GPRS Data Transmit Unit

(USR-GPRS232-701)

File version: v1.6



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1. Product Description

1.1.Instruction

GPRS DTU (Data Transfer unit) is a wireless terminal equipment which can converter serial data to IP data or converter IP data to serial data, then transmit through wireless communication network. GPRS DTU is to use GPRS network to transmit data, it adopts industrial-grade embedded processor, embedded TCP/IP protocol stack. To provide users with virtual private networks, which is high speed, stable and reliable, data terminal online forever, and a variety of protocol conversion.

At present, this device have already been used widely in M2M industry, such as

- Electric power industry: 1. Electric remote meter reading 2. Substation monitor 3. Power line monitor 4. Switch monitoring system on distribution network column
- Water conservancy industry: 1. Water quality monitor 2. Reservoir gate remote control system solutions 3. Water conservancy GPRS scheduling system application solutions 4. Water pipe network monitoring system 5. Reservoir automatic monitoring system
- Oil industry: 1. Oil and gas well remote monitor 2. GPRS remote oil field automation monitoring system 3. Gas pipeline network monitoring system solutions
- Municipal industry: 1. Street lamp remote monitoring management 2. Pipe network remote monitor 3. City energy consumption monitor
- Environmental protection industry: 1. Pollution source monitor 2. Atmospheric environment monitor 3. Noise monitor 4. Dust monitor
- Agricultural applications: 1. Greenhouse remote monitor 2. Aquaculture farmers monitor 3. Water pump monitor and control
- Other industries: 1. Warehouse monitor management 2. Elevator remote monitor 3. Remote crane management system 4. Industrial energy consumption monitoring 5. Gas station GPRS data acquisition system 6. GPRS weather information collection system

1.2. Features

- > Easy to use, only configurate few parameters
- > Use MD251 industrial module
- Support TTL/RS232/RS485 interface, choose before purchase
- > Using single module embedded protocol stack, no external CPU, higher stability
- Embedded TCP/IP protocol stack and GPRS technology
- > Support remote parameters settings, can change IP, port, ect. by SMS



- Support GSM network, four frequency for global
- Support public and APN network access
- Can configure heartbeat pack data format, transmit interval, and keep connection with server. Can configure log pack data format and automatically establish network connection with server.
- Support data length control, can set the length of single sending package and data pack waiting time.
- Support ALWAYS ONLINE mode, and dropped reconnect.
- Completely transparent transmission, can take place of data transfer radio, no changes needed on your original system
- > Use aluminum alloy case, shielding external disturbance effectively
- Matched sucker antenna, convenient for customers install and use inside the iron case
- Support four frequency, can be used all over the world

1.3. Parameters

- Working Voltage: 5-28v
- ➢ Working current: max 1200mA
- ➢ Working temperature: -20∼75Celsius
- Storage temperature: -40~85Celsius
- Storage humidity: 5%~95%RH
- MAX transmit consumption: GSM900 class4(2W)

DCS1800 class1(1W)

Working Frequency: 850/900/1800/1900MHZ



2. Install

2.1.Packing list

- RS232 version:
- 1. USR-GPRS232-701 with antenna * 1
- 2. Serial cable * 1
- 3. 12V1A power adapter * 1
- 4. User guide CD * 1
- RS485 version:
- 1. USR-GPRS232-701 with antenna* 1
- 2. 12V1A power adapter * 1
- 3. User guide CD * 1

2.2. Size and Diagram

DTU can be used independently, which packaged in metallic casing. It is easy to install by the fixed position of the hole on both side. Details as follows (unit: mm)





PCB size: 80 * 50mm



2.3. Antenna and SIM Card Installation

The antenna use SMA female base. Revolve the SMA male head to DTU antenna base, and ensure it is tightened, not to affect the signal quality.

When install or take out SIM card, firstly use a spike to insert the little yellow point on the right side of SIM base, then SIM cutting ferrule is open. SIM card should be put into cutting ferrule in first while installing, ensure metal face outside.

2.4. Power Supply

DTU is widely used in complex external environment. To adapt to its application and improve working stability of system, it use advanced power technologies, users can use our 5V 1A power adapter directly.

