

S1S60000

Application Note

No.1 Serial and Ethernet Data Conversion

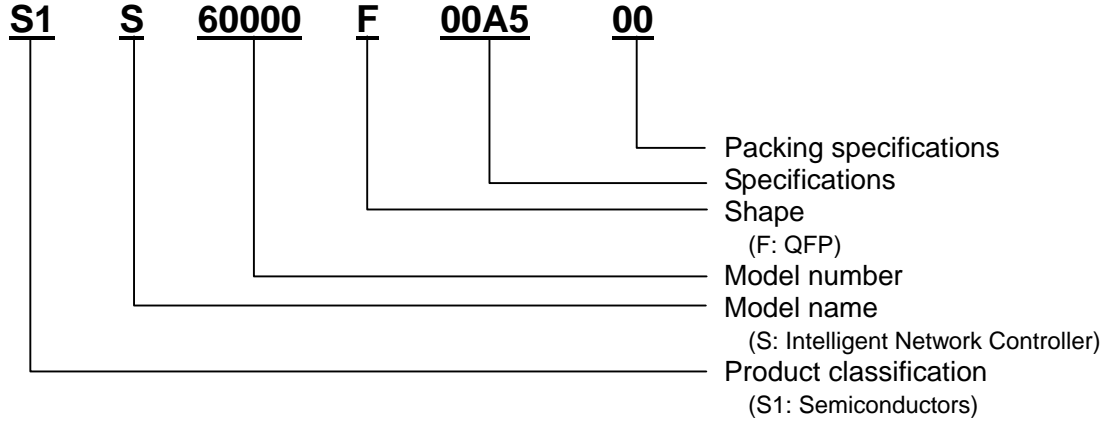
NOTICE

No part of this material may be reproduced or duplicated in any form or by any means without the written permission of Seiko Epson. Seiko Epson reserves the right to make changes to this material without notice. Seiko Epson does not assume any liability of any kind arising out of any inaccuracies contained in this material or due to its application or use in any product or circuit and, further, there is no representation that this material is applicable to products requiring high level reliability, such as, medical products. Moreover, no license to any intellectual property rights is granted by implication or otherwise, and there is no representation or warranty that anything made in accordance with this material will be free from any patent or copyright infringement of a third party. This material or portions thereof may contain technology or the subject relating to strategic products under the control of the Foreign Exchange and Foreign Trade Law of Japan and may require an export license from the Ministry of International Trade and Industry or other approval from another government agency.

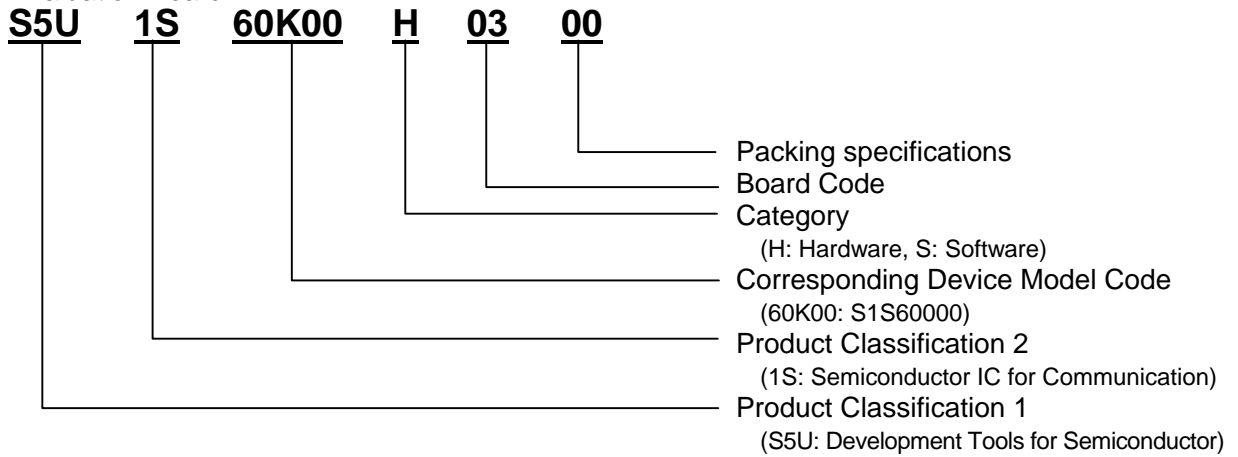
All other product names mentioned herein are trademarks and/or registered trademarks of their respective companies.

