

## 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 <https://www.usriot.com>, 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 download 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

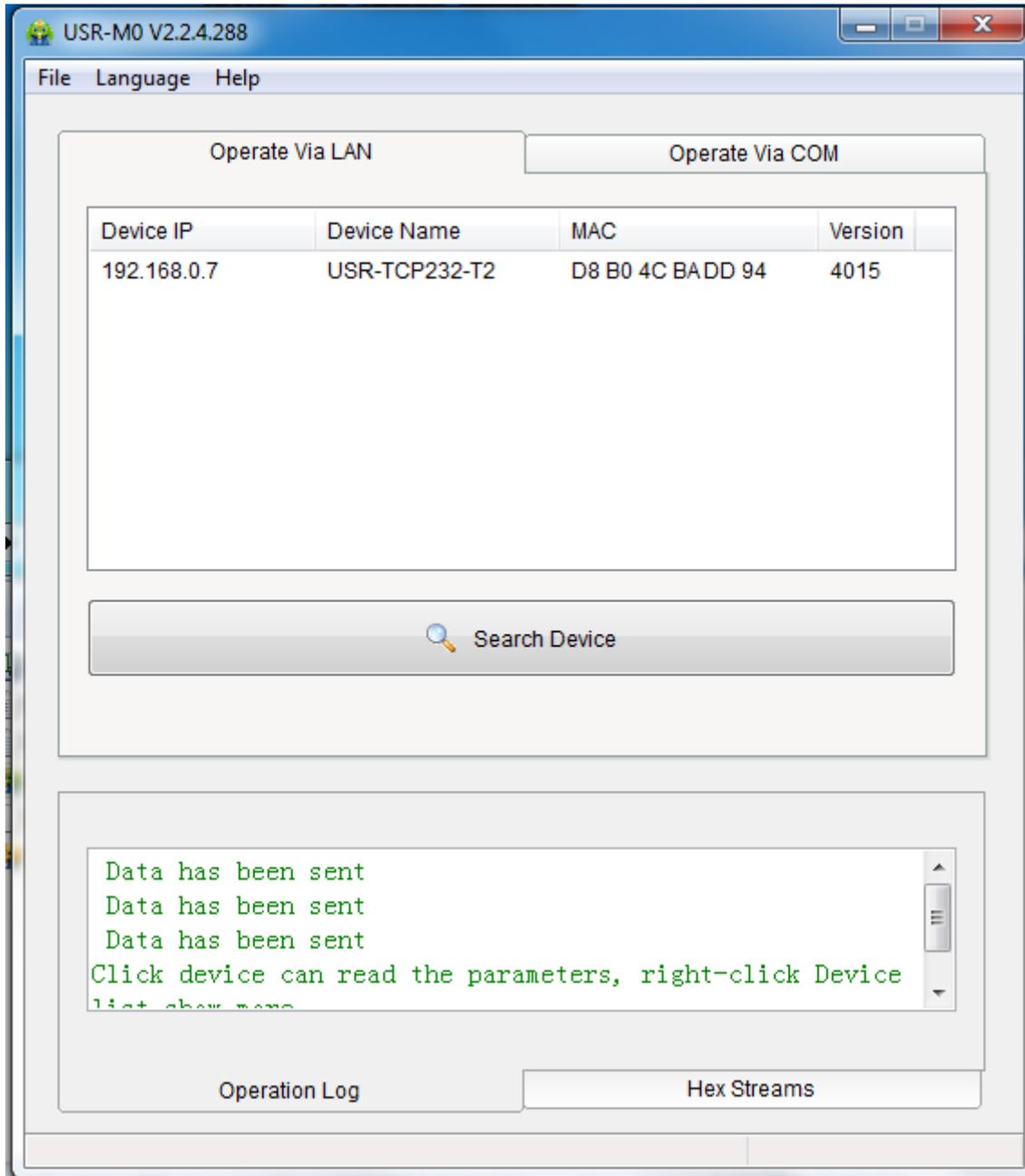
Module Port: 20108

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

Destination Port: 8234 (For host PC)

