KB3060 CDMA DTU
User Manual

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1 Brief Introduction

Thanks for you to use our products!

1.1 Brief Introduction

KB3060 CDMA DTU (Data Terminal Unit) is wireless data transmitting terminal of CDMA and embedded with High reliable ARM7 CPU.

Based on the public net, KB3060 CDMA DTU transmit widely, stably and reliably, KB3060 CDMA DTU is widely used in unattended operation device, Remote AMR, remote data acquisition, remote AMR, remote scheduling and so on. Due to this product is designed for industry integrated, we adopt special designs in the temperature scope, shaking, EMC and interface multiform and so on, to keep it good stability in the severe atmosphere, ensure high quality for your device.

Aim at different scope user's requirements to supply different define CDMA Terminal unit, it needs taking industry characteristics for developing on hardware & software and system integration. CDMA mobile net can supply TCP/IP connection; CDMA DTU can be use for internet connection, data transmitting application and so on. KB3060 CDMA DTU (Data Terminal Unit) is special CDMA wireless device that send the data from COM port through CDMA mobile data network.

KB3060 CDMA DTU is used in electric power automatic system, industry monitoring, traffic management, atmosphere, pro-environment, pipe network monitoring, finance, securities departments and so on. Consider the networking request from different application scope, achieve Virtual data private network in network structure. It is applicable to small and medium data transmitting of the Center to multi-points, multi-points scatter.

1.2 Product Feature

- Standard industrial products, EMC anti-jamming design, strong adaptiveness.
- Independent research and developing, embedded 32 bit ARM7-CPU with real-time operating system.
- Embedded Watchdog chip, provide multiple Reset mechanism, can be controlled by software, achieve industrial security mechanism perfectly.
- Working Frequency adopt 800 MHz, compatible CDMA200 1X technology system.
- Advanced and strict data communication protocol, with the function of correction and encryption. Never lose package when data transmission, can

achieve pictures over than 100K and Flash animation files transmission, no Mosaic happened.

- Various working mode: DTU (default) and Modem. DTU mode is CDMA data transmission which can get the data from device's COM port (RS232/RS485/TTL) and transmit to the server in Internet. When set to Modem, compatible standard AT commands (GSM07.05 and 07.07). user can write AT command software to realize the function user need.
- Various networking ways: KB3060 can network with NET Converter KB2000 and KB3060 (it is convenient to use CDMA without internet). This can achieve networking of point-to-point, center to multi-points.
- Plug and play: when work with KB2000 or KB3060 of our product, no need to develop any software and hardware, can build large SCADA system.
- Automatical IP register mechanism, can achieve various server modes, build complete super large SCADA system..
- Remote sleep and awake: User can use appointed cell phone number to dial or send message can sleep or awake DTU, it is convenient for user to save a lot of CDMA Flow Fee when no need to use DTU.
- Remote modify DTU parameters: Support that SMS and data service center modify DTU parameters.
- IO switching value function: Two channels input, two channels IO output. Remote control and reading. Alarm status threshold, automatic alarm signal report function.
- Strong communication backup function: Support automatic switching between main server and backup server, It will connect to backup server when main server has problem.
- Strong server software support, Application server software for many years, powerful and stable;
- Support special APN, data center support fixed IP and DDNS.
- Working temperature range: -30℃-75℃,communication is not effected at -30℃.

1.3 Safe Use

KB3060 CDMA DTU Completely complied with national radio product safety technical regulations.

Warm Tip: You must not touch the antenna with your hands or body. During 15 seconds after KB3060 DTU started, Please keep away from the antenna. If the antenna is damaged, you must replace it in time, assorted and qualified cable and antenna.

1.4 EMI

Now most electric device all has electromagnetic pulse hardening, but some old device may have no, under RF power radiation, it may go wrong. When you use KB3060 CDMA DTU, please check the device nearby have electromagnetic pulse hardening or not.

1.5 Appearance and Interface

KB3060 CDMAS DTU has three physical interfaces:

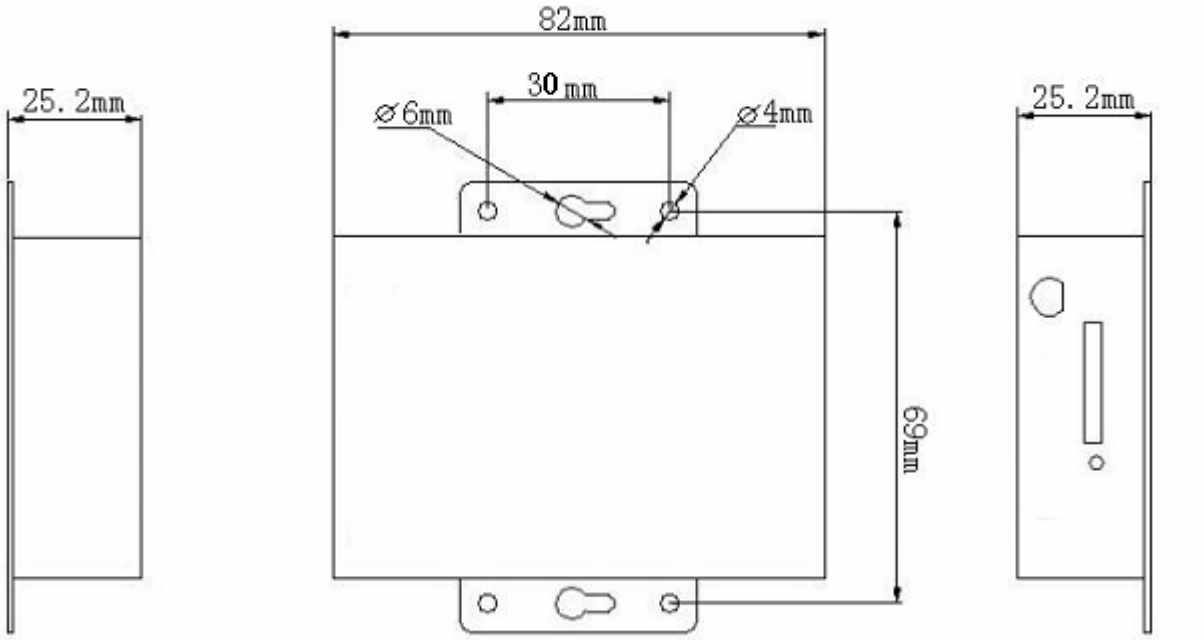
. The first is 10 pins main interface: RS232/RS485/TTL (5V)/CMOS (3.3V), Power supply