701 power supply ranges DC5~28V

2.5. Indicator Lamps

There are 3 indicators on DTU: "NET", "POW", "DATA"



index	name	description
1	PWR	On once power is on
2	NET	State Module function:
		Off Module is not running;
		64ms On/800ms Off Module does not find the network;
		64ms On/3000ms Off Module find the network;
		64ms On/300ms Off GPRS communication;
3	DATA	When TCP link is established, it will on

2.6. Serial Port Instruction

2.6.1. RS232 Definition

RS232 port use 9 pin, female hole. Only three lines are defined, the rest is empty.



Diagram 2-2 RS232 interfaces

ID	Indicia	Function	Instruction
2	TXD	Device data transmit	RS232 level
3	RXD	Device data receive	RS232 level
5	GND	Ground	Communication
			common place

Diagram 2-3 RS232 Pin description

In order to debug easily, serial cable will be supplied for customer to connected with PC directly.



2.6.2. RS485 definition

Please inform us before order if you need RS485 version.

DB9 connector is the same as RS232 port on above photo. As to 6,9 pin of RS485, following function:

ID	Indicia	Function	Instruction
6	485-A	A pin of RS485	RS485 level
9	485-B	B pin of RS485	RS485 level

Diagram 2-4 RS485 pin description

As to RS485 equipment, we supply a DB9 pin connector and case for users make RS485 cables by themself.

2.6.3. TTL definition

Please inform us before order if you need TTL version.

DB9 connector is the same as RS232 port on above photo, use pin1, pin4 and pin9, following function:

ID	Indicia	Function	Instruction
1	RXD	Device data transmit	RS232 level
4	TXD	Device data receive	RS232 level
5	GND	Ground	Communication common place

Diagram 2-5 TTL pin description

3. Parameter Configuration

3.1. Hardware Connection

Configuration

Before configuration, you need to connect DTU with PC by serial cable and power on.



3.2. Parameter Configuration

- > Software: Configuration by software in CD. Easy to configurate through PC .
- Command: Configuration by AT command. In this case, users just need serial communication program.
- Message: configuration by sending sms.

3.3. Software configuration

3.3.1. Software interface introduce

DTU access into AT command mode automatically after power on, within 2~40s, users can set parameters by serial port; If not, DTU will access to working mode, you need to set by sms after preparation of the GSM network.

Free setup software is supplied,

USR-GPRS232-700V1. 0. EXE

double-click to run,

"USR-GPRS-DTU V1.0.exe", reference as below:

🏟 USR-GPRS232-7	00 ¥1.1.0.0			
File(F) 中文(L) Hel	Lp (<u>H</u>)			
Computer Com			Information Clear in	formation
(1) ComName	COM1 . (2)	Close	[Receive]:	~
(3) BaudRate	115200		[Receive]: (19) +BATS: 0	
(4) Parity/data/stop			[Receive]:@@Ver:V01_B01_025-DTU-01, Build Time:2012/12/27 14:08	
DTU Parameters Config	g		[Send]:AT+CSTT="CMNET"	
APN Name	CMNET CMNET	_ (?) <mark>(5)</mark>	[Receive]:	
IP/DomainName	124.128.16.120	[?] <mark>(6)</mark>		
NetProtocol	TCP (?)(7)		[Send]:AT+CIPCFG=1,50,0,0,0,0	
Remote Port	10000 (?) (8)		[Receive]: OK	
DTU BaudRate	115200 • (?) (9)		[Send]:AT+CIPPACK=0,"4C4F47"	
Parity/data/stop	NONE - 8 - 1 - (?) (10)		[Receive]:	
Device ID	1001 (?) (11)			2
Heartbeat Format	LOG (?) (12)		[Send]AT+CIPPACK=1, 4C4F47434E3A31303031	
Heartbeat Time	50 s (?) (13)		[Heceive]: OK	
Wait Length	0 Bytes (?) (14)		[Send]:AT + CIPMUX = 0	
Wait Time	0 ms (?) (15)		[Receive]: +CIPMUX: 0	
(16) Write default(17) 🚰 Read Dev Config (18 😿 W	/rite All Config	ок	~

Software instruction:

1) Select PC serial port which connected with DTU

- 2) Serial port status: Open Serial closed
- 3) PC Baud rate(Default 115200 is okay. Will be modified according to (9))
- 4) PC Parity bit/data/stop bit(Default value.Will be modified according to (10))
- 5) Set DTU APN account
- 6) Set DTU destination IP or domain name
- 7) Set DTU network protocol
- 8) Set DTU destination port
- 9) Set DTU baud rate(Recommend default value 115200. If it is changed, the user also need to modify the above baud rate of PC.
- 10) Set DTU parity/data/stop bit(Recommend default value . If it is changed, the user also need to modify these above parameters of PC)
- 11) Set DTU ID
- 12) Set DTU heartbeat format
- 13) If specified need automatic reconnection when start the network link, then after the link is accidentally disconnected, waiting for <interval> seconds, will reestablish the server connection. This configuration effective for client only.

If specified need sending heartbeat packet when start the network link, in links space <interval> seconds, will automatically send heartbeat packet to server. This configuration effective for client only.

- 14) Device receive<waiting data size> bytes data, immediately sent to connected server.
- 15) When serial port receive less <wait for data size> bytes data, and the module waiting for <waiting data timeout> milliseconds later, still didn't receive serial data, then will start sending buffer data.
- 16) Restore default configuration
- 17) Read current configuration
- 18) Save current settings
- 19) Message area, show configuration information

3.3.2. Software operation

Configuration instruction

1. If you have already set up the IP and port number, after powering on, the power indicator light, the network indicator starts to flash quickly, when find network, the network indicator flashes once per second, then start mount GPRS network now. The network indicator flashes quickly, if you find the network in about 10-30s, then the network indicator flash quickly and the DATA indicator light and start flashing. It express that the device access to DTUGPRS transparent transmission mode.

2. 2s later after DTU powered on, you can make AT command configuration within 2~30 seconds

Operation:



Make sure serial cable connected with PC, software running and serial port opening. When DTU powered on again, it will show:

"+BATS: 0 @@Ver:V01_B01_025-DTU-01, Build Time:2012/12/27 14:08"

When it shows "device started, please finish read and configuration within 15 seconds", then click "configure all parameters" (This operation should be finished before DTU mount GPRS, about 10-30 seconds. During this time, you can make the operation of reading, configuration; If overtime, you will need power on and operate again)

3.4. AT Command Configuration

Open serial testing software, and serial port corresponding with PC, power on again, the same steps as "3.3.2 software operation". AT commands please refer to "6. AT commend instruction"

3.5. Message Configuration

In the case of GPRS network have been mounted by DTU, send short messages to configure, steps as follows:

1. Change IP

Message content 111888,setip:0,<ipaddr> For example, IP is 182.32.116.166 So message content is 111888,setip:0,182.32.116.166 Return: SETIP OK

2. Change port

Message content: 111888,setport:0,<port> For example, port is 7100 So message content is 111888,setport:0,710 Return: SETPORT OK

3. Inquiry DTU parameter

111888,status





4. Change Bund rate

111888,setbaud:115200

5. Restart DTU to work with new configuration

111888,reset Return: RESET OK

When receive the correct return after sending messages, you need to send "command 5" (restart module to work with new configuration), then the device will work in your settings.

4. Public IP Instructions

DTU data can not be sent to device which has not been connected to internet or intranet. So public IP must be used in DTU application. Following is the description of public IP Public IP is the address that the online PC obtained from Internet. PC with public IP and PC on Internet can access to each other.

NAT(Network Address Translator) realize intranet IP interconversion with public IP, transform mass intranet IP to one or less public IP addresses separately, to reduce the occupation of public IP address. The most typical application of NAT: In LAN, only need one computer connected to the Internet, you can use NAT to share Internet connection, made other computers in LAN can also surf the Internet. With NAT protocol, computers in LAN can get access to the computers on Internet, but computers on Internet cannot access to computers in LAN.

On windows operating system, the software of Internet connection sharing, sygate, winroute, unix/linux natd etc. all use NAT protocol to share Internet connection. The intranet internet access mode provided by ISP(Internet Service Provider) is based on NAT protocol.

The classification of public IP address

Class A: From 1.0.0.0 to 127.255.255.255, assigned to large network which has a large number of hosts but with fewer LANs.