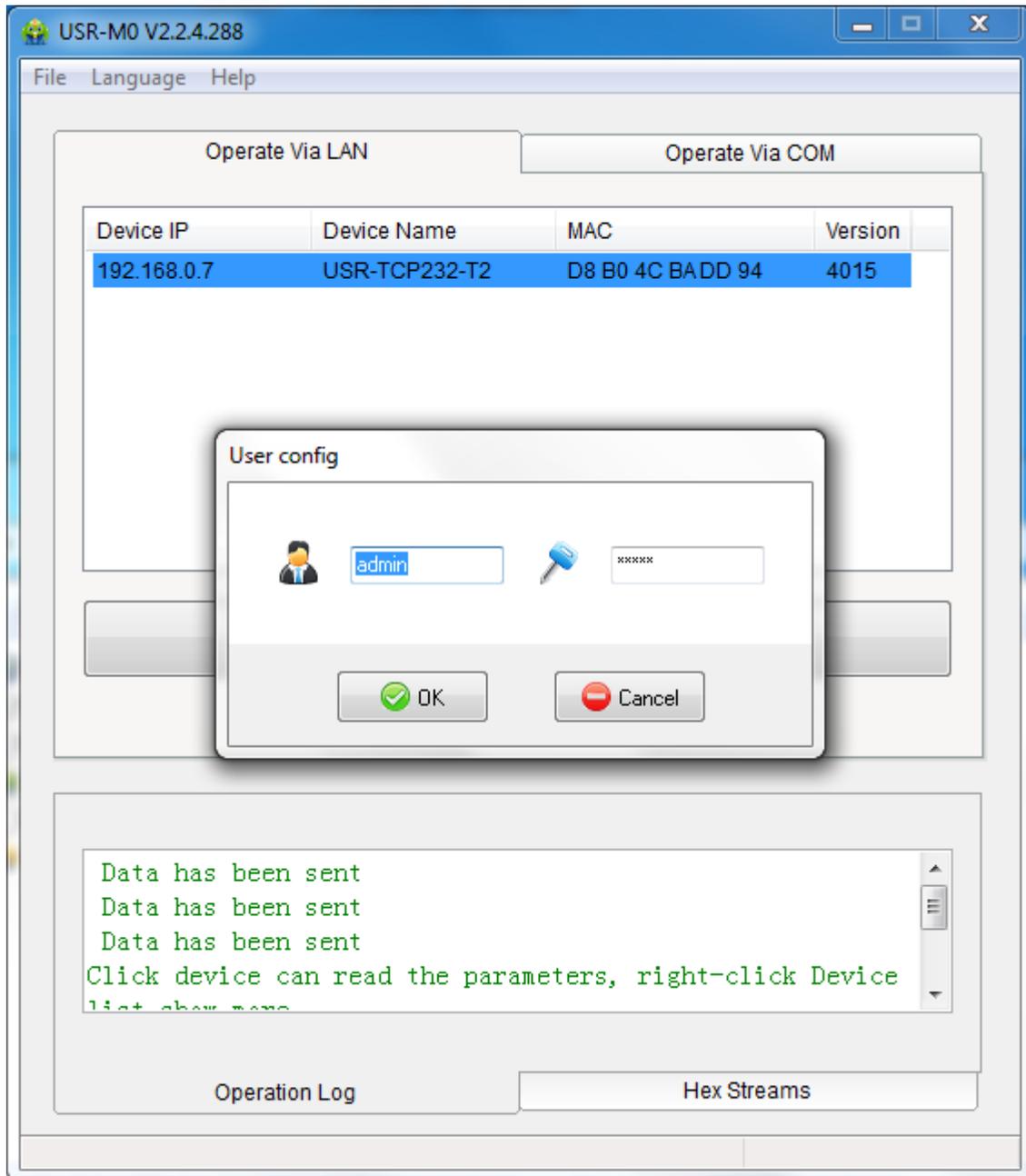
First determine what the PC (Host IP and Host port is and what the protocol is) and reset as required to match above last two entries.

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.