. The second is SMA RF interface: For the antenna

. The third is embed SIM socket: For SIM card

. Size: 82mm(L)*59mm(W)*25.2mm(H)

. Weight: 200g(without Antenna, Data wire)



2 Technical Specification

2.1 CDMA:

Frequency Band: 800 MHz

Output Power: 30mA/5V

Sensitivity: <-104dBm

Compatible standard AT command（GSM07.05 and 07.07）
Support extend command
Support SMS, CSD, FTP, DTMF
Embed TCP/IP Protocol

2.2 Basic Function:

Embed TCP/IP Protocol
Embed standard AT command（GSM07.05 and 07.07）
Support extend command
Support SMS,CSD,FTP,DTMF
Transparent data transmitting
Support IP address or domain name
Support special APN

2.3 User Interface

1. **User Interface:** Interface as follow (From left to right):

1	2	3	4	5	6	7	8	9	10
VCC	GND	UTXD1/A	URXD1/B	Output1	Input1	GND	Output2	Status	Input2

Pin No.	Definition	Description	Remark
1	VCC	Power: DC5~16V	
2	GND	Ground	
3	UTXD1	TXD（DTU COM/RS485: A）	RS232,TTL:RXD; RS485:A
4	URXD1	RXD（DTU COM/RS485: B）	RS232,TTL:TXD; RS485:B
5	Output1	Output NO.1 of IO; User can set it as RTS hardware flow control port (Default: Output1)	
6	Input1/RST	Input No.1 of IO; User can set it as RST reset pin (Default: Input1)	
7	GND	Ground (COM)	RS232,TTL,RS485:Data groud
8	Output2	Output No.1 of IO; User can set it as CTS hardware flow control port (Default: Output2)	
9	Status	Online is high,offline is low	
10	SW/Input2	Input No.2 of IO; High is DTU, low is SMS, user can set it as Input 2 of IO(Default: SW)	

Red LED: power light, will light after power-on.
Green LED: Communications light, when KB3060 connect Server OK, it will often light green, otherwise, it will flash.

2. SIM Card Interface

SIM Card Interface is on the side of the antenna. When you plug in the SIM card, please note the direction and front /back side. First please push the point nearby, the drawer socket will go out automatically. Then take out the drawer socket and put the SIM card into it, at last push the whole drawer socket(IC side of SIM card face down) into the hole of DTU. Just as below picture:

Notes: Please don’t plug or move SIM card after power-on, if you need to plug and move, please put equipment blackouts first.

2.4 Electric Specificity

Work Voltage: 5V～16V DC (7-60V can be custom made)
Power:
Standby: < 30mA@5V
Communicating: < 230mA@5V
Peak point current: 1.5A@5V

2.5 Circumstances Specificity

Working Temperature: -30℃～75℃
Storage Temperature: -40℃～80℃
Relative Humidity： 20%~ 95%（No Condensation）

3 Terminal Setting

3.1 Overview

KB3060 CDMA MODEM must correct installation just can achieve design functions, usually equipment installation must be approved in our company under guidance of qualified engineers.

Note: please don't charged when install KB3060 CDMA MODEM.

3.2 Unpack

For transportation safety, usually KB3060 CDMA MODEM needs reasonable packaging, when you please keep unpacking packaging materials used for future need transshipment. KB3060 CDMA MODEM includes the following parts:

KB3060 CDMA MODEM 1Unit (Packaging depend on order quantity)
Electronic instructions (CD-ROM) 1 copy
Small chuck antenna or club-shaped antenna (SMA interface) 1 root
5V / 2A industrial power adapter 1
KB3060 special cable 1

When unpacking the case, check the specific items according to the packing of user's ordering contract.

3.3 Antennas and SIM card installed

Antenna support SMA female pedestal, spin the left from MODEM and lock it.

