EG-SR-7100A User's Manual

(Version 4.1)





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1.Introduction

EG-SR-7100A is a gateway module that converts RS-232 protocol into TCP/IP protocol. 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, EG-SR-7100A 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. Product Contents

- EG-SR-7100A module
- EG-SR-7100A test board
- Adaptor: 5V, 500mA
- Serial Cable
- LAN cable (cross over cable)
- CD (User's manual and EG-SR-7100A test board schematic are included)

1.2. Product Specification

1.2.1. EG-SR-7100A Module

Category	Specification		
Protocol	TCP, UDP, IP, ARP, ICMP, Ethernet MAC		
Network interface	10/100 Base-T Ethernet (Auto detection)		
Serial port	1 RS-232 port (3.3V LVTTL)		
CPU	Atmel AT89C51RC2 (8bit MCU and 32K Flash)		
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, DTR, DSR, GND		
Software	Remote download and configuration possible		
Transmission speed	1200bps ~ 230Kbps		
Memory	32K Flash (inside MCU), 32K SRAM		
Temperature	10'C ~ 80'C (Operating), -40~85'C (Storage)		
Humidity	10~90%		
Power	3.3V, 150mA		



Connector type	2x12 2mm Pin header array
Size	50mm x 30mm x 8.85mm



1.2.2. EG-SR-7100A Test board



Fig 1.1 EG-SR-7100A Test Board

For normal operation, the position of the mode switch should be upper side.



1.2.2.1. Serial Interface



Fig 1.2 Serial Pin Assignment of EG-SR-7100A Test Board

Pin Number	Signal	Description		
1	NC	Not Connected		
2 RxD		Receive Data		
3 TxD		Transmit Data		
4	DTR	Data Terminal Ready		
5 GND		Ground		
6	DSR	Data Set Ready		
7	RTS	Request To Send		
8 CTS		Clear To Send		
9 NC		Not Connected		

Table 1.2 Serial Pin Description

- RxD, TxD, GND: This is all you need if the device don't use hardware handshaking.
- RxD, TxD, GND, RTS, CTS : If the device use hardware handshaking



Fig 1.3 Serial Cable



1.2.2.2. LED

Power LED: displays power status of EG-SR-7100A Link LED: indicates network link is established 10 LED: indicates network speed is 10M bps 100 LED: indicates network speed is 100M bps Collision LED: indicates a packet transmitted from the Ethernet controller to the network has collided with another packet



2 Getting Started

2.1. Hardware Installation Procedure

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

- **STEP1:** Plug the EG-SR-7100A module into the sockets on the test board. *Be careful of connecting the JP1 on the module to the correct JP1 on the test board.*
- **STEP2:** Connect the EG-SR-7100A test board RJ-45 connector to the Ethernet hub.
- **STEP3:** Connect the EG-SR-7100A test board DB9 jack and serial device with RS-232 serial line.
- **STEP4:** Connect the 5V (500mA) DC power adaptor to the EG-SR-7100A test board. For reference, the power used for EG-SR-7100A is 3.3V.



 (\mathbf{O})

	- 0	COLUMN STOR	1
ard list	Network Serial Op	tion	
9	Local IP	D	Por
	Subnet	Ē	
	Gateway	F	
	Server IP	G	Pol
	Gateway Server IP	Bode Setword	P k Hode tent R

2.2. Configuration Tool Features

Fig 2.1 Configuration Tool Initialization Window (Network Config.)

Version	Enable Serial 1	Debug Node	
Board list	Network Serial Op	tion	
	3peed	2	
	basasir	×	
	Paraty D		
	Stop Bit	<u>.</u>	
	Flow		
	Direct IP See	urch 🕞 🐚	

Fig 2.2 Configuration Tool Initialization Window (Serial Config.)



Version	Enable Serial Debug Mode
Board list	Network Serial Option
	Inactivity time Q (0 - 65535 sec)
	Closes socket connection, if there is no transmission during this time.
	Data Packing Condition
	Time (0 ~ 65535 ms)
	Size (0 🔞 S5 Byte)
	(herechie)
	Direct TP Search

Fig 2.3 Configuration Tool Initialization Window(Option Config.)

(A) Version

Represent Firmware version

(B) Enable Serial Debug Mode

If this mode is checked, you can monitor the status and socket message of EG-SR-7100A(listen OK, connect fail etc.) through terminal. If not, it's not need to check.

