



# F5-23xx TDM over IP device

## User Manual

(Version: 1.2)

Beijing Fibridge Co. Ltd.

## Table of Content

<b>1</b>	<b>Overview .....</b>	<b>2</b>
<b>2</b>	<b>Features .....</b>	<b>2</b>
<b>3</b>	<b>Functional Principle.....</b>	<b>2</b>
<b>4</b>	<b>Typical Application.....</b>	<b>3</b>
4.1	Voice-Used in campuses or MAN .....	3
4.2	Distant telephone in IP .....	3
4.3	Voice-data backbone line on IP .....	4
4.4	Transmitting voice relay on IP .....	4
4.5	Converting existing PBXs .....	4
4.6	E1 private service on IP .....	4
4.7	Transmit E1 through WLAN .....	5
<b>5</b>	<b>Specifications.....</b>	<b>5</b>
5.1	Power.....	5
5.2	10/100 BASE-T Ethernet port .....	5
5.3	E1 Port.....	5
5.4	Environmental.....	6
<b>6</b>	<b>Panel description .....</b>	<b>6</b>
6.1	Size.....	6
6.2	Front view .....	6
6.3	LED descriptions.....	6
6.4	Back view:.....	7
6.5	Port Description .....	7
<b>7</b>	<b>Hardware installation and testing.....</b>	<b>7</b>
7.1	installation preparation .....	7
7.2	Cable connecting .....	8
7.2.1	power source connecting .....	8
7.2.2	LAN connecting .....	8
7.2.3	E1 connecting .....	8
7.3	Function testing .....	8
<b>8</b>	<b>Software installation and testing .....</b>	<b>9</b>
8.1	software interface.....	9
8.2	Trouble shooting .....	15
<b>9</b>	<b>Order Information.....</b>	<b>16</b>

## 1 Overview

With the quick development of the IP network, the wide band data network between each city and each company has become mature. How to apply the traditional communication service to the IP networks with comparatively low cost has become the hotspot. For example, IP telephone has quickly spread in recent years. Keeping up with the information technology development trend, on the basis of having deeply investigated traditional service and IP technology, our company developed F5-23xx IP circuit emulation (**IPCE**) series products.

## 2 Features

- Transmitting framed and non framed E1 signal through IP network,
- High transmitting speed, low transmitting time delay
- Optional output clock: internal clock, external clock, network adaptable clock or get the clock from the E1 input line
- Network adaptable clock is stable, little jitter and float
- Can be configured into N X 64K, or can be adaptable to network wide band N X 64K
- E1 information transmitted on the IP network has QoS guarantee
- Convenient to use, no complicated configuration
- Transmitted package based on the IP address, through switches, routers network equipment etc.
- General UTP Ethernet interface, 10M/100M auto-negotiation

## 3 Functional Principle

IPCE can transmit 1-2 E1 or N timeslot (N can be configured ) transparently. At the same time through the down link network port to provide a network port. IPCE support all of the traditional E1 and IP services, voice, data, fax, signaling and all the other communication service. For example, adding telephone access equipment in the two ends, 30 lines telephone can be accessed, and can fully displace IP telephone. For needn't any variable IP gate equipment, the cost is cut down greatly.

## 4 Typical Application

### 4.1 Voice-Used in campuses or MAN



As to TDM, especially to the voice getting connected to the remote building through campus network or MAN, IPCE is a fast but not expensive solution. Gigabit Ethernet switch on the fibers and wide band wireless modulator or laser equipments with Ethernet ports, can all reduce the cost of the infrastructure to the lowest. As to enterprises and the local governments, it means that this cancels the PSTN as to international service, only through binding voice communication function on the present LAN and MAN connectivity to save the telephone fee. As to the applying enterprise, this means to transmit voice, LAN and special service bound together through MAN. The main advantage is to concentrate to a complex voice/LAN network. Especially to the ATM switches on the SONET/SDH backbone line, this solution is low cost and fast.

### 4.2 Distant telephone in IP

Using IPCE can provide high quality distant telephone service, and enhance the competition of the applied enterprise. In the place with IP network management and cost advantage, voice sellers can make use of voice compaction based on TDM. The advantage includes reducing the set time to the minimum and supporting to transmit SS7 and the other signals transparently, protecting the investment on the traditional telephone equipment, and providing service to more areas using IP infrastructure.



### **4.3 Voice-data backbone line on IP**

Applied enterprises can make use of the variable advantages of IPCE to provide more service and more service access point to the costumers, so that they can occupy the market share swiftly.

### **4.4 Transmitting voice relay on IP**

IP/Lambda, DWDM and G-G routing new technologies can help to build high quality IP backbone linkage. This kind of backbone routing function has higher efficiency, compared with SONET, SDH and ATM. IPCE supports traditional telephone switch on IP. At the routing aspect, IPCE can surely provide a much better and much flexible function and price ratio solution. And this solution does not depend on the restriction of ADD/DELETE SONET, and SDH multiplexer. And it is not as expensive and complicated as ATM.

### **4.5 Converting existing PBXs**

Converting existing traditional PBXs to IP service, provides low cost and convenient conversion for the PBX enterprises that need seamless conversion to IP. This needs no retraining to the customers because the integrity of the E1 linkage is reserved, without losing PBX characters, for example, conference call, call forward, and identification of the caller etc. This revolutionary method is more acceptable to the final customers, and it can also make PBX enterprises satisfied, because their private signaling is supported.

