EX-9332D-Z/EX-9333D-Z
(DTU)
User Manual

<Version 1.00>

Date: 7/30/2011

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Revision History

Version	Date	Comments	Author
1.00	2011-07-30	Initial Release Version	Takaku

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Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as this device are used in a normal manner with well‑constructed network, this device should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. This device accepts no responsibility for damages of any kind resulting from delays or errors in data transmission, or for failure of this device to transmit or receive such data.

Safety and Hazards

Do not operate this device in areas where blasting is in progress, where explosive atmospheres may be present, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference. In such areas, this device MUST BE POWERED OFF. This device can transmit signals that could interfere with this equipment. Do not operate this device in any aircraft, whether the aircraft is on the ground or in flight and it MUST BE POWERED OFF when in an aircraft. When operating, this device can transmit signals that could interfere with various onboard systems.

> *Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is opened.*

The driver or operator of any vehicle should not operate this device while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

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Contents

Overview

EX-9332D-Z/ EX-9333D-Z (DTU) (M2M Device) is used for serial port device to transmit data transparently. The document describes how to the AT+i command set for using EX-9332D-Z/ EX-9333D-Z (DTU). The aim is to help user easy and quick to test, use and disposition the EX-9332D-Z/ EX-9333D-Z (DTU).

Note: Though all features are documented here, new features may still be in beta stage at publication and therefore may not yet be validated. Please refer to the Customer Release Note for complete and detailed information regarding beta and validated features at time of release.

This document applies to following products.

EX-9332D-Z	GPRS DTU
EX-9333D-Z	CDMA DTU

Abbreviations

APN	Access Point Name
DAC	Digital Analog Converter
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
IP	Internet Protocol
KB	Kilobyte
MCC	Mobile Country Code
MNC	Mobile Network Codes
MS	Mobile Station
PDU	Protocol Data Unit
PLMN	Public Land Mobile Network
RSSI	Received Signal Strength Indication
SMA	Small Adapter
SMS	Short Message Services

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Introduction

With the development of wireless communication technologies, wireless products are being adopted in numerous industrial and civilian fields. EX-9332D-Z/ EX-9333D-Z is DTU that support various frequency bands of GPRS and CDMA, and provides industrial terminal solutions for 2.5G communication. As a wireless modem, it support proprietary AT+i command for configuration via RS-232 interface.

EX-9332D-Z/ EX-9333D-Z adopts industrial level modules, specially designed for the complicated industrial environment which compatible with EMC, and will be your best choose of wireless communication.

Features

- *Data transparent transmit*
- *Always online*
- *Trigger up*
- *Remote wakeup*
- *Remote reboot*
- *AT command interface*
- *AT+i command interface*
- *Support GPRS*
- *Support APN*
- *LED: power, ring, data*
- *Interface level: RS232*
- *Watchdog(software and hardware)*
- *Industrial design for small dimension*
- *Robust industrial housing, Steel shell for anti-electromagnetic interference*
- *DC5~25V wild rang, low consumption*

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Specification

Product	Network	Temperature	Humidity	Voltage Range
EX-9332D-Z (DTU)	GSM 850MHz EGSM 900MHz DCS 1800MHz PCS 1900MHz	Operation: -20°C ~ +70°C Storage: -40°C ~ +85°C	90%	DC5~25V
EX-9333D-Z (DTU)	CDMA 800MHz	Operation: -30°C ~ +75°C Storage: -40°C ~ +85°C	5% ~ 95%	DC5~25V

Application

Remote Data Monitor and Control

Water, gas and oil flow metering

AMR (automatic meter reading)

Power station monitoring and control

Remote POS (point of sale) terminals

Traffic signals monitor and control

Fleet management

Power distribution network supervision

Central heating system supervision

Weather station data transmission

Hydrologic data acquisition

Vending machine

Traffic info guidance

Parking meter

Telecom equipment supervision (Mobile base station, microwave or optical relay station)