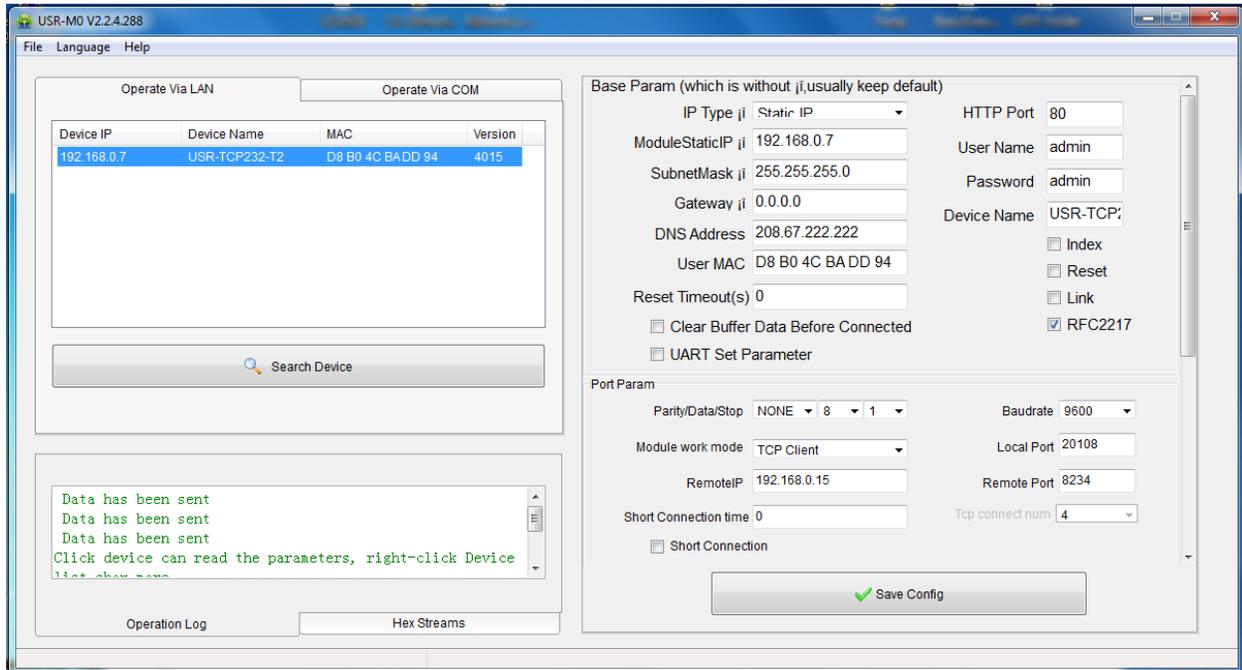


The Operate Via LAN tab is the only tab that will be used for this discussion.

Clicking on the Device will show the following screen.



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.



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.

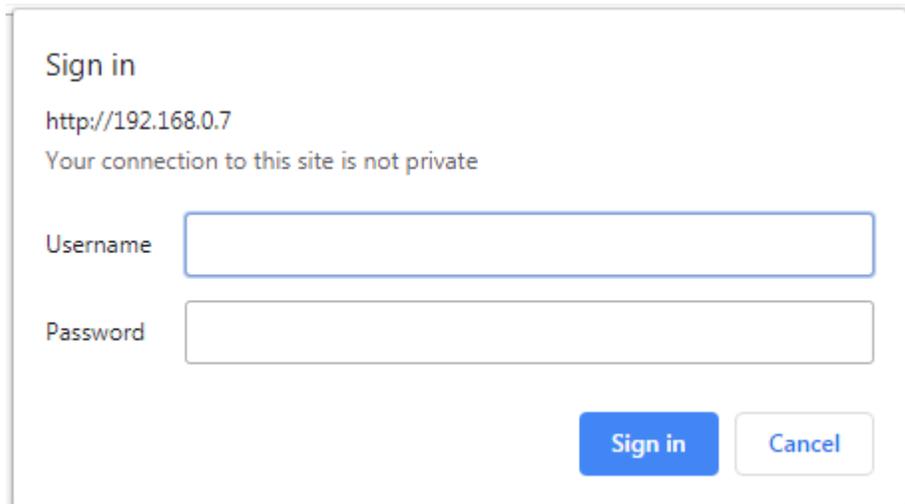
The Setup Program can now be closed.

## 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 display as shown below.



The screenshot shows a web browser window with the following content:

- Title: Sign in
- Address bar: http://192.168.0.7
- Message: Your connection to this site is not private
- Username field: A text input box with the label "Username" to its left.
- Password field: A text input box with the label "Password" to its left.
- Buttons: A blue "Sign in" button and a white "Cancel" button with a blue border, located at the bottom right of the form.

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	parameter	Help
Current Status	Module Name: <b>USR-TCP232-T2</b>	<ul style="list-style-type: none"> <li>• <b>Current IP Address:</b> default IP of module</li> <li>• <b>Remote IP/TX/RX:</b> IP of server or device connecting with module;reset for disconnect TX/RX:data volume that each server or device communicates with module;reset for disconnect</li> <li>• <b>TX Count/RX Count:</b> a total of data volume that servers or devices communicate with module;reset for power off</li> </ul>
Local IP Config	Current IP Address: 192.168.0.7	
Serial Port	MAC Address: d8-b0-4c-ba-dd-94	
Expand Function	Remote IP/TX/RX-1 : 0.0.0.0 / 0 byte / 0 byte	
Misc Config	-2 : 0.0.0.0/ 0 byte / 0 byte	
Reboot	-3 : 0.0.0.0/ 0 byte / 0 byte	
	-4 : 0.0.0.0/ 0 byte / 0 byte	
	-5 : 0.0.0.0/ 0 byte / 0 byte	
	TX Count/RX Count: 0/ 0 bytes	

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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.