(C) Board List

Display all EG-SR-7100A in the subnet as MAC address when click "Search" button.

(D) Local IP/Port

EG-SR-7100A's IP address and Port number for connection

(E) Subnet

EG-SR-7100A's Subnet mask



(F) Gateway EG-SR-7100A's Gateway address

(G) Server IP/Port

When the mode of EG-SR7100A is "Client mode" or "Mixed mode", you should set the "Server IP". EG-SR-7100A attempts to connect this IP address.

(H) Enable DHCP Mode

Set this option to use DHCP mode. First check 'Enable DHCP mode' and push 'Setting' button and the results are displayed as MAC address on the board list.(This takes some time to acquire IP address from DHCP server) When the results on the board list are selected, IP address, Subnet mask and Gateway are acquired and displayed from DHCP server.

(I),(J) Network mode: TCP(client/server/mixed), UDP

Four different operation modes—TCP Server, TCP Client, Mixed and UDP — are available. The main difference of TCP and UDP protocols is that TCP guarantees delivery of data by requiring the recipient to send an acknowledgement to the sender. UDP does not require this type of verification. By using UDP, data can be delivered quicker

• TCP server mode



Fig 2.4 TCP Server mode

To operate this mode, Local IP, Subnet, gateway address and local port



number should be configured. In TCP Server mode, EG-SR-7100A provides the unique IP address and port number on a TCP/IP network. EG-SR-7100A waits to be contacted by the host computer, allowing the host computer to establish a connection and get data from the serial device.

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

1. The host connects to the EG-SR-7100A 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 EG-SR-7100A, and from the EG-SR-7100A to the host.



• TCP client mode

Fig 2.5 TCP Client mode

To operate this mode, Local IP, Subnet, gateway address, server IP, server port number should be set. In TCP Client mode, EG-SR-7100A can actively establish a TCP connection to a host computer when serial data arrives.

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

1. EG-SR-7100A board operating as TCP Client Mode actively establishes a connection based on the conditions set in the firmware. EG-SR-7100A can connect to a remote host on start up, or connect later when data from serial device arrives.

2. As the connection is established, data can be transmitted in both directions - from the host to the EG-SR-7100A, and from the EG-SR-7100A to the host.



• Mixed mode

In this mode, EG-SR-7100A operates as TCP Server and waits for the connction request from the peer. If there is no connection and have data to be sent to the Ethernet, EG-SR-7100A changes to the client mode and send this data to the server IP.

• UDP mode



Fig 2.6 UDP mode

In UDP mode, any special connection procedure is not defined.

(K) Direct IP Search

If the Direct IP search is checked, the configuration tool use the TCP instead UDP broadcast. Therefore, IP address of a module is required. This feature is useful when the module is not in the same subnet.

(L) 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 located module is displayed as MAC address in the "Board list".

(M) Setting

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.

(N) Upload

Upload the firmware through the network.

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

(O) Exit

Close the configuration Tool program.

(P) Serial Configuration

Serial information of selected EG-SR-7100A is displayed.

(Q) 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.

(R) Data Packing Condition

You can designate how the serial data can be packed to be sent to the Ethernet. There are 3 delimiters - time, size and character. If all of them are set as '0', whenever the serial data is arrived, they are sent to the Ethernet.

- A. Time: Every designated time, serial data converted to Ethernet.
- B. Size: Every designated data size, serial data converted to Ethernet.
- C. Char: Every designated character, serial data converted to Ethernet. (It's available only Hex.)

When any of 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



3. Firmware Uploading

3.1. Using Configuration Tool Program

Run '7100A_C.exe' and click "Search" button.

If the board is properly connected to the network, "Searching completed" message and MAC address will be displayed on the "Board List" as shown in Fig 3.1.

🙀 IIM7100A Configuration	Tool ver 3.0.8		
Version 4,4	🗹 Enable Seria	l Debug Mode	Not Connected
Board list	Network Serial Local IP Subnet	0ption 192.168.11.10 255.255.255.0	Port 4000
Status	S Window Complete s	earching	Port 4000 Dde Mode
		C Sey	rver Mode
	Direct IP	Search Search	Setting Upload Exit

Fig 3.1 Board Search Window

Select board for upload and click "Upload" button.

Before upload through Ethernet, you should set the network information of EG-SR-7100A first by Configuration Tool program as shown in Fig 3.1.

