Industrial Class D120 Serial IP Modem

User Manual

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Content

Chapter 1

1 Preparation job before configuration

1) For GSM/GPRS version, please get a SIM card with data business.
2) For CDMA1x version, please get a UIM card with data business or inform us before order if the network uses non-ruim (nam-flashing).
3) Make sure the sim card or uim card is with enough data business and balance.
4) Make sure the signal is good enough where you test or install the router. Weak signal will make the router no work. If you find your signal strength is not good, please contact us for high gain antenna.
5) Find the modem type at the back cover of the router. It marks some characters like “Modem Type: Z-M3000”. Different modem types makes different configuration.

Notes:
We call D120 series IP modem as DTU (Data Transmission Unit)
Some people call it serial to cellular gateway modem.

Chapter 2

2 Prologue

This document is just suitable for the following mode type; it helps you quickly to used D120 DTU function and resolves some common questions.

Type	Description
D120g-Z-M3000	GPRS DTU

2.1 Version

Version	Date	Description	Author
2.1	2012-03-10	Update	Jason

2.2 Referenced Documents

D120_Datasheet_Eng

2.3 Notice

Chapter 3

3 Introduction

3.1 Brief

D120 Serials is a GPRS DTU with TCP/IP Protocol embedded. It has two comparatively individual parts: IP module with TCP/IP, software interface is AT+I commands; and GPRS module, supports all the AT Commands. All the standard AT Commands are transferred to GPRS module via the transparent Mode of IP module.
D120 Serials is usually applicable to the Host, which has no TCP/IP but has serial interface, such as SCM Data Collection Transmission System.

3.2 Features

- Compact and easy to integrate into your solution;
- Multi-flexible and compact data interface, TTL, 232 and 485, TTL and 232 are reduced to Rx, Tx, GND;
- Supports more IP Protocol families;
- Data transmission via Serial NET Mode, enters transmission mode when power on;
- Multi-operating status LED;
- Optimized modularization design, easy to upgrade.

Chapter 4

4 Getting Started

4.1 Panel introduction

4.2 The LED state

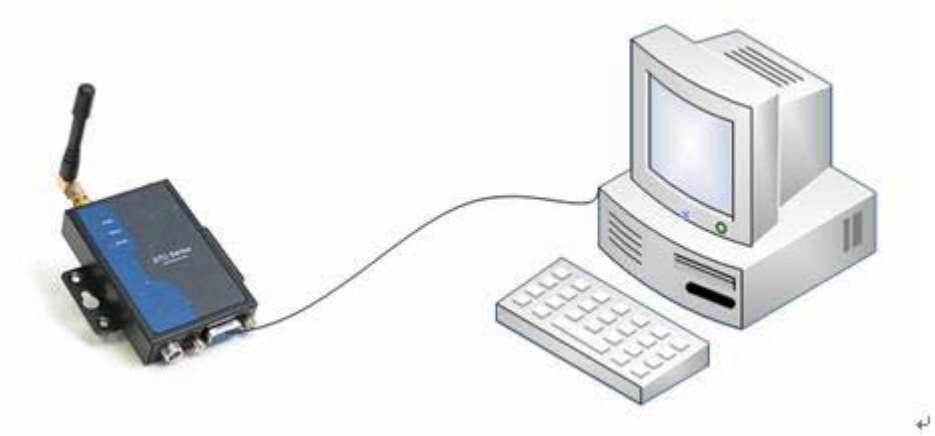
In order to check the module working state, our product have three Led, pwr LED is power state, Ring LED is Ring state, Data LED is Data state.

	PWR	Ring	Data
Start-up	Lights up 3s，flashing 0.5s,wink 0.5s ,lights up0.5s	wink	Lights up 0.5s
Logon network	flashing	wink	flashing
Sleep state	Lights up 0.5s, wink 0.5s	wink	wink
date Transfer	Lights up 0.5s, wink 0.5s	wink	flashing
No date transfer	Lights up 0.5s, wink 0.5s, Lights up 1s	wink	wink
Voice call	Lights up 0.5s, wink 0.5s	Lights up 1s,	wink

		wink 4s	
reboot	After 5s. wink	wink	wink

4.3 Connect to products

Please connect antenna and cable with our products, make sure, the port is COM1 or COM2?

