User manual of GPRS module

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Contents

GPRS module is mainly used on remote communication for AMI meter and prepayment meter; support communication of GPRS and GSM; provide four online mode which are permanent online, period online, passive activate, demands online; meter reading by SMS.

1 List of technical specifications

No.	Technical specifications	Remarks
1	QHX-J011-0402 interface definitions between module and meter A3	
2	RD_TX_0001_130909 Xunlong extended protocol	
3	DLMS COSEM local communication standard A2 20141230 B	
4	DLMS、COSEM remote communication standard A2 2014.11.7	
5	1376.3-Part 3:interface protocol of collection terminal remote module	
6	G610_GPRS_Module_AT_Command_User_Manual_V1.3.1_20110607	
7	FIBOCOM_H330 Module AT Command User Manual_V1.2.1	

2 Products

No.	Structure type	Product type	Product No.	Dimensions	Weight
1	CH70	MGB201	1A5R2H	69.7mm×53.1mm×24.7mm	60.6g
2	CJ73	MGT203	1A5R2H	92.6mm×95.6mm×30.0mm	118.8g
3	BH70	MGB202	1A5R2H	69.9mm×49.9mm×24.5mm	56.6g
4	BJ73	MGT204	1A5R2H	75.9mm×64.4mm×26.0mm	69.8g

