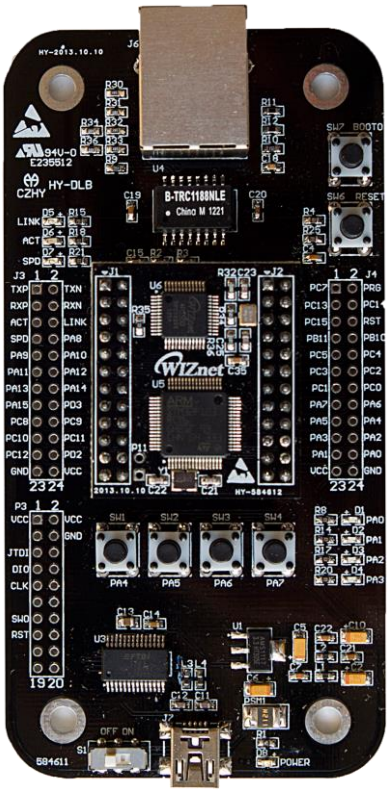
W5500-EVB User Menu

V1.01



For more information be refer: http://wizwiki.net/

Document Revision History:

Version	Date	Description
V1.0	**08 Oct, 2013**	**Release with W5500**
V1.01	**14 Jan, 2014**	**Modify the format issues;**

Catalogue

Figures

Table

1 Introduction

W5500 Evaluation Board named as W5500-EVB. We had developed an Evaluation board for our W5500 to provide more chances for user can easily to understand this product. This design has used STM32F103RCT6+W5500 that will be a Cortex M3 MCU that based in ARM solution.

W5500 has followed WIZnet's previous ToE technology. This technology has used the Hardwired TCP/IP technology to create the data transfer and network layout. (In example: TCP, UDP, ICMP, IPv4, ARP, PPPoE etc.),This simplify the workload of the MCU by shifting to W5500 for handling the data transferring layer and physical layer of network processing that includes 32K bit Rx/Tx buffer data storage. This method has reduces the workload of the MCU that improves the performance and reliability of the system.

In processing stage, user could assume our W5500 as an external RAM of the MCU. Our W5500 includes Wake up LAN and power down mode reference source that could reduce Energy consumption. W5500 has 80 MHz High speed SPI interface that provides different kind of platform to create a high speed network solution.

2 Features

- High Speed Serial Peripheral Interface (SPI MODE 0, 3)
- Hardwired TCP/IP Protocols : TCP, UDP, ICMP, IPv4 ARP, IGMP, PPPoE, Ethernet
- 10BaseT/100BaseTX Ethernet MAC/ PHY embedded
- Auto Negotiation (Full and half duplex, 10 and 100-based)
- 8 independent sockets simultaneously
- Internal 32Kbytes Memory for Tx/Rx Buffers
- Multi-function LED outputs (Full/Half duplex, Link, Speed)
- Power down mode
- Wake on LAN
- 0.13 μm CMOS technology
- 3.3V operation with 5V I/O signal tolerance
- Lead-Free Package
- Small & Compact 48 Pin LQFP Package

3 Specification

Table 1 Specification

Module	Components	Description	Remarks
Main board	TCP/IP Chip	W5500	Full hardwired TCP/IP protocol
	MCU	STM32F103RCT6	
	EEPROM	AT24C16	4K EEPROM
	J1, J2 pin header	External pin	2.54mm 12*2
Interface board	Transformer	B-TRC1188NLE	
	RJ-45		Not included LED and Transformer
	Voltage converter	LM1117-3.3	
	USB to RS232	FT232RL	
	LED		Link,ACT,Speed
	J3,J4 pin header	External pin	2.54mm 12*2
	P3 pin header	J-Tag connecter	2.54mm 10*2
	button		6 pieces

4 Block Diagram

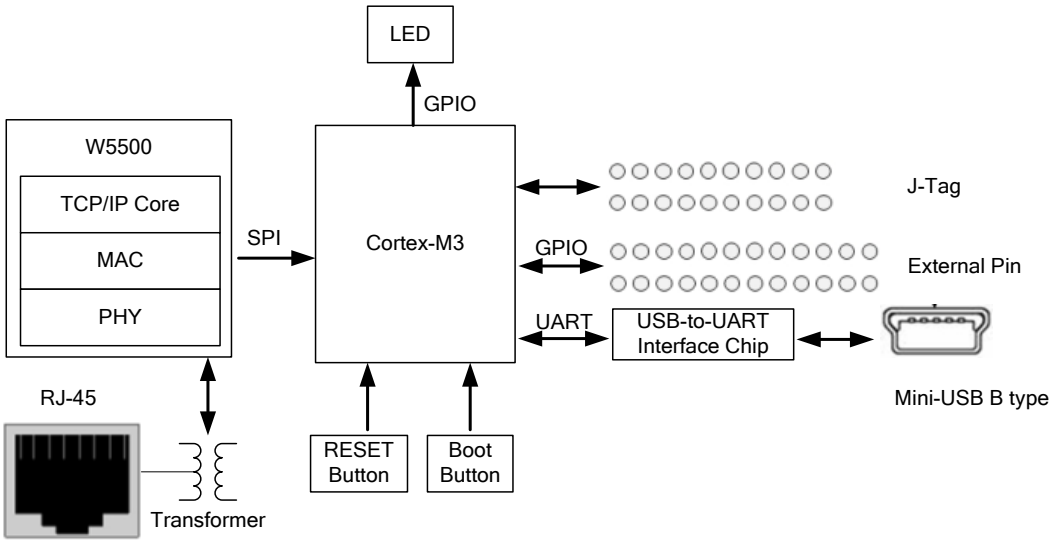


Figure 1 Block Diagram

5 Hardware layout

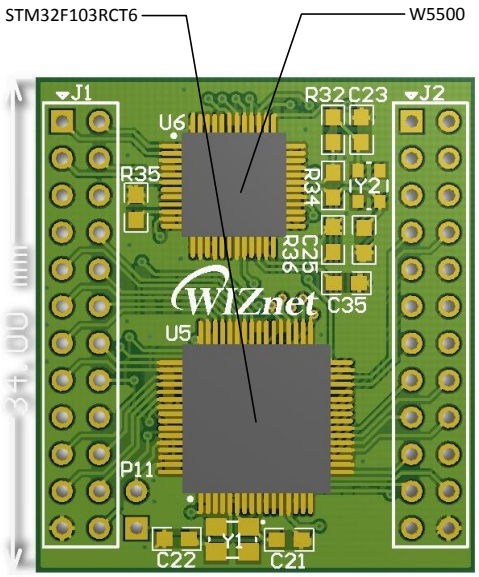


Figure 2 Main Board (Front side)

