

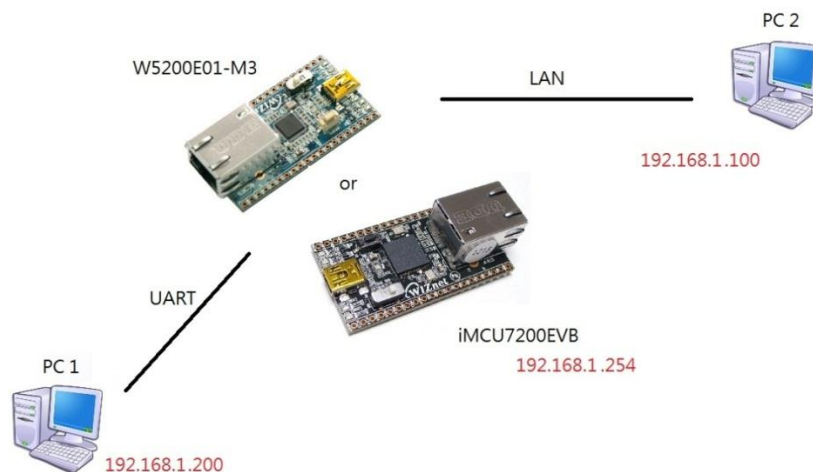
## W5200 Wake Up LAN Application Note

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.

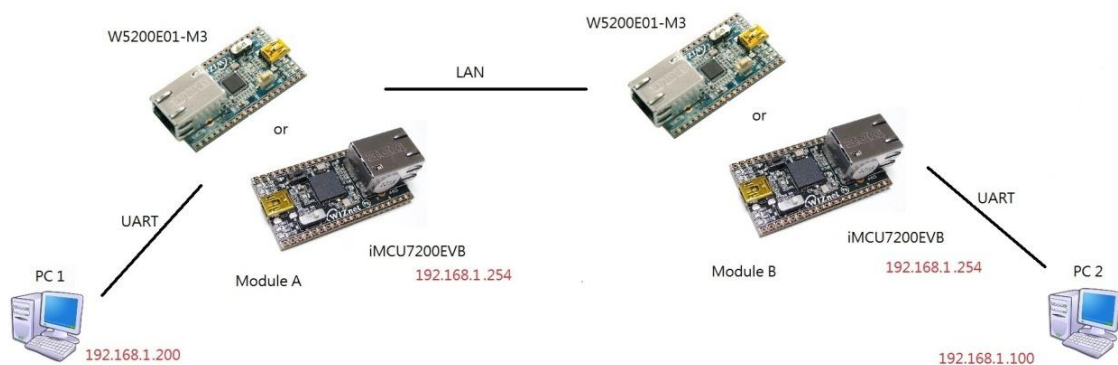
Generally, Power Down Mode can control on and off of PHY operation to save the power consumption. Wake-up ON LAN controls MCU mode by switching sleep mode and normal mode. When W5200 gets WOL magic packet, Wake-up ON LAN will issue an interrupt(through W5200) into MCU in sleep mode.

### 1. Diagram

#### 1.1 Wakes On LAN Executable on Windows and Linux



#### 1.2 Wakes On LAN Working on W5200 EVB



## 2. W5200E01-M3\_WOL Sample code

In HyperTerminal.c

```
IINCHIP_WRITE(MR, MR_WOL); // Enter into the WOL Mode
Delay_ms(1000);

while(1) {
    Delay_ms(1000);
    printf("MR = %02X\t", IINCHIP_READ(MR));
    printf("IR = %02X\r\n", IINCHIP_READ(IR));
    if(IINCHIP_READ(IR) == 0x10){ // If WOL Interrupt occurs..
        GetNetInfo(&netinfo); // Read network information from W5200
        Reset_W5200(); // Reset W5200
        wizInit(); // Initialization W5200
        SetNetInfo(&netinfo); // Write network information to W5200
        break;
    }
}
```

Firstly it enter into the WOL Mode, if W5200 is receive magic packet, it will Read network information from W5200, Reset W5200, Initialization W5200 and Write network information to W5200.

### 3. Configuration

#### IAR Embedded Workbench



Type.h

If the module is W5200E01-M3, the definition of W7200 is disable.

```
#define __DEF_W5200__
//#define __DEF_W7200__
```

If the module is iMCU7200EVB, the definition of W5200 is disable.

```
//#define __DEF_W5200__
#define __DEF_W7200__
```

