SICOM3171 Series
Managed Traffic Ethernet
Serial Server

Software Operation Manual

KYLAND Technology Co., Ltd.

SICOM3171 Series Managed Traffic Ethernet Serial Server
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Preface

SICOM3171 is a high-performance embedded serial server specially designed by KYLAND Technology CO., LTD., supporting one 10/100Base-TX Ethernet copper port, four RS232/RS485/RS422 serial ports, supporting TCP/UDP Server and TCP/UDP Client, supporting RS232/RS485/RS422 mode, supporting 5, 6, 7, 8 data bits, and 1, 2 stop bits, supporting parity and no parity.

SICOM3171 Serial Server Software Operation Manual mainly introduces the configuration and application of serial server, test methods, etc. It is a reference for users in system startup, expansion and routine maintenance. It is also a practical teaching material for user training and technician study.

This manual mainly includes the following contents:

Chapter 1 Functions of Serial Server;

Chapter 2 Configuration and Application of Serial Server;

Chapter 3 System Upgrade of Serial Server;

Chapter 4 Test Methods of Serial Server;

Appendix A Introduces User's Question and Answers of Serial Server (Q&A);

Statement: As product and technology upgrades and improves constantly, the contents of this document may not completely accord with the actual product. For product upgrading information, please visit our company's website or directly contact with our business representative.

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Chapter 1: Function Introduction

1.1 Function Overview

SICOM3171 serial server is a communication interface protocol converter which realizes data conversion from RS232/422/485 terminal to TCP/IP network.

SICOM3171 serial server provides 4 full-function RS232/422/485 serial ports with RJ45 connectors, one 10/100Mbps self-adaptive Ethernet port, Reset button, real time clock (RTC), SSH, SSL/TLS etc.

Serial server supports TCP/UDP Server mode and TCP/UDP Client mode, RS232/RS485/RS422 mode, 5,6,7,8 data bit, 1,2 stop bit; and support parity and no parity, xon/xoff software flow control..

Its built-in embedded Linux operation system and its complete TCP/IP communication protocol can provide bidirectional transparent data transmission between RS-232/422/485 terminal and TCP/IP network.

SICOM3171 uses 10pin-RJ45 serial port. Hardware interface wiring is as follows:

RJ-45 10-Pin Jack	RS232	RS422	RS2485
1	N/A	N/A	TxD-
2	N/A	TxD/RxD-	RxD-
3	N/A	N/A	N/A
4	N/A	N/A	N/A
5	TxD	N/A	TxD+
6	RxD	TxD/RxD+	RxD+
7	SG	SG	SG
8	N/A	N/A	N/A
9	N/A	N/A	N/A
10	N/A	N/A	N/A

1.2 Basic settings

Default username: root, password: 123

Default ip: 192.168.0.3

Default path:/root

Web user name: root, Web password: 123

1.3 uboot, kernel, filesystem

linux embedded development mainly refers to uboot, kernel, Filesystem:

uboot: bootstrap program

kernel: linux operation system kernel programm

filesystem: file system

Chapter 2: Configuration and Application of Serial Server

2.1 Channel Configuration

Serial server can be embedded into devices and convert four-channel serial data to TCP/IP protocol packets and connect to Ethernet. TCP/IP protocol supports connection-based TCP protocol and connectionless-based UDP protocol simultaneously, so that any PC in the network can control serial devices and share the information of serial devices.

User can use the Ethernet port in serial server to Telnet or WEB login the server to set the serial server IP address and working mode. Before using serial server, user should obtain the unique IP address for remote setting and normal working.

SICOM3171 serial server has one Ethernet port. The factory default settings of serial server: IP address is 192.168.0.3 and subnet mask is 255.255.255.0

2.1.1 Telnet Configuration

Firstly, use cross-over cable or straight-through cable to connect the Ethernet port (ETH) in serial server with user's PC network card. In the "Operation" window of Windows system or MS-DOS command line prompt, type "telnet 192.168.0.3" to enter the Telnet window, and system will display "System login", please enter user name "root" and password "123", shown in the Figure 2-1, Figure 2-2 and Figure 2-3

