

"Lipstick" Size 4G Modem

USR-DR154

User Manual



V2.0

Be Honest & Do Best

Your Trustworthy Smart Industrial IoT Partner

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1. Introduction

USR-DR154-E is a LTE CAT 1 communication modem, which supports LTE band, covers the mainstream frequency bands of European operators. It has perfect software function, supports TCP/UDP transparent transmission, HTTPD Client mode MQTT client mode and AT command configuration. In addition, it is simple to configure, has high reliability and built-in hardware watchdog, supports FOTA upgrading.

USR-DR154-E supplies a wide voltage range power through terminal interface, RS485 standard interface, meets the needs of different application scenarios.

1.1. Features

- 4G Cat1 connectivity, low latency, broad coverage, and high network stability;
- Supports multiple work modes: TCP, UDP, HTTP, and MQTT, capable of interfacing with various protocol servers;
- Built-in hardware watchdog to ensure stable operation without crashes;
- Industrial-grade design with a wide operating temperature range: -20 to 75°C;
- Wide voltage supply: 5-24V;
- Modbus gateway: allowing seamless communication between on-site devices and SCADA software;
- Supports both DIN rail and mounting hole installations;
- Utilizes push-in terminals for easy wiring;
- High EMC protection level: Level 2;
- Remote management through the PUSR platform, enabling remote device management.

1.2. Ordering Guide

Mode1	USR-DR154-E	USR-DR154		
		LTE FDD:		
Energy	LTE FDD:	Band1/3/5/8		
Frequency	B1/3/5/7/8/20/28	LTE TDD:		
		Band38/39/40/41		
	Europe,			
Region	Southeast Asia,	China, India		
	Middle East			
TCP Server		/		
Modbus Gateway		/		
SMS	/			



1.3. Technical Parameters

USR-DR154-E parameters are as follows:

Power	Power Supply	5-24V DC, 12V/1A is commanded		
rower	Consumption	Average:0.8W, Max:3.5W		
	Frequency Band	B1/3/5/7/8/20/28		
	Transmition Rate(Mbps)	10.3 DL/5.1 UL		
	Modulation System	UP link: QPSK/16QAM		
	modulation System	Down link: QPSK/16QAM/64QAM		
	Tx Power	23.5±2dBm		
		Band 1 -98.5 10MHz Bandwidth		
		Band 3 -98.0 10MHz Bandwidth		
Cellular		Band 4 -97.5 10MHz Bandwidth		
		Band 5 -98.0 10MHz Bandwidth		
	Receive Sensitivity	Band 7 -97.5 10MHz Bandwidth		
		Band 8 -98.0 10MHz Bandwidth		
		Band 20 -98.5 10MHz Bandwidth		
		Band 28 -98.0 10MHz Bandwidth		
	SIM Slot	1*4FF, Nano SIM card		
	Antenna Connector	1*SMA Female		
	Baud Rate	600bps~230400bps		
Control Dont	Data Bits	7,8		
Serial Port	Stop Bit	1,2		
	Parity Bit	NONE, EVEN, ODD		
	Protocols	TCP/UDP/HTTP/MQTT/DNS/NTP/FTP/SSL		
	Words Mode	TCP Server, TCP client, UDP client,		
	work mode	HTTP client, MQTT Client		
Software	Registration Packet	\checkmark		
Features	Heartbeat Packet	\checkmark		
	Modbus Gateway	Modubs RTU to Modbus TCP conversion		
	Remote Management	PUSR Cloud(Not available in Europe)		
	Configuration	Config Tools, AT command		
	Operating Temprature	−25°C~+75°C		
Environmental	Storage Temprature	$-40^{\circ}C^{\sim} +85^{\circ}C$		
Characteristic	Operating Humidity	5%~95%(Non-condensing)		
	Weight	<50g		
	Dimension	74*24*22mm(L* W* H)		
Others	Certificate	CE, NBTC, RoHS*, WEEE*		



1.4. Indicator status description

Name	Description
PWR	Red,
	on: power on
	Off: power off
WORK	Green, 1Hz flashing frequency after the system boot up.
NET	Green,
	On: when it connects to cellular network.
	Off: when it not connects to cellular network.
LINKA	Green,
	On: when socketA is in connectivity.
	Off: when socketA is not in connectivity

Table 1. Indicator Status

1.5. Dimensions

Unit: mm



1.6. Serial port

USR-DR154 series adopts push-type terminal connector, which can realize wiring conveniently and quickly. Terminal wiring definitions are shown below.





Table 2. Pin description

No.	Pin	Туре	Description
1	DC 5-24V +	Р	Positive input of the power supply
2	DC 5-24V -	Р	Negative input of the power supply
3	RX/A	I/O	Serial signal
4	ТХ/В	I/O	Serial signal
5	GND	Р	The digital ground

2. Get started

2.1. Preparations

2.1.1. Hardware

USB to RS485 converter*1

PC*1

USR-DR154-E*1

4G antenna*1

Power Supply*1

SIM card*1

2.1.2. Configuration software

Configuration software downloading: 插入下载地址

2.1.3. Hardware connection and test

Description:

1.In PC serial parameter setting area, it is necessary to set the serial parameters consistent with the serial

device, otherwise they cannot communicate with each other.

2.Working mode selection area, select the work mode of the modem.

3.In the parameter setting area of characteristic functions, set parameters related to modem's featured



functions.

4.Modem parameter area, setup some basic global parameters.

5.Common command button, click to send the self-input command.

- 6.Data receiving and display area, displaying the data sent and received.
- 7.Data sending area, input the data and click Send.

O PV DTUSet V	V1.3.4		– 🗆 🗙
File Language			
[PC Serial Param	neters] : Serial Port COM42 💌 BaudRate 115200 💌 Parity/Data/Stop N		
Choose Work Mo	ode	Operation and Hints	
• Transparent	t Mode 2 C HTTPD Client Mode C MQTT Mode	5 Query all parameters	parameters
	TCP/UDP Serial Serial	Enter Serial AT command mode Exit Serial AT comm	nand mode
PC	NetWork M2M device Serial device	Build Time Query IMEI Query phone number	Query version
Transparent Mod	e Parameters	Ouery RSSI Save parameters Reset to factory setting	Restart
Finable Socke	et IP&Port 58.34.63.87 2317	6	
3	Link Type TCP V Perse V	Timestamp Hex RX:11789	Reset Count
		173456789	^
	Enable ModbusRTU to TCP OFF	heartheat	
Enable Socke	et	>[Rx<-][15:29:51][asc]	
В		heartbeat	
		>[Rx<-][15:30:21][asc]	
		heartbeat	
Enable Socke	et	<pre>v >[Rx<-][15:30:51][asc]</pre>	
Modem Paramet	arc	heartbeat	
Flotent Paramet		[Rx<-][15:31:21][asc]	
🔽 More	Packaging Interval(ms) 50 3ckaging Length(Bytes) 1024	heartbeat	
4	✓ Enable Echo ✓ Serial data cache ✓ Security		~
	Serial AT command Vetwork AT NTP function	7 123430789	
	Command Prefix 4G DTU		
	Reboot Message USR-DR154		
		Send via Serial Port 🗸 🗌 Hex TX:77	🧐 Send 👻
			.ei

3. Serial port

3.1. Basic Parameters

Serial parameters of USR-DR154-E must be consistent with the parameters of the serial device. Serial port

parameters include basic parameters and framing parameters.

Item	Parameter			
Baud rate	1200~230400bps			
Data bit	8			
Stop bit	1,2			
Chack hit	NONE			
CHECK DI	EVEN			



			ODD		
B PV DTUSet V	1.3.4				– D X
File Language					
[PC Serial Parame	eters] : Serial Port COM42 💌 BaudRate 115200 💌 Parity/Data/Stop NONI 💌	8 • 1 • • Clos	se		
Choose Work Mod	de	Operation and Hints			
Transparent I	Mode C HTTPD Client Mode C MQTT Mode	Query a	all parameters	Set and save	all parameters
	TCP/UDP Serial	Enter Serial AT	command mode	Exit Serial AT con	mmand mode
PC	NetWork M2M device Serial device	Build Time	Query IMEI	Query phone number	Query version
	Parameters IP&Port 58.34.63.87 [2317]	Query RSSI	Save parameters	Reset to factory setting	Restart
^	Link Type TCP Persis				
	Time of Transitory Link(s) 10	🔽 Timestamp 🗌 Hex	RX:12139		Reset Count
	Enable ModbusRTU to TCP OFF	>[Tx->][15:37:07][a	sc]		^
		AT+UART=?			
Enable Socket	t	▼ E>[Rx<-][15·37·07][a)	scl		
Modem Paramete	rs	AT+UART=?	5C]		
Serial Port	Serial BaudRate 115200 - Flow Control RS485 -	1			
	Parity/Data/Stop NONE 8 1	+UART:<1200~2304	00>,<8>,<1,2>, <n< td=""><td>IONE,ODD,EVEN>,<non< td=""><td>E></td></non<></td></n<>	IONE,ODD,EVEN>, <non< td=""><td>E></td></non<>	E>
More	Packaging Interval(ms) 50 3ckaging Length(Bytes) 1024				
, nord		ОК			
	Enable Echo V Serial data cache Security				
		Operation complete			
	Command Pretty 4G DTO			•	*
	APN CMNFT0	AT+UART=?			
	No data auto restart time(s) 1800				
	Security Code *****				
	NTP Server cn.ntp.org.cn,us.ntp.org.cn	Send via Serial Port 👻	Hex TX:156		🧐 Send 👻

3.2. Frame Forming Mechanism

3.2.1. Time Trigger

When DR154-E 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 10ms~500ms. Factory default: 50ms.

