W5200 Power Down Mode Application Note

==========

W5200 and W7200 provide two attractive functions, such as Power Down Mode and Wake-up ON LAN. However, these two functions are not able to be used at the same time. If Power Down Mode is activate, PHY on Chip will be turned off and stop operating. And then the device in Power Down Mode cannot handle WOL magic packet for Wake-up ON LAN. It means Wake-up ON LAN will stop operating as well.

Generally, Power Down Mode can control on and off of PHY operation to save the power consumption. Wake-up ON LAN controls MCU mode by switching sleep mode and normal mode. When W5200 gets WOL magic packet, Wake-up ON LAN will issue an interrupt(through W5200) into MCU in sleep mode.

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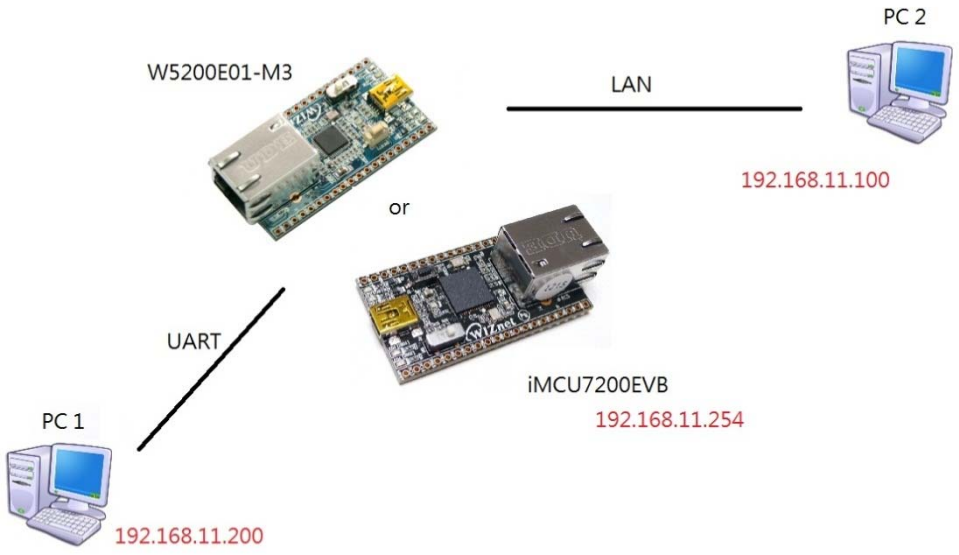
1. Diagram



2. W5200E01-M3_PWDN Sample Code

```
if (strcmp(choice,"7")== 0)
{
	bTreat = (bool)SET;
	if((IINCHIP_READ(PHY)&0x08) == 0x00){
		SerialPutString("\r\nEnabling...\r\n");
		GPIO_SetBits(GPIOB, WIZ_PWDN);
		Delay_ms(500);
		if((IINCHIP_READ(PHY)&0x08) == 0x08)
			SerialPutString("\r\nEnabled PHY Power Down!!!\r\n");
	} else{
		SerialPutString("\r\nAlready Enabled!!!\r\n");
	}
}
```

After choice the number of 7, if PHY registor is equal to disable power down mode(0x00), GPIO will set to enable power down mode. Otherwise PHY registor is already set to enable.

```
if (strcmp(choice,"8")== 0)
{
	bTreat = (bool)SET;
	if((IINCHIP_READ(PHY)&0x08) == 0x08){
		SerialPutString("\r\nDisabling...\r\n");
		GPIO_ResetBits(GPIOB, WIZ_PWDN);
		Delay_ms(3000);
		if((IINCHIP_READ(PHY)&0x08) == 0x00)
			SerialPutString("\r\nDisabled PHY Power Down!!!\r\n");
	} else{
		SerialPutString("\r\nAlready Disabled!!!\r\n");
	}
}
```

After choice the number of 8, if PHY registor is equal to enable power down mode(0x08), GPIO will set to disable power down mode. Otherwise PHY registor is already set to disable.