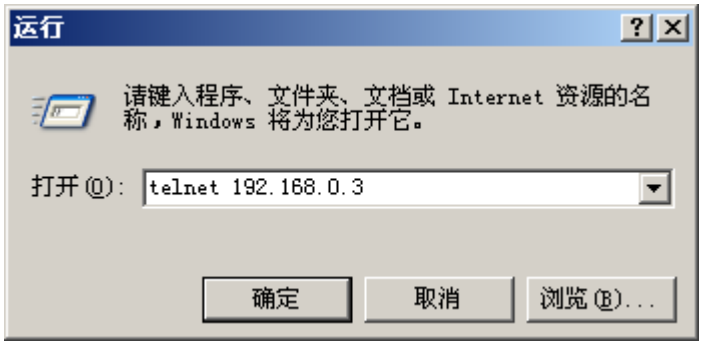

Figure 2-1 Telnet Login

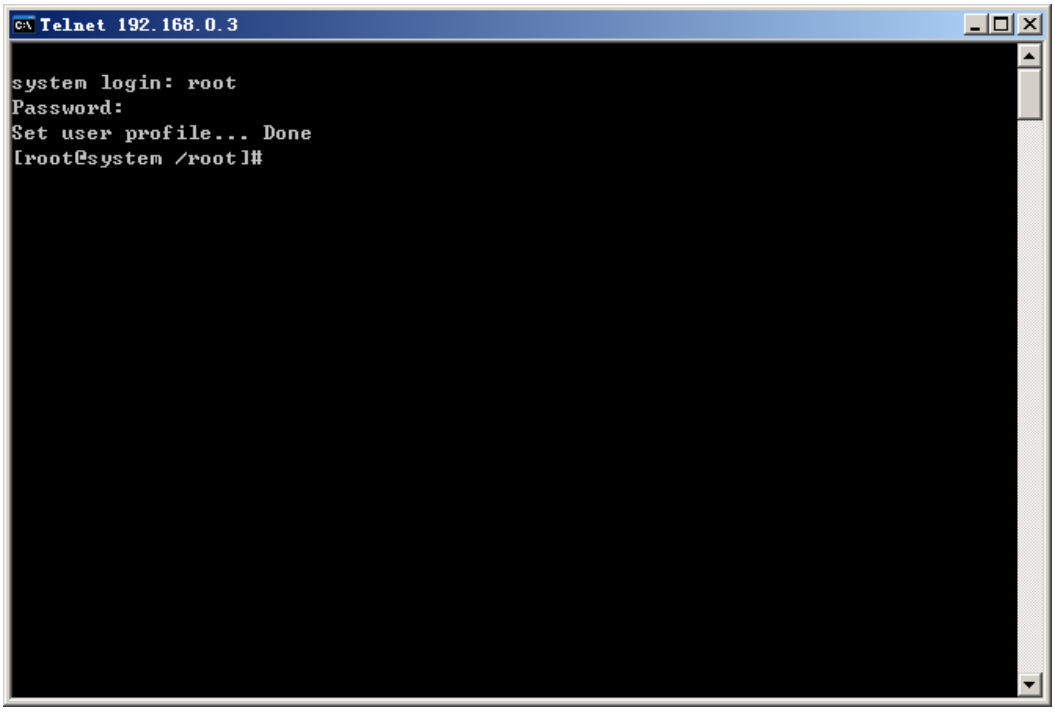

Figure 2-2 User login

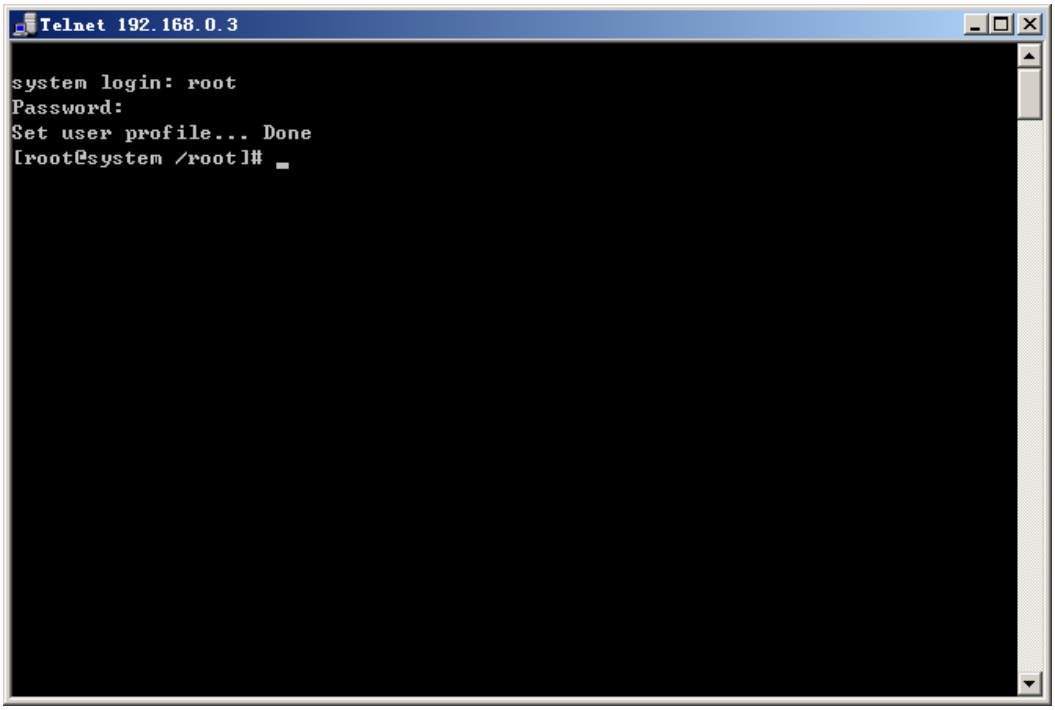

Figure 2-3 Telnet configuration interface

Table 2-1 Channel configuration commands

Command	**Function Description**
--save	save current channel configuration
--saveall	save all channel configuration

--read	read configuration file
--show	show current channel configuration
--close	close current channel
--start	restart current channel
--help	show help file
--version	show current version

Table 2-2 Serial port parameter setting

Command	**Function Description**
-c, --channel=[1,2,3,4]	specify a channel (mandatory)
-d, --data=[5,6,7,8]	setting data bit
-s, --stop=[1,2]	setting stop bit
-P, --parity=[O,M,N,L,P]	setting parity mode L:None, M:Even, N:Odd ,O:Mark, P:Space
-b, --baudrate=BAUDRATE	setting baud rate of current channel serial port optional baud rate: 1000000,921600,576000,500000,460800,230400,115200,57600,38400,19200,9600,4800,2400,1800,1200,600,300, 200,150,134,110,75,50
-x[on,off]	setting software flow control
-m, --mode=[rs232,rs485,rs422]	setting serial port mode

Table 2-3 connection mode configuration

Command	**Function Description**
--server, --client	setting the channel is server or client
--tcp, --udp	setting the protocol type: tcp or udp
-a, --address=IP	setting the port IP. If the protocol type is TCP and the channel is server, user need not care about this item
-p, --port=[1024~65535]	setting the TCP/IP port number. If it is udp port, the next udp port number is occupied. If this udp port is server, this port is a transmitting port, and the next port is a receiving port; if this udp port is client, this port is for receiving and the next port is for transmission
-n, --nodelay --delay	if there is delay in network data

Configuration example:

#channelc -c 1 -m rs485 -b 115200 -d 8 -p L -s 1 --server --tcp --port 9200

This command is to set channel 1 with rs485 mode, baud rate “115200”, data bit “8”, parity “none”, stop bit “1”and the network mode of channel is tcp SOCKET, and server monitor port 9200.

2.1.2 WEB Configuration

Operation Steps:

- Connect the device Ethernet port (ETH) with the management PC through Ethernet; input device IP address in IE browser, such as IP is 192.168.0.3; press "Enter"; enter default user name "root" and default password "123"; click "Sign in" to enter the WEB main page of serial server.
- After entering WEB main page of serial server, click "Channel Setup" in the main menu to enter channel configuration page, as shown in Figure 2-5
- Configure data port channel according to the table 2-4, 2-5 and 2-6

Table 2-4: serial port parameter setting

Command	**Function Description**
Channel ID=[1,2,3,4]	specify a channel (mandatory)
Stop Bit=[1,2]	setting stop bit
Data Bit=[5,6,7,8]	setting data bit
Parity=[None, Even, Odd, Mark, Space]	setting parity mode
Baud Rate	setting baud rate of current channel serial port optional baud rate: 1000000,921600,576000,500000,460800,230400,115200,57600,38400,19200,9600,4800,2400,1800,1200,600,300,200,150,134,110,75,50
Stream Contrl [on,off]	setting software flow control
Serial mode=[rs232,rs485]	setting serial port mode

Table 2-5 network parameter configuration

Command	**Function Description**
Server/Client =[Server,Client]	setting the channel is client or server
Protocol Type =[TCP, UDP]	setting protocol type: tcp or udp
IP Address=IP	setting the port IP. If the protocol type is TCP and the port is server, user need not care about this item
Port=[1024~65535]	setting the TCP/IP port number. If the port is udp, the next udp number is occupied. If this udp port is server, this port is a transmitting port, and the next port is a receiving port; if this udp port is client, this port is for receiving and the next port is for transmission

No delay=[No, Yes]	if there is delay in network data

Table 2-6 Function Keys

Command	Function Description
Apply setting	apply the setting and save
Cancel changes	cancel current setting and read the previous setting
Auto Refresh	auto refresh