Oil field data acquisition

Warehouse supervision

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Basics

Environment

LED	Description	
Power	ON	boot
	FLASH	running
Ring	ON	boot
	FLASH	incoming call
Data	ON	boot
	FLASH	data transfer

| Interface	Description
Antenna	50Ω/SMA/Female
SIM	3.3V/1.8V
Power	Φ5.5mm/2.5mm, 5~25V (sugest 12V)
Serial Port	DB9

Assemble the antenna, power adapter, connect the EX-9332D-Z/ EX-9333D-Z (DTU) to PC via RS-232 serial cable, open the back cover, insert SIM/UIM card, at last, power on.

Note: Don't insert or remove the SIM/UIM card in power on state.
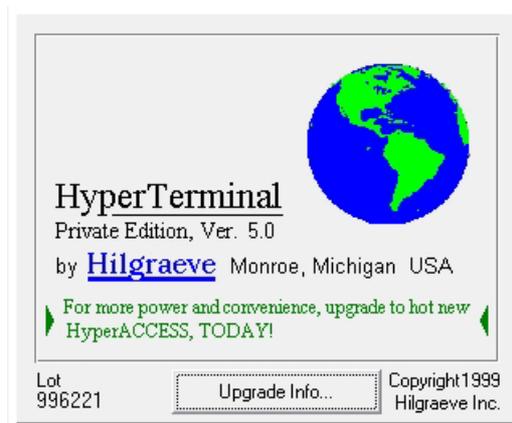
Follow these steps to open a HyperTerminal session.

Win XP: <**Start**> → <**Programs**> → <**Accessories**> → <**Communications**> → <**Hyper Terminal**>
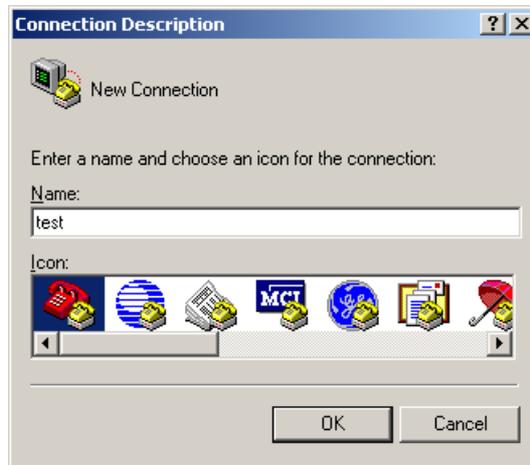
Enter the name of the connection and click **OK**.

Choose the communication port and click **OK**.

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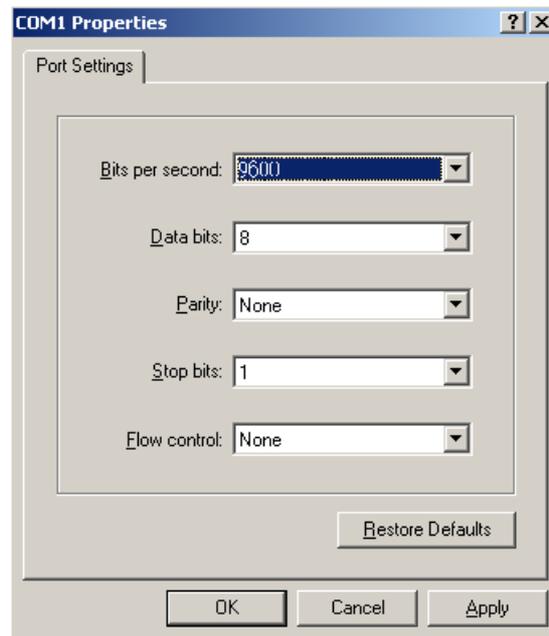
Set session properties.