CH70 structure CJ73 structure BH70 structure BJ73 structure

3 Working parameters

Normal working condition of GPRS module：

working voltage DC 12V ±20%

working temperature -40°C to +85°C

storage temperature -40°C to +85°C

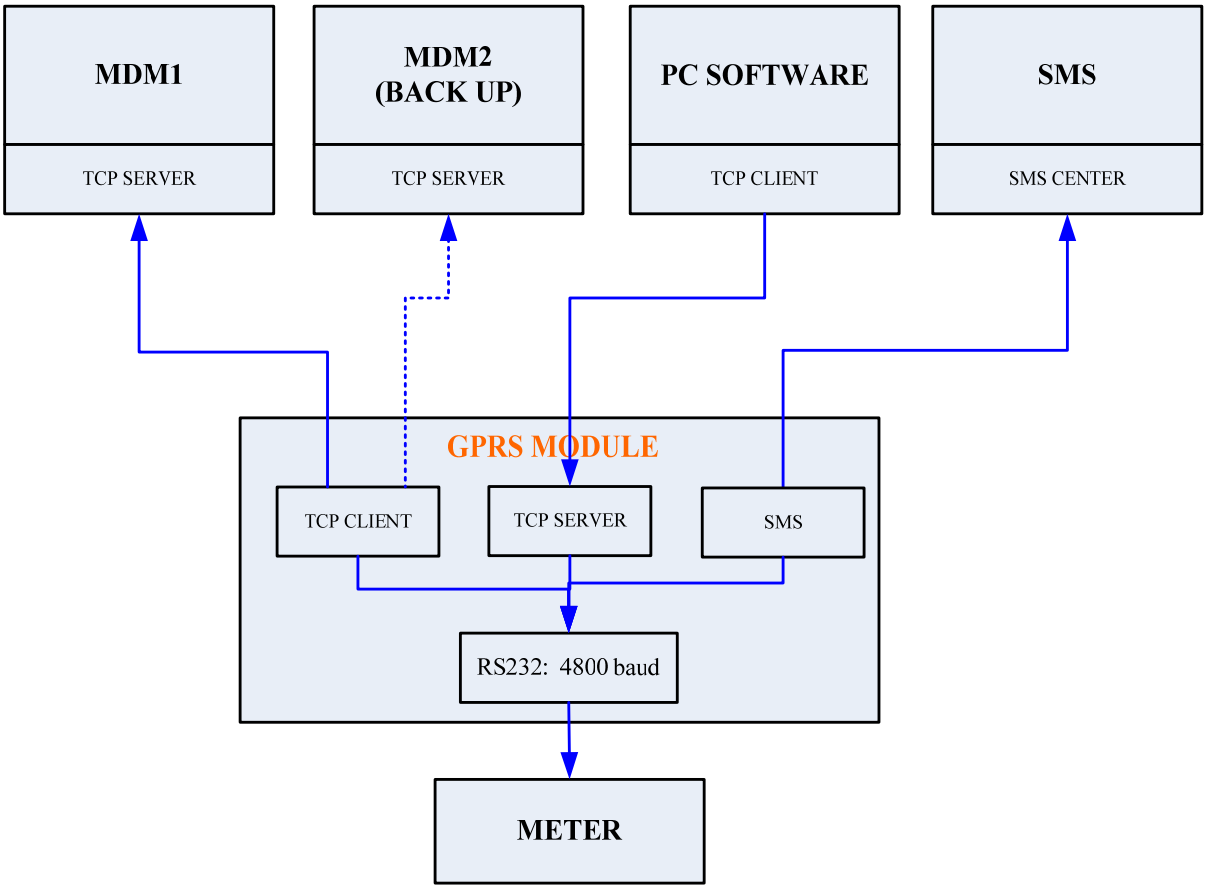
working humidity： 5% ~ 100%

GPRS chip specification ：

Product Features	
Operating systems:	Quad-band EGSM 900/1800MHz
Physical Characteristics	
Operational temperature:	-40°C to +85°C
Storage temperature:	-40°C to +85°C
Performance	
Tx power:	Class 4 (2W) @ 900 MHz
	Class 1 (1W) @ 1800 MHz
Current consumption	1.6mA@Sleep mode
	24mA@Idle mode
	420mA@on GPRS data
	MAX 2.0A@Burst
	80uA@Power off
	12uA@RTC only
Rx sensitivity:	850/900MHz: -107dBm 1800/1900MHz: -106 dBm
Interfaces	
SIM Card:	External SIM connectivity
GPRS:	Multi-slot class 10 (4 Rx / 2 Tx / 5 Sum)
	Class B GSM 07.10 multiplexing protocol

4 Main functions of communication module

Communication process of GPRS module is below：



（1）After GPRS module power on, module will automatically get working parameters from meter, automatically register GSM network according to working parameters.

（2）After GSM successfully registered, GPRS module will automatically register GPRS network according to user setting, support 3 PPP certification method(NONE, PAP, CHAP), APN support maximum 31 bit. Under PDP private network, PDP user name and password support maximum 31 bit.

（3）After GPRS successfully registered, GPRS module will be set to TCP/UDP communication and three communication mode which are client, server, mixed mode.

（4）Client mode can set in four online mode which are permanent online, period online, passive activate, demands online.

（5）GPRS module will automatically check GSM network register status, GPRS network register status, CSQ signal strength, TCP link status; automatically maintain and guarantee GPRS module well function. When there's abnormal status which checked by module, GPRS will solve accordingly: reset TCP link, register GPRS network, register GSM network, GPRS chip soft shut down, GPRS chip hard shut down, MCU reset etc.

（6）Upload communication method support GPRS and SMS, be able to set to SMS mode or GPRS mode according to demands, be able to deal with SMS data under GPRS mode.

（7）When meter or module have events or alarm need to push, module can send these to master

station by GPRS if GPRS module successfully connect with master station, otherwise module will send these to master station by SMS.

（8）When PC software connect GPRS module TCP server on its own, read meter, GPRS module will receive and deal with data requirements from PC software at once, meanwhile cut down link with master station; after finish meter reading by PC software, GPRS module will reconnect with master station at once and report to master station about PC software meter reading events.

（9）Support meter reading in GPRS mode according to DLMS protocol.

（10）Support meter reading in SMS mode according to DLMS protocol, but per frame SMS bytes is no more than 140.

（11）SMS mode support command of prepayment meter reading.

（12）SMS support tocken codes generate.

（13）shield illegal telephone number call according to setting, set up maximum 5 legal telephone number.

（14）Support send events and data by SMS according to demand, support SMS group message, support maximum 5 telephone numbers.

（15）Send task data(curve, daily frozen, month frozen) according to demands setting.

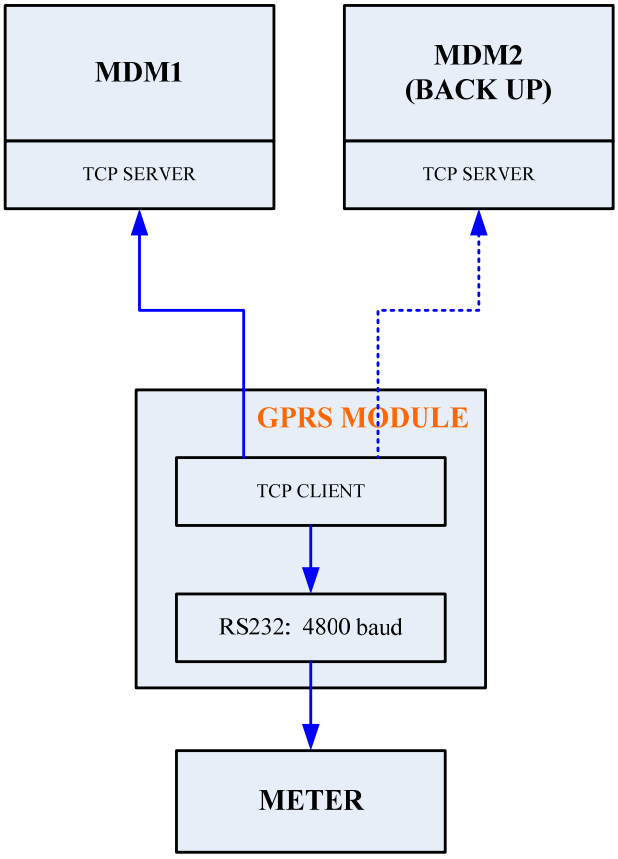
（16）Support remote or local commissioning, update(update support HTTP).

（17）Support remote or local read module log and working statistics, maximum save 30 days' data.

5 Application place and parameters setting

5.1 Client mode

GPRS module as TCP client, will send TCP link requirements to master station's TCP server, and keep TCP link.