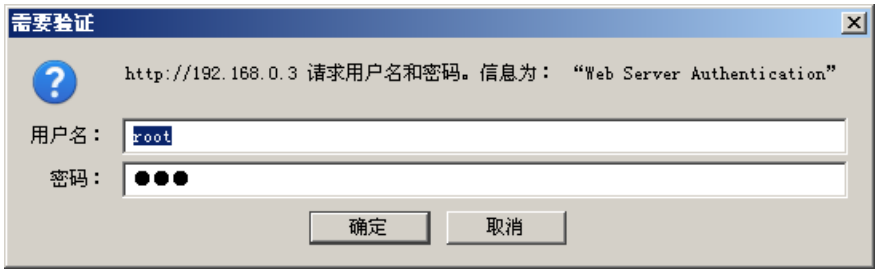

Figure 2-4 WEB login interface

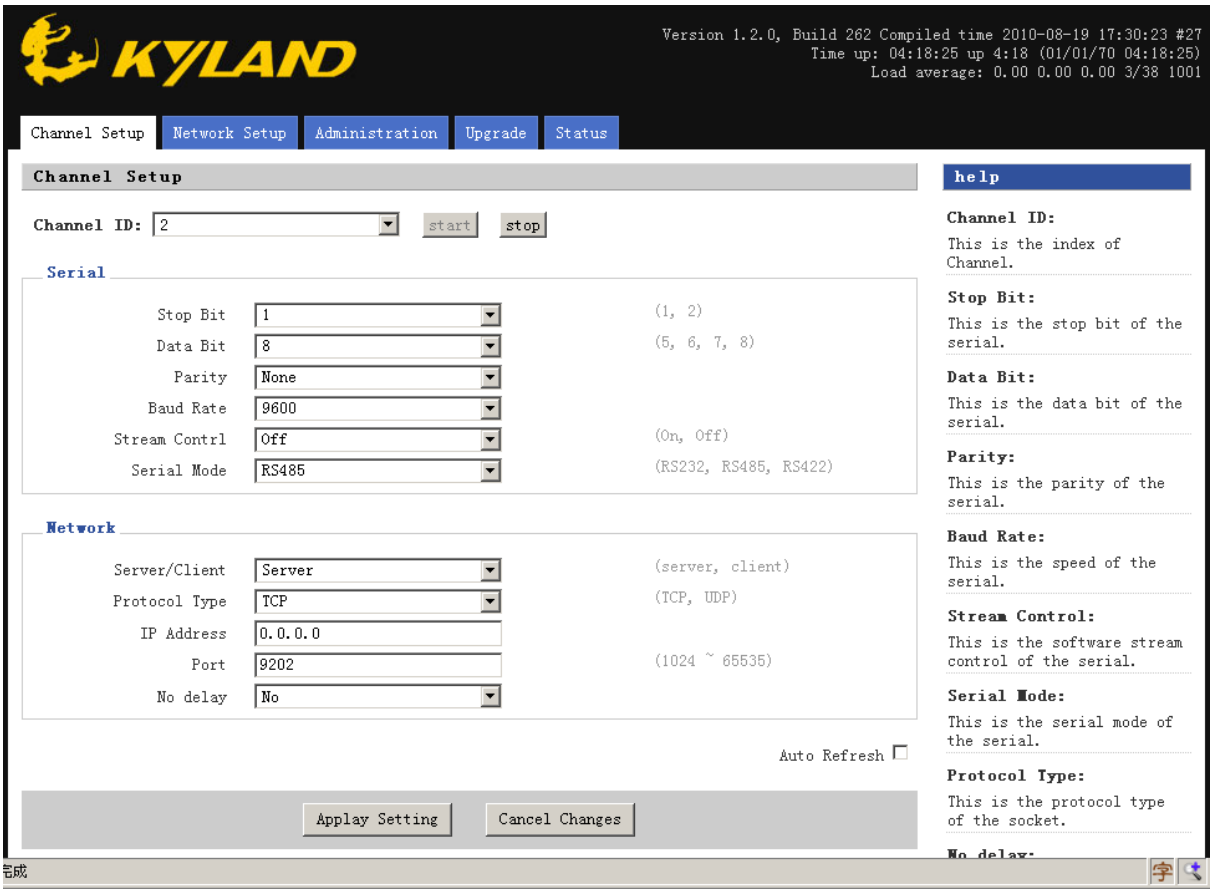

Figure 2-5: Channel Configuration

2.2 Serial server network parameter configuration

2.2.1 Telnet configuration

Setting IP address, MAC address and network mask

Method 1:

#ifconfig eth0 192.168.0.1 netmask 255.255.255.0

#ifconfig eth0 hw ether 00:11:22:33:44:55

Method 2:

ech ipaddr=192.168.0.1 >> /etc/eth-setting

ech netmask=255.255.255.0 >> /etc/eth-setting

ech gatewayip=192.168.0.1 >> /etc/eth-setting

ech dns=192.168.0.1 >> /etc/eth-setting

ech ethaddr=00:11:22:33:44:55 >> /etc/eth-setting

/etc/init.d/ifconfig-eth save

Note 1: method 1 can temporarily change IP address or MAC address, and take them effect immediately

Method 2 can permanently change IP address or MAC address. Only after restarting the device, can the configuration comes into effect.

Note 2: If IP address is changed, the established Telnet remote access will be disconnected.

2.2.2 WEB Configuration

Operation steps:

- Enter WEB main page of serial server; click “Network Setup” in the main menu to enter network configuration page as Figure 2-6
- For network configuration, please refer to table 2-7 and 2-8

Table 2-7: Network Setup

Command	Function Description
Eth0:Local IP Address	setting IP address of Ethernet port (ETH)
Eth0:Subnet Mask	setting subnet mask of Ethernet port (ETH)
Eth0:Gateway	setting gateway of Ethernet port (ETH)
Eth0:Local DSN	setting DNS of local server

Eth0:Local MAC Address	setting MAC address of Ethernet port (ETH)
SSH Server =[Enable, Disable]	enable or disable SSH safe Shell mode
SSL =[Enable, Disable]	enable or disable HTTPS safe WEB mode
LLDP Protocol =[Enable, Disable]	enable or disable LLDP protocol
SNTP Client =[Enable, Disable=]	enable or disable SNTP client function
Remote server	remote SNTP server address
Synchronous	synchronization time
Time zone	time zone
Summer time	enable or disable daylight saving time
Last SYNC	Last synchronization time

Table 2-8 Function keys

Command	**Function Description**
Save setting	apply the setting and save them
Cancel changes	cancel current settings and read previous configuration