3. Configuration

IAR Embedded Workbench

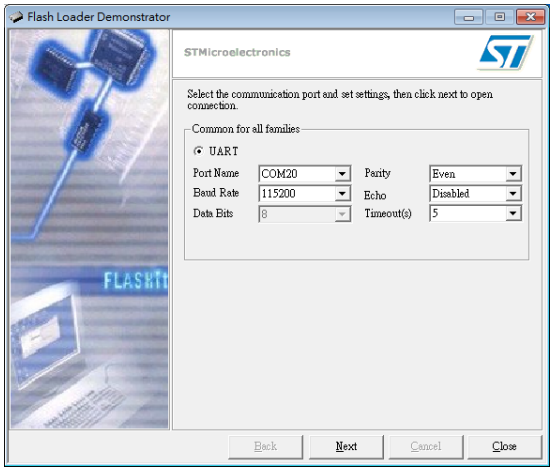
Type.h

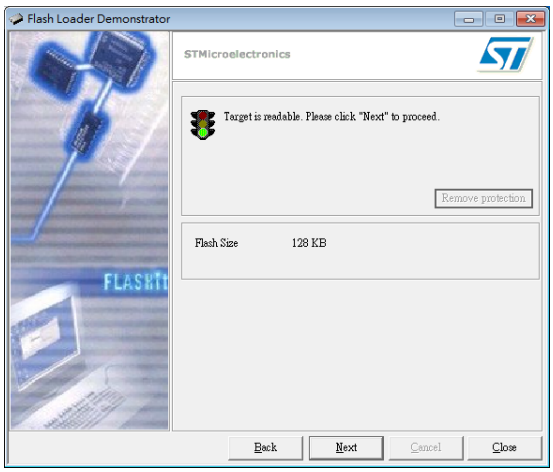
If the module is W5200E01-M3, the definiation of W7200 is disable.
#define __DEF_W5200__
//#define __DEF_W7200__

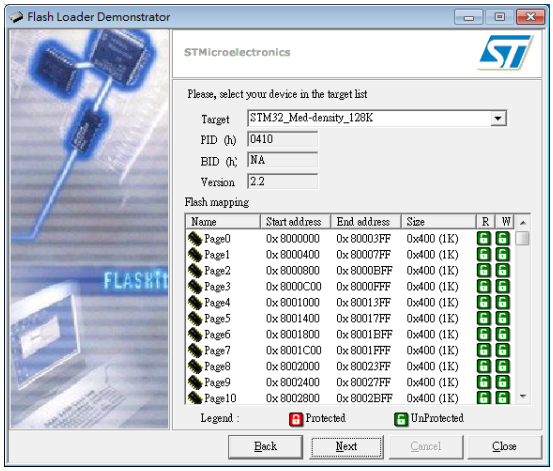
If the module is iMCU7200EVB, the definiation of W5200 is disable.
//#define __DEF_W5200__
#define __DEF_W7200__

