USR-LTE 7S4 User Manual

File version: V1.0.3.1

Function Feature

- Supports TDD-LTE(38,39,40,41), FDD-LTE(1,3), WCDMA(1,8), TD-SCDMA(34,39), GSM(3,8).
- Based on embedded Linux system, in high stability.
- Support RNDIS Remote Network Driver Interface (USB interface).
- 4 Line network connections at same time (TCP and UDP).
- 10KB Serial data buffer each link prevent data-losing.
- Identity package and Heartbeat package.
- Support configuring the parameters via SMS.
- Work mode: Transparent mode and HTTPD client mode.
- Configured with AT Command Set.
- Socket distribution protocol, can send data to different sockets.
- upgrade firmware for your MCU with FTP.
- upgrade firmware for your 7S4 with FTP.
- Send message by AT Command.
- Synchronous and adaptive Serial port baud rate.
- Its pins are compatible with 2G module 7S2/7S3, Simple replacement.

1. Overview

1.1. Brief Introduction

4G Module USR-LTE-7S4 is used to transmit data between serial port and network server by operator network. It is configured by AT Command and work in dual transparent transmission mode.
USR-LTE-7S4 is in small size, which is used in LTE, WCDMA, TD-SCDMA. It works in transparent transmission mode and more functional software with high speed and less time delay, supports FTP protocol. USR-LTE-7S4 is compatible with 2G module 7S2/7S3, user can replace 7S3 easily. We add Watch dog function in firmware to ensure the stability if work for a long time.

1.2. Basic parameter

	Parameter	Value	
Wireless parameters	Wireless standard and band	TDD-LTE	Band 38 / 39 / 40 / 41
		FDD-LTE	Band 1 / 3
		WCDMA	Band 1 / 8
		TD-SCDMA	Band 34 / 39
		GSM/GPRS/EDGE	Band 3 / 8
	Transmit power	TDD-LTE	+23dBm(Power class 3)
		FDD-LTE	+23dBm(Power class 3)
		WCDMA	+23dBm(Power class 3)
		TD-SCDMA	+24dBm(Power class 2)

		GSM Band 8	+33dBm(Power class 4)
		GSM Band 3	+30dBm(Power class 1)
	Specification	TDD-LTE	3GPP R9 CAT4 downlink 150 Mbps, uplink 50 Mbps
		FDD-LTE	3GPP R9 CAT4 downlink 150 Mbps, uplink 50 Mbps
		WCDMA	HSPA+ downlink 21 Mbps, uplink 5.76 Mbps
		TD-SCDMA	3GPP R9 downlink 2.8 Mbps uplink 2.2 Mbps
		GSM/GPRS/EDGE	MAX: downlink 384 kbps , uplink128 kbps
	Antenna	IPEX interface	
Hardware Parameter	Interface	UART: 300bps - 460800bps	
	Voltage	DC 5V~16V	
	Current	Ave: 55mA-127mA, Max: 147mA -12V	
	Operation temperature	-20℃~70℃	
	Storage temperature	-40℃~ 125℃	
	Size	44.4×41.8 ×12.8mm	
Software Parameter	Work mode	Transparent mode, HTTPD mode, FTP mode	
	Set command	AT Command	
	Protocol	TCP/UDP/DNS/HTTP/FTP	
	Connection numbers	4	
	Configuration	Serial AT Command, Network AT Command, SMS AT Command	
	Software	Setup software	
Software Function	DNS	Support	
	Transparent mode	TCP Client / UDP Client	
	Socket distribution protocol	Send serial data to multiple sockets	
	HTTP	Support	
	Heartbeat package	Support	
	Baud rate synchronization	Support	
	Identity package	User-defined/ ICCID/ IMEI for Identity package	
	USR Cloud	Support	
	Upgrade firmware	Support	