Configuration of product number

●DEVICES



●Evaluation Board



CONTENTS

1. DESCRIPTION	1
2. SETUP BEFORE STARTUP	2
2.1 Pin Setting	2
2.2 Connecting the RS-232C Driver IC	2
2.3 Setup of EEPROM	3
2.4 PC Setup	3
3. STARTUP	4
4. CONNECTION	4
4.1 Serial Connection.....	4
4.2 TCP/IP Connection (with PC Client Operations)	6
4.3 HyperTerminal Local Echo Setup.....	7
5. DATA TRANSMISSION	10
5.1 Data Transmission from Serial Port to Network	10
5.2 Data Transmission from Network to Serial Port	10

1. DESCRIPTION

This document describes the conversion procedure between serial and Ethernet data using the S1S60000 module.

The document describes how to configure the system which connects an RS-232C driver IC to the Epson's S5UIS60K00H0300 board that uses the S1S60000 module, how to start up the system as the Ethernet (TCP/IP) or serial data (start-stop synchronization) converter, and an example of test data transmission using the PC.

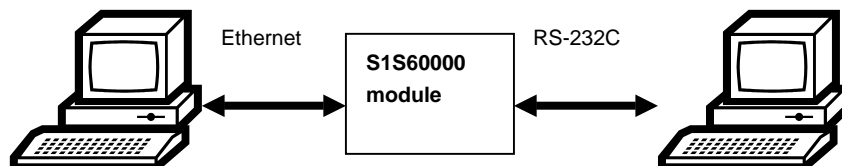


Fig.1.1 Test system example (using two PCs)

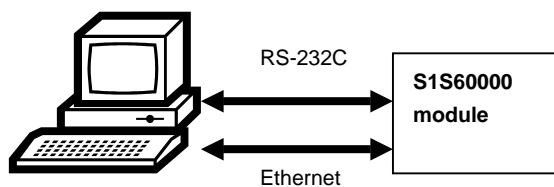


Fig.1.2 Test system example (using one PC)

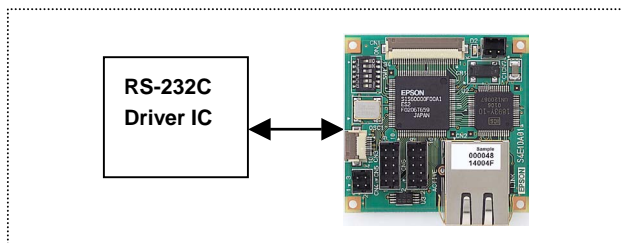


Fig.1.3 S1S60000 module example

2. SETUP BEFORE STARTUP

2. SETUP BEFORE STARTUP

This section explains the standard setup required before turning on the S1S60000 module.

2.1 Pin Setting

Set HFSEL[2:0]=HHH and GPIO10=L.

If you are using the S5UIS60K00H0300 board, you can set the HFSEL[2:0] to “HHH” by turning switches #1 to #3 of DIP switch SW1 OFF. Turn switches #4 to #6 ON. Set pin 3 of the CN5 10-pin connector to LOW, and GPIO10 will be set to LOW.

2.2 Connecting the RS-232C Driver IC

The Epson’s S1S60000 and MAXIM’s MAX3241 are used for the example in this section.

On the S5UIS60K00H0300 board, the GPIO terminal of S1S60000 is connected to the 10-pin connector of the RS-232C driver IC as shown on Table 2.1.

Table 2.1 Terminal Connection between S1S60000 and S5UIS60K00H0300

S1S60000 GPIO terminals	Pin Assignment of S5UIS60K00H0300's CN5 Connector
GPIO8	1
GPIO9	2
GPIO10	3
GPIO11	4
GPIO12	5
GPIO13	6
GPIO14	7
GPIO15	8
	9(GND)
	10(3.3V)