Class B: From 128.0.0.0 to 191.255.255.255, generally used for international companies and government agencies



Class C: From 192.0.0.0 to 223.255.255, generally used for small companies, campus network and research institutions,etc

Class D: From 224.0.0.0 to 239.255.255, used for special purpose, also called "broadcast address"

Class E: From 240.0.0.0 to 255.255.255.255, Temporary retention

To judge if the computer has a public IP, you can operate like this to check:

Start- Run- input CMD- then Enter- input "ipconfig/all". As following picture: 180.186.12.99 is belong to Class B, it is an effective public IP address.

C:\TINDOWS\system32\cmd.exe - 8 × Microsoft Windows [版本 5.2.3790] . (C) 版权所有 1985-2003 Microsoft Corp. C:\Documents and Settings\Administrator>ipconfig/all Windows IP Configuration Host Name : vps27 Primary Dns Suffix Node Type : Unknown IP Routing Enabled. No WINS Proxy Enabled. . . . : No Ethernet adapter 本地连接: Connection-specific DNS Suffix . : Description : Intel(R> PRO/1000 MT Network Connection DHCP Enabled. No IP Address. : 180.186.12.99 Subnet Mask : 255.255.255.224 Default Gateway : 180.186.12.97 C:\Documents and Settings\Administrator>_

Generally, we can distinguish whether the IP is public IP through following method:

- Usually, the machine that Telecom and Netcom through adsl dial-up obtain IP address, it should be public IP; Railtom broadband has NAT address translation, not public IP.
- > Cable modems for dial-up Internet IP address, also public IP.
- GPRS wireless card (for laptop wireless Internet), the IP is Mobile GPRS internal IP, but because for GPRS DTU, they are from the same network, so they can also be used for connectivity.
- If users access to Internet through a router, and the router address is not the public IP through NAT translation, then we can adopt router port mapping, so the data can be forwarded through a router to your computer (Specific application diagram reference to chapter 5.2)
- > If the machines IP is dynamic public IP, means the Internet IP is not fixed, it requires a



dynamic DNS software installed on the PC. DTU support DNS, so as long as users' applying domain name remains the same, DTU can also connect with them. There are many free DNS and domain name of the companies now, such as PeanutHull and Secco communication software.

If your public IP address problem has been solved, so your PC will have the condition as DTU data collection center, then you can test and use DTU.

5. Application Environment Testing

There are three application environment testing, as belows:

- 1. The application of public network server
- 2. The application of router transit
- 3. The application of server transit

5.1. Application of Public Server



1. Testing target: Server software and local device can be in two way transmission by DTU

2. Testing request: DTU serial port connected with PC serial port

3. Testing tool: USR-TCP-232-Test debugging tool, DTU

4. Testing environment: Target server IP "180.186.12.99", Listening port"9696", protocol"TCP"



😔 USB-TCP232-Test BS	232 to Ethernet Convert teste	r			
File(F) Options(0) Help) (H)				
COMSettings	COM port data receive		Network data receive		NetSettings
PortNum COM1 💌					(1) Protocol
					TCP Server 💌
BaudR 13000					
DPaity NONE 💌					100 100 12 00
DataR 8 bit 🔻					1100,100,12,99
					(3) Local host port
StopB 1 bit					9696
On on					
Open					Disconnect
Recv Options					Recv Options
TReceive to file					TReceive to file
🗖 Add line return					Add line return
🔽 Receive As HEX					Receive As HEX
🔽 Receive Pause					🔽 Receive Pause
Save Clear					Save Clear
Send Options					Send Options
🔽 Data from file					🗖 Data from file
Auto Checksum					Auto Checksum
Auto Clear Input					Auto Clear Input
Send As Hex					Send As Hex
Send Recycle			Remain All Connections	-1	Send Recycle
			All connections		
Interval [1000 ms				1000	Interval 1000 ms
Load Clear		Send		Send	Load Clear
🕼 Ready!	Send:0 Recv:0	Reset	🕼 Ready!	Send:0	Recv:0 Reset

