Guideline to configure Modbus RTU to TCP of Serial device for 4G Router



The following content uses a Local test environment as an testing example, shown as Figure 1. For User's public Server network environment just refer to Figure 2.

Figure1



Figure2

1.Connect the LAN port of the router to the computer, and set the automatic dhcp mode for the computer Network Ineterface Card, and ensure that the computer can obtain the address 192.168.1.x, netmask 255.255.255.0.



2.Open the browser, type the default IP address of the router with 192.168.1.1, then press Enter. And then input the username/password with admin/admin to login the Router.



3.After logging , you will see overview details about the router system, including the software/hardware version, product model, product id, networking mode, and MAC address, etc.

← → C ▲ 不安全 192.168.1.1 cgi-bin/luci/ 🗟 Q 🖻 🛧 🗯 🖬 😩 : M2M wireless terminal **Cellular Router** System Status 44 Smartlink × ➡ Tab operation Overview Status System Router Name M2M Product Name ZR2721S Firmware Version Premium Wireless Router v2.5.221125 Product ID 1120ZR21908270518 Local Time Mon Nov 28 19:44:33 2022 Hardware Class Single Model Single Card Basic Network Uptime 0h 8m 39s MAC Address 34:0a:68:24:b8:ec Load Average 1.06, 1.11, 0.58 WAN Mode 4G/5G and Wired Advanced Network VPN Configuration > MobileWAN Status System Management > Interface Mobile Network1 Logout Gateway IPv4Address DNS Modem Type LTE/WCDMA/TD-SCDMA/EVDO/CDMA/EDGE/GPRS/GSM Modem IMEI 868821041133992 Modem IMSI Modem ICCID Network Operator

4. Check the LAN IP address of the router and PC address connected to router , shown as follows:

System Status	*	Overview 🗙 Sma	rtlink × Wired Network ×				₩	Tab operatio
Basic Network ~								
Switch		WAN LAN M	GT					
Hostnames		Interfaces - LAN						
Static Routes		On this page you can o several network interfa	configure the network interfac aces separated by spaces. Yo	ces. You can bridge sev ou can also use <u>VLAN</u> no	eral interfaces by tic otation INTERFACE. VL	king the "bridge interfaces" field and enter t NNR (<u>e.g.</u> : eth0. 1).	he nam	ies of
Wired Network		Common Configur	ation					
Mobile Network		General Setun	Advanced Settings					
Wireless Network			, la la local de clango					
Static address			Status	Collecting data				
Advanced Network			Protocol	Static address	~			
VPN Configuration			IPv4 address	192.168.1.1/24	+			
System Management >			Use custom DNS servers		+			
Logout			IPv6 assignment length	64	~			
				Assign a part of given	length of every publi	c IPv6-prefix to this interface		
			IPv6 assignment hint					
				Assian nrefix narts usi	no this hexadecimal	suborefix ID for this interface		

System Status ~	Overview # Smartlink # Wired Network #		➡ Tab operation
Overview Routes	et	MAC Address: 34:0A:68:24:B8:EC Netmask: 255.255.255.255 Gateway: 0.0.0.0	-
System Log	Active Connections	160 / 16384 (0%)	
Kernel Log Realtime Graphs	Memory		
Basic Network >	Total Available	2172 kB / 123688 kB (58%) 4404 kB / 123688 kB (52%)	
Advanced Network >	Buffered	7768 kB / 123688 kB (6%)	
VPN Configuration > System Management >	DHCP Leases		
Logout	Hostname IP Address mc007 192.168.1.236	MAC-Address E4-E7:49:1A:A7:F3	Leasetime remaining 11h 49m 21s
	Wireless Generic MAC80211 802.11bgn Wireless Controller (radio0	SSID: ZP2721S-24b8ec Mode: Master Channel: 6 (2.437 GHz) Bitrate: 7 Mbit/s BSSID: 340A:68:24188/EE Encryption: mixed WPA/WPA2 PSK (CCMP) Uptime: 0h 10m 57s SSID: default Mode: Client Channel: 6 (2.437 GHz) Bitrate: 7 Mbit/s Wireless is disabled or not associated	

5.Start to configure smartlink usage.

5.1 to config 'cloud'/'uplink device' option: set it to Modbus TCP Slave mode, and set a cutstomized listening port, such as 30001.