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



Note: T is the packing interval time.



3.2.2. Length trigger

When DR154-E 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 5~4096. Factory defaults to 1024.

This parameter can be set by AT command, AT+UARTFL=<length>.



Note: L is the packaging length.

4. Operating Mode

USR-DR154-E has three operating modes: transparent mode, HTTPD Client mode and MQTT mode.

4.1. Transparent Mode

In this mode, users do not need to pay attention to the data conversion process, can realize the bidirectional data transparent transmission between serial devices and network servers.

DR154-E supports 4 socket connections, Socket A, Socket B, socket C and socket D, which are independent with each other. Each socket supports TCP Client and UDP Client. Except TCP/UDP client, socket A supports **TCP server** in additional.



≻Set parameters by the utility:



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DTUSet V	1.3.4				– 🗆 X
File Language					
[PC Serial Parame	eters] : Serial Port COM42 💌 BaudRate 115200 💌 Parity/Data/Stop NO	II ▼ 8 ▼ 1 ▼ ■ Close	1		
Choose Work Mod	de	Operation and Hints			
 Transparent I 	Mode C HTTPD Client Mode C MQTT Mode	Query al	parameters	4 Set and save	all parameters
	CP/UDP Serial Serial	2 Enter Serial AT	command mode	Exit Serial AT cor	nmand mode
PC	NetWork M2M device Serial device	Build Time	Query IMEI	Query phone number	Query version
Transparent Mode	Parameters	Query RSSI	Save parameters	Reset to factory setting	Restart
Enable Socket Enable Socket Enable Socket Enable Socket	IP&Port 58.34.63.87 2317 Link Type TCP Fersis Time of Transitory Link(s) 10 Enable ModbusRTU to TCP OFF	★ Timestamp ☐ Hex >[Kx<-J[1b:U2:28J]ast OK Operation complete >[Rx<-][16:02:35][ast USR-DR154	RX:14172 cj		Reset Count
С		 Send data 		•	
Modem Paramete	rs				
Serial Port	Serial BaudRate 11520(• Flow Control RS485 • Parity/Data/Stop NONE • 8 • 1 • Packaging Interval(ms) 50 3ckaging Length(Bytes) 1024				
	I Enable Echo I Serial data cache I Security				
	✓ Serial AT command ✓ Network AT	Send via Serial Port → Γ	Hex TX:222		🧐 Send 👻

≻Set by AT command:

	Command	Operation
1	+++a	Enter serial AT command mode
2	AT+WKMOD=NET	Set the work mode to Transparent mode
3	AT+SOCKAEN=ON	Enable Socket A
4	AT+SOCKASL=LONG	Set Socket A to persistent link
5	AT+SOCKA=TCP,50.34.63.87,2317	Set the remote IP and port of Socket A working
		in TCP client
6	AT+SOCKA=TCPS,0.0.0.0,5000	Set Socket A work in TCP server and the local
		port is 5000
7	AT+S	Save all parameters and restart

≻Test

Connect the serial port of USR-DR154-E to the computer via a RS485 serial to USB cable, send data from the utility, the test server will return the same data to serial port.

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BV DTUSet V1.	3.4						– 🗆 X
File Language							
[PC Serial Paramete	ers] : Serial Port COM42 💌 E	BaudRate 115200 💌	Parity/Data/Stop NONI -	8 🔹 1 💌 🔲 Clos	e		
Choose Work Mode	E.			Operation and Hints	8-70I		
Transparent Mo	ode C HTTPD	O Client Mode	C MQTT Mode	Query a	I parameters	Set and save	all parameters
			Serial	Enter Serial AT	command mode	Exit Serial AT cor	nmand mode
PC	NetWork	M2M device	Serial device	Build Time	Query IMEI	Query phone number	Query version
Transparent Mode P	arameters			Query RSSI	Save parameters	Reset to factory setting	Restart
✓ Enable Socket A ✓ Enable Socket B	IP&Port Link Type Time of Transitory Link(s) Enable ModbusRTU to TCP	58.34.63.87 TCP 10 OFF	2317 ▼ Persk ▼	✓ Timestamp ☐ Hex Send data >[Rx<-][16:06:45][as Send data >[Tx->][16:06:46][as Send data >[Rx<-][16:06:46][as Send data	RX:14262		Reset Count
Enable Socket C Modem Parameters Serial Port	Serial BaudRate 1152	IO(T Flow C	ontrol RS485 V	Send data		₹	
I⊄ More	Parity/Data/Stop NON8 Packaging Interval(ms) 50 F Enable Echo F S Serial AT command F	E V 8 V 3ckaging Length(1 Serial data cache C Network AT C	1 Image: Constraint of the security Security NTP function	Send via Serial Port 🔹 1	□ Hex TX:240		Ø, Send →
	Serial AT command 🔽	Network AT	NTP function	Send via Serial Port 👻	Hex TX:240		🧐 Send

4.2. HTTPD Client

In this mode, user's terminal device can send request data to the specified HTTP server through this modem, then the modem 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 modem will filter out the received HTTP protocol header data by default, only output user data to the serial port. Users can choose whether to filter by AT command.

≻Set parameters by the utility:



🙆 PV D	TUSet V1.3.4		- 🗆 X
File Lan	nguage		
[PC Seria	al Parameters] : Serial Port COM42 💌 BaudRate 115200 💌 Parity/Data/Stop NONI 💌	8 • 1 • Close	
Choose V	Work Mode	Operation and Hints	
C Tran	nsparent Mode 1 • HTTPD Client Mode C MQTT Mode	Query all parameters 4	Set and save all parameters
	HTTP Serial Serial	3 Enter Serial AT command mode E	xit Serial AT command mode
HTTP	server NetWork M2M device Serial device	Build Time Query IMEI Query ph	one number Query version
HTTPD C	lient Mode Parameters	Query RSSI Save parameters Reset to fa	ictory setting Restart
2	HTTP request method GET HTTP URL /1.php? HTTP server address 39.99.166.146 HTTP server port 80 ime of Transitory Link(s) 10 HTTP request Header Accept:text/html[0D][0A] K Remove Header	✓ Timestamp	Reset Count
Modem P	Jarameters		
Se I More	erial Port Serial BaudRate 11520(Flow Control R5485) Party/Data/Stop NONE Rev 8 1 1 1 Packaging Interval(ms) 50 3ckaging Length(Bytes) 1024		
	✓ Serial AT command ✓ Network AT	Send via Serial Port 🗸 🗌 Hex TX:240	🧶 Send 👻
		•	

Set by AT command:

	Command	Operation
1	+++a	Enter serial AT command mode
2	AT+WKMOD=HTTPD	Set the work mode to HTTPD Client
3	AT+HTPTP=GET	Set the HTTP request type to GET
4	AT+HTPURL=/1.php?	Set the HTTP URL
5	AT+HTPSV=39.99.166.146,80	Set the HTTP server address and port
6	AT+HTPHD=Accept:text/html[0D][0A]	Set the HTTP request header
7	AT+HTPTO=10	Set the time of transitory link
8	AT+HTPPK=ON	Set whether to filter HTTP header
9	AT+S	Save parameters and restart the modem

≻Test

After the NET light is flashing, send the data in the format of "data =". After the data is sent successfully, HTTP server will return the data with time stamp.