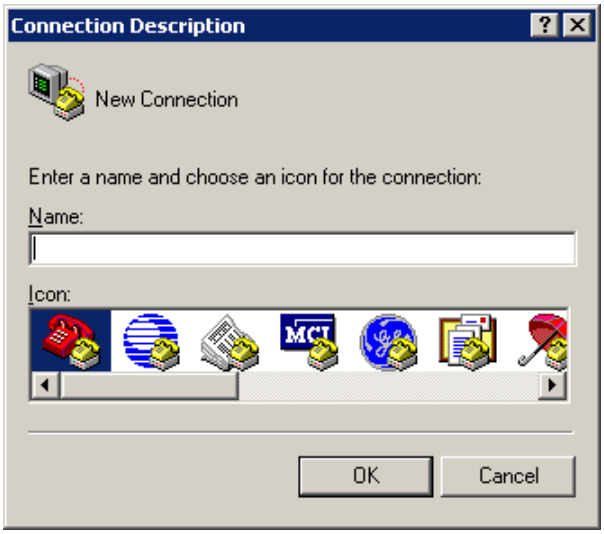


4.4 Insert SIM Card

Open the back cover. Insert into SIM card as follow

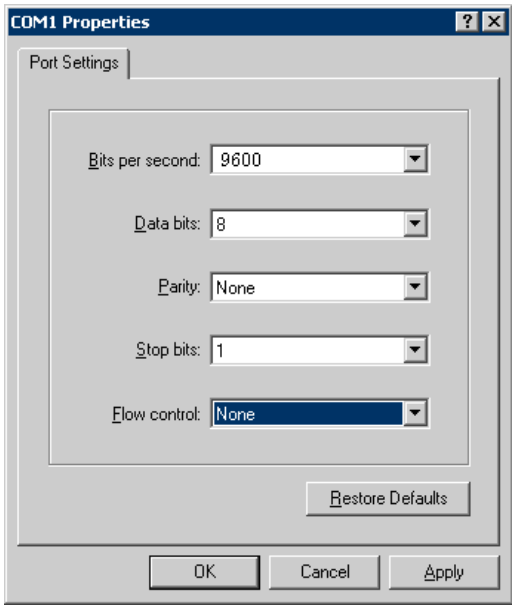
4.5 Note: Hyper Terminal

1. Open the HyperTerminal and input ***(any) as follows



2. Choose a right port

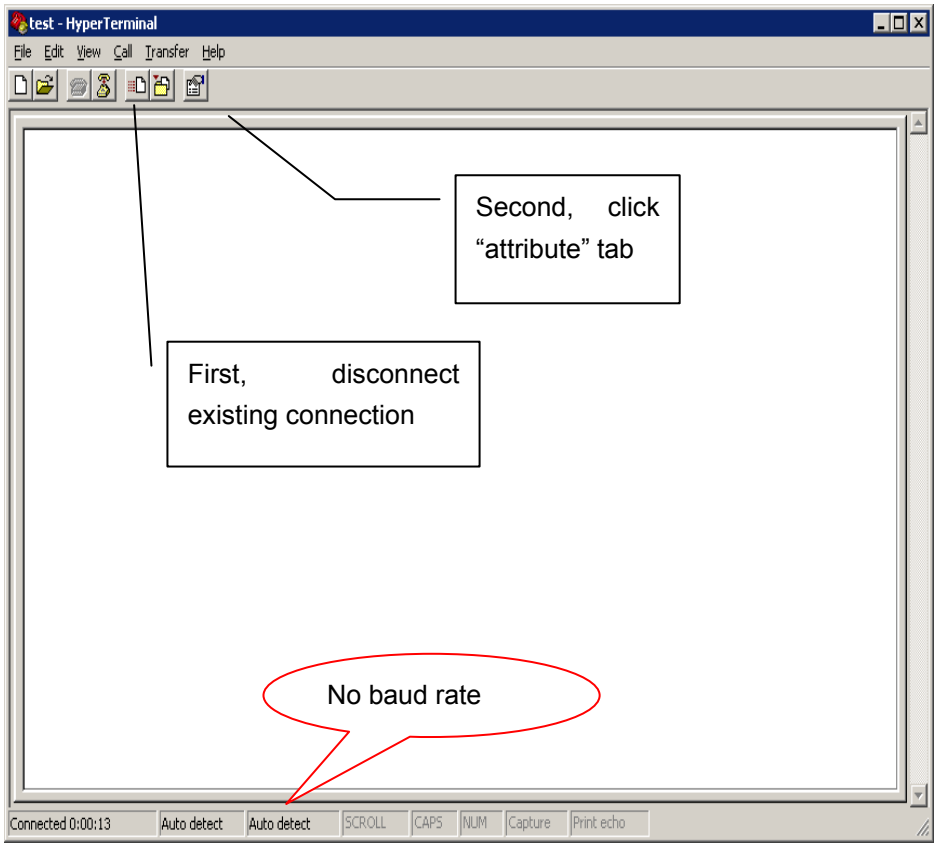
3. The right configuration as following



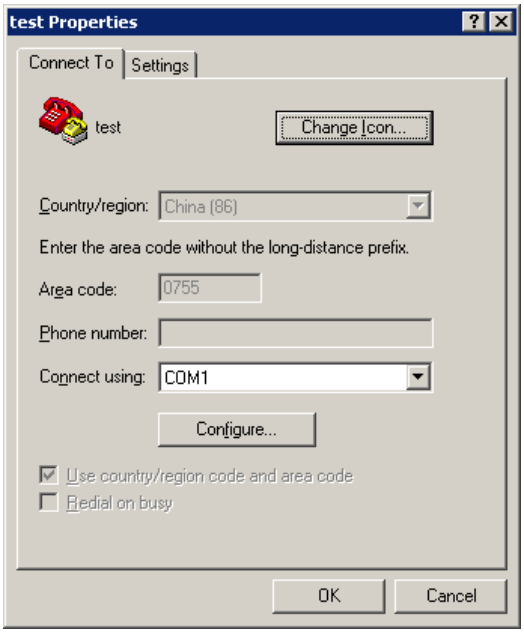