System Status	>	44	Overview 🛪	Smartlink 🗙	Wired Network 🛪						₩ T	ab operation 👻
Basic Network	>		General Col	lection Ac	lvance							-
Advanced Network	•											
QoS			Mode Configu	iration								
DMZ			Enabled		Uplink Device		1	Downlink Devic	e			
Firewall			√		Cloud			UART_DEV		EDIT	DELETE	
Port Forwards			ADD									
Static NAT												
Smartlink			Connection C	onfiguration								
M2M Platform			Enabled	Name	Working Mode	Target Addres	ss Status	Conns	Protocol			
Network Monitor			V	Cloud	TCP Server	30001	Listening	0	Pass-Through	EDIT	DELETE	
Link Control			V	UART DEV	UART	COM1	Connected	1	Pass-Through	EDIT	DELETE	
Dynamic DNS			_							CON	DEELTE	•
SNMP Service			ADD									
VPN Configuration	>											
System Managemen	it >		Serial Configu	uration								
Logout			Interfac	e	Speed	Data Bit	Stop Bit	Parity	Flow Control			
			COM1		115200	8	1	None	None		EDIT	
										15.1		_
										SAVE & APF	PLY	ESET

System Status	> 41	Overview × Smartlink × Wired Network ×	₩	Tab operation 🕶
Basic Network	,			
Advanced Network	•	General Collection Advance		
QoS		Cloud		
DMZ		Enabled		
Firewall				
Port Forwards		Name Cloud		
Static NAT		Working Mode TCP Server		
Smartlink		Listen Port RealCom TCP Server		
M2M Platform		Protocol UDP Server		
Network Monitor		UDP Client Enable Heartbeat MQTT Client Moditure TCP Meeter		
Link Control		Modbus TCP Slave Modbus RTU Master		
Dynamic DNS		BACK TO OVERVIEW Local Server S	AVE & APPLY	RESET
SNMD Service				
		Consider to Department and United Materials to		
System Status	> 41	Overview * Support * Avied Metwork *	19	Tab operation *
Basic Network	*	Ceneral Collection Advance		
Advanced Network	~			
QoS		Cloud		
DMZ		Enabled 💟		
Firewall		Name Cloud		
Port Forwards		Working Model Modelius TCP Slave		
Static NAT				
Smartlink		Slave Port 30001		
M2M Platform		Protocol Modbus TCP 🗸		
Network Monitor		Slave ID 1		
Link Control		Acceptable Values: 0~255		
Dynamic DNS		Modbus Debug		
SNMP Service		[
VPN Configuration	>	BACK TO OVERVIEW	SAVE & APPLY	RESET

5.2 to modify 'Downlink Device' from UART mode to 'Modbus RTU Master' mode and select protocol to Modbus RTU, Slave ID to 1 as an example. ALL shown as below.

System Status →		Smartlink :	Wired Network	к						**	Tab operation +
Basic Network >											Ê
Advanced Network 🗸	General	Collection	Advance								
QoS	Mode	Configuration									
DMZ	Enal	oled	Uplink Device	•		Down	link Device				
Firewall	v		Cloud			U	ART_DEV		EDIT	DELET	E
Port Forwards	AD	D									_
Static NAT											
Smartlink											
M2M Platform	Conne	ction Configuratio	on								
Network Monitor	Enat	led Name	Working Mo	de	Target Address	Status	Conns	Protocol	_		_
Link Control	v	Cloud	Modbus TCP S	Slave	30001	Listening	0	Modbus TCP	EDIT	DELET	E
Dynamic DNS	v	UART_DEV	UART		COM1	Connected	1	Pass-Through	EDIT	DELET	E
SNMP Service	AD	D									
VPN Configuration >											
System Management >	Serial	Configuration									
Logout		Interface	Speed	Data Bit	Stop Bit	Par	ity	Flow Control			
		COM1	9600	8	1	No	ne	None		EDIT	
									SAVE &	APPLY	RESET

System Status >	Image: wide of the state of the s	Tab operation •
Basic Network >	Ceneral Collection Advance	
Advanced Network 🗸		
QoS	UART_DEV	
DMZ	Enabled 💟	
Firewall	Name UART_DEV	
Port Forwards	Working Mode Modbus RTU Master	
Static NAT		
Smartlink		
M2M Platform	Device Name COM1	
Network Monitor	Slave ID 1	
Link Control	Acceptable Values: 0~255	
Dynamic DNS	Response Timeout 1500	
SNMP Service	msec	
VPN Configuration >	Byte Timeout 60	
System Management >	msec	
Logout	Moadus Debug	
	BACK TO OVERVIEW SAVE & AP	PLY RESET

