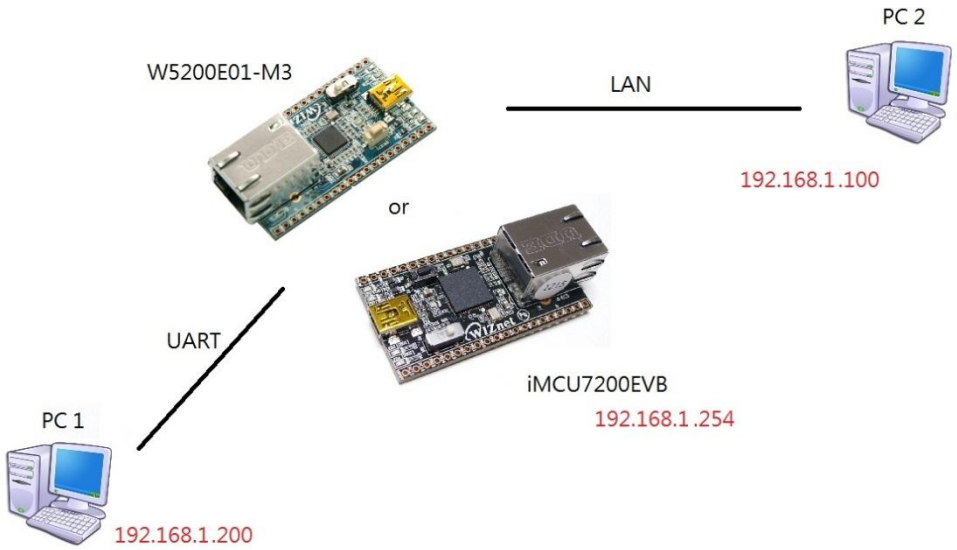
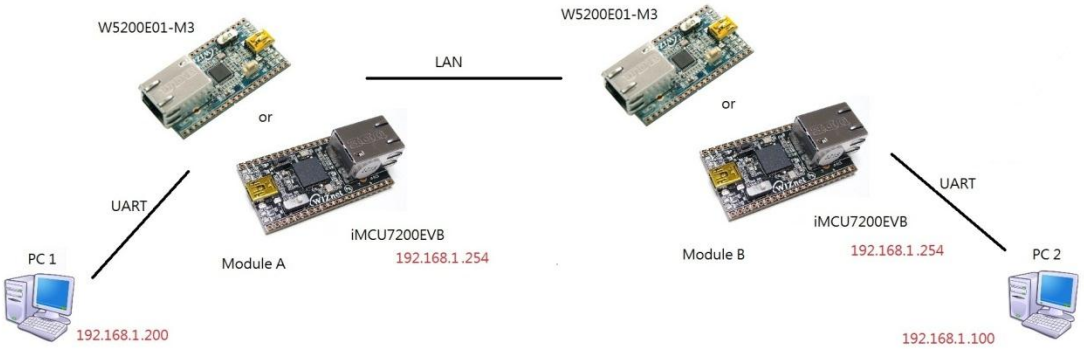
W5200 Wake Up LAN Application Note

1. Diagram

1.1 Wakes On LAN Executable on Windows and Linux



1.2 Wakes On LAN Working on W5200 EVB



2. 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__

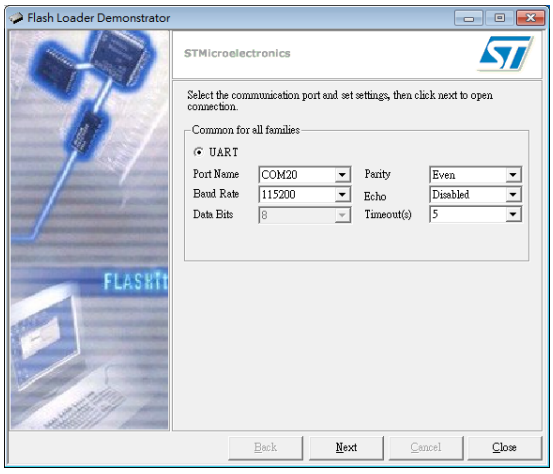
#define __DEF_W7200__

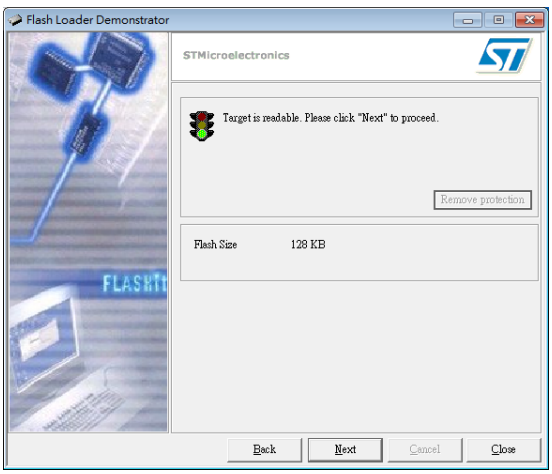
Flash Loader Demonstrator

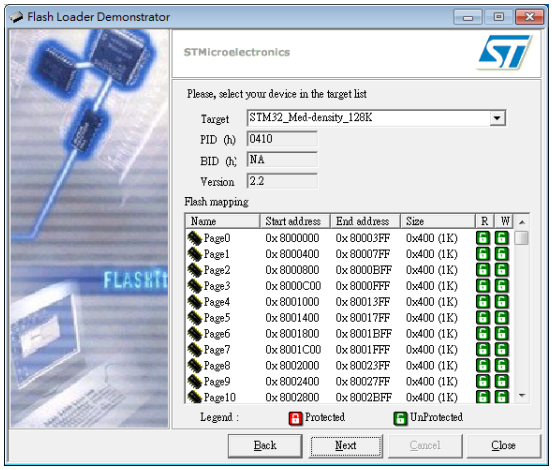
Open the Flash Loader Demo software to program into iMCU7200EVB or W5200E01-M3.

