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# EG-SR-7150MJ User's Manual

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# 1. Introduction

The EG-SR-7150MJ is a gateway module that converts serial data into TCP/IP data type. It transmits the data sent by a serial equipment to the Internet and TCP/IP data to the equipment.

With the EG-SR-7150MJ mounted with an RJ-45 connector, users can have an easier and quicker interface with the Ethernet.

The EG-SR-7150MJ provides serial commands, with which the developers of any serial device can add local configuration capability to their products. For example, a card reader developer can program the keypad on a card reader to configure serial or network on-site without the use of a laptop or PC.

# 1.1. Key Features

- Ready-to-go serial to Ethernet gateway module mounted with an RJ-45 connector
- Serial Command Support
- Simple command frame format
- Comprehensive & readable command set for network and serial settings
- On-site configuration without PC
- High stability & reliability by using a W3150A WIZnet Chip, a fully-hardwired TCP/IP stack
- Easy and powerful configuration program
- 10/100Mbps Ethernet interface, Max. 230Kbps Serial interface
- RoHS compliant

# 1.2. Products Contents (EG-SR-7150MJ-EVB)

The EG-SR-7150MJ-EVB, the evaluation kit for the EG-SR-7150MJ contains the following items;





Test Board for EG-SR-7150MJ
12pin Cable (Connecting EG-SR-7150MJ to Test Board)
Serial Cable (Connecting Serial Device to Test Board)
LAN Cable (Connecting EG-SR-7150MJ to Host)
Power (DC 5V Adaptor)





# CD (Containing Manual, H/W & S/W Materials)

Please immediately notify your sales representative if any of the items above is missing or damaged.



# 1.3. Specifications of the EG-SR-7150MJ

Category	Specifications	
Form Factor	2mm Pitch 2x6 pins, 62x40 mm	
LAN Interface	10/100 Mbps auto-sensing, RJ-45 connector	
Protocol	TCP, UDP, IP, ARP, ICMP, MAC, (IGMP, PPPoE)	
CPU	AT89C51RC2 (8bit MCU and 32K Flash)	
Serial Interface	RS 232 (LVTTL)	
Serial Signals	TXD, RXD, RTS, CTS, GND	
Serial	Parity : None, Even, Odd	
Parameters	Data bits : 7, 8	
	Flow control : RTS/CTS, XON/XOFF	
Speed : up to 230Kbps		
Management	Configuration utility based on Windows	
Temperature	0℃~70℃ (Op <mark>e</mark> rating), -40℃~85℃ (Storage)	
Humidity	10~90%	
Power	150mA @ 3.3V (max)	
Size	40mm x 62mm x 17mm	



# 2. Getting Started

This Chapter describes how to set up and configure the EG-SR-7150MJ.

The following items are required to get started.

- Power Cable (included in the EG-SR-7150MJ-EVB package)
- Serial and Ethernet Cables (included in the of EG-SR-7150MJ-EVB package)
- PC or Laptop with Network Interface Card (hereafter, NIC) and/or one RS232 serial port

# 2.1. Hardware Installation procedure

Follow steps below to prepare the module and evaluation board for testing.



**STEP 1**: Connect the EG-SR-7150MJ 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. Configuration tool features

🙀 EG-SR7150 Configurati	on Tool ver 1.0.0	
Module list	F/W Version 0.2 00:08:DC:00	:00:50
00:08:DC:00:00:50	31P Configuration Method	Network setting
	🕞 Static 🔿 DHCP	Local Port 5000
	Local IP 192.168.11.2	Server IP 192.168.11.3
	Subnet 255.255.255.0	Server Port 5000
	Gateway 192.168.11.1	
	4 Operation Mode	·
		TCP Client connection method
		💿 Startup C Any Character
	Serial	
	Baud 9600 🔻 DataBit 8 💌 H	Parity None 🔻 Flow None 💌
	Serial command method	
	📀 H/W Trigger 🔿 S/W Trigger	
	Trigger Character	2B 2B 2B (0x00~0xFF)
	Etc	
Found : 1	6 Delimiter	
	Time 0 (0~65535 msec) Size	0 (0~255)  Char 0 (0x00~0xFF)
Direct IP Search	Inactivity time n (0~65535 s	sec)
Mode	D mode	2 8
Socket Status Not co	nnected	
	Search	Setting Upload Exit

# ① Search

The Search function is used to search all modules existing on the same Subnet. The UDP broadcast is used for searching modules on a LAN.