2 PV DTUSet V1.3.4					– 🗆 X
File Language					
[PC Serial Parameters] : Serial Port COM16 💌 BaudRate 115200	Parity/Data/Stop NONI	8 • 1 • Clos	e		
Choose Work Mode		Operation and Hints			
C Transparent Mode	C MQTT Mode	Query a	I parameters	🔚 Set and save a	all parameters
	Serial	Enter Serial AT	command mode	Exit Serial AT cor	nmand mode
HTTP server NetWork M2M device	Serial device	Build Time	Query IMEI	Query phone number	Query version
HTTPD Client Mode Parameters		Query RSSI	Save parameters	Reset to factory setting	Restart
HTTP request method GET HTTP URL /1.php? HTTP server address 39.99.166.146 HTTP server port 80 ime of Transitory Link(s) 10 HTTP request Header Accept:text/html[0D][0A] IV Remove Header IV Remove Header Modem Parameters Serial BaudRate 11520(-) Flo Parity/Data/Stop NONE -) 8	v Control R5485 v	▼ Timestamp Hex 123456 2024-07-02 17 >[Rx<-][17:24:14][as	RX:7371 1:20:53 [c] [c] [:24:56 [c] [:24:58		Reset Count
Packaging Interval(ms) 50 3ckaging Leng	gth(Bytes) 1024	Send via Serial Port 👻	Hex TX:44		🧶 Send 🕞

4.3. MQTT Mode

4.3.1. Generic MQTT

4.3.1.1. Basic parameters

In this mode, USR-DR154 works as an MQTT Client, which can help users quickly access the built private MQTT server or public MQTT IoT cloud platform. Users do not need to pay attention to the data conversion process between serial port data and network data packets, and can realize data transparent transmission between serial port and server only through simple parameter settings.

USR-DR154 supports quick access to general MQTT server and Alibaba Cloud, and supports multi-topic data publishing and data subscription.

Setup software is like below:



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File Language [PC Send Pranteters]: Serial Port (20M42) Bauditate [115200) Party/Data/Stop [NONI [6]] Choose Work Mode Choose Work Mode Choose Work Mode Choose Work Mode MOTT Hode Parameters NOTT Gener Generic MQTT Chart MOTT Gener MOTT Horde Message MOTT Gener MOTT Horde Message MOTT Horde Message MOTT Horel	B PV DTUSet	t V1.3.4					– 🗆 🗙
[PC Setial Parameters]: Setial Port[COM42] Build Rate [115200] Choose Work Mode Operation and Hints Choose Work Mode Operation and Hints Choose Work Mode C Query all parameters MOTT MOTT MOTT MOT MOTT MOTT MOTT MOTT Network MOTH MOTT MOTH MOTT ALL Cloud With To Server IP&Both Institutor.cn Usemane Usemane Worth Toerson 3.1 With Toerson 3.1 MOTT MOTT Mott Toerson IP erial trans mode MOTT Motor Mott Toerson IP erial trans mode MOTT Motor MOTT Gean session Moter Manameters Moter Moter Transparent mode Moter Seconde University IP Both Institutor.cn Moter Marameters <td>File Languag</td> <td>e</td> <td></td> <td></td> <td></td> <td></td> <td></td>	File Languag	e					
Choose Work Mode Operation and Hints Transparent Mode MOTT ALI Cloud Timestamp Hex RX:20658 Reset to factory setting Restant Timestamp Hex RX:20658 Reset Count Reset Count Reval of Reconnection(s) ID MOTT server IPRAPART MOTT server IPRAPART MOTT server IPRAPART MOTT Interval of Reconnection(s) ID MOTT server IPRAPART MOTT server IPRAPART	[PC Serial Para	meters] : Serial Port COM42 💌 BaudRate 115200 💌 P	arity/Data/Stop NONI -	8 • 1 • Clos	e		
Transparent Mode C HTTPD Clent Mode MQTT Mode MOTT MOTT Serial Serial device PC NetWork Serial device Enter Serial AT command mode Ext Serial AT command mode MQTT Genet Generic MQTT ALI Cloud Usery MIE Query MEI Query phone number Query version MQTT Genet MQTT Server IPSPort mettass Server IPSPort Reset Count MQTT Version 3.1 Image: Server IPSPort Image: Server IPSPort Reset Count MQTT Version 3.1 Image: Server IPSPort Image: Server IPSPort Reset Count MQTT heartbeat time(s) 60 Image: Server IPSPort Image: Server IPSPort Reset Count MQTT heartbeat time(s) 60 Image: Server IPSPort Image: Server IPSPort Reset Count MQTT heartbeat time(s) 60 Image: Server IPSPort Image: Server IPSPort Reset Count Modern Parameters Reboot Message USR-DR154 Image: Server IPSPort Reset Count Image: Server IPSPort Reset Count Notementers Reboot Message USR-DR154 Server IPSPort Image: Server IPSPort Server IPSPort Server IPSPort Ser	Choose Work N	Mode		Operation and Hints			
MOTT MOTT Serial PC NetWork M2M device NQTT Inde Parameters M2M device Serial device MQTT Clent Generc MQTT All Coud Image: MQTT Server P&Port Image: MQTT Image: MQTT Image: MQTT Version 3.1 Image: MQTT Server P&Port Image: MQTT Server P&Port Image: MQTT Server P&Port MQTT Server IP MQTT Transparent mode Image: MQTT Server IP MQTT Server IP MOTT Image: MQTT Server IP MOTT Image: MQTT Server IP MOTT Image: MQTT Server IP MOTT MQTT Server IP MOTT Clean session CK Image: MQTT Server IP MOTT Clean Session Modem Parameters Rebort Message USR-DR154 Image: MQTT Server IP MOTT MOTT Server IP MOTT MOTT Server IP MOTT MOTT Server IP MOTT Server IP MOTT MOTT Server IP MOTT Server	C Transparer	nt Mode C HTTPD Client Mode		Query a	I parameters	Set and save	all parameters
PC NetWork M2M device Serial device MQTT Mode Parameters Build Time Query JMEL Query phone number Query version MQTT Clent Connect		MQTT MQTT Seri		Enter Serial AT	command mode	Exit Serial AT cor	mmand mode
MQTT Mode Parameters Query RSSI Save parameters teset to factory setting Restart MQTT Clent	PC	NetWork M2M device	Serial device	Build Time	Query IMEI	Query phone number	Query version
MQTT Client Connect MQTT Server IP&Port Iserame Iserame Password Isr.cn Password Client ID 123456test1234 MQTT Version J.I MQTT serial trans mode Transparent mode MQTT serial trans mode Transparent mode MQTT heartbeat time(s) 60 Clean session Modem Parameters Modem Connection restart time(s) No connection restart time(s) Send via Serial Port + Hex Tx:322	MQTT Mode Pa	rameters		Query RSSI	Save parameters	Reset to factory setting	Restart
Interval of Reconnection(s) 10 MQTT serial trans mode Transparent mode MQTT heartbeat time(s) 60 Clean session Clean session Modem Parameters Reboot Message USR-DR154 APN CMNET,0 No connection restart time(s) Send via Serial Port * Send via Serial Port * Hex TX:32	MQ1T Client Connect	Generic MQTT C ALI Cloud MQTT Server IP&Port mqtt.usr.cn Username usr.cn Password usr.cn Client ID 123456test1234 MQTT Version 3.1	1883	Timestamp □ Hex >[Rx<-][17:03:53][as AT+NTPSVR=cn.ntp.o	RX:20658 sc] org.cn,us.ntp.org.cn		Reset Count
Modern Parameters Reboot Message USR-DR154 APN CMNET,.,0 No connection restart time(s) 1800 Send via Serial Port + T Hex TX:332 Send - 		Interval of Reconnection(s) 10 MQTT serial trans mode Transparent mode MQTT heartbeat time(s) 60 Clean session		>[Tx->][17:03:53][as <u>AT+C</u> data=123456	sc] •	¥	~
Reboot Message USR-DR154 ^ APN CMNET,,,0	Modem Parame	eters					
No connection restart time(s) 1800 Send via Serial Port v TX:332		Reboot Message USR-DR154 APN CMNET,,,0		^			_
		No connection restart time(s) 1800		✓ Send via Serial Port →	Hex TX:332		🧐 Send 👻

Options	Descriptions	Default
MQTT Mode	Whether to enable MQTT mode	OFF
MQTT Version	V3.1, V3.1.1	V3.1
MQTT Server IP	MQTT server domain name or IP address	mqtt.usr.cn
Port	MQTT server port	1883
Client ID	MQTT client identifier. Not repeatable when connected to the same MQTT server.	123456
Username	Username for MQTT connection authentication	None
Password	Password for MQTT connection authentication	None
Interval of	Interval between next reconnection after MQTT	10
Reconnection	disconnection, unit: s.	
MQTT heartbeat	MQTT protocol heartbeat time, unit: s.	60
time	Note: Alibaba Cloud requires that the heartbeat can be set	
	within 301200 seconds, and it is recommended to set it to	
	300 seconds when connecting to Alibaba Cloud.	
MQTT serial trans mode	Transparent mode, distribution mode	Transparent mode
Clean session	MQTT protocol connection flag, used to control the lifetime of session state.	Disable
Will messages	MQTT connection flag, when the network connection is	Disable
enable	closed, the server must publish the will message, and the	



	client subscribing to the will topic will receive the set will.	
Will topic	Will topic	/will
Will payload	Will content	offline
QOS	QOS of the will, can be set: 0: at most once. 1: at least once. 2: Accurate once.	0
Retain	Keep will message	Disable
SSL	 Support SSL3.0, TLS1.0, TLS1.1 and TLS1.2 version protocols. Authentication methods can be selected: >Do not verify certificate: Only implement data layer transmission decryption, and do not verify the identity of the other party during the handshake process. >Verify server certificate: the client will verify the server certificate during the handshake, and the client needs to preset the root certificate of the server. >Two-way authentication: The client and the server verify each other's identity, and the server root certificate, client certificate, and client private key need to be preset. 	Do not verify certificate

4.3.1.2. Subscribe/Public Topics

Users can configure the subscribe topics, public topics, topic numbers, QOS, whether to retain will message via the setup software. DR154-E supports two MQTT modes, transparent mode and distribution mode.

