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# Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832 Email & Skype: info@chipsmall.com Web: www.chipsmall.com Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





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# WIZ105SR User's Manual

(Version 1.2.0)





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Technical Support: <u>support@wiznet.co.kr</u> Sales & Distribution: <u>sales@wiznet.co.kr</u>

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# 1. Introduction

WIZ105SR is a gateway module between serial device and Ethernet. It can transmit serial data to Ethernet and vice versa. With WIZ105SR, you can connect your serial device with Ethernet via WIZ105SR provides interface quite easier and shorten your development period to obtain more gains.

We also provide full functional configuration tools for WIZ105SR. You can set WIZ105SR upon your needs by using serial configuration command when WIZ105SR is in serial configuration mode or using provided configuration tool via Ethernet to make WIZ105SR embedded in your products well.

# 1.1. Key Features

- High speed Serial-to-Ethernet gateway module with an RJ-45 jack
- High stability and reliability Ethernet connection solution
- 10/100Mbps Ethernet interface supported with full hardwired TCP/IP stack chip W5100
- Up to 230Kbps serial communication interface
- Serial configuration commands support
- Simple command frame format
- Comprehensive & readable command set for network and serial settings
- On-site configuration without PC
- Powerful remote configuration tool
- RoHS compliant





#### Products Contents (EVB model) 1.2.





Power

(DC 5V Adaptor)

Table 1. Products Contents



# 1.3. Products Specification

# 1.3.1. WIZ105SR Module

WIZ105SR uses a high performance 8051 compatible microcontroller which feathers 62K in chip Flash, 16K in chip SRAM and 2K EEPROM. WIZ105SR feathers our fast hardwired TCP/IP stack chip W5100 and most of TCP/IP protocols such as TCP, UDP, IP, ARP, ICMP, IGMP, PPPoE and Ethernet MAC are all supported. 10Mbps and 100Mbps Ethernet are all supported and one standard Ethernet Jack is mounted in WIZ105SR. One serial port is provided in WIZ105SR via 12-pin connector which feathers standard RS-232 specification. WIZ105SR can be powered by a DC 3.3V power supply with at least 200mA current supply. The detailed specifications are listed in Table 2.

Category	Specification			
Protocol	TCP, UDP, IP, ARP, ICMP, IGMP, MAC, DHCP, PPPoE, DNS			
Network Interface	10/100 Base-T Ethernet (Auto detection)			
Serial Port	1 RS-232 port (3.3V LVTTL)			
CPU	8051 compatible			
Serial line format	8-N-1, 8-O-1, 8-E-1, 7-O-1, 7-E-1			
Serial flow control	None, XON/ XOFF, CTS/ RTS			
Serial signal	TXD, RXD, RTS, CTS, GND			
Software	Remote Download and Configuration			
Serial Transmission Speed	1200bps ~ 230Kbps			
Memory	Internal Memory (62KB Flash Memory, 2KB EEPROM, 16KB SRAM)			
Temperature	0'C ~ 70'C (Operating), -40~85'C (Storage)			
Humidity	10~90%			
Power	3.3V, 200mA			
Connector type	2x6, 2mm Pitch Pin header array			
Size	40mm x 62mm x 17mm			



## 1.3.2. Connector Pin Assignment

WIZ105SR provides an external connector to connect it with your application board. The pin assignment and definition of the connector are introduced in Figure.1 and the specification of each pin is described in Table 3.