4. When your start-up Hyper Terminal, if it is not connected successfully, you can see the red mark of follow picture without any number.

Please follow the following steps to make it work.

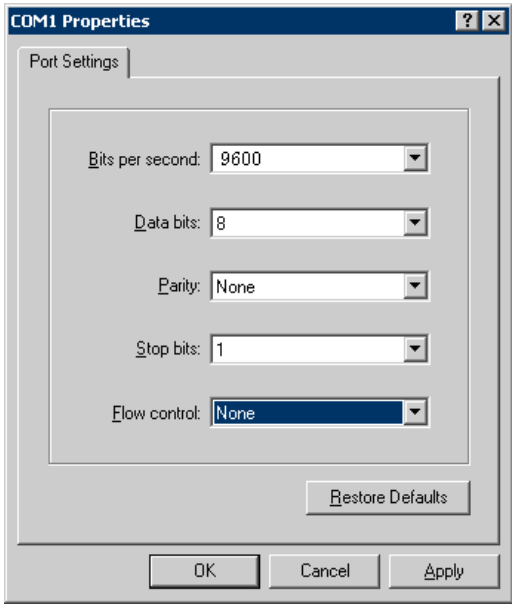
1) First, disconnect existing connection.
2) Second, click the “Properties button” or “attribute button”.



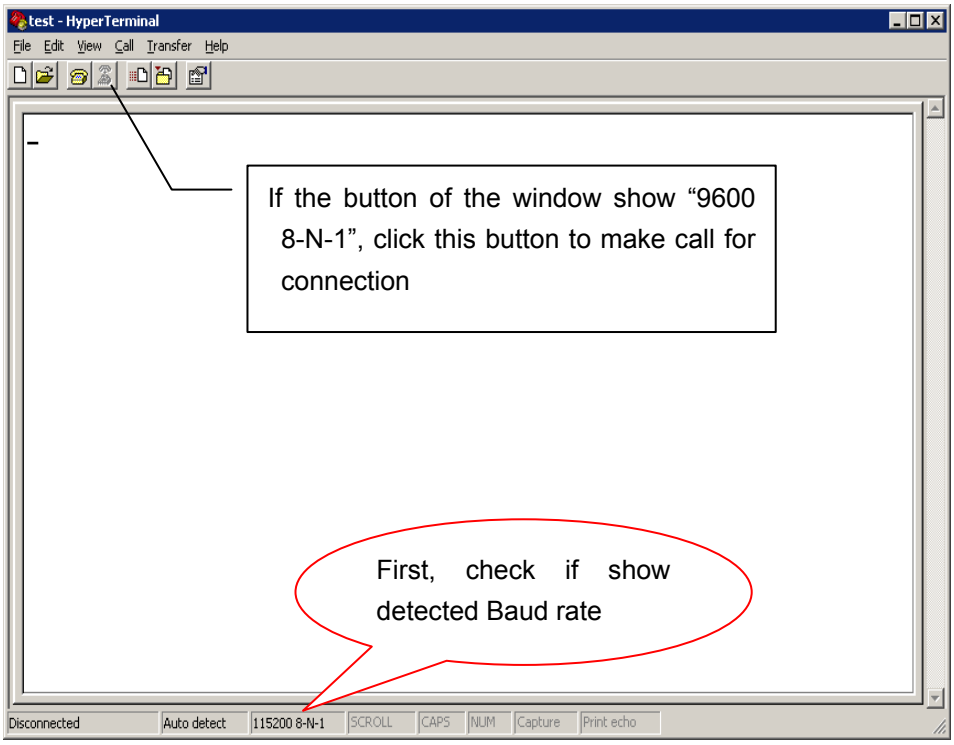
5. click the “configure”, and make sure again of you modify configure