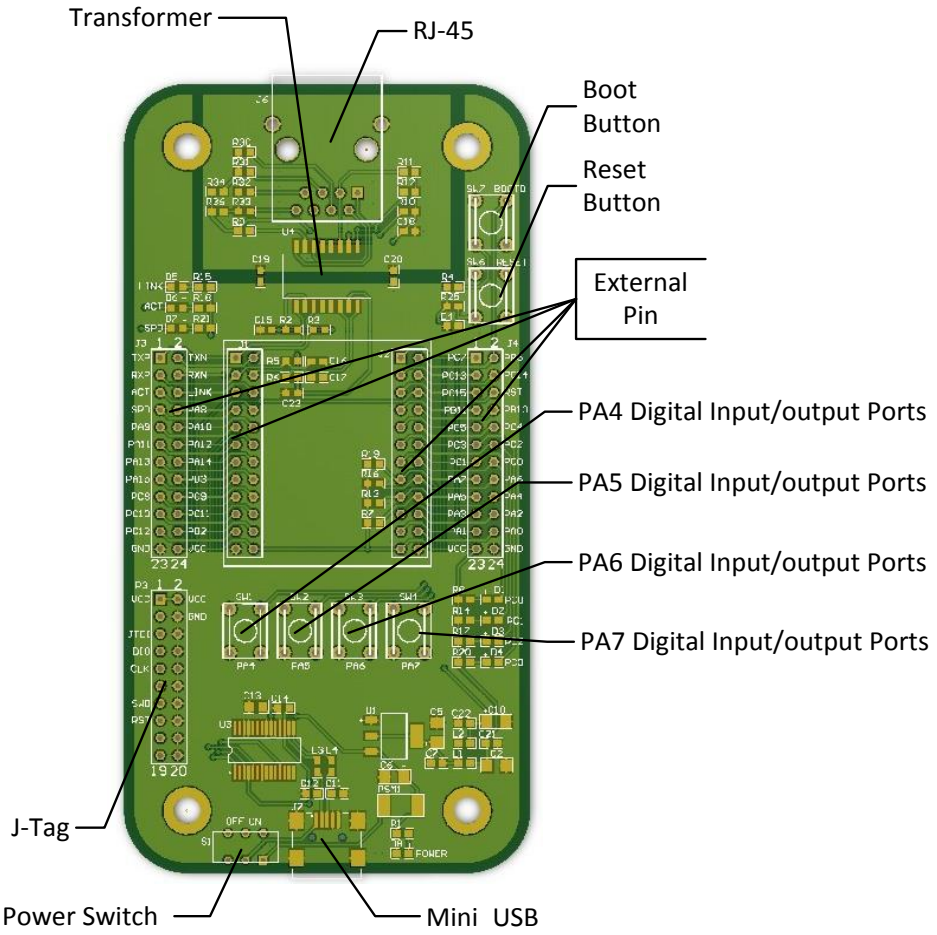


Figure 3 Interface board physical layout(Front side)

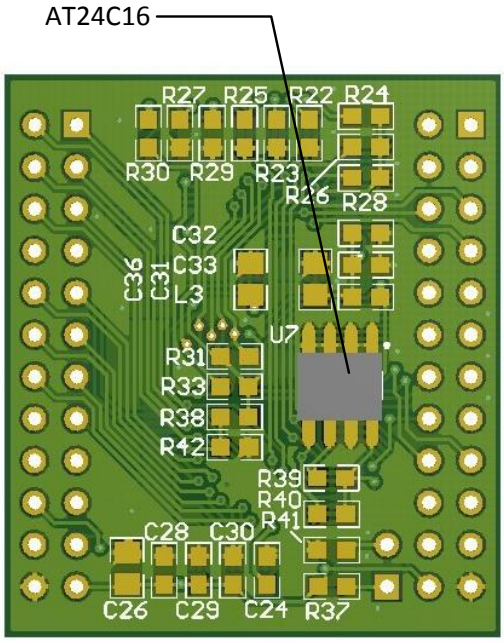


Figure 4 Main Board (Back side)

6 Pin Header layout

Table 2 Pin Header layout

	J1				J3
No.	**Name**	**Type**	**Details**	**Function**	**Name**
1	TXP	AO	Differential signal Transmit		TXP
3	RXP	AI	Differential signal Receive		RXP
5	ACTLED	O	Active LED		ACTLED
7	SPDLED	O	Network Speed LED		SPDLED
9	PA9	I/O	PA9	USART1_TX/ TIM1_CH2	RX_USB
11	PA11	I/O	PA11	USART1_CTS/USBDM CAN_RX/TIM1_CH4	RTS_USB
13	PA13	I/O	JTMS- SWDIO	JTMS- SWDIO	SWDIO
15	PA15	I/O	JTDI	SPI3_NSS/ I2S3_WS	JIDI
17	PC8	I/O	PC8	TIM8_CH3/SDIO_D0	PC8
19	PC10	I/O	PC10	UART4_TX/SDIO_D2	PC10
21	PC12	I/O	PC12	UART5_TX/SDIO_CK	PC12
23	GND		GND		GND
2	TXN	AO	Differential signal Transmit		TXN
4	RXN		Differential signal		RXN

			Receive		
6	LINKLED		Link LED		LINKLED
8	PA8	I/O	PA8	USART1_CK/TIM1_CH1/MCO	PA8
10	PA10	I/O	PA10	USART1_RX/TIM1_CH3	TX_USB
12	PA12	I/O	PA12	USART1_RTS/USBDP/CAN_TX/TIM1_ETR	CTS_USB
14	PA14	I/O	JTCK- SWCLK		SWCLK
16	PD3	I/O	PD3	FSMC_CLK	SWO
18	PC9	I/O	PC9	TIM8_CH4/SDIO_D1	PC9
20	PC11	I/O	PC11	UART4_RX/SDIO_D3	PC11
22	PD2	I/O	PD2	TIM3_ETR/UART5_RX SDIO_CMD	PD2
24	VCC				VCC
	J2				J4
No.	**Name**	**Type**	**Details**	**Function**	**Name**
1	PC7	I/O	PC7	I2S3_MCK/TIM8_CH2/SDIO_D7	
3	PC13	I/O	PC13	TAMPER-RTC	
5	PC15	I/O	PC15	OSC32_OUT	
7	PB11	I/O	PB11	I2C2_SDA/USART3_RX	
9	PC5	I/O	PC5	ADC12_IN15	
11	PC3	I/O	PC3	ADC123_IN13	
13	PC1	I/O	PC1	ADC123_IN11	
15	PA7	I/O	PA7	SPI1_MOSI/TIM8_CH1N/ ADC12_IN7 TIM3_CH2	
17	PA5	I/O	PA5	SPI1_SCK/DAC_OUT2 ADC12_IN5	
19	PA3	I/O	PA3	USART2_RX/TIM5_CH4/ ADC123_IN3/TIM2_CH4	
21	PA1	I/O	PA1	USART2_RTS ADC123_IN1/TIM5_CH2/ TIM2_CH2	
23	VCC		VCC		
2	BOOT0	I	BOOT0		
4	PC14	I/O	PD14	FSMC_D0	
6	nRESET				
8	PB10	I/O	PB10	I2C2_SCL/USART3_TX	
10	PC4	I/O	PC4	ADC12_IN14	
12	PC2	I/O	PC2	ADC123_IN12	
14	PC0	I/O	PC0	ADC123_IN10	

16	PA6	I/O	PA6	SPI1_MISO TIM8_BKIN/ADC12_IN6 TIM3_CH1	
18	PA4	I/O	PA4	SPI1_NSS/USART2_CK DAC_OUT1/ADC12_IN4	
20	PA2	I/O	PA2	USART2_TX/TIM5_CH3 ADC123_IN2/TIM2_CH3	
22	PA0	I/O	PA0	WKUP/USART2_CTS ADC123_IN0 TIM2_CH1_ETR TIM5_CH1/TIM8_ETR	
24	GND				

7 Development and Testing tools

7.1 Programming tools

1) IAR Embedded

The current IAR embedded platform that we are using is ARM IDE (Other IDE tools could support ARM IDE, i.e. Keil). W5500EVB software package version are targeting ARM 5.41 Embedded platform. For how to use IAR's solutions, please refer IAR user menu.
Driver Code Source: w5500_cortexm3_firmware_for_legacy.zip

2) CoIDE

CoIDE combines CoBuilder and CoDebugger that provides programming, downloading and debugging in software. This platform provides a complete platform for ARM cortex M series's user could easily and quickly to create their application. This combination software provides a good developing environment for user to develop their applications.
Driver Source Code: iolibrary_v100.zip
Reference: For more information of CoIDE, Please refer WizWiki→W5500 or login to CooCox official website.