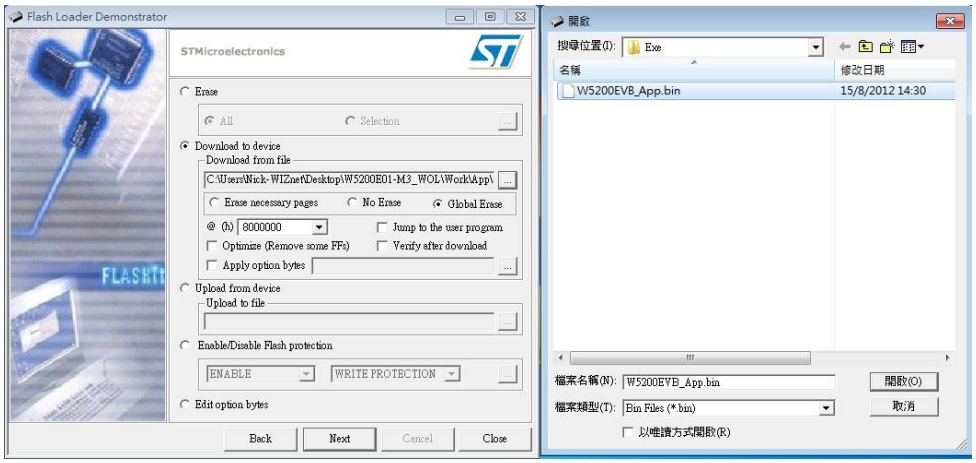
W5200E01-M3_WOL->Work->App->Debug-> W5200EVB_App.bin

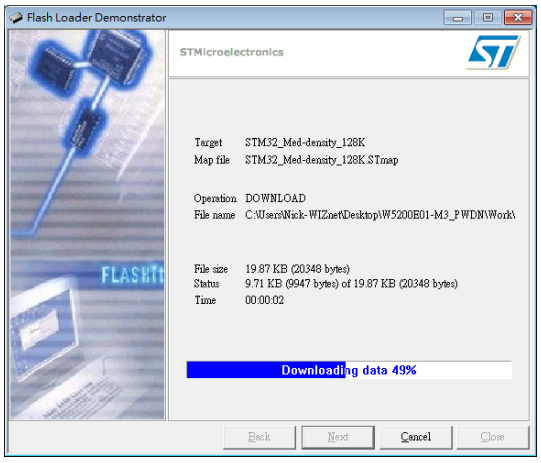
The program step as follows:

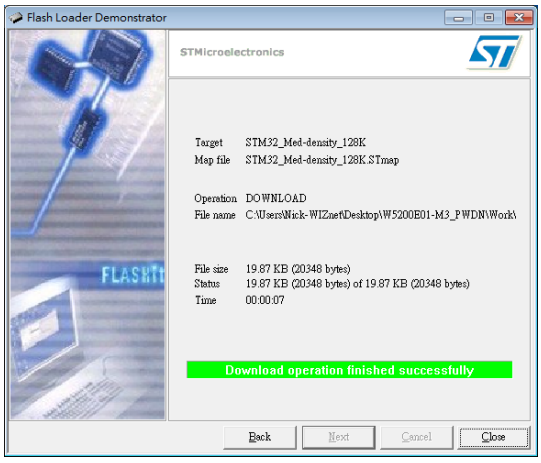




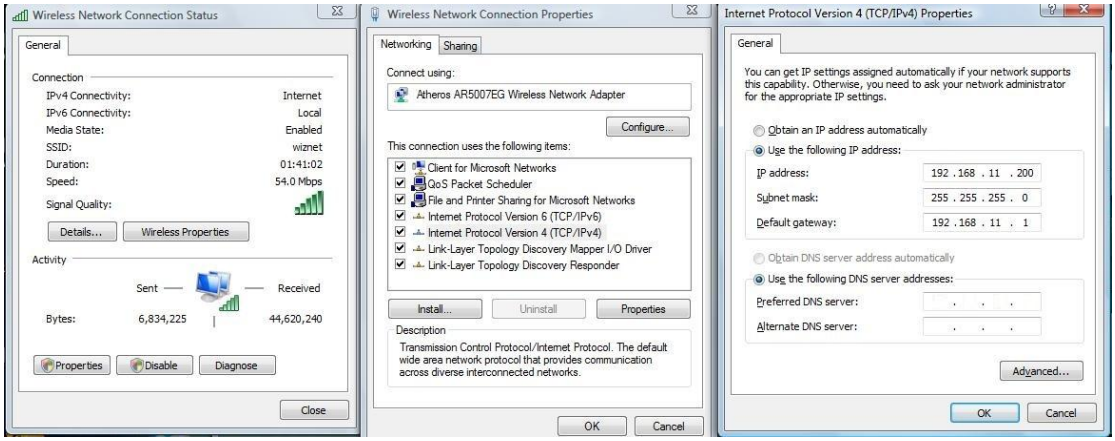

Flash Loader Demonstrator
STMicroelectronics
Please, select your device in the target list
Target STM32_Med-density_128K
PID (h) 0410
BID (h) NA
Version 2.2
Flash mapping
Name Start address End address Size R W
Page0 0x8000000 0x80003FF 0x400 (1K)
Page1 0x8000400 0x80007FF 0x400 (1K)
Page2 0x8000800 0x8000BFF 0x400 (1K)
Page3 0x8000C00 0x8000FFF 0x400 (1K)
Page4 0x8001000 0x80013FF 0x400 (1K)
Page5 0x8001400 0x80017FF 0x400 (1K)
Page6 0x8001800 0x8001BFF 0x400 (1K)
Page7 0x8001C00 0x8001FFF 0x400 (1K)
Page8 0x8002000 0x80023FF 0x400 (1K)
Page9 0x8002400 0x80027FF 0x400 (1K)
Page10 0x8002800 0x8002BFF 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_WOL\Work\App\
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 15/8/2012 14:30
檔案名稱(N): W5200EVB_App.bin
檔案類型(T): Bin Files (*.bin)
以唯讀方式開啟(R)
開啟(O)
取消


