



GPRS/CDMA DTU

Developer Datasheet

Version 2.4.0

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Disclaimer

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A. Brief introduction:

This UTEK's GPRS/CDMA DTU provides a plug & play, full-transparent protocol convert from RS232/485 to PPP/TCP/IP, brings wireless for distance-communication. User friendly, easy to configure, easy to use, easy to connect your embedded system to Internet. Applicable for real-time data logging, Koisk, and remote control, process control,etc

1.1 Feature

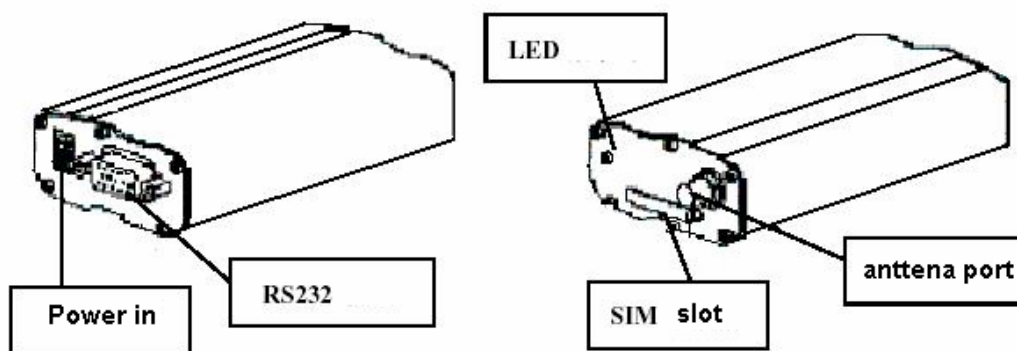
3 wire for Serial port(TXD/A+,RXD/B-,GND), $\pm 15KV$ ESD protection
Baud rate:1200bps~115.2Kbps adjustable
Totally capacity to handle TCP/IP protocol stack's malfunction, heart beep, connection lost inspection
Auto-dial while power-on, auto-redial while connection dropped
Support full-version TCP/UDP/IP/PPP protocol, DNS
Support sending data package to two servers in Simultaneously
Industrial grade, Strong at anti-interference
Heart beat supported in the application layer
Power supply: DC5V-2A
Remote configuration supported
Built-in hardware watch dog

1.2 Working environment

Working temperature	$-10^{\circ}C \sim +50^{\circ}C$
Working humidity	Below 95%
Storage temperature	$-20 \sim +60^{\circ}C$

二、-GPRS DTU appearance and installation

Size	110×54×25mm
Weight	130gram
Volume	132.3 cubic CM
Casing	AL-alloy



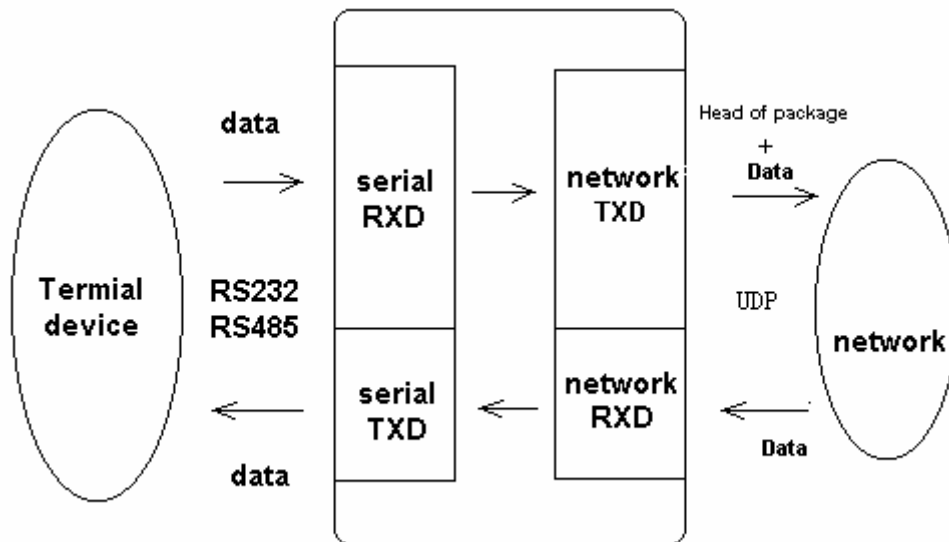
- Push-in small yellow button of SIM slot, install SIM card with metal side up, then push it back
- Connect the DTU' s RS232 port to other Host or device
- Connect DTU' s antenna to antenna port
- Connect Power for DTU
- After successful power-on, DTU indicator should be on and then begin to blink.