	for your MCU with FTP	

Figure 1

2. Function

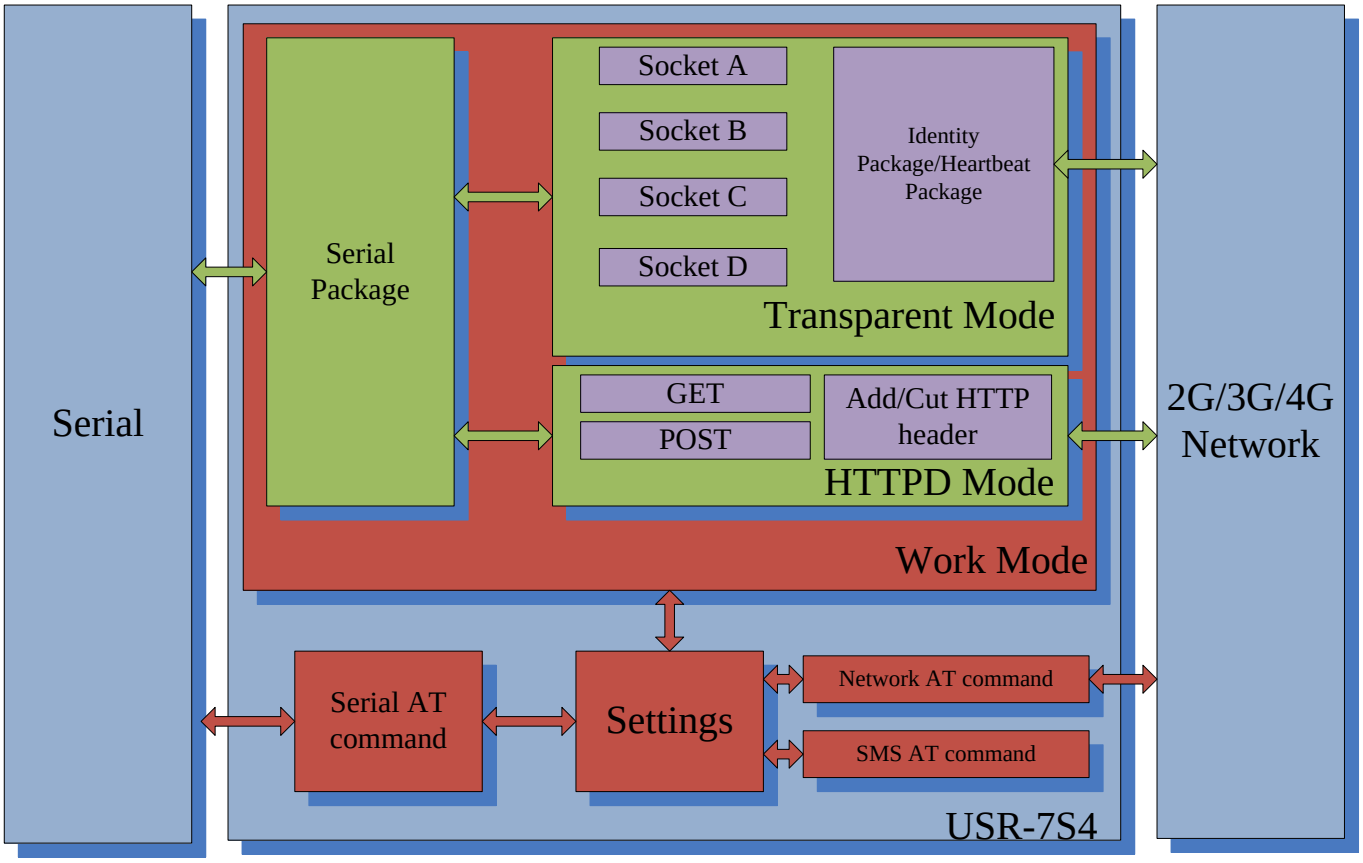
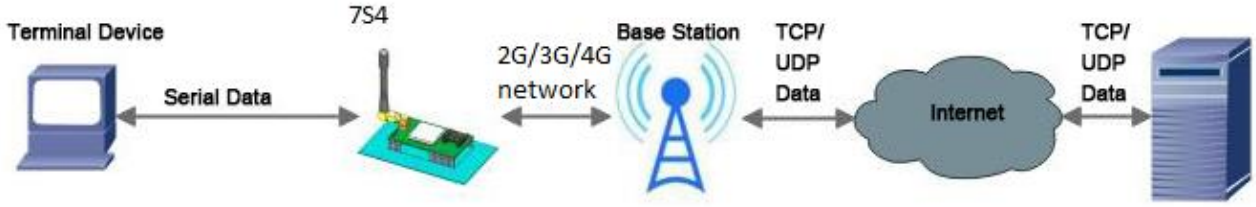