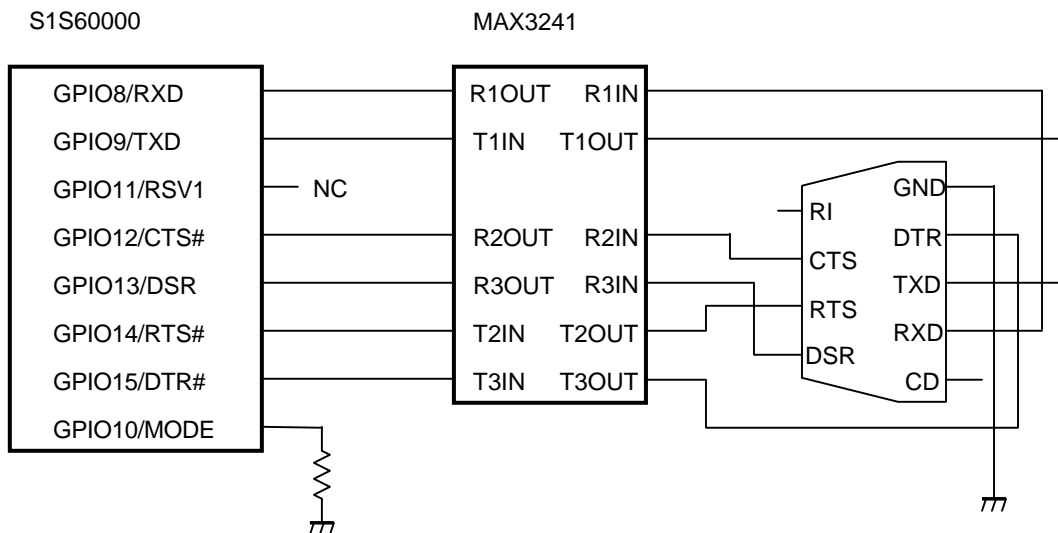


Fig.2.1 Connection Diagram of RS-232C Driver IC

2.3 Setup of EEPROM

The EEPROM connected to the S1S60000 has initial values of S1S60000's built-in registers. First, you must set the correct values in the EEPROM. You can easily set up the EEPROM using the Epson's EEPROM setup tools. If you purchase the S5UIS60K00H0300 board and start up the system using the default EEPROM values, the system is set up as follows. This Application Note uses the default EEPROM values of the S5UIS60K00H0300 board.

(1) Setup of S1S60000 network port

- IP address: 192.168.0.254
- Subnet mask: 255.255.255.0
- Default gateway: 192.168.0.1
- Operation in TCP/IP connection: Passive Open (The server waits for a connection request from the client.)
- Listen port (waiting for a connection request): 49152

(2) Setup of S1S60000 serial port

- Baud rate: 9600 bps
- Data length: 8 bits
- Stop bit length: 1 bit
- Parity check: None
- Flow control: RTS/CTS

(3) PHY setup

- Chip connected: ICS1983
- Link setup: Auto negotiation, 10BaseFull or half

2.4 PC Setup

The following gives an example where the HyperTerminal communication software is used on the PC. The HyperTerminal software is preinstalled on many PCs. However, the Tera Term or other terminal software can also be used for the following tests.

Because the IP address of the S1S60000 has been set to 192.168.0.254, set the IP address of the PC to 192.168.0.XXX.

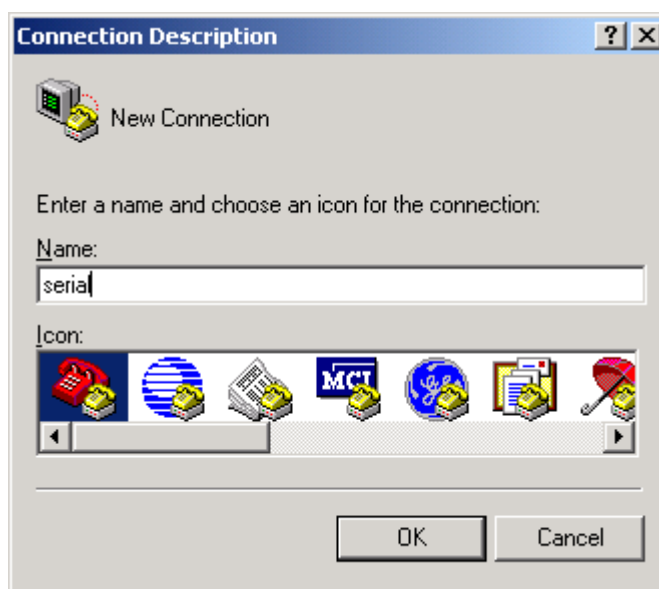


Fig.2.2 HyperTerminal

3. STARTUP

3. STARTUP

Connect the serial cable and the LAN cable correctly, and turn the S1S60000 power on. The S1S60000 has the IP address of 192.168.0.254, port 49152 is open, and a TCP/IP connection request is awaited.

