LXI980G

Industrial-grade External GPRS / CDMA /ET Wireless Data Transmission Unit （DTU）

V1.0 Date: 2016/05/16

GPRS/CDMA version

Ethernet version

Version History

Date	Versionn	Content
2016-05-16	1.0	New product issue

Contents

1 Product Structure and Performance

1.1 Product list

LXI980G series	
Model	**Version**
LXI980G-GSM	GPRS+GPS version
LXI980G-CDMA	CDMA+GPS version
LXI980G-ET	Ethernet version

1.2 Product overview

This series product has LXI980G-GSM/CDMA/ET three models，can meet customer's requirement of GPRS wireless communication，CDMA wireless communication，Ethernet wire communication and WIFI wireless communication. It can compatiblewith DSE, ComAp, Harsen, LIXiSE, Smartgen etc main controllers (Due to the increasing number of compatible controllers, the LIXiSE website will show details). The model with "G" means this product has the GPS function. The following will introduce LXI980G as sample.

LXI980G is a industrial-grade GPRS/CDMA /ET product with GPS global satellite positioning function. The product internal integration with high performance, low power consumption of industrial-grade GPS module and GPRS/CDMA/ET module, perfect combination of GPS global positioning technology and wireless GPRS/CDMA/ET communication technologies.

LXI980G platform based on ARM and embedded operating system, built-in industrial-grade module, it can be used in harsh environments, working temperature range can be up to -40℃～+ 85℃. LXI980G provide standard RS232 serial interface, can be quickly and PLC, industrial control, instruments, meters, RTU equipment is linked together, through the GPRS/CDMA/ET network will be linked to LXI980G equipment data transmission to a host on the Internet, realize the data remote transparent transmission, at the same time to the front-end equipment of GPS location information reported to host, realize positioning of the equipment.

LXI980G has positioning, wireless data communications and data processing capabilities, small size, strong and durable, stable and reliable, easy installation, It can be widely used in construction, transportation and other industries. Particularly suitable for tower crane monitoring, heavy machinery management. But also can be used in the field of taxi operations management, transport vehicles, special vehicles, vehicle rental management and leasing, etc.

GPRS/CDMA Version

Ethemet Version

P 1.1 LXI980G Product apprearance

1.3 Product features

- ❖ Each frame can be set to 1024B length (CACHE 4 frames), suitable for continuous transmission of large amounts of data;
- ❖ Use industrial-grade GPRS/CDMA module, embedded protocol stack;
- ❖ Supply voltage range: 6V to 36V
- ❖ With device power off function, easy to control.
- ❖ Data transparent transmission, the user does not need to understand the complex TCP/IP, PPP and other protocols
- ❖ Support data center dynamic domain name or IP address access
- ❖ Support APN virtual private network service
- ❖ Support break automatically reconnect function
- ❖ Have humanized connection occasion controlled function, more save data flow rate.
- ❖ Support local and remote graphical interface configure and maintain
- ❖ upports GPS positioning data reporting and query functions, data import Baidu map to achieve satellite map precise positioning
- ❖ Reliable design of multiple hardware and software, combined the watchdog technology, make the safe running of the equipment

1.4 Performance Parameters

1.1 LXI980G main parameters

Name	Parameter	Remark
Network type	GPRS mobile station type /GPRS Multi-slot type CDMA2000 1X /Ethemet	
Frequency band	GSM850/900/1800/1900MHz CDMA 800MHz	
GPRS network CDMA network	Downlink：	GPRS Max：85.6Kbps CDMA Max：153.6Kbps
GPRS/CDMA network transmission rate	Uplink：	GPRS Max：42.8Kbps CDMA Max：153.6Kbps
SIM card voltage	2.85V/1.8V	
Antenna Interface	50Ω/SMA	
Serial interface Level type	RS-232 Standard Level /RS485/LINK/CAN	
Serial port baud rate	300～115200bps	Supports standard baud rate
Power supply	DC：+6V～36V	
Power dissipation	Working：Max 800mA-104dBm	communication module work current
	Standby：≤30 mA	
Working temperature	-25℃～+70℃	
Storage temperature	-40℃～+80℃	
Humidity range	0～95%	Non-condensing

Indicator Status Description:

LED Lamp	Color	State	Description
Power / Data state	Red	Light	Working status
		Flash	Data is being transmitted / Standby
Working	Green	Light	Already connected to wireless network
		Light off	Not connected to wireless network
		Fast flash	Connecting to data center
		Slow flash	Dialing
GPS	Red	Light	Has positioned the latitude and longitude
		Fast flash	To find the satellite signal, but not locate of the latitude and longitude
		Slow flash	The satellite signal was not found
RS232	Green	Light off	Not connected to the RS232 data serial port
		Light	Connected to the RS232 data serial port
LINK/USB	Green	Light off	Not connected to the LINK/USB data serial port
		Light	Connected to the LINK/USB data serial port
CAN/RS485	Green	Light off	Not connected to the CAN/RS485 data serial port
		Light	Connected to the CAN/RS485 data serial port

Terminal Blocks Description

Terminal	Description
B-/B+	Power supply. DC 8.0V to 35.0V continuous power supply
ICOM/IA	Generated current input. Maximum input current is 5A
AI1/2/3	Sensor input
IN1/2/3/4	Digital input （Grounding effective）
OUT1/2	Relay output, relay withstand current is 1A
GEN VOLTS (L N)	Generated voltage input. 15V AC-360V AC(ph-N)
F+/F-	Excitation voltage input, 10V DC-70V DC(ph-N)
ACT+/ACT-	Governor actuator input, 7V DC-30V DC(ph-N)
RS232(TX RX)	RS232 port, connect to controller(DSE/ComAp/LIXiSE etc)
RS485(B- A+)	RS485 port, connect to controller(DSE/ComAp/LIXiSE etc)
CAN(H L)	CAN port, connect to ECU
Small USB port	Connect computer to do configuration settings
Big USB port	Connect to controller (DSE etc)
LINK port	connect to controller(Smartgen/Harsen etc)

1.5 Mechanical Dimensions

1.2 LXI980G Shell Mechanical Dimensions

1.6 Networking mode

1.3 Networking mode Schematic plan

1.7 Typical application

LXI980G module drives connected devices directly, for data reading and management, uploaded the intelligent data to the server and alarms, and user interaction.

2 Equipment installation

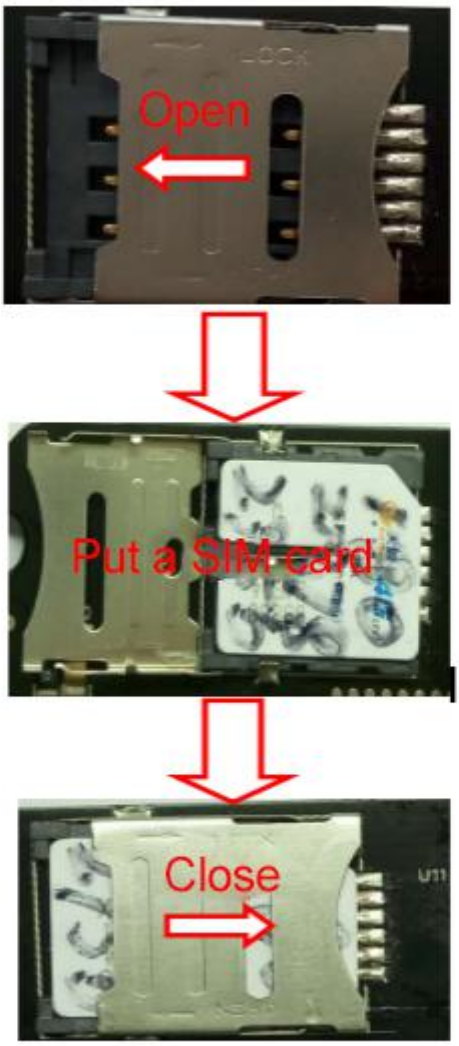
The product must be installed correctly, in order to achieve the desired design requirements; this section mainly explains the installation step product .

2.1 Antenna Installation

The antenna interface is a 50Ω SMA female pedestal. And the external antenna must be compatible with GPRS/CDMA module working band. If not, there is a risk to damage product, and DTU also can`t work.

2.2 SIM Card Installed

This product uses mobile operator GPRS/CDMA network, so we need to purchase the operator SIM card. Before installing the SIM card, first, open the shell of LXI 980 shell, open card slot, put the SIM card in the slot, and close the card slot. Specific steps shown as Figure 2.2.