7.2 Downloading tools

Flash loader Demonstrator is the downloading tools for W5500-EVB.
For more information of STM32F103xx Flash Loader demonstrator, Please refer to www.st.com of UM0462 user menu.
Download: UM0462 Flash loader demonstrator
http://www.st.com/internet/mcu/product/216817.jsp
Click “Design Support” -> SW DEMOS(bottom of the page)

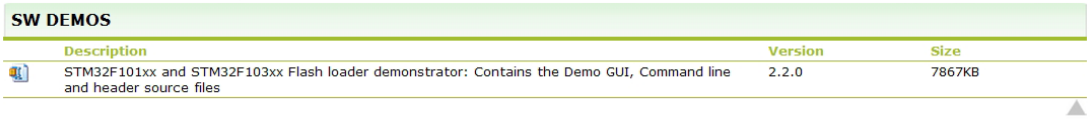


Figure 5 ST Download tools information

7.3 USB to UART connector IC Diver

While mini-USB has connected to Windows PC, The PC will automatically find the related driver to active the USB port. If it doesn’t work as expected, you could go to www.ftdichip.com to download the driver for this USB connector.

8 Download Source Code

8.1 Hardware connection

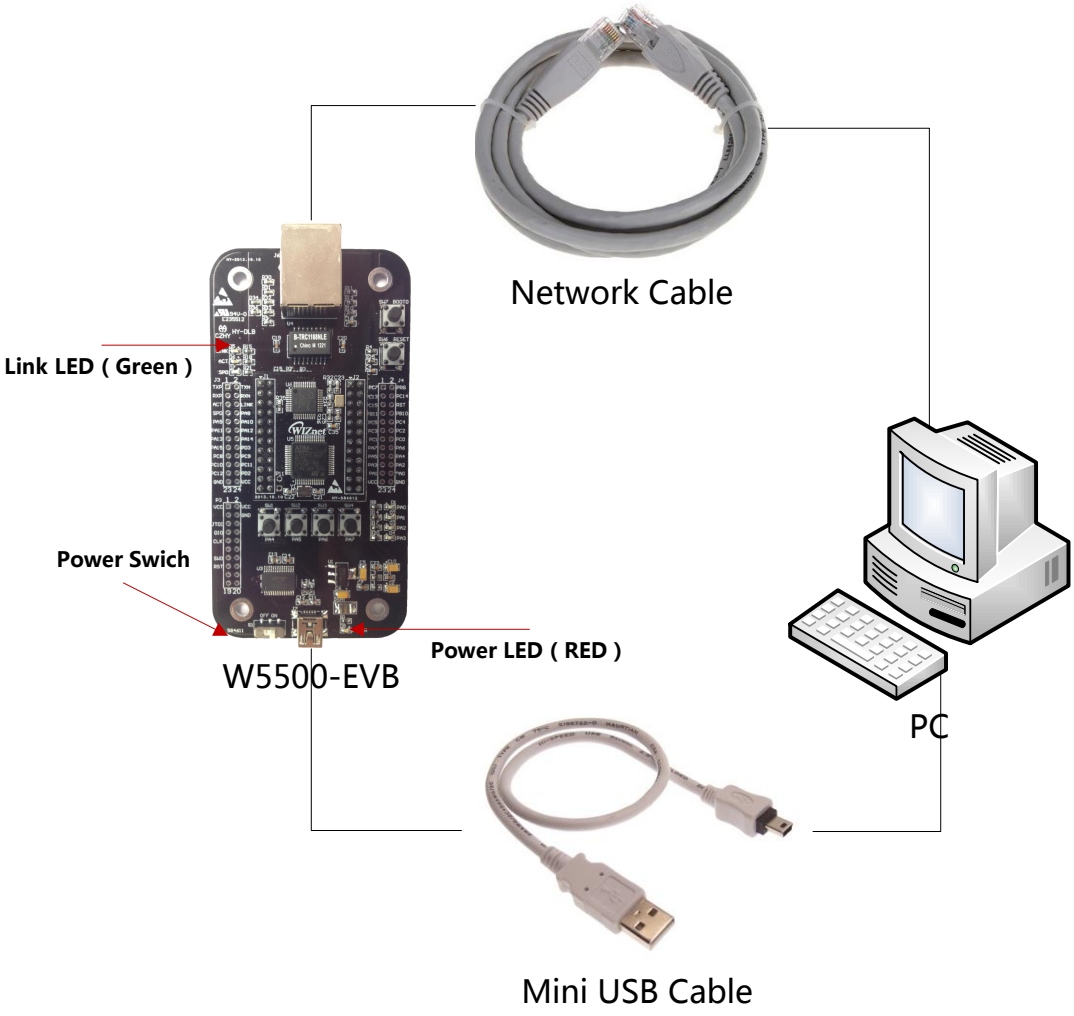


Figure 6 Hardware connection diagram

8.2 Complying the Source code

Use IAR to open W5500EVB as the following figure shows (Loopback example). Then compile it.

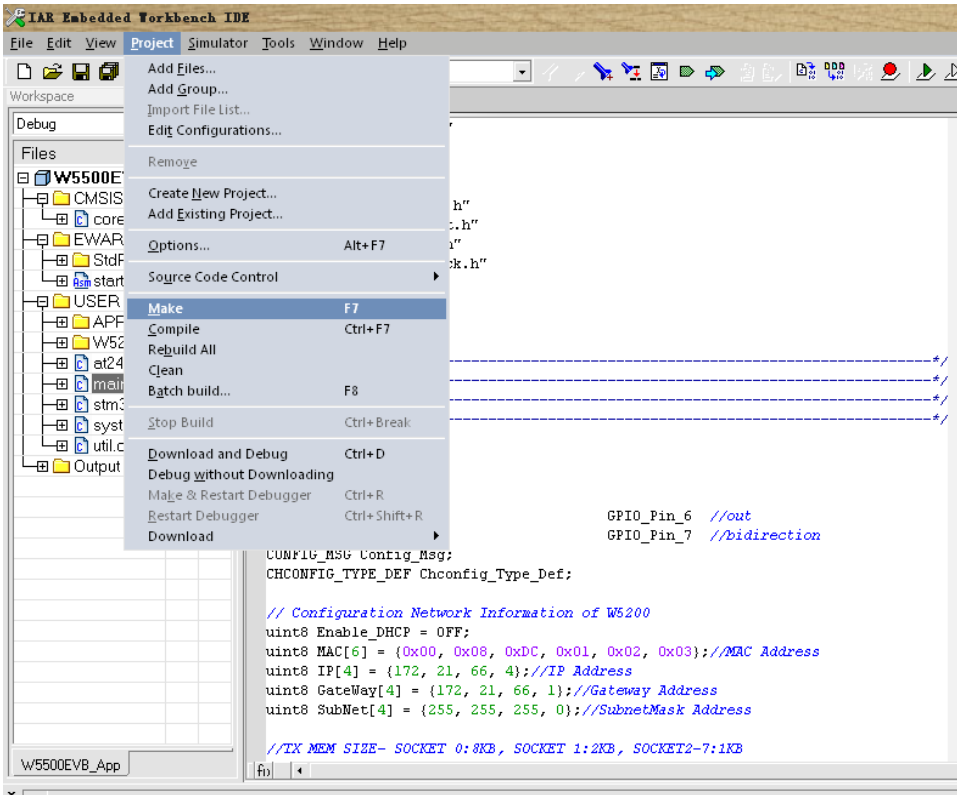


Figure 7 Open the source code by IAR

8.3 Program Download

1) Open the Device Manager, Check Mini USB cable has used which COM Port.

Figure 8 check the port number

2) Open the Flash loader Demonstrator; choose the related COM port and Serial settings.

