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# **WIZ1000 User's Manual**

**(Version 1.1.0)**



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## WIZnet's Online Technical Support

If you want to know more about WIZnet products, please visit WIZnet website ([www.wiznet.co.kr](http://www.wiznet.co.kr)), and you could also put your questions on Q&A Board. Our engineers will reply you as soon as possible.



The screenshot shows the WIZnet website homepage. At the top left is the WIZnet logo and navigation links: HOME, LOGIN, JOIN, CONTACT US, ENGLISH, CHINESE, JAPANESE, KOREAN, and On-line Mail. A sidebar on the left contains a menu with items: PRODUCTS, TECHNOLOGY, TECHNICAL Q&A (highlighted with a blue circle and 'CLICK'), LIBRARY, DISTRIBUTOR, PARTNERSHIP, BLOG, and ABOUT US. The main content area features a large image of a WIZnet Ethernet W5300 chip with the text 'Stable 70Mbps Guaranteed (in DMA!) W5300'. To the right, a box titled 'WIZnet website Renewal/ Open with web 2.0 concepts!' lists several updates: Easy-to-check new or amended info. thru 'What's updated' board; Support RSS in each board; Enhance Search function; Open Blog & Community menu; Build Technical forum as well as Q&A; Easy-to-find local distributors; WIZnet own innovation spirit visualized; Chinese version Grand Open!; Japanese version Coming Soon! Below this is a 'CLOSE' button. The footer contains several sections: 'RoHS Semiconductor Production Line Control System', 'NEWS | NEWS LETTER' with a list of recent news items, 'NEW PRODUCT W5300' with specifications (Over 50 Mbps, 16/8 bit data bus width, 8 independent sockets, Also, support SWTCP/IP simultaneously thru), 'WHAT'S UPDATED' with a list of updates, 'COMPANY OVERVIEW', 'DISTRIBUTOR Worldwide WIZnet Distributors', 'WIZnet 3rd Party e-market place www.WIZwiki.net', 'WIZnet e-sale International www.ewiznet.com', 'WIZnet Ethernet 2007 Winners Announcement', 'IIC Taiwan Sep. 9-11, 2008 Booth #: 2L06', and 'Download Sales Materials WIZwiki.tistory.com'.

## Document Revision History

Date	Revision	Changes
2009-06-26	v1.0.0	First Release
2013-06-17	v.1.1.0	The software CD is not provide anymore. For more software contents, please visit our website. ( <a href="http://www.wiznet.co.kr">www.wiznet.co.kr</a> ) Modified the table of contents in CH 1.3. Software CD is removed in the table of contents.

## Copyright Notice

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For more information, please visit our website: <http://www.wiznet.co.kr>

## Certification Information

### CE for Class A ITE

**WARNING :** This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### FCC for Class A ITE

#### INFORMATION TO THE USER

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**WARNING :** Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

### KCC for Class A ITE

- Trade Name or Applicant : WIZnet, Inc.
- Equipment Name : Serial to Ethernet Device Server
- Basic Model Number : WIZ1000
- Manufacturer / Country of Origin : WIZnet, Inc. / KOREA
- Certification Number : WWW-WIZ1000-S2E(A)

**WARNING :** This equipment has been tested for a Class A digital device.

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## 1. Introduction

WIZ1000 is one model of Serial to Ethernet Device Server which is one finished product of WIZnet with CE, FCC and KCC certifications. WIZ1000 acts as a gateway between RS-232 and Ethernet. It enables remote gauging, managing and control of a device through the network based on Ethernet and TCP/ IP by connecting to the existing equipment with RS-232 serial interface. In other words, WIZ1000 is a protocol converter that transmits the data sent by serial equipment as TCP/ IP data type and converts back the TCP/ IP data received through the network into serial data to transmit back to the equipment.

### 1.1. Key Features

- Connect with the Serial Device directly
  - Adding Network Function Simply and Quickly
  - Providing Firmware Customization
- System Stability and Reliability by using W5100 Hardware Chip
- Supports PPPoE Connection
- Supports Serial Configuration –with Simple and Easy command
- Supports Password for the Security
- Configuration Tool Program
- [Telnet Com Port Option \(RFC2217\) Compliant](#)
- 10/ 100 Ethernet Interface and max 230Kbps Serial Interface
- RoHS Compliant
- [CE, FCC and KCC certificated](#)



## 1.2. Specification

The specifications of WIZ1000 are introduced in Table 1.

ITEM	Description
MCU	8051 compliant (having internal 62K Flash, 16K SRAM, 2K EEPROM)
TCP/IP	W5100 (Ethernet MAC & PHY Embedded)
Protocol	TCP, UDP, IP, ARP, ICMP, MAC, DHCP, PPPoE, DNS
Network Interface	10/100 Mbps(Auto detection), RJ-45 Connector
Serial Interface	RS232(DB9)
Serial Signal	TXD, RXD, RTS, CTS, GND
Serial Parameters	Parity : None, Even, Odd
	Data Bits : 7,8
	Flow Control : None, RTS/CTS, XON/XOFF
	Speed : up to 230Kbps
Input Voltage	DC 5V
Power Consumption	Under 200mA
Temperature	0°C ~ 80°C (Operation), -40°C ~ 85°C (Storage)
Humidity	10 ~ 90%