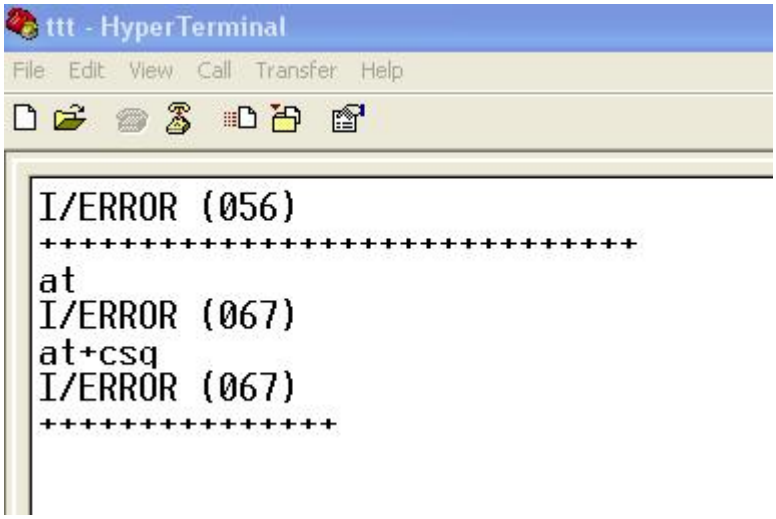
6. make sure your modify configure again, click “OK”



7. Then you can see it appeared baud rate on white label, then click the black label to make call



8. Press “+” three times on computer keyboard until the “Hyper Terminal screen” shows the “++++++++”, (if cannot, try to press “+ “until it show the “+++++++” on the screen), which means your configuration of the Hyper Terminal is successful.



Do not care about the ERROR code, just care if you see “++++++++++” on the screen. If yes, the connection is successful.

4.6 Test command

Notes:

1. **All <CF> means “enter”**
2. **The character and words in Green and Red is very important. Please study carefully. Thanks!**

AT<CF> //Test “at“ command
I/OK //Response ok parameter if successfully connected, you can make sure the module have no malfunction
AT+i //do nothing, or switch mode from AT command to AT+I Command
AT+iMCM //switch mode from AT+I command to AT command

Notes:
if the DTU is in “at” command mode, the ”at+i” command will not work, then you need switch “at” command mode;
if the DTU is in “at+i” command mode, the ”at” command will not work, then you need switch “at+i” command mode;
For example, if you are in “at” command mode, you can only input “at+csq” command, but cannot input “AT+iPARS” command. At this situation, you need type “at+i <CF>” to switch to “at+i” command mode. Then you can input “AT+iPARS” command successfully.

AT+CSQ<CF> // to check the Signal quality
+CSQ: **, ## // ** Should be the number between 10 and 31, the signal quality becomes better as the number grows. ## should be is 99, Or you should checking the equipment of antenna or SIM card.

ATD13800000000; //voice call for D120-221/225/229/325/328 (this is just an example for Chinese Mobile Network Provider)
AT+CDV13800000000 //voice call for D120c-329 (this is just an example for Chinese Mobile Network Provider)

AT+IPR=### //Set the Baud Rate, Please refer the chapter 6 for detail

For normally, just set the following parameters.
AT+iHSRV=ip:port //set the server IP and port, you can also set as DDNS instead of IP.
AT+iMIS=”at+cgdcont=1,ip,****” //Setting network(APN), fit for D120-221
AT+iMIS=”at+cgdcont=1,\”ip\”,\”****\”” //Setting network(APN),suitable for D120-225/229
AT+iUSRN=**** // user name
AT+iPWD=*** // password
AT+iPARS //save the parameter

AT+iHSRV? // to enquiry the “AT+iHSRV” setting result.

Chapter4

5 Configure DTU by PC

5.1 TCP Client

5.1.1 SerialNet Mode

AT+iHSRV=ip:port //set the server IP and port, you can also set as DDNS instead of IP.
AT+iTUP=2 //always online mode
AT+iPARS //parameter save
Notes: Please must input “AT+iPARS” command to save the parameters after configuration.