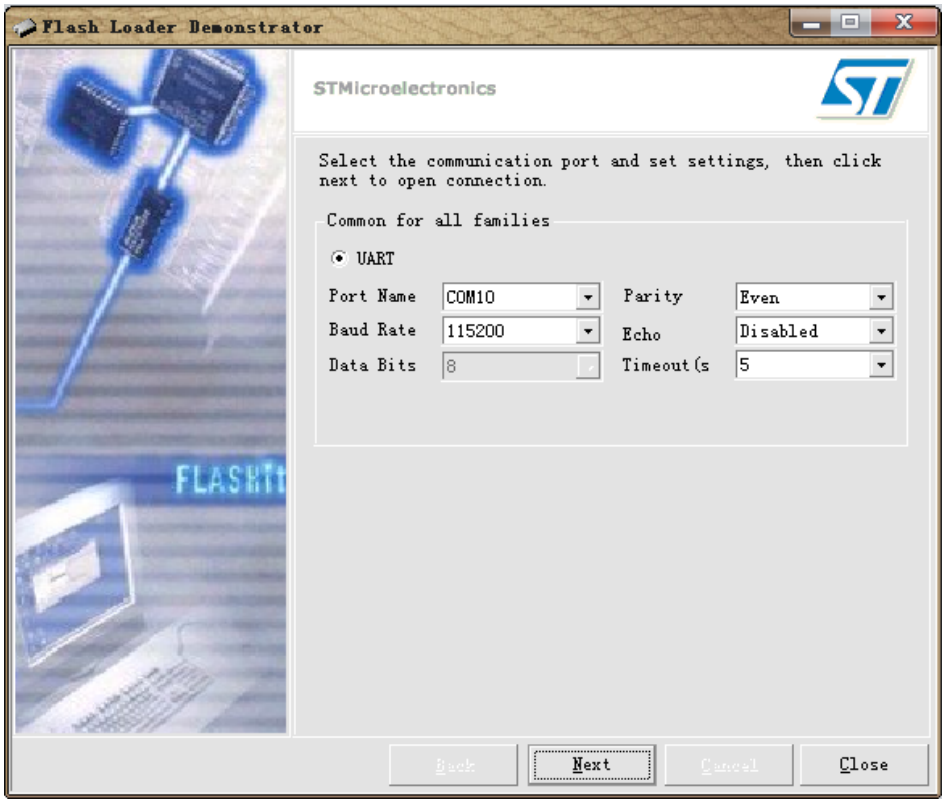


Figure 9 Progress to download (Step 1)

3) Press and hold the SW7 button (BOOT0). Then press SW6 (RESET) button to reset the EVB. After reset, release SW7 to program download mode

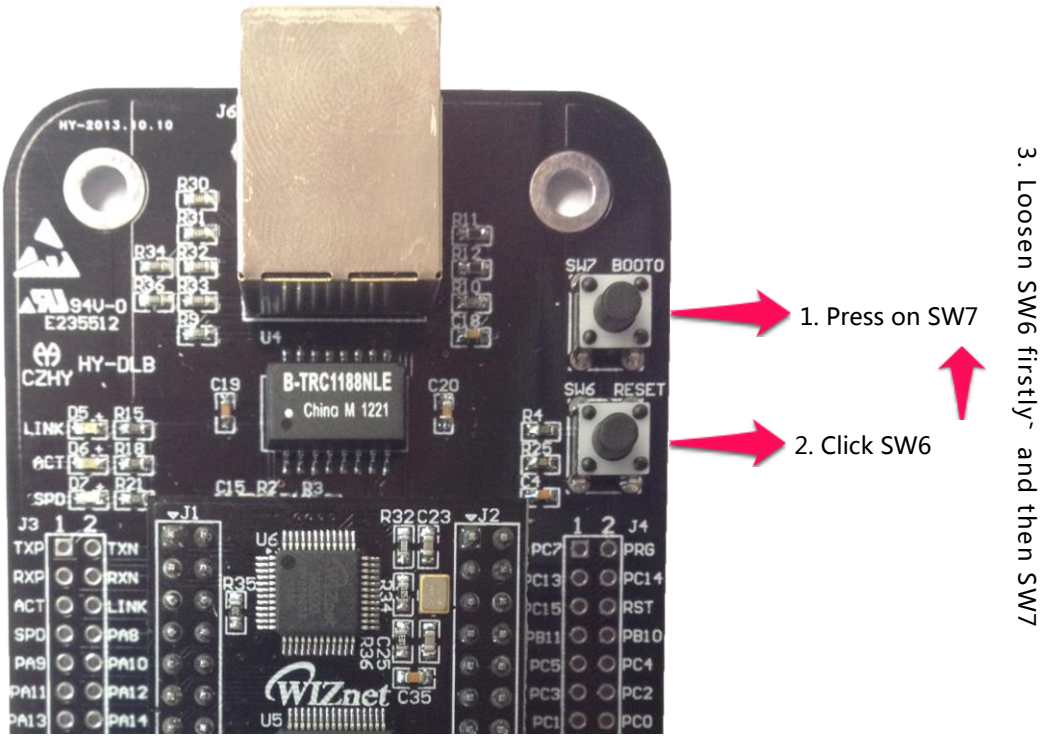


Figure 10 button procedure for Program download

4) Press next step on the Flash loader Demonstrator. Check MCU is it available to write.

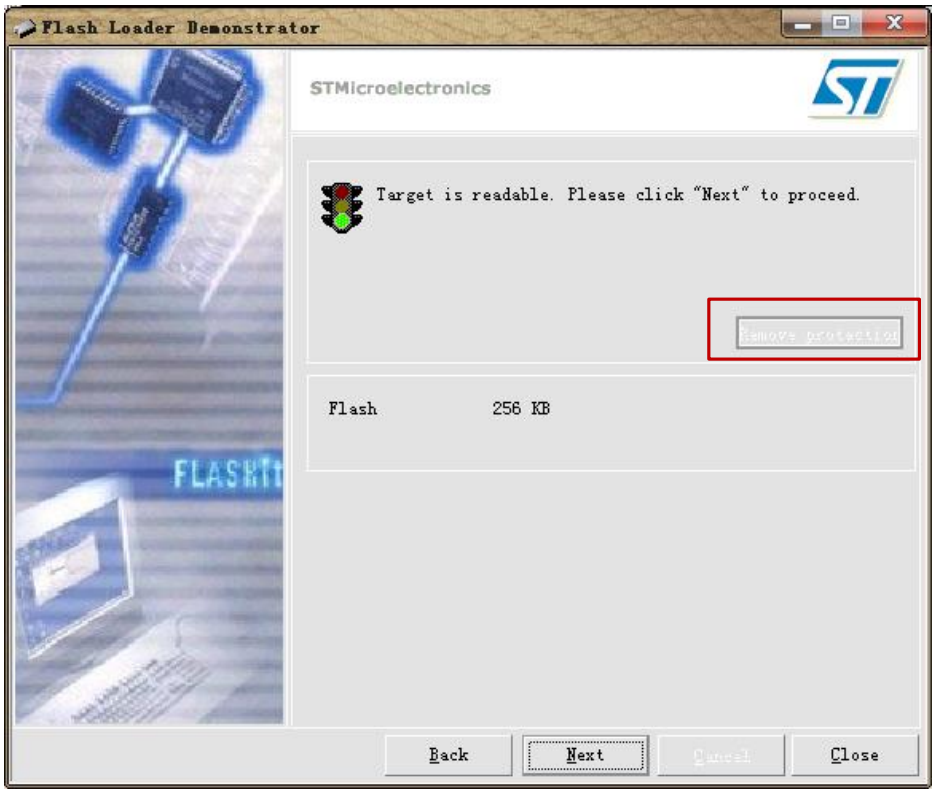


Figure 11 Progress to download (Step 2)

5) Press next, Select the target device.