			-		burner with it has							
System Status		44	Overview ×	Smartlink 🗙	Wired Network 🛪						₩	Tab operation
Basic Network												
Advanced Network			Mode Confi	guration								
QoS			Enabled		Uplink Device		Down	link Device				
DMZ			√		Cloud		UA	RT_DEV		EDIT	DELE	TE
Firewall			ADD									
Port Forwards												
Static NAT												
Smartlink			Connection	Configuration	Working Mode	Taraat Addrase	Statue	Conne	Protocol			
M2M Platform			Liabled	Cloud	TCR Client	102 169 1 226-20000	Disconnect	O	Pace Through	FDIT	DEL	-15
Network Monitor			v	cioud	TOP Glient	192.100.1.200.20000	Disconnect	U	rass-mougn	LDIT	DEL	
Link Control			V	UART_DEV	UART	COM1	Connected	1	Pass-Through	EDIT	DELI	ETE
Dynamic DNS			ADD									
SNMP Service		-										
VPN Configuration			Serial Confi	guration								
System Managemei	nt>		Interf	ace	Speed	Data Bit Stop I	Bit Par	ity	Flow Control		_	1
Logout			CON	A1	115200	8 1	No	ne	None		EDIT	
										- T	_	J
	0											
System Status	*	41	Overview 🛪	Smartlink x	Wired Network 🗙						₩	Tab operation
Basic Network	>											
Advanced Network	•		General Co	llection Adv	ance							
QoS			COM1									
DMZ					Speed	9600	~					
Firewall					Data Bit	8	~					
Port Forwards					Ctop Bit							
Static NAT					этор вн	1	~					
Smartlink					Parity	None	~					
M2M Platform					Flow Control	None	~					
Network Monitor					Enable Frame							
Link Control					Frame Interval	60						
Dynamic DNS						msec						
					Frame Length	1460						

5.3 to Set serial port parameters for RS485/232 device, such as baud rate, data bit, and parity bit.

bytes

SAVE & APPLY

RESET

VPN Configuration >
System Management >

Logout

BACK TO OVERVIEW

5.4. All configuration finished as following.

System Status	> 4	Overview 🗙	Smartlink 🗙	Wired Network 🗙						₩ T	ab operatio
Basic Network	•										
Advanced Network	~	General C	ollection Ad	vance							
QoS		Mode Confi	guration								
DMZ		Enabled		Uplink Device		Downlink	Device				
Firewall		√		Cloud		UART	DEV		EDIT	DELETE	
Port Forwards		ADD									
Static NAT											
Smartlink											
M2M Platform		Connection	Configuration	Westing Meda	Torrest Address	Chatria	C	Destand			
Network Monitor		Enabled	Cloud	Modhus TCR Slave	20001	Listening	Conns	Modbus TCR	EDIT	DELETE	
Link Control		v	Cioda	Moubus TCP Slave	30001	Listening	0	moubus rep	EDIT	DELETE	
Dynamic DNS		~	UART_DEV	Modbus RTU Master	COM1	Connected	1	Modbus RTU	EDIT	DELETE	
SNMP Service		ADD									
VPN Configuration	>										
System Management		Serial Confi	guration								
Logout		Interf	ace	Speed Data Bit	Stop Bit	Parity		Flow Control			
		COM	11	9600 8	1	None		None		EDIT	
									11 - 12 - 14 - 14 - 14 - 14 - 14 - 14 -		
									1000		

6. Start to test Modbus RTU to TCP communication progress.

6.1 Run the ModSim32.exe tool (to simulate a RS485 RTU device) and ModScan32.exe tool (to simulate a Server tool supporting Modbus TCP protocol) on the computer at the same time;



of the view the composition of the converter of the re-	(0011	1101	
example). 書 设备管理器	-		×
文件(E) 操作(A) 查看(V) 帮助(H)			
~ 📇 mc007			^
> 🧝 IDE ATA/ATAPI 控制器			
> 🏺 USB 连接器管理器			
> 🔐 安全设备			
> □ 处理器			
》 磁盘驱动器			
○ Saa 存储控制器			
> 同 打印队列			
> 🦢 电池			
→ 員端口(COM和LPT)			
USB Serial Port (COM4)			
加 家功能活动哭			

Then to to configure parameters for ModSim tool: to select Port4 and check all serial port parameters as below.

atii ModSim32 - ModSim1		- 🗆 X
<u>File</u> <u>Connection</u> <u>D</u> isplay <u>V</u>	<u>V</u> indow <u>H</u> elp	
Connect > Disconnect > Address: 0001 Length: 10 40001: <00000> 40002: <00000> 40003: <00000> 40005: <00000> 40006: <00000> 40007: <00000> 40008: <00000> 40009: <00000> 40010: <00000>	Port <u>1</u> Port <u>2</u> Port <u>3</u> Port <u>5</u> Port <u>6</u> Port <u>7</u> Port <u>8</u> Port <u>9</u> <u>M</u> odbus/TCP Svr	

