Ethernet Option

A Serial to Ethernet Module is used to provide the Ethernet communications capability. The light source Microprocessor Option is required to support this option. The jumper settings on the Microprocessor Option are set to Ethernet, RS-232, RS-232 when the Ethernet Option is provided.

When the Ethernet Module is attached to the microprocessor board, the microprocessor communicates with the Ethernet Module in serial RS-232 format except that the signal levels and phases are TTL.

The Serial to Ethernet Module used is USR-TCP232-T.

Visit <u>https://www.usriot.com</u>, go to the download section for the module. Download and save the program USR-MO-V2.2.4.288 or the latest available version (*it will be referred to as "Setup Program" in this document*).

Also down load and save the program USR-TCP232-TestV1.4 (it will be referred to as "Test Program" in this document).

FTI LO-35 series light sources equipped with Ethernet are shipped configured as follows:

Operation Mode: TCP Client

Module I.P.: 192.168.0.7

Subnet mask: 255.255.255.0

Default Gateway: 0.0.0.0

Baud Rate 9600

Parity / Data / Stop: None / 8 / 1

Module Port: 20108

Destination I.P.: 192.168.0.15 (For host PC)

Destination Port: 8234 (For host PC)

First determine what the PC (Host IP and Host port is and what the protocol is) and reset as required to match above last two entries.



To configure the light source, attach the Ethernet port of the light source to the Ethernet port of the PC. At this point a direct connection using a cross over cable or straight cable can be made (the module is equipped with auto cable type sensing). A switch with straight cables may be used as well, just the PC and light source on the switch for now. Apply power to the light source and run the Setup Program. Click the Search Device Button and you will see a screen similar to the one below.

| 🔮 USR-M0 V2.2.4.288 | | | | | | |
|---------------------|--|-----------------------------------|----------------------|------------|--|--|
| ile | Language Help | | | | | |
| | 0 | re- LANI | | | | |
| | Operate | | Operate Via C | COM | | |
| | Device IP | Device Name | MAC | Version | | |
| | 192.168.0.7 | USR-TCP232-T2 | D8 B0 4C BADD 94 | 4015 | | |
| | | | | | | |
| | | 🔍 Searc | h Device | | | |
| | | | | | | |
| | Data has been | sent | | - | | |
| | Data has been Data has been Click device o | sent sent an read the nerve | etera right-click | E Devri ce | | |
| | list show more | an reau the para | wetters, right-click | - Device - | | |
| | Operatio | on Log | Hex Stream | IS | | |
| | | | | | | |



The Operate Via LAN tab is the only tab that will be used for this discussion.

Clicking on the Device will show the following screen.

| 🙆 US | SR-M0 V2.2.4.288 | 3 | | |
|------|---|---|---------------------|----------|
| File | Language He | lp | | |
| | Op | erate Via LAN | Operate Via CC | MC |
| | Device IP | Device Name | MAC | Version |
| | 192.168.0.7 | USR-TCP232-T2 | D8 B0 4C BADD 94 | 4015 |
| | | Jser config | Exxxx Cancel | |
| | Data has b Data has b Data has b Click devic | been sent been sent been sent ce can read the para | meters, right-click | Device - |
| | Oţ | peration Log | Hex Streams | |
| | | | | |



The default user name and password are both admin. Enter these and click OK, the screen will expand to look like the one shown below.