The MAC address for a searched module will be listed in the "Module list".

If **Direct IP Search** is checked, TCP will be used for searching instead of UDP. This mode is used more for searching the EG-SR-7150MJ modules on remote networks than local networks with the same subnet. An IP address assigned to the module will be required.



# ② Setting

If you select one of the MAC addresses listed in the "**Module list**", the configuration value of the selected module will be displayed. After changing each value in the configuration program, click the "**Setting**" button to complete the configuration.

The module will be initialized with the new configurations.

# **③ IP Configuration method:** Static, DHCP

Static: The IP address can be manually assigned by users.

**DHCP**: The module assigns IP, subnet and gateway addresses by acquiring them from the DHCP server

The orthogonal of the set manually except for the IP configuration of DHCP.

# **④** Operation mode: TCP server, TCP client, UDP

Three different operation modes are supported — TCP Server, TCP Client, and UDP.

The main difference between the TCP and UDP protocols is that TCP guarantees the delivery of data by requesting the recipient to send an acknowledgement to the sender. On the other hand, UDP does not require this type of verification, so data can be delivered quicker, but its delivery can not be guaranteed.

The TCP Server and TCP Client mode are related to the first step of connection establishment. Once the connection is established, data will be transparently transmitted in both directions (from Server to Client or from Client to Server).

#### TCP server mode





To operate this mode, the Local IP, Subnet, gateway address and local port number should be configured. The EG-SR-7150MJ waits to be connected by the host computer, allowing the host computer to establish a connection and get data from the serial device.

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

1. The host connects to the EG-SR-7150MJ which is configured as TCP Server Mode.

2. Once the connection is established, data can be transmitted in both directions - from the host to the EG-SR-7150MJ, and from the EG-SR-7150MJ to the host.

#### TCP client mode



To operate this mode, the Local IP, Subnet, gateway address, server IP, server port number should be set. In the TCP Client mode, the EG-SR-7150MJ proceeds active open for establishing a TCP connection to a host computer.

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

1. The EG-SR-7150MJ operating as TCP Client Mode establishes a connection based on the condition set in the **TCP client connection method** (**Startup**, **Any character**). i.e. the EG-SR-7150MJ can try to connect as soon as one starts up(**Startup**), or later when data from serial device arrives. (**Any character**).

2. After the connection is established, data can be transmitted in both directions - from the host to the EG-SR-7150-MJ, and from the EG-SR-7150-MJ to the host.

#### UDP mode





In UDP mode, any TCP/IP connection procedure is not required.

# **⑤** Serial command method: H/W trigger, S/W trigger

With this menu, you can designate how the Serial command mode can be entered. Two types are supported - H/W Trigger and S/W Trigger.

**H/W trigger**: Serial command mode can be triggered by pulling H/W trigger pin to low. It can be exited by pulling it to high.



**S/W trigger**: Serial command mode can be triggered when 3 user-defined characters are detected. It can be exited by using the WR command.



## 6 Delimiter: Time, Size, Character

You can designate how the serial data can be packed and sent to the Ethernet. There are 3 delimiters - Time, Size and Character. If all of them are set as '0', whenever the serial data arrives, they will be sent to the Ethernet without any condition. When any of the three delimiters is satisfied, data can be sent to the Ethernet.

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

Serial data: 0123456789abc

Ethernet data: 0123456789

"abc" data remains in the serial buffer of module

# ⑦ Inactivity time

After the connection is established, if there is not any data transmission within the time defined in "**Inactivity time**", the connection will be automatically closed.

# ⑧ Upload

Upload the firmware through the network.

Free After uploading the firmware, 10~20 seconds are required for initialization.

## 2.3. Serial Communication Specification

In this chapter, we describe the structure of the data frames used in issuing commands and receiving responses to and from the device.