In transparent mode, the data received by the serial port is transparently transmitted to the associated topic as the payload of the topic, and up to 4 publish/subscribe topics are supported. Add the identifier of the topic in the distribution mode, and after the module receives the serial port data, it will push it to the associated topic according to the identifier. The identifier defaults to the topic number, and the identifier and payload are separated by commas. The message format is: symbol, <payload>



USR-DR154 User Manual

File Language						
IDC Carial Daramet	and Course Dest COM42 - Revel Date 115200 -	Davity/Data/Chan NONI				
LPC Serial Paramet				se		
Choose Work Mode			Operation and Hints			
C Transparent M	lode C HTTPD Client Mode	MQTT Mode	Query :	all parameters	Set and save	all parameters
			Enter Serial AT	command mode	Exit Serial AT cor	nmand mode
PC	NetWork M2M device	Serial device	Build Time	Query IMEI	Query phone number	Query version
AQTT Mode Param	eters		Ouery RSSI	Save parameters	Reset to factory setting	Restart
messages			^			
enable					······	
			Timestamp 🗆 Hex	RX:20658		Reset Coun
Topics	Image: Topic1 /SubTopictest123 0 • Image: Topic2 /SubTopic2 0 • Image: Topic3 /SubTopic3 0 • Image: Topic4 /SubTopic4 0 •		>[Rx<-][17:03:53][a AT+NTPSVR=cn.ntp. OK	sc] org.cn,us.ntp.org.cn		
Publish Topics	▼ Topic1 /PubTopic1test123 0 ▼	🗆 Retain	>[1x->][1/:03:53][a	scj		
2.0		Retain	data=123456		•	
		□ Retain	0000-125450			
		I 🗆 Retain				
			✓			
Modem Parameters	3					
	Reboot Message USR-DR154		^			
	APN CMNET,,,0					

4.3.1.3. Communication test

S MQTTX				– 🗆 X	ta/Ston NONI				
File Edit \	/iew Window Help					Operation and Hints			
	Connections New Collection	ΜQTT 📎 🔟		७ ⊿ 🗊 …	'T Mode	Query all	parameters	Set and save	all parameters
	MQTT@mqtt.usr.cn:1	+ New Subscription	Plaintext ~ All	Received Published		Enter Serial AT c	ommand mode	Exit Serial AT cor	nmand mode
L		/PubTopic1test123_OoS.0	2024-06-28 17:15:23:302		erial device	Build Time	Query IMEI	Query phone number	Query version
-		The operation and the	Topic: /PubTopic1test123 QoS: 0			Query RSSI	Save parameters	Reset to factory setting	Restart
ው			heartbeat			^			
			2024-06-28 17:15:37:634			Timestamp	RX:20666	• • • • • • • • • • • • • • • • • • •	Reset Count
+			Topic: /Sub	Topictest123 QoS: 0		>[Tx->][17:15:15][asc]		~
			MQTTtest			USR-DR154-E	1		
			2	024-06-28 17:15:51:444		MQTTtest	1		
			Topic: /PubTopic1test123 QoS: 0			>[Tx->][17:15:54][asc]		
B			USR-DR154-E		in	USICULIA	-		v
			2024-06-28 17:15:54:108		in	USR-DR154-E		Ť.	
Ū			Payload: Plaintext ∨ QoS: 0 ∨ 📀	Retain Meta	in				
			/SubTopictest123	~	in	•			
0			MQTTtest	$\epsilon = 3$					
						^			
Service			No connection restart time(s) 1800	-		Send via Serial Port -	Hex TX:354		🕘 Send 🕞
loT Configura	tion		1						

4.3.2. AWS IoT Service

DR154-E supports connecting to AWS IoT platform via MQTT.

Visit https://aws.amazon.com/, log in to the IoT console, choose AWS Management Console.



$\leftrightarrow \rightarrow G$	aws.amazon.com						1	B 🕁 🛸		更新
re:Invent	Products Solutions	Pricing	Documentation Learn Partner Network	AWS Marketplace Customer Enablement	Events Explore More Q	Contact Us Support + English + My Acco AWS Man. Account S	unt • Sign In agement Console	Create an AW!	i Account	
<			watch on demand AWS INVENT AWS Application (Preview)	Catch up on resinvent 2022 keynotes : n Composer	and leadership sessions on demand	Watch now - Watch now - Watch now - Watch now -	iost Management redentials anal Health d			>
			Visually design and build serverles	ss applications quickly.						,
			Announcements Learn about new AWS products and features	Keynotes Watch the keynote presentations	Leadership Sessions Hear directly from leaders across AWS	Official AWS Merch Store Your favorite AWS & releavent apparel, accessories, and more				
https://aws.amazo	on.com/≅		Featured Announce	ements						

4.3.2.1. AWS IoT Configuration

1. In Things, click to Create things--Create single thing.

aws III Services			🗘 🔞 Beijing 🕶	-
Monitor	Amazon IoT > Manage > Things			
Connect Connect one device Connect many devices	Things (9) and As is it may is a parsentation and recent of your physical device in the claud. A physical device results at throng record in order to work with Amazon to?		C Advanced search Run aggregations Edit Delete Crusts	things
Tort	Q. Filter things by: name, type, group, billing, or searchable attribute.		< 1	> @
MQTT test client	Name	Thing type		
	USR-M100	type_none		
Manage	N540-Test			
Things	□ N540	,		
Thing groups	🗆 jason_zhou			
Thing types Fleet metrics	П н7-4			
 Greengrass devices 	USR-N510			
Remote actions	Test-Example	3		
 Message routing Retained messages 	Peng	type_none		
▼ Security	L Idx1	type_none		
Intro				
Certificates				
Certificate authorities				
Role Aliases				
Authorizers				
Audit				
▶ Detect	0 things selected			^





2. Edit the Thing name, click Next.

/S Services		
Monitor	*	
	Amazon IoT > Manage > Thing	ys > Create things > Create single thing
Connect	Step 1	Specify thing properties
Connect one device	Specify thing properties	
Connect many devices		A thing resource is a digital representation of a physical device or logical entity in Amazon 101. Your device or entity needs a thing resource in the registry to use Amazon IoT features such as Device Shadows, events, jobs, and device management
	Step 2 - optional	features.
Test	Step 3 - optional	Thing properties Info
MQTT test client	Attach policies to certificate	
		Thing name
Manage		6771-E
All devices		Enter a unique name containing only: letters, numbers, hyphens, colons, or underscores. A thing name can't contain any spaces.
Things		
Thing groups		Additional configurations
Thing types		You can use these configurations to add detail that can help you to organize, manage, and search your things.
Fleet metrics		
Greengrass devices		Thing type - optional
Remote actions		Searchable thing attributes - optional
Message routing		
Retained messages		Ining groups - optional
▼ Security		Billing group - optional
Intro		
Certificates		
Policies		Device Shadow Info
Certificate authorities		Device Shadows allow connected devices to sync states with Amazon Web Services. You can also get, update, or delete the state
Role Aliases		information of this thing's shadow using either HTTPs or MQTT topics.
Authorizon		
Audit		No shadow
h Datast		 Named shadow Create multiple shadows with different names to manage access to properties, and logically group
₽ Detect		your devices properties.
	-	 Unnamed shadow (classic)

3. Choose Auto-generate a new certificate. Then click Next.



	Stan 1				
Connect	Specify thing properties	Configure device certificate - optional Info			
Connect one device		A device requires a certificate to connect to Amazon IoT. You can choose how you to register a certificate for your device no			
 Connect many devices 	Step 2 - optional	or you can create and register a certificate for your device later. Your device won't be able to connect to Amazon IoT has an active certificate with an appropriate policy.			
	Configure device certificate				
est	Step 3 - optional	Device certificate			
MQTT test client	Attach policies to certificate				
Manage		Generate a certificate, public key, and private key using Amazon IoT's certificate authority.			
All devices					
Things		O Use my certificate			
Thing groups		Use a certificate signed by your own certificate authority.			
Thing types					
Fleet metrics		Upload CSR Register your CA and use your own certificates on one or many devices.			
Greengrass devices					
Remote actions		Skin creating a certificate at this time			
 Message routing 		You can create a certificate for this thing and attach a policy to the certificate at a later time.			
Retained messages					
/ Security		Court During Har			
Intro		Cancet Previous Nex			
Certificates					
Policies					
Certificate authorities					
Role Aliases					
Authorizers					
Audit					