J1	1	/ RESET	2	3.3V
	3	RXD	4	3.3V
	5	CTS	6	/ FACTORY_RESET
= =	7	TXD	8	/ HW_TRIGGER
	9	RTS	10	NC
11-12	11	GND	12	GND

Figure 1. WIZ105SR Connector Pin Assignment and Definition

Name	Functions	I/O	
3.3V	Power		
	Low active reset		
	Minimum 1.2 usec is required.		
/ RESET	Do NOT leave the input pin(nRESET) as floating.	Input	
	If it is not in use, it must be pulled-up, otherwise the		
	module may not work properly.		
RXD	RS-232 Data Input	Input	
CTS	RS-232 Clear To Send	Input	Optional
TXD	RS-232 Data Output	Output	
RTS	RS-232 Request To Send	Output	Optional
/ FACTORY BESET	Pull Factory Reset to low and if / RESET is activated,	Input	
	the configuration is changed to factory default.	mput	
	When pulled low, enter the serial command mode		
	while WIZ105SR is powered on or reset. (In S/W	Input	
/ HW_TRIGGER	trigger method, this signal ignored.)	/ Output	
	When WIZ105SR is booted over, this pin will indicate		
	the status of TCP/ IP socket connection.		

Table 3. Pin Assignment

All signals are in 3.3V LVTTL.



# 1.3.3. RJ-45 Pin Assignment

The pin assignment of Ethernet Jack RJ-45 is described in Figure 2, and description of each pin is introduced in Table 4.



Figure 1. Pin Assignment of RJ-45 in WIZ105SR

Pin Number	Description
1	TX+
2	TX-
3	RX+
4	Unused
5	Unused
6	RX-
7	Unused
8	Unused

Table 4. Pin Definition of RJ-45



# 2. Getting Started

This chapter describes the configuration steps of WIZ105SR. The following listed items which are included in your WIZ105SR-EVB package will be required in configuration.

- Power Adapter (included in the WIZ105SR-EVB package)
- Serial and Ethernet Cable (included in the of WIZ105SR-EVB package)
- A computer with Network Interface Card (NIC) and/or one RS232 serial port

If you have prepared those things, the configuration of WIZ105SR can be getting started. The board connection steps are introduced in section 2.1.

# 2.1. Hardware Installation Procedure

The following steps are required while to set up the configuration environment for WIZ105SR and the connection diagram is shown in Figure 3.



Figure 2. WIZ105SR Configuration Environment Setting Diagram

- STEP 1: Connect the WIZ105SR module to the test board by using the 12pin cable.
- STEP 2: Connect the 5V DC power line to the power jack of the test board.
- **STEP 3**: Use the RJ45 Ethernet cable in order to connect the module to an Ethernet network.
- STEP 4: Use the serial data cable to connect the test board to a serial device.



# 2.2. Configuration Tool

# 2.2.1. Network Configuration

🐐 WIZ100SR/105SR/110SF	3 Configuration Tool ver 2.1.0
Version (a) (b)	Enable Serial Debug Mode
Board list	Network Serial Option TP Configuration Method © Static (C) C DHCP C PPPoE
C	Local IP Subnet Gateway PPPOE ID Password Server IP Operation Mode C Client C Server © Mixed Use UDP mode Use UDP mode Duse DNS DNS Server IP Domain Name
(	Direct IP Search

Figure 2. Configuration Tool (Network Config)

(a) Version : Displays firmware version.

(b) Enable Serial Debug Mode : If this mode is checked, you can monitor the status module and socket message (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.

(d) **IP Configuration Method:** Select IP setting mode, you can select one of Static, DHCP, PPPoE mode.

- **Static**: "Static" is option for setting WIZ105SR IP with static IP address. Firstly, select MAC address which you wanted to set as static IP in the 'board list'. Then "Local IP, Subnet, Hardwired Internet Connectivity Wizard (WIZnet, Inc.) 14



Gateway box will be enabled. Input Static IP address and click "setting" button. Then set the IP address as you wanted. (PPPoE ID, Password box is disabled)

- **DHCP**: Set this option to use DHCP mode. Firstly, check 'DHCP' and click 'Setting' button. If IP address is successfully acquired from DHCP server, the MAC address will be displayed on the configuration window. (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** : WIZ105SR supports PPPoE for ADSL user. When you select PPPoE at the "IP Configuration Method", PPPoE ID & Password box is enabled.

