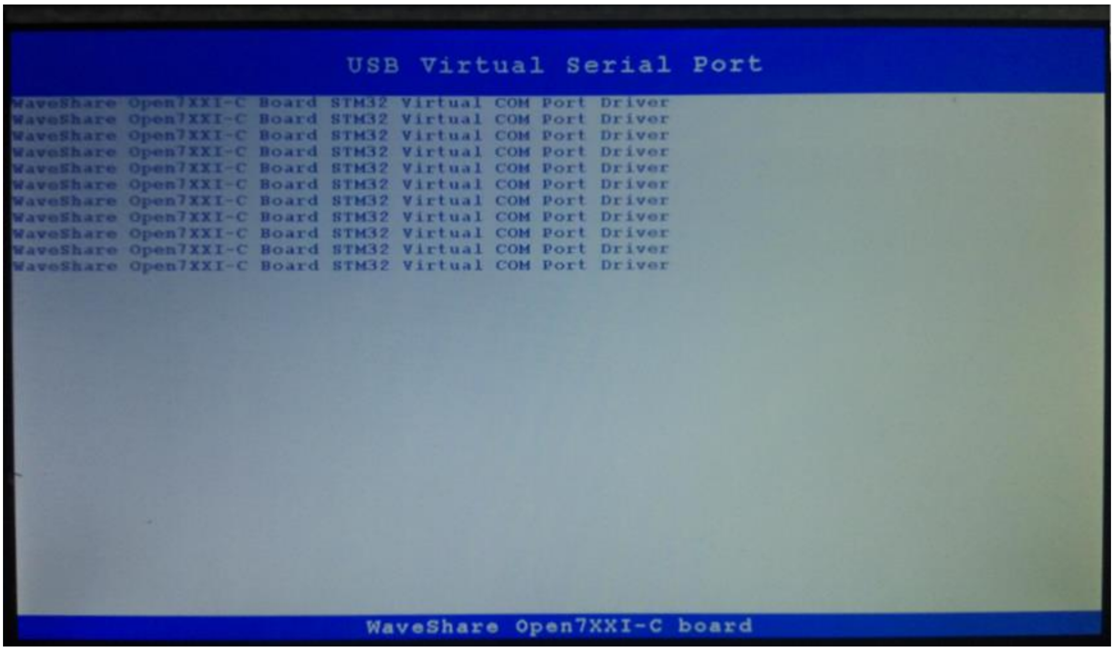
- Operation and result

Open board is recognized as virtual com port. “STMicroelectronics Virtual COM Port” will appear on the computer Device Manager. Extract and install stsw.zip which is located on Software directory. Information are printed to serial assistant, and data sent from assistant will be printed to LCD

WaveShare Open4X9I-C Board STM32 Virtual COM Port Driver

WaveShare Open4X9I-C Board STM32 Virtual COM Port Driver

WaveShare Open4X9I-C Board STM32 Virtual COM Port Driver



2.32.2.USB FS DEVICE (HID_STANDALONE)

- Overview

FS USB Device HID demo. Open board is recognized as Mouse by PC

- Hardware connection

Connect Mini USB interface to PC by mini USB cable

- Operation and result

  Check Device Manager, an “USB Input device) is recognized. Use Joystick to control cursor

2.32.3.USB FS DEVICE (MSC_STANDALONE)

- Overview

  FS USB Device MSC demo. Open board is recognized as mass storage device

- Hardware connection

  Connect mini USB interface to PC by mini USB cable

  Connect Micro SD Storage Board to SDIO interface of Open board, and insert SD card to Micro SD Storage Board

- Operation and result

  Check Device Manger, an “USB Mass Storage Device” is recognized by PC, the

SD card appears as a removable hard drive on the PC.