Notice: Other specific working condition, please check with our technician before installation.

C、GPRS DTU's function

After successful powered GPRS DTU (about 5s), power indicator should be on, wireless module begin to start, 6s later, DTU will log in to GPRS/CDMA. Once the indicator start to blink, it's mean, DTU is ready to work. During 1st time usage, please input :%%%%%%%%%% to enter configuration mode.



Principle

At TCP/UDP working mode, when the length of GPRS DTU received data beyond 512/255 byte or exceed the idle time of previous setup, data will be packed then transmit to specified server by IP and port. Vice versa for the serial port

Transmission Mode	Trigger data length(Byte)	Idle time without data receiving
TCP	512	Default :120MS, customize:(50MS-1000MS)
UDP	255	Default :120MS, customize:(50MS-1000MS)

四、GPRS DTU command of communication

Every DTU in the network have a unique terminal ID, which can be set via %ID command. Device ID length=4 bytes ASCII. More detail about transmission working mode please refer to %TM command.

1 UDP full-transparent data transmission working mode

1.1 Up-stream UDP data package with Device ID

Device ID	User data
4 bytes	251 byte

Notice: Device ID is not required for Down-stream UDP data

1.2 Up-stream UDP data package without Device ID

User data
255 bytes

1.3 UDP Data package with device ID and heart beep

Device ID	Heart beep Message ++H--
4byte	5bytes
Server feedback with a ++H—UDP package while receive this.	

1.4 UDP Data package with heart beep, without device ID

Heart beep Message ++H--
5bytes
Server feedback with a ++H—UDP package while receive this.

1.5 Down-stream UDP data package

User data
0-255 bytes
Heart beat
++H--

2 UDP encapsulation transmissions

Type	Description	Definition
UDP_TP_DATA	Data	0x2A
UDP_TP_HEART	Heart beep	0x26
UDP_TP_POWERUP	Terminal online	0x40
UDP_TP_CMD	Server command	0x43

2.1 Up-stream UDP data package with terminal ID

Package type 0x2A	Terminal ID Length+0x30	UDP PID	Terminal ID	User data
1byte	1byte	4byte	4byte	0-245bytes

2.2 Up-stream UDP data package without terminal ID

Package type 0x2A	0x30	UDP PID	User data
1byte	1byte	4byte	0-249byte

2.3 Up-stream UDP data package with terminal ID and Heart beep

Package type 0x26	Terminal ID length +0x30	UDP PID	Terminal ID	++H--
1byte	1byte	4byte	4byte	5byte

2.4 Up-stream UDP data package without terminal ID, with Heart beep

Package type 0x26	0x30	UDP PID	++H--
1byte	1byte	4byte	5byte

2.5 Up-stream UDP data package with terminal ID and power-up remind

Package type 0x40	Terminal ID length +0x30	UDP PID	Terminal ID	POWERUP
1byte	1byte	4byte	4byte	7byte

2.6 Up-stream UDP data package without terminal ID and power-up remind

Package type 0x40	0x30	UDP PID	POWERUP
1byte	1byte	4byte	7byte

2.7 Up-stream UDP command package with terminal ID

Package type 0x43	Terminal ID length+0x30	UDP PID	Terminal ID	command
1byte	1byte	4byte	4byte	0-245byte

