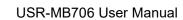






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1. Introduction

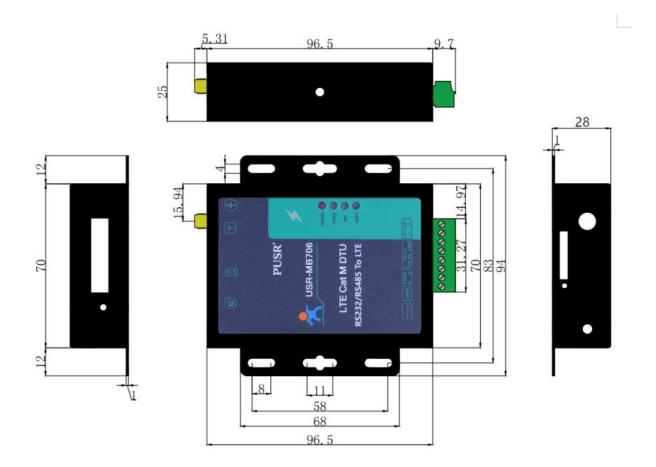
1.1. Overview

USR-MB706 is a LTE Cat M serial modem which supports GNSS. It supports LTE Cat M1, LTE Cat NB2, and EDGE/GPRS compatible, covers global frequency bands. It has perfect software function, supports transparent transmission, HTTPD Client, SMS mode and AT command configuration. Also, it is simple to configure, has high reliability and built-in hardware watchdog, supports FOTA upgrading. USR-MB706 adopts terminal interface design, RS232/RS485 interface easy to connect to serial port sensors, PLC, IPC, and controller, meets the needs of different application scenarios such as meter reading, security monitoring, vehicle positioning, alarms, asset tracking, etc.

Please open our official website for more information:

https://www.pusr.com/products/RS232/RS485-serial-to-LTE-cat-M-modem-MB706.html

1.2. Dimensions





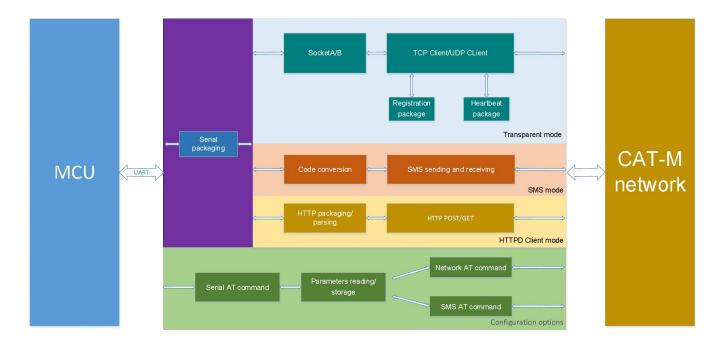
1.3. Specification

Pa	arameters	Description
	Standard	Cat.M1/Cat.NB2/EGPRS
	Power Supply	DC 9V~36V
	Consumption	Average: 30.99mA-43.05mA, maximum: 175.08mA (12V)
		POWER: Indicates power status, always on after power supply.
		WORK: Indicates operation status, flashes every 1s in normal operation,
Basic		flashes every 500ms in positioning.
Parameters	Indicators	NET: Indicates network connection status, always on after connecting to the network.
		LINKA: Indicates socket A connection status, always on after connecting
		successfully.
	SIM/USIM	1.8V, 2FF
	UART Interface	RS232/RS485, baud rate 2400~230400 (bps)
	Antenna Interface	SMA female interface
_	Dimensions (mm)	105*94*28(L*W*H)
Appearance	Weight (g)	<110g
Temperature	Operation Temperature	-35℃~ +75℃
remperature	Storage Temperature	-40℃~ +85℃
Humidity	Operation Humidity	5%~95% (non-condensing)
	Cat.M1	588Kbps DL/1119Kbps UL (half-duplex)
Transmission	Cat.NB2	127Kbps DL/158.5Kbps UL
Speed	EDGE	296Kbps DL/236.8Kbps UL
	GPRS	107Kbps DL/85.6Kbps
_	Cat.M1	B1/2/3/4/5/8/12/13/18/19/20/25/26/27/28/66/85
Frequency	Cat.NB2	B1/2/3/4/5/8/12/13/18/20/25/28/66/71/85
Bands	GSM/EDGE	850/900/1800/1900 MHz
	Cat.M1	B1/2/3/4/5/8/12/13/18/19/20/25/26/27/28/66/85: 21dBm+1.7/-3 dB
TYP	Cat.NB2	B1/2/3/4/5/8/12/13/18/20/25/28/66/71/85: 21dBm+1.7/-3 dB
TX Power	GSM850/EGSM900	33dBm±2dB
	DCS1800/PCS1900	30dBm±2dB
	Cat.M1	B1/2/3/4/5/8/12/13/18/19/20/25/26/27/28/66/85: -106dBm
	Cat.NB2	B1/2/3/4/5/8/12/13/18/20/25/28/66/71/85: -114dBm
Rx Sensitivity	GSM850/EGSM900	-107dBm
	DCS1800/PCS1900	-107dBm
	Operation Mode	Transparent mode, HTTPD Client mode, SMS mode
Cofficient	Configuration Command	AT+Command
Software	Network Protocol	TCP/UDP/DNS/FTP/HTTP/IPV4/IPV6
	Number of Sockets	2



Be Honest, Do	USR-N	IB706 User Manual	Technical Support: h.usriot.com
	User Configuration	Serial AT commands, netw	ork AT commands, SMS AT commands
	Heartbeat Package	Support user-defined heart	beat
	Identity Package	Supports user-defined ider	tity package/ICCID/IMEI
	FOTA Upgrading	Support	
	GNSS	Support	
	Base Station		
	Geolocation	Support	
	FTP Upgrading	Support	
	Modbus RTU to TCP	Support	

2. Features



2.1. Network Mode

MB706 support CAT M1, cat NB2, EGPRS three network modes. After configuring the network modes, users do not need to care about the connection status between the device and base station, just need simple configuration to connect it to the network.