2.2 SIM card installation

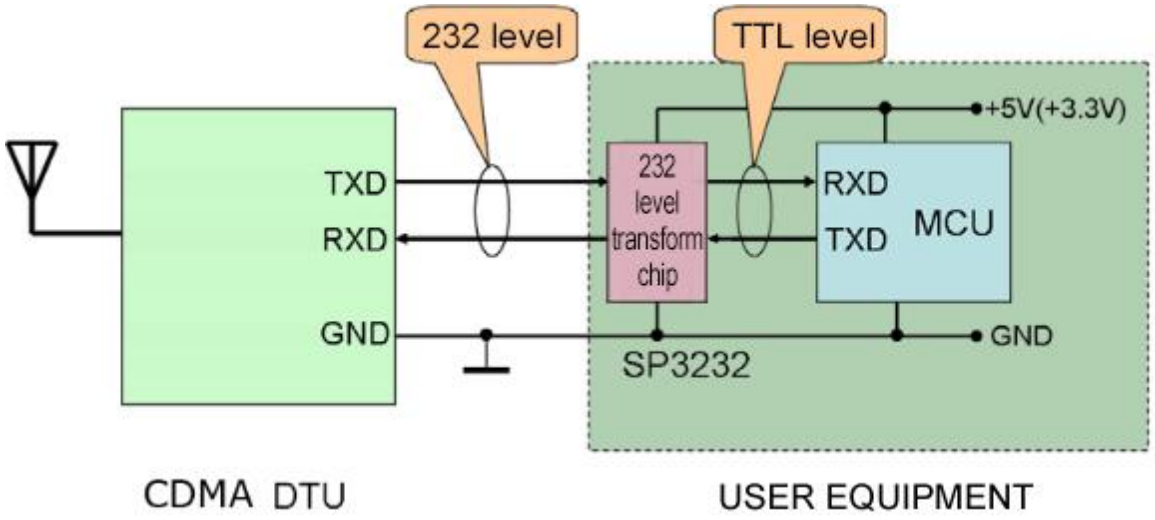
✧ Note: Under the condition of the DTU electrify ,inserted or pull out SIM card is strictly prohibited. Device during initialization, all text messages in SIM card will be deleted. In actual use, it should pay attention to the backup useful information in SIM card, for the deleted information, our company's apology.

2.3 Power Selection And Installation

The product can be used to + 6V ~ 36V wide range voltage power supply, power supply ripple control within 300mV. When the product In wireless communication, the transient current will be large and rapid change, so internal resistance of the external power should be as small as possible. When using a 6V power supply, the cables needs to rough enough.

