

RS232 Serial to Ethernet convert Module

USR-TCP232-T Hard Version: V2.0 Doc Version: V1.1 2011-08-16



Jinan USR IOT Technology Co., Ltd. works on LAN and WAN and wireless for MCU to Ethernet Solutions, Ethernet, WIFI, GPRS, Zigbee and Wireless modules, we can supply custom design for those usage, looking forward to cooperate with you.



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1. Introduction

1.1 Overview

The USR-TCP232-T is an intelligent plug-and-play RS232 to Ethernet adapter that enables any device or machine with a serial port, to become Ethernet network and Internet enabled. Go from Ethernet to serial with the USR-TCP232-T. It features a powerful built-in device server, so you can access your serial device from anywhere in the world over internet! The USR-TCP232-T is easily configured via Ethernet, and can also be set up through the serial port.

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1.2 Features

- Auto detected 10/100M High speed Ethernet
- AUTO MDI/MDIX, Use crossover cable or parallel cable connection
- Baud rate 300 ~ 25600 bps
- TCP Server, TCP Client, UDP client , UDP server
- Can work as Virtual COM
- Auto reconnect TCP connection
- Socket program reference
- Free setup software and setup Agreement available
- Agreement: ETHERNET, ARP, IP, UDP, TCP
- 3.3V and 5V two power input interface
- OEM and custom versions available

1.3 Applications

- Fire and Security Panels
- Vending Machines
- Point of Sale Terminals
- Remote equipment management
- IT management services
- Access Control
- Industrial Control
- Home Automation
- Instrumentation
- Building Control
- Power Management



1.4 Order information

Туре	Part Numbers	Electric interface
Serial to Ethernet Adapter	USR-TCP232-T	TTL
Serial to Ethernet Adapter	USR-TCP232-4	RS485
Serial to Ethernet Adapter	USR-TCP232-2	RS232
Serial to Ethernet Adapter	USR-TCP232-24	RS232/RS485 choose by jumper
Serial to Ethernet Adapter	USR-TCP232-D	DIP module in TTL version, without RJ45 on board.

Modbus, Ethernet/IP and Encrypted Versions are also available

1.5 Electrical Characteristics

DC Power Supply Voltage: Two DC Voltage can be choose VCC: type: 3.3V, min: 3.15, max: 3.45 V VDD: type: 5V, min: 4.5V, max: 5.5V Operating supply current : Max: 180 MA Operating Temperature: 0~75 °C (business version) -25-80°C (industry version) Storage temperature: -40~85 °C



2. Work Mode

2.1 Block diagram



2.2 TCP Client Mode





2.3 UDP client mode



2.4 UDP server Mode

Like the socket UDP server in pc API. Many to one data transfer supported, the data from uart/232/485 part will be transformed to the last UDP packet's address.







2.5 TCP server Mode





3. Hardware Description

3.1 LED status

There is two leds in RJ45 connector, one is green, and the other is yellow.

LED	name	description
green	Link state	Light when 100Mbps network linked
yellow	Data transfer	Blink when there is data in or out

3.2 Pin description

pin	name	description
VDD	Power 1	4.5~5.5V
VCC	Power 2	3.3V
GND	GND	Power and Communications Ground
RST	Reset pin	200ms GND reset the module
TXD	UART transmission pin	5v tolerance
RXD	UART receive pin	5v tolerance
CFG	Configure pin	Configure mode when this pin GND, normal mode when VCC or idle

3.3 Connection Diagram





3.4 Package

Unit: mm,



Allegro / protel / pads / CAM PCF files available for your project design.



4. Configure

parameters: work mode, source IP, source port, net mask, gateway, UART baud rate, destination IP, destination port.

Configure command is 24byte length.

Pull down CFG pin change the module into configuration mode when use UART to config.