2.8 Up-stream UDP command package without terminal ID

Package type 0x43	0x30	UDP PID	command
1byte	1byte	4byte	0-249byte

2.8 Down-stream UDP data package from server

Package type	0x30	UDP PID	Data or command
1byte	1byte	4byte	0-245byte

3 TCP communication mode

When under TCP communication working mode, once the terminal ID is set, then the start 4bytes of 1st TCP package means terminal ID, otherwise means communication is full-transparent. More detail about Cycle and online working mode of TCP could be found %TM

四、GPRS DTU command for configuration

Necessary configuration will be needed while 1st usage, Insert an available GPRS/CDMA SIM/UIM card, connect the serial to PC, then power on. Open Hyper terminal of Windows or other serial port debug program, set the com parameter as 9600 bps, no flow control, data bit: 8

Command	Description
%SR	Set the 1 st server's IP or host name
%PT	Set the 1 st server's communication port
%2SR	Set the 2 nd server's IP or host name
%2PT	Set the 2 nd server's communication port
%UB	Set DTU serial baud rate; default:9600BPS
%NS	Set 1 st server's DNS IP address or SMS DNS server's no.
%NS2	Set 1 st server's DNS IP address or SMS DNS server's no.
%OT	Set idle handling time, default: 120MS
%HT	Set heart beat time, default:0 MS
%ID	Set terminal ID, default: nill
%CP	Check current server's IP
%ATF	Restore factory setup
%AP	Set or review GPRS Access Point Name
%RC	Set or review DTU configuration mode
%TM	Set transfer mode
%UP	Set serial audit mode
%RST	DTU reset
%RSD	Set PPP dial delay
%RV1	Set 1 st vibrate wakeup service no.
%RV2	Set 2 nd vibrate wakeup service no.
%SS1	Set 1 st SMS wakeup service no.
%SS2	Set 2 nd SMS wakeup service no.
+++++	
Enter upon command during start up to restore factory setup	
%%%%%%%%	
Enter upon command during start up to enable setup, GPRS network will not be started.	

Command grammar:

Set parameter: %+command+value+Enter

Parameter review: %+command+?+Enter

1.2 %SR & %2SR

Description:

%SR command: Set 1st server's IP address or URL

%2SR: Set 2nd server's IP address or URL,

Note: Only supported under UDP mode

format :

command format : %SR<server's IP or name><?><LR>

command	Return value
%SR211.162.198.1 %NS Note: : Set 1st server's IP address 211.162.198.1	%SR211.162.198.1 OK %NS OK
%SR Note: : 1st server is forbidden	%SR OK
%2SRWWW.TOM.COM %NS2IP211.137.160.5 %2SR? Note: : Set 2 nd server's URL : <u>WWW.TOM.COM</u> , URL DNS: 211.137.160.5	%2SRWWW.TOM.COM OK %NS2IP211.137.160.5 OK %2SR? <u>WWW.TOM.COM</u> OK

Note: Once using %SR: Set URL as server's address, then %NSIP command must be used to set DNS's IP address, or using the %NSSC command to set a SMS URL DNS's no.

If user using %SR Set fix IP address as the server, then make sure use %NS command to Set URL DNS's address to Empty

Note: DTU in TCP mode only support one server, say, TCP/IP DTU is not support %2SR command.

1.3 %PT & %2PT

Description:

%PT: Set 1st serve's service port no.

%2PT: Set 2nd server's service port no.

format :

command format : %PT< server's service port no ><?><LR>

Note: : Default: 3000

command	Return value
%PT5000 Set 1st server port:5000	%PT5000 OK

%2PT50040 Set 2nd server port:5004	%2PT50040 OK
%PT609706767 Server's port not exist	%PT609706767 ERROR

DTU in TCP mode only support one server, say, TCP/IP DTU is not support %2PT command.