AT+i!SNMD //switch to SerialNet mode (please must input this command after parameter save, then the DTU modem will be into communication mode for work)
……
……
…… //communication
……
……
+++ //exit SerialNet mode
AT+iTUP=0 //disable the always online mode, refer chapter 8 for detail
AT+iPARS // parameter save

5.1.2 SerialNet Mode with trigger up

AT+iHSRV=ip:port // set the Server IP and port
AT+iIATO=n //n=Integer, the DTU will offline when the connect no data transport in (n) seconds
AT+iTUP=1 //set it to trigger up mode, refer chapter 8 for detail
AT+iPARS // parameters save
AT+iSNMD //switch to SerialNet mode
……
……
…… //communication

……
……
+++ //exit SerialNet mode
AT+iTUP=0 //disable the trigger up function
AT+iPARS //parameters save

5.1.3Socket mode

AT+iSTCP:ip,port //establish a tcp connection to the IP and port
I/(000) //000 is the Right connection handle
I/ERROR(075) //not logon cellular network，please checking Card and Signal quality
I/ERROR(207) //logon cellular network，But can't connecting to TCP server programme，you should to check firewall, IP Port and port listen if collide with them

AT+iSSND%:000, n:*******
//send a stream(******) to connect 000, length is (n),
AT+iSRCV: 000 //receive data from connection 000
AT+iSCLS: 000 //close the connection 000

5.2 UDP Connect

5.2.1SerialNet Mode

AT+iSTYP=1 //set UDP mode
AT+iHSRV=ip:port //set opposite IP and port
AT+iLPRT=port //set local port for listen
AT+iTUP=2 //always online
AT+iPARS //parameters save
AT+i!SNMD //switch to SerialNET mode (please must input this command after parameter save, then the DTU modem will be into communication mode for work)
……
……
…… //communication
……
……
+++ //exit SerialNet mode
AT+iTUP=0 //disable always online function
AT+iSTYP=0 //restore to tcp mode
AT+iPARS //parameter save

5.2.2 SerialNet Mode with Trigger Up

AT+iSTYP=1	//set UDP mode
AT+iHSRV=ip:port	//set opposite IP and port
AT+iLPRT=port	//set local port for listen
AT+iIATO=n	//n=Integer, the DTU will offline when the connect no data transport in (n) seconds
AT+iTUP=1	//set it to trigger up mode, refer chapter 8 for detail
AT+iPARS	//parameters save
AT+i!SNMD	//switch to SerialNET mode (please must input this command after parameter save, then the DTU modem will be into communication mode for work)
……	
……	
……	//communication
……	
……	
+++	//exit SerialNet mode
AT+iTUP=0	//disable always online function
AT+iSTYP=0	//restore to tcp mode
AT+iPARS	//parameter save

Note: change to SerialNet mode, the AT command don't have "!"

5.2.3 Socket Mode

AT+iSUCP:ip,port:lport	//establish a UDP connection by command. Send data to ip&port, receive data from lport
I/(000)	//000 is handle of the connection
AT+iSSND%:000,n:*******	//send a stream (******) to connect 000, length is (n),
AT+iSRCV: 000	//receive data from connection 000
AT+iSCLS: 000	//close the connection 000

5.3 DTU Point to Point Connecting Mode

Client setting is the same as above, server setting is below

Note: in china mainland, the point-to-point transmit ion mode is used to special network: VPDN,

5.3.1 TCP Server

AT+iHSRV=""	//clear the parameter
AT+iLPRT=port	//setting the listen port
AT+iTUP=2	//always online
AT+iPARS	//parameters save
AT+i!SNMD	//switch to SerialNET mode (please must input this command after parameter save, then the DTU modem will be into communication mode for work)
……	
……	
……	//wait for the connection establish
……	
……	
+++	//exit SerialNet mode
AT+iTUP=0	//disable always online function
AT+iPARS	//parameter save

Note: TCP Server must use always online function, please put jumper to the pin of watch dog, refer chapter 7 for detail.

5.3.2 UDP Server

No especial setting

Note: UDP connection both sides is equal, so both sides is used the same settings as before.