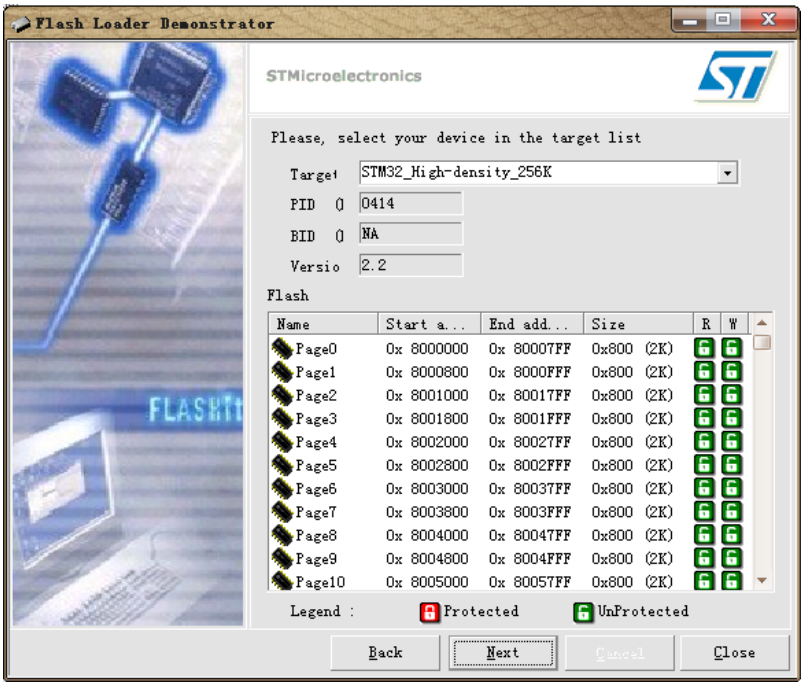


Figure 12 Progress to download (step 3)

6) Choose the Source code that you need to download to the MCU

Remark: We suggest erasing all the Flash data before you implement the source code to the MCU.

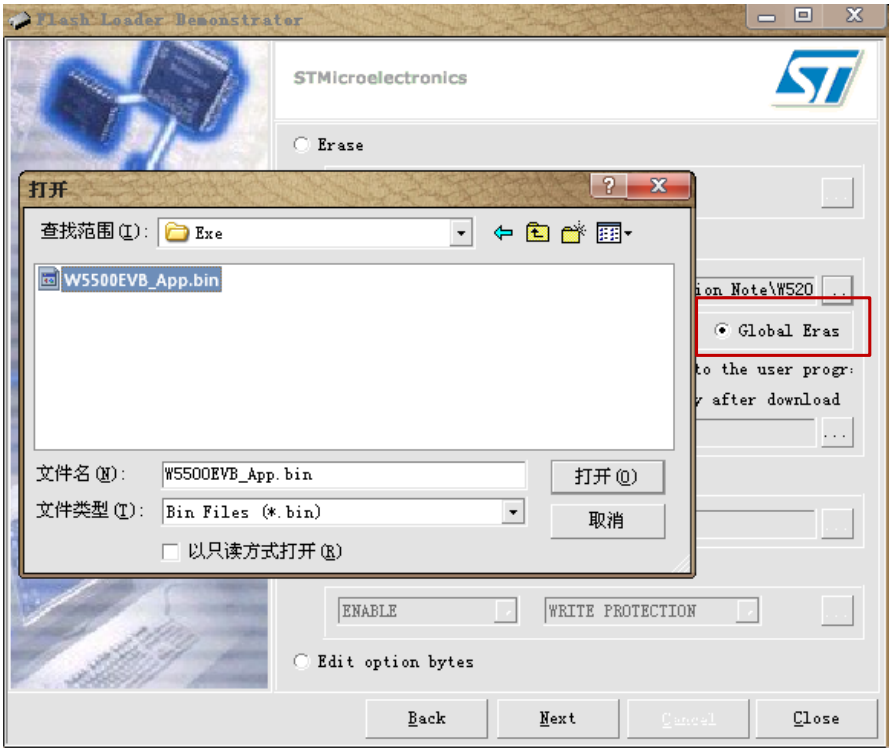


Figure 13 Progress to download (Step 4): Choose the Source code to download

7) Download completed

9 Demonstration

The following demonstration will use an F/W that has Web server function.

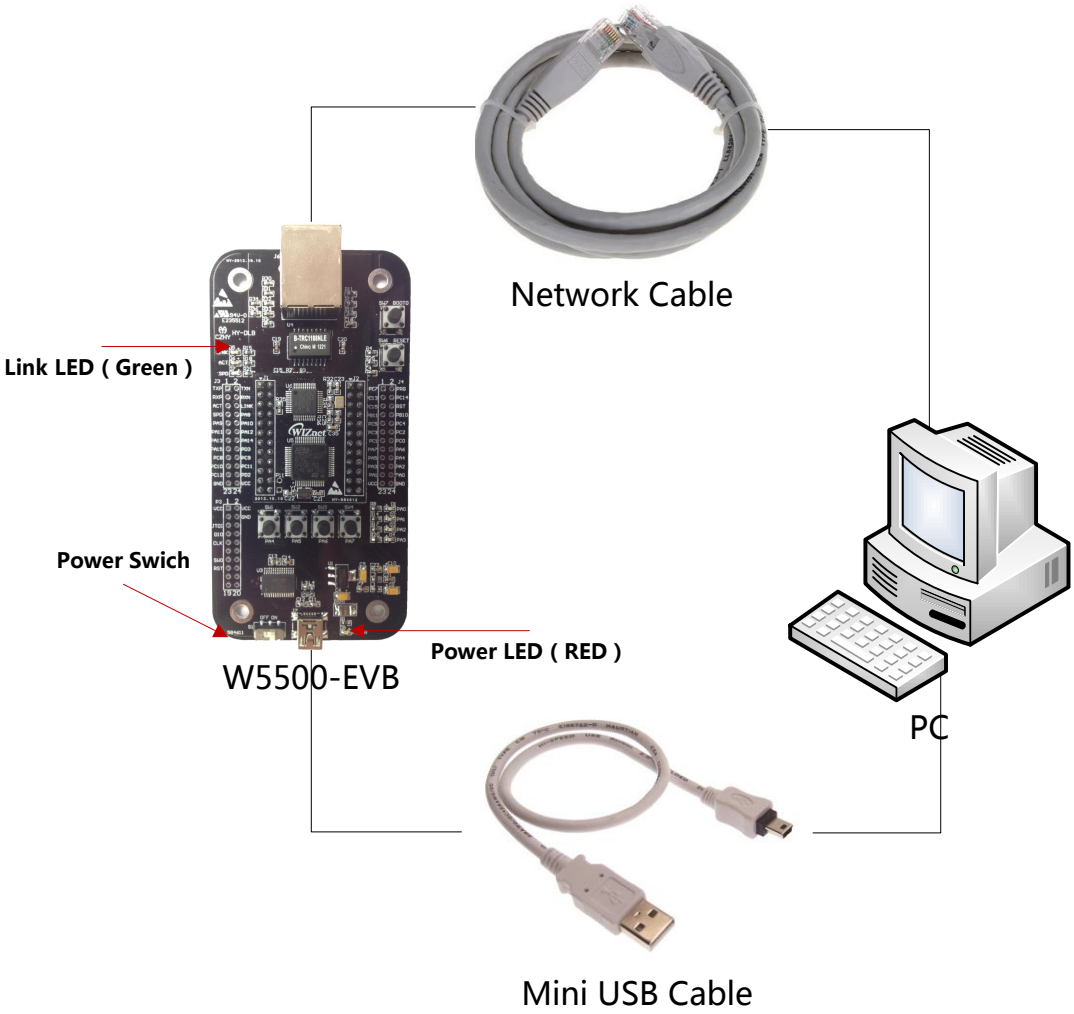


Figure 14 Hardware connection

9.1 Default settings

Table 3 W5500-EVB Http Server default settings

Settings	Value
Local MAC address	00:08:DC:11:11:11
Local IP Address	192.168.1.101
Subnet Mask	255.255.255.0
Gateway	192.168.1.1

1) Open app.eww by using IAR, search the left side of IAR program, double click device.c file, if this is the first time to use the EVB, EEPROM will not save any related IP address informations, so the default setting will be active. From the function of set_default() that shows on figure below, it shows the default information of the module. The location IP (lip) and Gateway (gw) address could change to your local address before implemented to the chip.