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 : 192.168.1.254
SN : 255.255.255.0
GW : 192.168.1.1
DNS server : 168.126.63.1 ISR()
-----------------------------------
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 :
```

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.

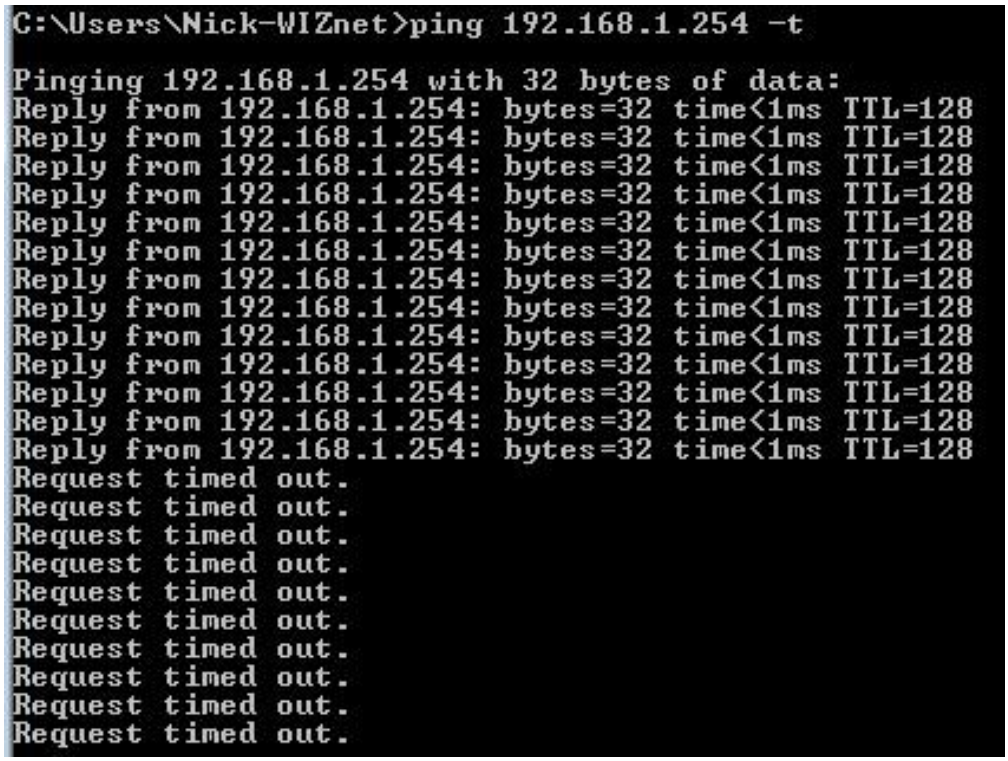
7	6	5	4	3	2	1	0
CONFLICT	Reserved	PPPoE	Reserved	Reserved	Reserved	Reserved	Reserved

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)

3. 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.



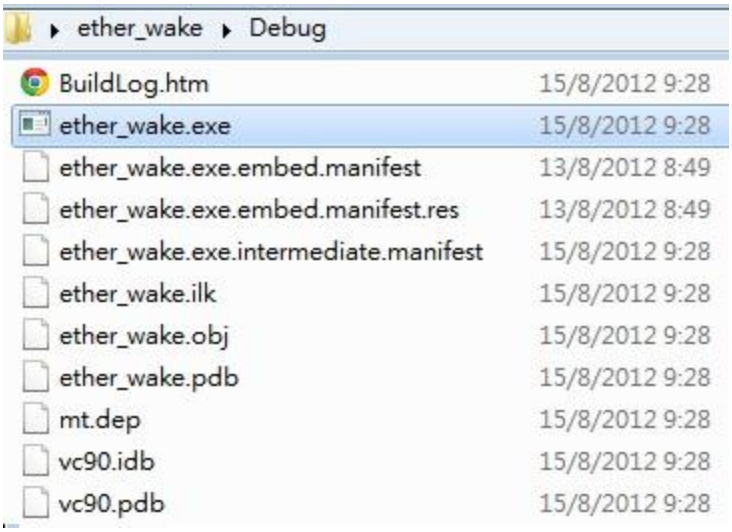
4. Wake On LAN Executable on Windows

Install WinPcap

Make and Send Magic Packet for WOL using WinPcap

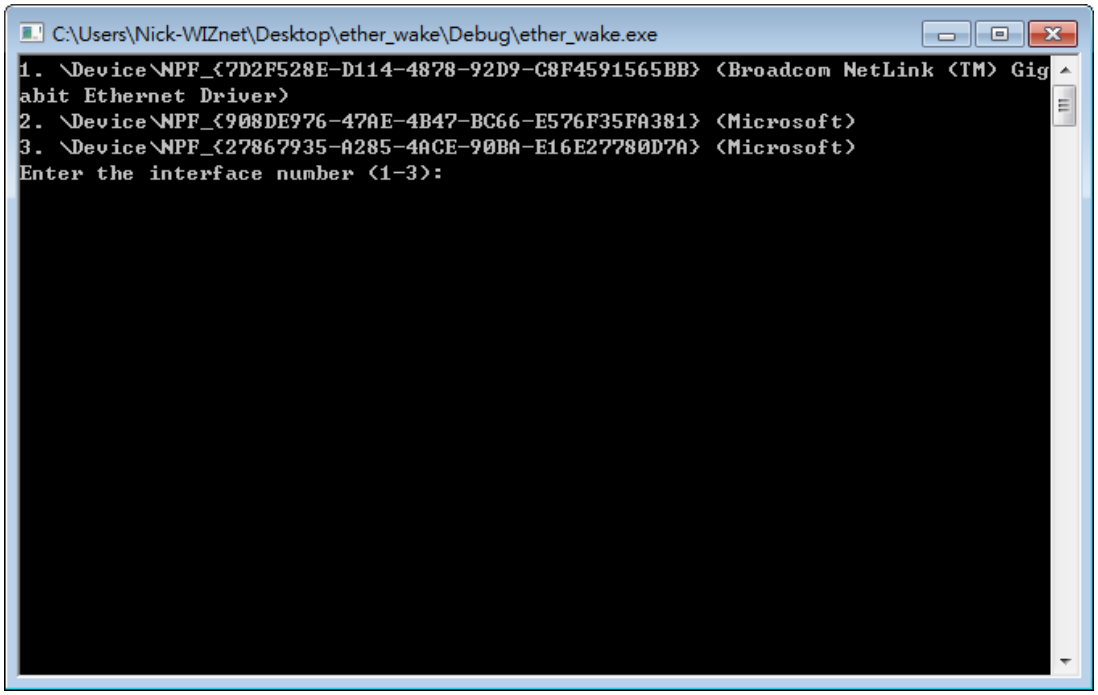
WOL: Use magic packet like below. It does not contain IP Header and Ethernet Header. So, it is only work on same sub networks. And, in the WOL Mode, W5200 cannot send & receive any packet expect to receive magic packet. W5200 is waiting only Magic Packet. So It does not response PING and etc.

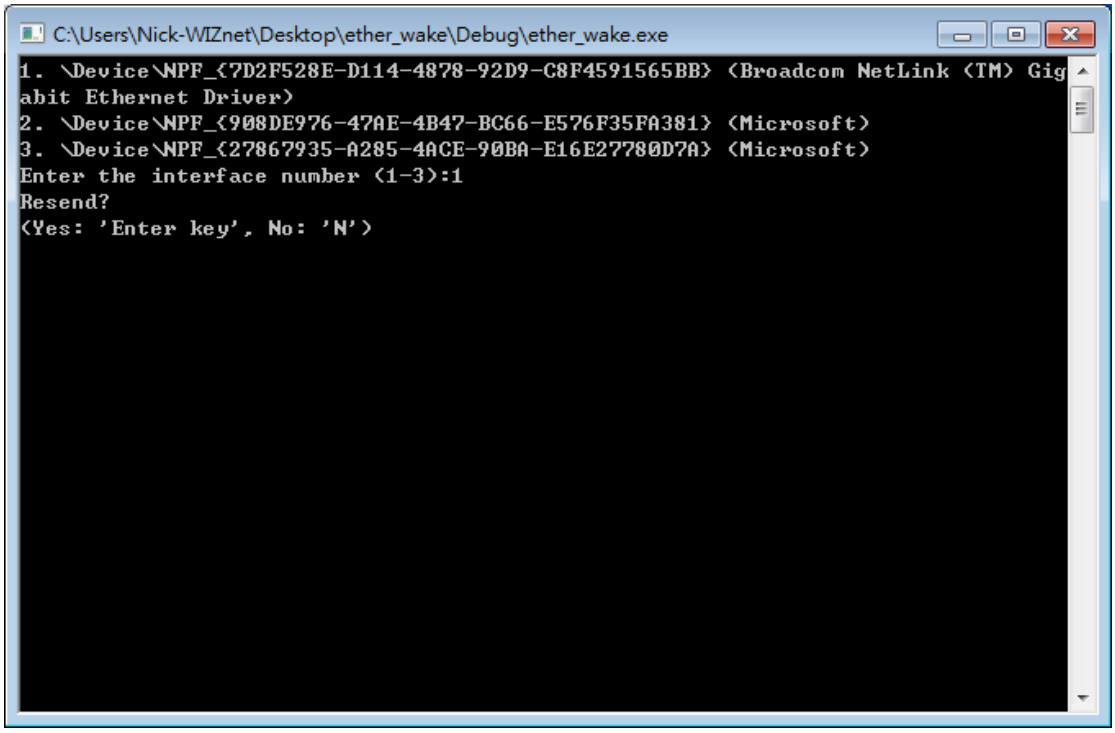
Open the program ether_wake.exe



Enter the interface number <1-3>: 1

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





Ping test

W7200 is getting Magic Packet. So it will response PING 192.168.1.254 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 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
Reply from 192.168.1.254: bytes=32 time<1ms TTL=128
```