Configure via Setup software:



Technical Support: h.usriot.com

축 USR-MB706 V File Language I		-	
[PC Serial Paramet	ters] : Serial Port COM27 🗸 BaudRate 115200 🗸 Parity/Data/Stop NONI	v 8 v 1 v 🔳 Close 🝕 Load image 🝕 Upgrade	
Choose Net Systen	m	Operation and Hints 9	
АUTO 4	○ GPRS ○ LTE Cat.M1 ○ LTE Cat.NB1	3 Query all parameters	ters
Choose Work Mode	e		
Transpare	ent Mode 🛛 🔿 🔿 HTTPD Client Mode 🔿 SMS Mode	Enter Serial AT command mode Exit Serial AT command m	node
	CP/UDP Serial	Help message 10 Restart Query ve Save as user defaults Restore user defaults Restore Facto	
PC	NetWork M2M device Serial device	Save as user defaults Restore user defaults Restore Facto	ry Defaults
FC Transparent Mode F	Genal device	☐ Timestamp ☐ Hex RX:1397	Reset Count
Socket A 6 Enable Socket B	IP&Port test.usr.cn 2317 Link Type TCPC ~ Interval of reconnection(s) 5	+DSTNUM:4000255652 >[Tx->][14:26:39][asc] AT+SMSFLT?	
		>[Rx<-][14:26:39][asc]	
Enable Heartbeat	Heartbeat Interval(s) 30	AT+SMSFLT?	
Package	Heartbeat Data 7777772E7573722E636E Hex Method of Heartbeat Send data to network V	+SMSFLT:ON	
Modem Parameters	s	Operation complete	
More	Packaging Interval(ms) 100 Packaging Length(Bytes) 1000	^	
0	Command Prefix www.usr.cn# Reboot Message [USR-MB706]		
	8 APN CMNET,0	✓ Send via Serial Port → □ Hex TX:0	🖏 Send 🔸

Configure via AT commands:

	Commands	Description
1	+++a	Enter AT command mode
2	AT+NWSCMOD=0	Set the network status to "AUTO"
3	AT+WKMOD=NET	Set the work mode to "Transparent mode"
4	AT+SOCKAEN=ON	Enable Socket A
5	AT+SOCKA=TCPC,test.usr.cn,2317	Set socket A to TCP Client
6	AT+Z	Restart the device

Note:

NWSCMOD parameters:

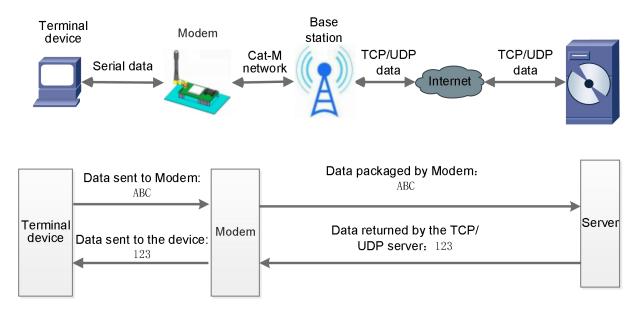
- 0: Auto
- 1: GPRS
- 2: CAT M1 & CAT NB2
- 3: CAT M1
- 4: CAT NB2



2.2. Operation Mode

USR-MB706 has three working modes: Transparent mode, HTTPD Client mode, SMS mode.

2.2.1. Transparent Mode



In this mode, user's serial device can directly send data to the specified network server through MB706. Module can also receive data from the server and directly forward to the serial device.

In this mode, users do not need to pay attention to the data conversion process between serial port and network data packets. They only need to set simple parameters to realize the transparent transmission of data between serial devices and network servers.

MB706 supports 2 socket connections, Socket A and Socket B, which are independent of each other. Only Socket A supports as TCP Client, TCP Server and UDP Client. Socket B supports TCP Client and UDP Client .

It supports up to 3 TCP Clients when works as a TCP Server. Because the conventional operator network can not be accessed through the external network, so for the Server function need to use a dedicated APN card .

Configure via setup software:



Technical Support: h.usriot.com

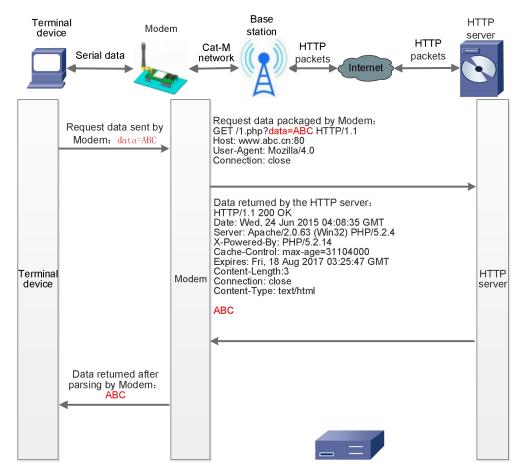
File Language	Help	
[PC Serial Parame	eters] : Serial Port COM27 v BaudRate 115200 v Parity/Data/	Stop NONI 🗸 8 🔍 1 🔍 👅 Close 😽 Load image 😽 Upgrade
Choose Net Syste	em	Operation and Hints 9
АUTO 4	○ GPRS ○ LTE Cat.M1 ○ LTE C	Cat.NB1 3 Query all parameters Save current parameters
Choose Work Moo Transpar		Enter Serial AT command mode Exit Serial AT command mode
	TCP/UDP Serial	Help message Image: Constraint of the start Query version Save as user defaults Restore user defaults Restore Factory Defaults
PC Fransparent Mode		al device
Socket A	IP&Port test.usr.cn [231 Link Type TCPC ~ Interval of reconnection(\$) 5	+DSTNUM:4000255652 >[Tx->][14:26:39][asc] AT+SMSFLT?
✓ Enable Heartbeat Package	Heartbeat Interval(s) 30 Heartbeat Data 7777772E7573722E636E V H Method of Heartbeat Send data to network V	>[Rx<-][14:26:39][asc] AT+SMSFLT? +SMSFLT:ON
Modem Paramete		Operation complete
More More	Packaging Interval(ms) 100 Packaging Length(Bytes) 100	
0	Command Prefix www.usr.cn# Reboot Message [USR-MB706] Reboot Message [APN (CMNET,,,0	Send via Serial Port + Hex TX:0

Configure via AT commands:

	Command	Description
1	+++a	Enter serial AT command mode
2	AT+WKMOD=NET	Set to transparent mode
3	AT+SOCKAEN=ON	Enable socket A
4	AT+SOCKA=TCPC,test.usr.cn,2317	Set the remote IP and port of socket A
5	AT+Z	Restart the device



2.2.2. HTTPD Client mode



In this mode, user's terminal device can send request data to the specified HTTP server through this module, then the module receives data from HTTP server, parses and sends data to the serial device.