Chapter 5

6 Common function

6.1 Ping Function

AT+iPDS1=220.192.32.103
//setting advanced destination for ping
AT+iPDS2=220.192.0.130
//setting backup destination for ping, when first destination replies time out
AT+iPDS1=www.sina.com //Setting aim top-priority server，send PING package for cycle, (you can changed address with others)
AT+iPDS2=www.21cn.com//setting backup server, in case top-priority servers have problem (you can changed address with others)

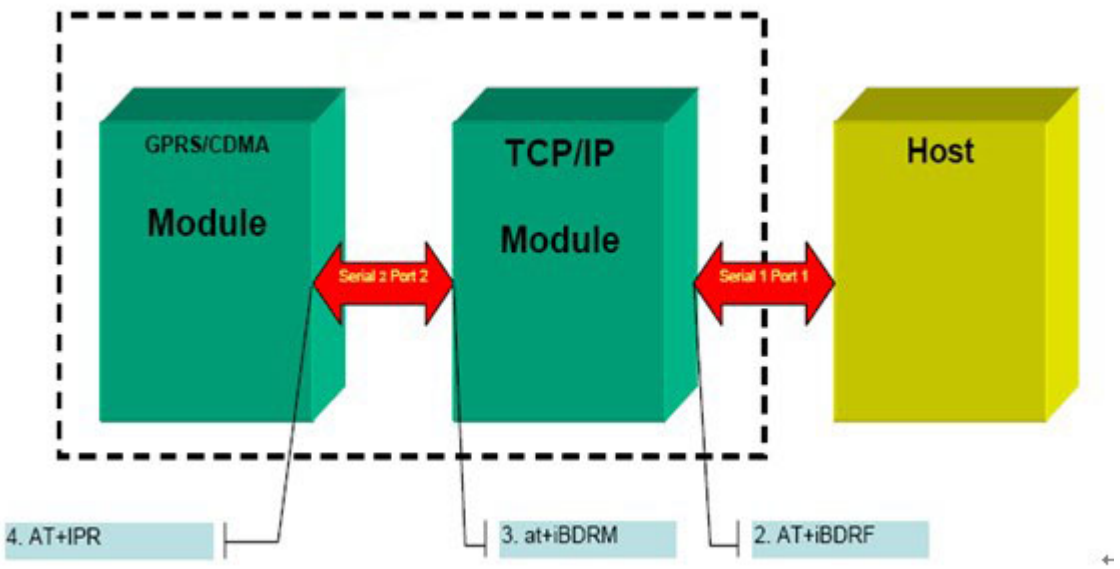
AT+iPGT=10000 //setting timeout
AT+iPFR=n //setting frequency to send ping packet
AT+iPARS //parameter save

Note: The function is only for SerialNET mode, detect whether online by period sending ping packet. Redial up when be detected offline. In Chinese mainland, China Unicom filter the ping packet to Internet, so the user should set the destination to China Unicom' DNS.

6.1.1Common China Unicom DNS

220.192.32.103
220.192.0.130

6.2 How to Change Baud Rate



6.2.1 Change CDMA Module Baud Rate

AT+iMCM	//switch to at command mode
AT+IPR?	//query current baud rate
AT+IPR=n	//setting a new baud rate

Note: n=0/2400/4800/9600/19200/38400/57600/115200 (the factory default value is 9600）

6.2.2Change TCP/IP Module Baud Rate

AT+i	//switch to AT+I command mode
AT+iBDRF=n	//below AT+I command should take effect after power down and on
AT+iBDRM=n	
AT+iSNSI=”n,8,m,1,0”	//m=n,o,e(no parity, odd parity, even parity), the parameters must use low case
AT+iPARS	//parameter save

6.2.3The relation with parameter to baud rate

n=1	600
n=2	1200
n=3	2400
n=4	4800
n=5	9600

n=6	19200
n=7	38400
n=8	57600
n=9	115200

Note: AT+IPR change the CDMA Module baud rate, AT+iBDRF, AT+iBDRM is TCP/IP Module baud rate for command mode, AT+iSNSI is TCP/IP Module baud rate for SerialNET. To change baud rate, you must take the right order, firstly CDMA Module, secondary TCP/IP Module

6.3 How to setup APN Or VPDN

6.3.1 Setting APN Configuration

AT+iMIS=”at+cgdcont=1,ip,APN” //Setting network(APN), fit for D120g-S
AT+iMIS=at+cgdcont=1,\”ip\”,\”APN\” //Setting network(APN),suitable for D120g-Z-M3000
AT+iUSRN=**** // user name
AT+iPWD=*** // password
AT+iPARS //save the parameter

Note: please modify the APN, username and password with your own from the ISP/SIM card provider