2.32.4.USB FS HOST (HID_STANDALONE)

- Overview

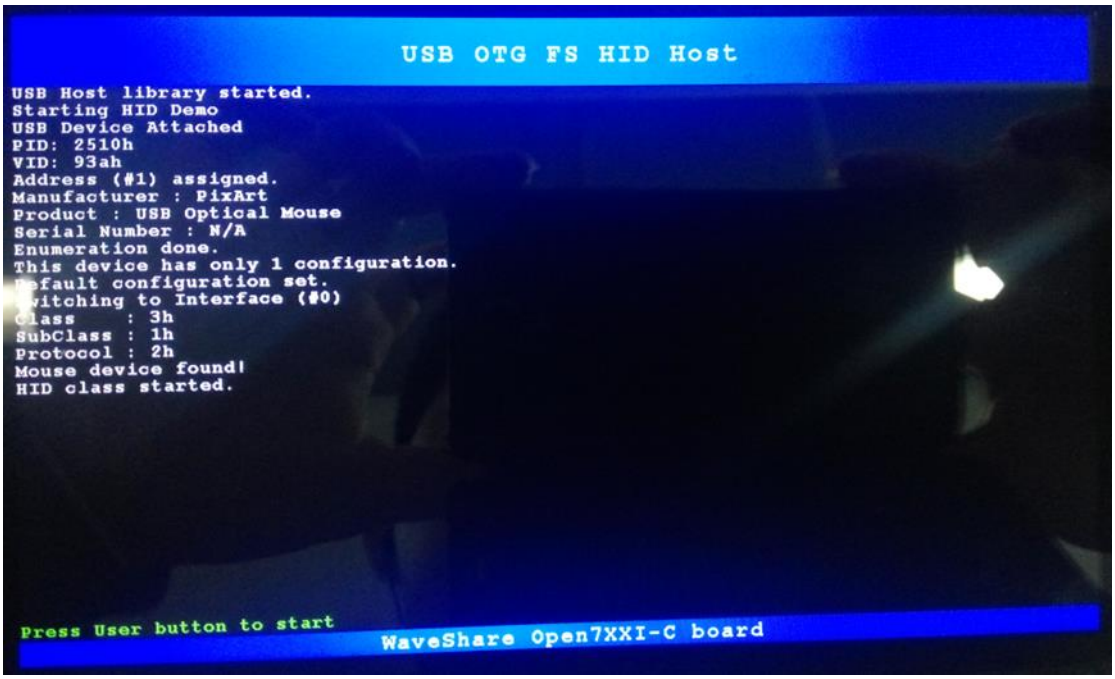
  FS USB Master HID demo. Open board can recognize and use Mouse connected

- Hardware connection

  Connect Mouse to one side of OTG cable, then connect another side of OTG to mini USB interface of Open board

- Operation and result

  Move Mouse to control the green point on LCD



2.32.5.USB FS HOST (MSC_STANDALONE)

- Overview

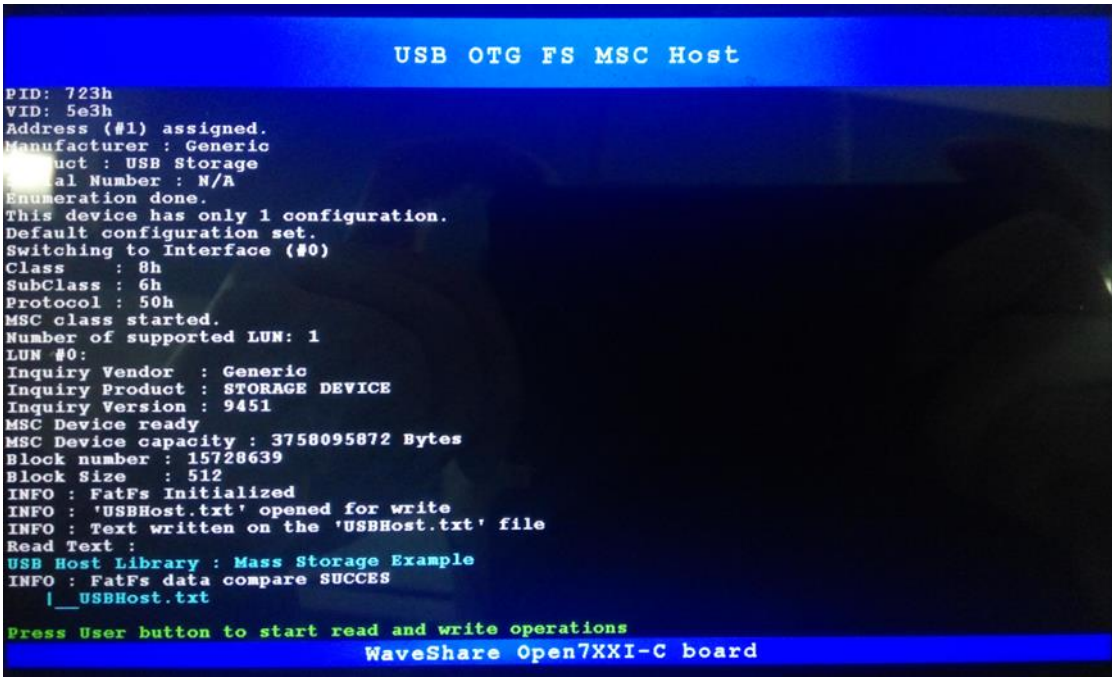
  FS USB Master MSC demo. Open board can connect and recognize USB drive.