4. Create Policy.

WS Services			
Monitor	Amazon IoT > Manage > Things	> <u>Create things</u> > Create single thing	
Connect Connect one device	Step 1 Specify thing properties	Attach policies to certificate - option Amazon IoT policies grant or deny access to Amazon IoT resources. Attac	al Info
Connect many devices	Step 2 - optional Configure device certificate	access to the device.	
Test MQTT test client	Step 3 - optional Attach policies to certificate	Policies (13) Select up to 10 policies to attach to this certificate.	C Create policy
		Q Filter policies	< 1 2 > @
Manage ▼ All devices		Name	
Things			
Thing groups		peng-test	
Thing types		new	
Fleet metrics		myh_510	
 Greengrass devices 		aws_test_strategy	
Remote actions		USP N510	
Message routing			
Retained messages		N540-Test	
* Security		N510-AWS	
Certificates		MylotPolicy	
Policies		MOTT-FX-Policy	
Certificate authorities			
Role Aliases		U 17-4	
Authorizers		Example	
Audit		AWSIOTtest	
Detect			
	-		Cancel Previous Create thing

5. Edit the **Policy name**, change the **Policy effect** to **Allow**, the **Policy action** and **Policy resource** to *****.

aws iii Services		¢	0	Beijing 🔻	test_gao @ 9442-8422-9783
Amazon IoT X	Amazon IoT > Security > Policies > Create policy				
Monitor	Create policy lute Amazon IoT Core policies allow you to manage access to the Amazon IoT Core data plane operations.				
Connect Connect one device Connect many devices	Policy properties Amuson lot Core supports named policies so that many identities can reference the same policy document.				
	Policy name				
Test	6771Test				
MQTT test client	A policy name is an alphanumeric string that can also contain period (), comma (), hyphen(-), underscore (), plus sign (+), equal sign (+), and at sign (p) characters, but no spaces.				
Manage	► Tags - optional				
All devices					
Greengrass devices	Policy statements Policy examples				
Remote actions					
Message routing	Policy document Info			E	uilder JSON
Retained messages	An Amazon IoT policy contains one or more policy statements. Each policy statement contains actions, resources, and an effect that grants or denies the actions by the resources.				
▼ Security					
Intro	Policy effect Policy action Policy resource				
Certificates	Allow • • •	Remove	,		
Policies			_		
Certificate authorities	Add new statement				
Role Aliases					
Authorizers					THE OWNER AND ADDRESS OF
Audit					Cancel Create
Detect					1

6. After created, return to the previous certificate interface, attach the new created policy to this certificate. Then

click Create thing.

Connect Connect one device Connect many devices	Step 1 Specify thing properties Step 2 - optional	Attach policies to certificate - optional Info Amazon IoT policies grant or deny access to Amazon IoT resources. Attaching policies to the device certificate applies this access to the device.
rest MQTT test client	Configure device certificate Step 3 - optional Attach policies to certificate	Policies (1/14) C Create policy 2 Select up to 10 policies to attach to this certificate.
122200		Q Filter policies
All devices		Name Name
Things		
Thing groups		peng-test
Thing types		new
Fleet metrics		myh_510
Greengrass devices		aws test strategy
Remote actions		
Message routing		USR-N510
Retained messages		N540-Test
/ Security		N510-AWS
Intro		
Certificates		U MylotPolicy
Policies		MQTT-FX-Policy
Certificate authorities		H7-4
Role Aliases		G771Test
Authorizers		
Audit		Example

7. Download 4 certificates in below interface. Then click **Done**.



8. Now new thing has been added successfully.

aws III Services		Ø Beijing	test_gao @ 9442-8422-
Amazon IoT ×	O You successfully created thing G771-E.		View thing
Monitor	O You successfully created certificate 9a5598e1847e99a54edad9c238ef97feb8f74a34e14d2fe3ce1ddf8f542d0116.		View certificate
	Amazon IoT > Manage > Things		
Connect Connect one device Connect many devices	Things (10) into An init Taning is a representation and record of your physical device in the cloud. A physical device needs a time proceed in order to work with Amazon bit.	C Advanced search Run aggregations Edit Delete	Create things
Test	Q. Filter things by: name, type, group, billing, or searchable attribute.		< 1 > ©
MQTT test client	Name	Thing type	
Manage	G771-E		
▼ All devices	USR-M100	type_none	
Things	N540-Test		
Thing groups	N540	2	
Thing types	large theu		
 Greengrass devices 			
Remote actions	11/-9		
Message routing	USR-N510		
Retained messages	Test-Example		
▼ Security	Peng	type_none	
Intro	Idx1	type_none	
Certificates		37-200	
Policies	0 things selected		
Certificate authorities	s unity secced		

9. In **Settings**, copy the AWS server address that needs to be filled in DR154-E device.





4.3.2.2. DR154-E device configuration

You can use an RS485 to USB adaptor to connect the serial port of DR154-E device to the computer. Then

open the CAT1 setup software to configure the MQTT parameters.

1. Here we choose Generic MQTT mode, the MQTT server IP should be the one that we copied in AWS Cloud, and

the MQTT port is 8883. Username and password can be any value. Configure the subscribe and publish

topics.

2.Upload the created certificates to DR154-E device. We need to upload the Server CA certificate(rootCA.pem),

Client certificate(certificate.pem.crt) and Client private key(private.pem.key).

合王 (4)			TLS Encrypted	parameters
◇ 今天 (4) Amazor <mark>RootCA1.pem</mark>	2023-01-07 15:32	PEM 文件	SSL	icate verification method Two-way authentication ~ 7
9a5598e1847e99a54edad9c238ef97feb8f74a34e14d2fe3ce1ddf8f542d0116 private.	pem.key2023-01-07 15:32	KEY 文件		→ Server CA certificate D:\C盘文件\下载\AmazonRootCA1.pem …
9a5598e1847e99a54edad9c238ef97feb8f74a34e14d2fe3ce1ddf8f542d0116-public.	2023-01-07 15:32	KEV 文件		Client Certificate D:\C盘文件\下载\9a5598e1847e99a54edad
9a5598e1847e99a54edad9c238ef97feb8f74a34e14d2fe3ce1ddf8f542d0116 certifica 	ate.pem.crt 2023-01-07 15:32	安全证书		→ Client private key D:\C盘文件\下载\9a5598e1847e99a54edad …

3.After configuring all parameters, click to Set and save all parameters. The device will restart automatically.



Lunguage							
[PC Serial Parame	eters] : Serial Port COM4 🛛 🗸	BaudRate 115200 ~	Parity/Data/Stop NONI ~	8 v 1 v 🖬 Clo	e		
Choose Work Mod	de			Operation and Hints		8	
O Transparent	Mode O HTTPD Client Mod	de 🔿 SMS Mode	MQTT Mode	Query :	I parameters	Set and save a	all parameters
				Enter Serial AT	command mode	Exit Serial AT con	mmand mode
PC	NetWork	M2M device	Serial device	Build Time	Query IMEI	Query phone number	Query version
IQTT Mode Paran	meters			Query RSSI	Save parameters	Reset to factory setting	Restart
MQTT Client Connect	Generic MQTT	O ALI Cloud		Timestamp 🗌 Hex	RX:30254	<u> </u>	Reset Count
	Username	admin		>[Tx->][15:44:40][a	sc		
	Password Client ID	admin 123456		AT+S	sc]		
^r LS Encrypted par	Password 2 Client ID 2	admin 123456		AT+S >[Rx<-][15:44:40][a AT+S	sc]		
TLS Encrypted par	Password [Client ID] rameters icate verification method [Server CA certificate [Client Certificate [Client private key [admin 123456 Two-way authentication D:(C盘文件)下载(AmazonRc D:(C盘文件)下载(9a5598e1 D:(C盘文件\下载(9a5598e1	✓ yotCA1.pem m 847e99a54edad m 847e99a54edad m	AT+S >[Rx<-][15:44:40][a AT+S OK Operation complete >[Rx<-][15:44:45][a USR-G771-E	sc]		
FLS Encrypted par ☑ SSL Modem Paramete	Password [Client ID] rameters icate verification method [Server CA certificate [Client Certificate [Client private key [HS	admin 123456 Two-way authentication D:(C盘文件\下载\AmazonRc D:(C盘文件\下载\9a5598e1 D:\C盘文件\下载\9a5598e1	×)))))))))))))	AT+S >[Rx<-][15:44:40][a AT+S OK Operation complete >[Rx<-][15:44:45][a USR-G771-E	sc]	Y	
TLS Encrypted par SSL Modem Paramete Serial Port	Password [Client ID] rameters icate verification method [Server CA certificate [Client Certificate [Client private key [sts Serial BaudRate 11 Parity/Data/Stop [NC]	admin 123456 Two-way authentication D:(C盘文件\下载\AmazonRc D:(C盘文件\下载\9a5598e1 D:(C盘文件\下载\9a5598e1 D:(C盘文件\下载\9a5598e1 S20(~	>	AT+S >[Rx<-][15:44:40][a AT+S OK Operation complete >[Rx<][15:44:45][a USR-G771-E	sc]		