4.1 configure command format

part	bytes	description	example	hex
prefix	2	0x55 0xAA	0x55 0xAA	0x55 0xAA
destination IP	4	destination IP	192.168.0.20 1	0xC9 0x00 0xA8 0xC0
destination port	2	Destination port	8234	0x2A 0x20
Host IP	4	The IP module hold	192.168.0.7	0x07 0x00 0xA8 0xC0
Host port	2	TCP/UDP source port	20108	0x8C 0x4E
Gateway	4	Gateway IP	192.168.0.20 1	0xC9 0x00 0xA8 0xC0
Work mode	1	0x01: TCP Client 0x00: UDP 0x02: UDP Server	TCP mode	0x01
baud rate	3	UART baud rate	115200	0x00 0xC2 0x01
Reserved	1	Reserved	00	0x00
checksum	1	Sum(destination IP, destination port, host IP, host port, gateway, work mode, baud rate, reserved)	0xB9	0xB9
Full example: 00 A8 C0 2A 20 07 00 A8 C0 8C 4E C9 00 A8 C0 01 00 C2 01 00 B9				

Configure mode UART interface: 9600bps,n,8,1

* once in configure mode, the UART parameter change to 9600bps,n,8,1, and a 'U' ascii character is send out to ensure the control MCU that in the configure mode. If the 24byte command has effect, a 'K' ascii character is send back to control MCU. If configure command format error, an 'E' character will be send back to control MCU. If the error is the checksum not match, the 1byte right checksum will be send back to control MCU also.



4.2 configure through rs232

- 1. Power on module, and connect CFG to GND, make module to setup status.
- 2. Write settings and click Setup.
- 3. After Setting, left CFG free or connect to VCC, module begin work.
- 4. The save and Default button would useful for you.

Note: the module RS232 is TTL lever, you need a RS232 to TTL convert to connect it to you PC.

🐑 USR-TCP-232 setup			
Work mode: • TCP	Client C WDP C WDP Server (?)		
Module IP:	192.168.0.7		
Subnet mask:	255. 255. 255. 0		
Default Gateway:	192.168.0.201 (?)		
Baud Rate(bps):	115200		
Module port:	20108		
Destination IP:	192.168.0.201		
Destination Port:	8234		
(hex) Module MAC:	00-01-02-03-04-05 (?)		
COM port: 1	Save Default Setup		
Information 1. Power on module, and connect CFG to GND, make module to setup status.			
2. Write settings and click Setup.			
 After Setting, left CFG free or connect to VCC, module begin work. 			
4. The save and Default button would useful for you.			
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4.3 Configure through RJ45

Since 2011-08-02, the new version modules support Setup via RJ45. Click search, find modules, choose the module, fill configration at left frame and then click Setup via RJ45.

💮 USR-TCP-232 setup		
_Setup via RS232		Setup via ethernet
Work mode:	TCP Client (?)	Please make sure your module support setup via Ethernet
Module IP:	192.168.0.7	Click search, find modules,
Subnet mask:	255. 255. 255. 0	choose the module, fill configration at left frame and
Default Gateway:	192.168.0.201 (?)	() then click Setup via RJ45.
Baud Rate(bps):	115200	Search Setup via RJ45
Module port:	20108	Module IP : MAC address 192 168 0 7 : 00420B0112PD
Destination IP:	192.168.0.201	
Destination Port:	8234	
(hex) Module MAC:	00-01-02-03-04-05 (?)	20
COM port: 1	Save Default Setup	
Information		
Search modules in LAN. Find 1 modules		



5. Test Methods

5.1 General Test

Default setup is as below picture.

USE-TCP-232 setup				
Work mode: 💽 TCP	Client 🔿 WDP 🛛 WDP Server (?)			
Module IP:	192.168.0.7			
Subnet mask:	255. 255. 255. 0			
Default Gateway:	192.168.0.201 (?)			
Baud Rate(bps):	115200			
Module port:	20108			
Destination IP:	192.168.0.201			
Destination Port:	8234			
(hex) Module MAC:	00-01-02-03-04-05 (?)			
COM port: 1 Save Default Setup				
Information				
 Power on module, and connect CFG to GND, make module to setup status. 				
2. Write settings and click Setup.				
 After Setting, left CFG free or connect to VCC, module begin work. 				
4. The save and Default button would useful for you.				
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Test:

1. material: pc with rs232(or use USB to rs232 cable), 3.3V or 5V power, rs232 cable, Network Cable, COM debug software, TCPIP debug software(in CD, also can be download).