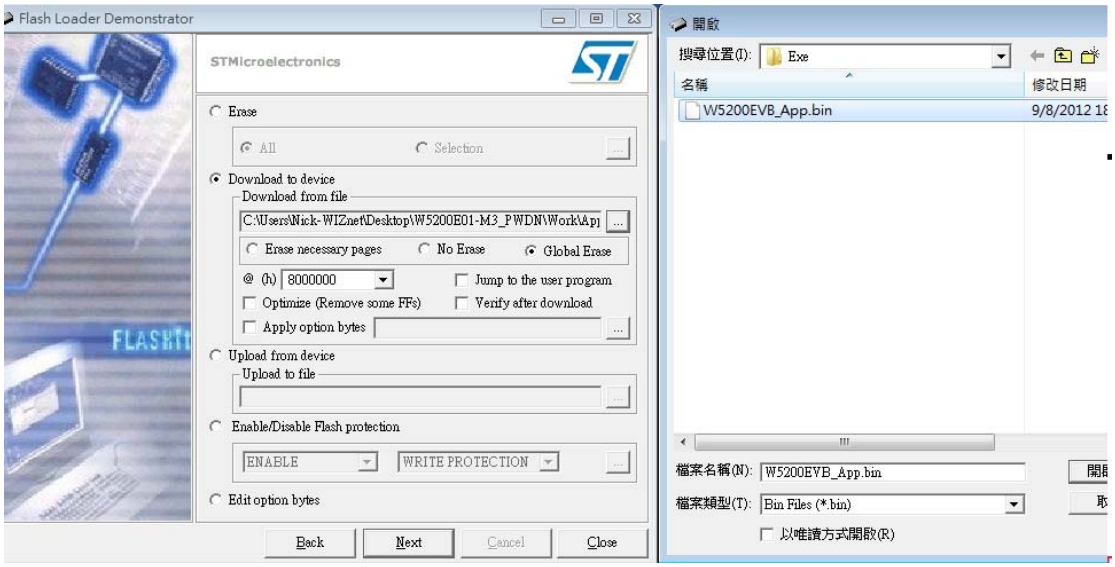
Flash Loader Demonstrator

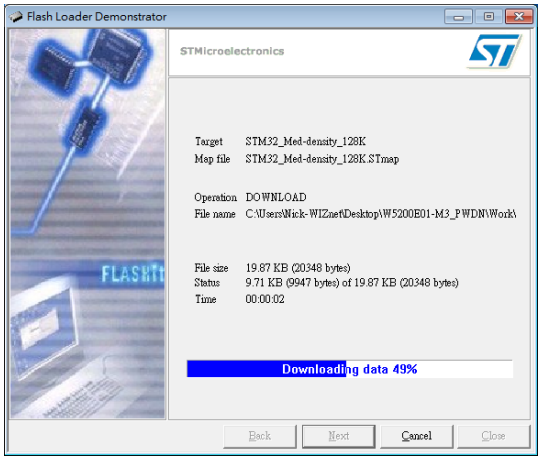
Open the Flash Loader Demo software to program into iMCU7200EVB or W5200E01-M3. The program step as follows:





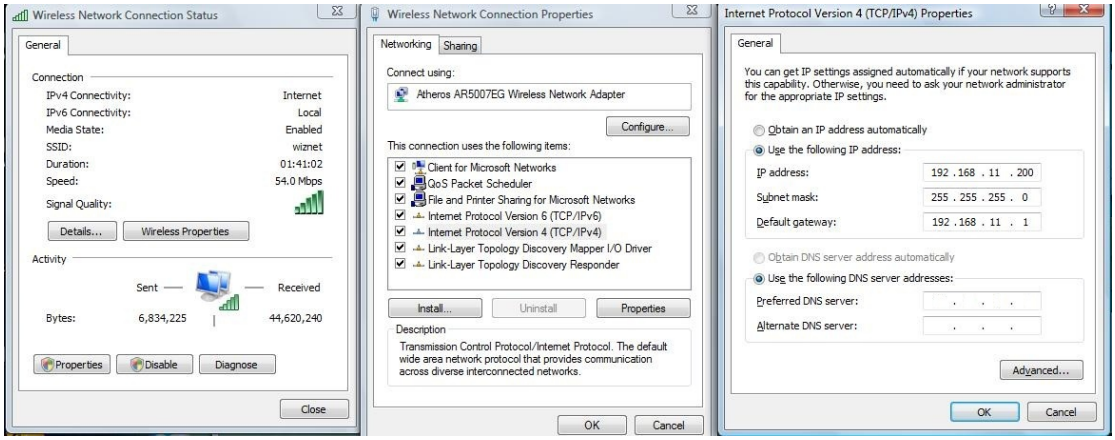

Flash Loader Demonstrator
STMicroelectronics
Please, select your device in the target list
Target STM32_Med-density_128K
PID (h) 0410
BID (h) NA
Version 2.2
Flash mapping
Name Start address End address Size R W
Page0 0x 8000000 0x 80003FF 0x400 (1K)
Page1 0x 8000400 0x 80007FF 0x400 (1K)
Page2 0x 8000800 0x 8000BFF 0x400 (1K)
Page3 0x 8000C00 0x 8000FFF 0x400 (1K)
Page4 0x 8001000 0x 80013FF 0x400 (1K)
Page5 0x 8001400 0x 80017FF 0x400 (1K)
Page6 0x 8001800 0x 8001BFF 0x400 (1K)
Page7 0x 8001C00 0x 8001FFF 0x400 (1K)
Page8 0x 8002000 0x 80023FF 0x400 (1K)
Page9 0x 8002400 0x 80027FF 0x400 (1K)
Page10 0x 8002800 0x 8002BFF 0x400 (1K)
Legend : Protected UnProtected
Back Next Cancel Close