**Table 1. Specification of WIZ1000**

### 1.3. Products Contents

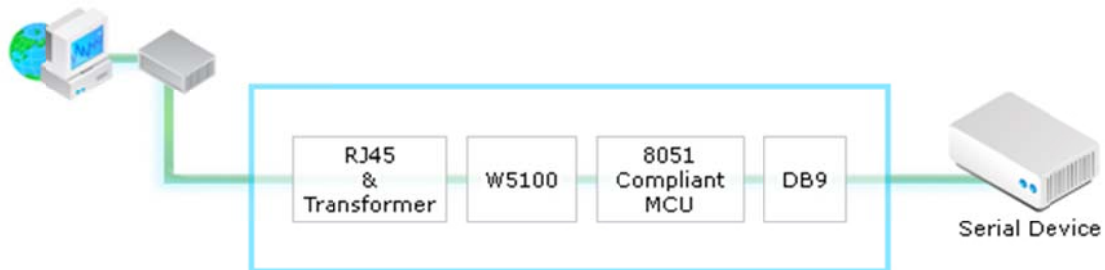
 <p>The image shows a black rectangular device server with a serial port at the top. It features the WIZnet logo and the model name 'WIZ1000'. On the right side, there are four status LEDs labeled 'Power', 'Serial Tx/Rx', 'Ethernet Link', and 'Ethernet Act'. At the bottom, there is a 'Reset' button and a 'DC-IN 5V' power input. The text 'Serial to Ethernet Device Server' is printed vertically on the left side, and '10/100M Ethernet' is printed at the bottom left.</p>	<p>WIZ1000 Device Server</p>
 <p>The image shows a blue Ethernet LAN cable with RJ45 connectors on both ends.</p>	<p>LAN Cable (Optional)</p>
 <p>The image shows a black 5V power adaptor with a power cord and a DC power connector.</p>	<p>5V Power Adaptor (Optional)</p>

Table 2. Products Contents

- ☞ If there is any missing item, contact to the shop where you purchased.
- ☞ The optional items should be purchased separately.

## 2. WIZ1000

### 2.1. Block Diagram



**Figure 1. Block Diagram**

WIZ1000 is a protocol converter that transmits the data sent by serial equipment to Ethernet and converts back the TCP/ IP data received through the network into serial data to transmit back to the equipment. When the data is received from serial port, it is sent to W5100 by MCU. If any data is transmitted from Ethernet, it is received to the internal buffer of W5100, and sent to the serial port by MCU. MCU in the module controls the data according to the configuration value that user defined.

## 2.2. Configuration Tool

### 2.2.1. Network Configuration

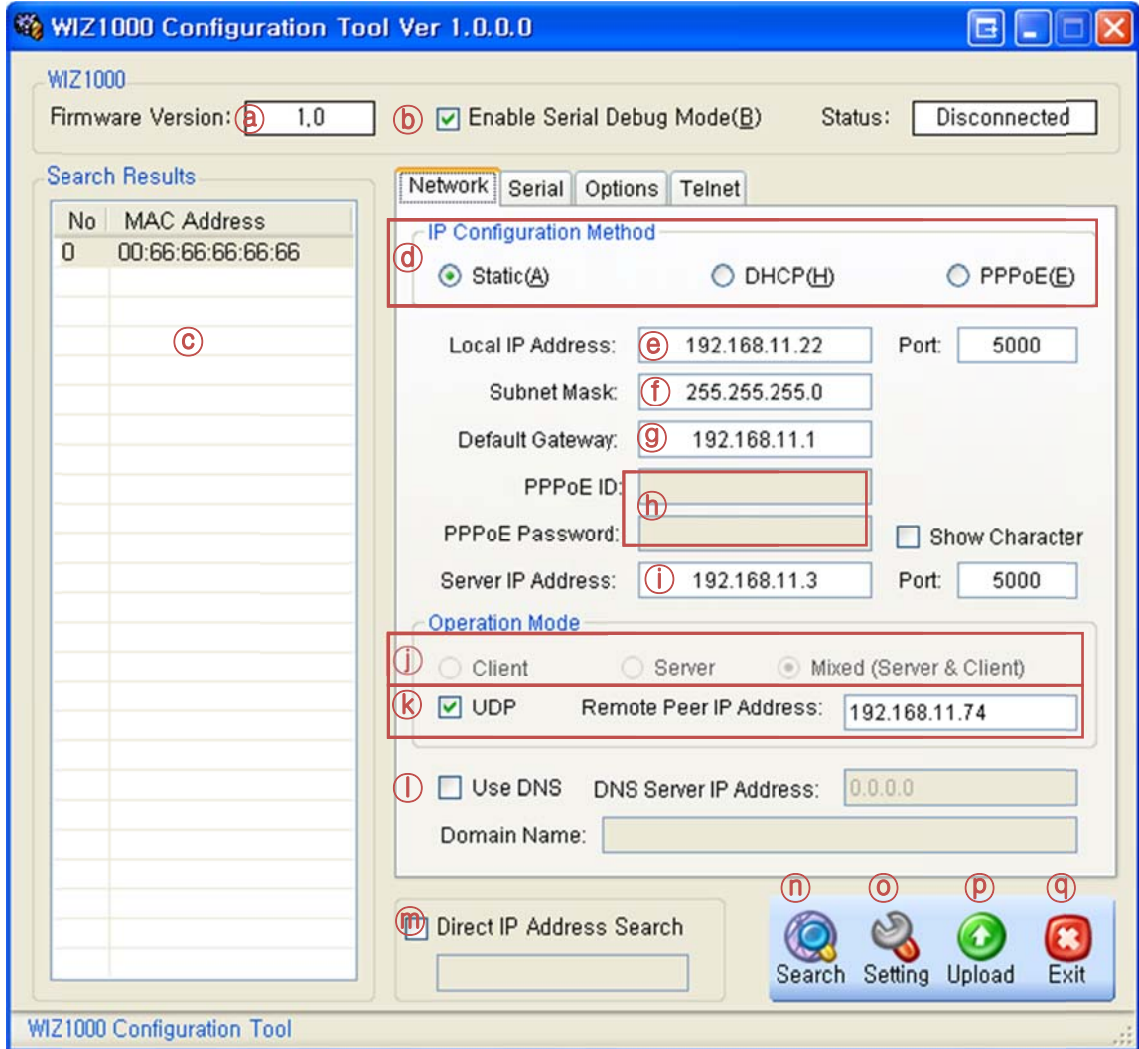


Figure 2. User Interface of Configuration Tool (Configuration via Network)

Ⓐ **Version** : Displays firmware version.