2. Connection: connect module rs232 to pc rs232, RJ45 to pc RJ45 or the same router (same subnet).

Notice : USE TTL to USB convert or TTL to RS232 convert

- 3. Power on the module 3.3V on VCC or 5V on VDD.
- 3. Setup PC IP to 192.168.0.201.
- 4. PING 192.168.0.7 (it is optional action)



C:\TIMDOTS\system32\ping.exe	_ 🗆 🗵
Pinging 192.168.0.7 with 32 bytes of data:	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128	
	•
	• //
7	



USR-TCP232-Test.exe

4. open the follow picture.

software in CD, TCP server, listen port 8234, TCP server as



😔 USR-TCP232-Test RS	232 to Ethernet Convert tester				
File (P) Options (D) Help (H)					
File (F) Options (U) Help COMSettings PortNum COM4 V BaudR 115200 V DPaity NONE V DataB 8 bit V StopB 1 bit V	> 0£) COM port data receive	Network data receive	NetSettings (1) Protocol TCP Server (2) Local host IP 192.168.0 .201 (3) Local host port 8234 Listening		
Recv Options Receive to file Add line return Receive As HEX Receive Pause Save Clear			Recv Options Receive to file Add line return Receive As HEX Receive Pause Save Clear		
Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle			Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle		
Interval 100 ms Load Clear	Jinan USR Technology Co. , Send Ltd.	http://en.usr.cn Send	Interval 1000 ms Load Clear		
🕼 Ready! S	end:0 Recv:0 Reset	💣 Ready! Send:O	Recv:0 Reset		

Click Listening, Open COM port.

The module will connect to the server and show the module IP and port.

💮 USB-TCP232-Test BS232 to Ethernet Convert tester		
File (F) Options (D) Help (H)		
COMSettings COM port data receive	Network data receive	NetSettings
PortNum COM4		(1) Protocol
BaudB 115200 💌		TCP Server
DPaity NONE		(2) Local host IP 192,168, 0, 201
DataB 8 bit 💌		(2) Levelheit aut
StopB 1 bit		8234
· Close		🔆 Disconnect
Recv Options		Recv Options
E Receive to file		🔲 Receive to file
🔽 Add line return		🔲 Add line return
Receive As HEX		🔽 Receive As HEX
TReceive Pause		🔲 Receive Pause
Save Clear		<u>Save</u> <u>Clear</u>
Send Options		Send Options
🔽 Data from file		🔲 Data from file
🔽 Auto Checksum		🔲 Auto Checksum
🔽 Auto Clear Input		🗌 Auto Clear Input
Send As Hex		🗌 Send As Hex
Send Recycle	Paers: 192.168.0.7:20108 💌 🔪	🔲 Send Recycle
Interval 100 ms	http://en.usr.cn	Interval 1000 ms
Load Clear Technology Co., Send Ltd.	Send	Load Clear
If Ready! Send: 0 Recv: 0 Reset	🝠 Ready! Send: O	Recv:0 Reset

5. Now you can transfer data from PC RS232 to Ethernet.

You can use other TCP UDP test software and COM port test software as you like.



💮 USB-TCP232-Test BS232 to Ethernet Convert tester				
File(F) Options(0) Help) (H)			
COMSettings	COM port data receive	Network data receive	NetSettings	
PortNum COM4	http://en.usr.cnhttp://en.usr.cnhttp://en.u	[Receive from 192.168.0.7 : 20108] :	(1) Protocol	
115200	sr. cnhttp://en.usr. cnhttp://en.usr. cnhttp:/	Jinan USR Technology Co., Ltd. Jinan USR	TCP Server 💌	
BaudR 115200	/en.usr.cnhttp://en.usr.cn	Technology Co., Ltd. Jinan USR Technology	(2) LevelbertyID	
DPaity NONE 💌		Co., Ltd.		
David Shit			192.168. 0 .201	
			(3) Local host port	
StopB 1 bit 💌			8234	
l la				
Ulose			Disconnect	
Kecv Uptions			Kecv Uptions	
Receive to file			Receive to file	
🔲 Add line return			🗌 Add line return	
🔲 Receive As HEX			🦳 Receive As HEX	
🔽 Receive Pause			🔲 Receive Pause	
Sava Clear			Save Clear	
<u>bure</u>				
Send Options			Send Options	
Data from file			Data from file	
Auto Checksum			Auto Checksum	
Auto Clear Input			Auto Clear Input	
Send As Hex			Send As Hey	
Sand Recycle			Sand Recycle	
j bend netytre		Peers: 192.168.0.7:20108	- Send necycre	
Interval 100 ms	Jinan USR Technology Co., Ltd.	http://en.usr.cn	Interval 1000 ms	
Load Clear	Send	Send	Load Clear	
🍯 Ready!	Send: 90 Recv: 112 Reset	💓 Ready! Send:112	Recv : 90 Reset	