Flash Loader Demonstrator
STMicroelectronics
Erase
All Selection
Download to device
Download from file
C:\Users\Nick-WIZnet\Desktop\W5200E01-M3_PWDN\Work\Ap
Erase necessary pages No Erase Global Erase
@ (h) 8000000
Jump to the user program
Optimize (Remove some FFs) Verify after download
Apply option bytes
Upload from device
Upload to file
Enable/Disable Flash protection
ENABLE WRITE PROTECTION
Edit option bytes
Back Next Cancel Close
開啟
搜尋位置(I): Exe
名稱 修改日期
W5200EVB_App.bin 9/8/2012 18
檔案名稱(N): W5200EVB_App.bin
檔案類型(T): Bin Files (*.bin)
以唯讀方式開啟(R)


Flash Loader Demonstrator
STMicroelectronics
Target STM32_Med-density_128K
Map file STM32_Med-density_128K.STmap
Operation DOWNLOAD
File name C:\Users\Nick-WIZnet\Desktop\W5200E01-M3_PWDN\Work\
File size 19.87 KB (20348 bytes)
Status 9.71 KB (9947 bytes) of 19.87 KB (20348 bytes)
Time 00:00:02
Downloading data 49%
Back Next Cancel Close


Flash Loader Demonstrator
STMicroelectronics
Target STM32_Med-density_128K
Map file STM32_Med-density_128K.STmap
Operation DOWNLOAD
File name C:\Users\Nick-WIZnet\Desktop\W5200E01-M3_PWDN\Work\
File size 19.87 KB (20348 bytes)
Status 19.87 KB (20348 bytes) of 19.87 KB (20348 bytes)
Time 00:00:07
Download operation finished successfully
Back Next Cancel Close

PC1 Static IP



Serial terminal Program

```
Serial port COM20 opened
MAC[0]: 0x 0
MAC[1]: 0x 8
MAC[2]: 0xdc
MAC[3]: 0x11
MAC[4]: 0x22
MAC[5]: 0x33

---------------------------------------
W5200E01-M3
Network Configuration Information
---------------------------------------
MAC : 00.08.DC.11.22.33
IP : 192.168.11.254
SN : 255.255.255.0
GW : 192.168.11.1
DNS server : 168.126.63.1
```

```
---------------------------------
SMTP Client using W5200
---------------------------------
=============================== STM32-Discovery ===============================
This Application is basic example of UART interface with
Windows Hyper Terminal.

================================================================================

                    APPLICATION MENU :

================================================================================

 1 - Set LD1 on
 2 - Set LD1 off
 3 - Show network setting
 4 - Set  network setting
 5 - Run TCP Loopback
 6 - Run UDP Loopback
 7 - Enable PHY Power Down
 8 - Disable PHY Power Down
Enter your choice :
```

For the W5200E01-M3_PWDN program is default to disable PHY power down mode. PHY Power Down means that control the ethernet PHY. So, PWDN enable means W5200 can not send&receive any packets.

4. Set network setting

```
Enter your choice : 4

MAC address : 00:08:DC:16:5F:AE

IP address : 192.168.1.200

Subnet mask : 255.255.255.0

Gateway address : 192.168.1.1

DNS address : 168.126.63.1

Mac : 00:08:DC:16:5F:AE
IP : 192.168.1.200
SN : 255.255.255.0
GW : 192.168.1.1
DNS server : 168.126.63.1
====================== STM32-Discovery ==================
This Application is basic example of UART interface with
Windows Hyper Terminal.
```