5.1.1 GPRS module working process：

1) After GPRS module power on, will automatically get working parameters from meter, automatically register GSM and GPRS network according to working parameters.
2) After GPRS network successfully registered, GPRS module will automatically connect with TCP server of master station.
3) If GPRS module fails 3 times try to connect with master station, module will try to connect with backup master station; if module fails 3 times try to connect with backup station, module will try to connect with master station, such a circular attempt. If the attempt fails for 10 consecutive rounds, GPRS module will sleep a minute later, to re-initialize and re-start the initialization process.
4) On period online mode, GPRS module normally is only on GSM network status. When online time comes, GPRS module will automatically register GPRS network and connect with master station.When offline time comes, module will cancel GPRS network, only keep GSM network.
5) On passive activate mode, GPRS module normally is only on GSM status. When master station send activation message(message content can set in advance) or call to activate, GPRS module will register GPRS network at once, automatically link master station server. After finish master station meter reading, if no meter reading action in 20

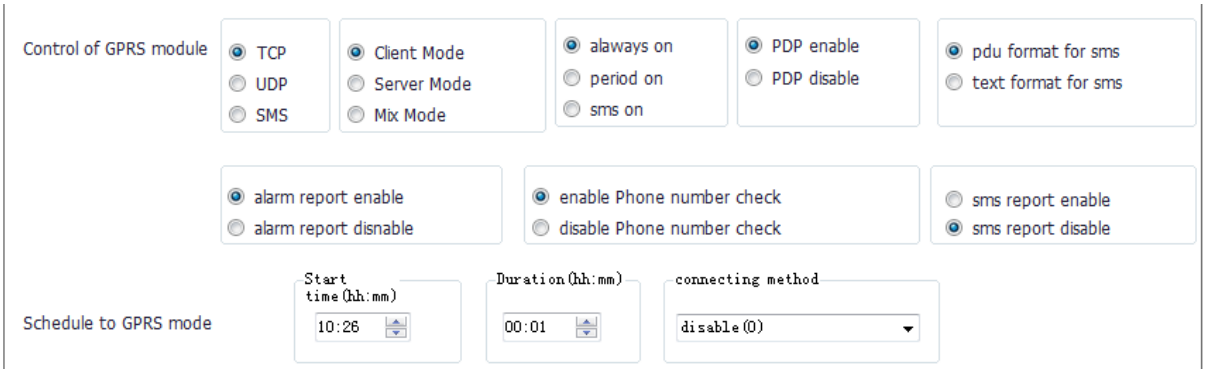
mins, GPRS module will automatically cancel GPRS and wait for next activation.

6) On demands online mode, GPRS module is normally only on GSM network status. When online time comes, GPRS module will automatically register GPRS network and link master station server. When offline time comes, GPRS module will automatically cancel GPRS, only on GSM network status. In offline time period, master station can send activation message(message content can set in advance) or call to activate, GPRS module will register GPRS network at once, link to master station server at once. After finish master station meter reading, if no meter reading in 20 mins, GPRS module will automatically cancel GPRS and wait for next activation.

5.1.2 GPRS module parameters setting：

	Value
TCP port	00000
GPRS APN	internet
CS IP	001.001.001.001
CS SMS number	
Server center SMS number	
PDP user name	username
PDP password	password
Text message for SMS	
TCP port for backup	00000
CS IP for backup	001.001.001.001
CS SMS number for backup	
Third CS SMS number	
GPRS signal strength	
Period of heartbeat	002
Timeout for disconnection after communication	
Communication mode for GPRS module	

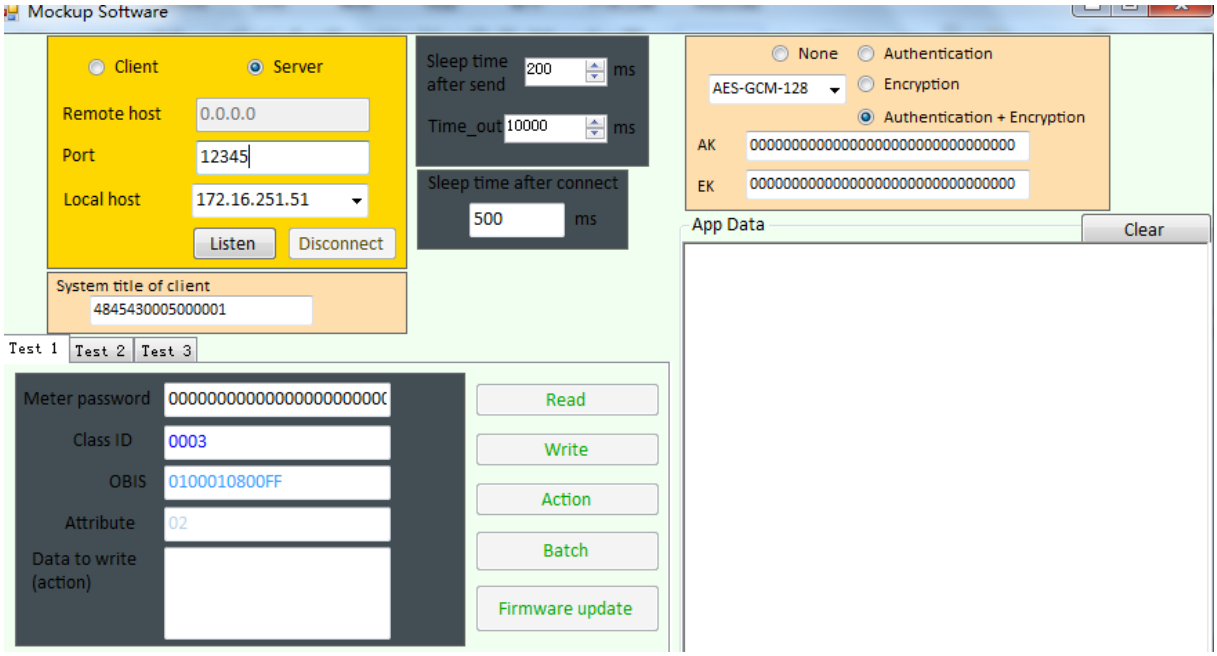
a. Fill in according to on site condition: APN.
b. If you use VPN network, you need to fill in PDP user name, PDP password.
c. If you use function related with SMS, you need to fill in CS SMS number, Server center SMS number etc。