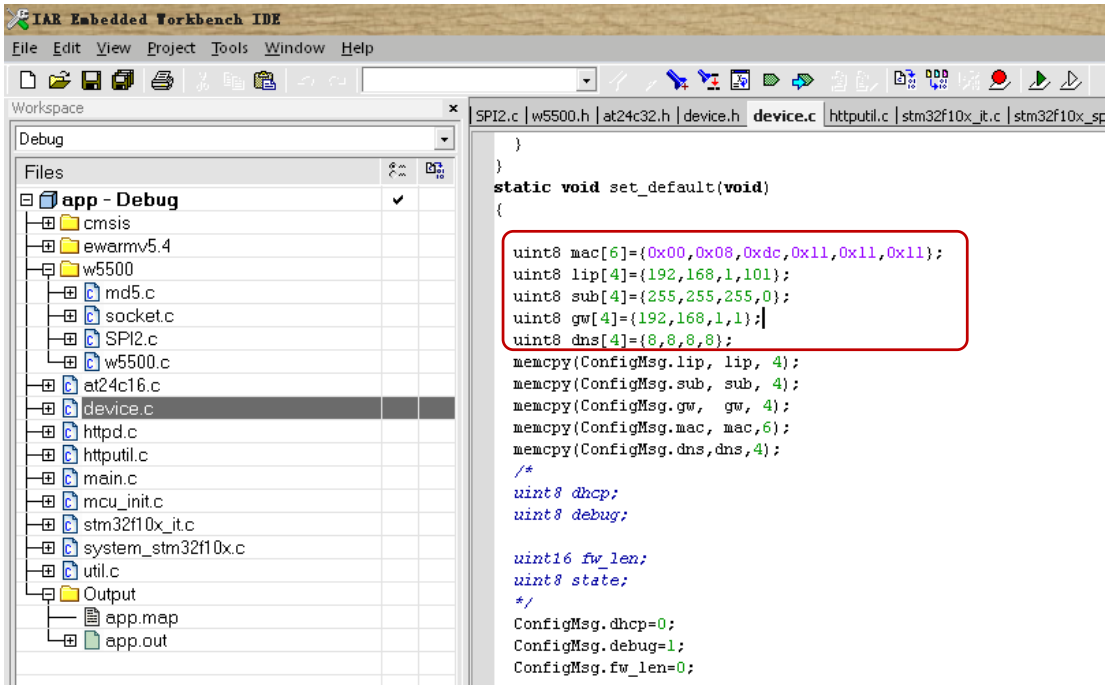


Figure 15 F/W procedure – Default settings

2) This F/W could do related testing by using serial commands. From the device manager you could find the USB Serial Port number, then please use related serial terminal to open. Press the Reset button (SW6) of the EVB, then you could read the default setting through serial terminal.

Figure 16 Check COM Port number

Figure 17 Serial Messages shows the default setting for this F/W

9.2 Open the Http Server

If you wanted to login to the Http Server, please remember to check the IP address of the EVB is it in the same sector of IP address with the PC.

1. Your PC could follow the default setting information, so you could your PC's address to 192.168.1.xxx to browse the module's HTTP server.
2. If you PC have set the IP address, you could change the module IP address to be the same sector as the PC. Please refer Section 8 – Download Procedure to re-download the EVB.

Open any browser, Type the local IP address of W5500-EVB, then it will be Http Server webpage.

Remark: The following example will use the default IP address of W5500-EVB (192.168.1.101)

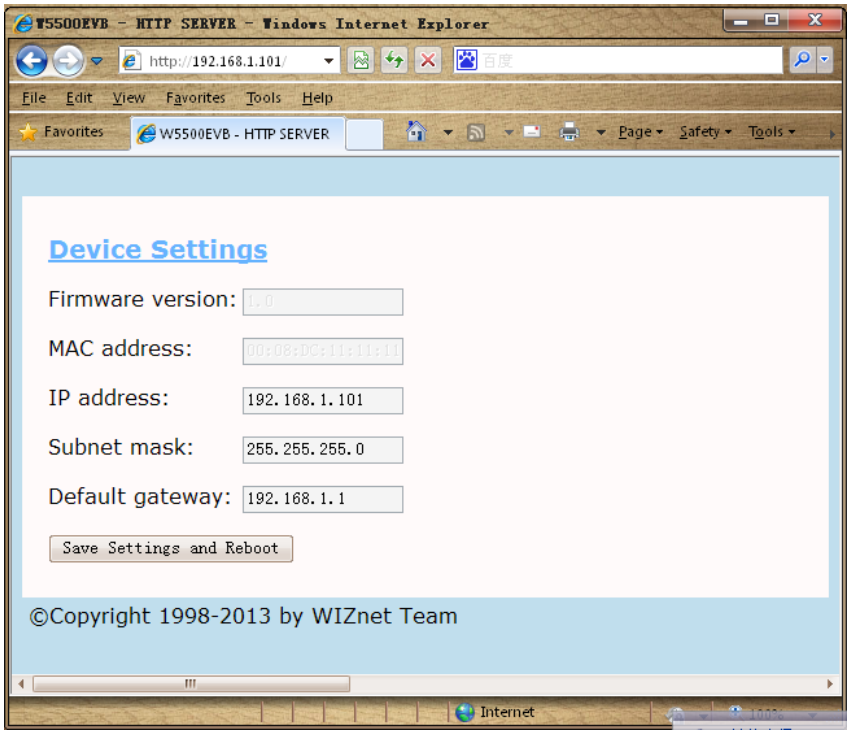


Figure 18 Http Server setting webpage: Setting Page

9.3 Http Server parameters modification

1) Turn on the webpage for changing the IP, subnet mask and gateway address.

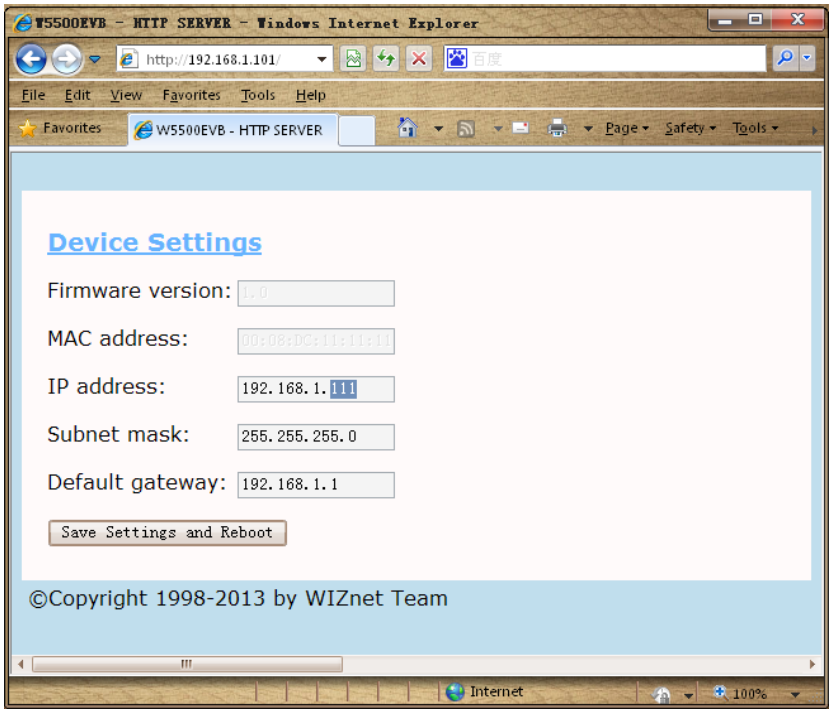


Figure 19 Http Server Setting page: change the settings

2) Press 'Save Settings and Reboot', it will save and reboot the system for 5 seconds and turns back to the IP address page automatically.