2.4 Terminal Signal Description

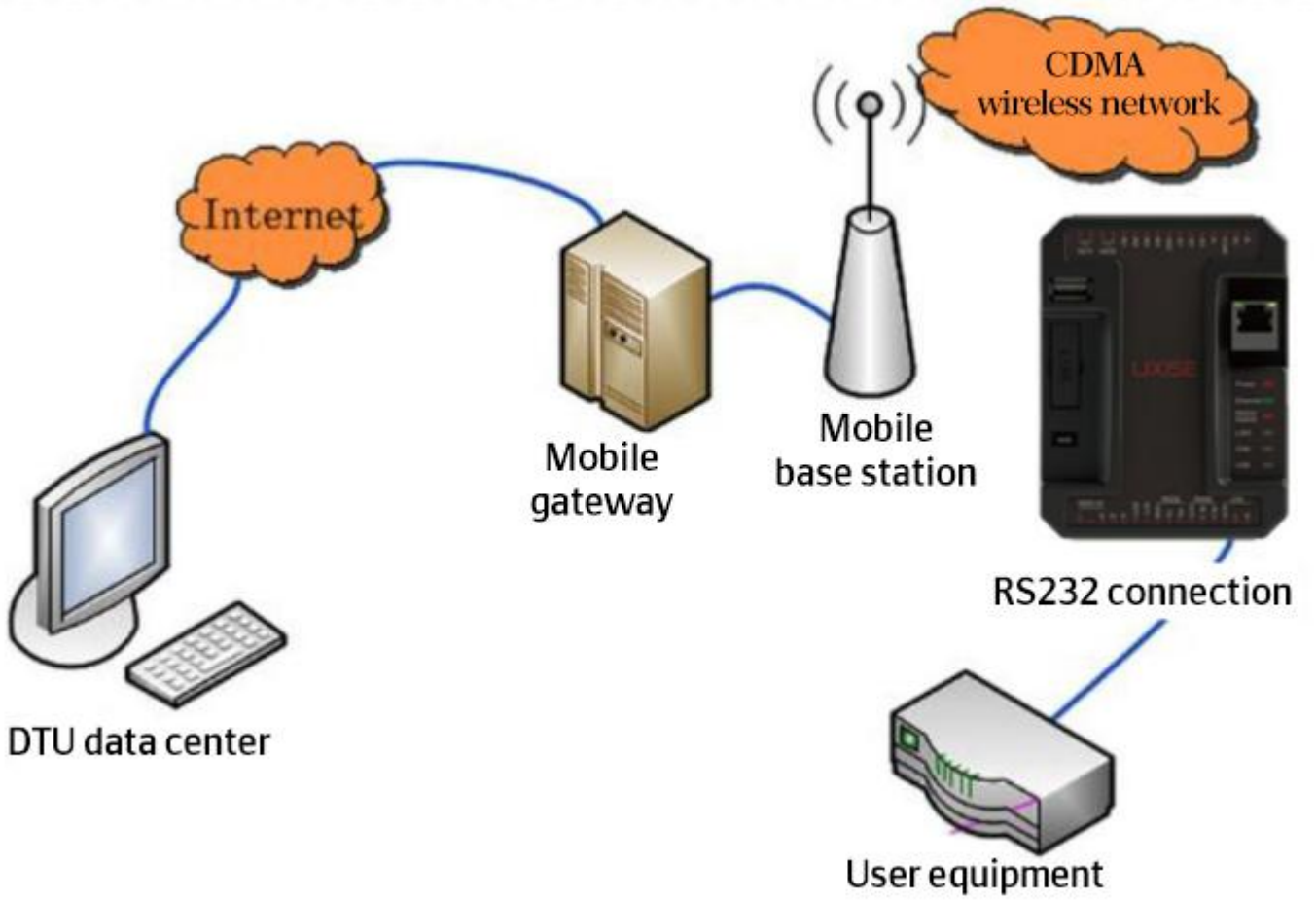
✧ Note: The interface signal level accords with the RS - 232 standard (+ 12 v), can't directly connect to TTL level, otherwise may damage the external devices (such as not using 232 level transformation chip, and directly connect the single chip microcomputer and DTU). The right way connect to level interface as shown below.



2.4 DTU and user equipment interface

2.5 System Connection

After finished above installation steps, the remote telecommunication system connection is successful, as shown in Figure 2.5.



2.5

3 Device configuration

Open LXI 980 configuration software, the LXI 980 connected to the computer via USB as shown in Figure 3.3

1：Select the connection mode: USB connection, displays "Device 1"；

2：Click on the "reading configuration"

3：Configuration software displays "enter configuration mode successfully" LXI980 now ready to be configured.

4：After configuration, click [Write Configuration] to enter the normal working condition.

3 Configuration software interface

3.1 Setting Item Description (Namely: device configuration AT command)

3.1.1 Device ID number（DTUID）

This is a uniqueness identification number of the module, through this number, the server can identify the connected module. The number is 15-bit ASCII character, set by the manufacturer, users can not modify.

3.1.2 Equipment hardware (software) version number（HDVER，SWVER）

They reflect the software and hardware version information of the module, the parameters set by the manufacturer, users can not modify. When user is seeking technical support, provide such information can get more targeted recommendations.

3.1.3 The number of data center master station（SVRCNT）

The DTU allows to set a primary center, this parameter is used to control the number of data centers, if the number of data center master station is set to 1, the backup center becomes invalid.

3.1.4 DNS setting（DNS）

When using the domain name way connected data center, need to configure the DNS server IP. Usually, using the local mobile DNS server connection would be more rapid, such as Guangdong Mobile's DNS server IP address: 211.136.20.203, Beijing Mobile's DNS server address: 211.136.17.107, Shanghai Mobile's DNS server address: 211.136.18.171. Of course, you can also search for "China DNS server list" on the "Baidu" to find a local DNS server, then make menuconfig. In addition, this can be left blank, to use DTU internal curing DNS address blank when left blank.