User does not need to pay attention to the data conversion process between the serial data and the network data packet, and can achieve the data request from the serial device to the HTTP server through simple parameter settings.

The module will filter out the received HTTP protocol header data by default, only output user data to the serial port. Customers can choose whether to filter HTTPD header data by AT command.

Configure via setup software:



Technical Support: h.usriot.com

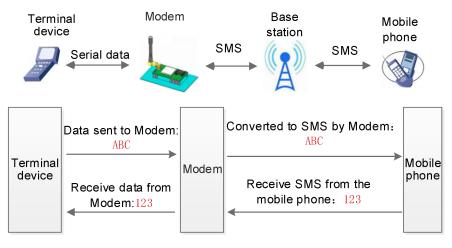
* USR-MB706 V1.0.3	×
File Language Help	
[PC Serial Parameters] : Serial Port COM27 v BaudRate 115200 v Parity/Data/Stop NONI v	8 v 1 v Close 🛿 Load image 🖇 Upgrade
Choose Net System	Operation and Hints
4 AUTO O GPRS O LTE Cat.M1 O LTE Cat.NB1	3 🗟 Query all parameters 9 📳 Save current parameters
Choose Work Mode	2 Enter Serial AT command mode Exit Serial AT command mode
○ Transparent Mode 5 ● HTTPD Client Mode ○ SMS Mode	Enter Senar AT command mode Exit Senar AT command mode
HTTP Serial	Help message Query version
	Save as user defaults Restore user defaults Restore Factory Defaults
HTTP server NetWork M2M device Serial device HTTPD Client Mode Parameters	Timestamp Hex RX:1397 AI+USINUM?
6 HTTP request method GET ~	+DSTNUM:4000255652
HTTP URL /1.php[3F] HTTP server address test.usr.cn	>[Tx->][14:26:39][asc] AT+SMSFLT?
HTTP server port 80 Interval of reconnection(s) 10	>[Rx<-][14:26:39][asc] AT+SMSFLT?
HTTP request Header Connection: close[0D][0A]	+SMSFLT:ON
Modem Parameters	Operation complete
More Packaging Interval(ms) 100 Packaging Length(Bytes) 1000	^ v
Enable Echo MODBUS Change Command Prefix www.usr.cn# Reboot Message [USR-MB706]	
8 APN CMNET,,,0	v Send via Serial Port v ☐ Hex TX:0 Ø Send v

Configure via AT commands:

	Commands	Description
1	+++a	Enter serial AT command mode
2	AT+WKMOD=HTTPD	Set the work mode to HTTPD Client
3	AT+HTPTP=GET	Set HTTP request method
4	AT+HTPURL=/1.php[3F]	Set HTTP request URL
5	AT+HTPSV=test.usr.cn,80	Set HTTP server address and port
6	AT+HTPHD=Connection: close[0D][0A]	Set HTTP request header
7	AT+HTPTO=10	Set HTTP request timeout
8	AT+HTPFLT=ON	Set whether to filter HTTP header
9	AT+Z	Restart the device



2.2.3. SMS Mode



In this mode, user's serial device can send SMS to the specified mobile phone and receive SMS from any mobile phone. User can decide whether to transmit the data of the specified mobile phone to the serial device through settings.

Users do not need to pay attention to the data conversion process between serial port data and SMS. They only need to set simple parameters to realize transparent data communication between mobile phones and serial port devices.

If the user's serial device is placed in a remote place, MB706 can be used to check the running status of the device or control the running parameters by sending and receiving SMS.

Configure via setup software:



USR-MB706 User Manual Technical Support: h.usriot.com * USR-MB706 V1.0.3 X File Language Help [PC Serial Parameters] : Serial Port COM27 BaudRate 115200 ✓ Parity/Data/Stop NONI √ 8 ~ 1 Close Load image 🗧 Upgrade Choose Net System Operation and Hints ● AUTO 4 O LTE Cat.M1 O LTE Cat.NB1 O GPRS Query all parameters Save current parameters Choose Work Mode Enter Serial AT command mode Exit Serial AT command mode O Transparent Mode O HTTPD Client Mode SMS Mode SMS ((()))) SMS Serial Restart Help message 10 Query version Save as user defaults Restore user defaults Restore Factory Defaults Mobile M2M device Base station Serial device Timestamp Hex RX:1397 Reset Count SMS Mode Parameters AT+DSTINUM? +DSTNUM:4000255652 >[Tx->][14:26:39][asc] Destination phone number 4000255652 AT+SMSFLT? Only receive SMS from dst. No. >[Rx<-][14:26:39][asc] AT+SMSFLT? +SMSFLT:ON Operation complete Modem Parameters Packaging Interval(ms) |100 | Packaging Length(Bytes)|1000 More More Enable Echo MODBUS Change Command Prefix www.usr.cn# Reboot Message [USR-MB706] Send via Serial Port + Hex TX:0 🕘 Send 🔸 APN CMNET,,,0

Configure via AT commands:

	Commands	Description
1	+++a	Enter serial AT command mode
2	AT+WKMOD=SMS	Set the work mode to SMS
3	AT+DSTNUM=10086	Set destination phone number
4	AT+SMSFLT=ON	Enable SMS filtering function
5	AT+Z	Restart the device

Note:

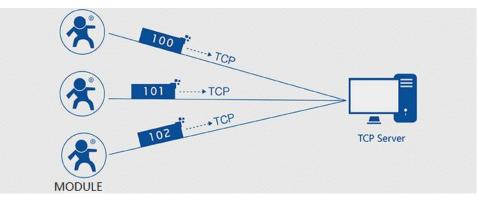
1. The destination phone number of SMS should be added with the international number.