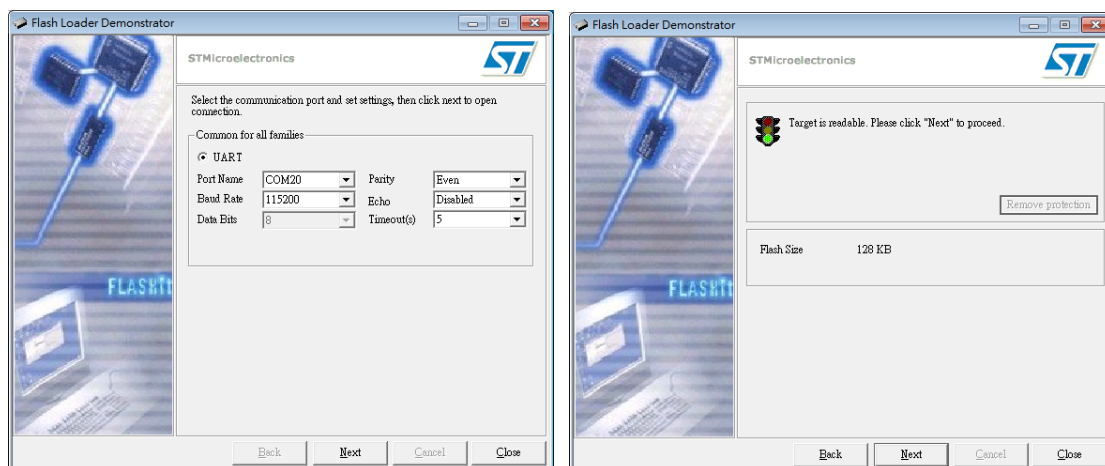
#### Flash Loader Demonstrator

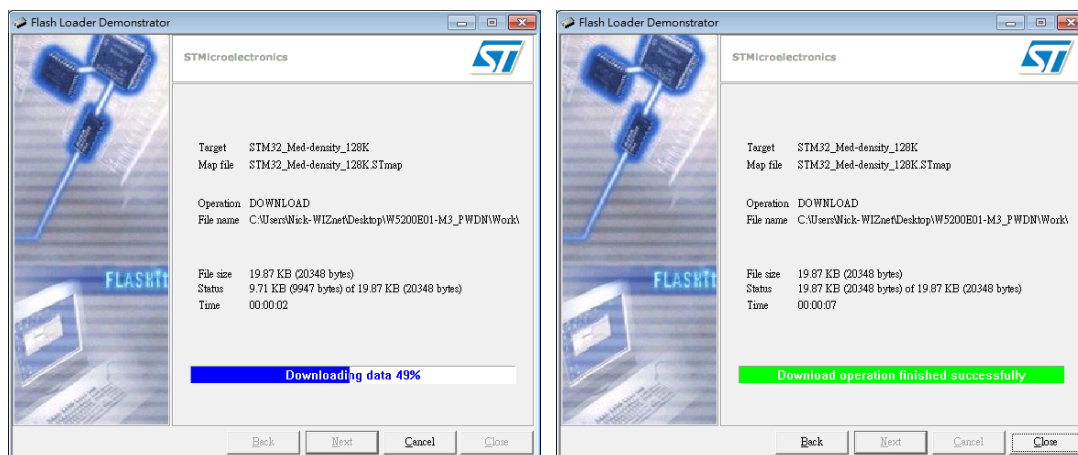
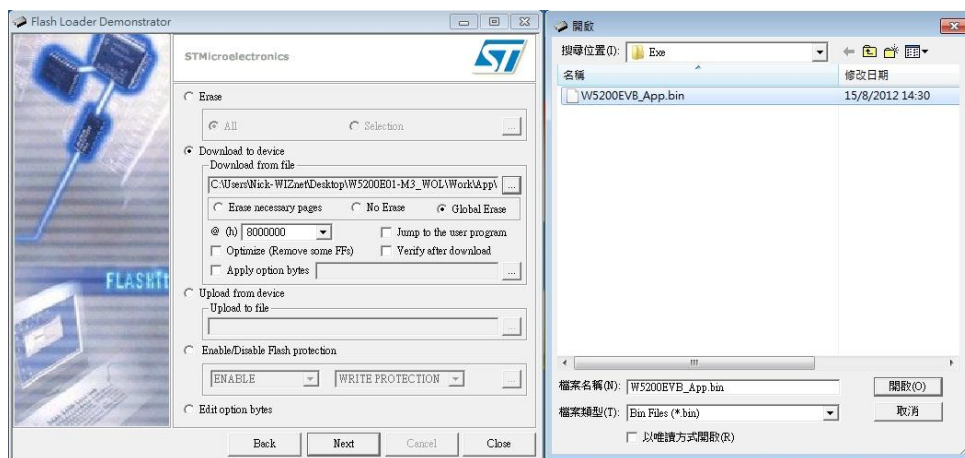
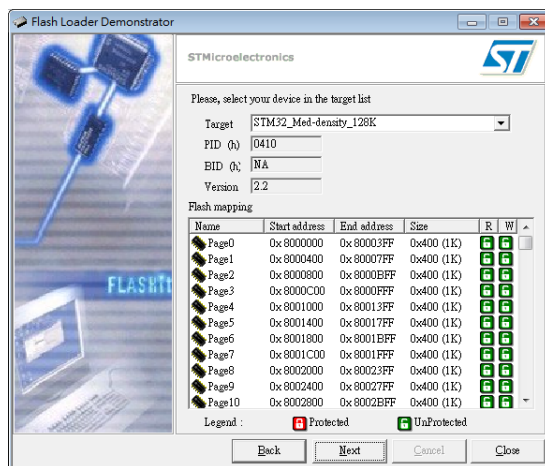


Open the Flash Loader Demo software to program into iMCU7200EVB or W5200E01-M3.

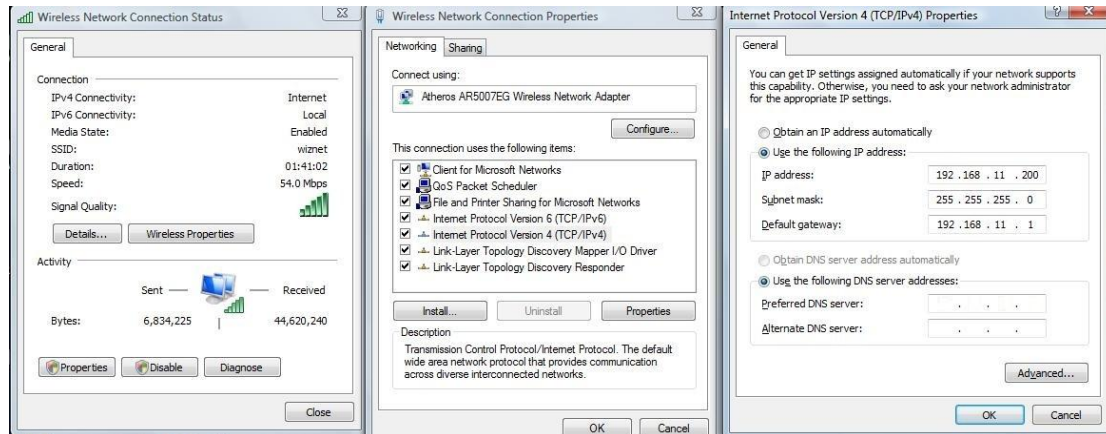
W5200E01-M3\_WOL->Work->App->Debug-> W5200EVB\_App.bin