For example with D120g-Z-M3000, for China Mobile Network Provider with EDGE/GPRS network, the command is as follows: AT+iMIS= at+cgdcont=1,\”ip\”,\”cmnet\”<CR>
AT+iUSRN=wap<CR>
AT+iPWD=wap<CR>
AT+iPARS<CR>

6.3.2 Setting VPDN configuration

AT+iUSRN=**** //user name
AT+iPWD=*** // password
AT+iPPP=1 //Setting network (VPDN)
AT+iATH=n //n=1(PAP), 2(CHAP) Network certification mode , need to consult for the UN
AT+iPARS // Save parameter

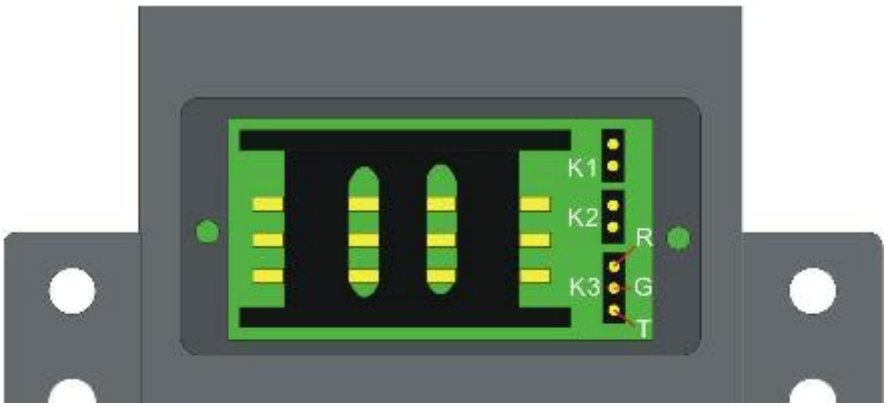
6.4 AT+iTUP Function

AT+iTUP=0 //disable the function
AT+iTUP=1 //trigger up mode
AT+iTUP=2 //always online mode

Note1: AT+iTUP=2 is for common SerialNET, auto redial up when offline; AT+iTUP=1 is for SerialNET with trigger up, offline when no data transfer in a period (refer chapter 9 for detail), and trigger up by some signal list below: 1 detect data need to transfer in serial port. 2 detect a ring signal, such as the wireless module has been dialed.

Note2: When the DTU in the command mode, and AT+iTUP=2, power on, in about 20~30 seconds the DTU should auto dial up, do not respond any command, If you don't want to wait, press a stream "+", to abort the DTU operation.

6.5 Watch Dog



K1	K2	Monitor Timeout
Open	Open	∞
Open	Close	15 minutes(D120g-S/Z) 30 minutes(D120g-H/C)
Close	Open	30 minutes(D120g-S/Z) 10 minutes(D120g-H/C)
Close	Close	5 minute

	RG Close	GT Close	Open
R●	Reserve	Monitor Host receive	Disable the Function
G●			
T●			

6.6 Flow Monitor

AT+iIATO=n //n>60 (second), offline when no data transfer (both send & receive) in the setting time.

Note: In the common SerialNET mode and AT+iTUP=2, the DTU should re-online immediately. In the SerialNET with trigger up and AT+iTUP=1, the DTU should be offline until be trigger up

Chapter 6

7 DTU Communication Guide

7.1 SOCKET Communication

D120-DTU has two operating modes, one is Command Mode, and the other is SerialNET Mode. Socket communication is implemented in Command Mode, when operating need commands to be sent.

7.1.1 Environment requests

You should be sure about the following test environment before starting the test
A computer online as application service center, which should have public network IP address.
Assure that the application service center has no programming implementation at gateway, and no restriction to 1024 port.
Get a Server Tool from E-Lins Technology and implement in the computer.

Setup listening mode (Default one is 1024，user can setup another one according to his own requirement).

Get the IP address of the computer.

Note：Fit for the requirements, we need to upgrade the software sometimes, the version you download maybe different from the photo above. The photo above is V1.32.

7.1.2Basic setting

AT+IISP1=*99***1#
AT+IDNS1=211.136.18.171
AT+IUSRN=WAP
AT+IPWD=WAP
AT+IMIS=AT+CGDCONT=1,\"ip\", \"CMNET\"
//You can get the parameter from your local network distributor.
AT+IXRC=0
AT+IMTYP=2

Note: You can omit this procedure if have set before.

7.1.3 SOCKET Setting

The following is an example of setting TCP communication. Default port is 1024; user can setup another one according to his own requirement.