7. Enable PHY Power Down

```
Enter your choice : 7

Enabling...

Enabled PHY Power Down!!!
```

8. Disable PHY Power Down

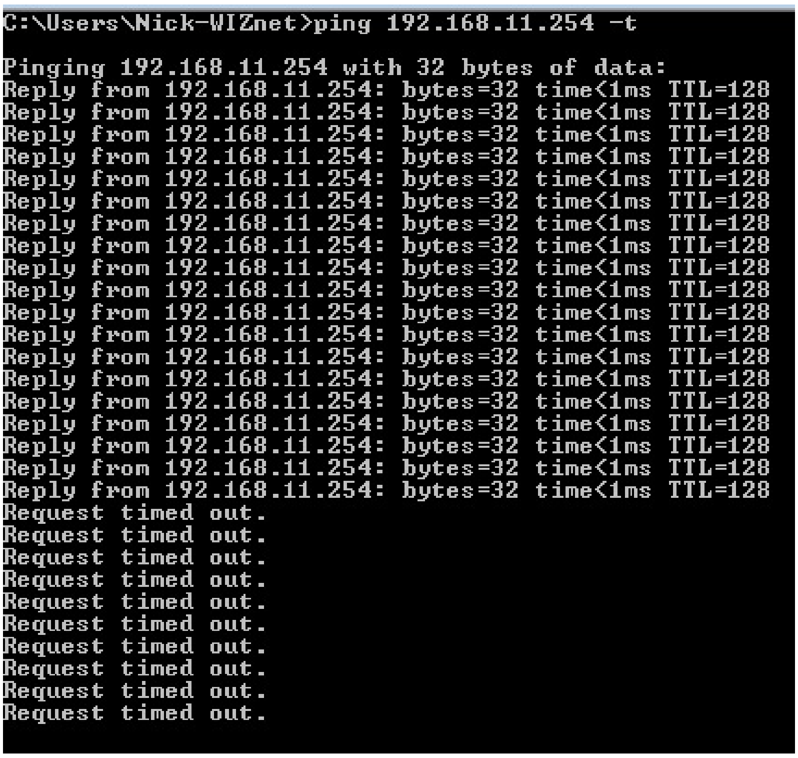
```
Enter your choice : 8

Disabling...

Disabled PHY Power Down!!!
```

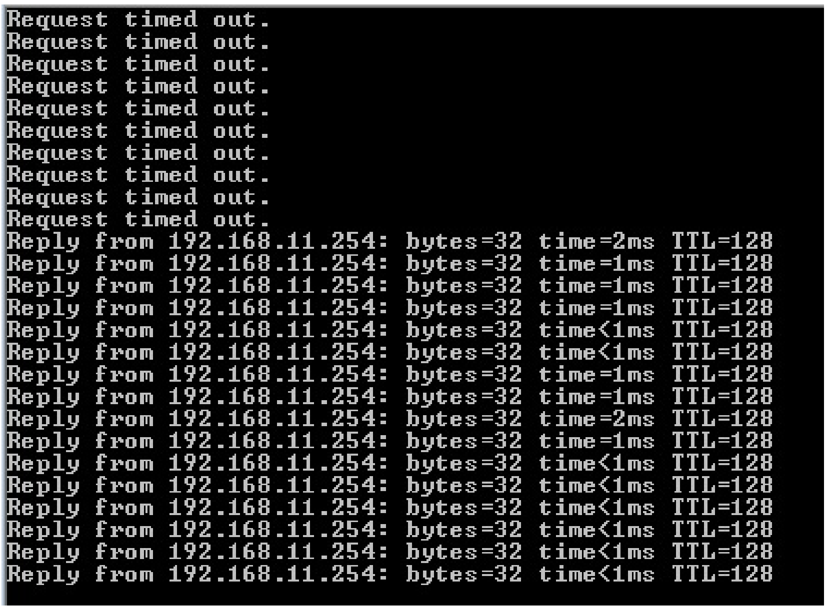
5. Ping test

PC 1 ping to iMCU7200EVB(192.168.11.254). If PC1 use the serial terminal program to change the W5200 from 8. Disable PHY Power Down to 7. Enable PHY Power Down, PC 1 cannot ping the iMCU7200EVB and show the message “Request timed out”.


```
C:\Users\Nick-WIZnet>ping 192.168.11.254 -t

Pinging 192.168.11.254 with 32 bytes of data:
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
```

Conversely, If PC1 uses the serial terminal program to change the W5200 from 7. Enable PHY Power Down to 8. Disable PHY Power Down, PC 1 can ping the iMCU7200EVB again.


```
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Reply from 192.168.11.254: bytes=32 time=2ms TTL=128
Reply from 192.168.11.254: bytes=32 time=1ms TTL=128
Reply from 192.168.11.254: bytes=32 time=1ms TTL=128
Reply from 192.168.11.254: bytes=32 time=1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time=1ms TTL=128
Reply from 192.168.11.254: bytes=32 time=1ms TTL=128
Reply from 192.168.11.254: bytes=32 time=2ms TTL=128
Reply from 192.168.11.254: bytes=32 time=1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
Reply from 192.168.11.254: bytes=32 time<1ms TTL=128
```