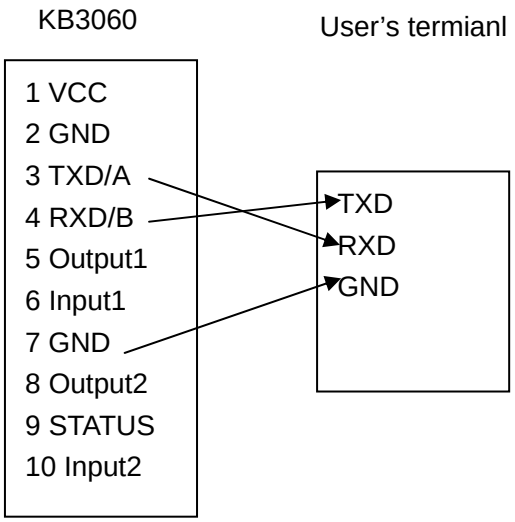
Insert SIM card from the antenna side of KB3060, please note that SIM card metal surface outwards, make sure insert the SIM card to drawer with stuck feeling, to avoid SIM card fall off when SIM card not insert in place or handling equipment vibration. Remove SIM card, click the left little point of SIM card with pointed thing, SIM seats can pop up.

Note: Please don't charged operation when connection with the antenna and install SIM card, please don’t power-on KB3060 first.

3.4 Serial cable connection

KB3060 CDMA MODEM

The cables interface type and connections of KB3060 as figure 3.2 show:



3.2 Serial connection schemes

KB3060 user data interface cable connectors is green connectors, spacing: 3.5 mm, 10Pin.

3.5 Inspect network situation

Connect cable and antenna, insert into effective SIM card, power-on KB3060, the power light of MODEM will flash, after 10 seconds later, the power light will always light, it means KB3060 into a normal work condition and connect with network successfully.

Note:

Before power-on, must confirm KB3060 connect with cable correct;

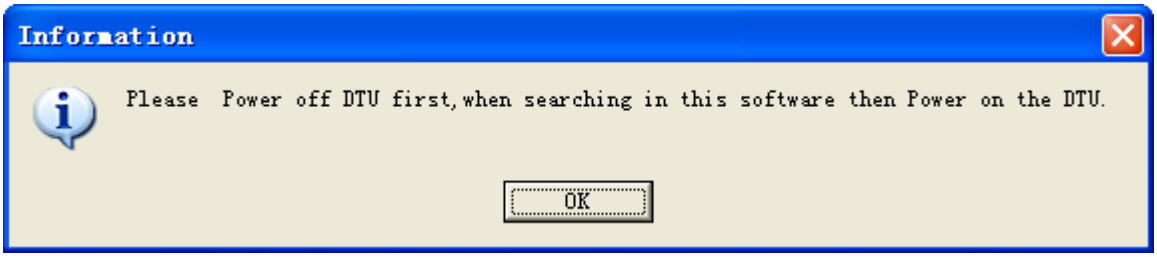
Before power-on, make sure to connect the antenna, to avoid RF impedance mismatch and damage module.

4 Terminal Setting

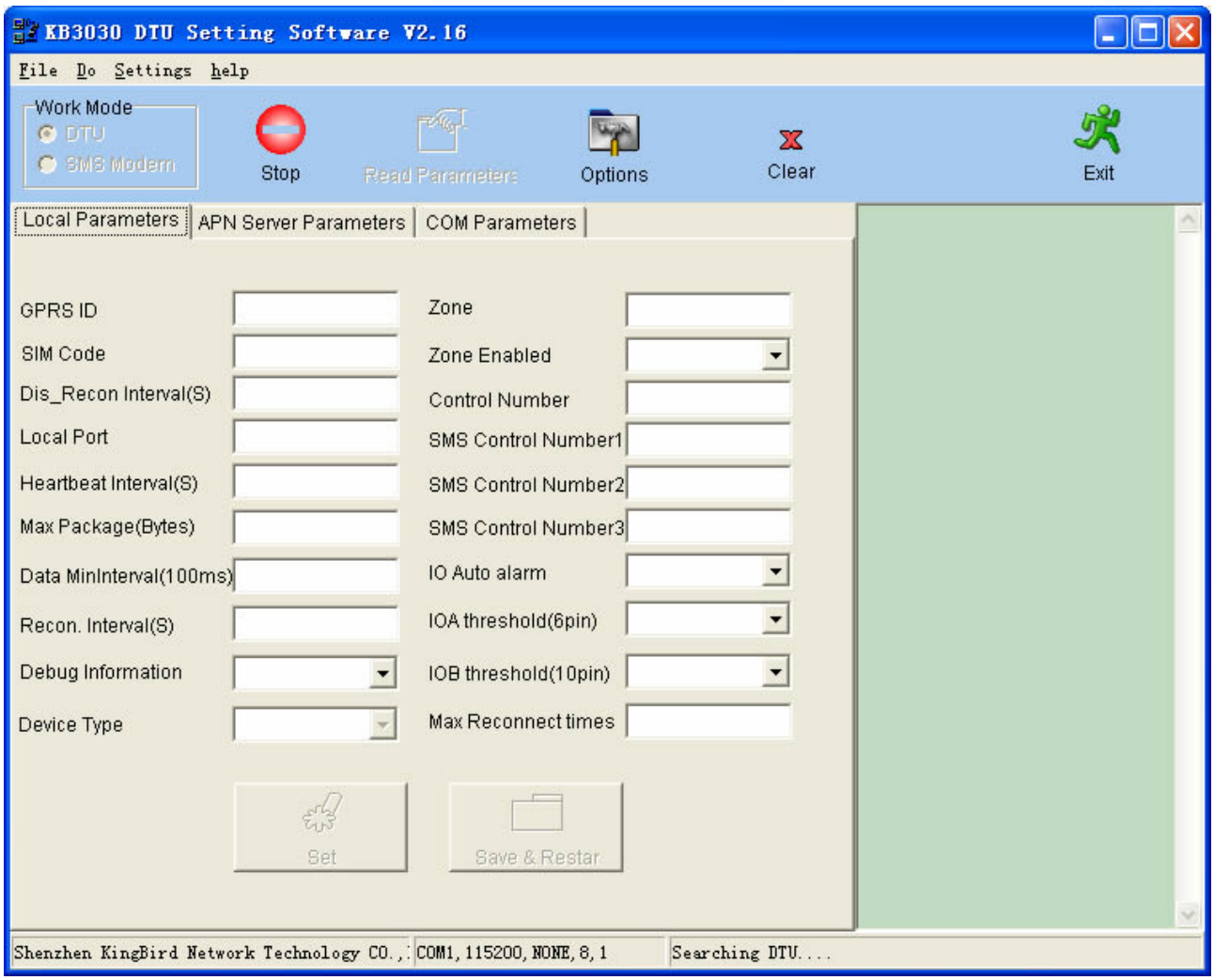
When you set KB3060 CDMA DTU, you are advised to use KB3060 DTU Setting Software (CDMA_DTU.exe). Introduce as follow:

Operating step:

1. Connect the interface of KB3060 to PC (KB3060 interface is COMA)
2. Run configuration software, tips are as follows:



Click OK, and enter the interface configuration software, as follows:



3. This software will automatically open corresponding serial search DTU, processing, please confirm whether the serial port which opened by software is the serial port connected with KB3060 DTU, if not, please click the “stop” button in toolbars in the menu options from the file, then change information in COM parameters settings window. (Note: configuration parameters are fixed by 115200bps)

4. Connect the KB3060 to the power supply, the system will prompt that search DTU successfully in 5 seconds and show as below:

5. Click Read in toolbars, the software will read the parameters, and the display the parameter of DTU.

Local Parameter:

CDMA ID: CDMA DTU the only mark, important at communication.
SIM Code: The SIM card number is only for user record.
Dis_Reconnection interval: The interval of DTU re-connects with backup server or the Main server when DTU connection error or disconnected with Main server or backup server.
Local port: DTU local TCP or UDP port.
Heartbeat interval: The interval of server with DTU's heartbeat for units in seconds, scope: 0-300S.
Max package: To send data packet maximum DTU data bytes (optional 512 bytes or 1024 bytes).
Data Mininterval: The smallest interval packets (0-1000ms) serial receives data between two value is less than this if a packet, 1~10 units for 100ms.
Recon. Interval:No Response reconnection cycle, if it do not received answer from server for some time, DTU will reconnect with the server. If you set this parameter to Zero, DTU will not reconnect. The value scope: 0-3600s.
Debug information: You can set DTU output its working state information or not. None: DTU will not output working state information; Normal: DTU will output simple working state information; Detail: DTU will output detailed working state information. When you connect DTU with your device, please set this parameters value to NONE, in order to avoid output information affect users of the equipment.
Device type: Two types as DTU, Modem.User can change this parameter to change the working mode. DTU is for CDMA data transmission,When set to Modem, through AT command users can achieve dialing, Internet, making phone calls, use of messages and so on.
Zone: The working code DTU belongs. Generally we just use this parameter when networking.
Zone Enabled: The enabled or disabled working code which DTU belongs to.
Control Number: The phone number which control sleep or awake product and amend the parameters by SMS, user can dial this number to control DTU sleep or awake, sleep mode can save a lot of CDMA Flow Fee, DTU will be sleep or awake by any call if this value is none, so user is advised to set a phone number.
SMS control number: Use to control this number works When DTU working as SMS Modem, the phone number which control sleep or awake product and amend the parameters by SMS.
IO Automatic alarm: When set it "ON", it will send alarm signal to server automatically, otherwise, it won't
IOA threshold (6 pin): When the IO automatic alarm is opening, set the situation of IOA as high level or low level, the DTU interface is the sixth terminal

from left to right.

IOB threshold (10 pin): When the IO automatic alarm is opening, set the situation of IOB as high level or low level, the DTU interface is the tenth terminal from left to right

MAX reconnection times: DTU will restart when it can not connect in how many times.

APN Parameter And Server Parameter:

APN: Name of CDMA Access Point. In China: cmnet
User name: Name of login CDMA account. When using VPN networking, user name must be input.
Password: the password when DTU login CDMA.
Main server IP: IP Address of main server connected with CDMA DTU.
Main server port: Port of main server connected with CDMA DTU.
Network Protocol: The protocol of Main server connected with CDMA DTU, include two types as TCP & UDP.
User Protocol: Single, Normal, Transparent, normally set it as “Single” if no special requirement, user is forbidden to change.
Backup server IP: IP Address of Backup server connected with CDMA DTU. User can set this parameters same as main server’s.
Backup server port: Port of Backup server connected with CDMA DTU. User can set this parameters same as main server.