Note: Here we use USR-TCP232-Test to simulative network server

5. Configuration

DSR-GPRS232-7 7ile(F) 中文(L) He	00 ¥1.1.0.0 1∍00)			
Computer Com			Information Clea	r information
ComName BaudRate Parity/data/stop	COM1	Close	[Receive]: +BATS: 0 [Receive]:@@Ver:V01_B01_025-DTU-01, Build	
DTU Parameters Confr APN Name	CMNET CMNET	(?)	[Send]:AT+CSTT="CMNET" [Receive]: OK	
NetProtocol Remote Port	TCP	(7) (7)	[Send]:AT+CIPCFG=1,50,0,0,0,0 [Receive]: OK	
DTU BaudRate Parity/data/stop	115200 • NONE • 8 • 1 •	(?) (?)	[Send]:AT+CIPPACK=0,''4C4F47'' [Receive]: OK	
Device ID Heartbeat Format Heartbeat Time	1001 LOG 50 s (?)	(?) (?)	[Send]:AT+CIPPACK=1,"4C4F47494E3A31303031 [Receive]: OK	н
Wait Length Wait Time	0 Bytes (?) 0 ms (?)		[Send]:AT + CIPMUX = 0 [Receive]: +CIPMUX: 0	
🗢 Write default	🖻 Read Dev Config	😽 Write All Config	ок	~

Note: We use China Unicom SIM Card, so it should be "UNINET"

Power on and configurate DTU to, set the destination IP to server IP, destination port to server port, and baud rate default, then close the setup software. Open USR-TCP232-Test, start the serial port that connect with DTU(Mine is Com1)

😔 USR-TCP232-Test	RS232 to Ethernet Convert test	er	
File(F) Options(Q) Help	о (£)		
PortNum COM1 PortNum COM1 BaudR 115200 DPaity NONE DataB 8 bit StopB 1 bit Close Recy Options	COM port data receive	Network data receive	NetSettings (1) Protocol TCP Client (2) Server IP 180.186.12.99 (2) Server Port 9696 Connect Recy Options
Receive to file Add line return Receive As HEX Receive Pause Save Clear			Receive to file Add line return Receive As HEX Receive Pause Save Clear
Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle			Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle
Interval 1000 ms Load Clear	http://www.usr.cn Send:0 Bery:0 Be	d http://www.usr.cn Send	Interval 1000 ms Load Clear
ta stobb		sec ter stopp Send. 0	Hecv. 0Reset

Click "Send", the server displays:



Network data receive Theories from LOGIN: 1001	04 : 5950] :	NetSettings (1) Protocol TCP Server (2) Local host IP 180,186,12,99 (3) Local host port 9696 Disconnect Receive to file Receive to file Add line return Receive As HEX Receive Pause Save Clear
Peers: 123.232.238.104:14	Send	Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle Interval 1000 ms Load Clear
🖝 Add line return	Send:0	Recv: 0 Reset

Already received data from DTU, click "send" on server side



😔 USR-ICP232-Test	RS232 to Ethernet Convert tester
File (F) Options (Q) Help COMSettings PortNum COM1 BaudR 115200 DPaity NONE DataB 8 bit StopB 1 bit Close Recev Options Receive to file Add line return Receive As HEX Receive Pause Save Clear Send Options Data from file Auto Checksum	COM port data receive http://www.usr.cn
└── Auto Clear Input └── Send As Hex └── Send Recycle	
Interval 1000 ms <u>Load Clear</u>	http://www.usr.cn Send

The local can also receive data from server

5.2. Application of Router Transit





- 1. Testing target: DTU send data to router, then router forward the data to destination PC
 - 2. Testing request: DTU serial port connected with PC serial port
 - 3. Testing tool: USR-TCP-232-Test debugging tool, DTU

4. Testing environment: Given router public network IP "60.208.252.67", and has been set "port forwarding". Forward port 9696 to the destination PC. Log in router page and set, for example, we use D-LINK router, steps: "Internet connection" --->"Advanced", as following picture:

	名称		公共端口	
_	DTU	< 应用程序名称 ▼	9696 ~ 9696	
V	IP地址	_	私有端口	任意 ▼
	192.168.0.109	<< 计算机名称 ▼	9696 ~ 9696	

Restart router after finish settings.