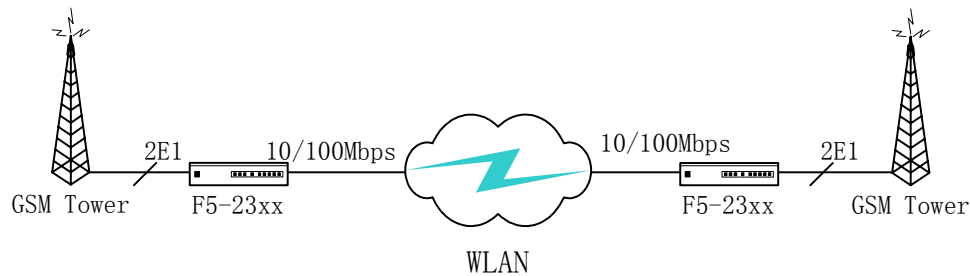
### **4.6 E1 private service on IP**

IPCE used on high speed Ethernet network or IP to provide traditional TDM. It makes the enterprises that have high speed IP infrastructure fabric attain a chance that can make use of residual band width and provide virtual E1 private rent. With low package time delay and low package loss network, this service has any other E1 private linkage function. As to the applied enterprises providing E1 service, the extension on IP/E1 is an exciting optional solution.

## 4.7 Transmit E1 through WLAN

This is widely used to complete the extension from GSM, CDMA, PHS wireless network etc. to E1

During the building of the wireless network, if the natural condition between the basic station and computer house is severe, with combining IPCE and WLAN, the wireless extension to E1 can be finished.



## 5 Specifications

### 5.1 Power

- AC power: 160-240V
- DC power: -24V/-48v/-60V, rating power  $\pm 20\%$
- Power consumption:  $\leq 4W$

### 5.2 10/100 BASE-T Ethernet port

- Physical port type: RJ-45
- Port rate: 10/100Mbps
- Working mode: full semi-duplex, 10/100M auto-negotiation
- Supporting IEEE802.3

### 5.3 E1 Port

- Channel number: 1-2E1
- Physical port type: BNC coaxial jack
- Input rate range:  $2.048Mbps \pm 50ppm$
- Port code type: HDB3
- Impedance:  $75 \Omega$  unbalanced
- Compatible with G.703

## 5.4 Environmental

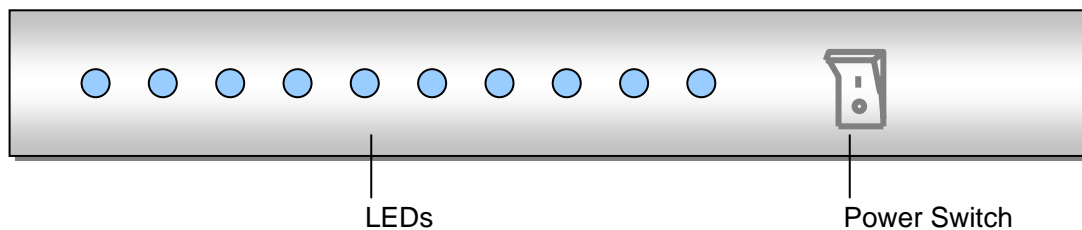
- Working environments  
Temperature operating range: 0~50°C  
Relative humidity: 20~90%
- Store environment  
Environmental temperature: -20~65°C  
Relative humidity: 10~95%

## 6 Panel description

### 6.1 Size

270mm(width)×40mm(height)×105mm(depth)

### 6.2 Front view



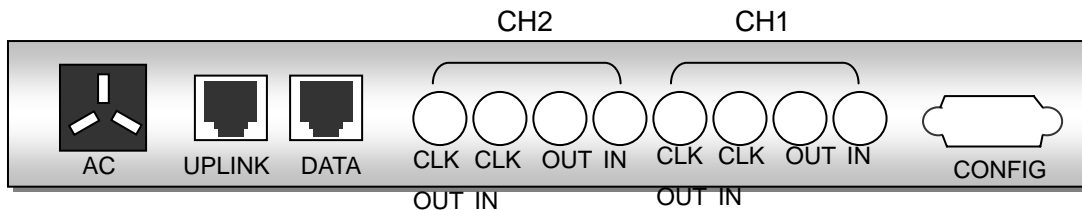
### 6.3 LED descriptions

- **PWR**: power on, lighted
- **SYS**: Multi-color, if red, IPCE's 1# CPU is running. Green means IPCE's 2# CPU is running. Yellow means two CPUs are both running. For F5-2315, only one CPU runs.
- **LOS1, 2**: lighted to alarm 1#, 2# E1 signal lost
- **RUN1, 2**: lighted to IPCE's 1# or 2#E1 links successfully.
- **UPLINK**: corresponding to UPLINK port, ON meaning UPLINK link successful, BLINK meaning data transmitting on UPLINK port.
- **DLINK**: corresponding to DOWNLINK port, ON meaning DOWNLINK link successful, BLINK meaning data transmitting on DOWNLINK port.
- **10/100M,FDX**: corresponding to UPLINK port, 10/100M is ON when

UPLINK port working in 100Mbps, and FDX is ON when UPLINK port working in Full Duplex Mode.