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Current Status	parameter		Help
Local IP Config	IP type: <input type="text" value="Static IP"/>		<ul style="list-style-type: none"> <li>• <b>IP type:</b> StaticIP or DHCP</li> <li>• <b>StaticIP:</b> Module's static ip</li> <li>• <b>Submask:</b> usually 255.255.255.0</li> <li>• <b>Gateway:</b> Usually router's ip address</li> <li>• <b>DNS IP:</b> DNS gateway or Router's IP</li> </ul>
Serial Port	Static IP: <input type="text" value="192"/> . <input type="text" value="168"/> . <input type="text" value="0"/> . <input type="text" value="7"/>		
Expand Function	Submask: <input type="text" value="255"/> . <input type="text" value="255"/> . <input type="text" value="255"/> . <input type="text" value="0"/>		
Misc Config	Gateway: <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>		
Reboot	DNS Server: <input type="text" value="208"/> . <input type="text" value="67"/> . <input type="text" value="222"/> . <input type="text" value="222"/>		
<input type="button" value="Save"/> <input type="button" value="Cancel"/>			
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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.

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Current Status		Help																										
Local IP Config																												
Serial Port	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #0056b3; color: white;">parameter</th> <th></th> </tr> </thead> <tbody> <tr> <td>Baud Rate:</td> <td><input type="text" value="9600"/> bps</td> </tr> <tr> <td>Data Size:</td> <td><input type="text" value="8"/> bit</td> </tr> <tr> <td>Parity:</td> <td><input type="text" value="None"/></td> </tr> <tr> <td>Stop Bits:</td> <td><input type="text" value="1"/> bit</td> </tr> <tr> <td>Local Port Number:</td> <td><input type="text" value="20108"/> (1~65535)</td> </tr> <tr> <td>Remote Port Number:</td> <td><input type="text" value="8234"/> (1~65535)</td> </tr> <tr> <td>Work Mode:</td> <td><input type="text" value="TCP Client"/></td> </tr> <tr> <td>Remote Server Addr:</td> <td><input type="text" value="192.168.0.15"/></td> </tr> <tr> <td>RESET:</td> <td><input type="checkbox"/></td> </tr> <tr> <td>LINK:</td> <td><input type="checkbox"/></td> </tr> <tr> <td>INDEX:</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Similar RFC2217:</td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table> <p style="text-align: center;"> <input type="button" value="Save"/> <input type="button" value="Cancel"/> </p>	parameter		Baud Rate:	<input type="text" value="9600"/> bps	Data Size:	<input type="text" value="8"/> bit	Parity:	<input type="text" value="None"/>	Stop Bits:	<input type="text" value="1"/> bit	Local Port Number:	<input type="text" value="20108"/> (1~65535)	Remote Port Number:	<input type="text" value="8234"/> (1~65535)	Work Mode:	<input type="text" value="TCP Client"/>	Remote Server Addr:	<input type="text" value="192.168.0.15"/>	RESET:	<input type="checkbox"/>	LINK:	<input type="checkbox"/>	INDEX:	<input type="checkbox"/>	Similar RFC2217:	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• <b>HTTPD URL:</b> Module add GET/POST and HTTP/1.1 in URL automatically according to user's setting.</li> <li>• <b>HTTPD Packet Header:</b> Module add HOST automatically according to user's setting. Add "Content Length" automaticall in POST mode.</li> </ul>
parameter																												
Baud Rate:	<input type="text" value="9600"/> bps																											
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LINK:	<input type="checkbox"/>																											
INDEX:	<input type="checkbox"/>																											
Similar RFC2217:	<input checked="" type="checkbox"/>																											
Expand Function																												
Misc Config																												
Reboot																												

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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.

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<ul style="list-style-type: none"> <li>Current Status</li> <li>Local IP Config</li> <li>Serial Port</li> <li style="background-color: #0070C0; color: white;">Expand Function</li> <li>Misc Config</li> <li>Reboot</li> </ul>	<div style="border: 1px solid #0070C0; padding: 5px;"> <p style="text-align: center; margin: 0;">parameter</p> <p>Enable USR Cloud: <input type="checkbox"/></p> <p>Heartbeat Packet Type: <span style="border: 1px solid #ccc; padding: 2px;">None</span> <span style="border: 1px solid #ccc; padding: 2px;">ASCII</span></p> <p>Register Packet Type: <span style="border: 1px solid #ccc; padding: 2px;">None</span></p> <p>Short Connection: <input type="checkbox"/></p> <p>Reload ON/OFF: <input type="checkbox"/></p> <p>TCP Server-kick off old connection: <input checked="" type="checkbox"/></p> <p>Buffer Data Before Connected: <input type="checkbox"/></p> <p style="text-align: center; margin-top: 10px;"> <input type="button" value="Save"/> <input type="button" value="Cancel"/> </p> </div>	<p style="text-align: center; margin: 0;">Help</p> <ul style="list-style-type: none"> <li>• <b>Custom Heartbeat Packet:</b> this function is not open, not do support the Chinese, and 40 bytes in length</li> <li>• <b>Custom Register Packet:</b> this function is not open, not do support the Chinese, and 40 bytes in length</li> <li>• <b>TCP Server-kick off old connection:</b> TCP Server mode, a new connection whether to kick off the old connection,</li> <li>• <b>Buffer Data Before Connected:</b> Before the TCP connection is established, whether the data sent by serial port is cached</li> </ul>
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In general, these parameters should be left as they are. Click the Misc Config selection to display the following screen.