The current version of the firmware of selected WIZ1000 is displayed in this field.

Ⓑ **Enable Serial Debug Mode** : If this mode is checked, you can monitor the status and socket message of WIZ1000 (listen OK, connect fail etc.) through serial terminal. If Debug mode is on, debug message can cause abnormal operation of the serial device. Therefore, just use this mode only for Debug mode.

Ⓒ **Board List** : If you click “Search” button, all the MAC addresses on a same subnet, will be

displayed.

④ **IP Configuration Method:** Select IP setting mode, you can select one from Static, DHCP, PPPoE mode.

**Static:** “Static” is the option for setting WIZ1000 with static IP address. First select MAC address that you want to set it as static IP in ‘board list’. Then, the “Local IP, Subnet, Gateway boxes are enabled. Input Static IP address and click “setting” button. Then IP is set as you want. (PPPoE ID, Password box will be disabled)

**DHCP:** Set this option to use DHCP mode. First, check ‘DHCP’ and click ‘Setting’ button. If IP address is successfully acquired from DHCP server, the MAC address will be displayed on the board list. (It takes some time to acquire IP address from DHCP server)

When a module on the board list is selected, IP address, Subnet mask and Gateway are displayed. If module could not acquire network information from DHCP server, IP address, Gateway Address and Subnet mask will be initialized to 0.0.0.0.

**PPPoE :** WIZ1000 supports PPPoE for ADSL user. When you select PPPoE in “IP Configuration Method” PPPoE ID and Password box will be enabled.

1. To set PPPoE, connect PC to WIZ1000 directly and execute Configuration Tool program on PC. (Configuration Tool version should be 2.1 or above)
2. Select ‘PPPoE’ of the “IP Configuration Method” tab and input ID & Password.
3. Click “setting” button to apply.
4. Connect Module to ADSL Line.
5. If “Enable Serial Debug Mode” is selected, you can see PPPoE access status via Serial console.



**Figure 3. PPPoE Connection Process in Serial Console**

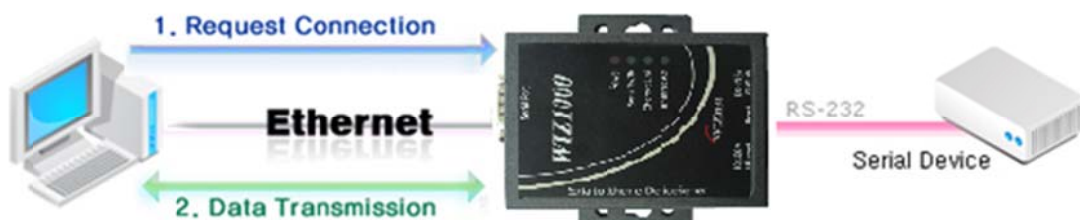
- Ⓔ **Local IP/Port** : WIZ1000's IP address and Port number for network connection  
*☞ Be sure to input correct network information. If you input incorrect IP address, it can cause network collision or mal-function.*
- Ⓕ **Subnet** : WIZ1000's subnet mask
- Ⓖ **Gateway** : WIZ1000's Gateway address
- Ⓗ **PPPoE ID/Password** : If you select 'PPPoE' mode, input ID/ Password which you received from ISP company.
- Ⓘ **Server IP/Port** : When WIZ1000 is set as "Client mode" or Mixed mode", server IP and port should be set. WIZ1000 attempts to connect this IP address.

⓫ **Network mode** :

**client/server/mixed** : This is to select the communication method based on TCP. TCP is the protocol to establish the connection before data communication, but UDP just processes the data communication without connection establishment.

The Network mode of WIZ1000 can be divided into TCP Server, TCP Client and Mixed mode according to the connection establishing method. At the TCP server mode, WIZ1000 operates as server on the process of connection, and waits for the connection trial from the client. WIZ1000 operates as client at the TCP Client mode on the process of connection, and tries to connect to the server's IP and Port. Mixed modes supports both of Server and Client. The communication process of each mode is as below.

**<TCP server mode>**



**Figure 4. TCP Server mode**

At the TCP Server mode, WIZ1000 waits for the connection requests.

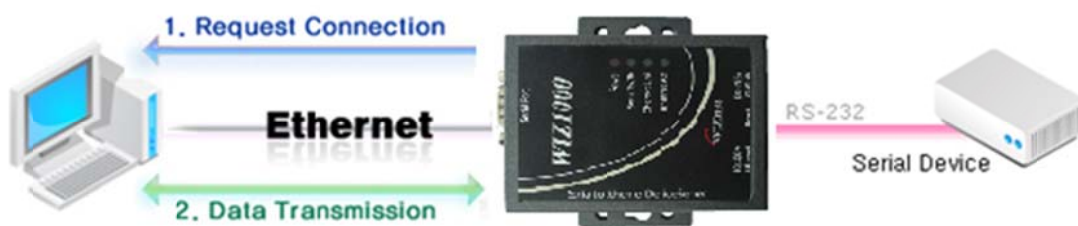
TCP Server mode can be useful when the monitoring center tries to connect to the device (where WIZ1000 is installed) in order to check the status or provide the commands. In normal time WIZ1000 is on the waiting status, and if there is any connection request (SYN) from the monitoring center, the connection is established (ESTABLISH), and data communication is processed (Data Transaction). Finally connection is closed (FIN).

In order to operate this mode, Local IP, Subnet, Gateway Address and Local Port Number should be configured first.