**Note:** For F5-2315, only 1# E1 is available. For F5-2325, both 1# and 2# E1 are available.

## 6.4 Back view:



## 6.5 Port Description

- AC: AC 220V power input, DC  $-48V/-24V/-60V$  is also variable (Different hole type);
- UPLNK: up link network port
- DATA: down link network port
- CLKIN: external clock input interface, 2Mhz TTL external synchronized clock input
- CLKOUT: external clock output interface, 2Mhz TTL external synchronized clock output
- IN: the 2M signal input
- OUT: the 2M signal output
- CONFIG: RS232 Console management port, private connected cable is provided by the vendor.

## 7 Hardware installation and testing

### 7.1 installation preparation

Before installation, make sure all the listed conditions below are available.

- 1). Clean site
- 2) Dry environment (20 to 90% comparative humidity, no coagulation)
- 3) Good ventilation
- 4) Power source, 220VAC or other Power input.

## **7.2 Cable connecting**

### **7.2.1 power source connecting**

Make sure the power switch is off, then plug into the AC 220V power jack, or connect the DC power to the junction pole. Pay attention to the polarity. Make sure they are well connected.

### **7.2.2 LAN connecting**

According to the requirement, prepare a RJ-45 crossing or straight UTP cable, connect one end to the UPLINK port in the back panel of the equipment. Connect the other end to PC or LAN switch. If power on and well connected, the LINK LED will be lighted.

### **7.2.3 E1 connecting**

IPCE provides standard BNC co-axial cable interface. Use two coaxial cables and connect IPCE to the terminal equipment (PBX).

## **7.3 Function testing**

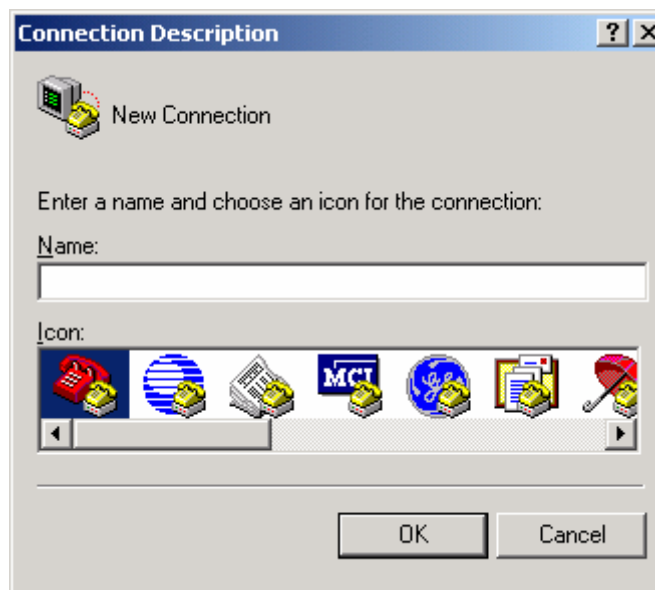
- Push the power switch ON
- Observe the alarming indicator on the panel

If the entire thing is normal working, the E1 alarming indicator LOS on the front panel will be OFF, and indicator PWR, LINK will be ON.