Serial Terminal Program

IR is change from 0x00 to 0x10

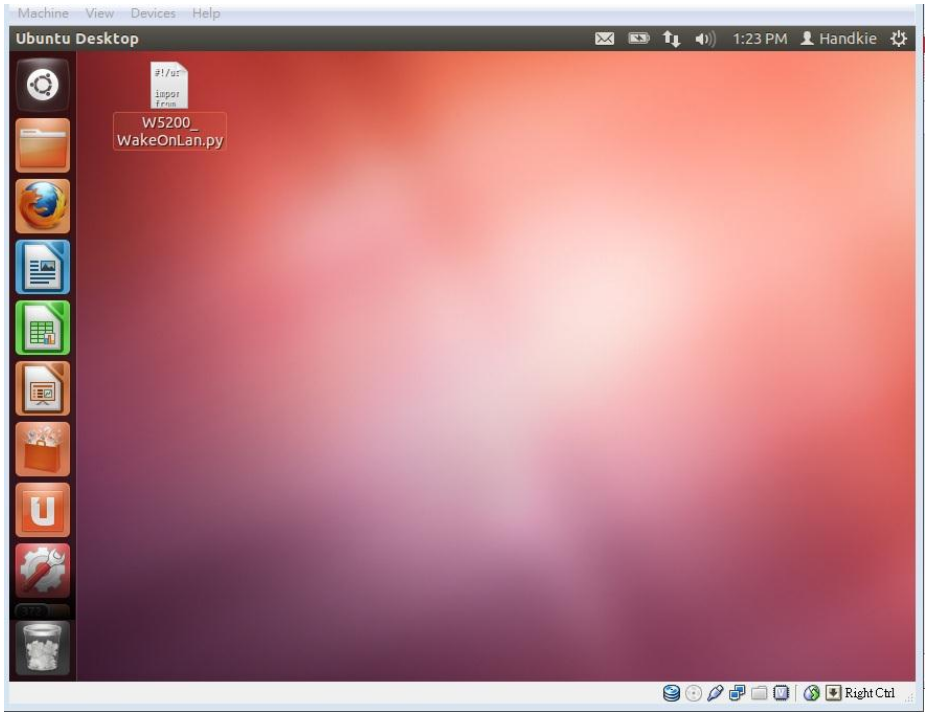
IR = 10.

Therefore the Module is receiving magic packet data.

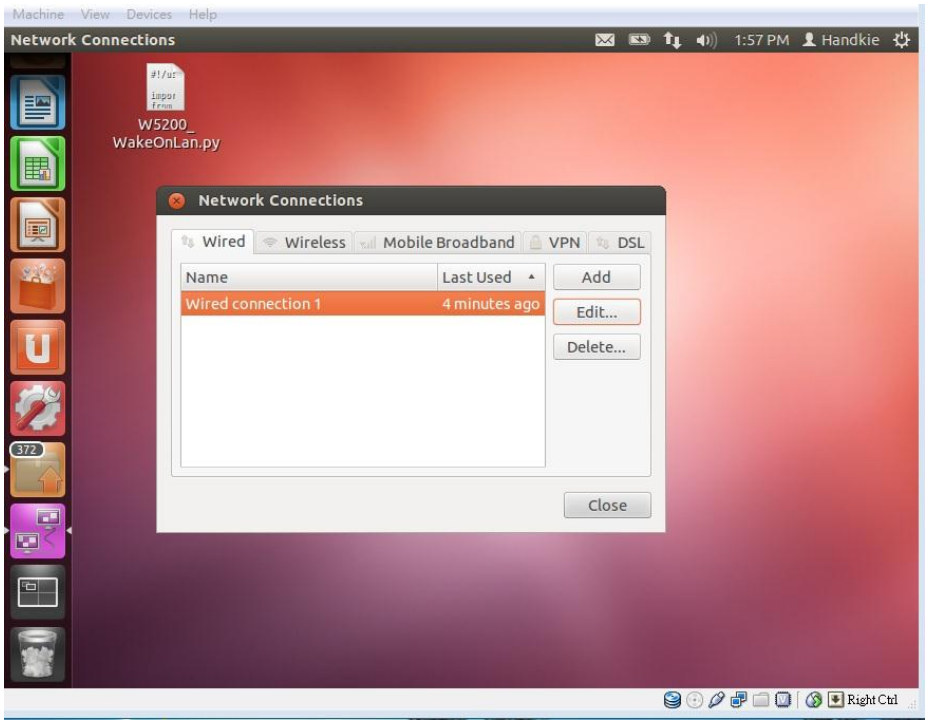
```
MR = 20IR = 00
MR = 20IR = 00
MR = 20IR = 00
MR = 20IR = 00
MR = 20IR = 00
MR = 20IR = 00
MR = 20IR = 00
MR = 20IR = 10
```

5. Wake On LAN Executable on Linux

Open the Linux system and put the W5200_WakeOnLAN.py in the desktop.