- Hardware connection

  Connect USB Drive to one side of OTG cable, then connect another side of OTG cable to mini USB interface of Open board

- Operation and result

  Press button to read information of USB drive



2.32.6.USB FS HOST (DYNAMICSWITCH_STANDALONE)

- Overview

  FS USB master demo. Open board can recognize Mouse and U drive

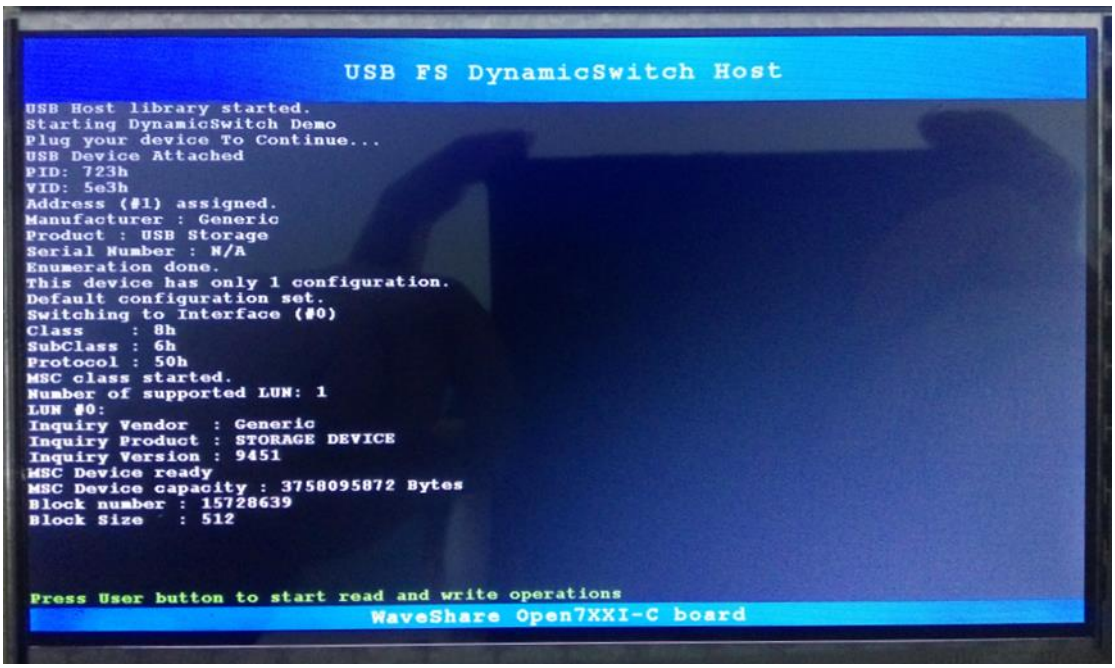
- Hardware connection

  Connect Mouse or U drive to one side of OTG cable, connect another side of OTG cable to mini USB interface of Open board

- Operation and result

  Open board will recognize the device connect automatically. (for example, if the

device connected is U drive)



2.33. USB HS

- Hardware connection

  Because of PIN conflict problem, LCD cannot be connection at the same time.

  Connect USB3300 module to ULPI interface of Open board

- Operation and result

  Its expected result is like FS demo.