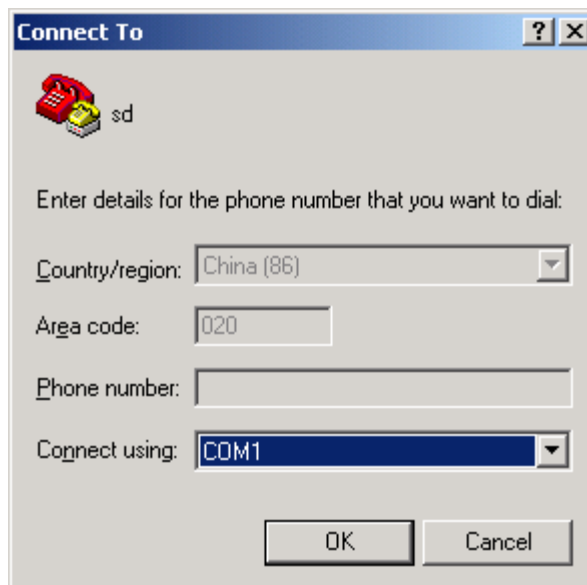
## 8 Software installation and testing

### 8.1 software interface

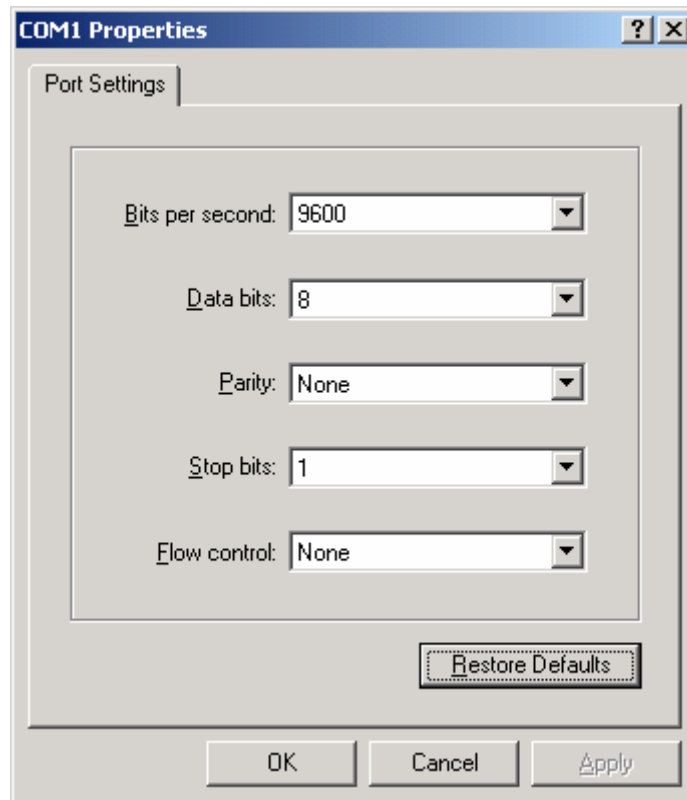
- connect one end of special serial line to “CONFIG” port on the panel of IPCE, and connect the other end to the serial port of computers. Note: For F5-2513, CONFIG port is divided to 2 RS232 interface, CONFIG1 is to manage 1# E1 port, and CONFIG2 is to manage 2# E1 port.
- Start the Hyper-terminal  
“start” menu “program” → “appendix” → “Hyper Terminal”



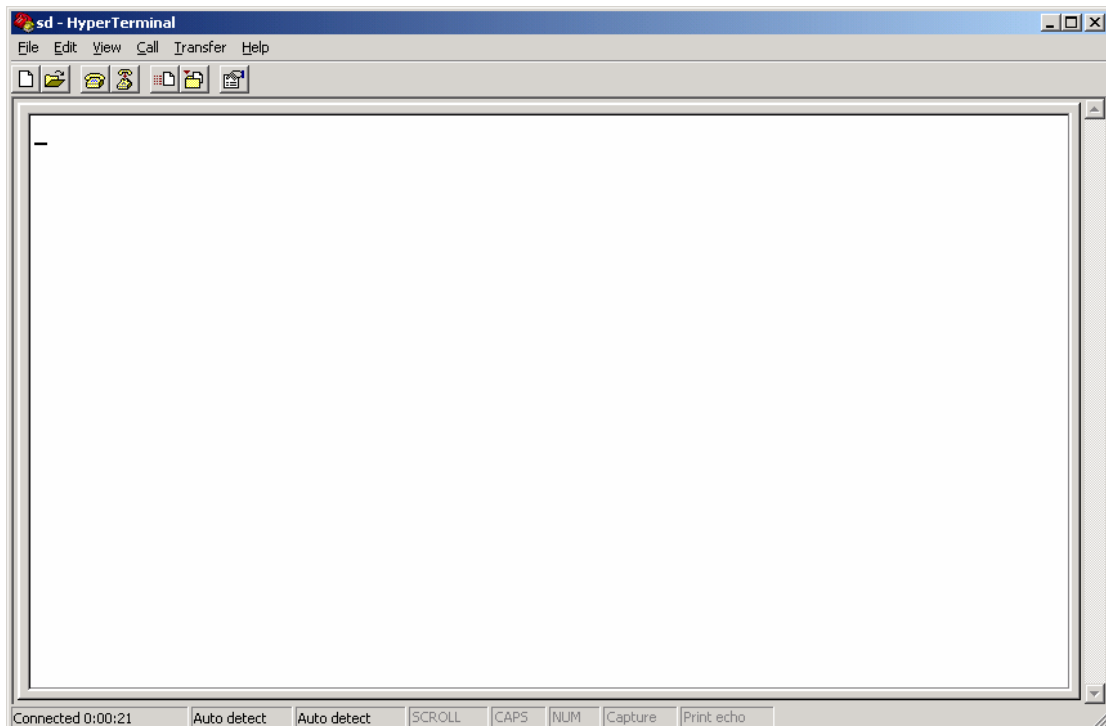
Input the user defined name, the click



After right choose the computer using serial port (general is COM1), the click OK.