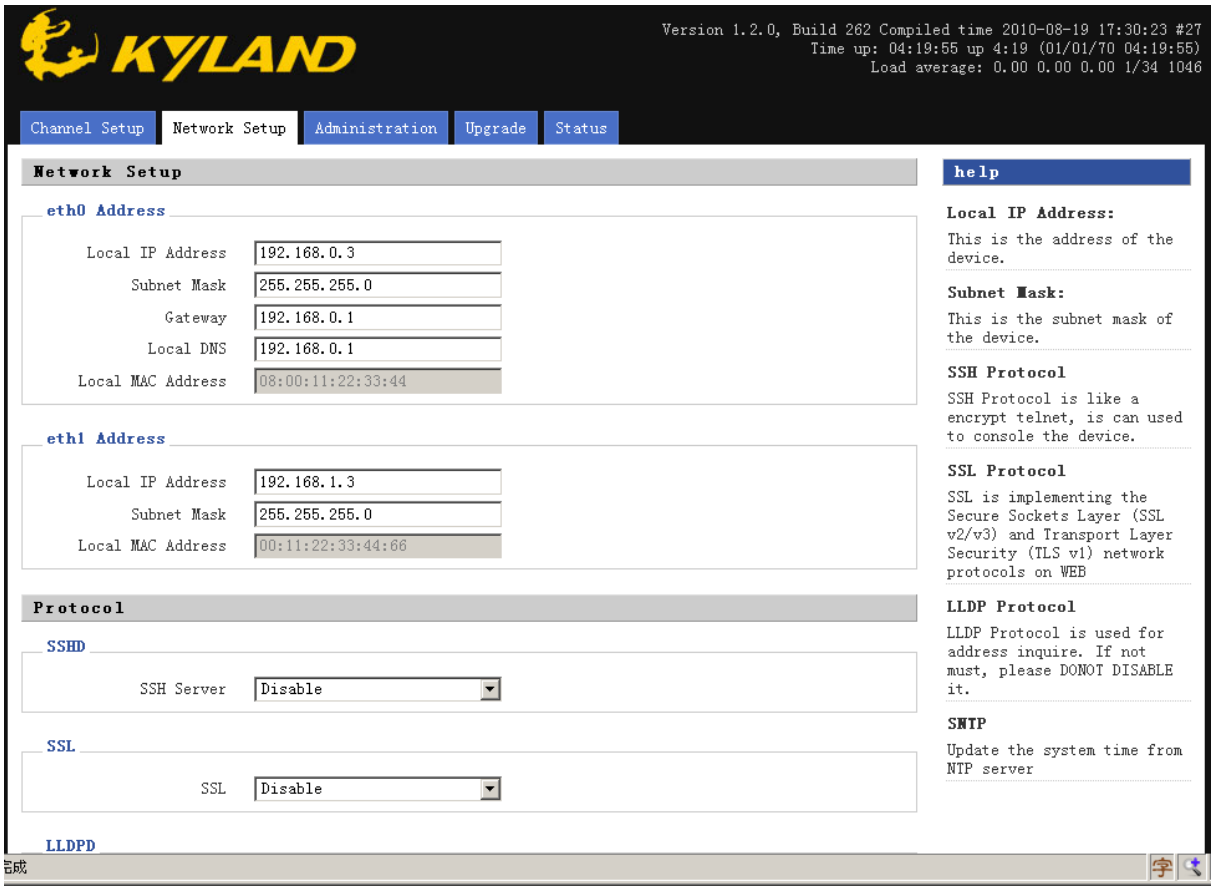

Figure 2-6 Serial server network parameter configuration

2.3 Device management configuration

2.3.1 Modify RTC time by Telnet

#date [[[[[YY]YY]MM]DD]hh]mm[.ss]

#hwclock -w -f /dev/rtc1

2.3.2 WEB configuration of device management

Operation steps:

- Enter WEB main page of serial server; click "Administration" in the main menu to enter the management configuration page as shown in Figure 2-7
- For network configuration, please refer to table 2-9 and 2-10

Table 2-9 Administration items

Command	**Function Description**
User Name	setting local WEB management user name
User Password	setting local WEB management user password
Set the RTC clock	setting local RTC clock
RESET TimeOut	the timeout of RESET button
RESET Lock	Locking RESET button

Table 2-10 Function keys

Command	**Function Description**
Save setting	apply the setting and save them
Cancel changes	cancel current configuration, read previous configuration

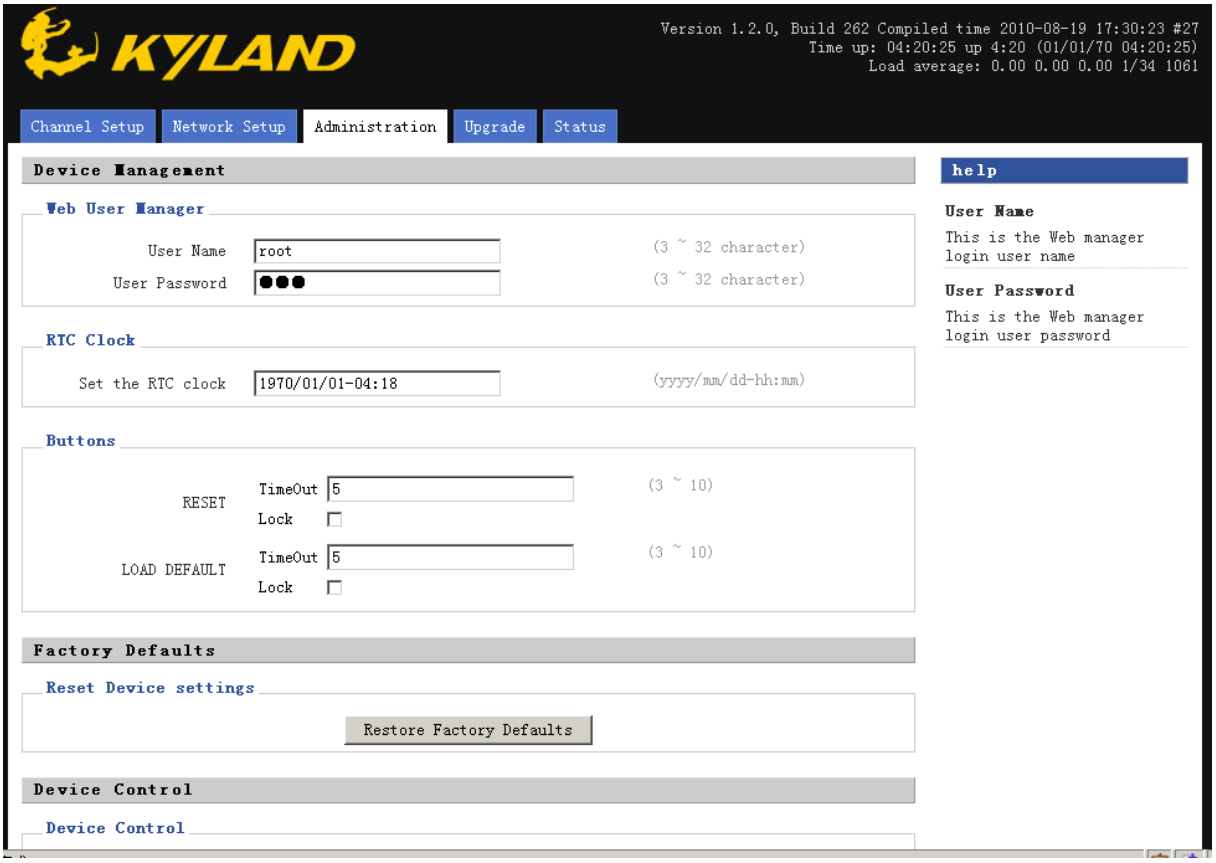

Figure 2-7 Management Configurations

2.3.3 Restore factory defaults

Enter WEB main page of serial server; click “Administration” in the main menu to enter the configuration page; click “Restore Factory Defaults” to restore factory default settings.