Network Connection

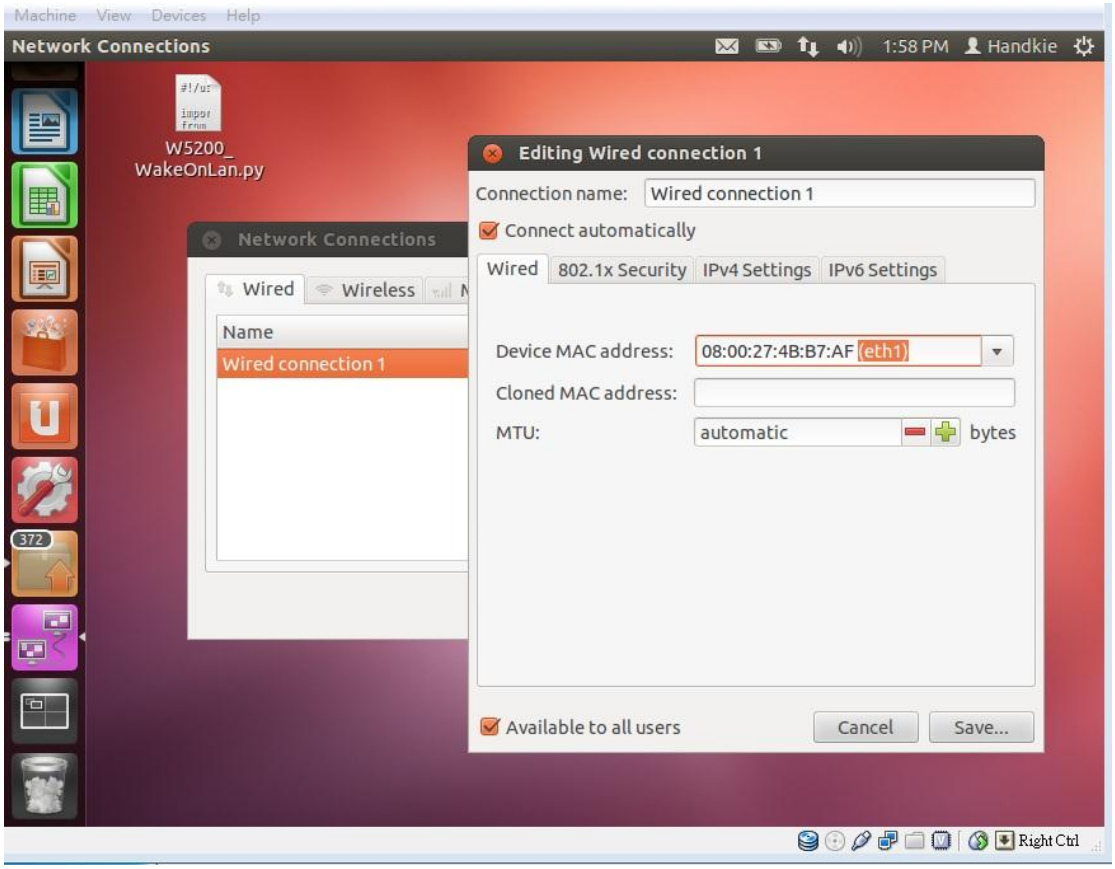


Editing Wired connection 1

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

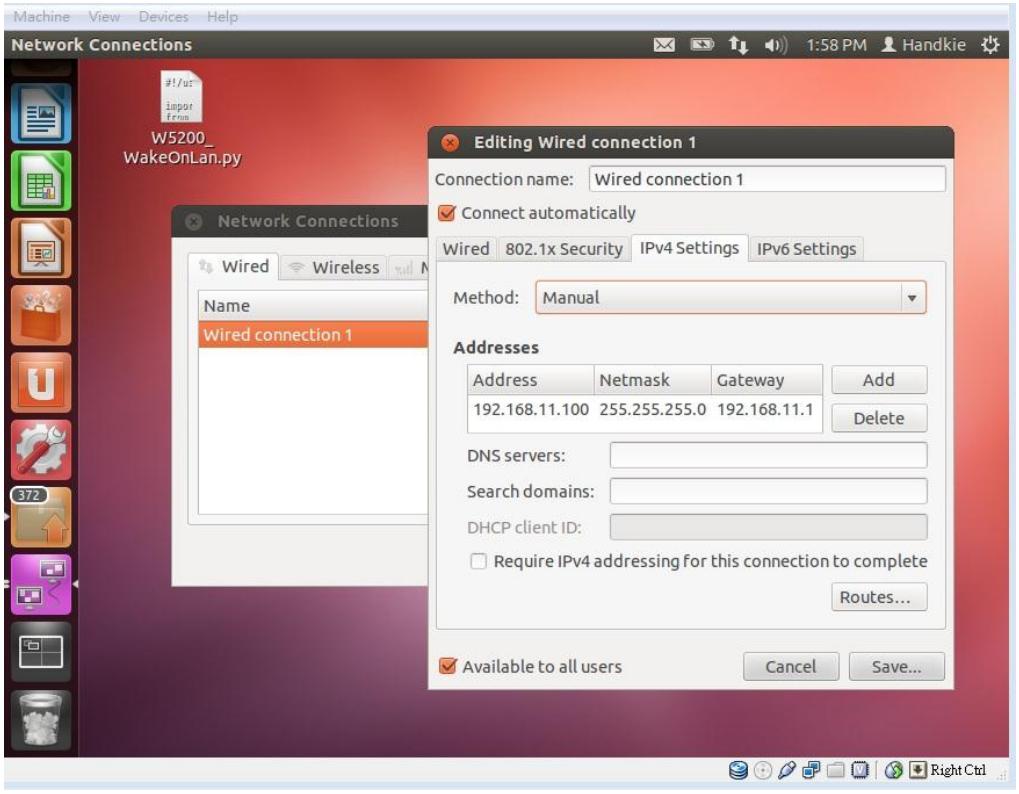
…….