2.33.1.USB HS DEVICE (HID_STANDALONE)

- Overview

  FS USB Device HID demo. Open board is recognized as Mouse by PC

- Hardware connection

  Connect USB cable to OTG interface of USB3300 and PC

- Operation and result

  “USB input device” is recognized in Device Manager. You can press Joystick to control cursor

2.33.2.USB HS DEVICE (MSC_STANDALONE)

- Overview

  HS USB Device MSC demo. Open board is recognized as U drive by PC

- Hardware connection

  Connect USB cable to OTG interface of USB3300 and PC

  Connect Micro SD Storage Board to Open board, insert SD card to Micro SD Storage module

- Operation and result

  “USB Mass Storage Device” is recognized by OC

2.33.3.USB HS HOST (MSC_STANDALONE)

- Overview

  HS USB Master demo. Open board can recognize U drive

- Hardware connection

  Connect USB3300 Module to ULPI interface of Open board

  Connect U drive to OTG interface of USB3300

- Operation and result

  U drive information are printed to serial port. Press button to print files' names of U drive

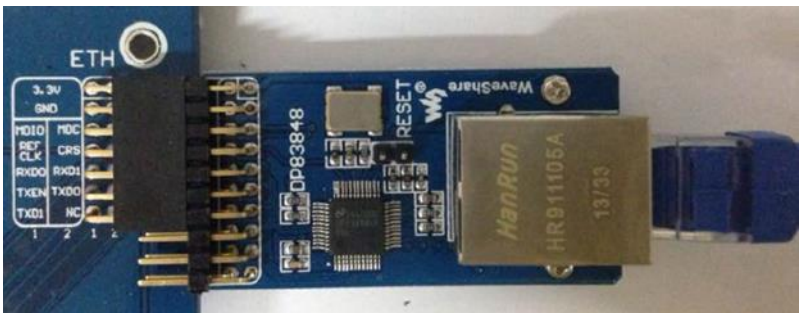
2.34. ETH

- Overview

  This demo has five projects. They are TCP client project, TCP server project, UDP client project, UDP server project and HTTP server project. Before starting this demo, please copy echotool.exe file from project directory to root directory of C drive

- Hardware connection

  Connect ETH cable to ETH interface and PC or router. (Router should use the same LAN as PC)



2.34.1.LWIP_TCP_ECHO_CLIENT

- Overview

  TCP Client demo. Echo data

- Operation and result

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

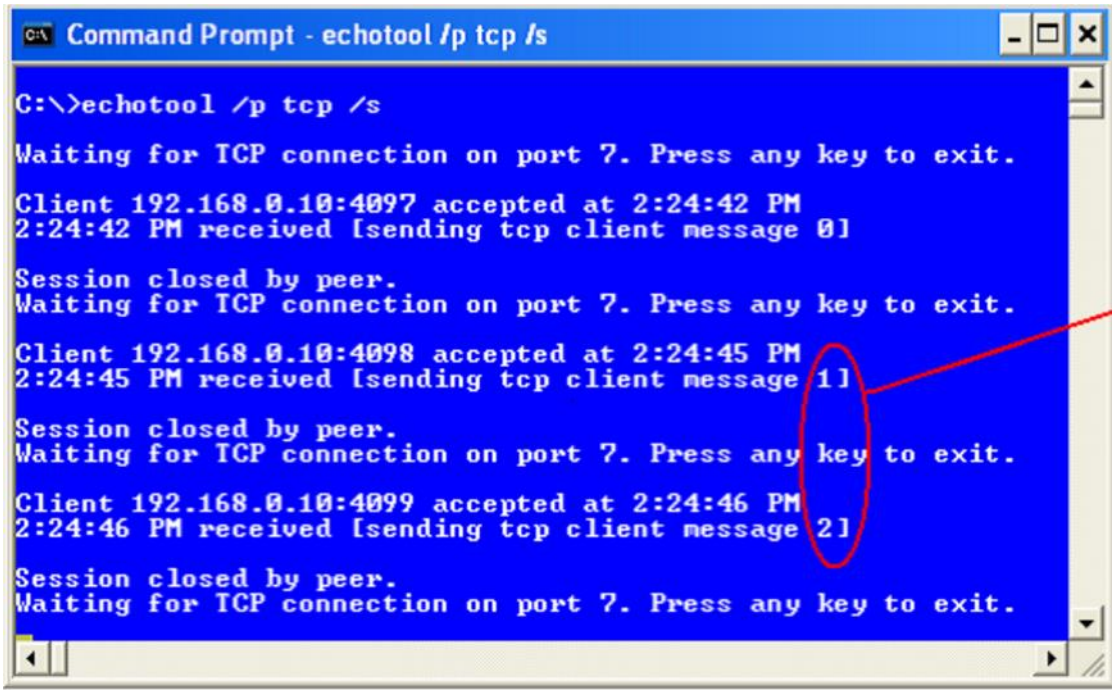
192.168.1.189)