#### 2.3.1. Frame Format

Command Frame format

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

**Reply Frame format** 

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

#### 2.3.2. STX & ETX

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



#### 2.3.3. Reply Code

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

#### 2.3.4. Command Code

WIXXX.XXX.XXX (eg. 192.168.11.133)Set Local IPWSXXX.XXX.XXX (eg. 255.255.0)Set Subnet maskWGXXX.XXX.XXX (eg. 192.168.11.1)Set GatewayWP0-65535Set Local IP's port numberWD0 : Static 1 : DHCPSet the IP configuration method 1 : DHCPWM0 : TCP server 1 : TCP client 2 : UDPSet the operation modeWC0 : startup 1 : any characterTCP client method 1 : any characterWBXXXX 4800, 7: 2400,8: 1200 [data byte] 7 : 7bit, 8bit [parity] 0 : no parity, 1 : Odd, 2 : Even [Flow] 0 : no, 1 : Xon/Xoff, 2 : RTS/CTSSet the serial command methodWT0 : Disable 1 : H/W triggerSet the serial command method	Command	Parameter	Comments
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eg. [Baudrate]1: 115200, 2: 57600,       and flow control.         3: 38400, 4: 19200, 5: 9600,       4bytes: [Baud][data byte][parity][flow         6: 4800, 7: 2400,8: 1200       [data byte] 7 : 7bit, 8bit         [parity] 0 : no parity, 1 : Odd, 2 :Even       [Flow] 0 : no, 1 : Xon/Xoff, 2 :RTS/CTS         WT       0 : Disable         1 : H/W trigger       Set the serial command method	WB	хххх	Set the serial baud rate, data, parity
3: 38400, 4: 19200, 5: 9600,       4bytes:[Baud][data byte][parity][flow         6: 4800, 7: 2400,8: 1200       [data byte] 7 : 7bit, 8bit         [parity] 0 : no parity, 1 : Odd, 2 :Even       [Flow] 0 : no, 1 : Xon/Xoff, 2 :RTS/CTS         WT       0 : Disable         1 : H/W trigger       Set the serial command method		eg. [Baudrate]1: 115200, 2: 57600,	and flow control.
6: 4800, 7: 2400,8: 1200 [data byte] 7 : 7bit, 8bit [parity] 0 : no parity, 1 : Odd, 2 :Even [Flow] 0 : no, 1 : Xon/Xoff, 2 :RTS/CTSWT0 : Disable 1 : H/W trigger		3: 38400, 4: 19200, 5: 9600,	4bytes:[Baud][data byte][parity][flow]
[data byte] 7 : 7bit, 8bit       [parity] 0 : no parity, 1 : Odd, 2 :Even         [Flow] 0 : no, 1 : Xon/Xoff, 2 :RTS/CTS         WT       0 : Disable         1 : H/W trigger		6: 4800, 7: 2400,8: 1200	
[parity] 0 : no parity, 1 : Odd, 2 :Even         [Flow] 0 : no, 1 : Xon/Xoff, 2 :RTS/CTS         WT       0 : Disable         1 : H/W trigger		[data byte] 7:7bit, 8bit	
[Flow] 0 : no, 1 : Xon/Xoff, 2 : RTS/CTS         WT       0 : Disable         1 : H/W trigger		[parity] 0 : no parity, 1 : Odd, 2 :Even	
WT     0 : Disable     Set the serial command method       1 : H/W trigger		[Flow] 0 : no, 1 : Xon/Xoff, 2 :RTS/CTS	
1 : H/W trigger	WT	0 : Disable	Set the serial command method
		1 : H/W trigger	
2 : S/W trigger		2 : S/W trigger	
WE         xxxxxx         Set the command mode character	WE	хххххх	Set the command mode character
(eg. In hex format : 2B 2B 2B)		(eg. In hex format : 2B 2B 2B)	



WX	xxx.xxx.xxx	Set server IP address
	(eg. 192.168.11.144)	
WN	0~65535	Set server port number
WR		Restart
OC	xx	Set delimiter character in hex
OS	0~255	Set delimiter size
OT	0~65535	Set delimiter time
01	0~65535	Set Inactivity timer value
Command	Parameter	Comments
RI		Get Local IP
RS		Get Subnet mask
RG		Get Gateway
RP		Get Local IP's port number
RD		Get the IP configuration method
RM		Get the operation mode
RC		Get the TCP client method
RB		Get the serial baud rate
RT		Get the serial command method
RE		Get the command mode character
RF		Get the firmware version
RX		Get the server IP address
RN		Get the server port number
QC		Get delimiter character in hex
QS		Get delimiter size
QT		Get delimiter time
QI		Get Inactivity timer value





# 2.5. Factory Default

While the Factory Reset is low and the /Reset is applied, the module is initialized with the factory default value.