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Current Status		Help
Local IP Config	parameter	
Serial Port	Module Name: <input type="text" value="USR-TCP232-T2"/>	
Expand Function	Webserver Port: <input type="text" value="80"/>	
Misc Config	Username: <input type="text" value="admin"/>	
Reboot	Password: <input type="text" value="admin"/>	
	MAC Address: <input type="text" value="D8-B0-4C-BA-DD-94"/>	
	Max Clients Connect To TCP Server: <input type="text" value="4"/> (1~16)	
	Reset Timeout: <input type="text" value="3600"/> (s)(60~8640000)	
	<input type="button" value="Save"/> <input type="button" value="Cancel"/>	
		<ul style="list-style-type: none"> <li>• <b>MAC Address :</b> The module can modify the MAC address,all IP is not allowed</li> <li>• <b>Max Clients Connect To TCP Server:</b> When Module is TCP Server, the max number of TCP client allowed to connect</li> <li>• <b>Timeout Restart Time:</b> When the network port or serial port without data, timeout restart.0s,Close the function</li> </ul>

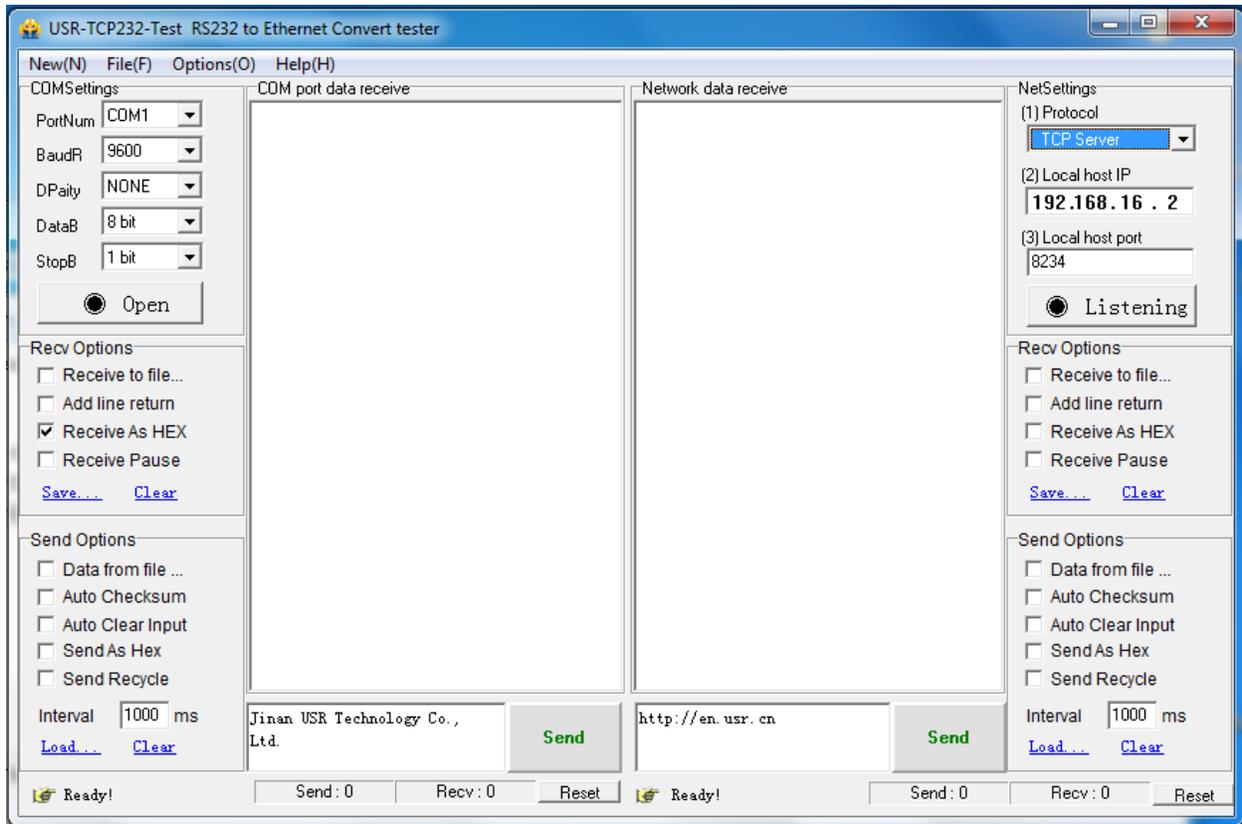
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In general these parameters are left the same with the exception of User Name and Password. If the User Name and Password are changed, then click Save. Click the Restart Module button to restart with all saved changes. Click OK in response to the Are 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.