Note: The default session properties are 9600/8/n/1/0 for this device, as shown in above picture.
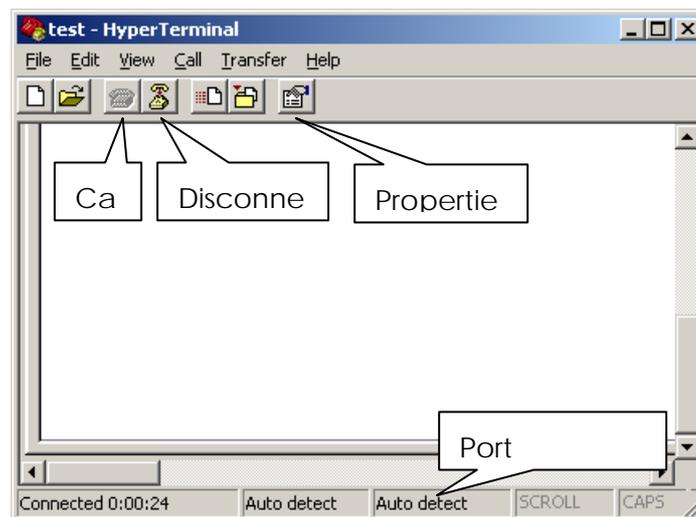
After configuration, new Hyper Terminal session window is shown as above.

If the baud rate appears auto detect, Click **Disconnect** button, then click **Properties** to set serial port parameters again.

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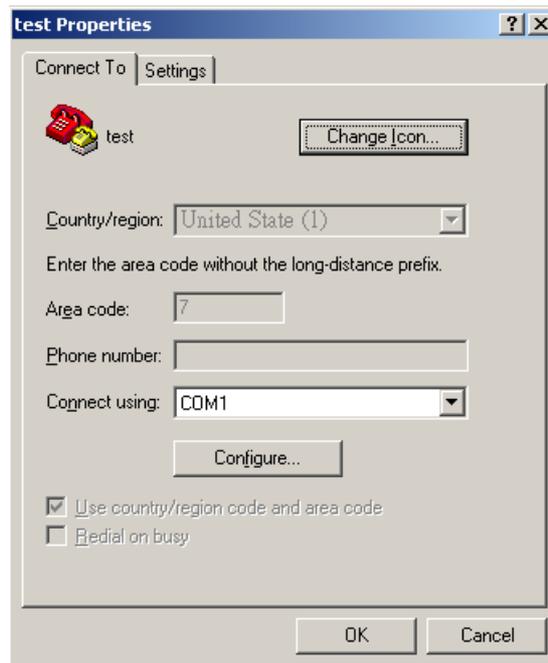
Click **Configure...** and then click **OK.**
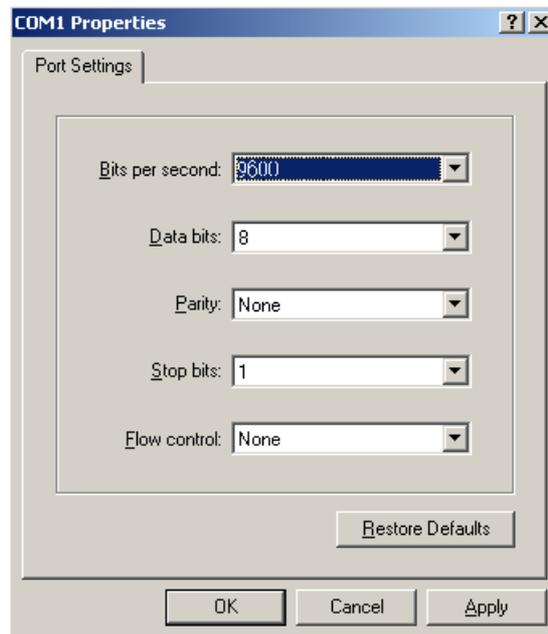
Confirm the parameters again.