IP configuration	Static
Local IP address	192.168.11.2
Subnet mask	255.255.255.0
Gateway address	192.168.11.1
Local port number	5000
Server IP address	192.168.11.3
Server port number	5000
Operation mode	TCP server mode
Serial port	9600 bps 8-N-1
Serial command method	H/W trigger



# 3. Demonstration and Test

In this chapter, three examples are given to show how functions of the EG-SR-7150MJ can be tested. The testing environment is as follows:

#### Hardware

- PC having RS-232 serial port.
- EG-SR-7150MJ & Test board

#### Software

- Windows operating system installed on testing PC.
- ♦ EG-SR-7150MJ Configuration tool
- Hyper Terminal Program

#### **Testing Structure**

- Ethernet cross cable to connect the LAN ports of PC and EG-SR-7150MJ.
- RS-232 cable to connect the COM port of PC (usually COM1 or COM2) and serial port of EG-SR-7150MJ-EVB.

## 3.1. Case 1: Getting IP address using H/W trigger

STEP1: Configure the trigger mode as "H/W trigger" in the Configuration Tool.

**STEP2**: Check the serial port setting such as baud rate of the module.

**STEP3**: Start HyperTerminal program and set the serial port of PC to the setting of module checked in STEP2.

**STEP4**: Pull H/W trigger pin to low to enter the serial command mode.

**STEP5**: Use HyperTerminal program to send "**<RI>**" (command to request IP address)

STEP6: HyperTerminal program displays "<S192.168.11.2>"

(It indicates that the command was successfully executed and IP address is 192.168.11.2)

**STEP7**: Pull H/W trigger pin to high to exit the serial command mode

## 3.2. Case 2: Changing IP address using H/W trigger

**STEP1**: Configure the trigger mode as "H/W trigger" in the Configuration Tool.

**STEP2**: Check the serial port setting such as baud rate of the module.

**STEP3**: Start HyperTerminal program and set the serial port of PC to the setting of module checked in STEP2.

**STEP4**: Pull H/W trigger pin to low to enter serial command mode.

**STEP5**: Use HyperTerminal program to send "<WI192.168.11.10>"

(command to change the IP address as 192.168.11.10)



**STEP6**: HyperTerminal program displays "**<S>**"

(Indicates the command was successfully executed)

**STEP7**: Use HyperTerminal program to send "<**RI**>" (command to request IP address)

STEP8: HyperTerminal program displays "<\$192.168.11.10>"

(Indicates the command was executed successfully and IP address is 192.168.11.10)

- STEP9: Pull H/W trigger pin to high to exit serial command mode
- IN All changes are applied after exit the serial command mode

#### 3.3. Case 3: Changing IP address using S/W trigger

- **STEP1**: Configure the trigger mode as S/W trigger at the Configuration program, and check the three trigger characters. For example, assume the trigger is "25 25 25"
- **STEP2**: Check the serial port setting such as baud rate of the module.
- **STEP3**: Start HyperTerminal program and set the serial port of the PC to the serial setting of the module checked in STEP2.
- **STEP4**: Use HyperTerminal program to send three trigger characters to enter the serial command mode; %%% (in hex :0x25 0x25 0x25) in this case.
- **STEP5**: Use HyperTerminal program to send "**<WI192.168.11.10>**" (command to change the IP address as 192.168.11.10)
- **STEP6**: HyperTerminal program displays "<**S**>"

(Indicate the command was executed successfully)

- STEP7: Use HyperTerminal program to send "<RI>" (command to request IP address)
- STEP8: HyperTerminal program displays "<S192.168.11.10>"

(Indicate the command was executed successfully and IP address is 192.168.11.10)

STEP9: Use HyperTerminal program to send "<WR>"

(command to exit serial command mode)

All changes are applied after exiting the serial command mode.