2.3.4 Reboot Switch

Enter WEB main page of serial server; click “Administration” in the main menu to enter the configuration page; click “Reboot Switch” to restart the device.

2.3.5 Statistics of transmitting bytes between serial port and network

Operation steps:

- Enter WEB main page of serial server; click “Status” in the main menu to enter the transmit statistics page, shown in Figure 2-8
- Checking the number of receiving and transmitting bytes between serial port and network

Table 2-11 Function keys

Command	Function Description
Reset	reset the statistics of a channel to 0
Refresh	manual refresh
Auto Refresh	auto refresh
Show SysLog	the function of checking system log

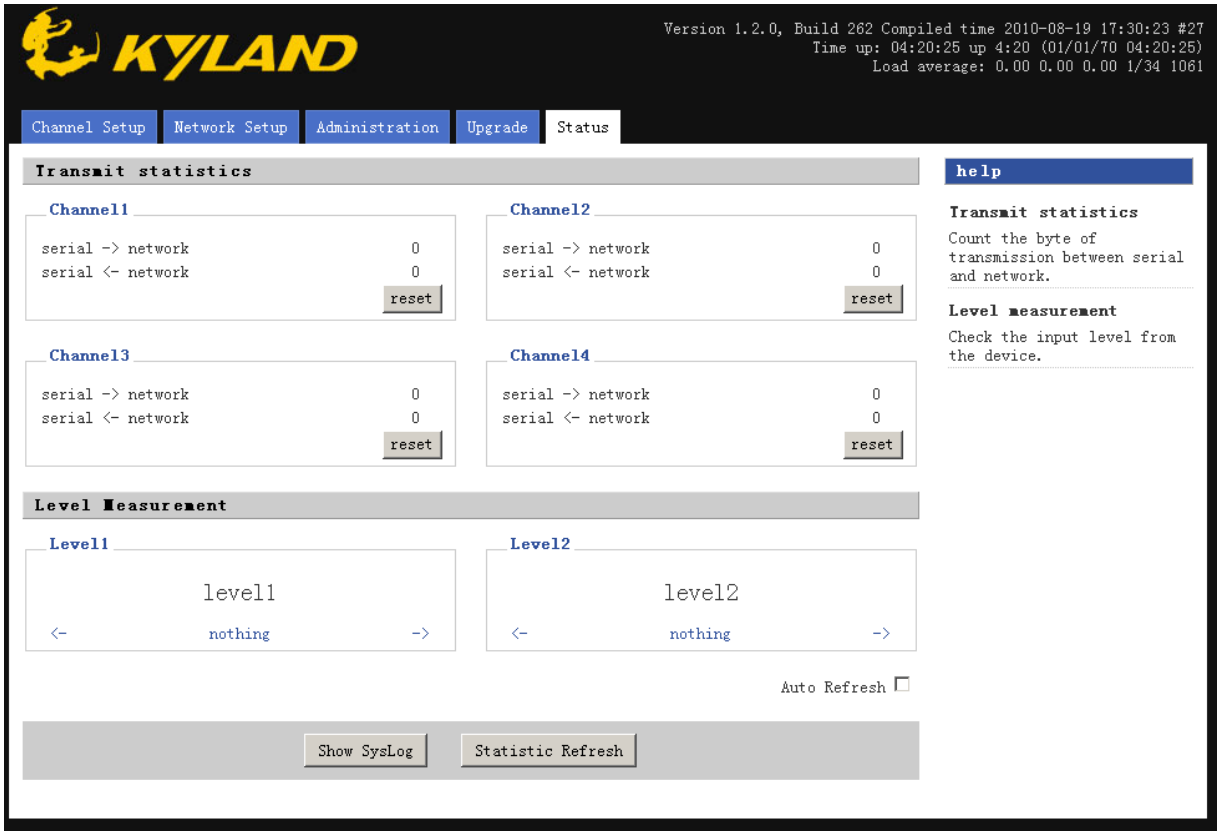

Figure 2-8 Statistics of Transmitting bytes

2.4 Serial Server Application

2.4.1 Serving as TCP server

Serial server adopts TCP server mode to achieve the data conversion and transmission from serial port to network port. After setting a unique IP and corresponding port number for serial server in the network, serial server starts to monitor. If there are hosts in the network sending “connection” requests, serial server will accept the requests and send the Ethernet -port-received data from the serial port; then send the serial-port-received data from the Ethernet port in the way of TCP/IP protocol message; device won’t make any analysis and modification on user data packets, providing completely transparent data channel.

2.4.2 Serving as TCP Client

In the Ethernet network of devices, if set one to be TCP Server and other one to be TCP client. When the TCP client is powered on, it will automatically connect to the server to achieve point-to-point connection of two serial ports. For example: server IP address is 192.168.0.3 and port number is 9201, the configuration is as follows:

Connection type: TCP Client

Remote IP address: 192.168.0.3

Remote Port number: 9201

2.4.3 UDP mode

In UDP mode, serial port receives network data. When serial port return the data, the data will be transmitted to the presetting IP address with a presetting port number without the necessary of pre-connection. If set the presetting IP address to be the broadcast address of network segment, it can achieve point to multi-point communication between serial ports..