5.2 virtual COM

Single-port TCP/IP - serial bridge (RFC 2217)

VSR-TCP-232 setup				
Work mode: 💿 TCP	Client C WDP C WDP Server (?)			
Module IP:	192.168.0.7			
Subnet mask: 255.255.255.0				
Default Gateway:	192.168.0.201 (?)			
Baud Rate(bps): 115200				
Module port:	20108			
Destination IP:	192.168.0.201			
Destination Port:	8234			
(hex) Module MAC:	00-01-02-03-04-05 (?)			
COM port: 1	Save Default Setup			
Information 1. Power on module, and connect CFG to GND, make module to setup status. 2. Write settings and click Setup. 3. After Setting, left CFG free or connect to VCC, module begin work. 4. The save and Default button would useful for you. www.usr.cn 2011-05-06 V2.1				

- 1. setup the module
- 2. Install VSPM



3. Open VSPM,

Initibs Semiconductors	
🚞 Cayee COM-Redirector	COM-Redirector
🛅 光影魔术手	▶ 💓 位置: D:\Program Files\Cayee\COM-Redirector
🛅 Inno Setup 5	🕨 🕅 Virtual Port Bus Reset Utility
i Mozilla Firefox	
Add virtual COM.	

File	Window	Tools	Help
New	r	Ctrl+	N
Ope	en	Ctrl+	0
<u>C</u> lo	se		
Sav	/e	Ctrl+	s

4. Setup as the follow pictures, you need to notice COM port, bond rate and work mode of PC, then click **Activate**.

Magnew - Serial to TCP/IP				
Serial Port Connector Baud Rate Data Bits Stop Bits Flow Control Buffer Size: Buffer Size: Buffer data if TCP/IP port closed Wait for timeout before transmit Timeout value (ms): 150	 TCP/IP Port PC act as TCP Client PC act as TCP Server Local P Address 192.168.0.201 Local Rort 8234 Use UDP instead of TCP/IP I/O Options 			
Activate				
COM Status:				

5. After Activate click, a Virtual COM port COM2, will be created, COM2 will receive data from TCPIP socket, and send data to COM2 will convert to TCPIP socket data to remote Equipment.

If create failed, please notice to see error notice and log, when use Virtual COM Port, you should close other software who use the same TCPIP port.

The success picture as follow:



Con-Red	×
<u>F</u> ile <u>W</u> indow <u>T</u> ools <u>M</u> elp	
Com-Red File Window Tools Melp File Window Tools Melp Serial Port Connector COM2 Baud Rate 115200 Baid Rate 115200 PC act as TOP Client PC act as TOP Server Local IP Address 192.168.0.201 Baifer Size: 8192 Create Virtual COM port Buffer data if TCP/IP port closed IVD Options Val for timeout before transmit Timeout value (ms): DeeActivate	○ ○
Virtual Port CDM2 created	田 ◇ 多功能卡

At this point, you can use your equipment as an ordinary serial port, and operate of local virtual serial port will converted to operation of the remote module RS232. The figure is show send data between the two serial port.