As illustrated in the above figure, data transmission proceeds as follows,

1. The host connects to the WIZ1000 which is configured as TCP Server mode.
2. As the connection is established, data can be transmitted in both directions –from the host to the WIZ1000, and from the WIZ1000 to the host

#### <TCP client mode>



**Figure 5. TCP Client mode**

If WIZ1000 is set as TCP Client, it tries to establish connection to the server.

To operate this mode, Local IP, Subnet, Gateway Address, Server IP, and Server port number should be set. If server IP had domain name, use DNS function.

In TCP Client mode, WIZ1000 can actively establish a TCP connection to a host computer when power is supplied.

As illustrated in the above figure, data transmission proceeds as follows:

1. As power is supplied, WIZ1000 board operating as TCP client mode actively establishes a connection to the server.
2. If the connection is complete, data can be transmitted in both directions –from the host to the WIZ1000 and from WIZ1000 to the host.

### <Mixed mode>

In this mode, WIZ1000 normally operates as TCP Server and waits for the connection request from the peer. However, if WIZ1000 receives data from the serial device before connection is established, it changes to the client mode and sends the data to the server IP. Therefore, at the mixed mode, the server mode is operated prior to the client mode.

As like TCP Server mode, the Mixed mode is useful for the case that the monitoring center tries to connect to the serial device (in which WIZ1000 is used) to check device status. In addition to this, if any emergency occurs in the serial device, the module will change to Client mode to establish the connection to the server and deliver the emergency status of the device.

### Ⓚ UDP

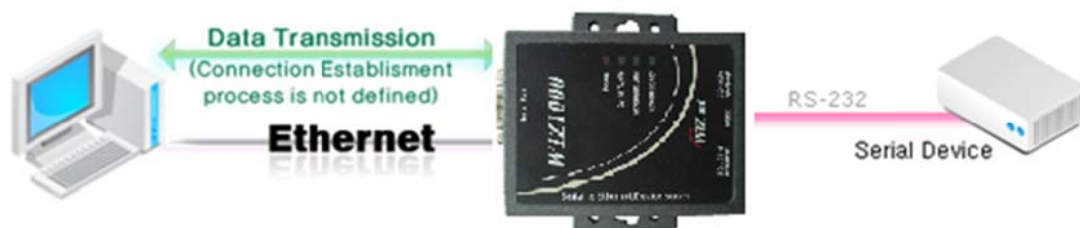


Figure 6. UDP mode

As we know, UDP is not a connection oriented protocol. But the communication port should also be defined well. If the UDP mode is selected, the data from serial interface can be defined where to delivery via the "Sever IP Address" and "Port", and the WIZ1000 can also be defined where to receive Ethernet data from via the "Remote Peer IP Address" definition. If the data destination and source are the same, the two IP address will also be the same. Please note the destination and source are using the same port.

① **Use DNS** : If DNS function is needed, check this option and input the domain name of DNS server. DNS(Domain Name System) is the database system having information about IP address and corresponding domain name. When connecting to domain name, you can use DNS function of WIZ1000. Input IP address of DNS server provided by ISP in *DNS Server IP*, and domain name in the *Server (Domain)*

If server has dynamic IP address, but domain name, if you use DNS function, you do not need to configure server IP address whenever it's changed.

**☞ If module does not have valid network information, Direct IP search is not available.**



**Check if module is connected to the NAT or private network. If so, it is not possible to connect to the module from outside.**

### Ⓜ Direct IP Address Search

If there are more than one WIZ1000 in the same subnet with the same password, the function of “Direct IP Address Search” will help users to get the specified WIZ1000 by input its IP address directly.

### Ⓝ Search

This function is used for searching the connected WIZ1000s in the same sub-network. If you want to configure or update the firmware of your WIZ1000, you have to find your WIZ1000 at first. In order to protect WIZ1000 from attacking, a search password is needed to input in the popup dialog after “Search” button clicked as shown in Figure 7. The password can be modified by using this configuration tool and its maximum length is 8 bytes. Be sure to input the correct password of your WIZ1000, otherwise, your device cannot be found. After searching over, the MAC addresses of found WIZ1000s are listed in the “Board list”. The default password is ‘wiznet’.



**Figure 7 Search password input dialog**

### Ⓞ Setting

This function is to complete the configuration change.

If you select the MAC address from the “Board list”, the default configuration value of the module will be displayed. Change the configuration and click “Setting” button to complete the configuration. The module will re-initialize with the changed configuration. Changed value is saved in the EEPROM of the module. Thus, the value is not removed even though power is disconnected.

The configuration value can be changed in below steps.

- ① Select the MAC address of which configuration value should be changed in the “ Board list. The values configured will be displayed.
- ② Change the value
- ③ Click “ Setting” button. The configuration change will be complete.
- ④ The module will be initialized to the changed values (re-booting is processed)
- ⑤ To check configuration result, click ‘ Search’ button.