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Port
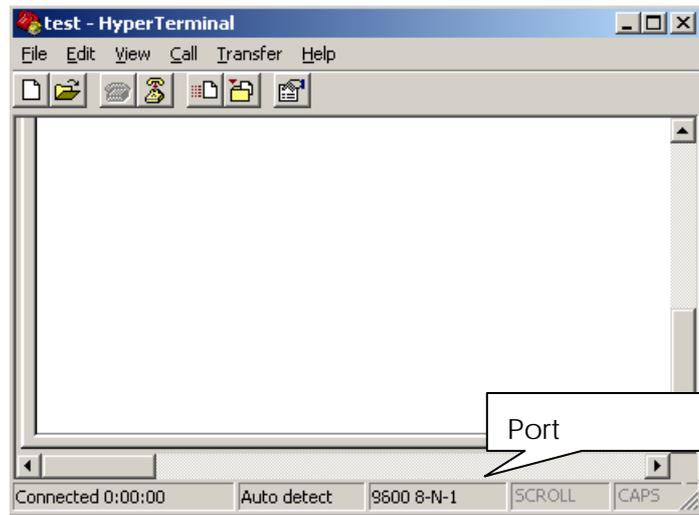
After configuration, new Hyper Terminal session window is shown as above.

Click **Call** button. If the bottom-left corner shows ***Connected…***, then this Hyper Terminal session is connecting to EX-9332D-Z/ EX-9333D-Z (DTU) and ready for operation.

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AT Commands Structure

AT***=***<CR>   *// setting the parameter*

AT***=?<CR>   *// query the parameter scope*

AT***?<CR>   *// query the recent parameter value*

AT+i Commands Structure

AT+i***=***<CR>   *// setting the parameter*

AT+i***=?<CR>   *// query the parameter scope*

AT+i***?<CR>   *// query the recent parameter value*

Mode Switch Command
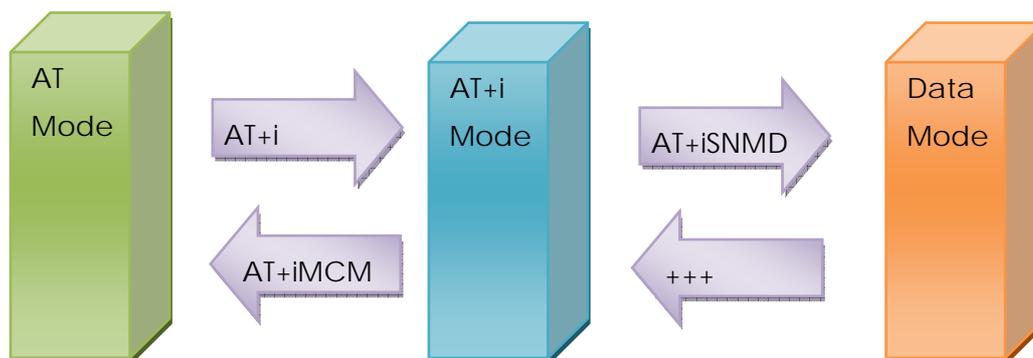
+++   *// return to command mode, the "+" do not display*

I/ERROR(056)   *// the background operate is abort, and start to accept the commands*

AT+iSNMD<CR>   *// switch to transparent data transmit mode*
I/OK

AT+i<CR>   *// switch AT command mode to AT+i command mode*
AT+iMCM<CR>   *// switch AT+i command mode to AT command mode*

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Configure EX-9332D-Z/ EX-9333D-Z (DTU)

TCP Mode

TCP Client Serial Net Mode Always Online

+++   *// interrupt, the EX-9332D-Z/ EX-9333D-Z (DTU) will change to command mode, the +++ will not to display, and the operate will keep about 10 second*

AT+iHSRV=ip:port<CR>   *// set the destination IP and port*

AT+iSTYP=0<CR>   *// set TCP mode*

AT+iTUP=2<CR>   *// always online mode*

AT+iPARS<CR>   *// parameter save*

AT+i!SNMD<CR>   *// switch to Serial Net mode*

……

……

……   *// communication*

……

……

+++   *// exit Serial Net mode*

AT+iTUP=0<CR>   *// disable the always online mode, refer chapter 8 for detail*

AT+iPARS<CR>   *// parameter save*

TCP Client Serial Net Mode Trigger online

+++   *// interrupt, the EX-9332D-Z/ EX-9333D-Z (DTU) will change to command mode, the +++ will not to display, and the operate will keep about 10 second*