4. CONNECTION

4.1 Serial Connection

Start up HyperTerminal on the PC. Select [Direct to COM1]. If the COM1 port is being used by another device, select a free COM port.



Fig.4.1 COM Port Selection Window

Set the serial connection conditions as follows. Baud rate (bps): 9600; Data bits: 8; Parity: None; Stop bit: 1; Flow control: Hardware.

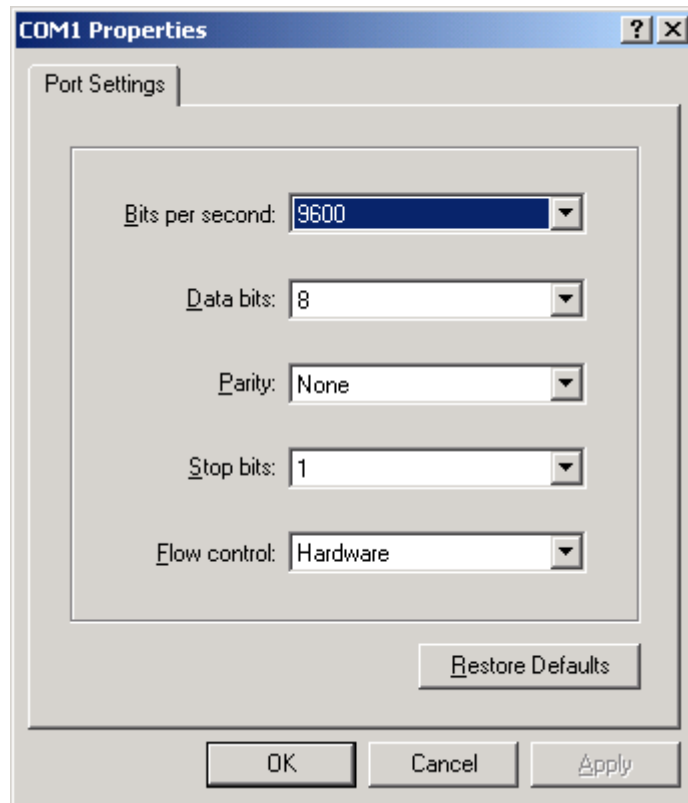


Fig.4.2 Serial Connection Setup Window

4. CONNECTION

4.2 TCP/IP Connection (with PC Client Operations)

Start up HyperTerminal on the PC. If you use a single PC for both serial data and network control, start up another HyperTerminal software. If you are using two PCs, connect them via the LAN cable and start up HyperTerminal on the PC. Select [TCP/IP (Winsock)]. Set the host address to 192.168.0.254 and port number to 49152. They are the IP address and port number of the S1S60000 module.

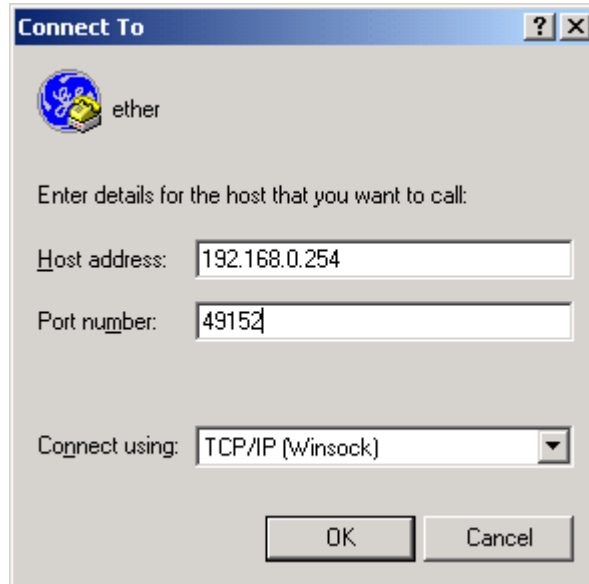


Fig.4.3 TCP/IP Connection Selection Window

The client (the PC in this test example) establishes the connection by issuing its request to the IP address and port of the S1S60000 module. The connection is established by the S1S60000 and PC automatically.