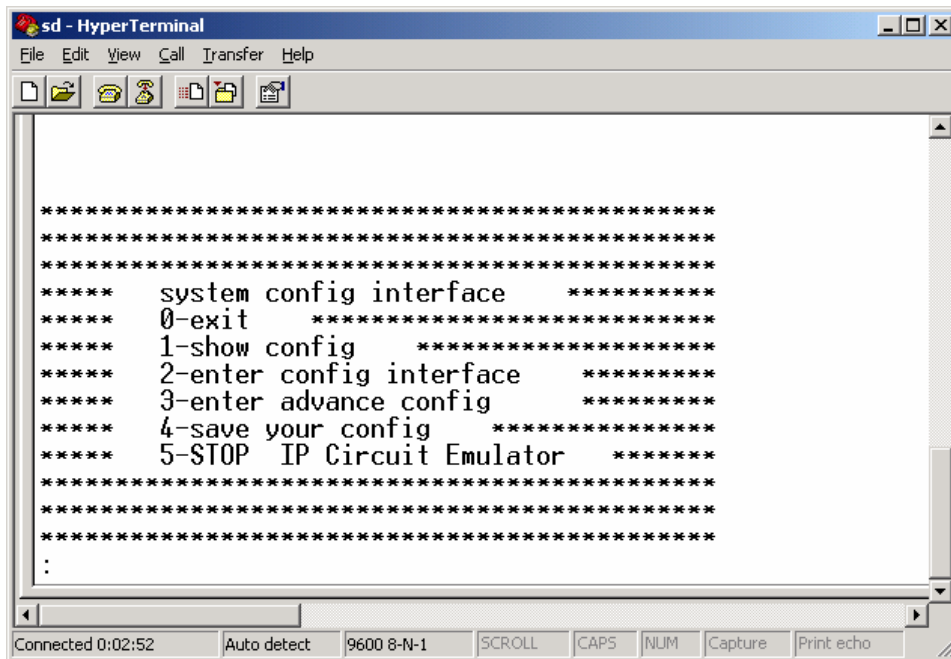


Configure the serial port according to the parameters listed in the above figure, after configuration, the click OK.

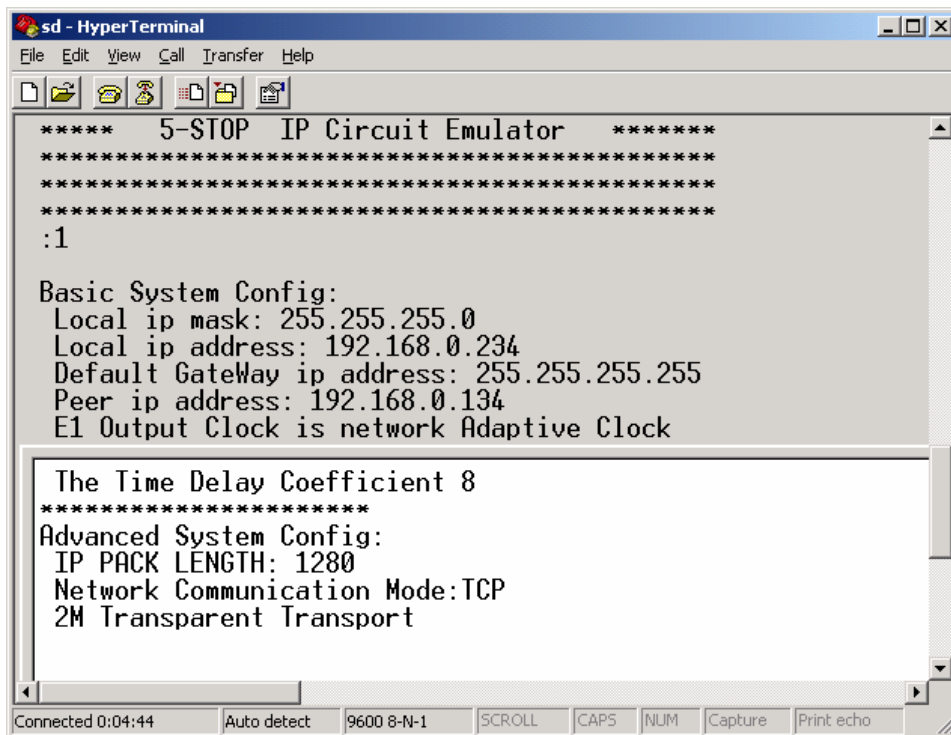


Press **ENTER** of Keyboard in the figure shown above, after the indicator ->

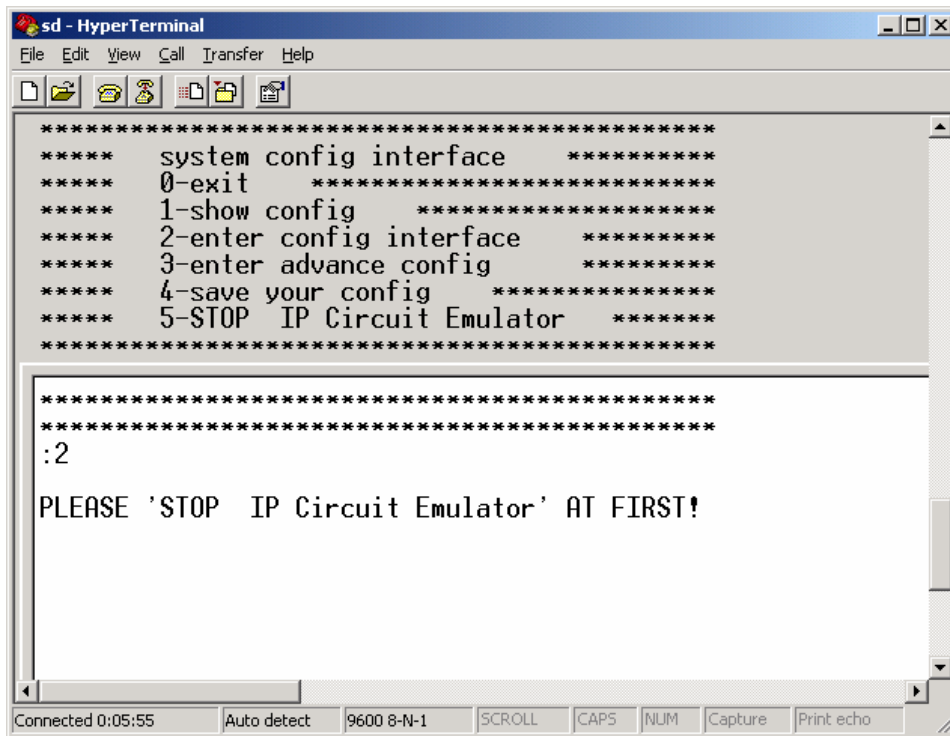
appears, then input **config**.