2. When non-target mobile phone number filtering is enabled, the non-target mobile phone number can still query or set parameters.



2.3. General Function

2.3.1. Identity Package



In network transparent mode, user can set the device to send identity package to the server. Identity package is intended to allow the server to identify the data from which device or to use it as a password to obtain authorization for the server's functions. Identity package can be sent when the module establishes a connection with the server, or be added at the forefront of each data packet to form a data packet to be sent to the network. Identity package data can be ICCID code, IMEI code, CLOUD, or User-defined data.

ICCID: Unique SIM identification code, for applications based on SIM card identification.

IMEI: Unique identification code of the Internet module, which is mainly used in device identification, has nothing to do with SIM card.

CLOUD: Cloud ID and password when connecting to PUSR Cloud.

USER: User-defined data.

Configure via setup software:



Technical Support: h.usriot.com

[PC Serial Paran	neters] : Serial Port COM27 V BaudRate 115200 V Parity/Data/Stop NON	∨ 8 ∨ 1 ∨ ■ Close 🥰 Load image 缓 Upgrade
Choose Net Syst		Operation and Hints
● AUTO	4 ○ GPRS ○ LTE Cat.M1 ○ LTE Cat.NB1	Query all parameters Save current parameters
Choose Work M	ode	
Transp	arent Mode 🛛 HTTPD Client Mode 🔷 SMS Mode	Enter Serial AT command mode Exit Serial AT command mode
	TCP/UDP Serial	Help message 10 Restart Query version
		Save as user defaults Restore user defaults Restore Factory Defaults
PC	NetWork M2M device Serial device	Timestamp Hex RX:1397 Reset Coun
ransparent Mod	e Palameters	AT+DSTNUM?
 Enable Heartbeat Package Enable Identity Package 	Method of Identity Package Send package as the pre 🗸	+DSTNUM:4000255652 >[Tx->][14:26:39][asc] AT+SMSFLT? >[Rx<-][14:26:39][asc]
6	Type of Identity Package User-defined data User-defined data 12345678001122334455	AT+SMSFLT?
	Reconnect times 60	+SMSFLT:ON
	ers	Operation complete
Modern Paramet	Packaging Interval(ms) 100 Packaging Length(Bytes) 1000	^
		×
Modem Paramet	Command Prefix www.usr.cn# Reboot Message [USR-MB706]	

Configure via AT commands:

	Command	Description
1	+++a	Enter serial AT command mode
2	AT+WKMOD=NET	Set the work mode to "Transparent mode"
3	AT+REGEN=ON	Enable identity package function
4	AT+REGTP=USER	Set the identity package to user-defined data
5	AT+REGDT=7777772E7573722E636E	Set user-defined data, hexadecimal string
6	AT+REGSND=LINK	Set the type as the prefix of each data packet
7	AT+S	Save parameters and restart the device

2.3.2. Heartbeat Package

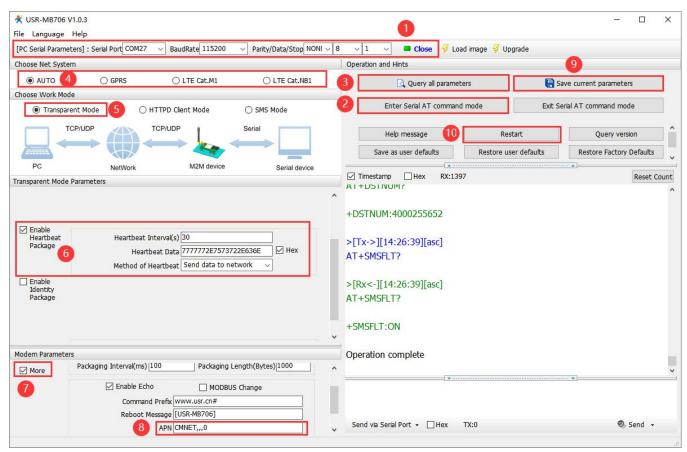
In network transparent mode, user can send the heartbeat package from the module to meet specific requirements.

Heartbeat package can be sent to the network or serial port device. The main purpose of sending to the network is to keep the connection stable and reliable, to ensure the normal connection of the module, and at the same time, to let the server know the online status of the module.

In the application of fixed query commands sent by the server to the device, in order to reduce communication traffic, user can choose to send heartbeat package (query commands) to the serial device instead of sending query commands from the server, so as to save traffic and respond faster.



Configure via setup software:



Configure via serial AT commands:

	Commands	Description
1	+++a	Enter serial AT command mode
2	AT+WKMOD=NET	Set the work mode to "Transparent mode"
3	AT+HEARTEN=ON	Enable heartbeat package function
4	AT+HEARTSND=NET	Set the heartbeat method to network
5	AT+HEARTDT=7777772E7573722E636E	Set the heartbeat data, HEX format
6	AT+HEARTTM=30	Set the heartbeat sending interval to 30s
7	AT+S	Save the parameters and restart the device

2.3.3. Base Station Geolocation

USR-MB706 supports LBS base station geolocation function, and can obtain general location of the device through the operator's network. Base station geolocation information is obtained through AT command, which can be used flexibly with serial AT and SMS AT command.

Command	Function	Default parameter
AT+LBS	Query station positioning information	Empty



Note: This function does not obtain positioning information directly (E.g. latitude and longitude information), but base station location information. Users need to obtain direct positioning information through calculation on a third-party platform. Third-party location information services are generally require charges. User can go to the URL to convert the actual location to test:

http://www.minigps.net/cellsearch.html (This URL is for testing only and we cannot guarantee stability) Query interface is shown below:



Click the query to get the converted location information:



2.3.4. GNSS

USR-MB706 supports multiple positioning modes, including GPS, beidou, glonass and galileo, the positioning data can be sent to the network server or serial port. Users can choose the positioning mode and the NMEA statement to be output.