4.3 HyperTerminal Local Echo Setup

If you use the terminal with the default setup, the received data is displayed on the terminal but the sent data, that is, the data you have entered from the keyboard, is not displayed. To display the sent data, enable the Local Echo.

To do so, click [File] and [Properties].

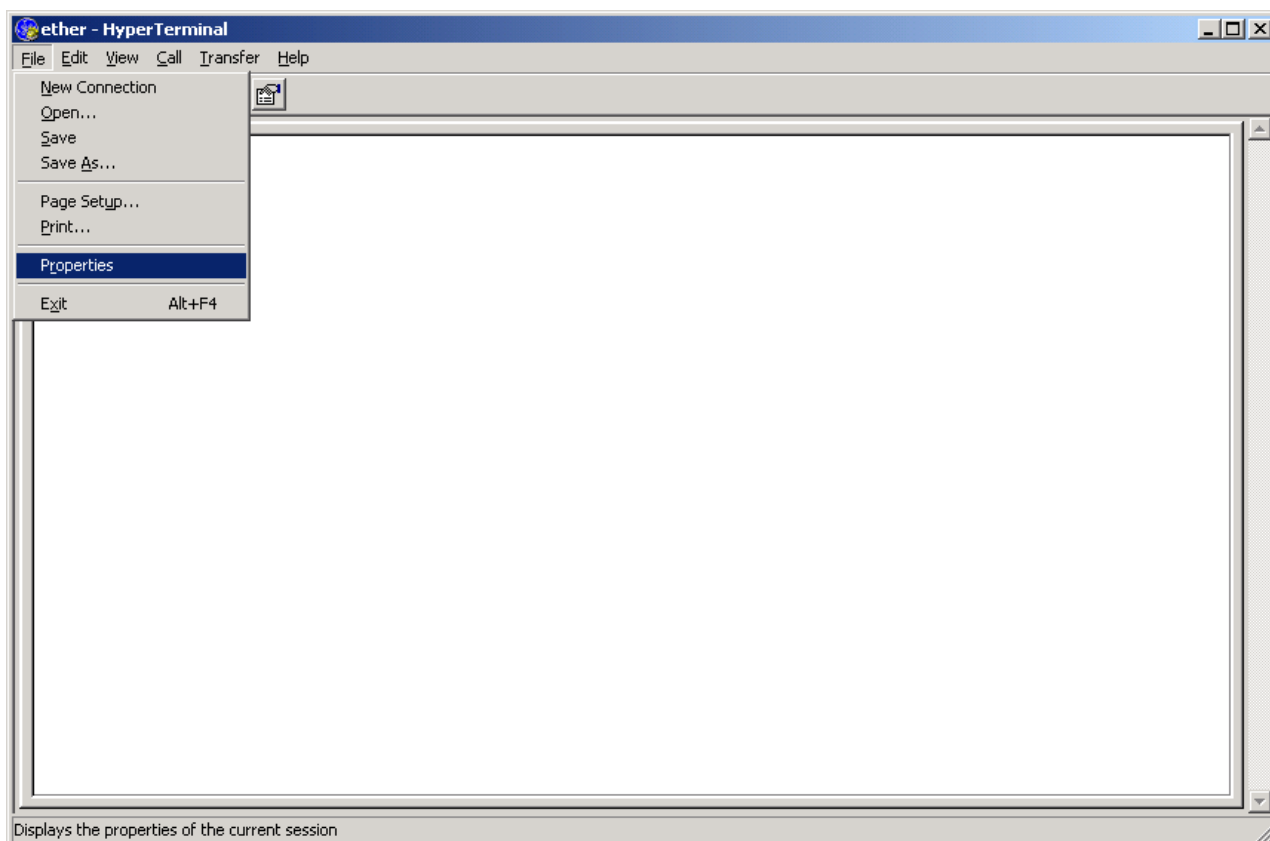


Fig.4.4 Local Echo Setup Window (1)

4. CONNECTION

Click [ASCII Setup (A)]