Figure 2

2.1. Work Mode

2.1.1. Transparent Mode

Mode instruction



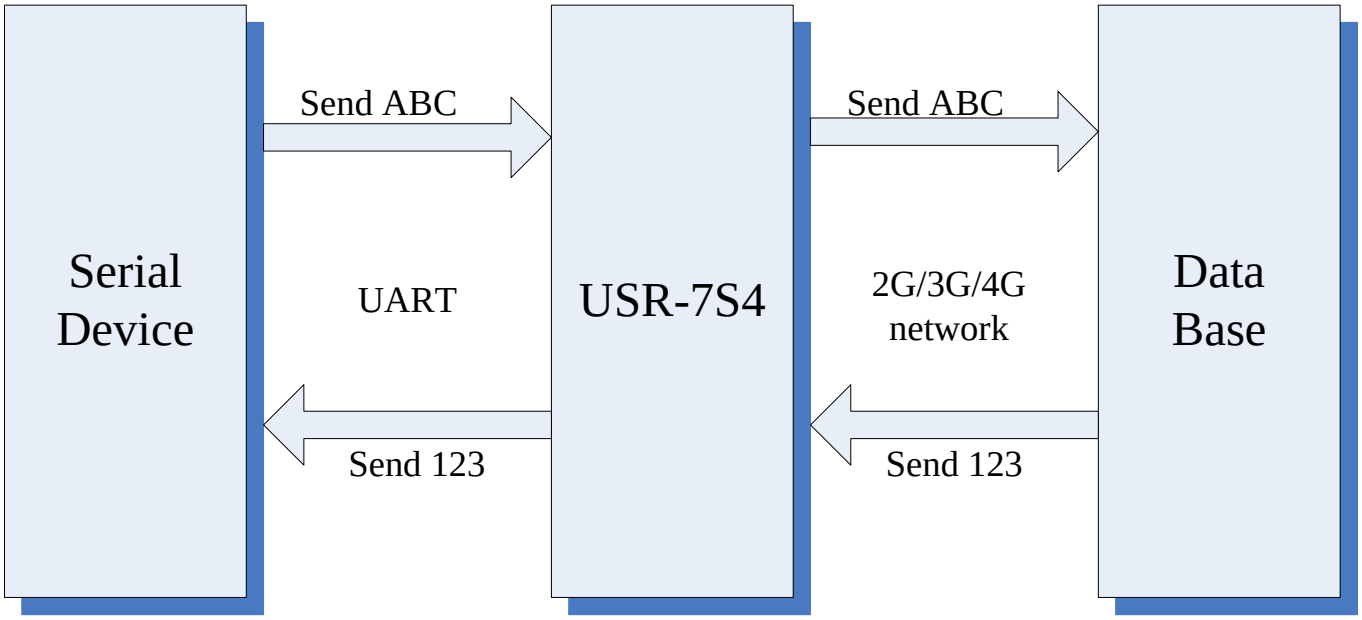


Figure 3

Transparent Mode: What you sent to serial will be forward to network. The communication is bidirectional. USR-7S4 supports 2 socket connections simultaneously: socket A, socket B, socket C and socket D. they are independent. This DTU only support working as TCP Client and UDP Client.

The TCP client can be persistence connection or not. If you don't use persistence connection, connection will disconnect after your data transmitted.