1.4 %UB

Description:

Set serial baud rate, default: 9600 bps, optional :1200、2400、4800、19200、38400、57600、115200

format :

command format : %UB < baud rate ><?><LR>

command	Return value
%UB57600 Set baud rate :57600	%UB57600 OK

1.5 %UP

Description:

Set audit mode, default: nill

format :

command format : %UP < audit mode ><?><LR>

command	Return value
%UP1	%UP1 OK
	UP 0> No Parity 1> Odd Parity 2> Even Parity 3> Forced "1" Parity 4> Forced "0" Parity

1.6 %NS %NS2

Description:

Set server's addressing method

format :

command format : %NSIP<URL server's IP><?><LR>

%NSSC<SMS URL's DNS server no><?><LR>

%NS2IP<URL server's IP><?><LR>
 %NS2SC<SMS URL DNS's no><?><LR>

command	Return value
%SR211.162.198.1 %NS Set 1st server's IP address 211.162.198.1	%SR211.162.198.1 OK %NS OK
%SR 1st server is forbidden	%SR OK
%2SRWWW.TOM.COM %NS2IP211.137.160.5 %2SR? Set 2 nd server's URL as WWW.TOM.COM , DNS server: 211.137.160.5	%2SRWWW.TOM.COM OK %NS2IP211.137.160.5 OK %2SR? <u>WWW.TOM.COM</u> OK
%SR211.164.1.1 %NS %2SRDEVICE %NS2SC13820009777 Set 1st server as fix IP Set 2 nd server as SMS URL DNS, Sever no:13820009777	%SR211.164.1.1 OK %NS OK %2SRDEVICE OK %NS2SC13820009777 OK

1.7 %HT

Description:

Set UDP heart beep time length, time start to count while the last DTU data was sent. If there is no new data sent in time length, then a heart beep will be sent.

For TCP mode's DTU, this command will active TCP protocol's keep alive time

format :

command format : %HT<heart beep time length(ms) ><?><LR>

Note: default heart beep is 0

%ID

Description:

Set DTU's ID (ASCII code in 4 bytes)

format :

command format : %ID<ID><?><LR>

1.8 %CP

Description:

Review current using server's IP address

format :

command format : %CP<LR>

1.9 %ATF

Description:

Restore factory Set

format :

command format : %ATF<LR>

1.10 %AP

Description:

Set GPRS Active Point's name

format :

command format : %AP< Active Point's name ><?><LR>

command	Return value
%APVIP.NET.QD	%APVIP.NET.QD
Set GPRS AP's name: VIP.NET.QD	OK

1.11 %OT

Description:

Set character input overtime length

format :

command format : %OT<Overtime length><?><LR>

command	Return value
%OT130	%OT130
Note: Data will be sent after 130ms if there is no new input	OK

1.12 %RC

Description:

Set DTU command configuration mode

format :

command format : %RC<STATUS><?><LR>

BYTE0 : allow serial port configuration while working	BYTE 1 : allow remote configuration
---	-------------------------------------

STATUS value

00、11、01、10、

command	Return value
%RC11 Note: allow remote configure from server and from serial port	%RC11 OK
%RC10 Note: forbid remote server setup, allow serial	%RC10 OK

1.13 %TM

Description:

Set DTU's transfer mode

format :

command format : %TM<MODE><?><LR>

Parameter:

Working mode	Protocol	Value	Description
Cycle	TCP	0	Using serial port to control server connection
Online	TCP	1	Auto-connect to server while power on
Full-transparent	UDP	0	UDP full transparent transfer (default)
Cap/half-transparent	UDP	1	Application level cap format for UDP data

TCP cycle mode command:

Prefix: 0X2B =ASCII '+'

TCP connecting command under cycle mode

Command	content	Return value	Description
Online	+UP	+OK	Successful connect to server
Online	+UP	+ER	connect failure to server
online	+UP	+RS	DTU occurred issue has to restart
After DTU will sent +DM to inform serial device after 500MS from connection drop			