Configuring via setup software:



Technical Support: h.usriot.com

🛠 USR-MB706 V1.0.3 ïle Language Help	1 >
[PC Serial Parameters] : Serial Port COM27 🗸 BaudRate 115200 🗸 Parity/Dat	ta/Stop NONI 🗸 8 🗸 1 🗸 🔎 Close 🛿 😴 Load image 😴 Upgrade
Choose Net System	Operation and Hints 10
● AUTO 4 ○ GPRS ○ LTE Cat.M1 ○ LT	TE Cat.NB1 3 Query all parameters 🔚 Save current parameters
Choose Work Mode	
Transparent Mode O HTTPD Client Mode O SMS Mode	de Exit Serial AT command mode Exit Serial AT command mode
TCP/UDP TCP/UDP Serial	Help message 11 Restart Query version
PC NetWork M2M device s	Save as user defaults Restore user defaults Restore Factory Defaults
PC NetWork M2M device Si ransparent Mode Parameters	erial device Timestamp Hex RX:1397 Reset Cour
6 Link Type TCPC Interval of reconnection(s) 5 Enable Socket B	+DSTNUM:4000255652 >[Tx->][14:26:39][asc] AT+SMSFLT?
Aodem Parameters	>[Rx<-][14:26:39][asc]
More Packaging Interval(ms) 100 Packaging Length(Bytes)	000 ^ AT+SMSFLT?
Enable Echo	+SMSFLT:ON
Reboot Message [USR-MB706] APN [CMNET,,,0 No data automatic restart time(s) 1800	Operation complete
Position PositionMethod GPS&GLONASS SendMethod COM	
SendInterval 300	Send via Serial Port - Hex TX:0

Configure via serial AT commands:

	Commands	Description
1	+++a	Enter serial AT command mode
2	AT+WKMOD=NET	Set the work mode to "Transparent mode"
3	AT+GNSSEN=ON	Enable GNSS function
4	AT+GNSSENTH=1	Enable other positioning methods except GPS
5	AT+GNSSSND=COM,500	Set the sending methods and interval of the positioning data
6	AT+GSGPLOC=1	Set the output format of the positioning data
7	AT+S	Save all parameters and restart the device

In addition to the above settings, you need to configure network connections such as Socket A and Socket B. For details, please check section 4.1.1. After setting all parameters, save and restart the device. After MB706 connects to the network, it will send positioning data to the serial port every 500 seconds.

Except obtaining positioning data by periodic reporting, you can also query GPS data by using the GSGPLOC command.

Note:

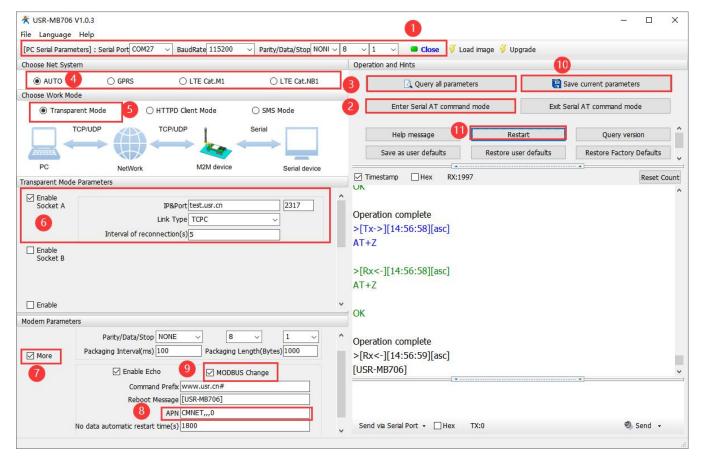
- 1. When there is data sent in positioning mode, positioning will be stopped and continued after data transmission is completed.
- 2. The longest continuous positioning time is 120s.



2.3.5. Modbus RTU to Modbus TCP

In transparent mode, if the serial device transmits data through Modbus RTU protocol and the server communicates through Modbus TCP protocol, users can enable Modbus function. After this function is enabled, USR-MB706 converts the Modbus TCP protocol data sent by the server to Modbus RTU data and sends it to the serial device, and converts the Modbus RTU protocol data sent by the serial device to Modbus TCP data and sends it to the server.

Configure via setup software:



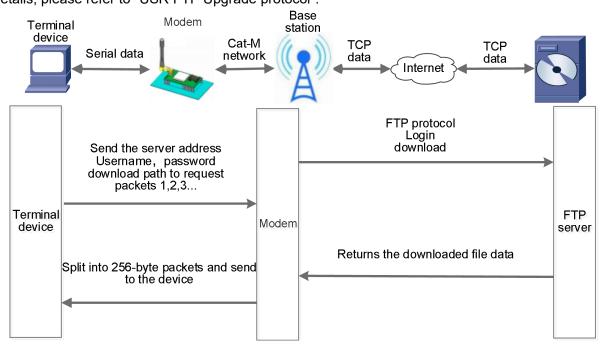
Configure via serial AT commands:

	Commands	Operation
1	+++a	Enter serial AT commands mode
2	AT+WKMOD=NET	Set to transparent mode
3	AT+SOCKAEN=ON	Enable socket A
4	AT+SOCKA=TCPC,test.usr.cn,2317	Set socket A to TCP Client
5	AT+MODBUSEN=ON	Enable Modbus RTU to Modbus TCP conversion
6	AT+S	Save parameters and restart the device



2.3.6. FTP Upgrading

MB706 supports FTP upgrade protocol, user's device can request files on FTP server by special protocol through serial port. The file of the server can be split into small packets with a maximum size of 256 bytes for transmission, which is convenient for customer device to upgrade or download large files remotely. For details, please refer to "USR FTP Upgrade protocol".



2.3.7. Indicators

There are four LED indicators on MB706, including PWR, WORK, NET and LINKA. Indicator status is explained as follows:

Indicators	Function	Description
POWER	Power indicator	Always on after power supply.
WORK	System status.	Flashes every 1s in normal operation, flashes every 500ms in positioning.
NET	Network status.	Always on after registering to network.
LINKA	Socket A connection status	Always on after socket A establishing connection.



2.3.8. Hardware Reset

After power on the device, press and hold the "Reload" button for 3~15s and release it to restore to factory settings. Less than 3s or greater than 15 seconds is invalid.