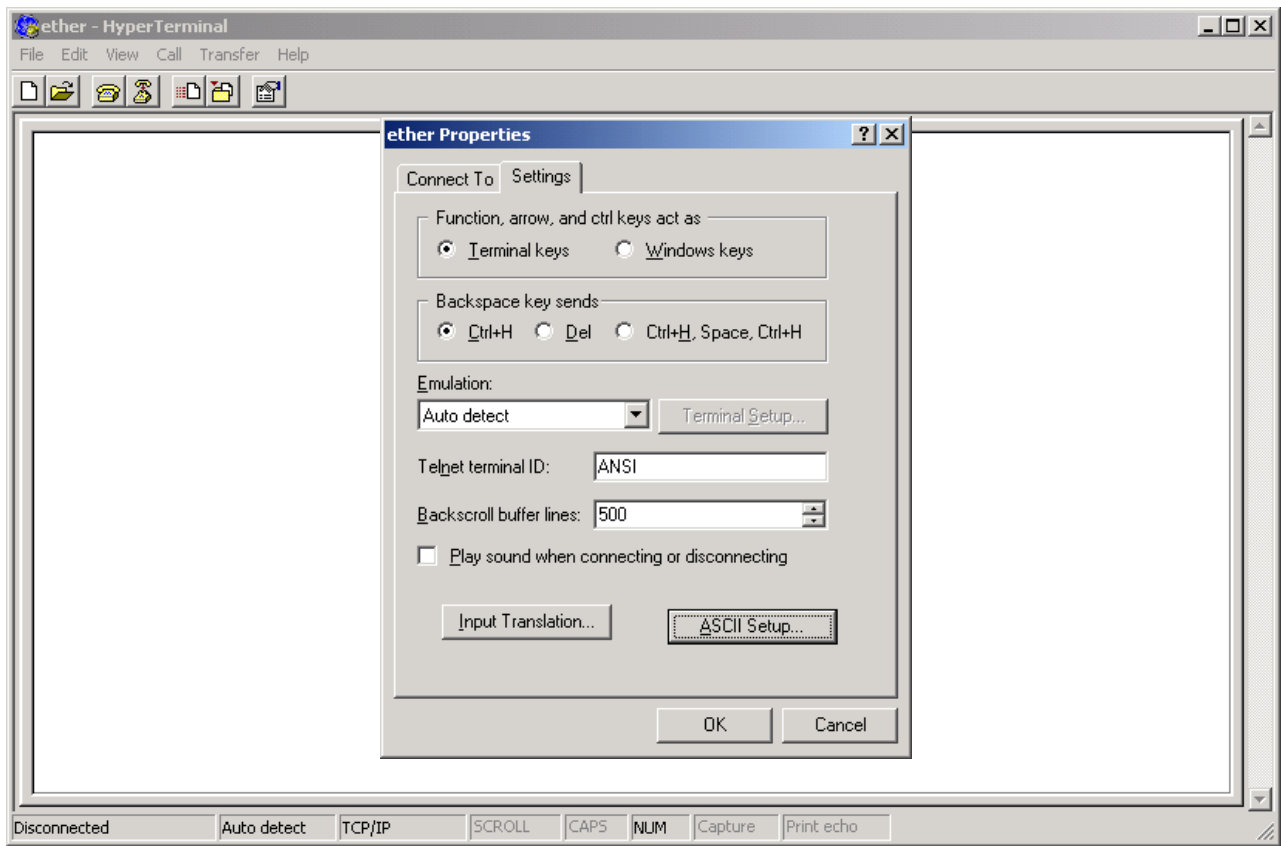


Fig.4.5 Local Echo Setup Window (2)

Check [Enable Local Echo] and [Fold back at right end], and click [OK].