2.1.2. HTTPD Client mode

2.1.2.1. HTTPD Client Mode Instruction

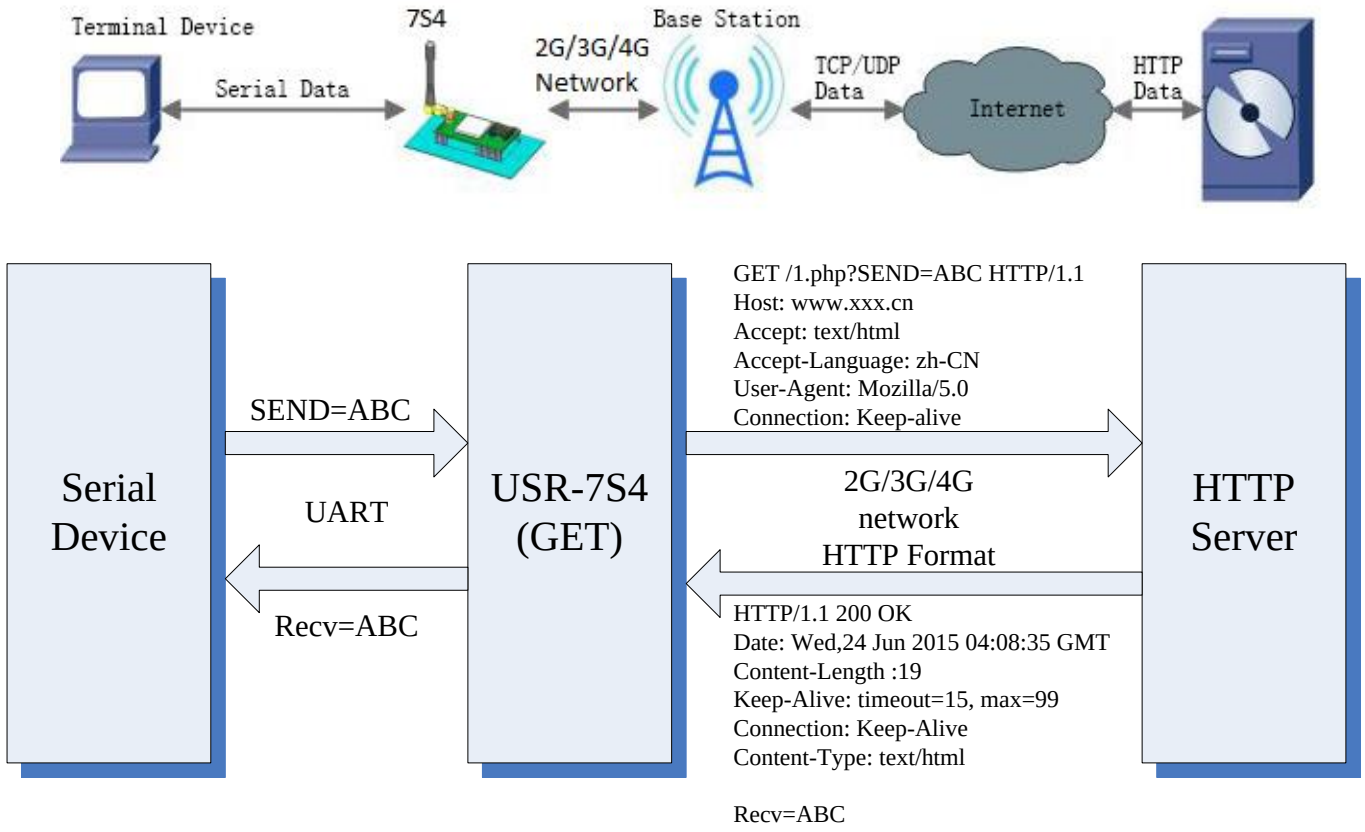


Figure 4

HTTPD Client Mode: USR-7S4 will add the HTTP header for every data from serial and transfer HTTP format data to Network and cut the HTTP header before send network data to serial. User needs to configure the HTTP Header before use this mode. User can use this mode transfer the serial data to HTTP server.