2.3.9. Firmware Upgrading

2.3.9.1. Serial Upgrading

USR-MB706 supports upgrading firmware via serial port.

(1) Set the baud rate to 115200, data bit to 8, stop bit to 1, no parity. Open the serial port, click "Load Fw", select the firmware to be upgraded.

Choose Net System				Operation and H	Hints				
		O LTE Cat.M1	O LTE Cat.NB1		Query all param	neters	E S	ave current pa	rameters
Choose Work Mode Transparen 	t Mode	HTTPD Client Mode	SMS Mode	Ent	ter Serial AT comma	ind mode	Exit S	erial AT comma	and mode
TCF		TCP/UDP	Serial	He	lp message	Resta	irt	Que	ery version
				Save a	s user defaults	Restore user	defaults	Restore I	Factory Default
PC	NetWork	M2M device	Serial device	Q	uery RSSI				
ransparent Mode Pa	arameters]					
Enable Socket A		IP&Port test.usr.cn	2317	* Please sel 査找范围(I)	ect firmware file) 🗊 📂 🖽	× •
	Interval of re	connection(s) 5		(Carl)	名称	^		修改日期	
Enable				最近使用的项目	USR-MB706	5_APP_V3.2.01.00000	00.0000.bin	2021-08-	23 15:37
Socket B									
			~	桌面					
Modem Parameters									
Serial Port	Serial BaudRa	ate 115200 🗸	^						
	Parity/Data/S	top NONE ~ 8	~ 1 ~						
More	Packaging Interval(ms) 100 Packaging	Length(Bytes) 1000	一世主题					
	🗹 Enable	Echo MODE	BUS Change	-					
		mand Prefix www.usr.cn#		WPS网盘	۲.				>
	Rebo	ot Message [USR-MB706]			文件名(N):		N	~	打开(0)
		APN AUTO,,,0			文件类型(T):	Firmware File(*.b)	in)	~	取消



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(2) Perform operations as prompted and wait for the upgrade.

[PC Serial Parar	meters] : Serial Port COM99	✓ BaudRate 115200	✓ Parity/Data/Stop NONI ✓	8 ∨ 1 ∨ ■ Close 🝕 Lo	ad image ダ Upgrade	e	
Choose Net Sys	stem			Operation and Hints		- 42	
● AUTO	⊖ GPRS	O LTE Cat.M1	O LTE Cat.NB1	Query all parame	ters	📳 Save	current parameters
Choose Work M Transp		HTTPD Client Mode	○ SMS Mode	Enter Serial AT comman	d mode	Exit Serial	AT command mode
	TCP/UDP	TCP/UDP	Serial	Help message	Restart		Query version
PC	NetWork	M2M device	Serial device	Save as user defaults Query RSSI	Restore user de	faults	Restore Factory Defaults
Transparent Mo	de Parameters						
Enable Socket A	Interval of recon	IP&Port test.usr.cn Link Type TCPC nection(s)5	2317	☑ Timestamp ☐ Hex RX:25: First dick "Enter Serial AT co >[Tx->][14:31:19][asc] +++ >[Rx<-][14:31:20][asc]		then dick "U	Reset Cour
Modem Parame	ters			а			
Serial Por	rt Serial BaudRate Parity/Data/Stop Packaging Interval(ms)	NONE ~ 8	✓ 1 ✓ ength(Bytes) 1000	>[Tx->][14:31:20][asc] a >[Rx<-][14:31:20][asc] +ok			
		o DOBUS d Prefix www.usr.cn# lessage [USR-MB706] APN AUTO,,,0	S Change	Operation complete			v]
Position	No data automatic restart	time(s) 1800		www.usr.cn#at+ver			
				Send via Serial Port 🗸 🗌 Hex	TX:38		🕘 Send 👻

(3) Firmware is downloading.



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Choose Net Sys	stem			Operation and Hints		
● AUTO		O LTE Cat.M1	O LTE Cat.NB1	Query all param	neters	Save current parameters
Choose Work M			0.000	Enter Serial AT comma	and mode	Exit Serial AT command mode
Transp	oarent Mode 🛛 🔿 H	ITTPD Client Mode	○ SMS Mode			
	TCP/UDP	TCP/UDP	Serial	Help message	Restart	Query version
				Save as user defaults	Restore user defa	aults Restore Factory Defaults
PC	NetWork	M2M device	Serial device	Query RSSI		
ansparent Mod	de Parameters					A
Enable Socket A		IP&Port test.usr.cn	2317	Timestamp Hex RX:2	53	Reset
JUCKEL		ink Type TCPC		First click "Enter Serial AT of	command mode", th	hen click "Upgrade"
	Interval of reconn			>[Tx->][14:31:19][asc]		
				+++		
Enable				+++		
Corbot D						
lodem Paramet	ters			<pre>>[Rx<-][14:31:20][asc]</pre>		
Corbot D	ters t Serial BaudRate	115200 ~		<pre>>[Rx<-][14:31:20][asc] a</pre>		
Iodem Paramet	ters t Serial BaudRate [Parity/Data/Stop]	115200 V NONE V		<pre>>[Rx<-][14:31:20][asc] a >[Tx->][14:31:20][asc]</pre>		
lodem Paramet	ters t Serial BaudRate	115200 V NONE V	✓ 1 ✓ ngth(Bytes)1000	<pre></pre>		
lodem Paramet	ters t Serial BaudRate [Parity/Data/Stop]	115200 V INONE V INONE Packaging Lei	ngth(Bytes)1000	<pre></pre>		
odem Paramet Serial Por	ters t Serial BaudRate [Parity/Data/Stop Packaging Interval(ms) [Enable Echo	115200 V INONE V Reckaging Let	ngth(Bytes)1000	<pre>>[Rx<-][14:31:20][asc] a >[Tx->][14:31:20][asc] a >[Rx<-][14:31:20][asc] +ok</pre>		
odem Paramet Serial Por	ters t Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Packaging Literval(ms) Command	115200 V INONE V IN	ngth(Bytes)1000	<pre></pre>		
odem Paramet Serial Por	ters t Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Packaging Literval(ms) Command	115200 V NONE V 8 100 Packaging Lei MODBUS Prefix www.usr.cn#	ngth(Bytes)1000	<pre>>[Rx<-][14:31:20][asc] a >[Tx->][14:31:20][asc] a >[Rx<-][14:31:20][asc] +ok</pre>		
odem Paramet Serial Por	ters t Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Packaging Literval(ms) Command	115200 ✓ NONE ✓ 8 100 Packaging Lei Prefix www.usr.cn# essage [USR-MB706] APN AUTO,,,0	ngth(Bytes)1000	<pre>>[Rx<-][14:31:20][asc] a >[Tx->][14:31:20][asc] a >[Rx<-][14:31:20][asc] +ok</pre>		
Modern Paramet	ters t Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Packaging Interval(ms) Command Reboot Mo	115200 ✓ NONE ✓ 8 100 Packaging Lei Prefix www.usr.cn# essage [USR-MB706] APN AUTO,,,0	ngth(Bytes)1000	<pre>>[Rx<-][14:31:20][asc] a >[Tx->][14:31:20][asc] a >[Rx<-][14:31:20][asc] +ok</pre> Operation complete		······································