| Ope | rate Via LAN | Operate Via (| СОМ | Base Param (which is v | without jī, usually keep defa | ault) | | - |
|--------------------------|----------------------|---------------------|----------|------------------------|-------------------------------|-------------|------------|---|
| | | | | IP Туре _і ї | Static IP - | HTTP Port | 80 | |
| Device IP | Device Name | MAC | Version | ModuleStaticIP ji | 192.168.0.7 | User Name | admin | |
| 192.168.0.7 | USR-TCP232-T2 | D8 B0 4C BADD 94 | 4015 | SubnetMask ii | 255.255.255.0 | D di Name | a dura in | |
| | | | | Gateway ii | 0000 | Password | admin | |
| | | | | DNC Address | 200 67 222 222 | Device Name | USR-TCP2 | E |
| | | | | DINS Address | | | Index | |
| | | | | User MAC | D8 B0 4C BA DD 94 | | Reset | |
| | | | | Reset Timeout(s) |) 0 | | Link | |
| | | | | Clear Buffer | r Data Before Connected | | RFC2217 | |
| | Q Sear | h Device | | UART Set P | Parameter | | | |
| | 00000 | | | Port Param | | | | |
| | | | | Parity/Data/Stop | NONE • 8 • 1 • | Baudra | ate 9600 🔻 | |
| | | | | Module work mode | TCP Client - | Local P | ort 20108 | |
| | | | | RemotelP | 192.168.0.15 | Remote P | ort 8234 | |
| Data has b | een sent | | <u>^</u> | Short Connection time | 0 | | m 4 👻 | |
| Data has b Data has b | een sent een sent | | = | Short Connection time | | | | |
| Click devic | e can read the para | meters, right-click | Device | Short Connect | uon | | | - |
| 14 at above a | | | | | A Davis C | onfin | | |

The right side of the screen is used to make the desired settings. For this discussion always select TCP Client mode. Set the Module IP to a value of your choosing. Set the Subnet Mask to 255.255.255.0, the Gate Way stays at 0.0.0.0 . The serial communications parameters need to match those of the light source microprocessor: Baud Rate 9600, No Parity, 8 Data Bits, 1 Stop Bit. The Local Port can stay at whatever has been automatically set. The Destination IP is set to what was determined in the beginning steps of this document for the PC Ethernet Port, likewise for the Remote Port. None of the other parameters need to be changed.

Clicking the Save Config button will load these settings via the Ethernet connection into the Ethernet Module in the light source.

Additional units can be set up the same way, if they are to be on the same network then make certain that their IP address is unique. Once all units have been configured they may be added to the switch. Selecting Search Device will populate the device list with all the modules that are present. Clicking on any device will fill the right side of the screen with the associated parameters. These can now be edited and saved with the Save Config button.

The Setup Program can now be closed.



ALTERNATE SETUP METHOD

The Ethernet Module has a built-in web page server that can be used to perform the parameter settings described above. This method for setup is described in the following.

Open a Web Browser and type in the Ethernet Module I.P. address (default is 192.168.0.7), The following screen will display.

| Type in the default user name and password (admin for both) Then click sign in, X out the prompt for saving the password to the computer. Then the Status Screen will | Sign in http://192.1(Your connec Username Password | 68.0.7 tion to this site is not private | | |
|---|---|--|---------|--------|
| display as shown below. | | | Sign in | Cancel |



| firmware revision: v4 | 4015 | | 生文 |
|--|--------------------------------|--------------------------|--|
| ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | USR -IOT Experts- | Б | e Honest, Do Best! |
| Current Status | | parameter | Help |
| Local IP Config | Module Name: | USR-TCP232-T2 | Current IP |
| Serial Port | Current IP Address: | 192.168.0.7 | Address: |
| Expand Function | MAC Address: | d8-b0-4c-ba-dd-94 | module |
| Misc Config | -2 : | 0.0.0.0/ 0 byte / 0 byte | Remote TP/TX/RX- |
| | -3 : | 0.0.0.0/ 0 byte / 0 byte | IP of server or |
| Reboot | -4 : | 0.0.0.0/ 0 byte / 0 byte | with module;reset |
| | -5 : | 0.0.0.0/ 0 byte / 0 byte | for disconnect |
| | TX Count/RX Count: | 0/ 0 bytes | that each server or device communicates with module;reset for disconnect • TX Count/RX Count: a total of data volume that servers or devices communicate with module;reset for power off |
| | | | |
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The screen will display the current status of the module at an update rate of approximately 5 seconds. Nothing needs to be done on this screen. Select Local IP Config and the following screen will display.