1. To set PPPoE, connect PC to WIZ105SR 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.

WIZ105SR Ver. 03.06
-- PHASE 0. PPPoE(ADSL) setup process --- PHASE 1. PPPoE Discovery process -- ok
-- PHASE 2. LCP process -- ok
-- PHASE 3. PPPoE(ADSL) Authentication mode -Authentication protocol : c223 00,
-- Waiting for PPPoE server's admission -- ok
-- PHASE 4. IPCP process -- ok

Figure 3. PPPoE Access PrSocess

Local IP/Port : WIZ105SR'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.



① Subnet: WIZ105SR's subnet mask

9 Gateway : WIZ105SR's Gateway address

(b) **PPPoE ID/Password :** If you select 'PPPoE' mode, input ID/ Password which you received from ISP company.

① Server IP/Port : When WIZ105SR is set as "Client mode" or Mixed mode", server IP and port should be set. WIZ105SR attempts to connect this IP address.

### ① 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 WIZ105SR can be divided into TCP Server, TCP Client and Mixed mode according to the connection establishing method. At the TCP server mode, WIZ105SR operates as server on the process of connection, and waits for the connection trial from the client. WIZ105SR 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.





Figure 4. TCP Server mode

At the TCP Server mode, WIZ105SR waits for the connection requests.

TCP Server mode can be useful when the monitoring center tries to connect to the device (where WIZ105SR is installed) in order to check the status or provide the commands. In normal time WIZ105SR 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 Transanction). Finally connection is closed (FIN).

Hardwired Internet Connectivity Wizard (WIZnet, Inc.)



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 WIZ105SR 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 WIZ105SR, and from the WIZ105SR to the host



<TCP client mode Communication>

Figure 5. TCP Client mode

If WIZ105SR 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, WIZ105SR 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, WIZ105SR 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 WIZ105SR and from WIZ105SR to the host

### <Mixed mode Communication>

In this mode, WIZ105SR normally operates as TCP Server and waits for the connection request from the peer. However, if WIZ105SR receives data from the serial device before connection is established, it changes to the client mode and sends the data to the server IP.

Hardwired Internet Connectivity Wizard (WIZnet, Inc.)



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 WIZ105SR 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.

### (k) Use UDP mode



Figure 6. UDP mode

At the UDP mode, the connection establishment is not defined. Just set the IP address and port number of the peer and send the data.

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 WIZ105SR. 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.

### Direct IP Search

Direct IP Search can be used for searching WIZ105SR not installed in the same subnet.

If the Direct IP search is checked, the configuration tool use the TCP instead UDP broadcast to search modules. Therefore, network information of the module such as IP address, subnet mask and gateway is required for the search.

If you check Direct IP search, the field in which IP address is input, will be activated. In this field, input IP address of the module, and click "Search" button.

If module does not have valid network information, Direct IP search is not available.
 Hardwired Internet Connectivity Wizard (WIZnet, Inc.)
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Check if module is connected to the NAT or private network. If so, it is not possible to connect to the module from outside.

### ① Search

The Search function is used to search all modules existing on the same LAN. By using UDP broadcast, all modules on the same subnet will be searched.

The searched module is displayed as MAC address in the "Board list".

### O 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.

(9) Exit : Close the configuration tool program.



### 2.2.2. Serial configuration

🏘 WIZ100SR/105SR/110S	R Configuratio	on Tool ver	2.1.0		
Version 3.5	🗹 Enable Ser	ial Debug M	ode [	Not Connect	ted
Board list	Network Ser	ial Option	]		
	r Speed	57600	•		
	DataBit	8	•		
	Parity	None	•		
	Stop Bit	1	•		
	Flow	None	•		
	Direct I	P Search	Search	Setting Upload	X Exit

Figure 7. Configuration Tool (Serial Config.)

# () Serial

Serial Configuration value of selected module is displayed.