The program step as follows:





## 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 : 192.168.1.254

SN : 255.255.255.0

GW : 192.168.1.1

DNS server : 168.126.63.1ISR()

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 - Test Wake on Lan

Enter your choice :

#### 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. Test Wake on Lan

Enter your choice : 7

Test Wake on Lan

MR=20IR = 00

MR=20IR = 00

MR=20IR = 00

MR=20IR = 00

MR=20IR = 00

MR=20IR = 00

MR=20IR = 00

MR=20IR = 00

|

**MR (Mode Register) [R/W] [0x0000] [0x00]**

This register is used for S/W reset, ping block mode and PPPoE mode.

7	6	5	4	3	2	1	0
RST			PB	PPPoE			

The bit 5 is WOL. This bit set to 0 that is disable WOL.

This bit set to 1 that is enable WOL(MR=0x20).

IR (Interrupt Register) [R] [0x0015] [0x00]

This register is accessed by the host processor to know the cause of interrupt. Any interruption can be masked in the Interrupt Mask Register (IMR). The nINT signal retain low as long as any masked signal is set, and will not go high until all masked bits in this Register have been cleared.

7	6	5	4	3	2	1	0
CONFLICT	Reserved	PPPoE	Reserved	Reserved	Reserved	Reserved	Reserved

The bit 4 is magic packet. This bit set 0 that is not receive data (IR=0x00)

This bit set 1 that is receive data (IR=0x10)

#### 4. Ping test

PC 1 ping to iMCU7200EVB(192.168.1.254). If PC1 use the serial terminal program to enter 7. Test Wake on Lan. PC 1 cannot ping the iMCU7200EVB and show the message "Request timed out".

W7200 is waiting only Magic Packet. So it does not response PING.

[illegible]



## 5. Wake On LAN Executable on Windows

Install WinPcap

Make and Send Magic Packet for WOL using WinPcap



WOL: Use magic packet like below. It does not contain IP Header and Ethernet Header. So, it is only work on same sub networks. And, in the WOL Mode, W5200 cannot send & receive any packet expect to receive magic packet. W5200 is waiting only Magic Packet. So It does not response PING and etc.

Open the program ether\_wake.exe

ether_wake > Debug	
BuildLog.htm	15/8/2012 9:28
ether_wake.exe	15/8/2012 9:28
ether_wake.exe.embed.manifest	13/8/2012 8:49
ether_wake.exe.embed.manifest.res	13/8/2012 8:49
ether_wake.exe.intermediate.manifest	15/8/2012 9:28
ether_wake.ilc	15/8/2012 9:28
ether_wake.obj	15/8/2012 9:28
ether_wake.pdb	15/8/2012 9:28
mt.dep	15/8/2012 9:28
vc90.idb	15/8/2012 9:28
vc90.pdb	15/8/2012 9:28

Magic Packet Format(Hexa)