| firmware revision: v4 | 015 | 生文 |
|-----------------------|--|--|
| A | USR -IOT Experts- | Be Honest, Do Best! |
| Current Status | parameter | Help |
| Local IP Config | IP type: Static IP ▼ | • IP type: |
| Serial Port | Static IP: 192 . 168 . 0 . 7 | StaticIP or DHCP |
| Expand Function | Submask: 255 . 255 . 255 . 0 | StaticIP: Module's static ip |
| Misc Config | Gateway: 0 . 0 . 0 . 0 | Submask: usually |
| Reboot | DNS Server: 208 . 67 . 222 . 222 | 255.255.255.0 |
| | Save Cancel | Usually router's ip address • DNS IP: DNS gateway or Router's IP |
| Copyright © 2009 - 20 | 015 • JiNan Usr IOT Technology Limited | website: <u>www.usriot.com</u> |

Set the parameters as required by your application, generally the static IP address is the only item that would need to be changed. Click Save to save the settings, ignore the Restart prompt and click the Serial Port selection. The following screen is displayed.



| | EN | יוח | ~ | <u>۸</u> | 12 | n |
|-----|-----|-----|-----|----------|-----|---|
| APP | LIN | יוס | ^ / | A | vz. | U |

| firmware revision: v | 4015 | | 史文 |
|----------------------|---|-----------------------------------|---|
| | USR -IOT Experts- | Be Ho | mest, Do Best! |
| Current Status | | parameter | Help [^] |
| Local IP Config | Baud Rate: | 9600 bps | HTTPD URL: |
| Serial Port | Data Size: | 8 v bit | Module add GET/POST and |
| Expand Function | Parity: | None | HTTP/1.1 in URL automatically |
| Misc Config | Stop Bits: | 1 • bit | according to user's setting. |
| Reboot | Local Port Number: Remote Port Number: Work Mode: | 20108 (1~65535) 8234 (1~65535) | HTTPD Packet Header: Module add HOST |
| | Remote Server Addr: | 192.168.0.15 | automatically according to user's setting.Add"Content |
| | RESET: | | Length"automaticall in POST mode. |
| | INNEX: | | |
| | Similar RFC2217: | | |
| | S | ave Cancel | |
| Copyright © 2009 - : | 2015 · JiNan Usr IOT Technology Limited | | website: <u>www.usriot.com</u> |

The serial port is already configured by FTI to 9600 BPS, 8 Data Bits, No Parity, 1 Stop Bit. The remaining parameters are generally left as they are except for the remote server address. Set this to what the users application requires. Again, click Save, ignore the Restart Module prompt and click on Expand Function. The following screen will appear.



| firmware revision: v4 | 015 | | 土文 |
|-----------------------|--|----------------|--|
| ^م رج | USR -IOT Experts- | | Be Honest, Do Best! |
| Current Status | | parameter | Help |
| Local IP Config | Enable USR Cloud: | | Custom |
| Serial Port | Heartbeat Packet Type: | None • ASCII • | Heartbeat Packet: |
| Expand Function | Register Packet Type: | None 🔻 | this function is not |
| Mise Config | Short Connection: | | support the Chinese, and 40 |
| Reboot | TCP Server-kick off old connection: | × | bytes in length |
| | Buffer Data Before Connected: | | Custom Register Packet: |
| | 5 | Save Cancel | this function is not open, not do support the Chinese , and 40 bytes in length TCP Server-kick off old connection : TCP Server mode, a new connection whether to kick off the old connection, Buffer Data Before Connected : Refore the TCP connected : Refore the TCP connection is established, whether the data sent by serial port is cached |
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In general, these parameters should be left as they are. Click the Misc Config selection to display the following screen.