Connection close process while under TCP cycle mode

- 1、 Input +++ after 4 idle character input cycle(%OT)
- 2、 Re-input +++ after 4 idle character input cycle(%OT)
- 3、 DTU confirm connection close request
- 4、 DTU will sent +DM to inform serial device after 500MS from connection close

1.14 %RV1 & %RV2

Description:

Set Ring alert server no.

format :

command format : %RV1<Number><?><LR>
 %RV2<Number><?><LR>

command	Return value
%RV1	%RV1
%RV2	OK
Forbid Ring alert	%RV2
	OK
%RV1075526503786	%RV1075526503786
DTU will dial after wake by for ring alert then dial	OK

Note: : -30000 系列 DTU 提供 2 个振铃唤醒号码

1.15 %RSD

Description:

Set rest time delay(0~600S)

format :

command format : %RSD<Number><?><LR>

command	Return value
%RSD0	%RSD0
Note: forbid PPP rest time delay	OK
%RSD200	%RSD200
Note: set RSD=200s	OK

1.16 %SS1 & %SS2

Description:

Set Sms alert server no

format :

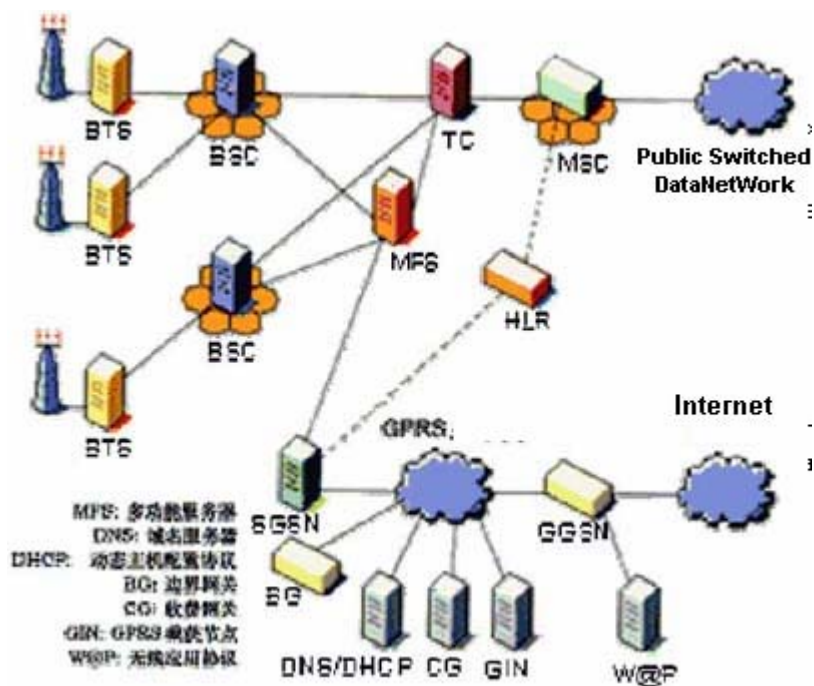
command format : %SS1<Number><?><LR>

%SS2<Number><?><LR>

command	Return value
%SS1	%RV1
%SS2	OK
Note: not use SMS alert server	%RV2
	OK
%SS113851478211	%SS113851478211
Note: : terminal will waitng SMS alert from 13851478211,then begin PPP dialing	OK