**Ⓟ Upload**

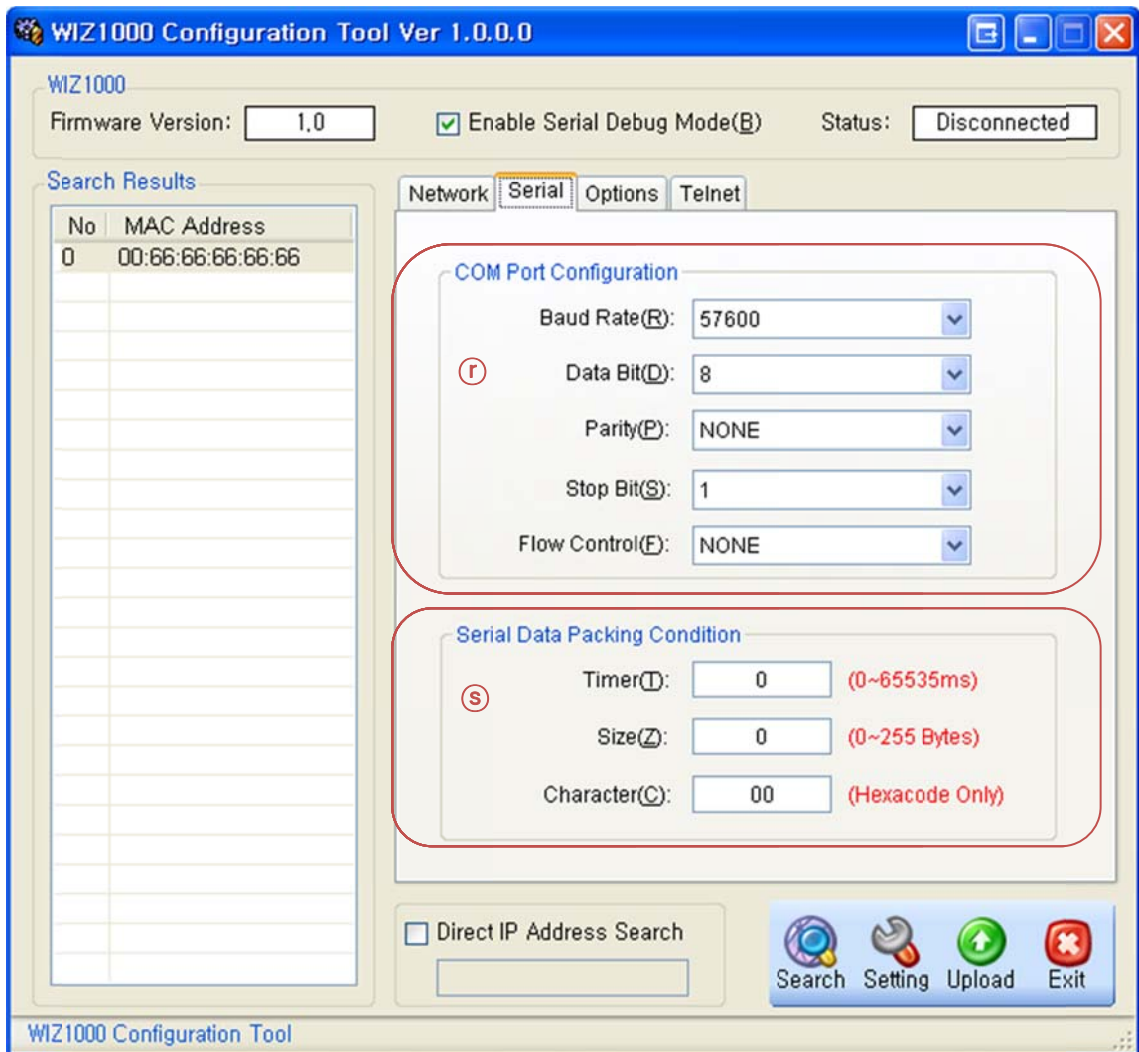
Firmware will be uploaded through network

**👉 After uploading the firmware, 20~30 seconds are required for initialization.**

**④ Exit :**

Close the configuration tool program.

## 2.2.2. Serial configuration



**Figure 8. Configuration Tool (Serial Config.)**

### **(R) COM Port Configuration**

The parameters of COM port of WIZ1000 are listed well in this page. Users can set the COM port of WIZ1000 by selecting the value of each parameter in the drop down list.

**☞ By clicking the “Setting” button, selected value can be applied.**

### **(S) Serial Data Packing Condition**

You can designate how the serial data can be packed to send to the Ethernet.

In default mode, WIZ1000 checks the serial buffer and sends any received data to Ethernet without any standard. Therefore, the data can be regarded as error data due to inconsistent data length. In order to solve this problem, the data from serial can be packed according to

the specified condition before sending to Ethernet. The condition is as below.

**Time:** If there is not any new data during designated time, all data in the serial buffer is converted to Ethernet packet. If new data is received, the time is re-calculated and the received data is saved in the serial buffer. Time condition can be utilized when the serial data size is variable and has no ending character, but needs to be delivered in frame unit. (If the value is '0', option is not used)

**Size:** When data is collected as much as the defined size in the serial buffer, it is transmitted to Ethernet (If the value is '0', option is not used)

**Character:** The data is collected in the serial buffer until specified character is received, and transmitted to Ethernet. The character can be specified in Hex formation. (The value is '0', this option is not used)

Any one of three conditions is satisfied, the data is transmitted to the Ethernet.