In order to change the serial configuration of WIZ105SR, this menu can be used.

Provide the "Setting" button, changed value can be applied.



### 2.2.3. Option configuration

WIZ100SR/105SR/110	SR Configuration Tool ver 2.1.0
Version 3.5	Enable Serial Debug Mode Not Connected
Board list	Network Serial Option Inactivity time 0 (0 ~ 65535 sec) Closes socket connection, if there is no transmission during this time. Data Packing Condition Time 0 (0 ~ 65535 ms)
	Size 0 (0 ~ 255 Byte) Char 00 (Hexacode) Password (TCP Server) Enable Password (Max 8 Bytes)
	Serial Configuration Enable Code 2B 2B 2B (in Hex)
	Direct IP Search

Figure 8. Configuration Tool (Option Config.)

### Inactivity time

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 WIZ105SR module. If one system holds the connection to the WIZ105SR, other systems can not 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

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Inactivity time, WIZ105SR will close the connection and enter into waiting status.

#### (1) Data Packing Condition

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

In default mode, WIZ105SR 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 lenth. 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)

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" data remains in the serial buffer of module.

### (U) Password

'Password' function is for blocking client's access which is not allowed.

'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".



Version 3.5	🗹 Enable Seri	al Debug Mode [	Not Connected
Board list 00:08:DC:14:74:77	Network Seri IP Configura © Static	al   Option   ation Method C DHCP C	PPPoE
	Local IP Subnet Gateway PPPoE ID	192.168.11.2 255.255.255.0 192.168.11.1	Port 5000
	Password Server IP Operation M C Client	192.168.11.3 ode Server C Mixed	Port 5000
	Use DNS Domain Name	DNS Server IP	0.0.0.0
	Direct IP	Search	🔊 🗐 🗙

Figure 9. Operation Mode for Password Setting

- 3. As shown in Figure 10, 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.

### **V**Serial Configuration:

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".



# 3. Firmware Upload

- Run 'WIZ100SR/ WIZ105SR/ WIZ110SR Configuration Tool' program, and click "Search" button.
- 2 If the module is properly connected to the network, "Complete Searching" message and

MAC address will be displayed on the "Board List" as shown below Figure.

🙀 WIZ100SR/105SR/110SR Configuration Tool ver 2.1.0						
Version 3.5	Enable Serial Debug Mode Not Connected					
Board list	Network Serial Option   IP Configuration Method © Static © DHCP © PPPoE					
	Local IP 192.168.11.2 Port 5000					
Status	Window Complete searching					
	Close Port 5000					
	C Client C Server . Mixed ☐ Use UDP mode					
	Use DNS DNS Server IP 0.0.0.0 Domain Name					
	Direct IP Search					

Figure 10. Board Search Window

① Select a module shown in "Board list", and click "Upload" button.

Before uploading through Ethernet, you should set the network information of WIZ105SR first by Configuration Tool program as shown above Fig 10. By using Ping test, you can check if network is correctly configured.

2 When the window as shown below Figure is displayed, select file for upload and click"Open" button.



File Select					? 🛛
	<ul> <li>➢ ROM</li> <li>➢ romfile</li> <li>➢ BOOT.BIN</li> <li>➢ IIM_APP,BIN</li> <li>➢ rom0100,bin</li> </ul>		•	← € 📸 🎫	•
내 네트워크 환경	파일 이름( <u>N</u> ):	rom0100, bin		•	열기( <u>0</u> )
	파일 형식( <u>T</u> ):	Bin File (∗.bin) ┌─ 읽기 전용으로 열기( <u>B</u> )		•	취소

Figure 11. Open dialog box for uploading

- To not upload any other files except for WIZ105SR application firmware file.
- ③ A dialogue box titled "Processing" will be displayed as below.



Figure 12. Firmware uploading window

(4) When uploading is complete, a message box with "Complete Uploading" will be displayed as shown in Figure 14.



Figure 13. Complete Uploading