3.1.5 Data Center Password（SVRPWD）

In order to increase the security of the data center, when DTU logs on the target server, it will send a data packet called "registration packet" (see section 3.4). The registration package contains the parameters, if user software finds the password does not match, it can refuse to log the device. "Password" can be set to any 8-byte long string.

3.1.6 Central server parameters

A target server settings include the IP address and port number, if the server does not have the fixed IP address, you can use domain name. When the server's IP address is valid, the domain name will be ignored.

✧ **Note：** In the network communications, there are TCP and UDP communication two ways. The TCP communication is based on connection communication mode, one side of communication is server, other side is the client-side, In the initial state, the server is in listening state, waiting for the client-side connecting, the client-side needs to take the initiative to connect to the server, in real application the data center usually is server mode, DTU usually is client-side mode. In TCP communication mode, any one party needs to respond after after receiving the data packet from the other side, so the method has the advantages of reliable communication but the communication speed would be slightly slower than the UDP mode. UDP is not based on the connection of communication mode, both sides of communication is equal, any one party after receiving data packet from other side don't need to reponse. Because of the communication process simplified, the UDP way has the characteristics of communication faster, but the stability and data reliability is not as good as TCP mode. When using TCP mode to establish a connection, DTU as TCP client-side, data center server as a TCP server, in this mode, DTU can make data exchanged after login data center server; When using UDP mode, no such relationship exists, data center host and DTU should establish a UDP connection. Because DTU in a mobile operator's network, network equipment on the public network (Internet) cannot directly

communication with DTU, in this case, just the DTU can initiative connect the public network equipment, when the DTU using UDP mode to send data to the data center, the data packet will carry its IP address and port number information, after the data center received the packet, according to the information, it can create a UDP connection to the DTU, after set up successfully, both sides can exchange data. Because under GPRS/CDMA environment, the UDP mode is not stable and easy to lost package, we don't recommend using UDP mode.

✧ **Notes: At present, DTU LXI 980 supports only TCP mode.**

3.1.7 Reconnection interval, connection times

When the network signal is bad, or data center server fails, the target server's connection may become difficult, if DTU constantly try to connect, will produce large amounts of data flow, increase the burden of the user. Through the parameters, users can easily control the connection conditions.

Target reconnection interval is used to control time interval of second try connection, minimum is 20s, the longest is 65534s. For example, suppose now configure reconnection interval is 200s, the connection times is 5, the main center and the standby center's IP and port number are set up. When DTU is working, first it will try to connect the main center, if the connection fails, will with the interval of the 200s, repeat, trying to connect to the main center until 5 connection chance to run out. Then, DTU will switch the target server, try to connect backup center, if the connection fails, will be in the interval of the 200s, repeat and try to connect backup center, until 5 connection chance to run out. If the system default 10 chances connection are fail, system will enter the interval time and wait. Add connection interruption interval increasing function, that is, when a group of main and backup service center after the connection fails, the connection interruption interval increases a set number (increasing connection interruption interval time). So, as the fail times of main and backup service center connection is more and more, connection interruption interval is becoming bigger, until the upper limit of set number (connection interruption interval maximum time).

3.1.8 Serial port baud rate（SERBAUD）

This parameter controls DTU serial communication baud rate, you must use the standard baud rate for communication, support baud rates as shown in Table 3.4.

3.4 Baud Rate

Standard Baud Rate									
300	600	1200	2400	4800	9600	19200	38400	57600	115200

3.1.9 Serial port data bits (stop bits) length（SERDAT，SERSTP）

These parameters control the format of the serial character data, user can set it according to their own serial device requirements.

3.1.10 Heartbeat packet interval（BEATTIM）

After module is connected to the server, if long time no produce data flow, connections will be cut off by operators. In order to keep connection activated state, the module will intermittent send a few bytes meaningless data to the server (the default Settings for FEh), the data is called heartbeat packets. The time intervals between two heartbeat packets can be set according to the local network situation, generally tens of seconds. Users can set heartbeat packet time interval by this parameter, value scope is 30 ~ 65534 (unit: S).