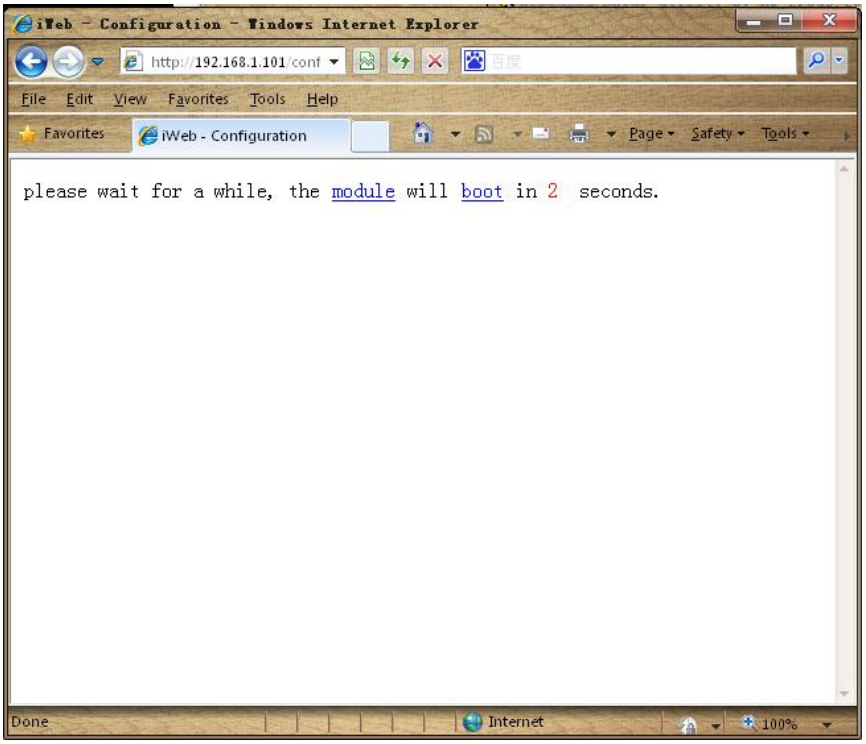


Figure 20 Http Server Reboot

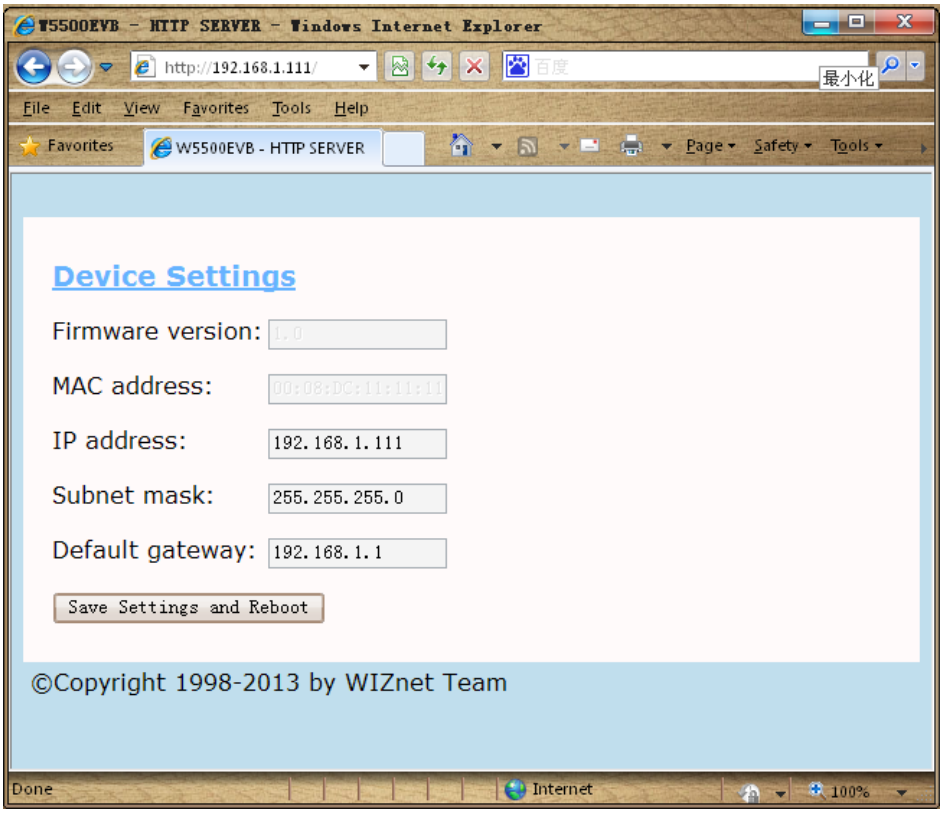


Figure 21 Http Server settings (After reboot)

3) The serial message will show the changes of the setting.