2.2. Serial Port

2.2.1. Basic Parameter

Name	Parameter
Baud rate	300,600,1200,2400,4800,9600,19200,38400, 57600,115200,230400,460800
Data bit	7,8
Stop bit	1,2
Parity	NONE EVEN ODD
***Flow control/485**	NFC:(no hardware flow control) 485:485 communication

Figure 5

2.2.1.1. Serial Package Methods

For network speed is faster than serial. Module will put serial data in buffer before sending it to network. The data will be sent to Network as Package. There are 2 ways to end the package and send package to network - Time and Length.

2.2.1.2. Time triggered mechanism

If no data get from serial over the time threshold, it will end the package and send this package to network. The range of threshold is from 50ms ~ 60000ms. Default is 50ms. If the serial keeping send data, this package will be 1K bytes.

2.2.1.3. Length Trigger Mode

The package will be sent to network when it up to length threshold. The range of length threshold is from 1 to 1024 bytes. Default is 1024 bytes.

2.2.1.4. Baud rate synchronization

This function is similar to RFC2217. When module works with USR devices or software, serial parameter will change dynamically according to network protocol. Customer can modify serial parameter by sending data conformed to specific protocol via network. It is temporary, when restart DTU, the parameters back to original parameters.

2.3. Feature

2.3.1. Registration package

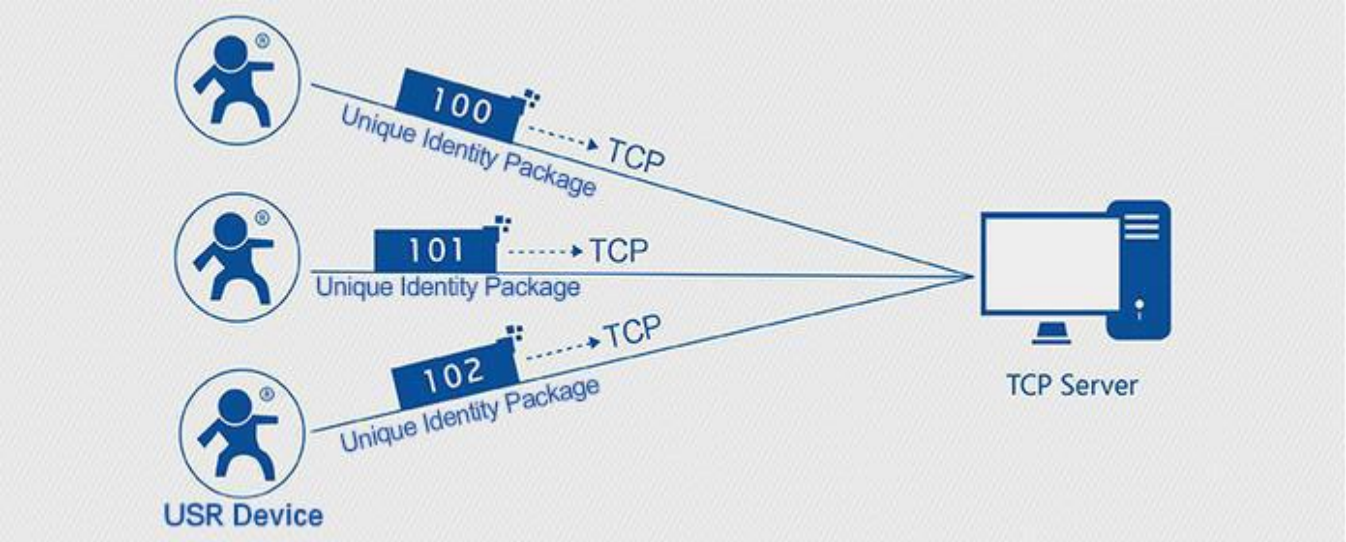


Figure 6

Identity Package is used for identify the device when module works as TCP client/UDP client. There are two methods for identity Package.

- Identity data will be sent when connection is established. (Only for TCP client)
- Identity data will be add on the front of every data package. (TCP client and UDP client)

Type of identity data: ICCID, IMEI, CLOUD and USER.