According to the figure shown above, do the corresponding procedure  
 Input 1, and look over all the existing configuration information



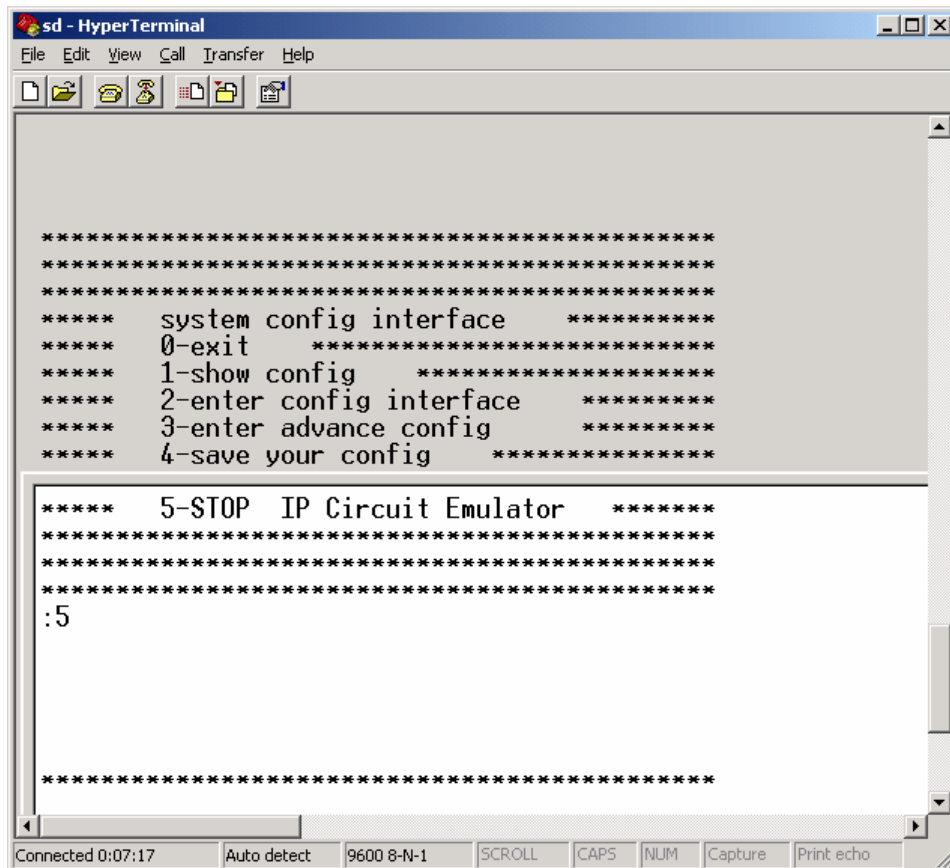
Input 2, and input the basic configuration information



```
sd - HyperTerminal
File Edit View Call Transfer Help
*****
***** system config interface *****
***** 0-exit *****
***** 1-show config *****
***** 2-enter config interface *****
***** 3-enter advance config *****
***** 4-save your config *****
***** 5-STOP IP Circuit Emulator *****
*****
*****
:2
PLEASE 'STOP IP Circuit Emulator' AT FIRST!
*****
*****
Connected 0:05:55 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo
```

The configuration information can only be input when IP circuit emulation stops. If the system is just running, it will indicate the operator stopping IP circuit emulation. As shown above.