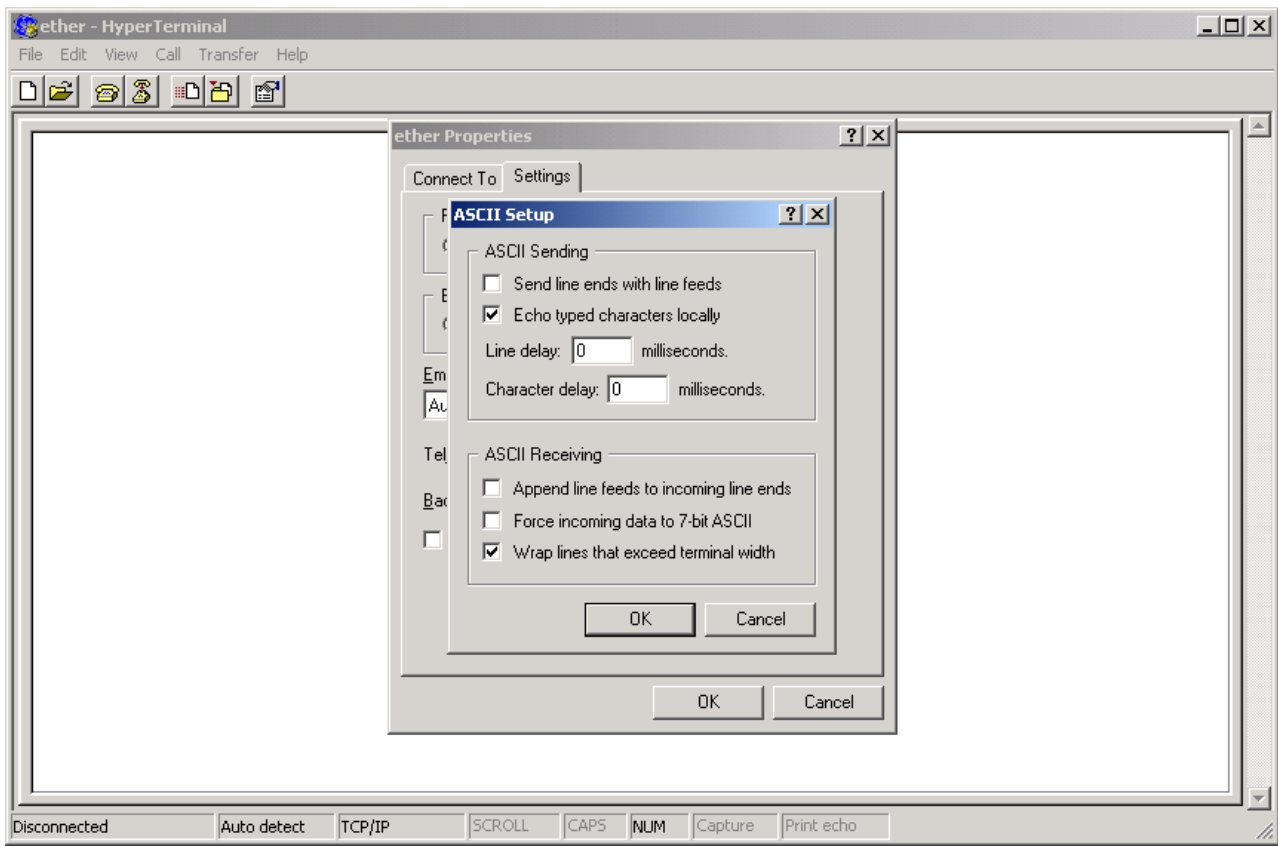


Fig.4.6 Local Echo Setup Window (3)

5. DATA TRANSMISSION

5. DATA TRANSMISSION

5.1 Data Transmission from Serial Port to Network

Transmit data from HyperTerminal of the serial port. When you enter a character string from the keyboard of the PC, it is sent and displayed on the HyperTerminal at the TCP/IP connection destination.

If the S1S60000 does not receive data within the 100-data transmission time* after the last data reception, or if the S1S60000 receives a single packet (536 bytes) of data, it will output the data to the network.

* 100-data transmission time: If the baud rate is 9600 bps, approximately 100 nanoseconds is required to send a single bit of data. If the data is 8 bits long, the data length including the start and stop bits is 10 bits. The 1-data time is approximately 1 millisecond. Therefore, the 100-data time is approximately 100 milliseconds. This time varies depending on the baud rate setup of the serial port.

5.2 Data Transmission from Network to Serial Port

Transmit data from HyperTerminal of the network. When you enter a character string using the PC keyboard, the character string sent to HyperTerminal of the serial port will be displayed. The S1S60000 checks for an error of the data received from the network, removes the header information, and outputs the data to the serial port.

AMERICA

EPSON ELECTRONICS AMERICA, INC.