- ICCID, the unique identifier of SIM card, suitable to the application based on SIM card identification.
- IMEI, the unique identifier of USR-7S4, suitable to the application based on device identification.
- CLOUD, the identification code based on USR CLOUD platform. For more information about USR Cloud, please go to cloud.usr.cn/en/
- USER, You can use your own identity data.

2.3.2. Heartbeat package

Heartbeat Package: Module will output heartbeat data to serial or network periodic. User can configure the heartbeat data and time interval. Serial heartbeat data can be used for polling Modbus data. Network heartbeat data can be used for showing connection status and keep the connection.
Heartbeat Package is only in transparent mode.

2.3.3. Socket distribution protocol

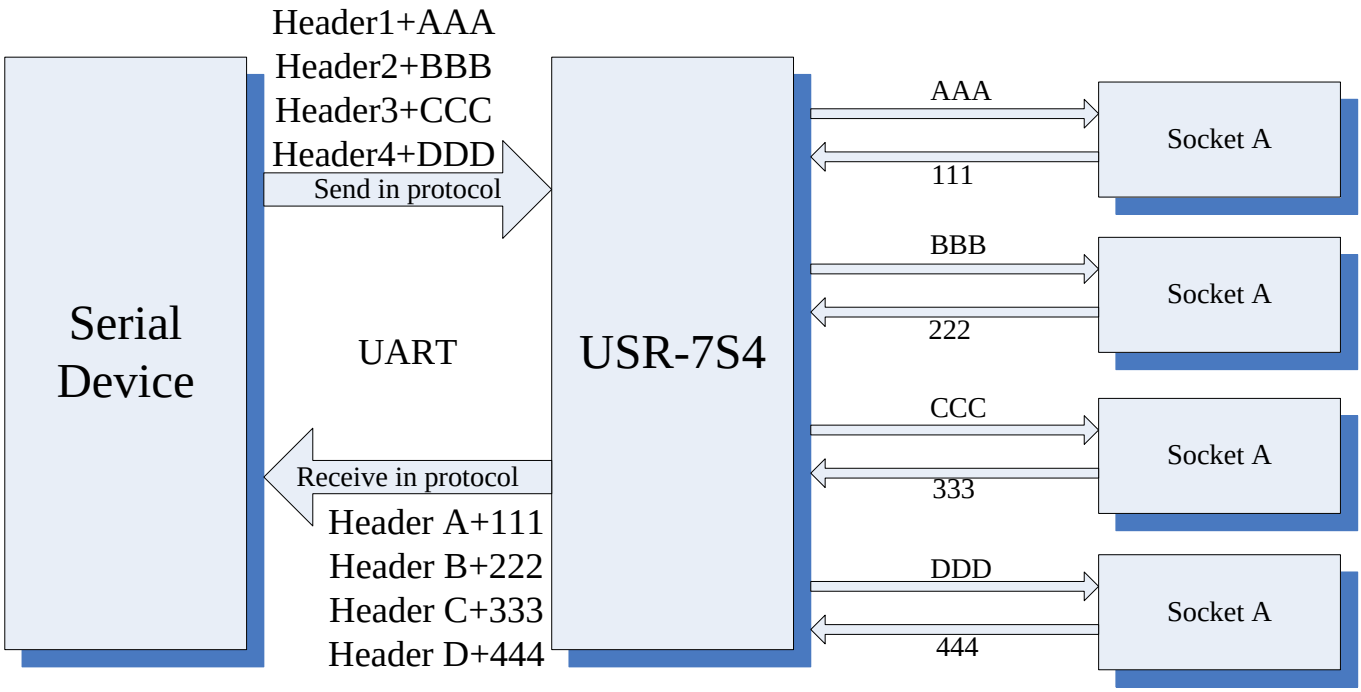


Figure 7

7S4 has 1 UART and 4 sockets. If you don't use this protocol, your UART data will be sent to enabled sockets And data from every socket will be sent to UART.