| | ENI | יוח | < A | 1/2 | n |
|-----|-----|-----|-----|------|---|
| AFF | | יוט | ΛA | v ∠. | υ |

| TIRMWARE REVISION: V/I | 015 | | <u> </u> |
|------------------------|--|----------------------|--|
| Ŕ | USR -IOT Experts- | Be Ho | nest, Do Best! |
| Current Status | para | meter | Help |
| Local IP Config | Module Name: | USR-TCP232-T2 | • MAC Address : |
| Serial Port | Webserver Port: | 80 | The module can modify the MAC |
| Expand Function | Username: | admin | address,all'F'is not allowed |
| Misc Config | Password: | admin | Max Clients |
| Reboot | MAC Address: | D8-B0-4C-BA-DD-94 | Connect To TCP Server: |
| Nobook | Max Clients Connect To TCP Server: | 4 (1~16) | when Module is TCP Server, the |
| | Reset Timeout: | 3600 (s)(60~8640000) | max number of TCP client allowed to |
| | Save | Cancel | connect • Timeoul Restart Time: When the network port or serial port without data, timeoul restart.0s,Close the function |
| Copyright © 2009 - 2 | 015 - JINan Usr IOT Technology Limited | | website: <u>www.usrlot.com</u> |

In general these parameters are left the same with the exception of User Name and Password. If the User Name and Password are changed, then click Save. Click the Restart Module button to restart with all saved changes. Click OK in response to the Are You Sure prompt, this will reset the connection and after a time out a browser message, "This Site Can't Be Reached" will be displayed. Search for the module again using the assigned IP address as well as any new user name and password that may have been changed.

The Ethernet Module is now set to run the Test Program.



Run the Test Program, a screen like the one below will appear. The left side COM related settings are not used. Setting them to what is being used, would be a convenience only.

On the right side of the screen select the following: TCP Server, the PC Ethernet Port IP and the PC Ethernet Port, Port Number.

| 🔮 USR-TCP232-Test RS232 to Ethernet Convert tester | | | | | | |
|---|---|-------|----------------------|---------|--|--|
| VSR-TCP232-Test RS232 t New(N) File(F) Options(O COMSettings PortNum COM1 BaudR 9600 Deaity NONE Deaity NONE DataB 8 bit StopB 1 bit | o Ethernet Convert tester) Help(H) COM port data receive | | Network data receive | | NetSettings (1) Protocol TCP Server (2) Local host IP 192.168.16.2 (3) Local host port 8234 | |
| Open Recv Options Receive to file Add line return Receive As HEX Receive Pause Save Clear | | | | | Listening 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 Interval 1000 ms | Jinan USR Technology Co., | Send | http://en.usr.cn | Send | Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle Interval 1000 ms | |
| Loaa <u>Llear</u> | Send:0 Recv:0 | Reset | € Ready! | Send: 0 | Recv: 0 Reset | |



| 🔮 USR-TCP232-Test RS232 | to Ethernet Convert tester | | | | | | |
|-----------------------------------|----------------------------|-------|--------------------------|---------|--|--|--|
| New(N) File(F) Options(O) Help(H) | | | | | | | |
| COMSettings | COM port data receive | | Network data receive | | NetSettings | | |
| PortNum COM1 💌 | | | | | (1) Protocol | | |
| BaudB 9600 ▼ | | | | | TCP Server 🗾 | | |
| | | | | | (2) Local host IP | | |
| DPaity NUNE | | | | | 192.168.0.15 | | |
| DataB 8 bit 💌 | | | | | (3) Local bost port | | |
| StopB 1 bit 💌 | | | | | 8234 | | |
| | | | | | 1 | | |
| 🔵 Open | | | | | 👷 Disconnect | | |
| Recv Options | | | | | -Recv Options | | |
| Receive to file | | | | | Receive to file | | |
| Add line return | | | | | Add line return | | |
| Receive As HEX | | | | | Receive As HEX | | |
| Receive Pause | | | | | Receive Pause | | |
| Save Clear | | | | | Save Clear | | |
| | _ | | | | | | |
| -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 | | | Peers: 192.168.0.7:20108 | | Send Recycle | | |
| Interval 1000 ms | Jinan USR Technology Co., | | http://en.usr.cn | | Interval 1000 ms | | |
| Load Clear | Ltd. | Send | | Send | Load Clear | | |
| 💣 Ready! | Send:0 Recv:0 | Reset | 💣 Ready! | Send: 0 | Recv: 0 Reset | | |

Clicking on the Listening button will produce a screen similar to the following:

The Peers drop down list box will list all the devices on the network, select any one of the devices (light sources) that you wish to communicate with.