4.3.2.3. Data Transmission Test

In AWS IoT platform, click **MQTT test client**, publish data from AWS to the subscribed topic of DR154 device , we can receive it from the serial port of DR154-E device.

aws iii Services						\$ Ø	Beijing 🔻 🛛 test_gao @	9442-8422-
Connect many devices	AWS IoT > MQTT test client		File Language	1.1.4 eters] : Seral Port COM4 v BaudRate 115200 v Parity/Data/Stop MC	NI ∨ 8 ∨ 1 ∨ ■ Clos	9e		- 7 - 6
Test	MQ11 test client inf	,	Choose Work Mo	de	Operation and Hints			
MQTT test client	You can use the MQTT test client to n	nonitor the MQTT messages	O Transparent	Mode O HTTPD Client Mode O SMS Mode NQTT Mode	Query a	I parameters	Set and save	e all paramet
Manage	publishes MQTT messages to inform	devices and apps of changes	1		Enter Serial AT	command mode	Exit Serial AT ci	ommand mor
All devices	Subscribe to a topic F	Publish to a topic	PC	NetWork M2M device Serial device	Build Time	Query IMEI	Query phone number	Query
Greengrass devices	/ L		NQTT Mode Para	meters	Query R5SI	Save parameters	teset to factory setting	Rer
	Copic name The topic name detertion for message: Q. SubTopic1 Message payload ("message": "Hello from Amazon) I Additional configuration Publish	The message psyload will be pub	Subscribe Topics	☑ Tapeci Sjub Topeci Ø □ ☑ Tapeci Sjub Topeci Ø □ □ Strever CA centrates D(top ZPH) Ten (SubStrever CL topen Single Strever Single Stre	Comparison of the second	R0:30302 R0:30302 Sc] Sc] orn Amazon IoT cor	sole*	Re
	Subscriptions	Торіс	Modem Paramete	115				
Device Software Billing groups Settings Feature spotlight	You have no topic subscriptions.		Serial Port	Serial Bauditate 115201 v Flow Control R5485 v Parity/Data/Stop NONE v 8 v 1 v Packaging Interval(ms) 50 vckaging Length(Bytes) 1024	Send via Serial Port +	Hex TX:55		Ø
Documentation 🖸								

Subscribe the publish topics of DR154-E device in AWS, we can receive the data sent from the serial port of

DR154-E device.



aws III Services			O Beijing test_gao (# 94					
Connect many devices			H USR-CATI VI.1.4					
	AWS IoT > MQTT test client		File Language					
	MOTT test slight		[PC Serial Parameters] : Serial Pont COIM4 V Baudkate (115200 V Parity/Data/Stop NONI V 8 V 1 V Cose					
Test	MQTT test client in	0	Choose Work Mode Operation and Hints					
MQTT test client	You can use the MOTT test client to r	nonitor the MOTT messages I	or Transparent Mode 🔿 HTTPD Clent Mode 🔿 SMS Mode 💿 MQTT Mode					
	publishes MQTT messages to inform	devices and apps of changes	es a MOTT MOTT Serial					
Manage			Enter Serial AT command mode Exit Serial AT command					
All devices	Subscribe to a topic	Publish to a topic	PC NetWork M2M device Serial device Build Time Ouery IMEI Ouery phone number					
Greengrass devices			MOTT Mode Parameters					
Remote actions	Topic filter Jose		Query RSSI Save parameters deset to factory setting Query RSSI Save parameters deset to factory setting					
Message routing	The topic filter describes the topic(s) to	which you want to subscribe. The	he t					
Ratained messanes	PubTopic1		Publish Topics 7 Topic1 0 V Retain					
Conuctor			☑ Topk2 PubTopic2 0 ✓ □ Retain					
* security	Additional configuration		□ Topk3 Pub Topic3 0 v □ Retain Operation complete					
Intro			□ Topic4 PubTopic4 0					
Certificates	Subscribe		USR-6771-E					
Policies			TLS Encrypted parameters >[Rx<-][15:45:33][asc]					
Certificate authorities	6 h	D 17.14	SSL icate verification method Two-way authentication ~ {					
Role Aliases	Subscriptions	Publopici	Server CA certificate D:(值文件)下载(AmazonRootCA1.pem)					
Authorizers			Client Certificate D:(C盘文注\下载)9a5598e1847e99a54edad					
Audit	Publopic1 VX		Client private key Dr.(2號文注十下號(9a5598e1847e99a54edadin) >[Tx->][15:47:30][asc]					
▶ Detect		Publiopic1	12345667890					
			Modern Parameters					
		12345667890	Savid Bart 0					
Device Software			Serie Buckate 112010 How Control Refer 0					
Billing groups		Properties	Parking local youp motion of the second seco					
Settings		, moperates						
Feature spotlight			-1					
Documentation 🔀								
New console experience								

In this way, we can achieve the bi-directional communication between serial device and AWS cloud via DR154-E device.

4.3.3. SSL/TLS encryption

In MQTT mode, the device supports SSL/TLS encryption. If the target server enables SSL certificate verification, you need to configure the SSL encryption parameters. It supports SSL3.0, TLS1.0, TLS1.1, and TLS1.2 versions, and the authentication method can choose not to verify certificate, verify server certificate, and two-way verification authentication.

🔞 PV DTUSe	t V1.3.4						- 🗆 🗙
File Langua	ge						
[PC Serial Par	ameters] : Serial Port COM16	▼ BaudRate 115200 ▼	Parity/Data/Stop NONI - 8	▼ 1 ▼ Clos	e		
Choose Work	Mode			Operation and Hints			
C Transpare	ent Mode O H	ITTPD Client Mode	• MQTT Mode	Query a	l parameters	🔚 Set and save	all parameters
				Enter Serial AT	command mode	Exit Serial AT cor	nmand mode
PC	NetWork	M2M device	Serial device	Build Time	Query IMEI	Query phone number	Query version
MQTT Mode P	arameters			Query RSSI	Save parameters	Reset to factory setting	Restart
	Password	1	^				
	Client ID	123456		🔽 Timestamp 🗌 Hex	RX:3302		Reset Count
	MOTT Version	21	 T	OK			
	ng i i veisior		1	NTV NI(11)25-411[-00	-1		
	Interval of Reconnection(s	i) 10		AT TODENOTITE			
	MQTT serial trans mode	e Transparent mode	·	>[Rx<-][11:35:41][as	cl		
	MQTT heartbeat time(s	60	1	AT+SSLAUTH?	-1		
TLS Encrypted	parameters			+SSLAUTH:ALL			
SSL	icate verification method	d Two-way authentication	· ^				
	Server CA certificate	e		ОК			
	Client Certificate	e					
	Client private ke	У	🗸	Operation complete			
Modom Daram	ator						
Houenrelan	icicio				•	•	



	Command	Operation
1	+++a	Enter serial AT command mode
2	AT+SSLEN=ON	Enable SSL encryption
3	AT+SSLAUTH=ALL	Enable two-way verification authentication
4	AT+SSLVER=TLS12	Selects TLS1.2 version
5	AT+SSLCRT=0,Content of certificate	CA certificate
6	AT+S	Save all parameters and restart

5. General Function

5.1. Identity packet

In **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 modem establishes a connection with the server, or as the prefix of each data packet or both.

Identity package data can be ICCID code, IMEI code, SN, CLOUD or User-defined data.

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

IMEI: Unique identification code of the Internet modem, which is mainly used in device identification, has

nothing to do with SIM card.

SN: Serial number.

USER: User-defined data.

CLOUD: Set the device ID and password when connecting to USR Cloud, sent when building connection.