d. Choose GPRS working mode ad TCP, Client Mode, always on.

e. If you use VPN network, you need to choose PDP enable.

5.1.3 Test communication by PC software：



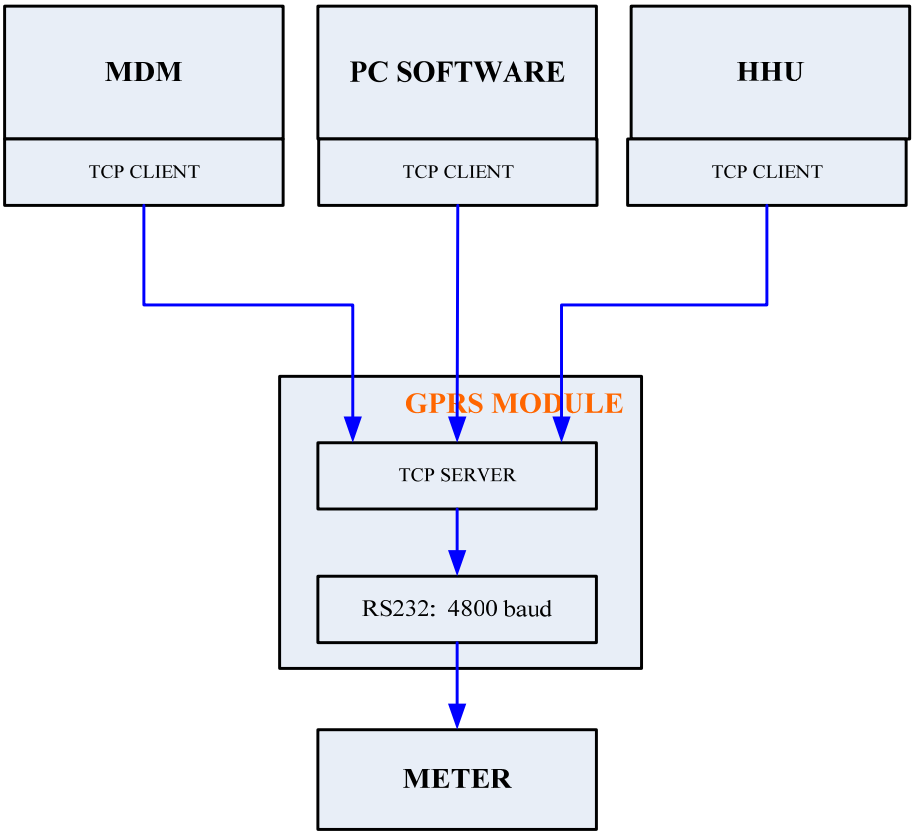
a. Choose PC software working mode as TCP, Server.

b. Fill in Local Port.

c. Open server monitor port, send data.