If you enable this protocol, UART data will be sent to appointed socket. And the data from different sockets will add different header before they are sent to UART.

2.3.4. Upgrade firmware for your MCU with FTP

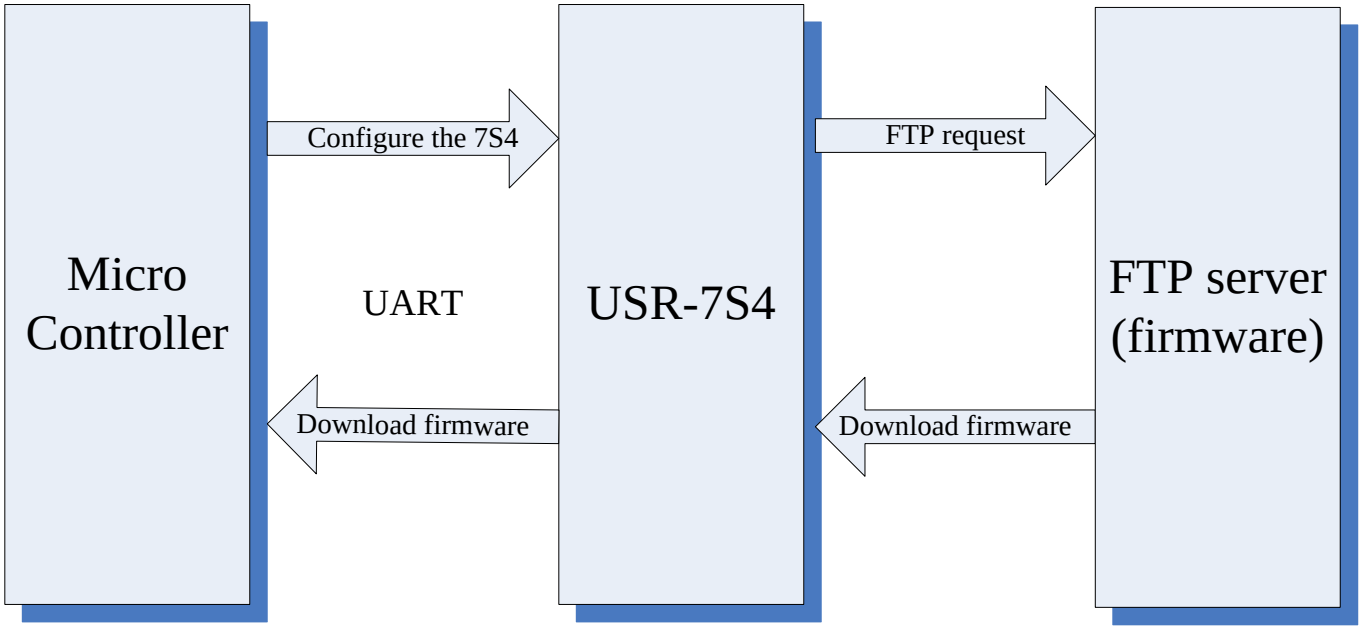


Figure 8

7s4 supports FTP. You can download firmware for you MCU from FTP server. FTP files will be divided to many packages within 256 bytes.

2.3.5. RNDIS (Remote Network Driver Interface Specification)

Your device can access to network via 4G when you connect to USB interface of 7s4. We provide Windows, Linux and Android drivers.

2.3.6. Indicators

Indicator	Function	Status
PWR	Power light	On: Power on Off: Power off
WORK	Systems operation indicator light	On: working Off: Not working
NET	Network status indicator light	Off : No network Twice per second: 2G network Three times per second: 3G network Four times per second: 4G network

Figure 9

Pin 1 (LINKA) outputs high level when socket A connects to server.
Pin 2 (LINKB) outputs high level when socket B connects to server.

2.3.7. Hardware restore factory setting

Pull down Reload Pin for 3~15 seconds, USR-7S4 will reload factory settings .

3. Parameter Setting

To configure module and querying status, there are 3 ways to use AT command. They are serial AT command, SMS AT command and transparent AT command. We provide the setup software based on serial AT command. You can download the setup software in our website www.usriot.com.