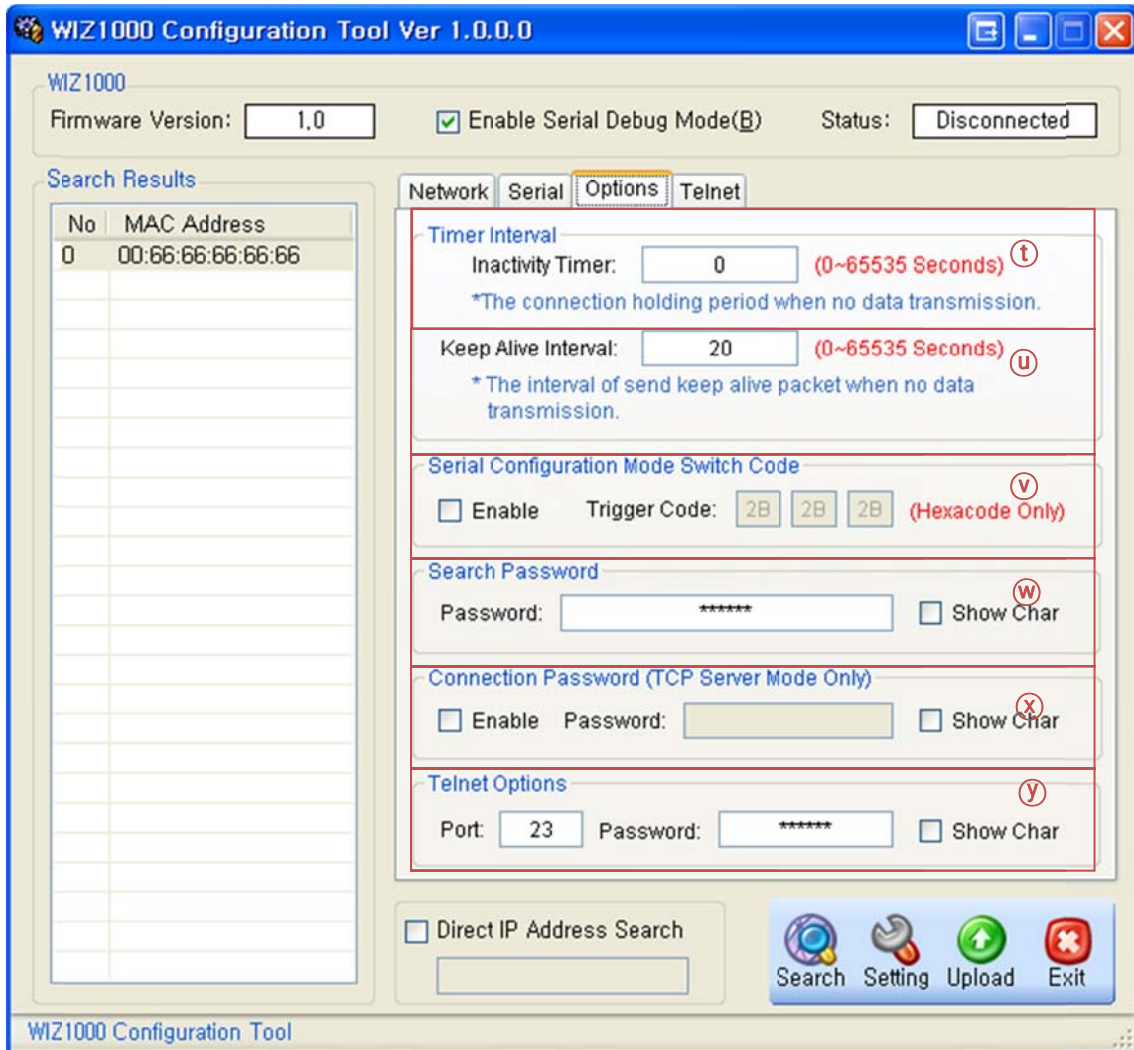
Ex) Delimiter: Size=10, Char=0x0D

Serial data: 0123456789abc

Ethernet data: 0123456789

☞ "abc" will be remained in the serial buffer of module.

### 2.2.3. Option configuration



**Figure 9. Configuration Tool (Option Config.)**

#### Ⓣ Inactivity timer

After the connection is established, if there is not data transmission within the time defined in Inactivity time, the connection is closed automatically.

The default value is '0'. If '0' is set, this function is not activated. In this default setting, the connection is maintained even though there is no data transmission. In order to close the connection, the 'Close' command should be given.

This function can be used for more than two or more systems to connect to a WIZ1000 module. If one system holds the connection to the WIZ1000, other systems cannot connect to the module. If there is no data transmission during the time defined in Inactivity time, the connection will be closed for other system to be connected.

Inactivity Time also can be useful for the case when the server system is unexpectedly shut down. In this status, if there is not any data communication during the time defined in the Inactivity time, WIZ1000 will close the connection and enter into listening status.

#### Ⓚ Keep Alive Interval

Keep-alive packet is usually used to check whether the other side is alive or not. Users can define the interval of sending keep-alive packet here, and timer will be started when there is no data to delivery between WIZ1000 and the other side. The interval can be set between 0~65535 seconds, and 0 means the keep-alive timer is disabled that no keep-alive packet will be sent.

#### Ⓜ Serial Configuration Mode Switch Code

This function is for module configuration not through network with Configuration tool but through serial communication. When you want to set via serial communication, check “enable”. Please detail about serial configuration refers to “4. Serial Configuration”.