6.1 firstly to View the comport created by the USB-RS485 converter on the PC (com4 for

The ModSim32 - ModSim1 <u>File Connection Display Window H</u> elp	X
Address: 0001 Device Id: Address: 0001 03: HOLDING R Length: 10	1 Setup Comm Port 4 ×
40001: <00000> 40002: <00000> 40003: <00000> 40005: <00000> 40006: <00000> 40007: <00000> 40008: <00000> 40008: <00000> 40010: <00000>	Baud Data Stop Parity NONE Hardware Flow Control Wait for DTR from Master Delay 0 ms after RTS before transmitting first Wait for CTS from Mas Delay 0 ms after last character before OK Cancel

6.2 Secondly, to configure ModScan tool: to select 'Remote TCP/IP Server '(working as Modbus client mode) and set IP address and port keeping same as LAN address of 4G Router.

ModScan32 -	ModSca1	Conr etails	nect		- □ ×
	Connect	Remote TCF	/IP Server		_
Address: 0	Configurati	IP So	Address: ervice	192. 168. 1. 1 30001	IP of Router
Length: 1	C Baud Word Parit	9600 8 NONE	Y Y Y	Hardware Flo Wait fo Delay 0 Wait fo Delay 0	w Control r DSR from sl ms after RTS before transmitting first r CTS from sla ms after last
Devic 00001: 00002: 00003: 00004: 00005: 00006:	Stop 0>]1	ro	tocol Selection	1

6.3 Finally, data flows sending and receiving testing were conducted between the two tools as follows. 2 different Modbus Function code demos(code 3 and code 1) are shown as below.

ti ModSim32-ModSim1 — □ × Ele <u>Connection Display Window H</u> elp	ModScan32 - ModSca1 Ele <u>Connection</u> <u>Setup</u> <u>View</u> <u>Window</u> <u>Help</u>	- 🗆 ×
WodSim1 Device Id: 1 Address: 0001 03: HOLDING REGISTER 40001: <00000> Write Register Address: 00001: <00000> Value: 00002: <00366> Value: 00000	Address: 0001 Device Id: 1 MODBUS Point Type Length: 10 03: HOLDING REGISTER ▼	of Polls: 46 ave Responses: 46 Reset Ctrs
40007: (00000) 40008: (00000) 40009: (00000) 40010: (00000) 40010: (00000)	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	

atii ModSim32 - ModSim1	- 🗆 X	ModScan32 - ModSc	a1			-		×
<u>File Connection Display Window Help</u>		File Connection Setup	<u>View Window H</u> e	Р				
- ModSim1			SQ 8 8 19					
Device Id: 1			6A 68					
Address: Length: 0001 MODBUS Point Type 03: HOLDING REGISTER •		ModSca1						×)
		Address: 0001	Device Id: MODBUS Pe	1 int Type	Number of Po Valid Slave F	olls: 126 Jesponse	s: 126	
40001: (00000>		Length: 10	03: HOLDING RE	GISTER 💌		Rese	et Ctrs	
40002: (09999) 40004: (09000)								
40005: (03293) 40006: (00000) 40007: (00333) 40008: (0000)		40001: < 0 40002: < 366 40003: < 9999)> 40007: 3> 40008: 40009:	< 333> < 0>	l L			
to read dat	as well	40004: < 0 40005: < 3299 40006: < 0	>> 40010: >>	< 0>				
		For Help, press F1			Polls: 127	Resp	s: 126	_

dji ModSim32 - ModSim1	- 🗆 X	■ ModScan32 - ModSca1 - □ >
<u>File</u> <u>Connection</u> <u>Display</u> <u>Window</u> <u>H</u> elp		<u>File Connection Setup View Window Help</u>
Ble connection Display Window Help ModSim Address: D001 Device Id: 1 MODBUS Point Type U1: COIL STATUS 00001: (1) 000005: (1) to write day 00005: (1) to read datas w	tas well	Ele connecton setup View Window Help Image: State of the setup of the
		For Halo press F1 Poller 15 Respect 14

6.4. Additional note: View serial port data logs.

Enable the log debug button on the Smartlink webpage. You can click download to get a *.tar log file and decompress it to view the details of the raw HEX datas from Modbus RTU device and Modbus TCP Master.