5. Configuration



🟟 USR-GPRS232-7	00 ₹1.1.0.0			
File(F) 中文(L) He	1p(H)			
Computer Com		1	Information Clear information	mation
LomName		📀 Close	[Send]:AT+CSTT="CMNET"	~
BaudRate	115200 💌		[Receive]:	
Parity/data/stop	NONE - 8 - 1 -		OK.	
			[Send]:AT+CIPCFG=1,50,0,0,0,0	
DTU Parameters Confi	ig		[Receive]:	
APN Name	CMNET CMNET	(?)	OK	
IP/DomainName	60.208.252.67	(?)	[Send]:AT+CIPPACK=0,"4C4F47"	
NetProtocol	TCP	(?)	[Receive]:	
Remote Port	9696	(?)		
DTU BaudRate	115200 🔹	(?)	[Send]:A1+CIPPACK=1;"4C4F47494E3A31303031"	
Parity/data/stop	NONE - 8 - 1 -	(?)	[Receive]: OK	
Device ID	1001	(?)	[Send]:AT + CIPMUX = 0	
Heartbeat Format	LOG	(?)	[Receive]:	
Heartbeat Time	50 s (?)			
Wait Length	0 Bytes (?)			
Wait Time	0 ms (?)		[Send]:AT + CIPMODE = 1	
4			[Receive]: +CIPMODE: 1, 0	
🥏 Write default	📑 Read Dev Config	💦 Write All Config	ок	~

Set destination IP to router public network IP, remote port "9696", net protocol "TCP". Power on DTU again, click "Write All Config", then close the software.

Open USR-TCP232-Test, as follows:



Network data receive	NetSettings
[Receive from 123.232.238.104 : 9696] : LOGIN:1001	TCP Client
	(2) Server IP 123,232,238,104
	(2) Server Port 9696
	🔅 Disconnect
	Recv Options
	TReceive to file
	Add line return
	Receive As HEX
	Save Clear
	Send Options
	Data from file Auto Checksum
	Auto Clear Input
LocalHost 192.168. 0 .131 Port 4123	Send As Hex
http://www.usr.cn Send	Interval 1000 ms Load Clear
🕼 Ready! Send : 17	Recv : 10 Reset

Set protocol"TCP Server", server port "9696", click "listening". There will be connection after a moment. Then DTU can have two way communication with PC.



😔 USR-TCP232-Test	RS232 to Ethernet	Convert tester			
File(F) Options(Q) Hel;	р (<u>Н</u>)				
COMSettings	COM port data receive		Network data receive		NetSettings
PortNum COM1 💌	http://www.usr.en		济南有人科技有限公司		(1) Protocol
BaudB 115200 -					TCP Client
					(2) Server IP
					123.232.238.104
DataB 8 bit 💌					(2) Server Port
StopB 1 bit 💌					9696
					1
Or Close					💓 Disconnect
Bear Ontions					Regr Options
Provins 4. 611.					E Provins 4. 611.
					F Add line wetween
Padd line return					Pauline return
Preceive AS IEA					Preceive As JEA
J Acceive rause					J Receive rause
Save <u>Clear</u>					Save Clear
Send Options					Send Options
□ Data from file					🗆 Data from file
Auto Checksum					Auto Checksum
Auto Clear Input					Auto Clear Input
Send As Hex					Send As Hex
Send Recycle			LocalHost 192.168. 0 .131	Port 4123	Send Recycle
Interval 1000 mm	※南有人科技有限公司		http://www.usr.cp	-	Interval 1000 ms
		Send	reception and the	Send	Ind Class
Load Llear					Luad Liear
🕼 Ready!	Send:0	Recv:0 Reset	🕳 Ready!	Send:0	Recv: 0 Reset

5.3. Application of Server Transit



In this mode, DTU data will be sent to our company server, and then the server forward data to destination DTU, to achieve remote communication between two DTU.

This function need the supporting of transfer program on server. We can supply a simple transfer sample testing program. Picture as follows:



🖣 TCP Se	rver			
Listen port	8899	Listen	Clients list	Send TCP Server
Message :	received			Send
₩ HEX	√ Show receive data	✓ forward enable		

6. AT Command

AT+ command use command line that based on ASCII code, command format as follows: <CR> <LF> means carriage returns, line feeds

<CR> means "\r", decimal ASCLL code is 13, hexadecimal code is 0x0D;

<LF> means '\n', ASCII code is 10, hexadecimal is 0x0A

<CR> <LF> means Carriage return, line feed. Pls input carriage returns and line feed but not those characters.