Chapter 3: System Upgrade

3.1 Upgrade boot, kernel, filesystem

3.1.1 Upgrade by Telnet

Operation command:

update.sh [boot|kernel|rootfs] <user> <password> <ftp ip> <file name>

1) Upgrade boot

   update.sh boot username password 192.168.0.50 u-boot.bin

2) Upgrade kernel

   update.sh kernel username password 192.168.0.50 uImage

3) Upgrade filesystem

   update.sh rootfs username password 192.168.0.50 ramdisk.gz

3.1.2Upgrade by WEB

1) Upgrade kernel

   Operation steps:

- Enter WEB main page of serial server; click “upgrade” in the main menu to enter the software upgrade page, shown in the Figure 3-1
- Set the upgrade parameter as Table 3-1; click the button of “upgrade”. FTP server IP address and device IP address should be in a same segment.
- Wait for the system upgrade until the system show you a successful information
- Click the button of “Administration” in the navigation bar to open the page, click “Reboot” to restart the device

Table 3-1 Upgrade options

Command	**Function Description**
Item=[Kernel,RootFS]	Choose upgrade items: kernel, root, file system
Server IP	setting FTP server IP address
User Name	setting FTP server user name
User Password	setting FTP server user password
File Name	file name

Table 3-2 function keys

Command	Function description
upgrade	upgrade

Warning: in the upgrade process, don't cut off the power or restart the device to avoid abnormal working of device.

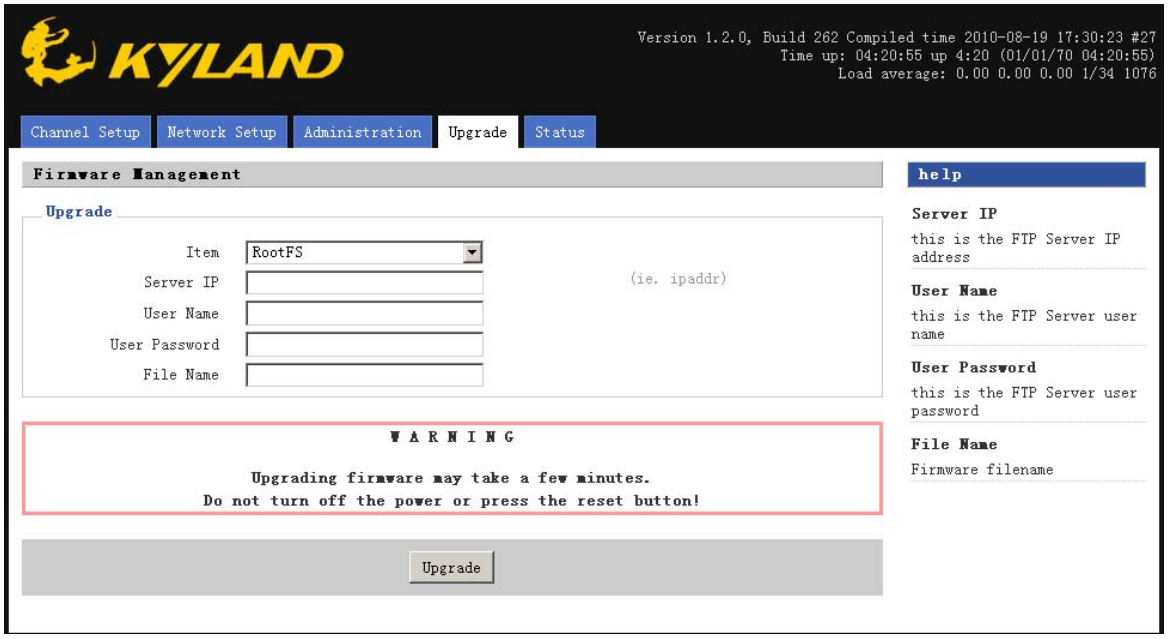

Figure 3-1 Upgrade kernel

2) Upgrade File System

The operation is the same as kernel upgrading, shown in the Figure 3-2

Figure 3-2 Upgrade file system

Chapter 4 Test Methods

4.1 Self inspection

After the device is powered on, PWR indicator will be always on. 20 seconds later device will be normally started up and RUN indicator will keep blinking.

4.2 Serial port test

4.2.1 Ethernet port-serial port test

Serial server has four channel data. Data interface has three modes: RS232/RS485/RS422. But at the same time, one channel serial port only supports one mode which can be set by software. Connect D1 serial port with RS232 mode on serial server to COM1 port of testing PC; connect Ethernet port (ETH) of serial server with the network port of testing PC through straight-through cable as shown in the figure 4-1.

The testing method is the same to D2 serial port, D3 serial port and D4 serial port.

IP address of device is 192.168.0.3 and its settings is as follows:

D1 settings as follows:

Channel: 1

Connecting type: TCP server

Port number:9201

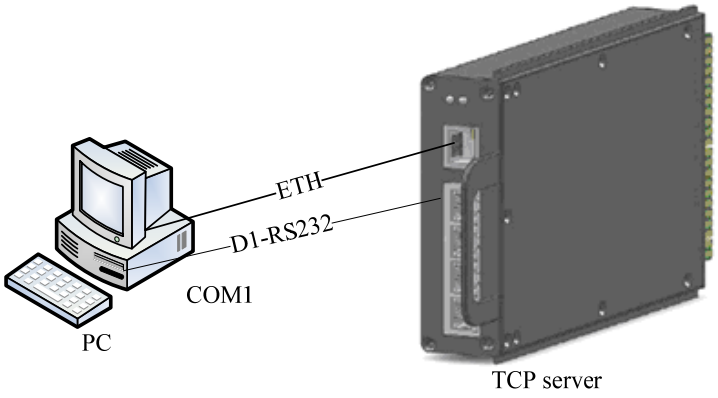

Figure 4-1 Ethernet port-serial port testing

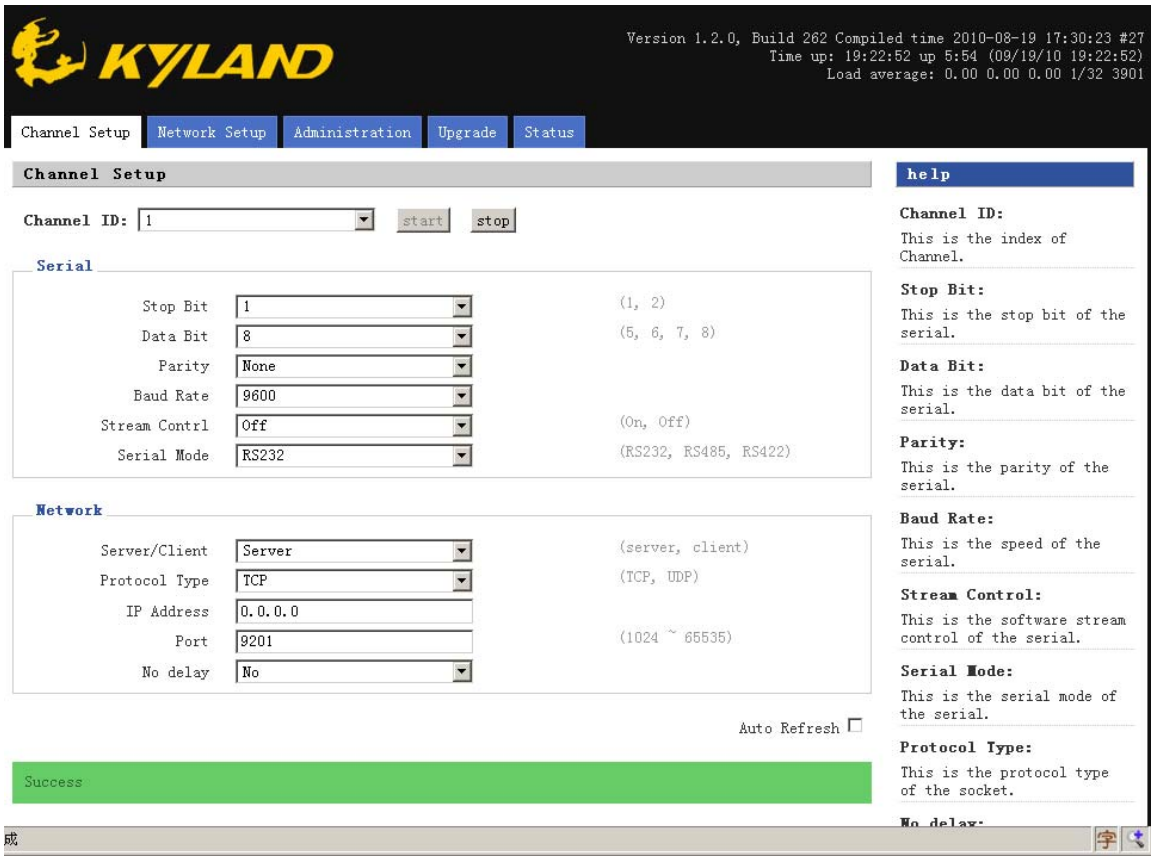

Figure 4-2 D1 Channel Setting

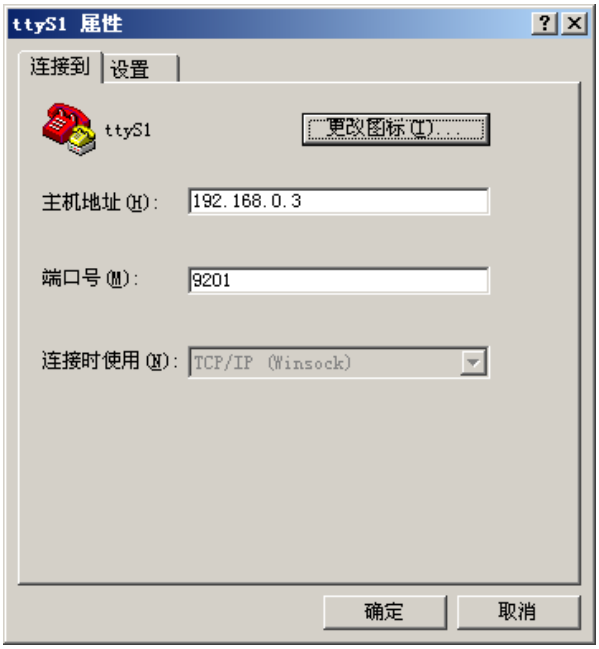

Figure 4-3 TCP/IP hyper terminal setting

D1 testing data:

Operate hyper terminal on the testing PC; enter “192.168.0.3” in host address; input “9201” in port number; use “TCP/IP (Winsock)” to connect, click “Apply” to open hyper terminal

interface; click the button  on the toolbar.

Operate hyper terminal on the testing PC; enter Baud rate “9600”, Data Bit “8”, Parity “none”, Stop bit “1”, Flow control “off”; select “COM1” to connect at the window; click “Apply” to open hyper terminal interface; click the button  on the toolbar.

After that, the characters input in TCP/IP hyper terminal window should be displayed in COM1 hyper terminal window. In the same way, the characters typed in COM1 hyper terminal window should be displayed in TCP/IP hyper terminal window. That means D1 testing is normal.

4.2.2 TCP server-TCP Client serial port testing

Two devices are connected through Ethernet. If we set one of them to be TCP server, and the other one is set as TCP Client. When TCP Client is powered on, it will automatically connect with the server to realize point-to-point connection between two serial ports..

Connect D1 serial port with RS232 mode on the server with COM1 port of testing PC; connect D1 serial port with RS232 mode on the client with COM2 port of testing PC; connect the Ethernet port (ETH) of the server with the Ethernet port (ETH) of the client through straight-through cable as shown in Figure 4-4:

IP address of Serial server is 192.168.0.3 and its settings is as follows:

Server settings as follows:

Channel: 1

Connection type: TCP server

Port number: 9201

Client settings as follows:

Channel: 1

Connection type: TCP Client

Remote IP address: 192.168.0.3

Remote port number: 9201

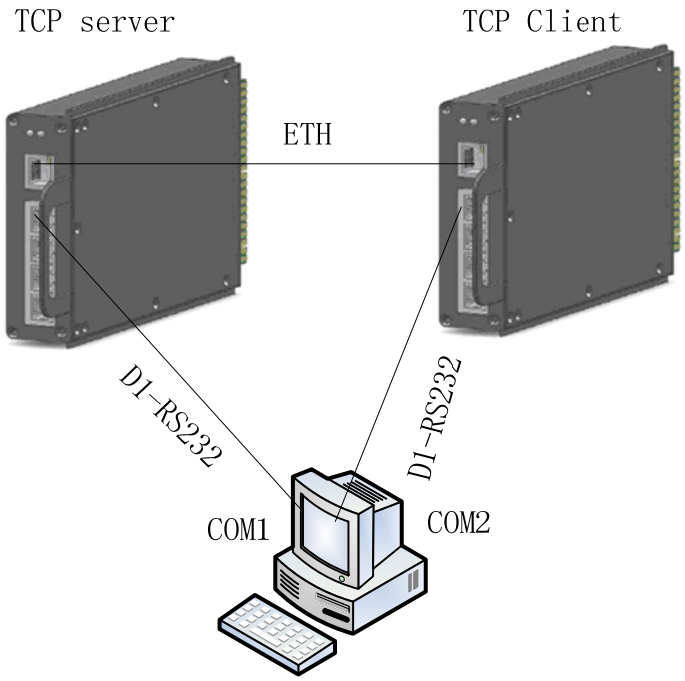

Figure 4-4: TCP server-TCP Client data testing

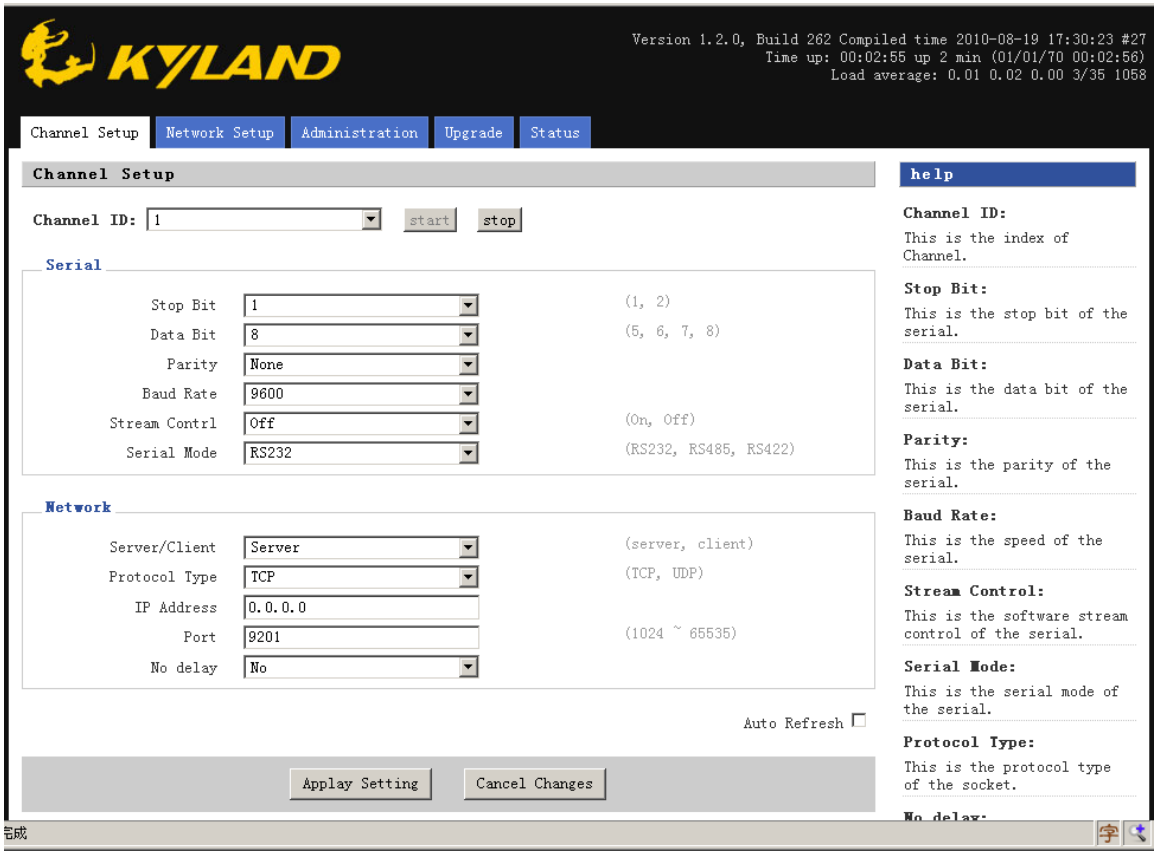

Figure 4-5 TCP server settings

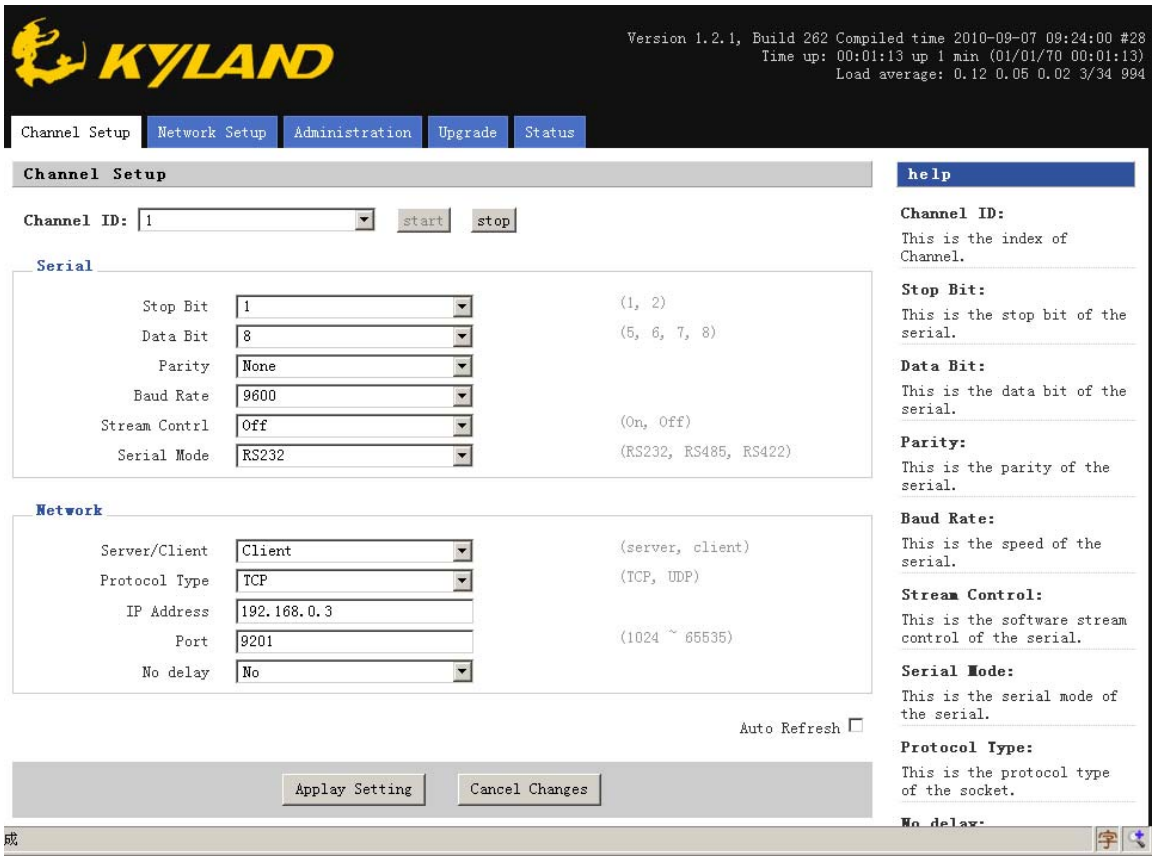

Figure 4-6: TCP Client settings

Testing data:

Operate hyper terminal on the testing PC; enter Baud rate “9600”, Data Bit “8”, Parity “none”, Stop bit “1”, Flow control “off”; select “COM1” to connect at the window; click “Apply”.

Operate hyper terminal on the testing PC; enter Baud rate “9600”, Data Bit “8”, Parity “none”, Stop bit “1”, Flow control “off”; select “COM2” to connect at the window; click “Apply”.

Enter the hyper terminal interface; click the button  .on the toolbar. After that the characters input in COM1 hyper terminal window should be displayed in COM2 hyper terminal window. In the same way, the characters typed in COM2 hyper terminal window should be displayed in COM1 hyper terminal window. That means data testing is normal.

Appendix A: Q&A

Q: forget WEB password

A: 1) Telnet serial server, use the following command

#cat /etc/httpd.conf

Checking WEB configuration and obtaining user name and password