System Status 🛛 😽 📢	Overview x Smartlink x Wired Network x		➡ Tab operation ▼
Basic Network			
	General Collection Advance		
Advanced Network ~			
QoS	Advanced Configuration		
DMZ	Enable		
Firewall	Debug		
Port Forwards			
Static NAT	TCP Keepalive Idle Time	60	
Smartlink		sec	
M2M Distform	TCP Keepalive Interval	3	
		sec	
Network Monitor	TCP Max keepalive Probe	3	
Link Control	Log File Num	2	
Dynamic DNS	Loa File Size	200	
SNMP Service		KB	
VPN Configuration >	Log Priority	Info 🖌	
System Management >			
Lonout	Log File	DOWNLOAD	
Logour			
		SAVE & A	PPLY RESET
ny work > TR069-IR4000 > smartlink > var > 1	log > smartlink	✓ ひ ○ 在 smartlink 中搜索	
▲ 名称	修改日期 类型	大小	^
E smartink.log		besk revultEV detec between seriel Device and	
~	Server	neck raw HEX datas between serial Device and	
492 [2022-11-28 20:40:32 305991]	INFO smartlink[14866]libcomm-1.1.0/mybase.	55(PrintHex): CMBusCtxt send or write: [00 02 00 00 04 01 01 01 17]	5
493 494 [2022-11-28 20:40:33 216112]	INFO smartlink[14866]libcomm-1.1.0/mybase.cp	p:65(PrintHex): modbus receive: [01 02 00 00 00 06 01 01 00 00 00 05]	_ ۲
496 [2022-11-28 20:40:33 21/340] 496 [2022-11-28 20:40:33 306928] 497 [2022-11-28 20:40:33 308036]	INFO smartlink[14866]libcomm-1.1.0/mybase.cp INFO smartlink[14866]libcomm-1.1.0/mybase.cp INFO smartlink[14866]libcomm-1.1.0/mybase.cp	p:65(PrintHex): modbus_send_raw_request; [01 01 00 00 00 05] p:65(PrintHex): modbus_receive_confirmation: [01 01 01 01 17 11 06] p:65(PrintHex): CMBusCtxt send or write: [01 02 00 00 00 04 01 01 01 17]	
498 499 [2022-11-28 20:40:34 216137]	INFO smartlink[14866]libcomm-1.1.0/mybase.cp	p:65(PrintHex): modbus receive: [02 02 00 00 00 06 01 01 00 00 00 05]	-
501 [2022-11-28 20:40:34 290800] 502 [2022-11-28 20:40:34 290901]	INFO smartlink[14866]libcomm-1.1.0/mybase.cp INFO smartlink[14866]libcomm-1.1.0/mybase.cp INFO smartlink[14866]libcomm-1.1.0/mybase.cp	p:65(PrintHex): modulos receive confirmation: [01 01 01 11 71 186] p:65(PrintHex): cMBusCtxt send or write: [02 02 00 00 00 04 01 01 01 17]	
2 503 504 [2022-11-28 20:40:35 217337] 505 [2022-11-28 20:40:35 218466]	INFO smartlink[14866]libcomm-1.1.0/mybase.cp	p:65(PrintHex): modbus_receive: [03 02 00 00 00 06 01 01 00 00 00 05]	1
506 [2022-11-28 20:40:35 304750] 507 [2022-11-28 20:40:35 305775]	INFO smartlink[14866]libcomm-1.1.0/mybase.cp INFO smartlink[14866]libcomm-1.1.0/mybase.cp	p:65(PrintHex): modbus_receive_confirmation: [01 01 01 17 11 06] p:65(PrintHex): CMBusCtxt_send_or_write: [03 02 00 00 00 04 01 01 01 17]	
<pre>508 509 [2022-11-28 20:40:36 216499] 510 [2022-11-28 20:40:36 217633]</pre>	INFO smartlink[14866]libcomm-1.1.0/mybase.cpp INFO smartlink[14866]libcomm-1.1.0/mybase.cpp	p:65(PrintHex): modbus_receive: [04 02 00 00 00 06 01 01 00 00 00 05] p:65(PrintHex): modbus send raw request: [01 01 00 00 00 05]	-
511 [2022-11-28 20:40:36 290887] 512 [2022-11-28 20:40:36 291913]	INFO smartlink[14866]libcomm-1.1.0/mybase.cp INFO smartlink[14866]libcomm-1.1.0/mybase.cp	p:65(PrintHex): modbus receive confirmation: [01 01 01 17 11 06] p:65(PrintHex): CMBusCtxt send or write: [04 02 00 00 00 04 01 01 01 17]	