FF FF FF FF FF FF [Target MAC Address] \* 16

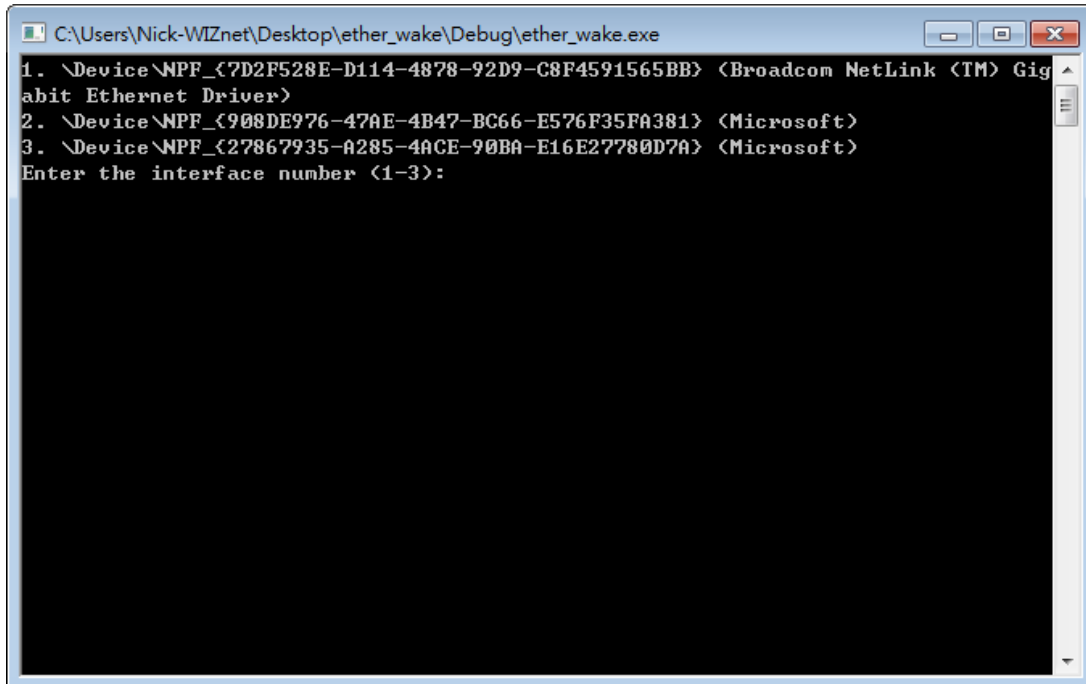
Target MAC Address : 00 08 DC 01 02 03

FF FF FF FF FF FF 00 08 DC 01 02 03 00 08 DC 01 02 03 00 08 DC 01 02 03 00 08 DC 01  
02 03 00 08 DC 01 02 03 00 08 DC 01 02 03 00 08 DC 01 02 03 00 08 DC 01 02 03 00  
08 DC 01 02 03 00 08 DC 01 02 03 00 08 DC 01 02 03 00 08 DC 01 02 03 00 08 DC 01  
02 03 00 08 DC 01 02 03 00 08 DC 01 02 03 00 08 DC 01 02 03

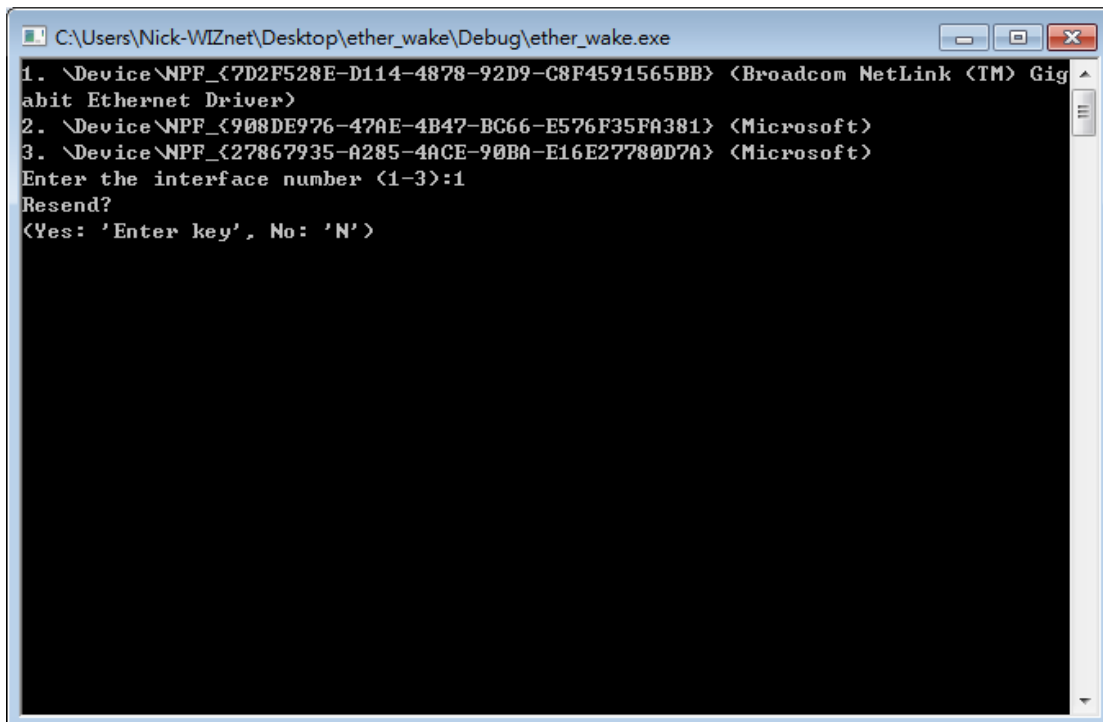


Enter the interface number <1-3>: 1

Resend?<Yes: 'Enter Key', No: 'N'>



```
C:\Users\Nick-WIZnet\Desktop\ether_wake\Debug\ether_wake.exe
1. \Device\NPF_{7D2F528E-D114-4878-92D9-C8F4591565BB} <Broadcom NetLink (TM) Gigabit Ethernet Driver>
2. \Device\NPF_{908DE976-47AE-4B47-BC66-E576F35FA381} <Microsoft>
3. \Device\NPF_{27867935-A285-4ACE-90BA-E16E27780D7A} <Microsoft>
Enter the interface number <1-3>:
```