A light source command can be entered into the text box next to the Send button. The following screen shows the entry of the unit 0 Report Status Command.

| USR-TCP232-Test RS232 to Ethernet Convert tester | | | | | | |
|--|---|---|--|--|--|--|
| WSR-TCP232-Test RS232 to Ethernet Convert tester New(N) File(F) Options(O) Help(H) COM Settings COM port data receive PortNum COM1 ▼ BaudR 9600 ▼ DPaity NONE ▼ DataB 8 bit ▼ StopB 1 bit ▼ © Open Receive to file Add line return ▼ ▼ | Network data receive | NetSettings (1) Protocol TCP Server (2) Local host IP [192,168, 0, 15] (3) Local host port [8234) Disconnect Receive to file Add line return Receive As HEX | | | | |
| ✓ Receive As HEX □ Receive Pause Save Clear Send Options □ Data from file □ Auto Checksum □ Interval □ 1000 ms □ Load □ Exer ■ ■ ■ ■ □ Data Feedul ■ | Peers: 192.168.0.7:20108 - \0,s0, Send set Fready Send: 0 | Receive As HEX Receive Pause Save Clear Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle Interval 1000 ms Load Clear Recy: 0 Receive | | | | |

When operating in Ethernet Mode, 0 can be used for the unit ID for any of the light sources.



To finalize the command a carriage return needs to be entered, to do this select Send As Hex using the appropriate check box. The command in the text box will change to Hex as shown in the following.

| SR-TCP232-Test RS232 to Ethernet Convert tester | | | | | | | |
|---|----------------------------|--------------------------|--|--|--|--|--|
| New(N) File(F) Options(O) Help(H) | | | | | | | |
| COMSettings COM port data receive | Network data receive | NetSettings | | | | | |
| PortNum COM1 - | | (1) Protocol | | | | | |
| BaudR 9600 - | | TCP Server | | | | | |
| | | (2) Local host IP | | | | | |
| | | 192.168.0.15 | | | | | |
| | | (3) Local host port | | | | | |
| StopB T Dit | | 8234 | | | | | |
| Open | | 🔆 Disconnect | | | | | |
| Recv Options | | Recv Options | | | | | |
| Receive to file | | Receive to file | | | | | |
| Add line return | | Add line return | | | | | |
| Receive As HEX | | Receive As HEX | | | | | |
| 🗖 Receive 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 | Peers: 192.168.0.7:20108 - | Send Recycle | | | | | |
| Interval 1000 ms Jinan VSR Technology Co., | 5C 30 2C 73 30 2C 0D | Interval 1000 ms | | | | | |
| Load Clear Ltd. Send | Send | Load Clear | | | | | |
| IF Ready! Send: 0 Recv: 0 Reset | 📝 Ready! Send: O | Recv:0 Reset | | | | | |

The text box shows 0D, Hex for carriage return already added; note that it was added as a space, 0 then D.



At this point the Send As Hex check box can be unchecked, and the screen will show as follows: the command displays in ASCII, the carriage return is there but not displayed. Clicking the Send button will send the command and also receive the corresponding response and display it in Network Data Receive window, as can be seen in the following.



Further commands can be input simply by editing the text box; the carriage return remains so there is no need to select Hex again. Simply make the edit and click Send.

To exit the program click Disconnect and Exit from the File pull down menu.

The <u>http://www.usriot.com</u> web site contains many sample programs and libraries to aid the software developer in creating their custom Ethernet communications applications.