3.1.11 Heartbeat packet response timeout time（BEATOVER）

When the heartbeat packets sent, if in a heartbeat packet response timeout time, did not get reply packets, this kind of situation happen 3 times in a row, it should be network anomalies. DTU will connected

to the Internet again.Users can through this parameter to set the heartbeat packets response timeout time, value range is 1 ~ 65534 (unit: s).

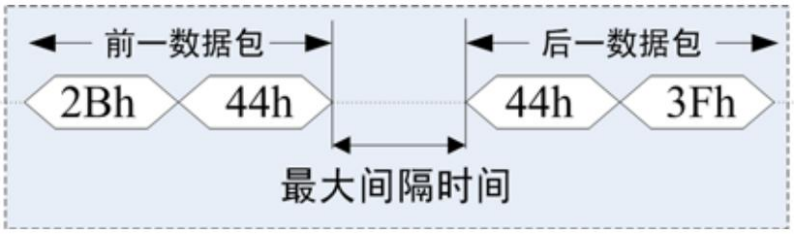
3.1.12 Heartbeat packet data setting（BEATDATA）

The default DTU heartbeat packets data is any ASCII data. Users can also set your own heartbeat packet data, the longest is 20 bytes, such as: "BeatData", when use the AT command configuration, the format is as follows:

“AT+BEATDATA=BeatDat”

3.1.13 Frame interval and packet maximum length（SERS，MTU）

After the serial port received the first byte data, if the received data in setting the frame interval time not reached the maximum length of data packets, the prior byte serial data as a pack, the next byte data as the start of next a pack, as shown in figure 3.8. If the user has framing requirements of the data transmission, can use the method to the subcontract.



3.8 Frame interval control of the subcontract

In GPRS/CDMA network, too big packets can increase the transmission delay, and easy to lose, so according to the situation of local network, please setup packet maximum length reasonably. When accepted data achieves the maximum number of packets, the module will make them as one packet to send, these movements is transparent to the user (also can be said to be hidden).

✧ **Note:** If the "frame interval time" or "packet maximum length" is set too small, then the network packet sent from DTU user data proportion will decline, will lead to flow increasing. If set too big, will cause packets send from DTU become bigger (no more than "the longest bag" value), and transmission delay will increase. User can grasp the specific parameters, if the data is not framing requirements, recommended "frame interval" is set to hundreds of milliseconds (the default value is 100 ms), "packet maximum length" is set to hundreds of bytes (the default value is 1024 bytes).

3.1.14 APN name、user name、password（APN，USRNAM，PWD）

These parameters are usually usd the default values. If using a dedicated VPN card, these parameters can be filled out according to the actual situation.

3.1.15 Authorized User number（USERNO1、USERNO2、USERNO3）

LXI980G can set three authorization number, the authorized cell phone number can use text message or ringing to configuration and awakening parameters of DTU, and when DTU configuration as server, can know the DTU local IP and port number.

✧ **Note:** When any one of the three authorized user number is configured to "888888", any number in the case of correct password, can usd SMS to operate DTU, does not include ringing.

3.1.16 IP

Internet Protocol Address, abbreviation is IP Address. IP address is the IP protocol provides a unified address format, it is for each network and each host on the Internet distribute a logical address, in order to shield the difference between a physical address.