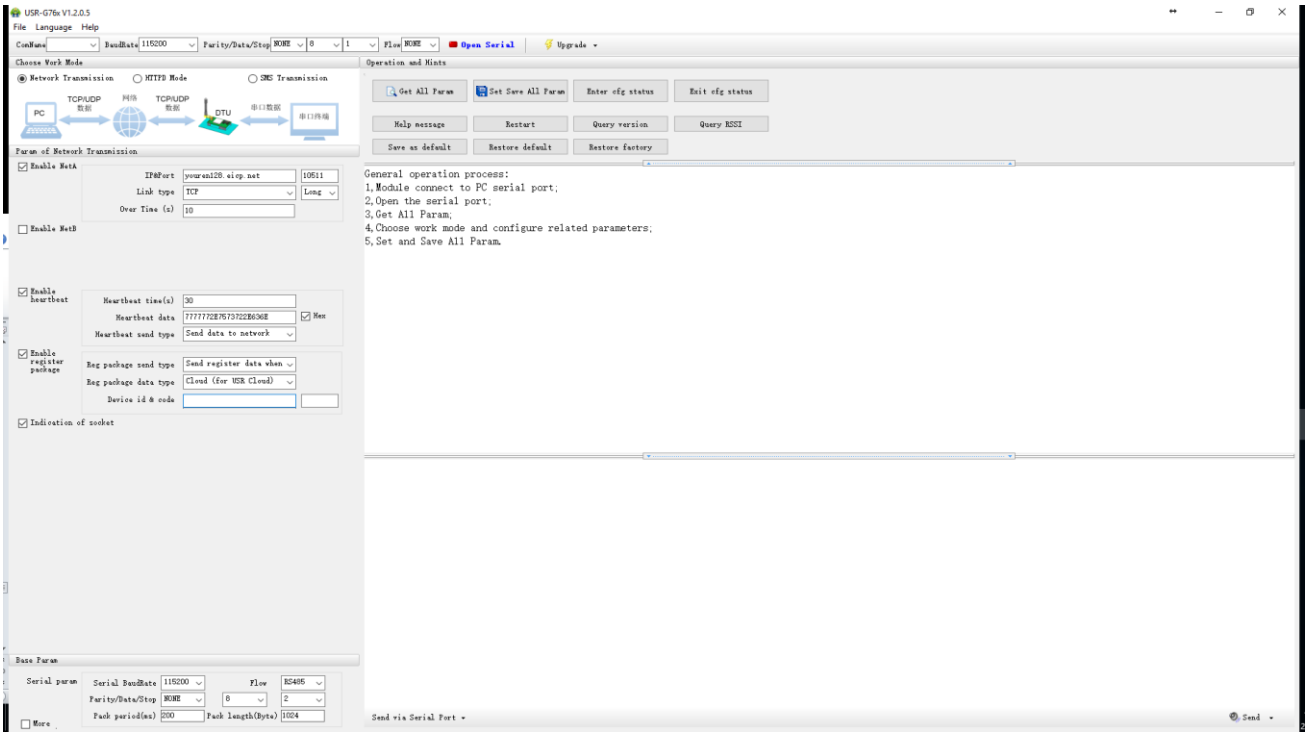


Figure 10

3.1. AT Command

3.1.1. Serial AT Command

In transparent mode, SMS mode and HTTPD mode, you can enter AT command mode. Then you can send AT command to module. Setup software is based on this function. For entering AT command mode, please refer to this FAQ: http://www.usriot.com/enter-serial-command-mode/.

3.1.2. Transparent AT Command

When module in transparent mode, you can use “Password,AT command” format to send AT command via serial or network. If you use transparent AT command, you needn’t enter AT command mode.

3.1.3. SMS AT Command

You can configure module or query status by SMS AT command. It is for your remote control your module in fields.

4. Contact Us

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6. Updated History

2016-11-28 V1.0.3.1 First English version.