AT+ISTCP:xxx .xxx .xxx .xxx,<Port Number> <CR>
//Set SOCKET connection ,here xxx .xxx .xxx .xxx means IP address of the computer.<Port Number>means port number, response I/xxx.xxx means handle number. The center shows the connection and gets the IP address of client if successfully connects. The center will display the detailed information, amount and speed as soon as the client transmits data. Generally, IP address of client will be cancelled by the center automatically once the client disconnects with the center via Socket command. Please note some unexpected situations, the center can't cancel its IP address if disconnects abnormally (e.g.
power off), when client connects with the center again, it will shows that there exists two clients though there just one client connect with the center.

AT+ISSND%:xxx,<string Length>:<string> <CR>
//Transfer data, xxx means handle, <string length> is the string length of
The transmission, <string> means the data. You can see the data from the terminal in the center.

AT+ISST:xxx<CR>

//Check Socket status, xxx means handle.
Response I/ <socketstat>
If <socketstat>≥0, means the number of the byte in Buffer; if <socketstat><0,means Socket error.

AT+ISRCV:xxx<CR>
//receive data, xxx means handle. Input characters and then press "enter", thus the data is transferred from the center to the terminal.

AT+ISCLS:xxx //Close Socket, xxx means handle
Please see Socket part of AT+I Command to get detailed information.

7.2 SerialNET Mode Communication

7.2.1 pDescription

D120-DTU has two operating modes, one is Command Mode, and the other is SerialNET Mode. Socket communication is implemented in Command Mode, when operating need commands to be sent. While in SerialNET Mode, as long as you initialize its parameter, you can transfer data via the parameter directly. That's because SerialNET Mode helps the equipment connect to D120 set TCP/UDP Socket connection via serial link.

7.2.2 Environment Requests

You should be sure about the following test environment before starting the test:

- A computer online as SerialNET Mode server, which should have public network IP address.
- Assure that the application service center has no gateway programming implementation, and no restriction to 1024 port
- Get a Server Tool from E-Lins Technology and implement in the computer. Setup listening mode (Default one is 1024).
- Get the IP address of the computer.
- Another machine for communication between SerialNET Client server and server.。
- Open the hyper terminal of the client

7.2.3 Basic setting

AT+IISP1=*99***1#
AT+IDNS1=211.136.18.171
AT+IUSRN=WAP
AT+IPWD=WAP
AT+IMIS=AT+CGDCONT=1,\"ip\", \"CMNET\"
AT+IXRC=0
AT+IMTYP=2

Note: You can omit this procedure if have set before.

7.2.4 Initialization setting

Serial NET Mode is established by first defining all related parameters using AT commands. Once in Serial NET Mode, no additional AT commands may be sent, as the host serial link will be dedicated to data, any characters will be sent as data. In this mode, no response for any commands, it's normal.

AT+IHSRV= xxx.xxx.xxx.xxx:< Port Number> <CR>
// Set Serial NET communication server IP, xxx.xxx.xxx.xxx means IP address, or name of the server, but it should be the one which DNS can read. <Port Number> means server listen port. If successfully sets, returns with I/OK.

AT+IDSTR=<string > <CR>
//Set disconnection signal in SerialNET Mode. <String> means signal string. After the terminal receives

the signal string, it will disconnect automatically.

<string> may be composed of any characters, unprintable ASCII character can be replaced by /Oxhh, here h mean hex number, 0..9 or A..F, that's to say hex number represents the character. For example:

AT+IDSTR=EEEEE

//the terminal will disconnect automatically as soon as it receives "EEEEE"

AT+IDSTR=PP\0x31

// the terminal will disconnect automatically as soon as it receives "PP1"string.

Returns with I/OK if successfully sets.

AT+ISTYP=v <CR>

//Set Socket communication type in Serial NET Mode.

v=0|1 //0 Means TCP, 1 means UDP

Returns with I/OK if successfully sets

AT+ISNSI=<baud>, <data_bits>,<parity>,<stop_bits>,<flow> <CR>

//Set communication interface parameter in SerialNET Mode.

<baud>=3..9 //baud rate classification

<data_bits>=7|8 // data bit

<parity>=N|E|O //verification

<stop_bits>=1 //stop bit

<flow>=0|1 //flow control

Default value: 8, 8,N, 1,0 //57600bps, 8 bits, doesn't need verify, one stop bit, doesn't need flow control.

Returns with I/OK if successfully sets.

AT+iIATO=n<CR>

//Set IATO parameter

n=0~65535, 1.2~1.5 heart-break cycle in common.

Returns with I/OK if successfully sets.