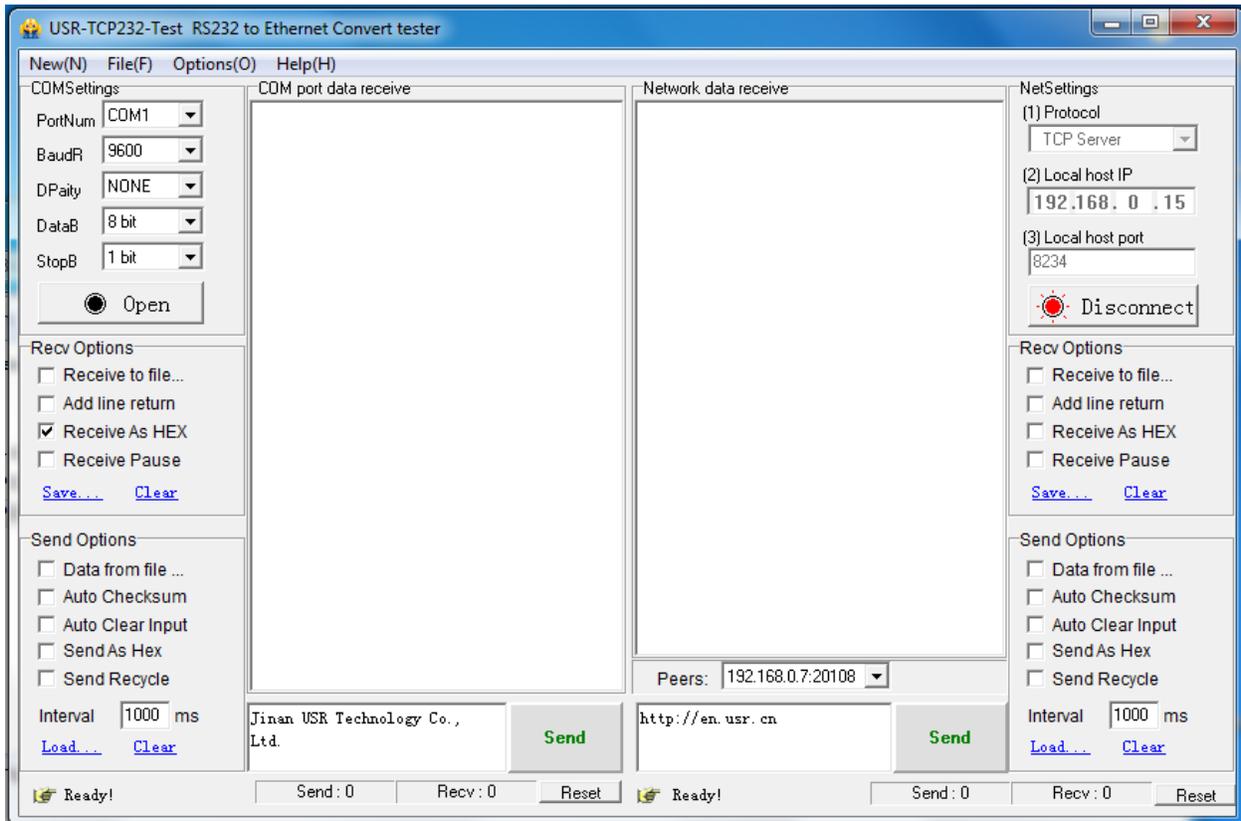
The Ethernet Module is now set to run the Test Program.

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.