3.1.17 Subnet mask

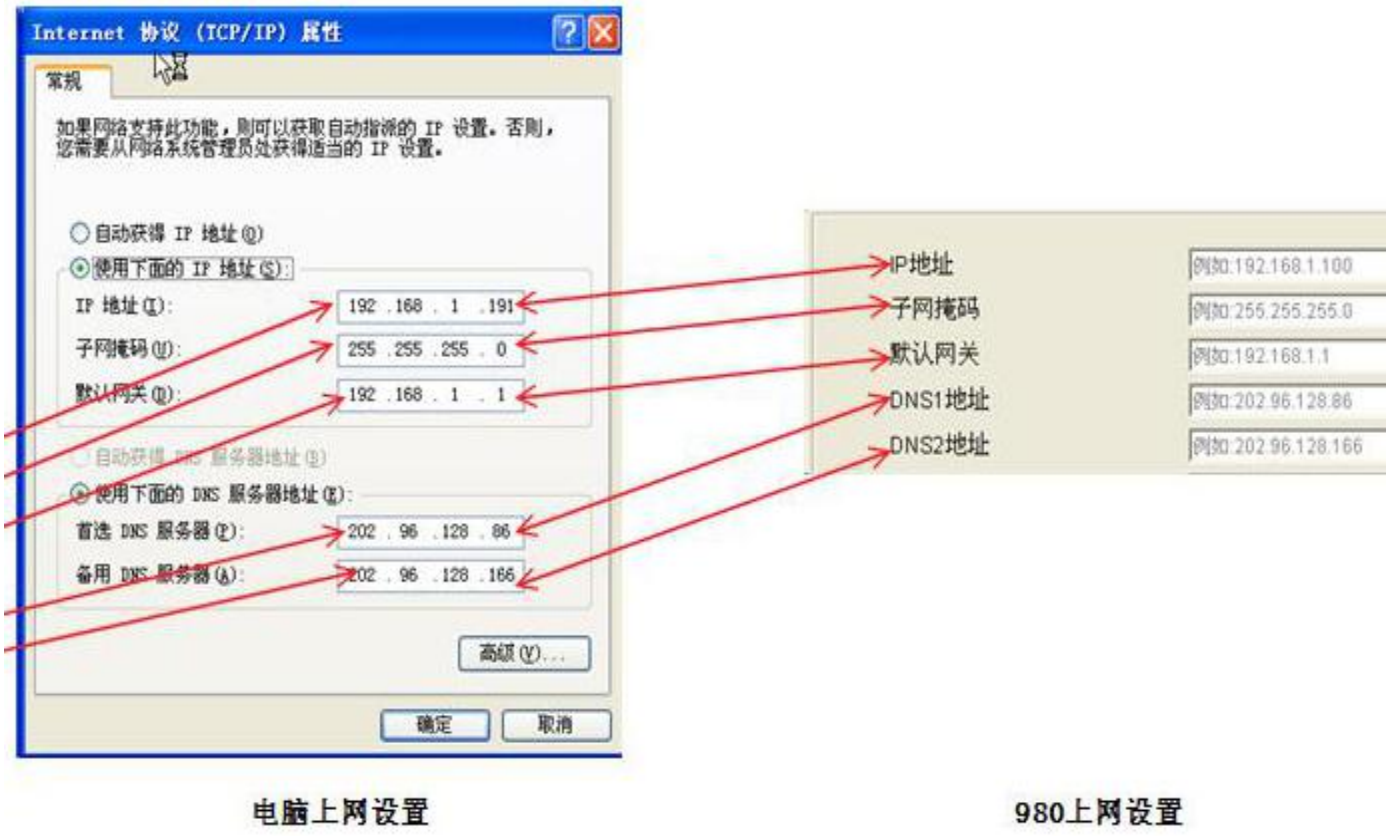
Subnet mask also call network mask, address mask, it is used to indicate which bit identifies an IP address is the subnet master resides, and which bit identify is bitmask of the host. The subnet mask can not stand alone, it must be combined with IP addresses to be used together. The subnet mask is only one function, that is to divide an IP address into a network and host addresses in two parts.