5.2 Server mode

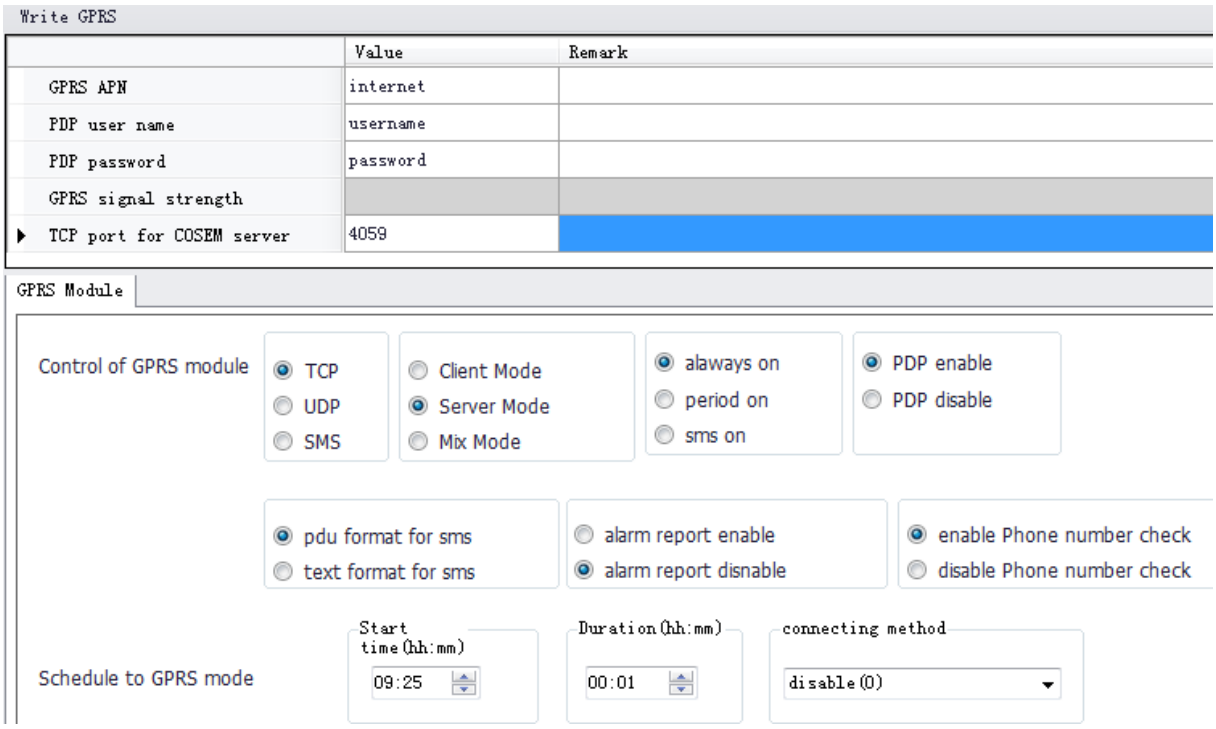
GPRS will automatically set up and keep a TCP server monitor port, receive TCP client link requirements from master station, PC software, HHU and other equipment.



5.2.1 GPRS module working process ：

1) After GPRS module power on, will automatically get working parameters from meter, automatically register GSM and GPRS network according to working parameters.
2) After GPRS successfully registered, automatically set up TCP server monitor port, wait for TCP client automatic link from PC software.
3) Server port only deal with 1 TCP client link at same time, if GPRS module receive multiple TCP server link requirements from PC software, GPRS only accept and deal with the last link, meanwhile close former links.
4) Server port will automatically check TCP link which received. If TCP link no data communication in 1 min, GPRS module will automatically close the TCP link passageway.