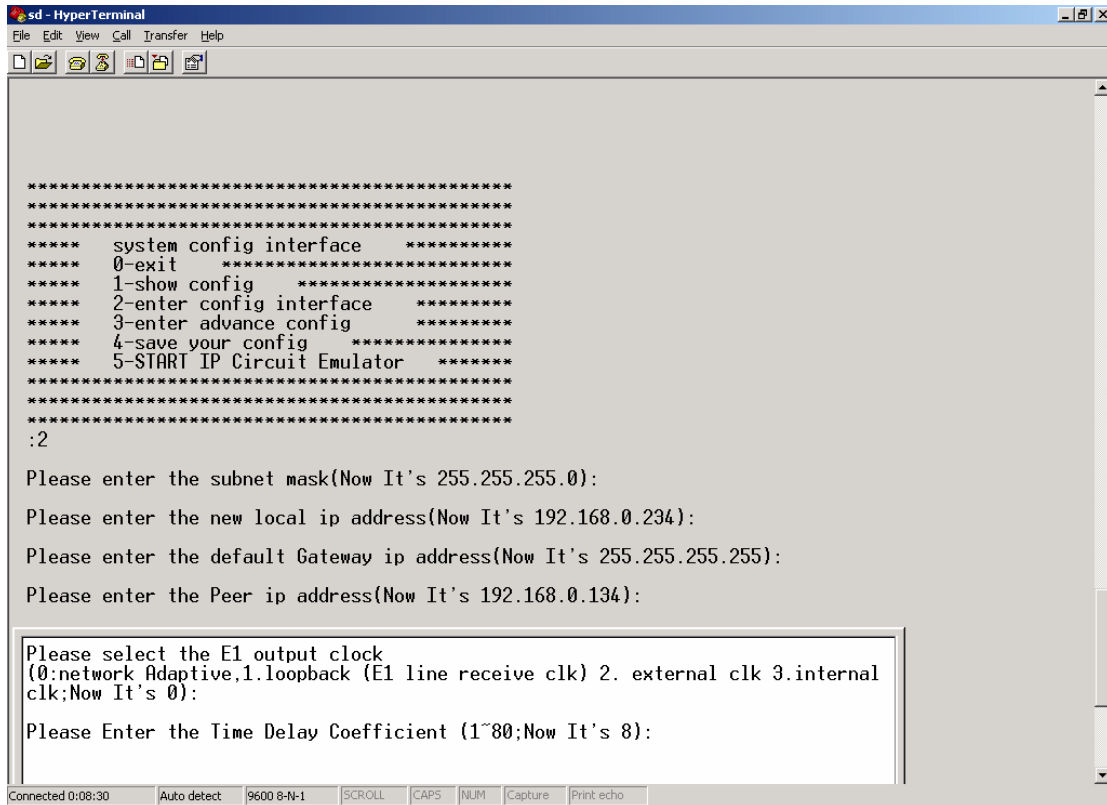
Input 5 and IP circuit emulation will stop.



```
sd - HyperTerminal
File Edit View Call Transfer Help
*****
***** system config interface *****
***** 0-exit *****
***** 1-show config *****
***** 2-enter config interface *****
***** 3-enter advance config *****
***** 4-save your config *****
***** 5-STOP IP Circuit Emulator *****
*****
*****
:5
*****
*****
Connected 0:07:17 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo
```

Stop the IP circuit emulation, the system shows 2M Link OUTPUT Error. This is because when stopping circuit emulation, the 2M input/output is stopped as well.

Then input 2, input the basic configuration information.



```

sd - HyperTerminal
File Edit View Call Transfer Help
*****
*****
*****
*****  system config interface  *****
*****  0-exit                    *****
*****  1-show config             *****
*****  2-enter config interface *****
*****  3-enter advance config   *****
*****  4-save your config       *****
*****  5-START IP Circuit Emulator *****
*****
*****
*****
:2
Please enter the subnet mask(Now It's 255.255.255.0):
Please enter the new local ip address(Now It's 192.168.0.234):
Please enter the default Gateway ip address(Now It's 255.255.255.255):
Please enter the Peer ip address(Now It's 192.168.0.134):

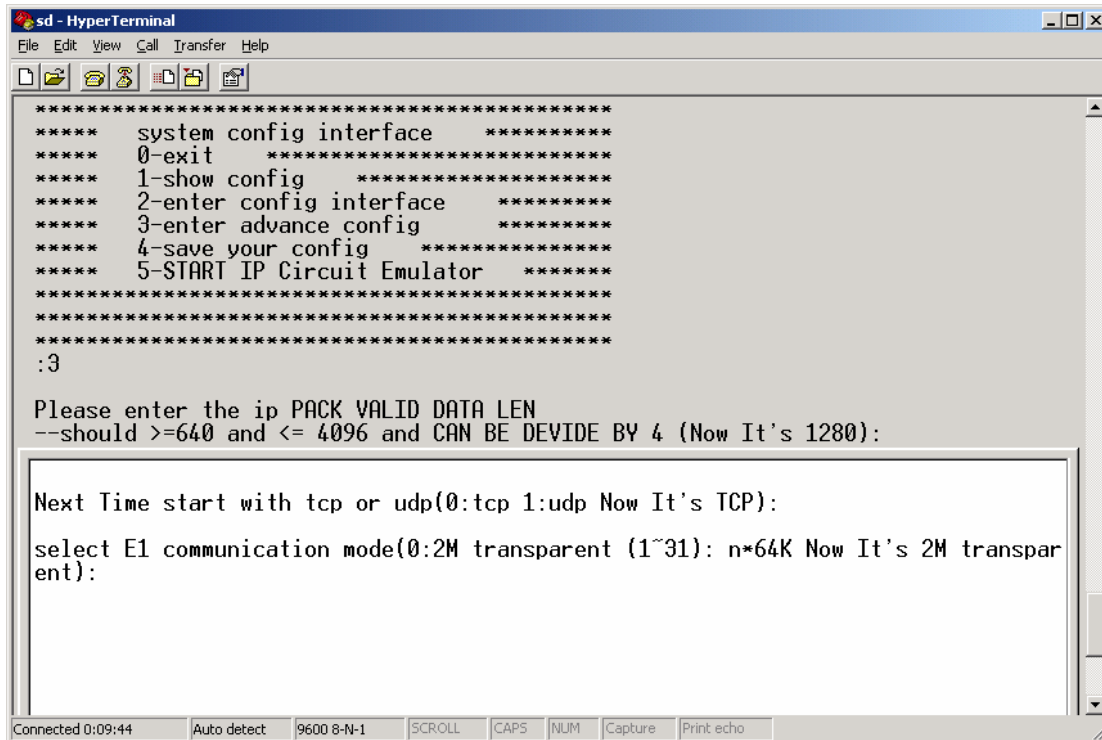
Please select the E1 output clock
(0:network Adaptive,1.loopback (E1 line receive clk) 2. external clk 3.internal
clk;Now It's 0):
Please Enter the Time Delay Coefficient (1~80;Now It's 8):
    
```

The basic configuration information includes subnet mask, local IP address, default net gate and IP circuit emulation IP address, E1 output clock and time delay parameter.