3.1.18 Default Gateway

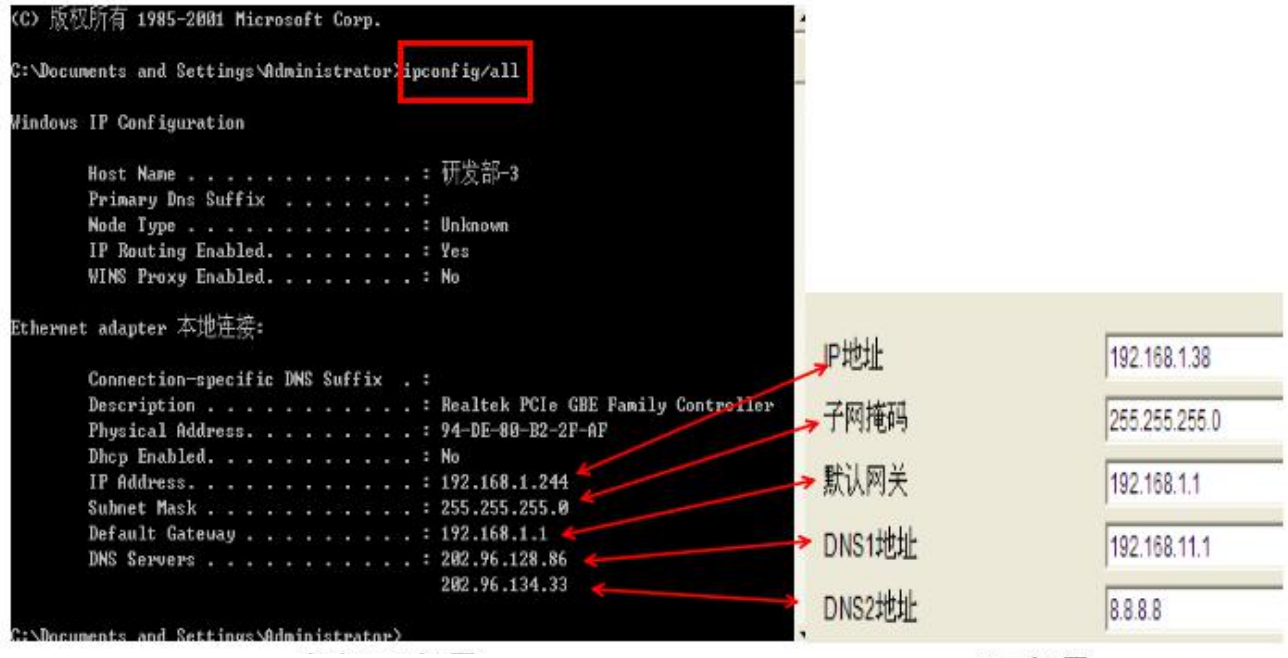
If a host can not find the available gateway, send the packet to the default assigned gateway, the gateway will process the data packet. Now the gateway of host is the default gateway generally. The default gateway of a computor can not be specified casually, must be correctly specified, or a computer will send packets to a no gateway computer, thus unable to communicate with other computers in other network. The default gateway setting also has manual and automatic two ways.The gateway is essentially a IP address let a network lead to the other network.

3.1.19 Set IP address 、Subnet mask 、Default Gateway;

LXI 980 Ethernet version communication online needs these data setting.



电脑上网设置　　980上网设置



Computer Internet settings **LXI980 setting**

3.1.20 IP address 、Subnet mask 、Default Gateway setting

. Device Interface

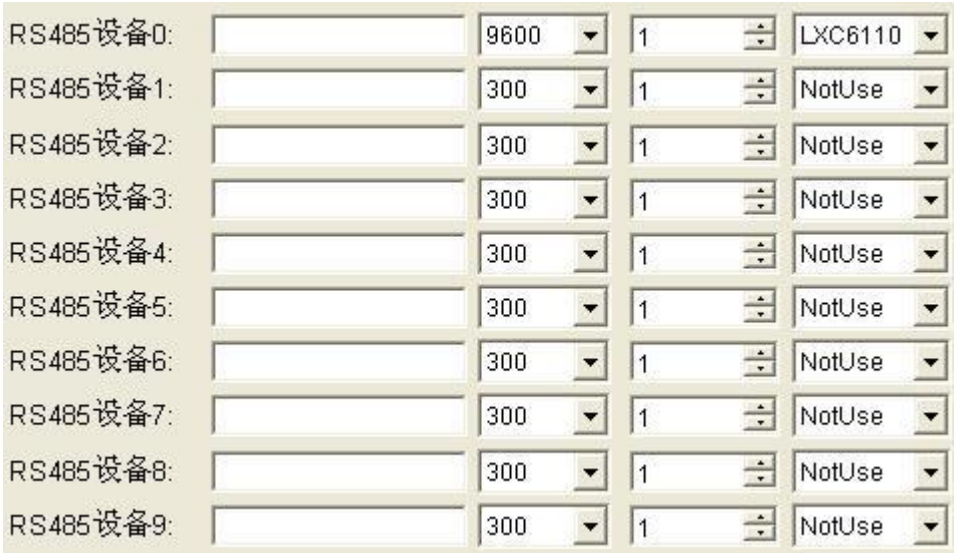
Make the following settings according to the external connection controller.

Ensample

RS232 port connect DSE7320(baud rate is 19200， ID is 10)

LINK port connect Harsen 660A(baud rate is 9600， ID is 1)

RS485 port connect LIXiSE6110(baud rate is 9600， ID is 1)



4 Statement

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