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

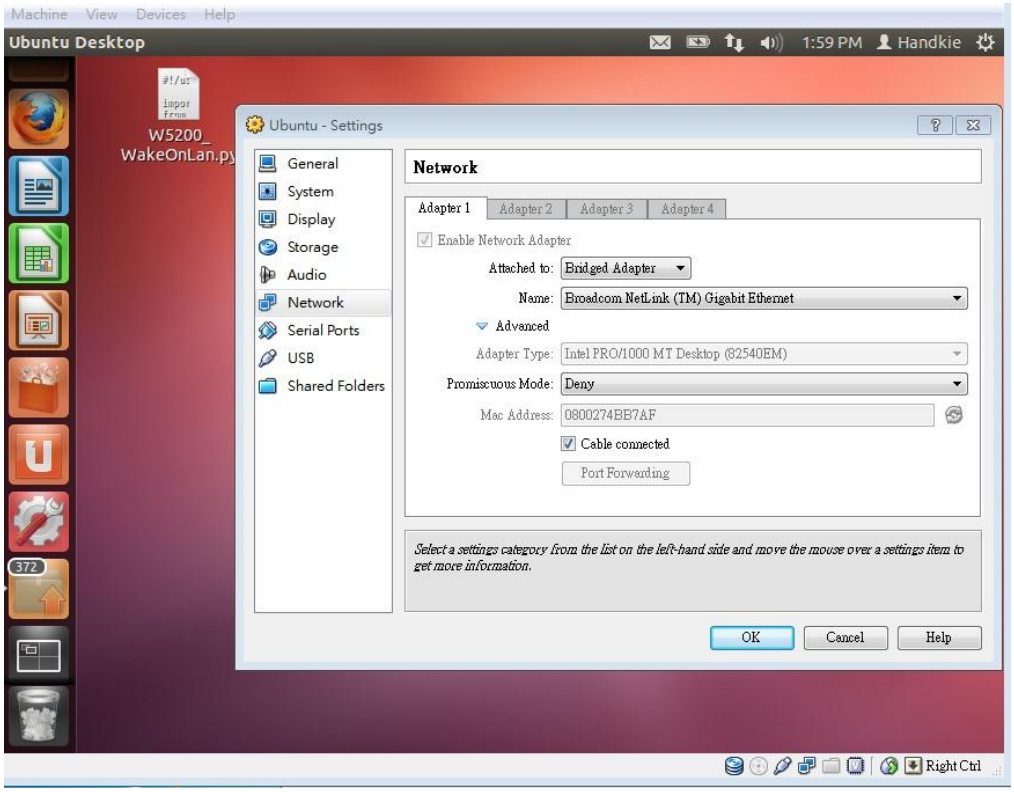
txFrame = "\xFF\xFF\xFF\xFF\xFF\xFF" + (dstAddr * 16)

…….