≻Set by the utility:



DV DTUSet V1	.3.4		– 🗆 🗙
File Language			
[PC Serial Parame	ters] : Serial Port COM16 💌 BaudRate 115200 💌 Parity/Data/Stop NONI 🗨 🛙	8 • 1 • Close	
Choose Work Mod	le	Operation and Hints	
Transparent N	Mode C HTTPD Client Mode C MQTT Mode	Query all parameters	all parameters
	CP/UDP	Enter Serial AT command mode Exit Serial AT cor	mmand mode
PC	NetWork M2M device Serial device	Build Time Query IMEI Query phone number	Query version
Transparent Mode	Parameters	Query RSSI Save parameters Reset to factory setting	Restart
 ✓ Enable Heartbeat Package ✓ Enable Identity Package 	Heartbeat Interval(s) 30 Method of Heartbeat Send data to network 文 心跳動構英型 自定义劲境 文 Heartbeat Data 686561727462656174 V Hex Method of Identity Package Send package once build 文 Type of Identity Package User-defined data 文 User-defined data [registerdata0] 「 Hex	Image: Timestamp Image: Timestamp Image: Timestamp Image: Timestamp 123456 2024-07-02 123456 2024-07-02 Image: Timestamp Image: Timestamp Image: Timestamp Timestamp Image: Timestamp	Reset Count
	Interval of Reconnection(s) 10 Times of Reconnection 60	123456 2024-07-02 17:24:58	~
Modern Parameter	s	uuu=123130	
Serial Port	Serial BaudRate 11520(Flow Control R5485)		@ coul
More	rackagnig interval(IIS) 50 sckagnig Length(bytes) 1024	Send via Senai PORt V I Hex IX:44	twy send ↓

≻Set by AT command:

	Command	Operation
1	+++a	Enter AT command mode
2	AT+WKMOD=NET	Set the work mode to NET
3	AT+REGEN=ON	Enable identity package function
4	AT+REGTP=USER	Set the type to User-defined
5	AT+REGDT=7265676973746572646 174613031	Set the User-defined data in HEX.
6	AT+REGSND=LINK	Send the package as the prefix of the data
7	AT+S	Save parameters and restart

5.2. Heartbeat packet

In **transparent mode**, user can send the heartbeat package from the module to the network side or serial port device .

Sending to the network is to ensure the normal connection of the module and let the server know the online status of the module. User can also set the serial heartbeat to a fixed query command instead of sending from server to save the traffic.

Heartbeat package can be ICCID code, IMEI code, SN, LBS or user-defined data.



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

IMEI: Unique identification code of the Internet modem, which is mainly used in device identification, has

nothing to do with SIM card.

SN: Serial number.

USER: User-defined data.

Set by the utility:

ne canguage					
[PC Serial Parame	eters] : Serial Port COM16 🔹 BaudRate 115200 💌 Parity/Data/Stop NONI 💌	8 • 1 • • Close			
Choose Work Mo	de	Operation and Hints			
Transparent	Mode C HTTPD Client Mode C MQTT Mode	Query all p	arameters	Set and save a	I parameters
	TCP/UDP Serial	Enter Serial AT co	mmand mode	Exit Serial AT con	mand mode
PC	NetWork M2M device Serial device	Build Time	Query IMEI	Query phone number	Query version
ransparent Mode	Parameters	Query RSSI	Save parameters	Reset to factory setting	Restart
✓ Enable Heartbeat Package	Heartbeat Interval(s) 30 Method of Heartbeat Send data to network 心味就很失型 百经公司报 Heartbeat Data [685561727462656174 Hex	>[Tx->][18:42:38][asc] +++ >[Rx<-][18:42:38][asc] a >[Tx->][18:42:38][asc]			
 Enable Identity Package 	Method of Identity Package Send package once build Type of Identity Package User-defined data User-defined data 72656769737465726461744 Hex	a >[Rx<-][18:42:38][asc] +ok Operation complete			

Set by AT command:

	Command	Operation
1	+++a	Enter AT command mode
2	AT+HEARTEN=ON	Enable heartbeat package function
3	AT+HEARTTP=NET	Send the heartbeat package to network
		side
4	AT+HEARTSORT=USER	Set the type to User-defined
5	AT+HEARTDT=7777772E757372	Set the User-defined data in HEX.
	2E636E	
6	AT+HEARTTM=30	Set the heartbeat interval

You also need to set the socket parameters. After setting all parameters, save and restart the modem. Note:

1, Network heartbeat package: In transparent mode, it will only be sent when there is no data sent to network within one heartbeat interval.

2, Serial heartbeat package: In transparent mode, it will always be sent to serial port according to the set interval.



5.3. Modbus Gateway

After enabling Modbus Gateway, Modbus RTU/TCP protocol conversion can be realized to connect with the customer's software.

≻Set by the utility:

File Language							
[PC Serial Paramete	ers] : Serial Port COM16 💌	BaudRate 115200 💌	Parity/Data/Stop NONI -	8 • 1 • • Oper	n		
Choose Work Mode				Operation and Hints			
 Transparent Mo 	Ode C HTTPC	O Client Mode	C MQTT Mode	Query al	l parameters	Set and save a	all parameters
			Serial	Enter Serial AT	command mode	Exit Serial AT cor	nmand mode
PC	NetWork	M2M device	Serial device	Build Time	Query IMEI	Query phone number	Query version
Transparent Mode P	arameters			Query RSSI	Save parameters	Reset to factory setting	Restart
F Enable Socket	IP&Port Link Type Time of Transitory Link(s) Enable ModbusRTU to TCP	58.34.63.87 TCP 10 ON	2317 • Persk •	✓ Timestamp	RX:0 ess: to PC serial port, p IO. Then Cick "Oper meters"	ower the module	Reset Cour
Enable Socket				4. Choose work mode 5. Click "Set current pa	and configure relate rameters"	d parameters	

Set by the AT command:

	Command	Operation
1	+++a	Enter serial AT command mode
2	AT+WKMOD=NET	Set the work mode to Transparent mode
3	AT+SOCKAEN=ON	Enable Socket A
4	AT+SOCKASL=LONG	Set Socket A to persistent link
5	AT+SOCKA=TCP,39.99.166.146,2317	Set the remote IP and port of Socket A working
		in TCP client
6	AT+SOCKA=TCPS,0.0.0.0,5000	Set Socket A work in TCP server and the local
		port is 5000
7	AT+MODBUSEN=ON	Enable Modbus TCP/RTU protocol conversion
8	AT+S	Save all parameters and restart

5.4. Socket Distribution Protocol

USR-DR154-E supports socket distribution protocol. When a device is connected to multiple sockets, can send different serial data to different servers via this protocol. Data returned from different server will also be sent to the serial port with the socket distribution protocol.

For detailed protocol, please refer to another document: socket distribution protocol.





Socket distribution protocol data follows the packaging mechanism, the total length of the real data and socket distribution protocol must be less than the packaging length.

This function is valid in transparent mode, disabled by default, can be set via AT command: **AT+SDPEN**.

5.5. PUSR Cloud

USR Cloud is an open platform for communication between devices and devices, devices and servers (Android, IOS, PC), it can achieve data remote monitoring (Modbus RTU) and transparent transmission. Our USR-DR154-E-E also supports connecting to USR Cloud. For details, please check this link: mp.usriot.com.

5.6. FTP upgrade

DR154-E 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".





5.7. NTP

USR-DR154-E supports connecting to the NTP server for time synchronization.

This function defaults to be disabled, support connecting to up to 4 NTP servers. User can send "AT+CCLK"

or "AT+CCLK?" to query the current time.

```
≻Set by the utility:
```

2 PV DTUSet V	/1.3.4		– o ×
File Language	e		
[PC Serial Para	meters] : Serial Port COM16 BaudRate 115200 Parity/Data/Stop NONI	8 • 1 • Gose	
Choose Work M	fode	Operation and Hints	
C Transparer	nt Mode C HTTPD Client Mode © MQTT Mode	Query all parameters	
PC	MOTT Senal Senal	Enter Serial AT command mode Exit Serial AT command mode	
	Network Senai device	Bouto Time Query Inter Query Inter Query Priore number Query Version	
MQTT Mode Par	rameters	Query RSSI Save parameters Reset to factory setting Restart	
	MQTT serial trans mode Transparent mode	۲ Timedamn Г Hex 8X:3917	Reset Count
	mort meatoreac differs) do		
	1 Clean session	AT+CCLK	
Will messages enable		>[Rx<-][12:04:45][asc] AT+CCLK	
		>[Rx<-][12:04:45][asc]	
TLS Encrypted	parameters		
🔽 SSL	icate verification method Two-way authentication 💌	+CCLK: "2024/07/03,12:04:43+32"	
	Server CA certificate	ОК	
	Client Certificate		
	Client private key	Operation complete	
		>[Wam][12:04:46][asc]	
		+CME ERROR:58	
Modem Parame	iters	operation complete	
I More	Packaging Interval(ms) 50 3ckaging Length(Bytes) 1024		
	🔽 Enable Echo 🖾 Serial data cache 🗖 Security		
	Serial AT command I Network AT I NTP function		
	Command Prefix 4G DTU		
	Reboot Message USR-DR154		
	APN CMNET,,,0		
	No connection restart time(s) 1800		
	Security Code ******		
	NTP Server cn.ntp.org.cn,us.ntp.org.cn		
	NTP calibration period (min) 60	Send via Serial Port + THEX TX:206	🕘 Send 🔸

Set by AT commands:



	Command	Operation
1	+++a	Enter serial AT command mode
2	AT+NTPEN=ON	Enable NET function
3	AT+NTPSVR=cn.ntp.org.cn,us.ntp.	Set the NTP server address
	org.cn	
4	AT+NTPTM=60	Set the NTP calibration interval
5	AT+S	Save all parameters and restart

5.8. Firmware Upgrade

DR154-E supports upgrading via FOTA or USB. For FOTA upgrading, please contact us for technical support.