6.1. Set Key Parameter

1. Set DTU APN account (Default: Mobile CMENT)

Send AT+CSTT=<apn><CR><LF> Note: <apn> is character string return <CR><LF>OK<CR><LF>

For example: China Unicom: AT+CSTT="UNINET"<CR><LF> China Mobile: AT+CSTT="CMNET"<CR><LF>



2. Set DTU automatic startup mode, automatic reconnect waiting time after off line

Send

AT+CIPCFG=<auto_start>,<keepalive_wait>,<hex_packet>,<wait_time>,<wait_data_len ><CR><LF>

return

<CR><LF>OK<CR><LF>

Parameter instructions

parameters	value	instructions
<auto_start></auto_start>	[0], 0-1	This specifies whether the module automatic
		recovery to original saved network connection
		context(including TCP/UDP connections, transparent
		transmission mode etc.), need AT + CIPSCONT
		command cooperate to use
<keeplive_wait></keeplive_wait>	[50], 1-86400	If specified need automatic reconnection when start
		the network link, then after the link is accidentally
		disconnected, waiting for <keeplive_wait> seconds,</keeplive_wait>
		will reestablish the server connection. This
		configuration effective for client only.
		If specified need sending heartbeat packet when start
		the network link, in links space <keeplive_wait></keeplive_wait>
		seconds, will automatically send heartbeat packet to
		server. This configuration effective for client only.
<hex_packet></hex_packet>	0-1	Whether internal command need be sent in
		hexadecimal text
<wait_time></wait_time>	[0], 0-3600000	Unit: ms, effective in transparent transmission mode
		only
		When serial port receive less <wait_data_len> bytes</wait_data_len>
		data, and the module waiting for <wait_time></wait_time>
		milliseconds later, still didn't receive serial data, then
		will start sending buffer data
<wait_data_len></wait_data_len>	[0], 0-65535	Unit: byte, effective in transparent transmission mode
		only
		Module will send to connected server immediately
		after receiving <wait_time_len> bytes data</wait_time_len>

6.2. Configure DTU business Packet

With AT+CIPPACK command to set data format of each DTU business packet.



When the module is establishing a connection, which specifies send some command protocol packet, such as register packet, heartbeat packet. Parameter definition is as belows:

- 0 Heartbeat packet
- 1 Device register packet (Device ID)

```
    a. Heartbeat packet set
Send
AT+CIPPACK=0,<keepalive_packet><CR><LF>
Return
<CR><LF>OK<CR><LF>
Note: <Keepalive_packet> is hexadecimal character string
    b. Device register packet (Device ID) set
```

```
Send
AT+CIPPACK=1,<register_packet><CR><LF>
Return
<CR><LF>OK<CR><LF>
Note: < register_packet> is hexadecimal character string
```

The data format definition of heartbeat packet or other data packet, each byte is called Hexadecimal character string, maximum support 80 bytes hexadecimal heartbeat packet.

Example:

```
AT+CIPPACK=0,"4C4F47" Configure DTU heartbeat packet data format
AT+CIPPACK=1, "4C4F47494E3A31303031" set module register packet "LOGIN:1001"
```

6.3.Set TCP/IP

1. Link Mode: Support single link mode only, as this device in transparent transmission mode

```
Configure single link mode
Send
AT+CIPMUX=0<CR><LF>
Return
<CR><LF>+CIPMUX:0<CR><LF>OK<CR><LF>
Configure common data mode
Send
```

Return

AT+CIPMODE=1<CR><LF>



<CR><LF>+CIPMODE:1,0<CR><LF>OK<CR><LF>

2. Configure a TCP or UDP client link, and automatic reconnection(Only start one client link in single link mode). All parameter will be kept in the module after running this command. Note: Need configure APN account of GPRS, method as follows:

Send

AT+CIPSCONT=<mux>,<net_protocol>,<ip_address>,<ip_port><link_mode><CR><LF> Return