Editing Wired connection 1



Network Adapter Setting

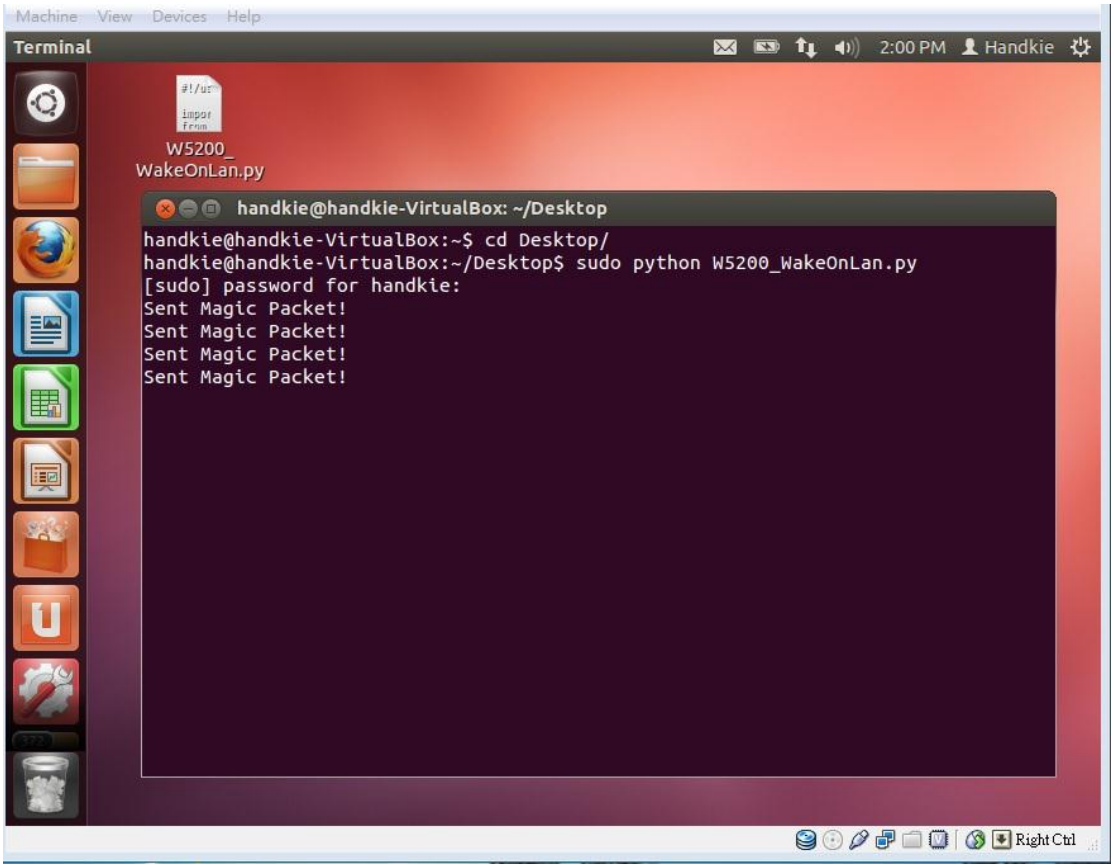


Linux Terminal

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

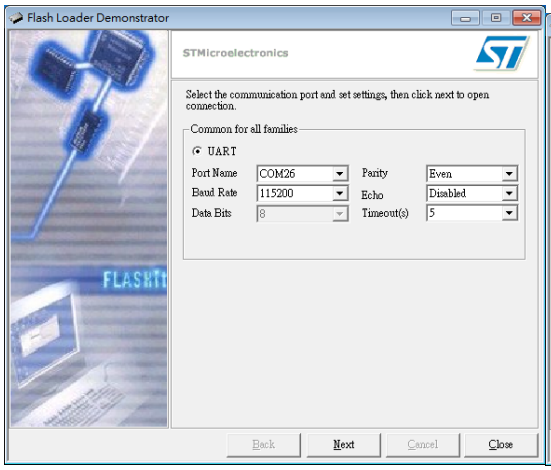
6. Wake On LAN Working on W5200 EVB

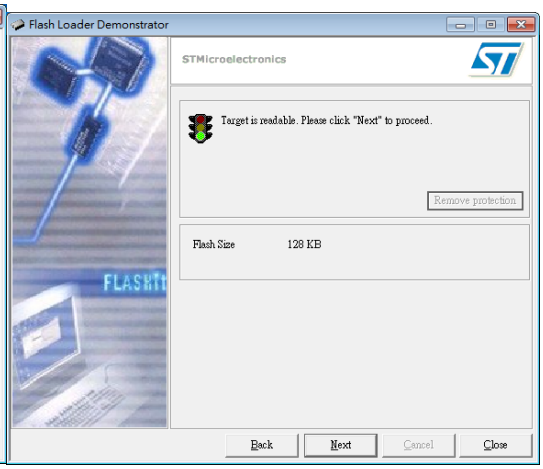
Flash Loader Demonstrator

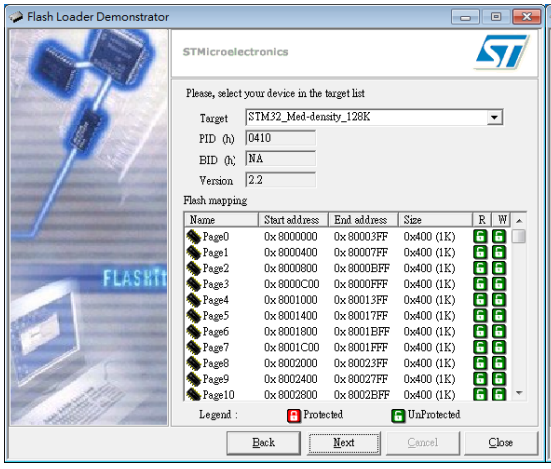
Open the Flash Loader Demo software to program into Module B iMCU7200EVB or W5200E01-M3.

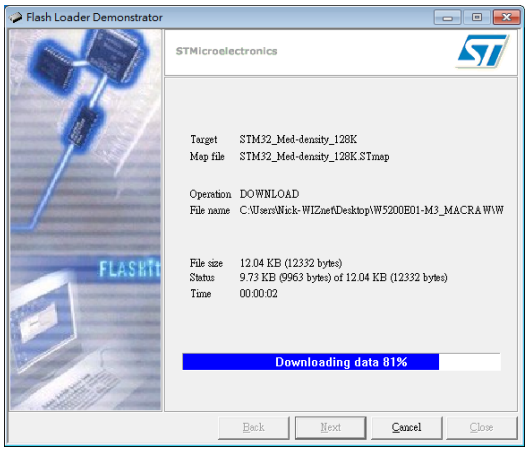
W5200E01-M3_MACRAW->Work->App->Debug-> Exe->W5200EVB_App.bin

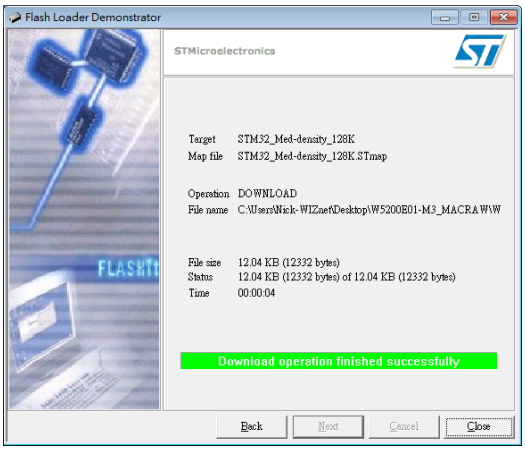
The program step as follows:











Serial Terminal Program Module A side

Module A side is keeping testing Wake on Lan.

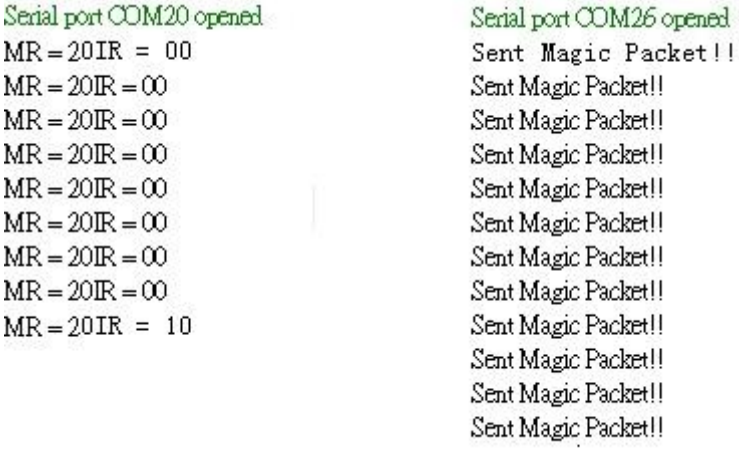
```
Enter your choice : 7

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!!”



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.