COM Parameter:

Baud Rate: The speed of CDMA DTU adopted, support from 300 to 115200bps.
Data bits: The data bits of CDMA DTU COM data, support four kinds of bits as 5/6/7/8.
Stop bits: The stop bits of CDMA DTU COM data, support three kinds of bits as1/2/1.5, generally the stop bits is 1bit.
Verify: The way of checking CDMA DTU COM data, Classify it to None, Even, Odd, Mark, Space, etc.
Flow Control: Com data transmission classify to none flow control, hardware flow control, software flow control. None flow control is in genaral.

Notice: After choose or import parameters, and click Set button, software will prompt:

Now, if you need to change others parameter, please choose NO, after changed others parameter, then click Set, will prompt it again, choose Yes, DTU will restart and exit the Parameters configuration state. If you need to change parameter again, you should to outage DTU and re-search after Power-on.

5. DTU Remote Control

5.1 Dialing Control Sleep and Waking Up

1. Controlled center number on DTU should set to user's cell phone number, Please refer the 4th chapter for parameter setting details.

2. Use cell phone dial the SIM card number in DTU, if DTU is on working, DTU will break away from CDMA and enter into sleep pattern, and user can see the green light DTU will be off. In sleep pattern, no heartbeat and can not transmit data, no CDMA flow fee. If DTU is on sleep state, dial DTU number, it will be waked up and connected with server, then enter into normal working state.

5.2 Internet Remote configuration Parameter

User can set the DTU parameters through our's configuration software (the server software must be our company's Data Center software), but for safety's sake, user is not advised to set parameters through Internet.

5.3 Message Control and Remote Modify Parameters

Setting major controlled center number on DTU as cell phone number which send message.(Only major controlled center number can send message to control, if it is empty, it will be controlled by any cell phone number)

Message control form: *CMD# (CMD represent all kinds of instructions, noted: Instructions are not case-sensitive, parameters case-sensitive)

1. *spb#: Enter/exit sleep pattern
2. *GPRS=ip*port*pn*pu*user*pass*apn#: Server IP Address, Port, Net Protocol, User Protocol and APN. When pn is 'T', it represents TCP. When it is 'U', it represents UDP; when pu is 0 – 2, represent user's protocol Normal;

1: Transparent protocol; 2: Single protocol. User, pass can be empty; apn is net access point.

3. *udn=device id#: Device number setting CDMA ID

For example:

1. Message set CDMA to sleep, the instruction as follow:

Use cell phone to edit message and send: *SPB# to CDMA DTU with SIM card.

Back to "SMS Super Device Srart Sleep Mode Ok", means enter into sleep pattern.

Send it again :*SPB# Back to: SMS Super Device Srart Normal Mode Ok, means Wake up DTU successfully, enter into normal working pattern.

2. Message modify CDMA IP instruction:

Use cell phone to edit message and send: *CDMA= 192.168.1.1*4501*T*2***cmnet# , means set DTU IP Address as 192.168.1.1, TCP port is 4501, user protocol is single, net access point: cmnet. it will be Back to: Reconnect Addr: 192.168.1.1 , Port: 4501, TCP, APN: cmnet

3. Message modify CDMA ID

Use cell phone to edit message and send：*udn=00000000127#

It will be back to: DEV ID: 00000000127

6. IO Control—Reading And Setting

User can send instruction to DTU through server, to read and control the IO flow.

6.1 IO Input state Reading

1. Read: Server➔DTU

Head	CDMA ID	Zone	Function Code	Zone enabled	PARITY
0xA881 (2bytes)	11bytes ASCII	4bytes ASCII	0x06 (1byte)	0x00 OR 0x01	CheckSum 1byte

State: CheckSum is a accumulation data form FH to PARITY, if the data greater than 255, then choose 256 pattern, (The Remainder by divided 255)

For example: A8 81 30 30 30 30 30 30 30 30 30 30 31 30 30 30 31 06 01 02, represent that reading the DTU's(CDMA ID: 00000000001, Zone: 0001, Zone enabled: true.) IO status.

2. Reply: DTU➔Server(or active report all this format when IO state response and change input interface)

Head	CDMA ID	Zone	Function Code	Zone enabled	IO STATE	PARITY
0xA881 (2bytes)	11bytes ASCII	4bytes ASCII	0x07 (1byte)	0x00 or 0x01	2bytes	CheckSum 1byte

Notice:

1. IO Port State: High Level: ox01, Low level: ox00, in proper order is 6, 10.
2. When set the DTU IO automatic alarm Open, and the input terminals 6,

10 feet of DTU is to the corresponding threshold, DTU will sent alarm information to server automatically, alarm information is this format.

6.2 Output state of IO flow settings

1. Setting: Server➔DTU

Head	CDMA ID	Zone	FUNCTION CODE	Zone enabled	IO STATE	PARITY
0xA881 (2bytes)	11bytes ASCII	4bytes ASCII	04 (1byte)	0x00 或 0x01	2bytes	CheckSum 1byte

State: Ouput port state: high level: ox01, low level: ox00

2. Reply: DTU➔Server

Head	CDMA ID	Zone	FUNCTION CODE	Zone enabled	IO STATE	PARITY
0xA881 (2bytes)	11bytes ASCII	4bytes ASCII	0x05 (1byte)	0x00 或 0x01	2bytes	CheckSum 1byte

State: Output port state: high level: ox01, low level: ox00

7. KB3060 Application Guide

7.1 Operation Steps:

(1). Plug in SIM card;

(2). Connect the antenna;

(3). Set DTU Parameters;

Connect the data cable. DTU's user interface is 10PIN socket, If DTU is RS232 interface, you can connect it with DB9 of COM port, if DTU is RS485 interface, and you can use one converter of RS232-RS485 to connect it with DB9 of COM port.