AT+iHSRV=ip:port<CR>   *// set the Server IP and port*

AT+iSTYP=0<CR>   *// set TCP mode*

AT+iIATO=n<CR>   *// n=Integer, the EX-9332D-Z/ EX-9333D-Z (DTU) will offline when the connect no data transport in (n) seconds*

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AT+iTUP=1<CR>   *// set it to trigger up mode,*

AT+iPARS<CR>   *// parameters save*

AT+iSNMD<CR>   *// switch to Serial Net mode*

……

……

……   *// communication*

……

……

+++   *// exit SerialNet mode*

AT+iTUP=0<CR>   *// disable the trigger up function*

AT+iPARS<CR>   *// parameters save*

TCP Client Socket mode

+++   *// interrupt, the EX-9332D-Z/ EX-9333D-Z (DTU) will change to command mode, the +++ will not to display, and the operate will keep about 10 second*

AT+iSTCP:ip,port<CR>   *// 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 check Card and Signal quality*

I/ERROR(207)   *// logon cellular network   But can 't connecting to TCP server program   you should to check firewall, IP Port and port listen if collide with them*

*AT+iSSND%:000, n:*******<CR>*

     // send a stream(******) to connect 000, length is (n),

AT+iSRCV: 000<CR>   *// receive data from connection 000*

AT+iSCLS: 000<CR>   *// close the connection 000*

TCP Server

+++   *// interrupt, the EX-9332D-Z/ EX-9333D-Z (DTU) will change to command mode, the +++ will not to display, and the operate will keep about 10 second*

AT+iHSRV=”” <CR>   *// clear the parameter*

AT+iLPRT=port<CR>   *// setting the listen port*

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AT+iSTYP=0<CR>   *// set TCP mode*

AT+iTUP=2<CR>   *// always online*

AT+iPARS<CR>   *// parameters save*

AT+i!SNMD<CR>   *// switch to SerialNET mode*

……

……

……   *// wait for the connection establish*

……

……

+++   *// exit SerialNet mode*

AT+iTUP=0<CR>   *// disable always online function*

AT+iPARS<CR>   *// parameter save*

> *Note: TCP Server must use always online function, please put jumper to the pin of watch dog, and refer follow chapters for detail.*

UDP Mode

UDP Serial Net Mode Always Online

+++   *// interrupt, the EX-9332D-Z/ EX-9333D-Z (DTU) will change to command mode, the +++ will not to display, and the operate will keep about 10 second*

AT+iSTYP=1<CR>   *// set UDP mode*

AT+iHSRV=ip:port<CR>   *// set opposite IP and port*

AT+iLPRT=port<CR> *// set local port for listen*

AT+iTUP=2<CR>   *// always online*

AT+iPARS<CR>   *// parameters save*

AT+i!SNMD<CR>   *// switch to Serial NET mode*

……

……

……   *// communication*

……

……

```
+++                      // exit Serial Net mode
AT+iTUP=0<CR>            // disable always online function
AT+iSTYP=0<CR>          // restore to TCP mode
AT+iPARS<CR>            // parameter save
```

UDP Serial Net Mode Trigger Online

```
+++                      // interrupt, the EX-9332D-Z/ EX-9333D-Z (DTU) will change to
                         command mode, the +++ will not to display, and the operate will
                         keep about 10 second
AT+iSTYP=1<CR>          // set UDP mode
AT+iHSRV=ip:port<CR>                        // set opposite IP and port
AT+iLPRT=port<CR>  // set local port for listen
AT+iIATO=n<CR>          // n=Integer, EX-9332D-Z/ EX-9333D-Z (DTU) will offline when the
                         connect no data transport in (n) seconds
AT+iTUP=1<CR>           // set it to trigger up mode, refer chapter 8 for detail
AT+iPARS<CR>            // parameters save
AT+i!SNMD<CR>           // switch to Serial NET mode
……
……
……                      // communication
……
……
+++                      // exit Serial Net mode
AT+iTUP=0<CR>            // disable always online function
AT+iSTYP=0<CR>          // restore to TCP mode
AT+iPARS<CR>            // parameter save
```

Note: changes to Serial Net mode, the AT command don't have
"!"