# WIZnet

#### **4. PIN Assignment and Dimensions** R3 BC7 U INNI WIZnet 111211 EG-SR-7150MJ **REV1.1** IIIMII <sub>Y2</sub> R6 1110 JP3 **MOMODINI** JP3 BC1 -----/RESET - 1 2 - 3.3V 48**(())()))**84 RXD - 3 4 - 3.3V CTS - 5 6 - /FACTORY\_RESET TXD - 7 8 - /HW\_TRIGGER RTS - 9 10 - /PSEN UIIIIIIII)|| 24 GND - 11 12 - GND BC3 ŇП (Pb

Nome	Functions	1/0	
Name	Functions	170	
3.3V	Power		
/RESET	Low active reset	Input	
	Minimum 1.2 usec is required.		
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 Reset	Pull Factory Reset to low and if /RESET is activated,	Input	
	the configuration is changed to factory default.	mput	
H/W Trigger	Pull H/W Trigger to low, enter the serial command	Input	
	mode		
/PSEN	Pull /PSEN to low and if /RESET is activated, the	Input	
	module enter the bootloader for FLIP connection	mput	

☞ All signal levels are 3.3V LVTTL.



## Ethernet port Pinouts



Pin	Signal		
1	TX+		
2	TX-		
3	RX+		
6	RX-		



Symbol	Dimension(mm)
А	40
В	62
С	15
D	20
E	4
F	2

**19**/23





# 6. ETC

# 6.1. Firmware Uploading through the FLIP software

The following items are required to get started. :

- EG-SR-7150-MJ test board
- UART cross cable
- Program file in HEX file format
- FLIP utility installed on your PC

On a PC, one must have a file in HEX format to program the EG-SR-7150MJ. For example this file could be named "app.hex".

#### Step 1

Connect the EG-SR-7150MJ test board to a PC with the UART cable supplied.



Important : If you have any program running on your PC with which COM port is used such as "Hyperterminal", be sure to connect the cable to the COM port not used.

#### Step 2

Power on the test board.

While pressing the /PSEN button, click the /RESET button. Then release the /PSEN button

#### Step 3

Run the ISP software named FLIP by ATMEL.

#### Step 4

Select the device by pushing the F2 button. Here you must choose AT89C51RC2.

#### Step 5

Set up the communication port by pushing the F3 button. Make sure to select the same port as the one you have plug in the UART cable of the EG-SR-7150MJ test board.

#### Step 6

Now, you should be connected to the board and able to program. Now you will have to browse your PC to load your file in hex format.

## <u>Step 7</u>

After programming, check if the BSB, SBV and SSB are set as FF, 00 and FF respectively.

## 6.2. Warranty

WIZnet Co., Ltd offers the following limited warranties applicable only to the original purchaser. This offer is non-transferable.

WIZnet warrants our products and its parts against defects in materials and workmanship under normal use for period of standard ONE(1)YEAR for the EG-SR-7150MJ Module, Evaluation Board and labor warranty after the date of original retail purchase. During this period, WIZnet will repair or replace a defective products or part free of charge.

#### Warranty Conditions:

- 1. The warranty applies only to products distributed by WIZnet or our official distributors.
- 2. The warranty applies only to defects in material or workmanship as mentioned above in 6.2 Warranty. The warranty applies only to defects which occur during normal use



and does not extend to damage to products or parts which results from alternation, repair, modification, faulty installation or service by anyone other than someone authorized by WIZnet Inc.; damage to products or parts caused by accident, abuse, or misuse, poor maintenance, mishandling, misapplication, or used in violation of instructions furnished by us; damage occuring in shipment or any damage caused by an act of God, such as lightening or line surge.

#### Procedure for Obtaining Warranty Service

- 1. Contact an authorized distributors or dealer of WIZnet Inc. for obtaining an RMA (Return Merchandise Authorization) request form within the applicable warranty period.
- 2. Send the products to the distributors or dealers together with the completed RMA request form. All products returned for warranty must be carefully repackaged in the original packing materials.
- 3. Any service issue, please contact to sales@wiznet.co.kr