#### Ⓦ Search Password

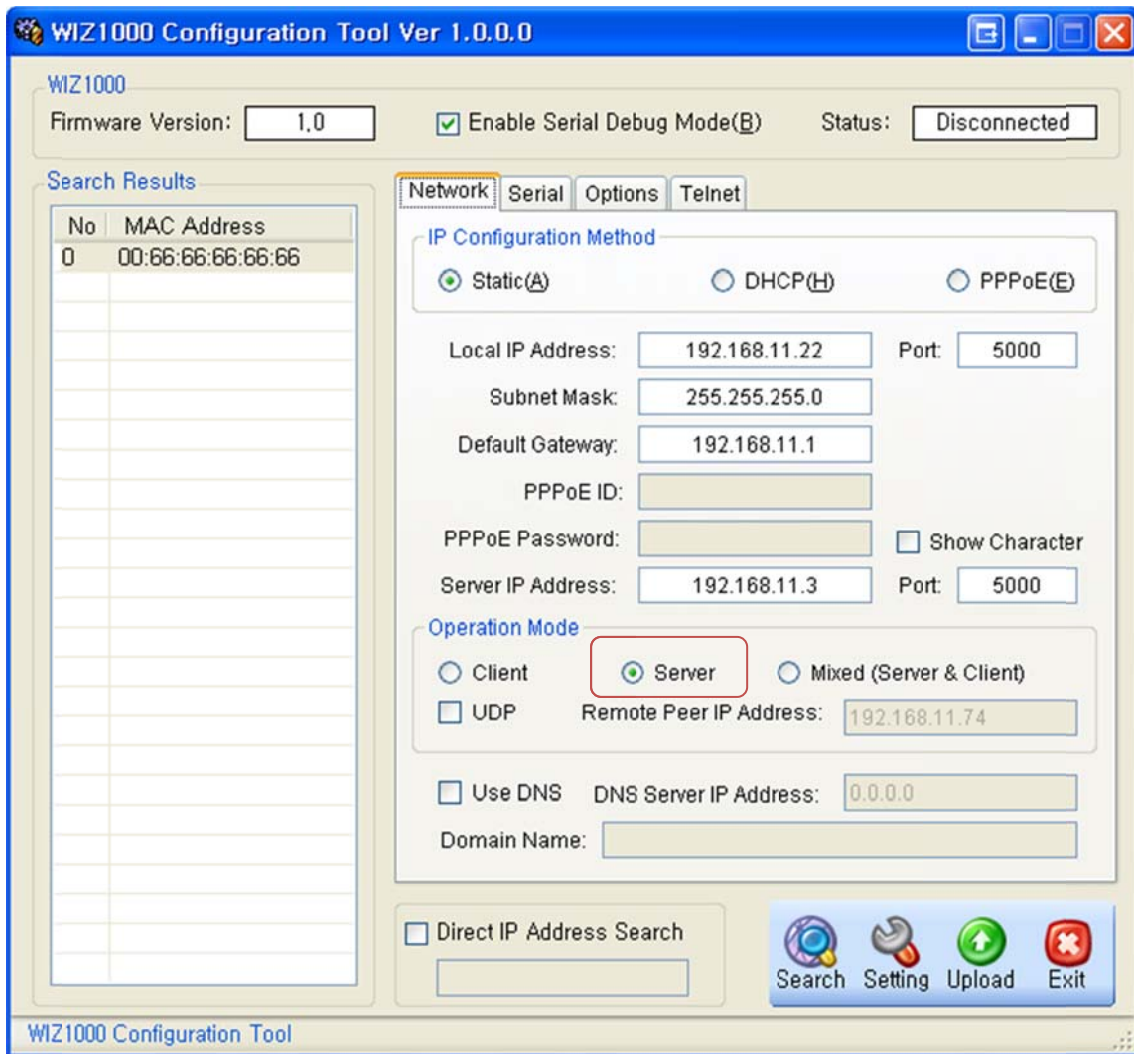
For the security issues, WIZ1000 can have its own password for searching. The password is stored in the EEPROM of WIZ1000, and it can be modified via this configuration tool. The password can be any alphabet or number. Its length can be variable and its maximum length is 8 bytes. The password is case sensitive and the default password is ‘wiznet’.

#### ⓧ Connection Password

‘Connection Password’ function is for blocking client’s access which is not allowed.

‘Connection Password’ function can be operated only in ‘TCP Server’ mode. When ‘password’ function operates, clients should input password to access.

1. Execute Configuration Tool program. (Configuration Tool version should be 2.1 or above)
2. Select ‘Server’ of “Operation Mode”.



**Figure 10. Option Mode for Password Configuration**

3. As shown in Figure 8, select Option tab and check 'Enable' combo box of "Password" menu.
4. Input password.
5. Click "Setting" button to apply password setting
6. When any client accesses the module, client should send 'password' to server module first, and then access will be allowed.

#### ④ Telnet Com Port Option

The port of telnet and login password can also be defined by users. The maximum length of telnet login password is 8 bytes and its default password is 'wiznet'. The default telnet port is 23.

### 3. Firmware Upload

- ① Run 'WIZ1000 Configuration Tool' program, and click "Search" button, and input search password in the popup dialog.
- ② If the module is properly connected to the network, "Complete Searching" message and MAC address will be displayed on the "Search Result" as shown below Figure.