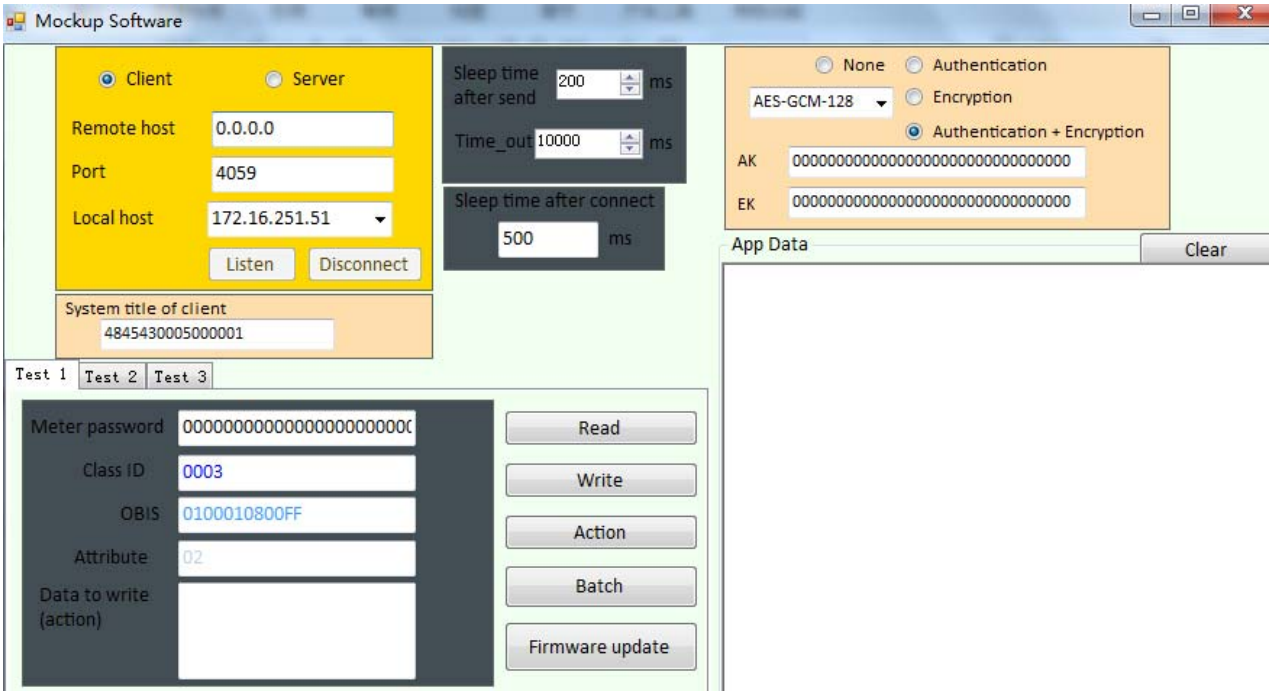
5.2.2 GPRS module parameters setting：



a. Fill in according to on-site condition: APN,PDP user name, PDP password,TCP port for COSEM server.

b. Choose GPRS working mode as TCP,Server Mode,always on,PDP enable.

5.2.3 Test communication by PC software：



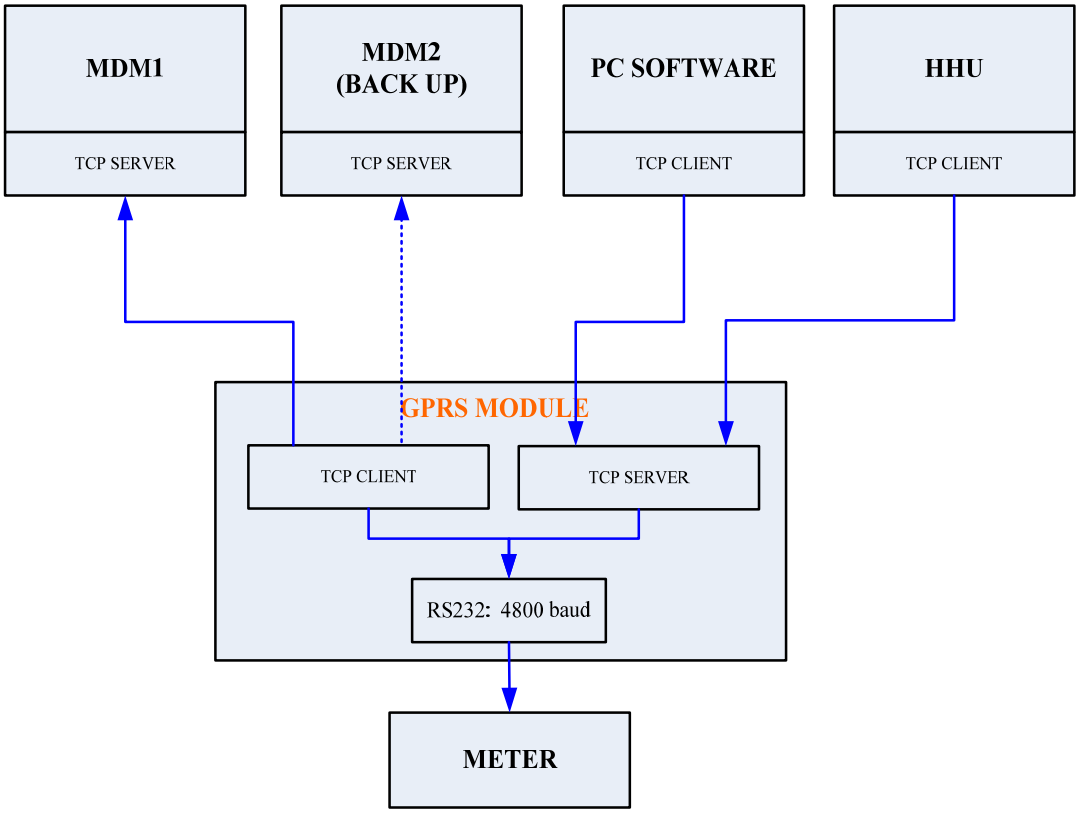
a. Choose PC software working mode as TCP, Client.

b. Fill in Remote host IP(is SIM card’s static IP)。

c. Fill in Remote host Port(TCP port for COSEM server in GPRS modem).

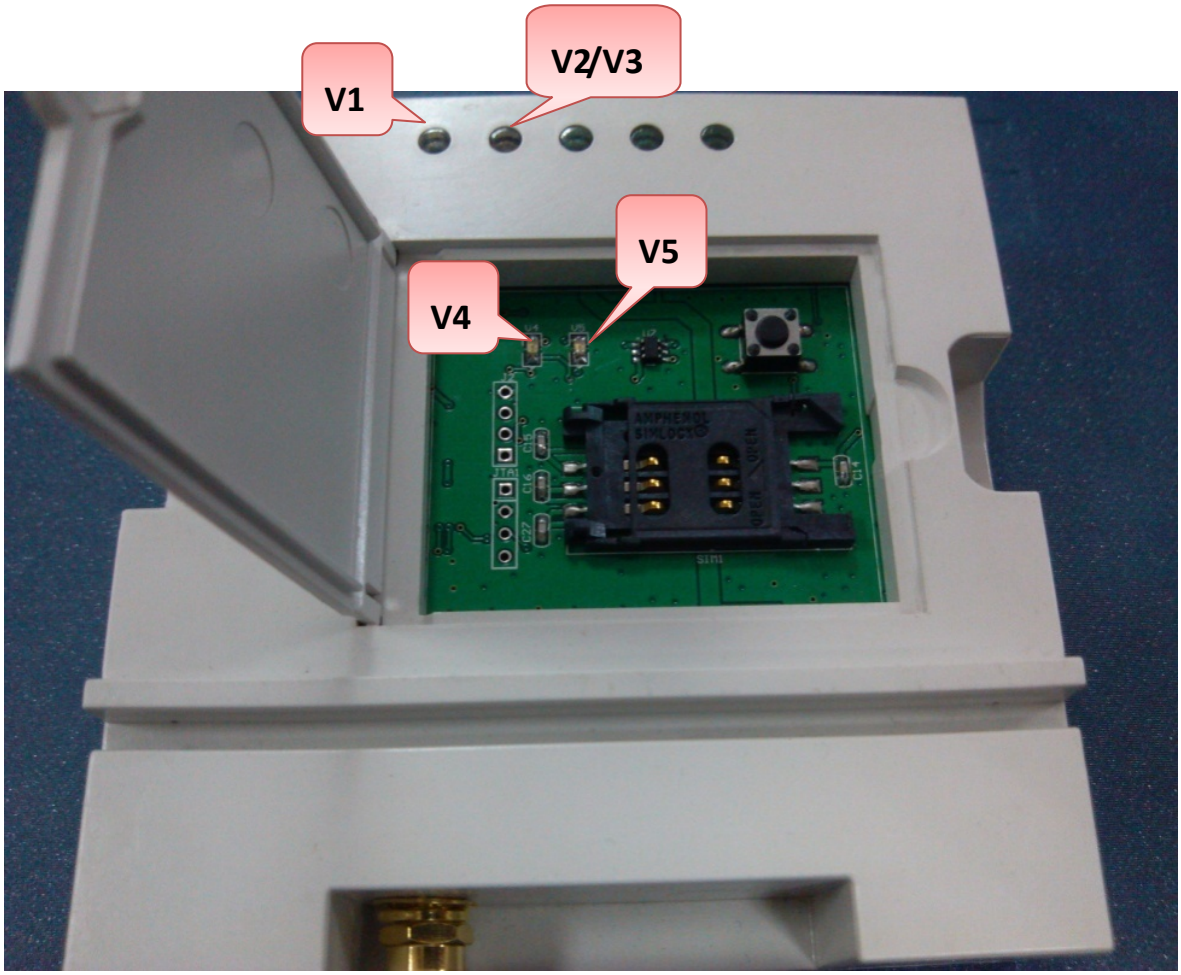
5.3 Mixed mode

GPRS module will automatically set up and keep a TCP server monitor port, receive TCP client link requirements from master station, PC software, HHU and other equipment, meanwhile GPRS module will send a TCP client link of master station MDM and keep it.



Regarding parameters setting and operation manual, please refer to 5.1 Client mode and 5.2 Server mode.

6 Lights description



No.	Lights name	Lights color	Descriptions
1	local light V1	green	On: communication with meter function well Off: fail to communicate with meter.
2	network status light V2	green	Off: module not work or intialization Blink: module has successfully register GSM, and try to register GPRS. On: module has successfully register GPRS, and connect with master station.
3	network data light V3	red	Off: there's no data sending and receiving between module and master station. Blinking: there's data receiving and sending between module and master station. On: module don't inspect SIM card or signal strength is weak.(malfunction remind).

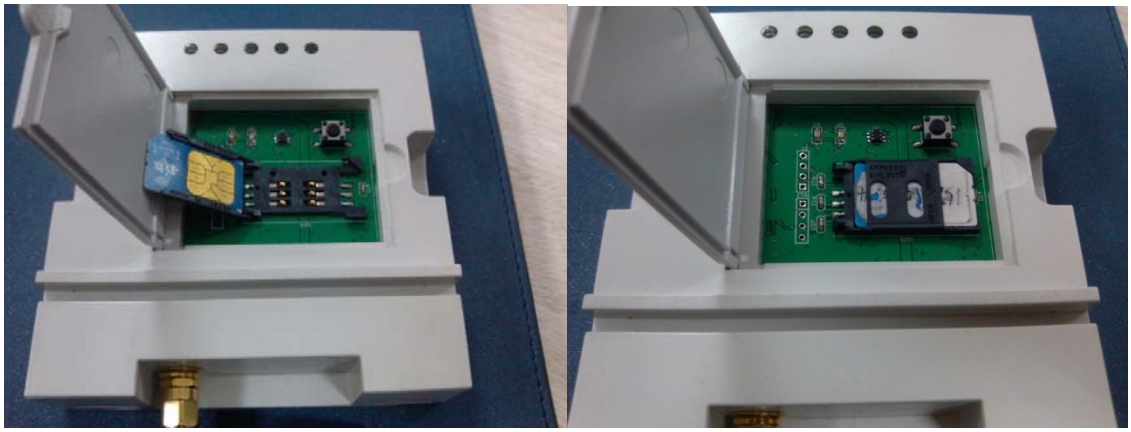
4	CPU working light V4	green	Blink: module function well Others: malfunction.
5	GPRS chip working light V5	red	Off: GPRS chip initialization. Slowly blink: GPRS chip is initialization. Uneven flashing (long OFF short bright):GPRS chip has successfully register GSM. Fast blink: GPRS chip has successfully register GPRS.

7 Signal strength descriptions

No.	Signal strength	Descriptions	CSQ range	DBM range
1		no signal, signal is weak	CSQ < 9	DBM <- 95dbm
2		signal is weak	9 <= CSQ < 14	-95dbm <= DBM < -85dbm
3		signal is just so so	14 <= CSQ < 19	-85dbm <= DBM < -75dbm
4		signal is good	19 <= CSQ < 23	-75dbm <= DBM < -67dbm
5		signal is very good	23 <= CSQ	-67dbm <= DBM

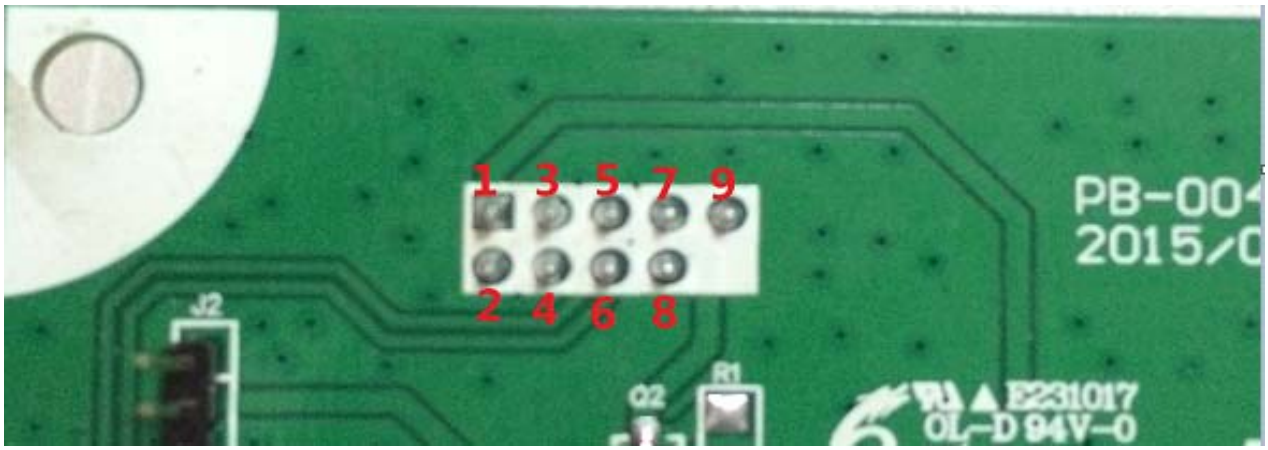
Note： -113 + 2*CSQ = DBM

8 How to change card



when meter need to change SIM card during function well condition, open SIM card cover, press change card button for 5S, Led V5 will be off. Now you need to change SIM card, please finish change card work in 30s. After pressing 30s, module will automatically restart.

9 Module hardware port descriptions



Signal name	Signal type	Pin No	Direction	Descriptions
VCC	power	1,2		Module simulate part power, voltage 11V~15V，no more than 400mA。
VSS	power	3,4		Communication ground(pin is 0.5mm longer than other pins)
TXD	signal	5	O	Module data sending(TTL3.3V electrical level), communicate port with basic meter.
RXD	signal	6	I	Module data receive（TTL 3.3V electrical level），communicate port with basic meter。
D3.3V	power	7		Power is supplied by module, communicate module data part power, voltage 3.3V±5%，maximum current 50mA，Common ground and VCC power for driving the communication interface optocoupler isolation.
RSET	IO	8	I	Meter set the pin low, can restart module.
EVNETOUT	IO	9	I	Meter set the pin low, inform module meter's events happen.

10 Interface descriptions

Module use interface to communicate with meter, interface descriptions are below：

Signal electrical level range：3.3V TTL electrical level

Local interface baud rate：4800bps

Data byte：8 bytes

Parity：NONE

Stop bit：1

Communication protocol shall complies with < QHX-J011-0402 interface protocol between communication module and meter A3>, hardware interface shall complies with < Hexing hardware interface definitions between communication module and meter>.

11 Notes

1) Do not make products completely enclosed in a metal box, if must be installed in a metal casing, antenna module must be drawn metal body.
2) When outdoors higher position, if the surrounding relatively empty, install a lightning rod to prevent lightning strikes.
3) This type of product is not waterproof, please do not use this product directly installed outdoors and damp places.
4) To prevent static electricity.