As to E1 output clock: in the IPCE-X equipment, E1 output clock is optional. There are totally four clocks to choose. 0 is network adapting clock. 1 is loop clock, namely E1 input clock. 2 is internal clock. 3 is output clock. Network adapting clock is IPCE recovers the E1 clock from according to the received data. The customers can choose approximate clock according to the concrete network conditions. What is more, the right clock configuration is the base of the IPCE working well.

As too time delay coefficient: because IP network is a package switching network, and E1 is circuit transportation, in order to let them be compatible, buffer forward is necessary in IPCE. And of course this causes time delay. Under the condition that network jittering is small, time delay coefficient can be set smaller, and this can reduce the time delay. But under a bad network

quality condition, small time delay can cause higher error rate, so increasing time delay coefficient is needed.



```

sd - HyperTerminal
File Edit View Call Transfer Help
*****
**** system config interface ****
**** 0-exit ****
**** 1-show config ****
**** 2-enter config interface ****
**** 3-enter advance config ****
**** 4-save your config ****
**** 5-START IP Circuit Emulator ****
*****
*****
*****
:3

Please enter the ip PACK VALID DATA LEN
--should >=640 and <= 4096 and CAN BE DEVIDE BY 4 (Now It's 1280):

Next Time start with tcp or udp(0:tcp 1:udp Now It's TCP):

select E1 communication mode(0:2M transparent (1~31): n*64K Now It's 2M transpar
ent):
    
```

Input 3, and input advanced configuration information.

Advanced configuration information includes then length of IP package, used network communication mode and E1 communication mode.

For optimization, the length of IP package must be divided exactly by 64, and it must not be less than 640 and bigger than 1024. short data package can have short time delay, while long data package can increase network forwarding. Network communication mode can choose TCP or UDP. When choosing TCP, input 0 after “Next Time start with TCP or UDP(0:tcp 1:udp):”. While choosing UDP, input 1. but TCP is recommended. E1 has two communication modes. One is none-framed transparently transmission. The other one is to choose how many time gaps to transmit. Input 0 after” select E1 communication mode(0:2M transparent; (1~31): n\*64K):”, this means to choose to transmit E1 transparently without dividing frame. Choose the numbers between 1 and 31, for example 10, then the ten time gap from 1 to 10 are transmitting (0 times gap is not included). When getting to the corresponding end, insert 0 time gap and other time gap to recreate E1 signal, namely, n\*64k transmitting mode.

After configuration, input 4 to save the configuration information. Or, when quitting the system, it will remind to save. If not saving, shutting down will lose

the configuration information.

On the other hand, 5 in the menu, according to the state the equipment is in, has different function, and has different illustration as well. If IP circuit emulation has been started, the illustration will be “5-STOP IP Circuit Simulator”. Input 4 now, IP circuit emulation will be stopped. If IP circuit emulation is in the stop state, the illustration will be “4-START IP Circuit Simulator”. Input 4 now, IP circuit emulation will be started.

**Note:** when starting the equipment, if all the configuration items are well configured, then IP circuit emulation will start automatically. Or the configuration interface will appear to allow the operators configure themselves. Other than serial port configuration, we can also use telnet to configure the remote terminal. The user interface is the same. The user’s name of telnet is “farboat”, the password is “farboat2003”. We must remember that only after all the configurations are well configured, the system can work well.

A well configured system must include 3 items:

- 1) the IP address is well configured. It includes subnet mask and net gate.  
Testing method: after the both ends are right configured, they can ping each other.
- 2) Right configure the IP address of the peer terminal. This is right the item “Peer ip address:” in the basic configuration.
- 3) The advanced configuration items in either the local system or remote system are completely the same.

## 8.2 Trouble shooting

After being started, it appears “NETWORK ERROR PLEASE CHECK NETWORK CABLE!”

Failure cause: network is obstructed.

Solution: check if the net wire is well plugged. If the local net wire has been well plugged, make sure the peer terminal net wire is well plugged. If net wire in both terminals has been well plugged, ask the network administrators for help.

## 9 Order Information

- F5-2315A** 1E1 over 2 Ethernet pot, Standalone, AC220V power supply
- F5-2315D** 1E1 over 2 Ethernet pot, Standalone, DC-48V power supply
- F5-2325A** 2E1 over 2 Ethernet pot, Standalone, AC220V power supply
- F5-2325D** 2E1 over 2 Ethernet pot, Standalone, DC-48V power supply
- F5-2345A** 4E1 over 2 Ethernet pot, Standalone, AC220V power supply
- F5-2345D** 4E1 over 2 Ethernet pot, Standalone, DC-48V power supply