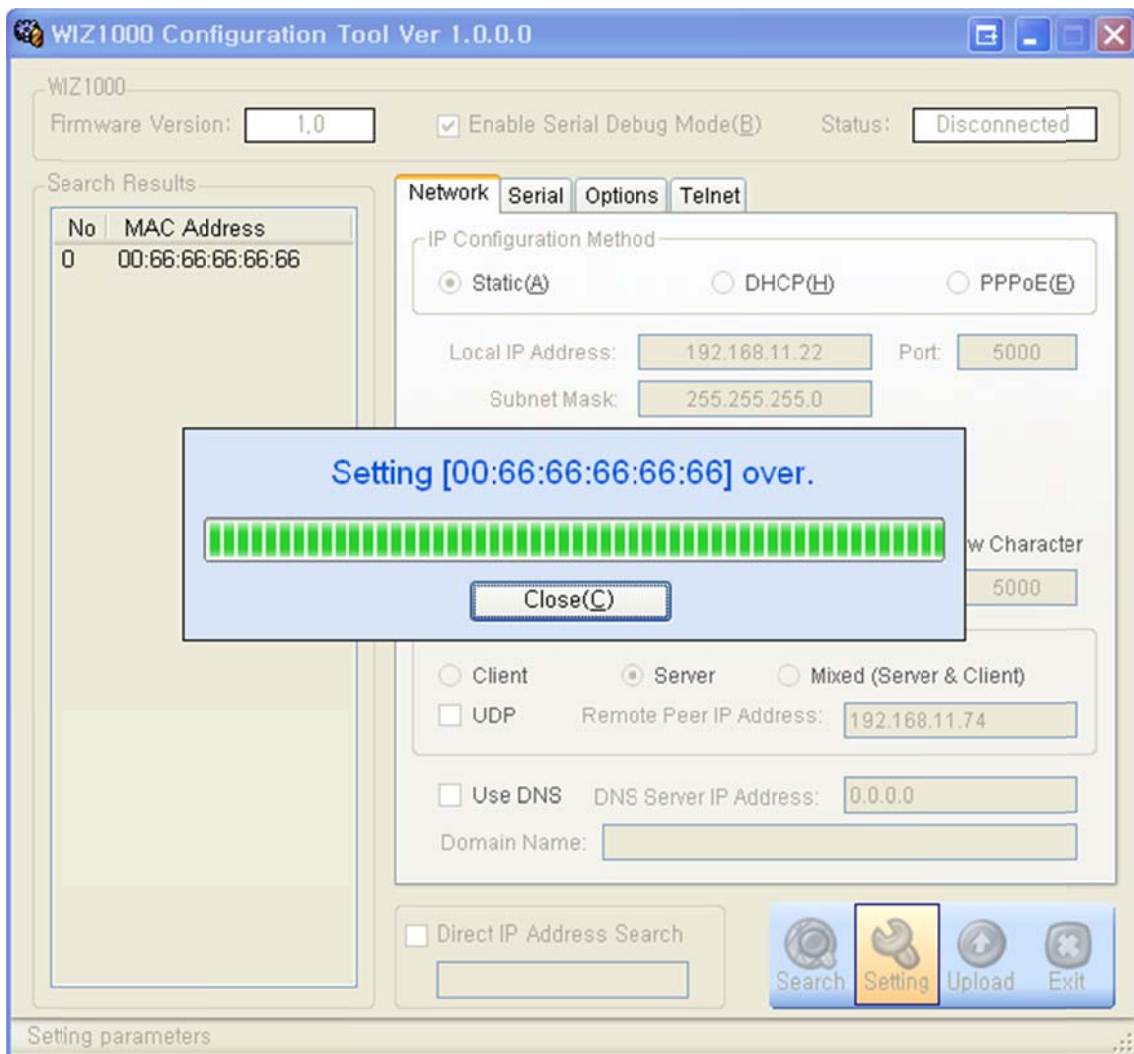
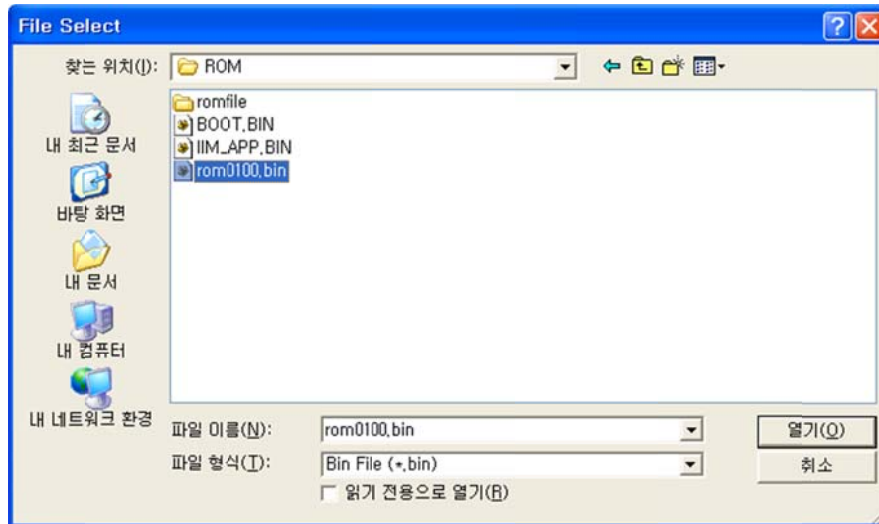


Figure 11. Board Search Window

- ③ Select a module shown in "Board list", and click "Upload" button.  
**⚠ Before uploading through Ethernet, you should set the network information of WIZ1000 first by Configuration Tool program as shown above Fig 10. By using Ping test,**



- ④ When the window as shown below Figure is displayed, select file for upload and click “Open” button.



**Figure 12. Open dialog box for uploading**

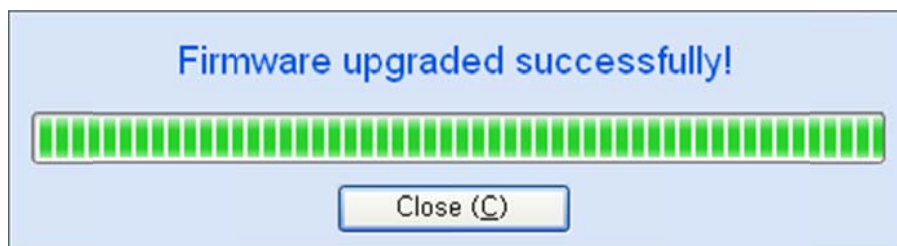
☞ Do not upload any other files except for WIZ1000 application firmware file.

- ⑤ The firmware uploading status will be pop up as shown in Figure 13.



**Figure 13. Firmware uploading window**

- ⑥ When the firmware is uploaded successfully, the following message will be shown.



**Figure 14. Firmware upgraded successfully**

## 4. Serial Configuration

### 4.1. Serial Command Format

It is possible to configure WIZ1000 by using serial command.

By inputting specified 3 characters you can enter into the configuration mode. The characters can be defined at the Configuration Tool.

#### <Frame Format>

##### Command Frame format

Descriptor	STX	Command code	Parameter	ETX
Length(bytes)	1	2	Variable	1

**Table 3. Serial Configuration Frame Format**

##### Reply Frame format

Descriptor	STX	Reply code	Parameter	ETX
Length(bytes)	1	1	Variable	1

**Table 4. Serial Configuration Reply Frame Format**

#### STX & ETX

Setting	Comments
STX	'<' : Hex = 3Ch
ETX	'>' : Hex = 3Eh

**Table 5. Serial Configuration STX & ETX**

#### Reply Code

Reply	Comments
S	Command was successful
F	Command failed
0	Invalid STX
1	Invalid command
2	Invalid parameter
3	Invalid ETX
E	Enter serial command mode

**Table 6. Serial Configuration Reply Code**