Run the configuration software, choose and open the COM port that DTU connected;

Connect with the Power. The power adaptor(5V) is One of the enclosures，first you can plug the power adaptor into the power socket, then connect the male into the female socket of the power cable. DTU can get power. KB3060 DTU Setting Software will list the menu of configuration. You can choose different menu to set different parameters, such as server IP, port, baud rate and so on. (Baud rate and Verify must be same with the device), then save the parameters and reset DTU.

(4). Connect DTU with the device

Connect DTU with the device according to the interface define of DTU. If DTU is RS232 interface, you can connect it with the device of RS232, If the DTU is RS485 interface, you can connect it with device of RS485.

(5). Star the control center software or the SCADA software to collect the remote device's data.

7.2 User utility software R&D and Server planning

Users need planning on R&D software which in CDMA application, user can choose fixed IP servers or dynamic domain mode. Based on dynamic DNS is unstable, User is not advised to adopt this way. Here is the explain for the planning on software R&D based on fixed IP servers

Fixed IP server user can rent or hosting ISP Internet service provider, or can apply special line to our server.

Generally speaking, user's monitoring software can divide into two modes:

One is the user monitoring software and Data center software (Data center) integration. Namely the user monitoring software is installed on the Server, and its working mode as Server, it communicate with and manage every scene DTU directly, the advantage of this way is communication directly, no data transfer, Disadvantage is that the flexibility for application is not strong, server must be in the user's master-control room (special line). So that users just can monitor and data collect in that server only.

Another one is the user monitoring software and Data Center software (Data Center) separation, Data Center dedicated to Data transfer and each machine DTU's management, monitoring software only in charge of the customer's business logic processing, it communicate with Data Center software through network, and it with Data Center software is C/S architecture, the monitoring software working mode as Client, and Data center as Server. The advantage of this way is very flexible application, user no need special line, only need place the server in ISP service provider, and install Data center software into server. User can manage it only by user's monitoring software, and when monitoring software install into a computer which connect with internet, it can achieve communication even in company or on business trip outside. The disadvantage of this mode is data need to transfer, monitoring software is not communicate with DTU directly, But communicate with data center software first, and then forward data to scene DTU. Users can plan the whole CDMA application system according to user's request. Normally, users are suggested using the second modem, our company's server and server software is available to offer a lot of support when user debugging and trial in the early time. If users develop software completely, Our company can offer SDK or Demo program when user monitoring software work as the server (when user monitoring software and data center software is integration) or Client (when user monitoring software and data center software is separation).

8. “Plug and play” of KB3060

When users don't want to or can not do software development based on customary communication to use CDMA, then can use “plug and play”. If user can develop software, then need not to use "plug and play".

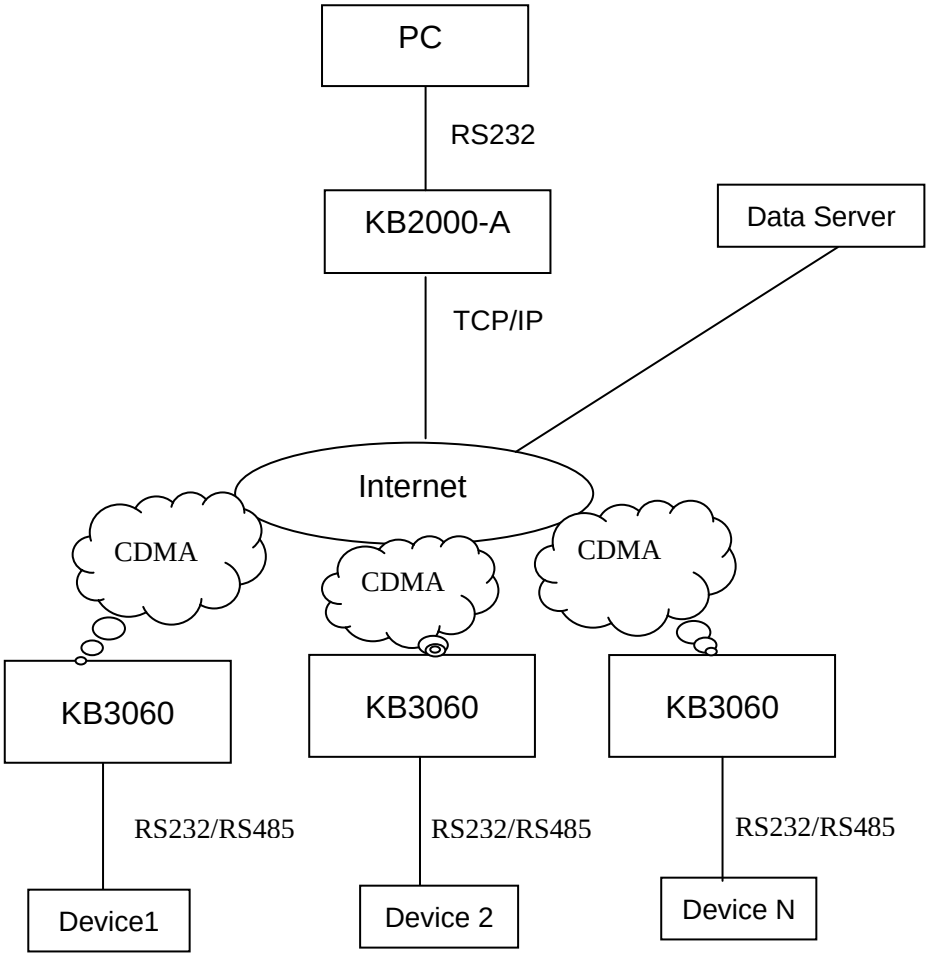
Normally, users monitoring software based on serial communication mode before user use CDMA, if user want to use CDMA system, user is advised to change the communication mode to network communication mode, meanwhile, Put the protocol of CDMA DTU in monitoring software (Invoke SDK from DTU manufacturers) and building server and so on many developments and applications. My company recommends "plug and play" solutions, user doesn't need to change its monitoring software, when users get our product, through my company's some software support, it can achieve remote CDMA communication through the monitoring software base on COM port communication modem. User can build a large SCADA system with our products and software in 10 minutes. In early time user debugging and try our products, user can use our server. If the bulk application is still need to adopt our company server, also can lease my company server.