<CR><LF>OK<CR><LF> Note: <net protocol>,<ip address> is character string

<mux>: Single link mode, default 0

<net_protocol>: Network protocol type <ip_address>: IP address <ip_port>: Port <link_mode>: Link mode 0:Don not need to keep long link

1: Specify whether it need reconnect to server, after the link idle specified time value

2: Send customized heartbeat packet and keep long link, after link in specified idle time value

For example

AT+CIPSCONT=0,"TCP","182.32.112.178",7000,2 single link mode, network protocol is TCP, IP is 182.32.112.178, port 7000, link mode is 2

6.4. Set Serial port parameter

- 1. Baud rate operation
- a. Inquiry

Send AT+CIPR?<CR><LF>

Return

<CR><LF>+CIPR:<rate><CR><LF>OK<CR><LF>

```
b. Setting
```

```
Send
AT+CIPR=<rate><CR><LF>
Return
<CR><LF>OK<CR><LF>
Baud rate setting supposefully. Then, work as per
```

Baud rate setting successfully. Then, work as per new baud rate.

<rate> Range of value: 110, 300, 600, 1200, 4800, 9600, 14400, 19200, 38400, 56000, 57600, 115200



- 2. Serial data bit, parity bit, stop bit settings
- a. Inquiry

```
Send
AT+ICF?<CR><LF>
return
```

<CR><LF>+ICF:<format>,<parity><CR><LF>OK<CR><LF>

b. Setting

```
Send
AT+ICF=<format>,<parity><CR><LF>
Return
<CR><LF>OK<CR><LF>
```

Setting successfully. Then, work as per new data bit, parity bit, stop bit.

With this command, can set start/ stop(asynchronous) frame format of the local serial port. When DCE receive DTE command and sending message text and result code, <format>,<parity> format as follows:

Format: 1: 8 data bit 2 stop bit 3: 8 data bit 1 stop bit 4: 7 data bit 2 stop bit 5: 7 data bit 1 parity bit 1 stop bit Parity 0: odd Parity 1: even parity 3: No parity Example:

Setting: 8 data bit, 1 stop bit, <format>,<parity>=3,3

6.4. Setting Example

```
//Power on, within 2-30 seconds, configure as follows:
```

```
AT+CSTT="CMNET"
```

OK

AT+CIPCFG=1,50,0,0,0,0

OK

AT+CIPPACK=0,"4C4F47"

OK

AT+CIPPACK=1,"4C4F47494E3A31303031"



ок
AT + CIPMUX = 0
+CIPMUX: 0
ОК
AT + CIPMODE = 1
+CIPMODE: 1, 0
ОК
AT+CIPSCONT=0,"TCP","124.128.16.120", 10000,2
ОК
AT+ICF=3,3
ОК
AT+CIPR=115200
OK

7. FAQ

Network can not connect to the server

Please follow the following steps to troubleshoot

- 1) Use this software USR-GPRS232-700 ¥1.3.0.0 to read DTU device configuration, to check destination IP, port, APN account and so on
- 2) Check SIM card model, make sure it has opened GPRS flow, not owning money, make sure the card is plugged in well, antenna connection, power indicator light
- Use this software USR-ICP232-Iest establish a TCP Client on a PC which can connect to Internet, then connect with the server. If connection is ok, the



server is working well, otherwise, the server may have some problems

4) If step 1) 2) 3) all right, but DTU still can not connect, pls change another SIM card or check hardware connection

Serial port can not connect with DTU to config

- 1) Confirm your interface, RS232, RS485 or TTL
- 2) Computer com baudrate, default is 115200, if you have changed this before, pls use the new one as you set

Computer Com	3	100	
ComName	COM1	•	👩 Open
BaudRate	115200	-	
Parity/data/stop	NONE - 8	• 1 •	

3) For RS232 interface, pls use the matched serial cable we send in your package; for RS485 interface, use qualified RS232 to RS485 adapter(recommend HEXIN active RS232 to RS485 adapter); for TTL interface, need serial to TTL level conversion then connect with PC

SIM Card

Do not support 3G, EDGE and CDMA Only support 2G and 2.5G



8. Contact

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9. File history

- V1.0 file established
- V1.5.4 add radio consumptionand 4 fre description
- V1.6 add GPRS232-701 description