HEADQUARTERS

150 River Oaks Parkway
San Jose, CA 95134, U.S.A.
Phone: +1-800-228-3964 FAX: +1-408-922-0238

SALES OFFICES

West

1960 E. Grand Avenue Flr 2
El Segundo, CA 90245, U.S.A.
Phone: +1-800-249-7730 FAX: +1-310-955-5400

Central

101 Virginia Street, Suite 290
Crystal Lake, IL 60014, U.S.A.
Phone: +1-800-853-3588 FAX: +1-815-455-7633

Northeast

301 Edgewater Place, Suite 210
Wakefield, MA 01880, U.S.A.
Phone: +1-800-922-7667 FAX: +1-781-246-5443

Southeast

3010 Royal Blvd. South, Suite 170
Alpharetta, GA 30005, U.S.A.
Phone: +1-877-332-0020 FAX: +1-770-777-2637

EUROPE

EPSON EUROPE ELECTRONICS GmbH

HEADQUARTERS

Riesstrasse 15
80992 Munich, GERMANY
Phone: +49-89-14005-0 FAX: +49-89-14005-110

DÜSSELDORF BRANCH OFFICE

Altstadtstrasse 176
51379 Leverkusen, GERMANY
Phone: +49-2171-5045-0 FAX: +49-2171-5045-10

FRENCH BRANCH OFFICE

1 Avenue de l'Atlantique, LP 915 Les Conquerants
Z.A. de Courtaboeuf 2, F-91976 Les Ulis Cedex, FRANCE
Phone: +33-1-64862350 FAX: +33-1-64862355

BARCELONA BRANCH OFFICE

Barcelona Design Center

Edificio Testa, C/Alcalde Barnils 64-68, Modulo C 2a planta
E-08190 Sant Cugat del Vallès, SPAIN
Phone: +34-93-544-2490 FAX: +34-93-544-2491

UK & IRELAND BRANCH OFFICE

8 The Square, Stockley Park, Uxbridge
Middx UB11 1FW, UNITED KINGDOM
Phone: +44-1295-750-216/+44-1342-824451
FAX: +44-89-14005 446/447

Scotland Design Center

Integration House, The Alba Campus
Livingston West Lothian, EH54 7EG, SCOTLAND
Phone: +44-1506-605040 FAX: +44-1506-605041

ASIA

EPSON (CHINA) CO., LTD.

23F, Beijing Silver Tower 2# North RD DongSanHuan
ChaoYang District, Beijing, CHINA
Phone: +86-10-6410-6655 FAX: +86-10-6410-7320

SHANGHAI BRANCH

7F, High-Tech Bldg., 900, Yishan Road,
Shanghai 200233, CHINA
Phone: +86-21-5423-5522 FAX: +86-21-5423-5512

EPSON HONG KONG LTD.

20/F., Harbour Centre, 25 Harbour Road
Wanchai, Hong Kong
Phone: +852-2585-4600 FAX: +852-2827-4346
Telex: 65542 EPSCO HX

EPSON Electronic Technology Development (Shenzhen) LTD.

12/F, Dawning Mansion, Keji South 12th Road,
Hi-Tech Park, Shenzhen
Phone: +86-755-2699-3828 FAX: +86-755-2699-3838

EPSON TAIWAN TECHNOLOGY & TRADING LTD.

14F, No. 7, Song Ren Road,
Taipei 110
Phone: +886-2-8786-6688 FAX: +886-2-8786-6677

HSINCHU OFFICE

No. 99, Jiangong Road,
Hsinchu City 300
Phone: +886-3-573-9900 FAX: +886-3-573-9169

EPSON SINGAPORE PTE., LTD.

1 HarbourFront Place,
#03-02 HarbourFront Tower One, Singapore 098633
Phone: +65-6586-5500 FAX: +65-6271-3182

SEIKO EPSON CORPORATION

KOREA OFFICE

50F, KLI 63 Bldg., 60 Yoido-dong
Youngdeungpo-Ku, Seoul, 150-763, KOREA
Phone: +82-2-784-6027 FAX: +82-2-767-3677

GUMI OFFICE

2F, Grand B/D, 457-4 Songjeong-dong,
Gumi-City, KOREA
Phone: +82-54-454-6027 FAX: +82-54-454-6093

SEIKO EPSON CORPORATION

SEMICONDUCTOR OPERATIONS DIVISION

IC Sales Dept.

IC Marketing Group

421-8, Hino, Hino-shi, Tokyo 191-8501, JAPAN
Phone: +81-42-587-5814 FAX: +81-42-587-5117