😂 USR-TCP232-Test BS23	2 to Ethernet Convert tester			
File(F) Options(0) Help(H	D.	💮 USE-TCP232-Test ES2	32 to Ethernet Convert tester	
COMSettings	COM port data receive	File(F) Options(0) Help	Œ	
PortNum COM2 -	Jinan USR Technology Co., Ltd.se	COMSettings	COM port data receive	Network data receive
D ID 115200 V	real com portsend from real com	PortNum COM4 💌	Jinan USR Technology Co., Ltd. send from	
Baudr 113200	send from real com port	RoudR 115200 ▼	Virtual com portsend from Virtual com port	
DPaity NONE	send from real com port		send from Virtual com port	
DataB 8 bit 🔻	send from real com port	DPaity NONE 💌	send from Virtual com port	
		DataB 8 bit 💌	send from Virtual com port	
StopB Dic		StopB 1 bit		
💓 Close				
-Rear Ontions		• Close		
Receive to file		Recv Options		
Add line return		Receive to file		
		Add line return		
		Beceive As HEX		
j Necelve Fause		E Receive Pause		
<u>Save</u> <u>Clear</u>				
Send Options		<u>Save</u> <u>Clear</u>		
🗖 Data from file		Send Options		
🗍 Auto Checksum		🔲 Data from file		
🗖 Auto Clear Input		🔲 Auto Checksum		
🗖 Send As Hex		🔲 Auto Clear Input		
🔽 Send Recycle		🔲 Send As Hex		
Taterral 1000 pc		🔲 Send Recycle		
Interval 1000 ms	send from Virtual com port	Interval 1000 ms		
Load Llear		Lood Clear	send from real com port	http://en.usr.cn
	Send: 186 Beou: 145	Load Crear	Stild	
L∰ Keady!	36h3,100 H66V,143	🍯 Ready!	Send:145 Recv:186 Reset	🍯 Ready!

Test 100ms recycle send, send and receive 10,0000 bytes, every thing is ok.

Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle	Gend Ha hex Send Recycle Interval 100 ms Load Clear ∭ Ready!	send from real com port Send Send: 114156 Recv: 128860 Reset
Interval 100 ms Load Clear	send from Virtual com port Send: 128860 Becy: 114156 Be	d http://en.usr.cn Send



6. Apps

6.1 COM<->TCP/UDP<->server



6.2 Virtual COM

Install VSPM software. The COM like installed in the pc.





6.3 COM <-> TCP/UDP <-> COM



6.4 many COM <-> UDP server <-> COM



When the UDP server COM transfer data to one of the many COM, the last COM that transferred data will be



choose.

6.5 COM<-> TCP/UDP<->proxy server <->TCP/UDP<->COM

You can use a proxy server to treat the data form one module to other, or just use you MCU to control the module IP and destination IP Real-time. The method is pull CFG PIN to GND, and send the new configuration data, then pull CFG pin to VCC to use new settings.





6.6 COM <-> TCP/UDP <-> server





7. Background Knowledge

7.1 socket program example

TCP client UDP Mode For VB, VC, OCX, Linux

辑(22) 视图(Y) 工程(22) 格式(2) 调试(22) 运行(23)	查询(U) 图表(I)	工具(I) 外接程序	F(A) 窗口	(W) 帮助(H)
🖥 🖬 👗 階 亀 桷 🗠 斗 🔳 🔳	¥ 🖻 🖻 ¥ 🛠		0, 0	<u>∓</u> ∰ 3915 x 36
		▼ KeyPress		
plicit			-	
sub Form_L sg As Str IP Address	1	×		udpServer
: "Enter t. .ient.Remo Enter the IP address of the server	确定	1		4
hpClient.R jent Remo	取消			CX CSellu
if		1		
.Tent. Keno				
Sub Form_U		-		1
.ient.Close				txtOutput
Sub_udpClient_DataArrival(ByVal_bytesTotal_As_Log			_	
ror Resume Next	TCP Server	TCP Client		
R tenServer				
	WDP Server	VDP Client		
1				
txtSend				
	www.	usr.cn		
3				- 🗆 ×
127.0.0.1:1886 connected	txtSend			
	I			
	127.0.0.1	3456 connected		
;c11 = 0				
.ient. SendData txtSend. Text itput. Text = txtOutput. Text & "Sent: " & txtSend. T	ext &			
itput. SelStart = Len(txtOutput. Text) and. Text = ""				
.1. Caption = "udpClient. State =" & udpClient. State				
状态常数 (如Winsock1. State)				
ad U. 本内还态				

You can use Winsock.ocx for your project program.

If needed, we can help you on work for this, only a little cost needed.



8. Contact us

Company: Jinan USR IOT Technology Co., Ltd Address: 1-523, Huizhan Guoji Cheng, Gaoxin Qu, Jinan, Shandong, China Tel: 86-531-55507297 86-531-88826739-803 Web: www.tcp232.net

9. Doc History

Version 1.0 2011-05-26 Version 1.1 2011-08-16 Add TCP Server mode, Add set via RJ45, modify virtual COM