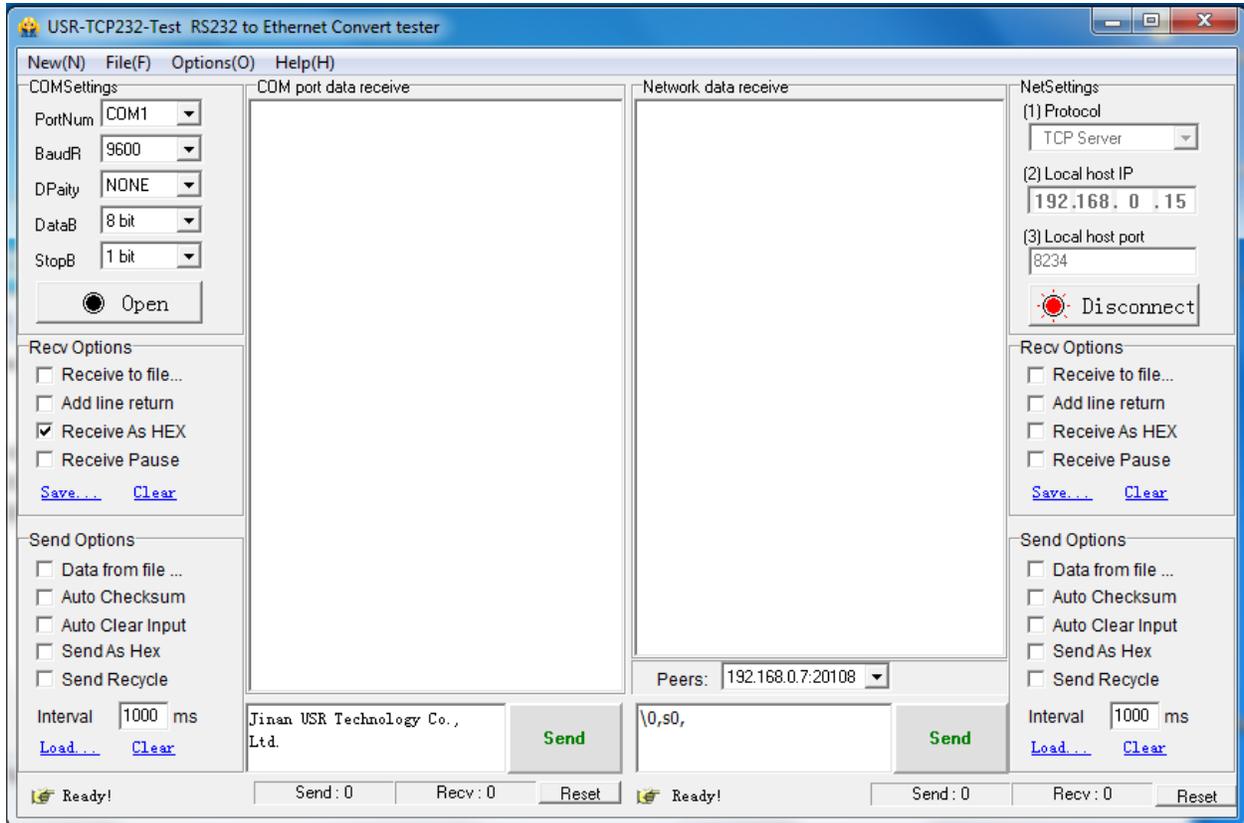


Clicking on the Listening button will produce a screen similar to the following:



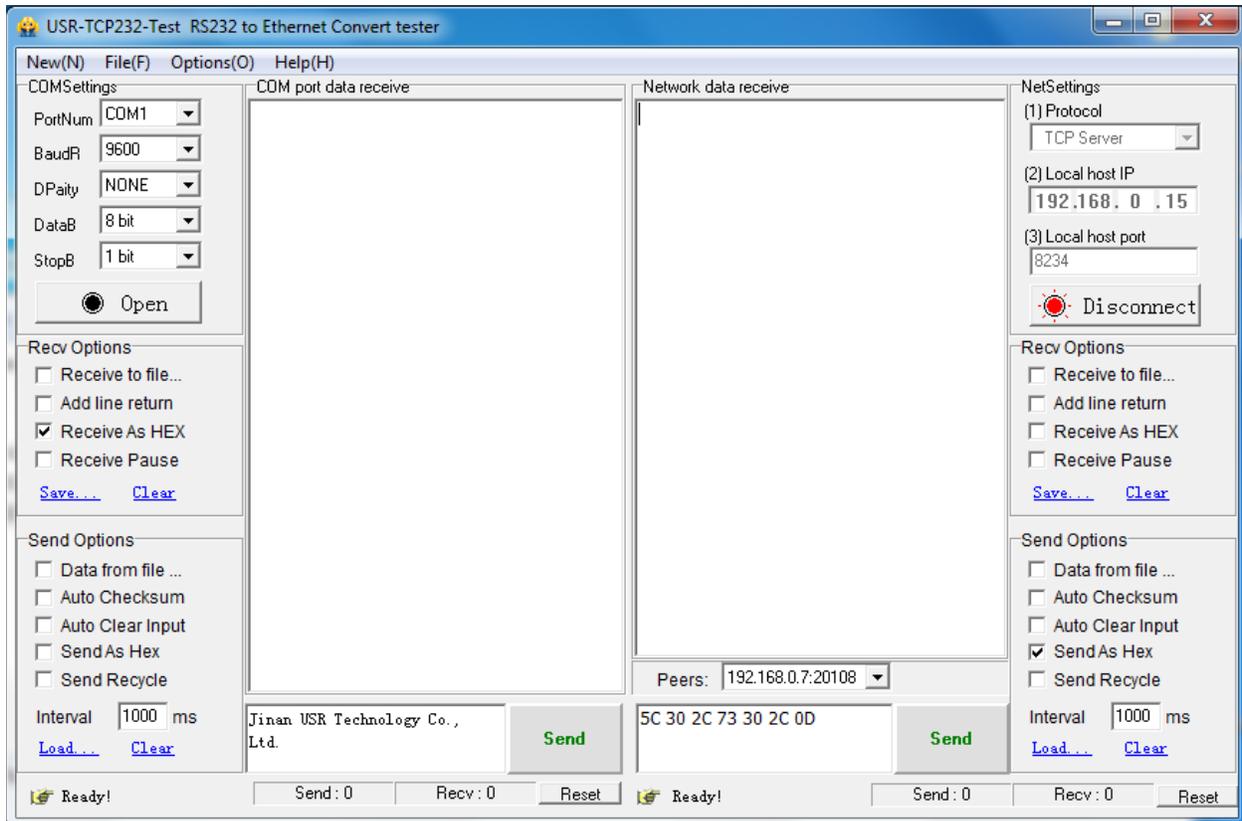
The Peers drop down list box will list all the devices on the network, select any one of the devices (light sources) that you wish to communicate with.