In Windows PC: Open CMD and input: **C:\>echotool /p tcp /s**

- /p tcp: TCP protocol

- /s: Connecting mode (Server Mode)

When pressing button. Client (Open board) will send strings to server and echo)



2.34.2.LWIP_TCP_ECHO_SERVER

- Overview

  TCP Server Demo. Echo information

- Operation and result

  Open CMD, and input:

  C:\>echotool IP_address /p tcp /r 7 /n 15 /t 2 /d Testing LwIP TCP echo server

- IP_address: IP address of Open board. Default using static IP address:

192.168.1.110

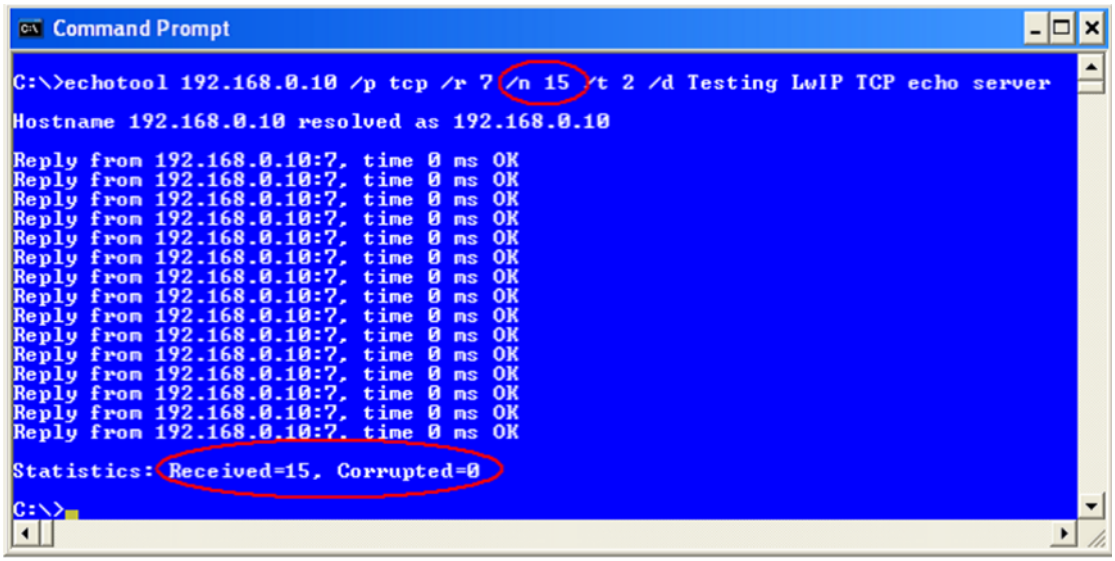
- /p tcp: TCP protocol

- /r: echo port

- /n: number of echo request (e.g. 15)

- /t: timeout of connection (s) (e.g. 2)

- /d: information echoed (e.g. "Testing LwIP TCP echo server")