Please also provide the IMEI and the firmware version of the device after connecting the device to the network.

Here we introduce how to upgrade via USB port:

1.Hardware connection: Connect the USB port (only for upgrading) of DR154-E to the computer.

2.Install the driver(Please contact the technical support).

3.Press the "Reload" button and power on the device at the same time, release it and the device will be in downloading mode. Download port is showing like below:



4.Please contact the sales for upgrading tool (Please contact the technical support). Find

"UpgradeDownload.exe" under UPGRADEDOWNLOAD\Bin.

5.Download the firmware.



6.Upgrade successfully. You can directly change to another device to upgrade. After all the devices are upgraded,



click "Stop", then close the tool.

😫 Upg	* UpgradeDownload - R23.0.0001								
٢	6	() () () () () () () () () () () () () (-GM5 : 8910 MODULE (PACKAGE SIZ	E = 5.726MB)					
Port	Step	Status	Progress	Time(s)	МСР Туре	Rate(MB/s)			
18	HOST_FDL	Connecting	In progress	38		Avg:0.00, Peak:0.00			
19	HOST_FDL	Connecting	In progress	38		Avg:0.00, Peak:0.00			
27	PREPACK	Finish	Passed	33s	1 <u></u>	Avg:0.15, Peak:0.19			

5.9. Restore to Factory Default Settings

1.Hardware reset: After power on, press the "Reload" button in the device for 3~15S to restore the device to factory parameters.

2.Software reset: After enter AT command mode, send "AT+CLEAR" from the serial port to restore the device.

5.10. Timeout Restart

USR-DR502-E supports timeout restart function, defaults to be enabled, 1800s. When there is no data in

30min, the device will restart automatically. You can change it via AT command: AT+RSTIM.

PV DIUSet VI.3.4	
File Language	
[PC Serial Parameters] : Serial Port COM16 BaudRate 115200 Parity/Data/Stop NONI	
Choose Work Mode	Operation and Hints
C Transparent Mode C HTTPD Client Mode © MQTT Mode	Query all parameters
MOTT MOTT Serial	Enter Serial AT command mode Exit Serial AT command mode
NetWork View Serial device	Build Time Query IMEI Query phone number Query version
MQTT Mode Parameters	Query RSSI Save parameters Reset to factory setting Restart
MQTT heartbeat time(s) 60	
Clean session	Timestamp Tiex RX:3999
T will messages enable	>[Tx->][18:45:41][asc] a >[Rx-][18:45:41][asc] +ok
Subscribe	Operation complete
TLS Encrypted parameters	>[Tx->][18:45:50][asc]
	AT+LBS
icate verification method Two-way authentication	
Server CA certificate	>[Rx<-][18:45:50][asc]
Client Certificate	AT+LBS
Lient private key	+LBS: LAC = 5277, CID = 8c3b485
	OK
	Operation complete
Modern Parameters	
More	
🔽 Enable Echo 🖾 Serial data cache 🗌 Security	A (LD)
Serial AT command R Network AT R NTP function	
Command Prefix 4G DTU	
Reboot Message USR-DR154	
APN CMNET,,,0	
No connection restart time(s) 1800	
Security Code ******	
NTP Server cn.ntp.org.cn,us.ntp.org.cn	
NTD calibration paried (min) 60	

6. AT Commands

AT command is used for controlling modem, for USR devices in transparent mode normally, you must enter AT command mode at first, then you can send AT commands to configure or query the parameter settings. After setting all parameters, restart the modem to make the settings take effect. Every time the modem restart will work in work mode rather AT command mode.



Every AT command must add character carriage return <CR> and line feed <LF>. In Hex, <CR> is 0x0D

<LF> is 0x0A.

For detailed AT commands, please check the AT commands set.

6.1. AT Command Settings



>Enter AT command mode:

1.Send "+++" from the serial port, it will be a "a" returned.

2.Do not send any data within a serial port packaging interval before sending "+++".

3.After receiving "a", send another "a" within 3s.

4.Receiving "+ok" means the device has changed to AT command mode.

5.Then can send AT commands to the device.

≻Exit AT command mode:

- 1. Send "AT+ENTM" from the serial port.
- 2. Receiving "+ok" means the device has exited AT command mode.

6.2. Serial AT Commands

When enable "Serial AT command" function, you can directly send "Command prefix+AT command" in transparent mode without changing to AT command mode. Command prefix defaults to "4G DTU". The serial AT command is enabled by default.

Example: query socket A status, there is a carriage return and line feed after the AT command.



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🔯 PV DTUSet V	1.3.4		—
File Language			
[PC Serial Parame	eters] : Serial Port COM16 💌 BaudRate 115200 💌 Parity/Data/Stop NONI 🗸	8 • 1 • • Close	
Choose Work Mo	de	Operation and Hints	
C Transparent	Mode C HTTPD Client Mode © MQTT Mode	Query all parameters	開 Set and save all paramete
	MQTT Serial	Enter Serial AT command mode	Exit Serial AT command mod
TLS Encrypted pa	arameters	Build Time Query IMEI	Query phone number Query
SSL	icate verification method Two-way authentication 💌	Query RSSI Save parameters	Reset to factory setting Res
	Server CA certificate	✓ Timestamp	Re
	Client private key	>[Rx<-][18:58:36][asc]	
		4G DTU +SOCKA:TCP,58.34.63.87,2317	
		ОК	
Modem Paramete	ers		
More	rackaging incertainable of tenaging congenetics are the	Operation complete	······································
		4G DTUAT+SOCKA	
	Serial AT command Vetwork AT Vetwork AT		
	Command Prefix 4G DTU		
	Reboot Message USR-DR154		
	APN CMNET,,,0		

The command prefix can be set by AT+CMDPW, like AT+CMDPW=USR.CN

PV DTUSet V1.	3.4								—
File Language									
[PC Serial Parame	eters] : Serial Port COM16 💌	BaudRate 115200	Parity/Data/Stop NONI	• 8	▼ 1 ▼ Clos	e			
Choose Work Mo	de				Operation and Hints				
Transparent	Mode C HTT	PD Client Mode	C MQTT Mode		Query al	parameters	Set and save a	all parameters	
			Serial		Enter Serial AT	command mode	Exit Serial AT con	nmand mode]
PC	NetWork	M2M device	Serial device		Build Time	Query IMEI	Query phone number	Query version	
Transparent Mode	e Parameters				Query RSSI	Save parameters	Reset to factory setting	Restart	
Frable Socke	IP&Port Link Type Time of Transitory Link(s;	58.34.63.87 TCP 10	2317 Persis	Î	Timestamp Hex >[Tx->][19:02:24][as AT+CMDPW=USR.CN	RX:7649			
Modem Paramete	ers								(
₩ More		ichuging co	igui(0)(00) 100 .	^	>[Rx<-][19:02:24][as AT+CMDPW=USR.CN	c]			0
	Enable Echo F Serial AT command Command Prefix	Serial data cache Network AT USR	Security NTP function	h	ок				
	Reboot Message APN	USR-DR154 CMNET,,,0			AT+S				
	No data auto restart time(s)	1800							

6.3. Network AT Commands

In transparent mode, you can also send "Command prefix+AT command" from the network side to query or change the modem's parameter settings. The network AT command is enabled by default, and the default command prefix is 4G DTU.



Modem Parame	ters		+SSLAUTH:ALL
✓ More	ו טרושטווע ארכוזטו(ווא) אין ארשטווע ברוענוועזינטן גער.	^	OK
	🔽 Enable Echo 🔽 Serial data cache 🗆 Security		
	Serial AT command For NTP function Command Prefix 46 DTU		Operation complete
	Reboot Message USR-DR154		AT+S
	APN CMNET,,,0		
	No data auto restart time(s) [1800 Security Code *****		
	NTP Server [cn.ntp.org.cn,us.ntp.org.cn		
	NTP calibration period (min) 60	~	Send via Serial Port + 🗌 Hex TX:365

Example: query socket A status, there is a carriage return and line feed after the AT command.

7. Contact Us

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