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.



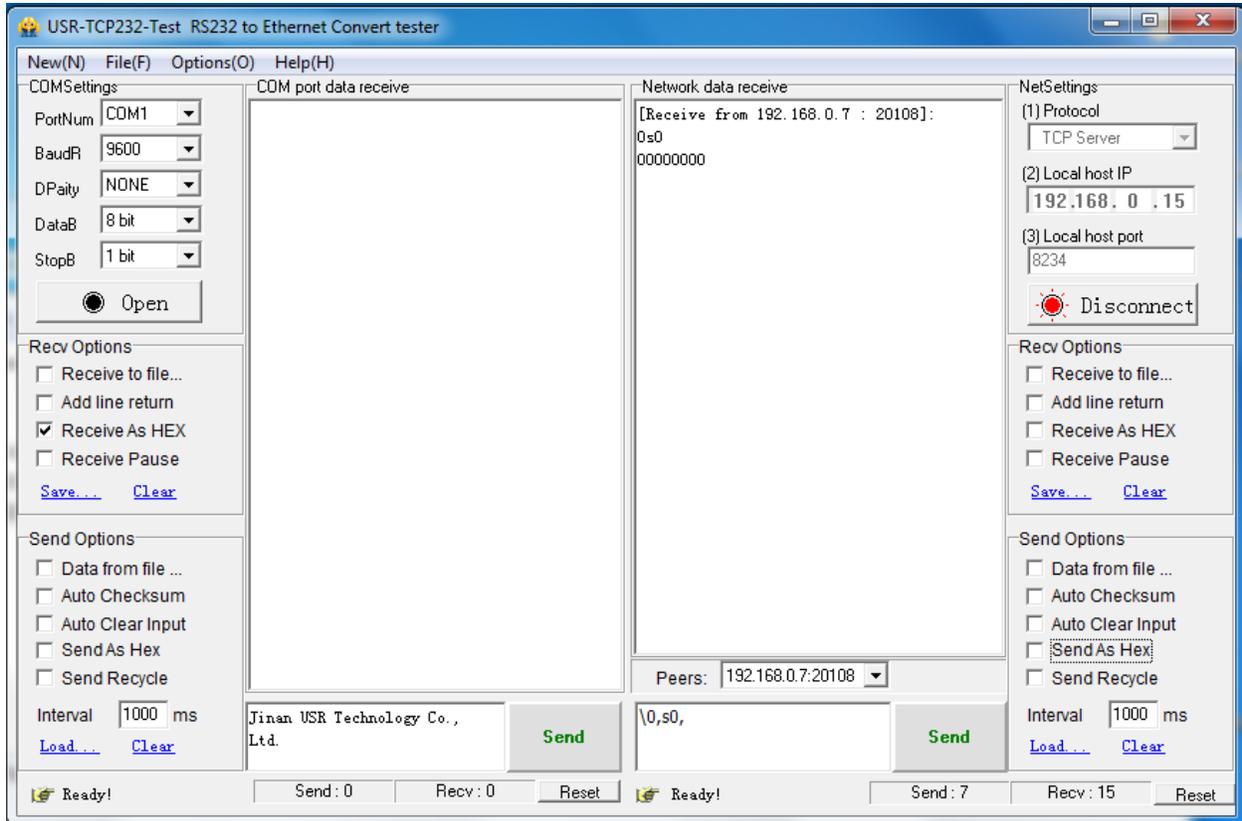
When operating in Ethernet Mode, 0 can be used for the unit ID for any of the light sources.

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.



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