2.34.3.LWIP_UDO_ECHO_CLIENT

- Overview

  TCP Client demo, echo

- Operation and result

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

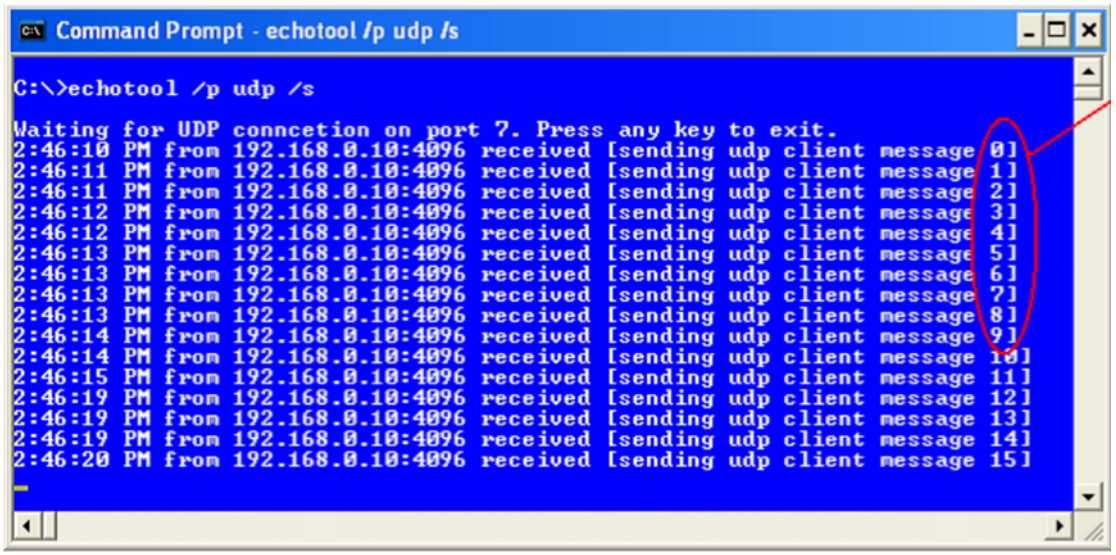
  192.168.1.189)

  Open CMD and input: **C:\>echotool /p udp /s**

  - /p udp: protocol

- /s: Connect mode (Server mode)

Client send data to sever and echo when pressing button.



2.34.4.LWIP_UDO_ECHO_SERVER

- Overview

  TCP Server demo. Echo

- Operation and result

  Open CMD and input:

  ```
  C:\>echotool IP_address /p udp /r 7 l/ 7 /n 15 /t 2 /d Testing

  LwIP UDP echo server
  ```

  - IP_address: IP address of Open board. Default using static IP address:

  192.168.1.110

  - /p: UDP protocol

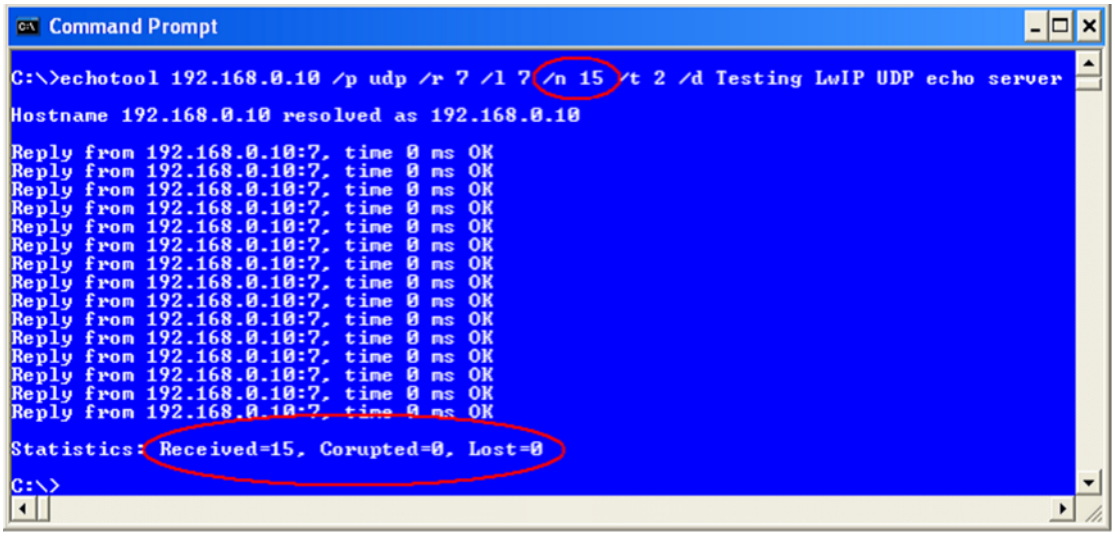
  - /r: Server port (echo port)