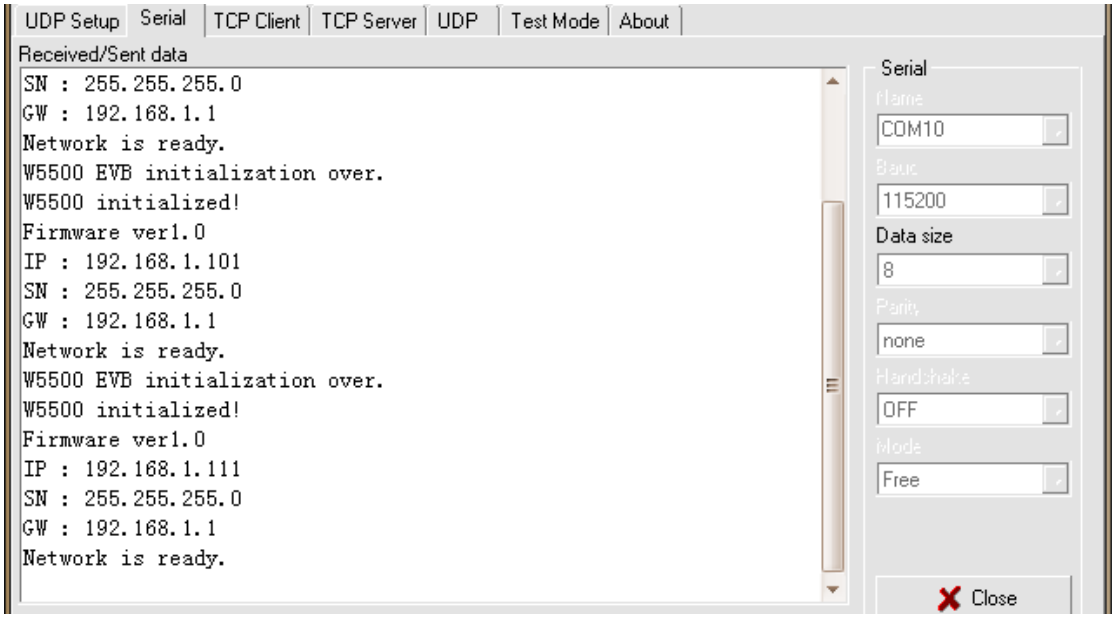


Figure 22 Serial Message after the changes

4) End of demonstration

10 Reference Schematic

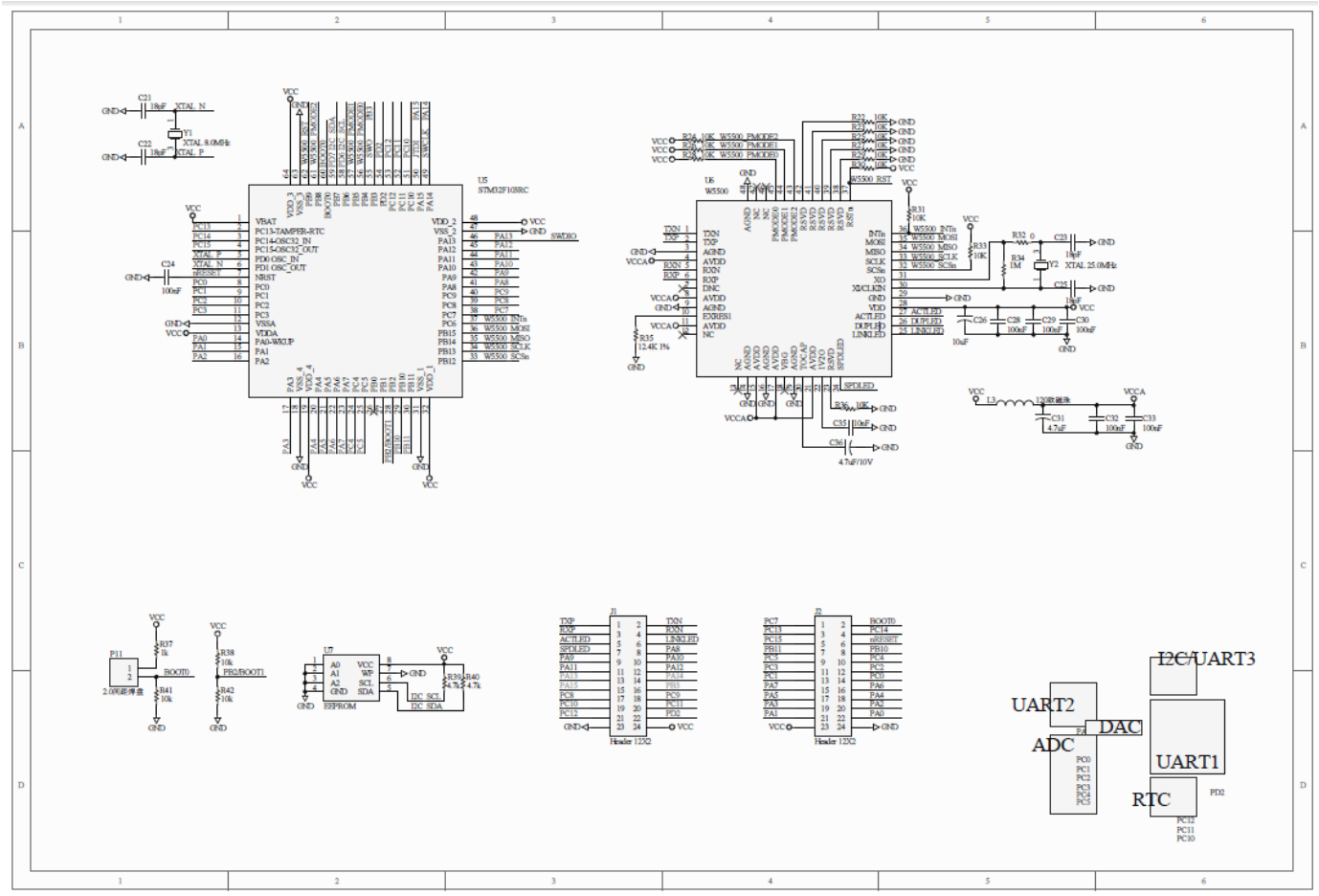


Figure 23 Core Board

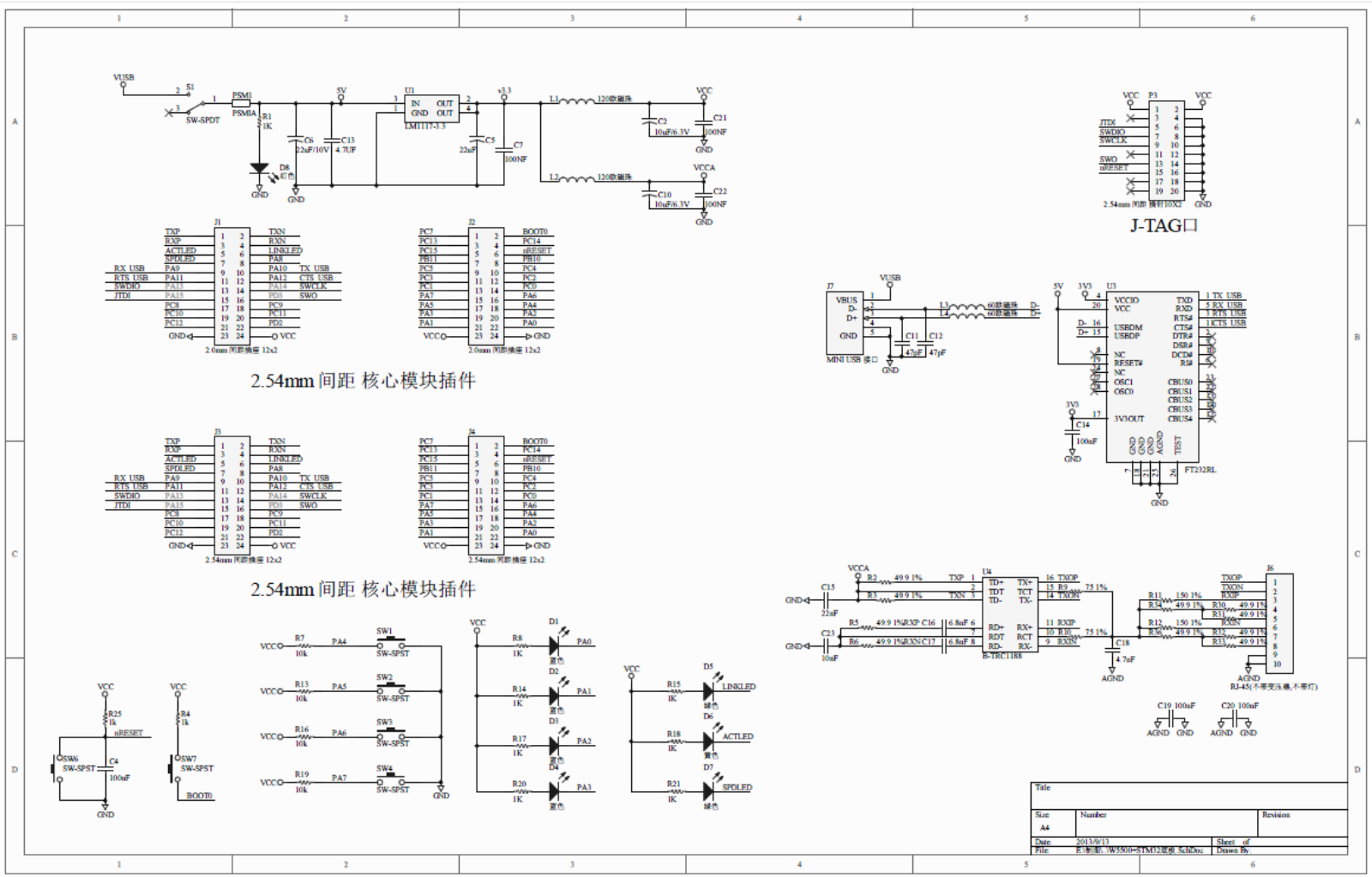


Figure 24 Base Board

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