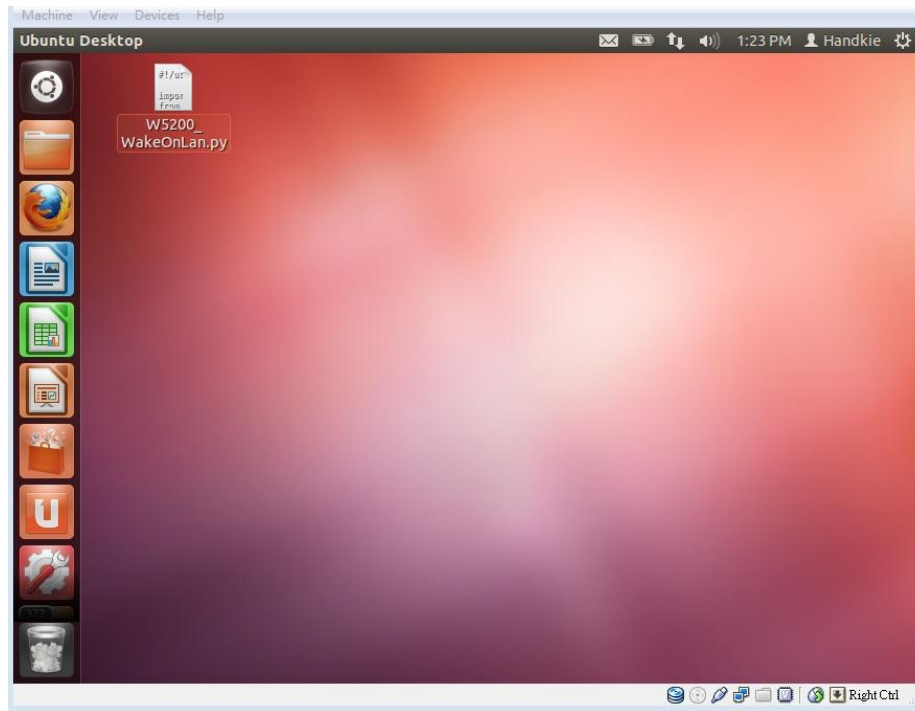


```
C:\Users\Nick-WIZnet\Desktop\ether_wake\Debug\ether_wake.exe
1. \Device\NPF_{7D2F528E-D114-4878-92D9-C8F4591565BB} <Broadcom NetLink (TM) Gigabit Ethernet Driver>
2. \Device\NPF_{908DE976-47AE-4B47-BC66-E576F35FA381} <Microsoft>
3. \Device\NPF_{27867935-A285-4ACE-90BA-E16E27780D7A} <Microsoft>
Enter the interface number <1-3>:1
Resend?
<Yes: 'Enter key', No: 'N'>
```

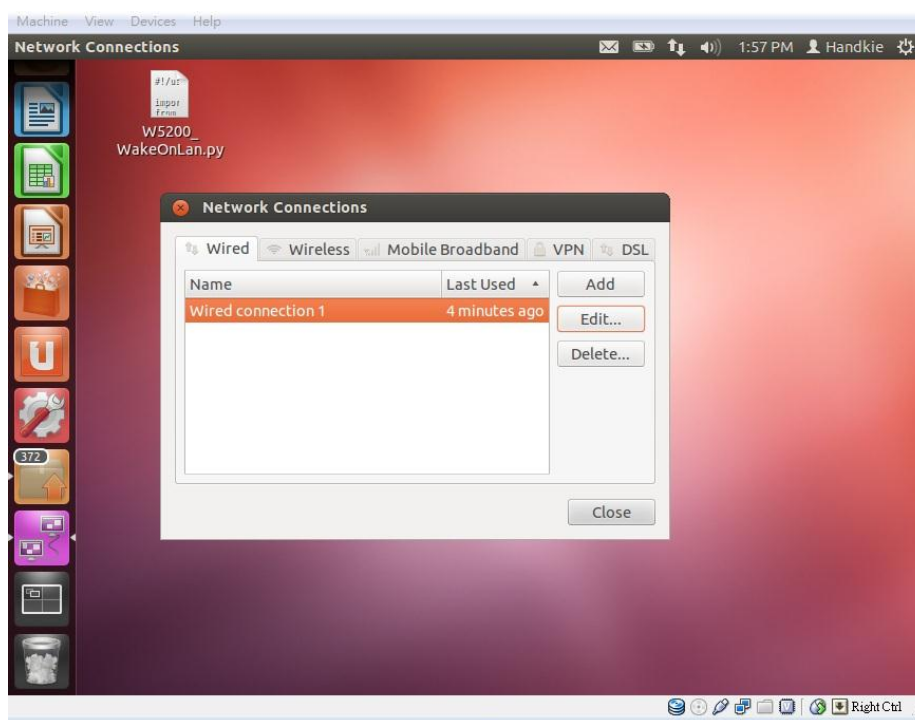


## 6. Wake On LAN Executable on Linux

Open the Linux system and put the W5200\_WakeOnLAN.py in the desktop.