UDP Socket Mode

```
+++                      // interrupt, the EX-9332D-Z/ EX-9333D-Z (DTU) will change to
                         command mode, the +++ will not to display, and the operate will
                         keep about 10 second
```

AT+iSUCP:ip,port:lport<CR>

       // establish a UDP connection by command. Send data to ip&port,

       receive data from lport (local port)

I/(000)   *// 000 is handle of the connection*

*AT+iSSND%:000,n:******* <CR>*

       // send a stream (******) to connect 000, length is (n),

AT+iSRCV: 000<CR> // receive data from connection 000

*AT+iSCLS: 000<CR> // close the connection 000*

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Common Function

Ping

AT+iPDS1=168.95.192.1<CR>

        // setting primary destination

AT+iPDS2=168.95.192.2<CR>

        // setting backup destination, when first destination reply time out

AT+iPGT=10000<CR>   *// setting timeout*

AT+iPFR=n<CR>   *// setting frequency to send ping packet*

AT+iPARS<CR>   *// parameter save*

Note: The function is only for Serial NET always online mode, detect whether online by period sending ping packet. Redial up when be detected offline. Some internet server machines may configured to drop ping requests, so it's better to set the global DNS server as PING destination, e.g. 168.95.1.1.

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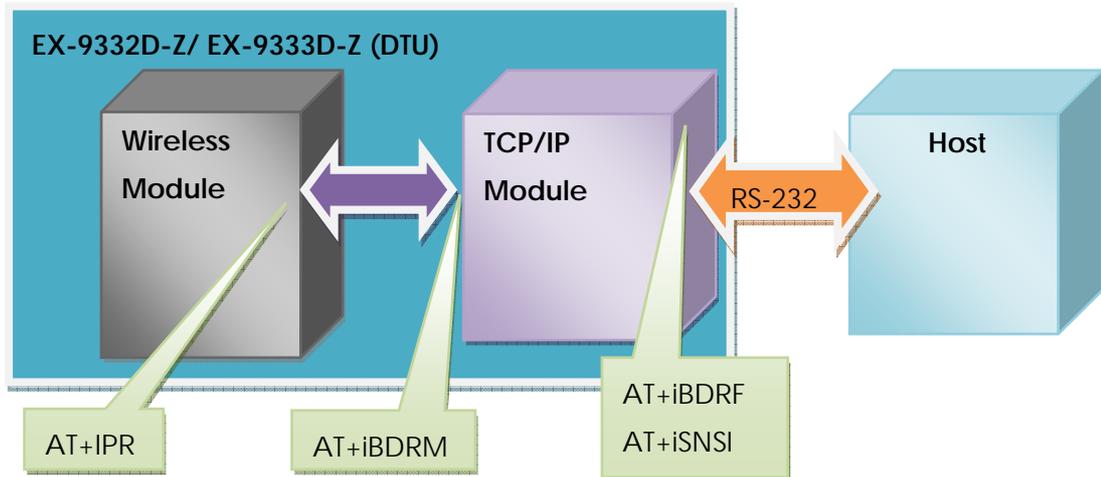
Baud Rate

Change Wireless Module Baud Rate

AT+iMCM<CR>   *// switch to at command mode*

AT+IPR <CR>   *// query current baud rate*

AT+IPR=n<CR>   *// setting a new baud rate*

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

Change TCP/IP Module Baud Rate

AT+i<CR>   *// switch to AT+i command mode*

AT+iBDRF=n<CR>   *// below AT+i command should take effect after power down and on*

AT+iBDRM=n<CR>

AT+iSNSI="n,8,m,1,0" <CR>

> *// m=n,o,e(no parity, odd parity, even parity), the parameters must use low case*

AT+iPARS<CR>   *// parameter save*

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The relation with parameter to baud rate

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 Wireless 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 Serial NET. To change baud rate, you must take the right order, firstly wireless Module, secondary TCP/IP Module.