When the window as shown in Fig 3.2 is displayed, select file for upload and click "Open" button



File Select					? 🛛
찾는 위치(!):	🗀 ver, 4_4		•	+ 🗈 💣 🎟+	
교 내 최근 문서	BOM0404, bin BOM0404_V28, E	BIN			
() 바탕 화면					
🎾 내 문서					
내 컴퓨터					
내 네트워크 환경	파일 이름(<u>N</u>):	ROM0404, bin		-	열기(<u>0</u>)
	파일 형식(<u>T</u>):	Bin File (*,bin)		•	취소
		1 회사 언어프로 실시(1)			

Fig 3.2 Open dialog box for uploading

Do not upload any other file except EG-SR-7100A application firmware file.

A dialogue box titled "Processing" will be displayed as shown in Fig 3.3.

Status Window		
Processing		

Fig 3.3 Firmware uploading window

When uploading is complete, a message box with "Complete Uploading" will be displayed as shown in Fig 3.4.

Fig 3.4 Complete Uploading



3.2. Using serial upload

If current firmware version is higher than ver.2.09, you should check Debug mode.

Connect EG-SR-7100A serial port and computer serial port by using the serial cable.

Make sure the position of the mode switch(JP4) is down.

Run terminal emulator such as the *hyper terminal* and switch on the EG-SR-7100A power.

Enter file size (bin file size) and press enter key.

After selecting text file send menu in the Hyper terminal, select bin file for transmission to transmit the file, update the firmware and complete the firmware update, then a new firmware will be running.

Caution

-. Be careful to upload firmware as text file type in Hyper Terminal. (Transfer

> Send Text File)

-. Don't turn off or reset the EG-SR-7100A Test Board (Model. IIM7100A TEST B/D) while firmware uploading is finished. You should wait until system reset after complete.

🖉 Mini Term 💽 🗖	
File (E) Configure (C) Transfer (T) Help (H)	
長 売	
<pre>IIN7100(A) Ver. 4.4 > Config <i>: Display Config <s>: Receive Config <c>: Firmware Update <d>: Disable DHCP <w>: Erase Passwd <e>: Exit >Type command : c File size >> 24412 Transfer File ! >Wait . #### IIM7100(A) Ver. 4.4 > Config <i>: Display Config <s>: Receive Config <c>: Firmware Update <d>: Display Dufte <d>: Display Dufte <d>: Display Dufte <d>: Erase Passwd <e>: Exit >Type command : _</e></d></d></d></d></c></s></i></e></w></d></c></s></i></pre>	
Connected 57600, 8-None-1, None Capture : OFF) TX

Fig 3.5 Serial Terminal Window



4. Serial Configuration

Warning : If current firmware version is higher than ver.2.09, you should check "Debug mode".

You can setup EG-SR-7100A's configuration easily by sending a text configuration file through serial.

The contents of configuration file have following meanings.

(File size is 94 bytes. This is for firmware v4.4)

Value	Description								
AA	Header	Header (Do not modify)							
0008DCxxxxxx	MAC ad	dress (x	xxxxx is	s uniqu	ely fact	ory se	t)		
01	Mode (M	1IXED m	ode: 01	I, SER\	/ER mo	ode: 02	2,Clier	nt mod	e: 00)
0000000	IP addre	SS							
0000000	Subnet r	mask							
0000000	Gateway	/ addres	S						
0000	Port nun	nber (Cli	ient)						
0000000	Server I	Server IP address							
0000	Port nun	Port number (Server)							
	Serial speed (bps) Default is FE								
FE	BB:	FF:	FE:	FD:	FA:	F4:	E8:	D0:	A0:
	230400	115200	57600	38400	19200	9600	4800	2400	1200
08	Serial da	Serial data size (08: 8 bit), (07: 7 bit)							
00	Parity (0	Parity (00: No), (01: Odd), (02: Even)							
01	Stop bit								
00	Flow control (00: None), (01: XON/XOFF), (02: CTS/RTS)								
00	Delimiter char								
0000	Delimiter size								
0000	Delimiter time								
0000	Delimiter idle time								
00	Debug code (00: ON), (01: OFF)								
03	Software major version								
09	Software minor version								
00	DHCP option (00: DHCP OFF, 01:DHCP ON)								



00	UDP mode (00: TCP; 01: UDP)
00	Reserved for future use
00	Reserved for future use

Downloading procedure of configuration file

a. Connect between EG-SR-7100A and Test PC with serial cable

b. Run terminal emulator program (e.g. Hyper terminal) on Test PC

c. Turn EG-SR-7100A's power on and press 'p' on terminal emulator program in a few seconds immediately. (To send the configuration file using pin JP1.12 or typing 'p' when the module is power up.)

d. "Transfer Config File!" message will be shown. Then, transfer prepared configuration file by ASCII (text) mode.