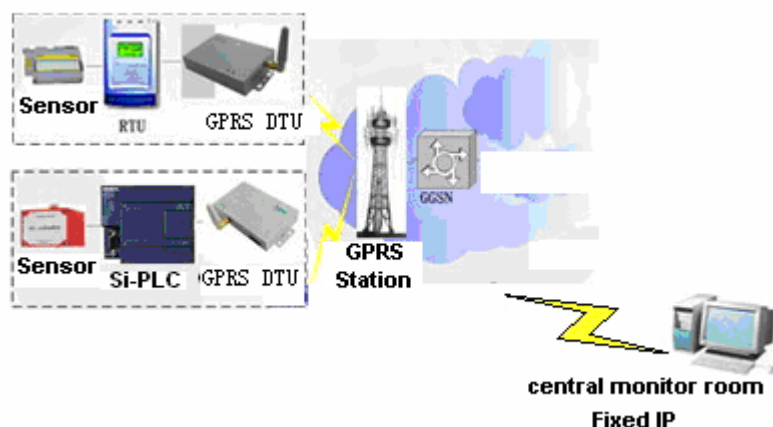
E、GPRS DTU network

Usually, GPRS-DTU terminal's IP address is dynamic intranet IP address , access Internet mobile service provider's GPRS gateway, then GPRS-DTU terminal gets temporary NAT port project service. So, Internet server can't access GPRS-DTU at the 1st move, instead of GPRS-DTU online then take the 1st access to Internet server.

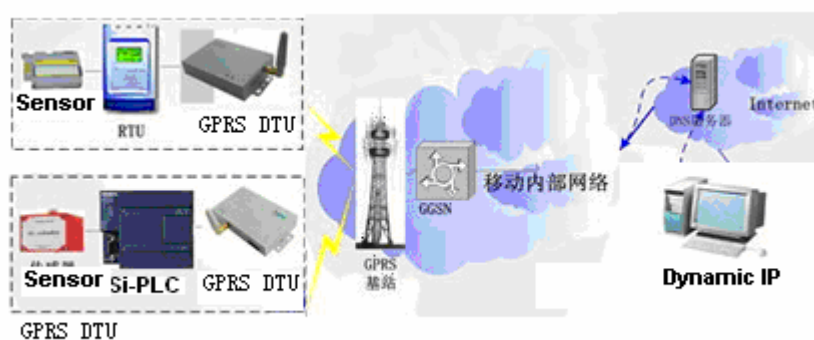


5.1 GPRS network topology

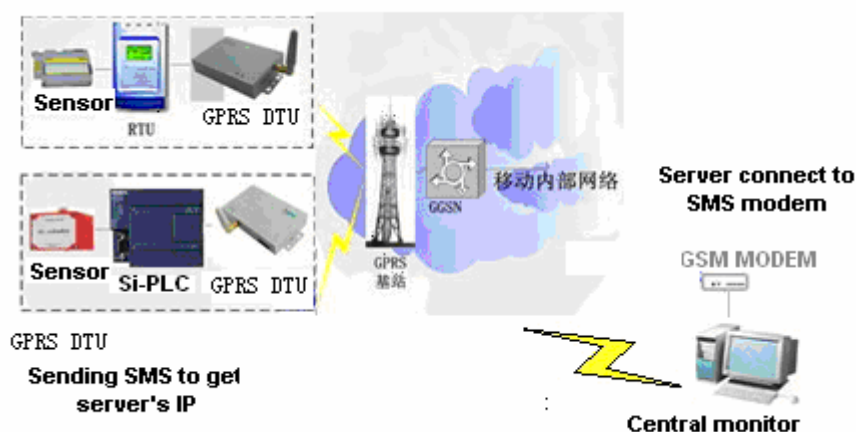
1: Public network, fix IP address Server, GPRS-DTU using IP address to access Internet server directly



2. Server using ADSL public network, Dynamic IP+URL DNS software



3. Server using ADSL public network, Dynamic IP+ SMS DNS software+ SMS modem



4: Server using GPRS-DTU or GPRS MODEM, APN fixed IP。

5.APN line, all connection via intranet fixed IP

F、 Note:

- 1、 Not using GPRS-DTU at plane or aircraft.**
- 2、 Not using GPRS-DTU at RF restricted area.**
- 3、 Not using GPRS-DTU inside medical device/vehicle or other electronic shield equip.**
- 4、 Using the original accessory only**
- 5、 Keep your eyes to prevent being steal or missing.**
- 6、 Power off before change SIM card**