### Network Connection

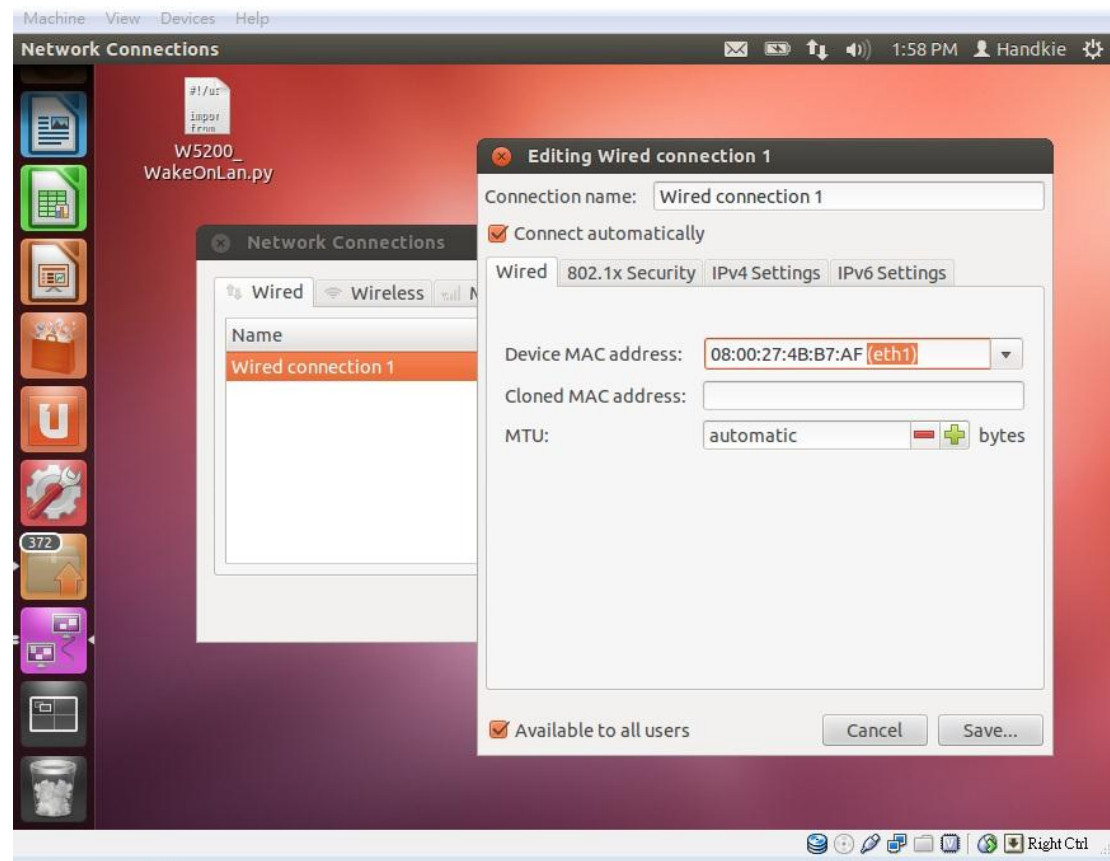


## Editing Wired connection 1

Device MAC address: 08:00:27:4B:B7:AF (eth1)

The name of "eth1" same to the W5200\_WakeOnLAN.py setting.

ps: For normal situation, the name is eth0.