5.Pin Assignment and Dimension



Fig 5.1 EG-SR-7100A Pin Assignment

PIN NAME	Functions	1/0	
RESET	Reset (Active High)	Input	
TXD	RS-232 Data Output	Output	
RTS	RS-232 Request To Send	Output	Optional
DTR	RS-232 Data Terminal Ready	Output	Optional
RXD	RS-232 Data Input	Input	
СТЅ	RS-232 Clear To Send	Input	Optional
DSR	RS-232 Data Set Ready	Input	Optional
TPRX-	Ethernet Differential Input-	Input	
TPRX+	Ethernet Differential Input+	Input	
TPTX-	Ethernet Differential Output-	Output	
TPTX +	Ethernet Differential Output+	Output	
/LINK_LED	Link LED	Output	
/10_LED	10 Mbps LED	Output	
/100_LED	100 Mbps LED	Output	
/COL_LED	Collision LED	Output	
Status	High : not connected,	Output	
	Low : connected		
VCC	3.3V Power	Power	



- All signal level is 3.3V LVTTL
- A high on RESET pin about minimum 1.2 usec must be applied for proper operation.





Fig 5.2 EG-SR-7100A Dimension

Symbol	Dimension(mm)
А	45.7
В	50.0
С	4.0
D	2.0
E	30.0
F	3.5
G	1.6
Н	1.9
l	3.5

Table 5.2 EG-SR-7100A Dimension



6.Demonstration and Test

In this chapter, we give an example that can be used to test the function of EG-SR-7100A. The testing environment is as follows:

Hardware

- ◆ PC that has an RS-232 serial port.
- EG-SR-7100A & Test board
- Ethernet cross-over cable to connect PC's and EG-SR-7100A's LAN ports..
- ♦ RS-232 cable to connect PC's COM port with EG-SR-7100A's serial data port.

Software

- Windows operating system installed on testing PC.
- ♦ EG-SR-7100A Configuration tool
- Hyper terminal



Fig 6.1 Data Flow about Serial-to-Ethernet



Fig 6.2 Data Flow about Ethernet-to-Serial

STEP1.

Make sure the position of the mode switch is normal mode.

Connect the computer and EG-SR-7100A Test Board by using RS-232.

Connect the computer and EG-SR-7100A Test Board by Ethernet cross-over cable.

Power on the EG-SR-7100A Test Board.

STEP2. (EG-SR-7100A Environment Setup)

Configure the EG-SR-7100A using configuration tool as shown in Fig.6.3.



Fig 6.3 Result Window after Running "Setting"



STEP3. (Data Transmission)

Run terminal emulator program (e.g. Hyper terminal) on Test PC. Set the baud rate as the same value of the EG-SR-7100A.

	COM1 Properties	? 🗙
	Port Settings	
	Bits per second: 57600	
Connect To	Data bits: 8	
🧠 Serial	Parity: None	
Enter details for the phone number that you want to dial: <u>Country/region</u> : United States (1)	Stop bits: 1	
Ar <u>e</u> a code: 82	Elow control: None	
Phone number:		
Connect using: COM1	<u>R</u> estore Defaults	
OK Cancel	OK Cancel Ap	ply

Fig 6.4 Serial Terminal Program Configuration

Execute another Hyperterminal and set the IP address and port number.

Connect To	? 🔀
Network	
Enter details for t	he host that you want to call:
<u>H</u> ost address:	192.168.0.2
Port nu <u>m</u> ber:	4000
Co <u>n</u> nect using:	TCP/IP (Winsock)
	OK Cancel

Fig 6.5 Network Terminal Program Configuration



Type some charater on the serial Hyper terminal screen. In this example, "01234567890" is entered.

Make sure this data is shown on the Network Hyper terminal window. (Serial to Ethernet)



Fig 6.6 Received Data by Network Terminal Program

As the same way, type some charaters on the network Hyper terminal, and then make sure these data are shown in the serial Hyper terminal window. (Ethernet to Serial)



7. Reference Schematic



litte	EG-SR-7100A Ref. Circuit
Size B	Document Number Rev <doc> 1.0</doc>
Date:	Wednesday, November 19, 2003 Sheet 1 of 1