(4) Firmware update is completed and the device will restart.



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Contraction of the second second	em			Operation and Hints		
OTUA (⊖ gprs	O LTE Cat.M1	O LTE Cat.NB1	Query all param	eters	Save current parameters
Choose Work Mo				Enter Serial AT comma	nd mode	Exit Serial AT command mode
Transpa	rent Mode O H	HTTPD Client Mode	SMS Mode	Litter Senar AT contria	ind mode	Exit Senar AT command mode
	TCP/UDP	TCP/UDP	Serial	Help message	Restart	Query version
				Save as user defaults	Restore user defaul	Its Restore Factory Defaults
PC	NetWork	M2M device	Serial device	Query RSSI		
Transparent Mode	e Parameters					
Enable			0217	^ ☑ Timestamp	01	Reset
Socket A		IP&Port test.usr.cn	2317	+ok		
		Link Type TCPC	~	- Sit		
	Interval of reconn	nection(s) 5		Operation complete		
C Carble						
Enable						
Carbot D				Module request to send		
Carbot D	ers			Module request to send Sending		
Carbot D	ers Serial BaudRate	115200 🗸		Module request to send Sending Firmware upgrade success		
Modem Paramete	1		v] [1 v]	Module request to send Sending		
Gorekot B Modern Paramete Serial Port	Serial BaudRate	NONE ~ 8	v <u>1 v</u>	Module request to send Sending Firmware upgrade success		
Nodem Paramete	Serial BaudRate Parity/Data/Stop Packaging Interval(ms)	NONE ~ 8 100 Packaging	→ 1 → Length(Bytes)[1000	Module request to send Sending Firmware upgrade success		
Serial Port	Serial BaudRate	NONE ~ 8 100 Packaging	✓ 1 ✓ Length(Bytes)1000	Module request to send Sending Firmware upgrade success Time Used(s): 80		
Serial Port	Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Enable Echo	NONE ~ 8 100 Packaging	✓ 1 ✓ Length(Bytes)1000	 Module request to send Sending Firmware upgrade success Time Used(s): 80 >[Rx<-][14:34:46][asc] 		
Cortor P Iodem Parameto Serial Port	Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Enable Echo Command	NONE V 8 100 Packaging 0 MODBL	✓ 1 ✓ Length(Bytes)1000	 Module request to send Sending Firmware upgrade success Time Used(s): 80 >[Rx<-][14:34:46][asc] 		
Serial Port	Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Enable Echo Command	NONE V 8 100 Packaging 0 MODBL d Prefix www.usr.cn#	✓ 1 ✓ Length(Bytes)1000	 Module request to send Sending Firmware upgrade success Time Used(s): 80 [Rx<-][14:34:46][asc] [USR-MB706] 		••••••••••••••••••••••••••••••••••••••
Serial Port	Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Enable Echo Command	NONE V B NONE B R B R B R B R B R B R B R B R B R B	✓ 1 ✓ Length(Bytes)1000	 Module request to send Sending Firmware upgrade success Time Used(s): 80 >[Rx<-][14:34:46][asc] 		
Modem Paramete Serial Port	Serial BaudRate Parity/Data/Stop Packaging Interval(ms) Enable Ech Command Reboot M	NONE V B NONE B R B R B R B R B R B R B R B R B R B	✓ 1 ✓ Length(Bytes)1000	 Module request to send Sending Firmware upgrade success Time Used(s): 80 [Rx<-][14:34:46][asc] [USR-MB706] 		

2.3.9.2. Remote Upgrading

MB706 queries by polling request the server every 30 minutes by default to get whether there is an upgrade demand. If the upgrade is needed, the system will download the firmware data from the server, if not, the system will sleep and wait for the next poll.The polling time of Fota upgrade can be set via "AT+FOTATIME" with a range of 10~65535s. Set to 0 to close the upgrade request.

3. Serial Port

3.1. Basic Parameters

Item	Parameter		
	RS232: 2400,4800,9600,14400,19200,28800,		
Baud rate	33600,38400,57600,115200,230400		
Daud Tale	RS485: 2400,4800,9600,14400,19200,28800,		
	33600,38400,57600,115200,230400		
Data bits	8		
Stop bits	1,2		



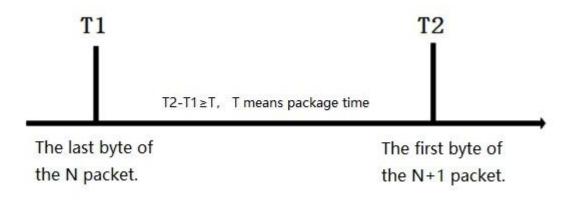
Be	Honest, Do Best ! USR	-MB706 User Manual	Technical Support: h.usriot.com
		NONE	
	Parity bit	EVEN	
		ODD	

3.2. Frame Mechanism

3.2.1. Time Trigger

When MB706 receives data from the UART, it continuously checks the interval of two adjacent bytes. If the interval time is greater or equal to a certain "time threshold", then a frame is considered finished, otherwise the data is received until greater or equal to the packet length byte set. This frame is sent to the network as a TCP or UDP packet. The "time threshold" here is the time between packages. The range of settable is 100ms~60000ms. Factory default: 100ms.