  - /l: Local Port of Client (echo port)

- /n: Number of echo request (e.g. 15)

- /t: timeout of connection (s) (e.g. 2)

- /d: information echoed (e.g. “Testing LwIP UDP echo server”)



2.34.5.LWIP_HTTP_SERVER_RAW

- Overview

  HTTP Server demo. Display Web Page

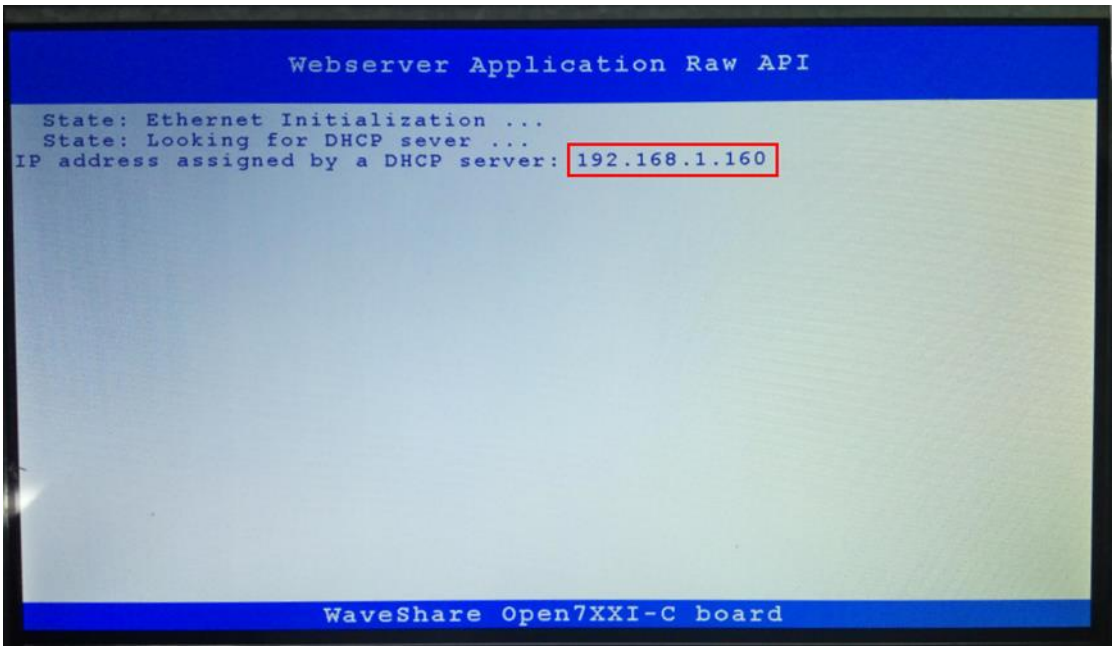
- Hardware connection

  Connect ETH cable to ETH module and PC.

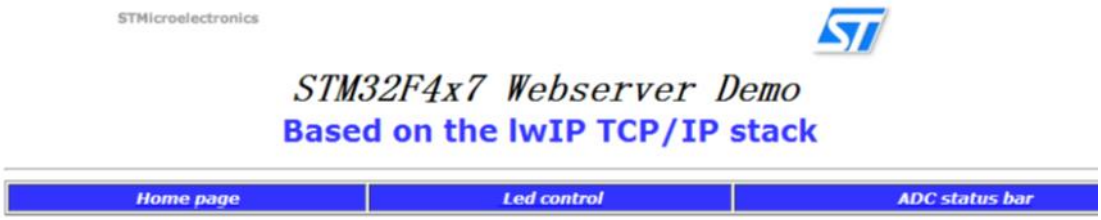
  Connect 7inch 1024x600 LCD to Open board

- Operation and result

  LCD will display information as below:



Input the IP address above to Browser in PC, you can enter a Web Page:



Click LED control to control LED of Open board

2.35. FREERTOS

- Overview

  FreeRTOS demo which is generated by STM32CubeMX software. This demo includes eleven projects

- Operation and dem

  Fit all the LED JMP. LED will flashing

2.36. UCOS III

- Overview

  uCOS III demo generated by STM32cubeMX software

- Operation and result

  Fit all the LED JMP. LED1 flashing.