Our company products "plug and play" solution requires our server software (Center Data) to support, the following various network scheme adopts our company's server software (installed in users server or our company server).

8.1 KB3060 work with KB2000

KB3060 CDMA DTU can be used with KB2000-A (our product). If your software is based on serial COM, and device is COM port too (RS232 or RS485), then you can chose this Plan. This network is plug and play way. It need not any development of software and hardware User need to hire our company’s server. It can peer to peer and center to multi-point. This type network is very suit for the situation that device and the PC software are based on the COM port communication, and they need remote communication. Such as LED display information release and so on.

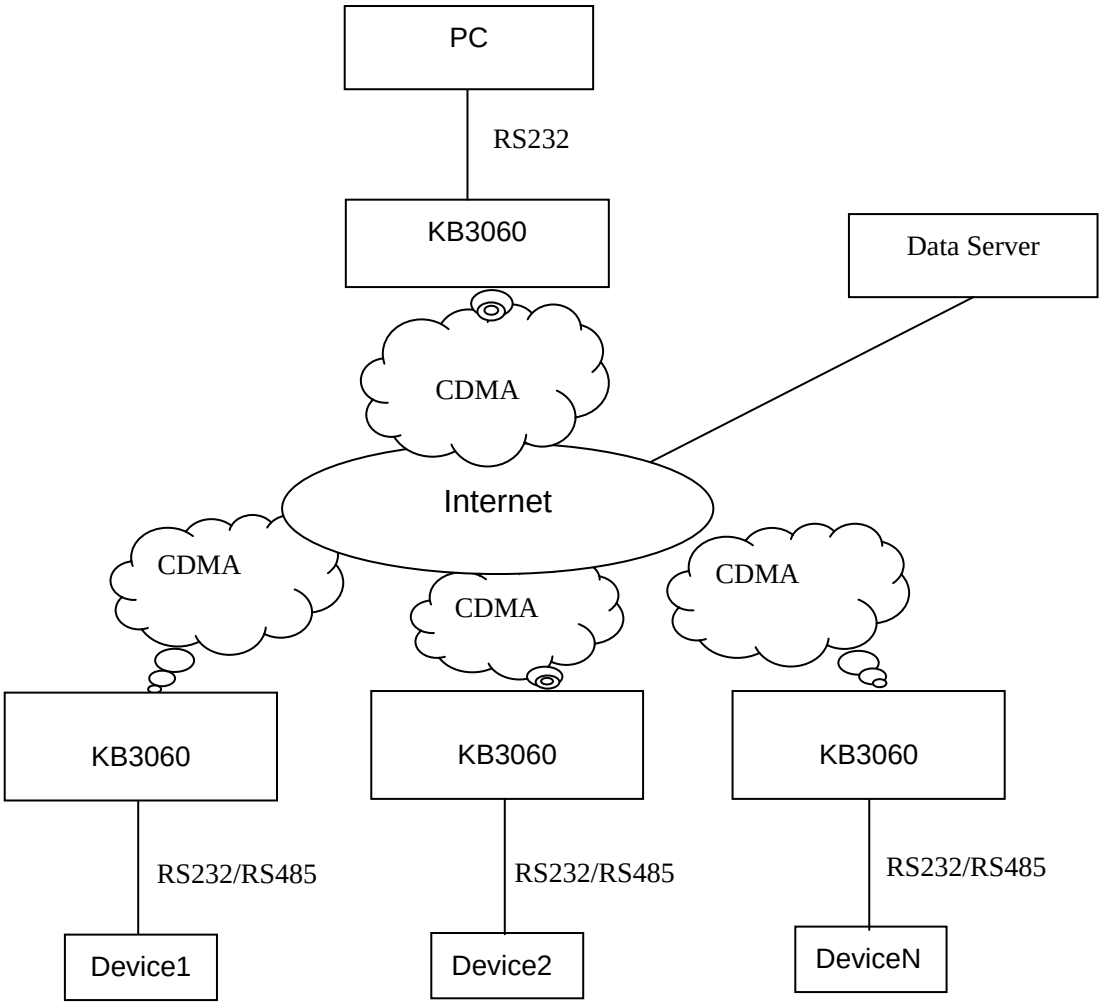
The network topology as follow:



8.2 KB3060 Work with KB3060

KB3060 can use with KB3060. When the master control room has no condition to surf the internet, user can use a KB3060 as main station, and use another KB3060 connected with device as slave station. This way is called plug and play (foolish application), no need to develop any software. User can use own server, or ours. Not only peer to peer, but also center to multi-point. This type network is very suit for the situation that main controlled room has no condition to surf the internet or outdoor, but need remote data communication.