This parameter can be set by AT command, AT+UARTFT=<time>.



3.2.2. Length Trigger

When MB706 receives data from the UART, it constantly checks the number of bytes received. If the number of bytes received is equal to a certain "length threshold", a frame is considered to have ended, otherwise the packaging time is waiting for the end. This frame is sent to the network as a TCP or UDP packet. The "length threshold" here is the package length. The settable range is 100~1000. Factory default 1000.

(Note: when using "command password +AT command" function, the package length must be larger than the "command password +AT command", otherwise AT command is invalid) This parameter can be set by AT command, AT+UARTFL=<length>.





3.3. Network Data Output Port

We need to set the output serial port of the MB706 network data. Setting commands and parameters as follows:

Command	Descriptions		
AT+CMDPT=RS232	Data sent from network is output on 232 serial port.		
AT+CMDPT=RS485	Data sent from network is output on 485 serial port.		
AT+CMDPT=RSALL	Data sent from network is output on 232 and 485 port. (Default)		

In order to ensure the data output efficiency, please select one serial port as the network data output port according to needs.

4. Parameter Settings

Users can configure MB706 via configuration utility, serial AT commands, network AT commands and SMS AT commands.

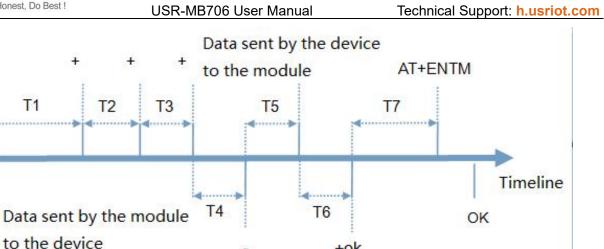
Configuration utility download address: https://www.pusr.com/Support/download_hits.html?id=533

4.1. Configuration via AT Commands

When the device works in transparent mode, HTTP mode or SMS mode, can switch to "AT command mode" by sending time-specific data by serial port. When the operation is completed in "AT command mode", send specific commands to return to the previous working mode.

For detailed AT commands, please refer to LTE CAT M AT Commands Manual.





+ok

Time sequence of switching from transparent mode to "AT Command mode" :

Serial device continuously sends "+++" to the device. After receiving "+++", the device will send an "a" to 1. the serial device.

a

- 2. No data can be sent during a packaging cycle before sending "+++".
- When the serial device receives "a", a "a" must be sent to the device within 3 seconds. 3.
- After receiving 'a', the device returns "+ok" and enter "temporary command mode". 4.
- 5. After receiving "+ok", the device has enter "temporary command mode" and now can send AT command to it.

Time sequence of switching from AT command mode to transparent mode:

- 1. Serial device sends "AT+ENTM" to G786-G.
- 2. After receiving the command, sends "OK" to the serial device and returns to the previous working mode.
- 3. After the serial device receives "OK", it will return to previous working mode.

4.2. Serial AT Commands

In transparent mode, we can directly send "Command prefix+AT command" to query and configure the parameters without changing to command mode.

Serial Port	Serial BaudRate	115200	~				
	Parity/Data/Stop	NONE	7	8	~	1	~
✓ More	Packaging Interval(ms)		Pack	aging Ler	ngth(Byt	tes)1000	
	Enable Ech	10	N	ODBUS	Change		
		no Id Prefix ww			Change		_1
	Comman		w.usr.cn	#	Change		
	Comman	d Prefix ww	w.usr.cn R-MB706	#	Change		



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User can use "AT+CMDPW" to query or configure the command prefix, it defaults to "www.usr.cn#". After configuration, restart the device. Then send "www.usr.cn#AT+VER" from the serial port, we will receive the response from the module. (Please note there is a line feed after the command)

Choose Net Sys	tem			Operation and Hints			
● AUTO		O LTE Cat.M1	O LTE Cat.NB1	Query all param	neters	🔚 Sav	e current parameters
Choose Work Mode Transparent Mode HTTPD Client Mode SMS Mode			Enter Serial AT comma	and mode	Exit Serial AT command mode		
Iransp			0.000				
	TCP/UDP	TCP/UDP	Serial	Help message	Restart		Query version
				Save as user defaults	Restore user d	lefaults	Restore Factory Defaults
PC	NetWork	M2M device	Serial device	Query RSSI			
ransparent Moo	de Parameters			▲ Timestamp □ Hev PV:1			
Socket A		IP&Port test.usr.cn	2317		.38		Reset
		Link Type TCPC	~	>[Tx->][14:04:03][asc] www.usr.cn#at+ver			
	Interval of re	connection(s) 5		www.usr.cn#dt+ver			
Enable				>[Rx<-][14:04:03][asc]			
lodem Paramei	ters						
Serial Por	t Serial BaudRa	ate 115200 🗸		+VER:V3.2.01.000000.000	00		
	Parity/Data/S		~ 1 ~	STATE BERLEVILLE AND T			
More	Packaging Interval(ms) 100 Packaging	Length(Bytes)1000	Operation complete			
	Enable	Echo MODE	US Change				
	_	mand Prefix www.usr.cn#					
		ot Message [USR-MB706]					
		APN AUTO,,,0		-			
	No data automatic res	tart time(s) 1800		www.usr.cn#at+ver			
Position							
FOSICION							

4.3. Network AT Commands

In transparent mode, user can send "command prefix+AT command" to query and configure parameters. Network AT commands are used to query or configure the parameters from remote server, which is similar to serial AT commands.

For example, we can send "www.usr.cn#AT+VER" to to query the firmware version from server side (there is a line feed after the command):



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4.4. SMS AT Commands

We can send "Command prefix+ AT Commands" via SMS to query and configure the parameters of the device if we know the phone number of the SIM card in the device.

For example, we can send "www.usr.cn#AT+VER" to the phone number of the device via SMS to query the firmware version, there is a line feed after the command.





+VER:V1.0.06.000000.0000





5. Contact us

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7. Revision History

Version	Date	Author	Description
1.0.0	2022.04.13	Hongmin, Peng	Initial