W5200\_WakeOnLAN.py

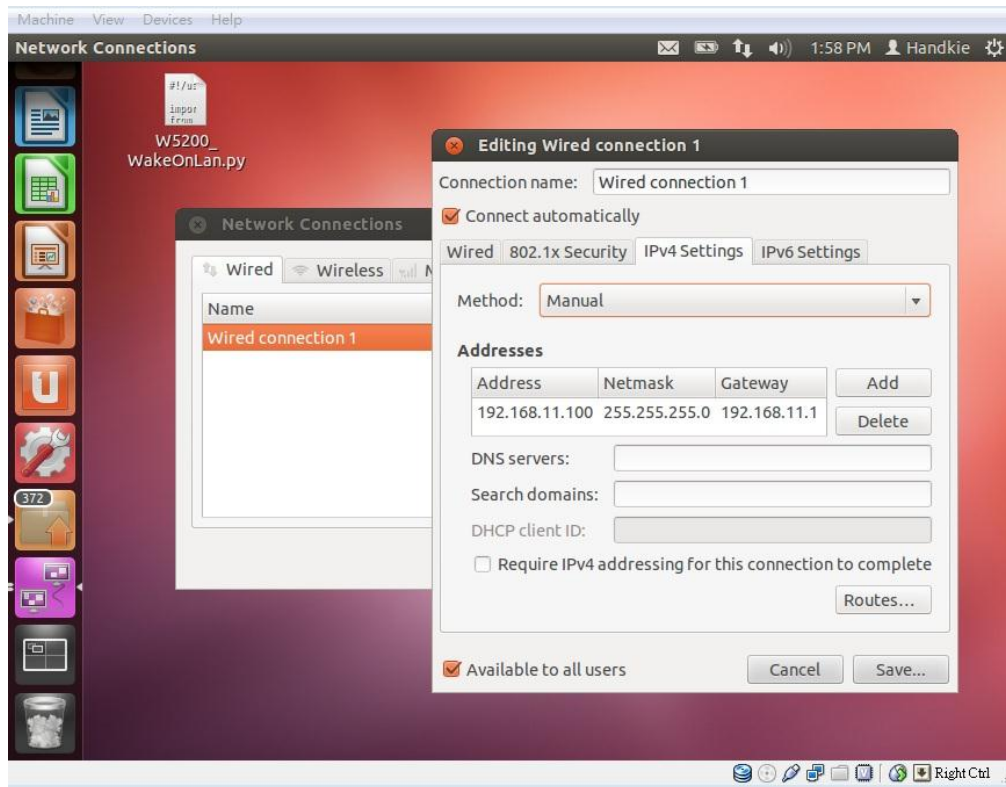
.....

```
s.bind(("eth1",0x0000))
```

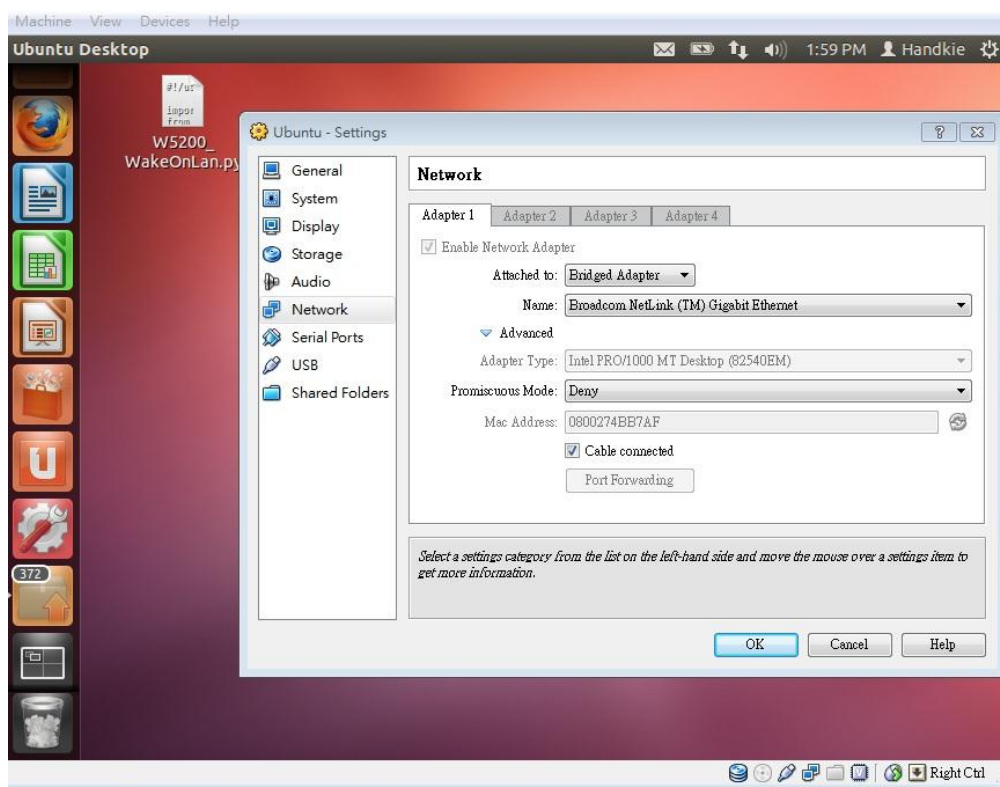
```
txFrame = "\xFF\xFF\xFF\xFF\xFF\xFF" + (dstAddr * 16)
```

.....

## Editing Wired connection 1



## Network Adapter Setting

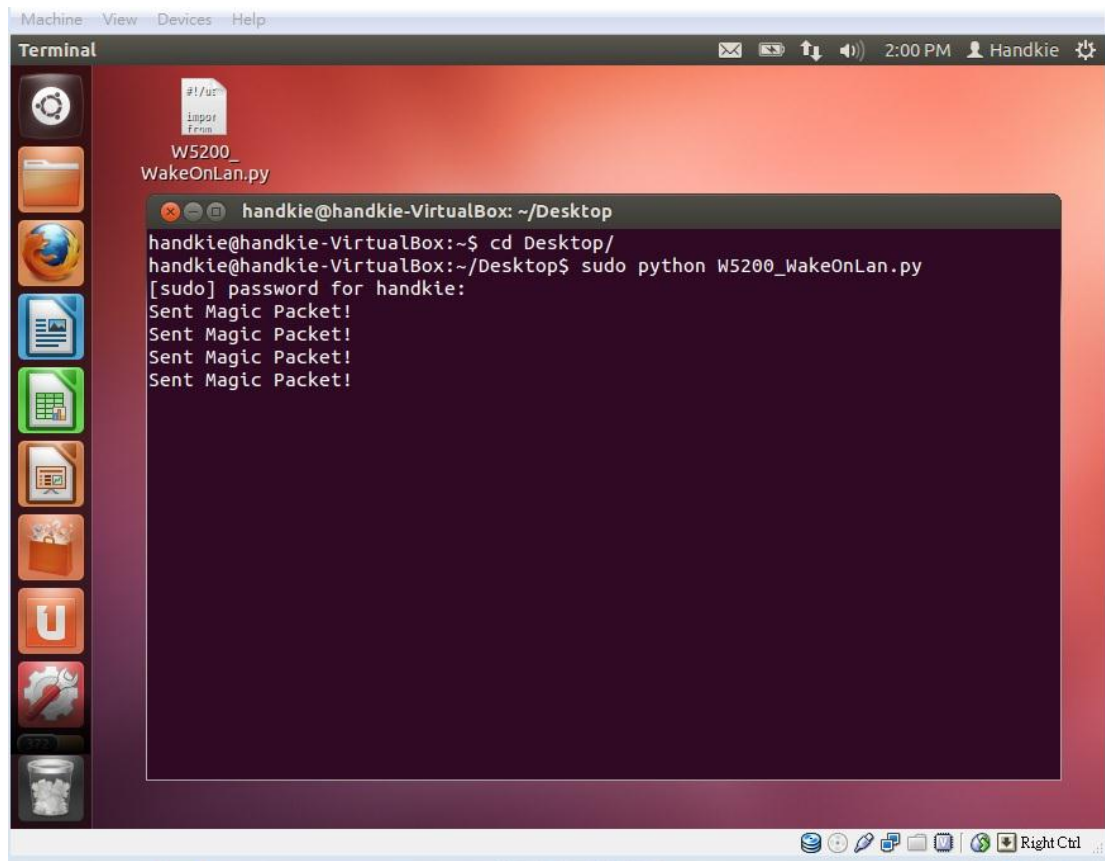


## Linux Terminal

cd Desktop/ ←Name of the directory user wishes to enter.

sudo python W5200\_WakeOnLAN.py

Sent Magic Packet! show in Linux Terminal.



## Serial Terminal Program

Meanwhile, after the “Sent Magic Packet!” is send.

IR is change from 0x00 to 0x10

IR = 10.

Therefore the Module is receiving magic packet data.

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 10



## 7. Wake On LAN Working on W5200 EVB

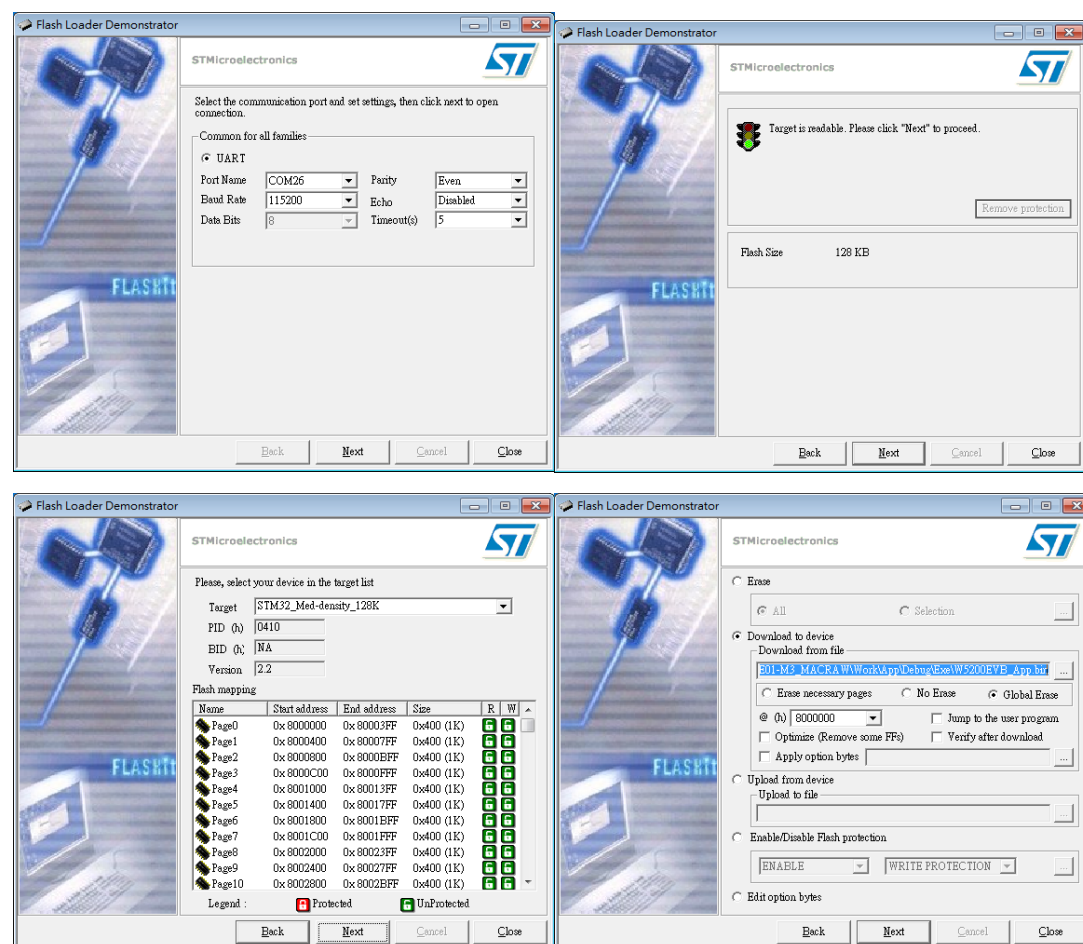
### Flash Loader Demonstrator



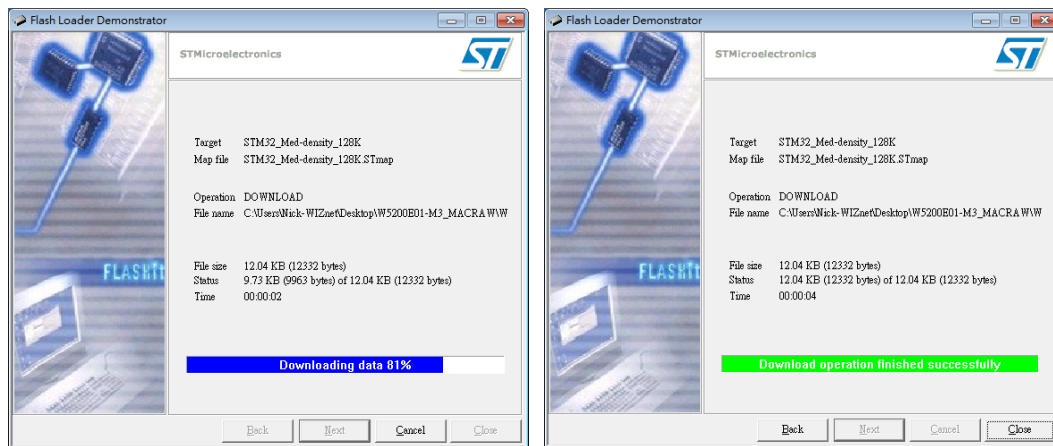
Open the Flash Loader Demo software to program into Module B iMCU7200EVB or W5200E01-M3.

W5200E01-M3\_MACRAW->Work->App->Debug-> Exe->W5200EVB\_App.bin

The program step as follows:







## Serial Terminal Program Module A side

Module A side is keeping testing Wake on Lan.

Enter your choice : 7

Test Wake on Lan

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

|

## Serial Terminal Program Module B side

Module B side is keeping "Sent Magic Packet!!"

-----  
TCP Server Loopback using W5200  
-----

Total packet size is 102

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Firstly, Module A side is keeping testing Wake on LAN. Then, Module B side is start and keeping "Sent Magic Packet!!"

Serial port COM20 opened

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 00

MR = 20IR = 10

Serial port COM26 opened

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Sent Magic Packet!!

Finally, after the "Sent Magic Packet!" is send in Module B side.

IR is change from 0x00 to 0x10 in Module A side

IR = 10.

Therefore the Module A is receiving magic packet data.