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Setup APN or VPDN

Setting APN Configuration

*AT+iMIS="at+cgdcont=1,\"ip\",\"****\" <CR>*
       // Setting network(APN), apply to GPRS EX-9332D-Z/ EX-9333D-Z
       (DTU)
*AT+iUSRN=****<CR> // user name*
*AT+iPWD=***<CR> // password*
AT+iPARS<CR> // save the parameter

Setting VPDN configuration

*AT+iUSRN=****<CR> // user name, apply to CDMA EX-9332D-Z/ EX-9333D-Z (DTU)*
*AT+iPWD=***<CR> // password*
AT+iPPP=1<CR> // Setting network (VPDN)
AT+iATH=n<CR> // n=1(PAP) 2(CHAP) Network certification mode , need to consult
      for the UN
*AT+iPARS<CR> // Save parameter*

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Transmit Mode

AT+iTUP=0<CR>　　*// disable the function*

AT+iTUP=1<CR>　　*// trigger up mode*

AT+iTUP=2<CR>　　*// always online mode*

Note 1: AT+iTUP=2 are for common Serial NET, auto redial up when offline; AT+iTUP=1 is for Serial NET with trigger up, offline when no data transfer in a period, and trigger up by signals list below: 1, detect data need to transfer in serial port. 2, detect a ring signal, such as the wireless module has been dialed.

Note 2: If EX-9332D-Z/ EX-9333D-Z (DTU) is in command mode and AT+iTUP=2, EX-9332D-Z/ EX-9333D-Z (DTU) should auto dial up in about 20~30 seconds after powered on. In that state, it will not response any command. Press a stream "+" to abort the EX-9332D-Z/ EX-9333D-Z (DTU) operation.

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Hardware Flow Monitor
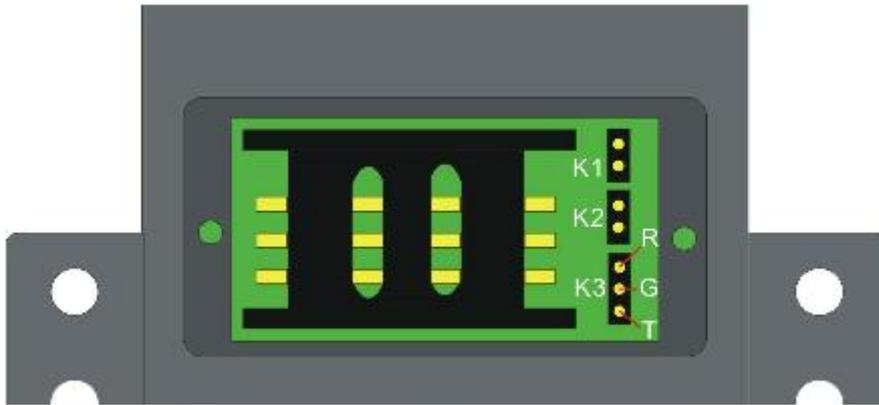
Time out	K1	K2
∞	Open	Open
15 mins	Open	Close
30 mins	Close	Open
5 mins	Close	Close

K3	Describe
RG Shortcut	Reserve
GT Shortcut	Monitor receive
Empty	Reserve

Software Flow Monitor

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

> *Note: In the common Serial NET mode and AT+iTUP=2, the EX-9332D-Z/ EX-9333D-Z (DTU) should re-online immediately. In the Serial NET with trigger up and AT+iTUP=1, the EX-9332D-Z/ EX-9333D-Z (DTU) should be offline until be trigger up*