Connected net system structure as follow:

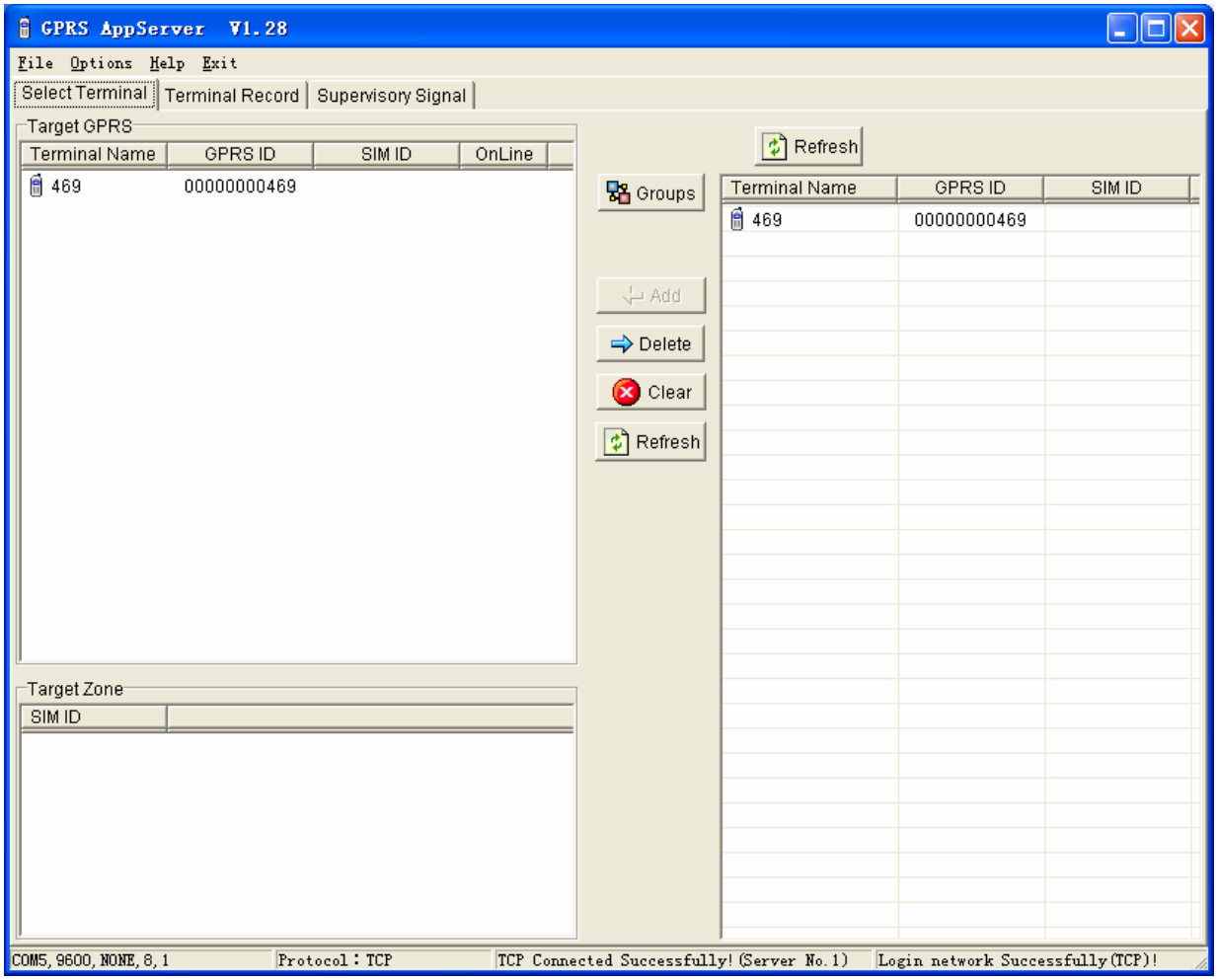


8.3 Appserver software work with KB3060

Appserver software is the client-side communication software developed by our company and application in one single host or multi host system, the single host or multi hosts in network are need data communications with the equipment. Appserver software can combine to use with user's device control software (based on COM port), it can obtain the data in user's device control software through COM part and send the data to the KB3060. In this way, when a host needs to communicate with device, Appserver software send TCP connection request to designated server, then communication with it. At the same time, the KB3060 which connected with device sends the TCP connection request to server, after connection established, KB3060 can communicate with server, then user can use Appserver

software in host communicate with every KB3060 through server. This network mode is very suitable for that equipment and PC software are serial communication mode, and need for remote data communication projects. Such as, LED display information issue system and so on.

The Appserver interface as follow:



The system schematic structure as follow: