RDS-3086/3166G

Industrial Modbus Gateway

Industrial 8/16-port Serial-to-Ethernet

Device Server

User Manual
Version 1.0
March, 2016

www.oring-networking.com

ORing Industrial Networking Corp.

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Getting Started

1.1 About the RDS-3086/3166G

The RDS-3086/3166G is a RS-232/422/485-to-LAN device server with 8 or 16 serial ports and 6 Ethernet ports. Besides standard features such TCP/IP interface and versatile operation mode support (Virtual Com, Serial Tunnel, TCP Server, TCP Client, and UDP), the device can be managed using the Windows untility, DS-Tool, which allows you to configure multiple devices and set up the mappings of Virtual Com. I addition, the device can simultaneously transfer data to up to five redundant host PCs to aovid Ethernet connection breakdown or any host PC failure. The device provides 4x10/100/1000Base-T(X) Ethernet ports and 2x100/1000Base-X SFP ports to meet demand for high bandwidth and long distance transmission. With a wide operating temperature from -40 ^{o}C to 70°C, the device is ideal for harsh industrial environments.

1.2 Software Features

- Redundant multiple host devices including Virtual COM, TCP Server, TCP Client modes and four IP ranges
- Supports multiple operating modes such as Virtual Com, Serial Tunnel, TCP Server, TCP Client, UDP
- NAT-pass through support
- Event warning by Syslog, Email, and SNMP trap
- Configurable by Web Interface
- Various Windows O.S. supported: Windows NT/2000/ XP/ 2003/VISTA(32/64bit)/ Windows 7(32/64bit)

1.3 Hardware Specifications

- 4 x 10/100/1000Base-T(X) Ethernet ports
- 2 x 100/1000Base-X SFP ports
- 8 or 16 x serial ports
- 1 x consol port
- 100-240VAC power supply
- Operating Temperature: -10 to 70°C
- Storage Temperature: -40 to 85°C
- Operating Humidity: 5% to 95%, non-condensing
- Dimensions: 443.7 (W) x 201 (D) x 45 (H) mm

Hardware Overview

2.1 Back Panel

2.1.1 Ports and Connectors

The device provides the following ports on the back panel, including four RJ-45 Ethernet ports, two SFP ports, and sixteen RJ48 serial ports

Port	Description
LAN slots	4 x 10/100/1000Base-T(X) ports
SFP port	2 x 100/1000Base-T(X) ports
Serial port	16 x RS-232/422/485 ports
Power connector	1 x 100-240VAC with power socket
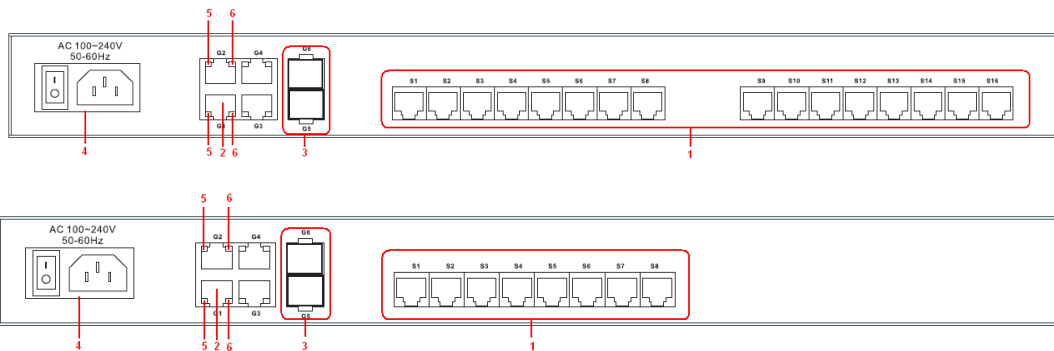
1. Serial ports
2. RJ-45 Ethernet LAN ports
3. SFP ports
4. Power socket
5. LNK/ACT LED for Ethernet LAN ports
6. Speed LED for Ethernet LAN ports

2.2 Front Panel

1. Link/Act LED for serial ports
2. Link/Act LED for Gigabit ports
3. Faulty relay LED

4. Console port
5. Power indicator
6. Reset button

2.2.1 LED

LED	Color	Status	Description
PWR	Green	On	Power module is on
ETH LNK/ACT	Green	On	Port is running at 1000Mbps
		Blinking	Transmitting data
	Amber	On	Port is running at 10/100Mbps.
Speed	Green	On	Port is running at 1000Mbps
	Amber	On	Port is running at 100Mbps
	Green/Amber	Off	Port is running at 10Mbps
Serial TX / RX	Amber	On	Port is receiving data
	Green	On	Port is transmitting data

Hardware Installation

3.1 Rack-mount Installation

The device comes with two rack-mount kits to allow you to fasten the device to a rack in any environments.
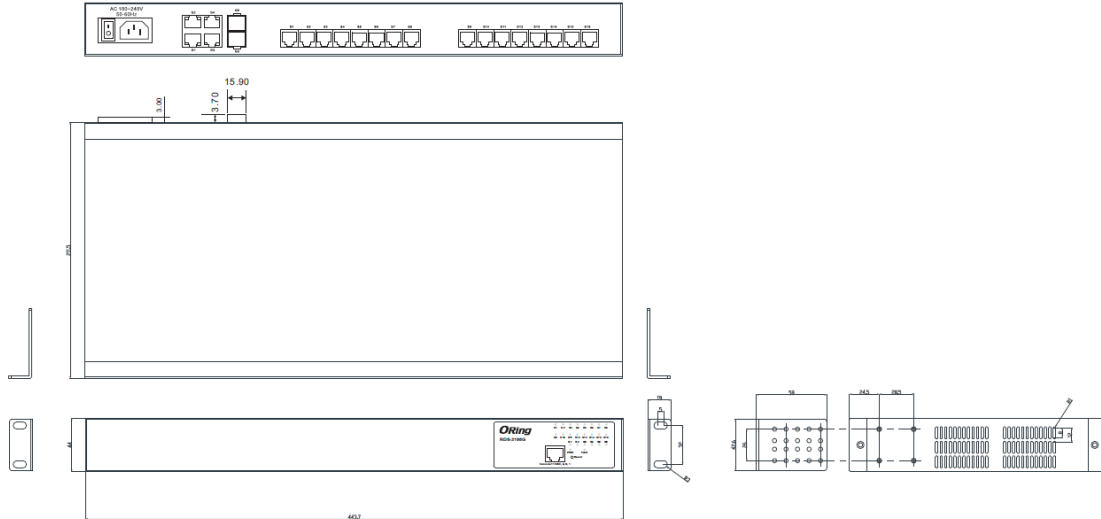
Rack-mount Kit Measurement (unit = mm)

Follow the following steps to install the device to a rack.

Step 1: Install left and right front mounting brackets to the device using 4 screws on each side.

Step 2: With front brackets orientated in front of the rack, fasten the brackets to the rack using two more screws.

Note: You can install the brackets on both sides at back of the device and mount it to the rack with the rear panel facing outward if the space for front panel cabling is limited. Remember, when installing the brackets on the front sides, use the four screw holes at the top and bottom. When installing the brackets on the back sides, use the four screw holes at the top and middle.
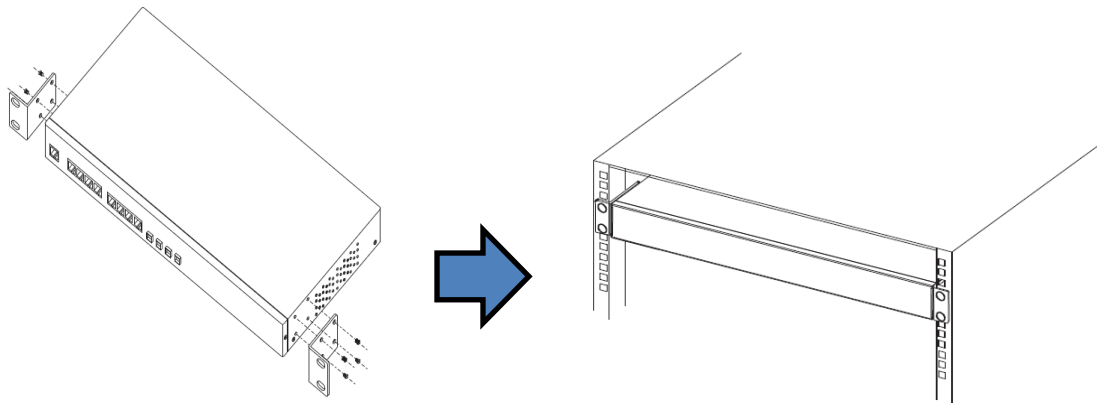
3.2 Wiring

WARNING

Do not disconnect modules or wires unless power has been switched off or the area is known to be non-hazardous. The devices may only be connected to the supply voltage shown on the type plate.

ATTENTION

1. Be sure to disconnect the power cord before installing and/or wiring your devices.
2. Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.
3. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.
4. Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
5. Do not run signal or communications wiring and power wiring through the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
6. You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring sharing similar electrical characteristics can be bundled together
7. You should separate input wiring from output wiring
8. It is advised to label the wiring to all devices in the system

3.2.1 Power Inputs

The device is powered by AC power. Simply insert the AC power cable to the power connector at the back of the device and turn on the power switch. The input voltage is 100V~240V / 50~60Hz.

3.3 Connection

3.3.1 Ethernet Port Pin Assignment

The device is equipped with standard Ethernet ports. According to the link type, the device uses CAT 3, 4, 5,5e UTP cables to connect to any other network devices (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

Cable Types and Specifications:

Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	RJ-45
100BASE-TX	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	RJ-45

| 1000BASE-T | Cat. 5/Cat. 5e 100-ohm UTP | UTP 100 m (328ft) | RJ-45 |

With 10/100Base-T(X) cables, pins 1 and 2 are used for transmitting data, and pins 3 and 6 are used for receiving data.

10/100Base-T(X) RJ-45 Port Pin Assignments:

Pin Number	Assignment
1	TD+
2	TD-
3	RD+
6	RD-

1000Base-T RJ-45 Port Pin Assignments:

Pin Number	Assignment
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-

The device supports auto MDI/MDI-X operation. You can use a cable to connect the device to a PC. The table below shows the 10/100Base-T(X) MDI and MDI-X port pin outs.

10/100Base-T(X) MDI/MDI-X Pin Assignments:

Pin Number	MDI port	MDI-X port
1	TD+(transmit)	RD+(receive)
2	TD-(transmit)	RD-(receive)
3	RD+(receive)	TD+(transmit)
4	Not used	Not used
5	Not used	Not used
6	RD-(receive)	TD-(transmit)
7	Not used	Not used
8	Not used	Not used

1000Base-T MDI/MDI-X Pin Assignments:

Pin Number	MDI port	MDI-X port
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-

Note: "+" and "-" signs represent the polarity of the wires that make up each wire pair.

3.3.2   SFP

The device comes with SFP ports that can connect to other devices using SFP modules. The SFP modules are hot-swappable input/output devices that can be plugged into the SFP ports to connect the device with the fiber-optic network. Remember that the TX port of Device A should be connected to the RX port of Device B.
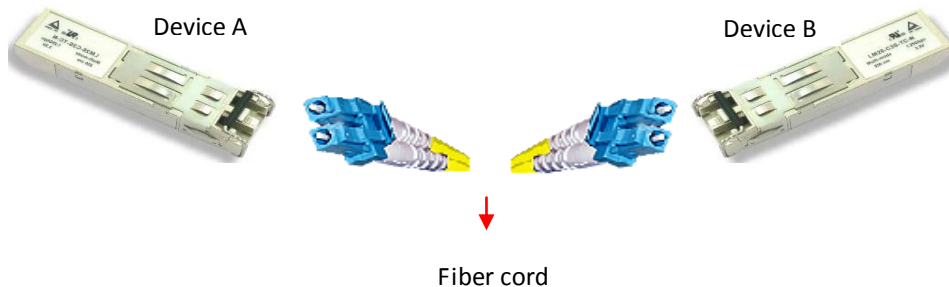
Fiber cord

1. Insert clean dust plugs into the SFPs after the cables are extracted from them.
2. Clean the optic surfaces of the fiber cables before you plug them back into the optical bores of another SFP module.
3. Avoid getting dust and other contaminants into the optical bores of your SFP modules in cases of malfunction.

3.3.3   Serial Port Pin Assignment

The device provides serial ports in RJ48 connector type. Please refer to the following table for pin assignment.
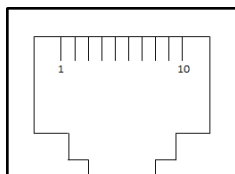
Pin #	RS-232	RS-422	RS-485 (4 wire)	RS-485 (2 wire)
1	NC	NC	NC	NC
2	DCD	TXD -	TXD -	DATA-
3	RXD	TXD +	TXD +	DATA+
4	TXD	RXD +	RXD +	
5	DTR	RXD -	RXD -	
6	GND	GND	GND	
7	DSR			
8	RTS			
9	CTS			
10	RI			
RS 232 mod act as DTE				

3.3.4   Console Port Pin Assignment

The device provides a console port in RJ45 connector type for device management. You can connect the port to a PC via the RS-232 cable with a DB-9 female connector. The DB-9 female connector of the RS-232 cable should be connected the PC while the other end of the cable (RJ-45 connector) should be connected to the console port of the device server.

PC pin out (male) assignment	RS-232 with DB9 female connector	DB9 to RJ 45
Pin #2 RD	Pin #2 TD	Pin #2
Pin #3 TD	Pin #3 RD	Pin #3
Pin #5 GD	Pin #5 GD	Pin #5

Management

4.1 DS-Tool

The Windows utility DS-Tool is a powerful Windows utility for DS series. It supports device discovery, device configuration, group setup, group firmware update, and monitoring functions. The tool enables you to easily install and configure devices on the network.
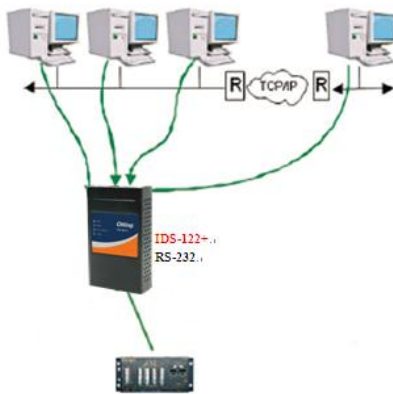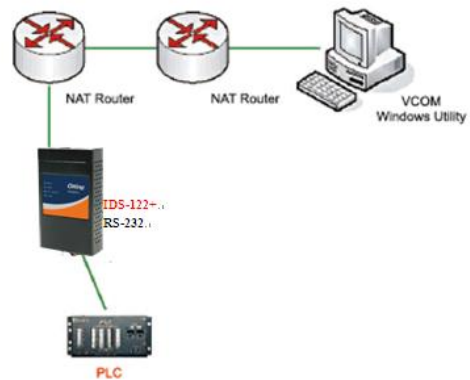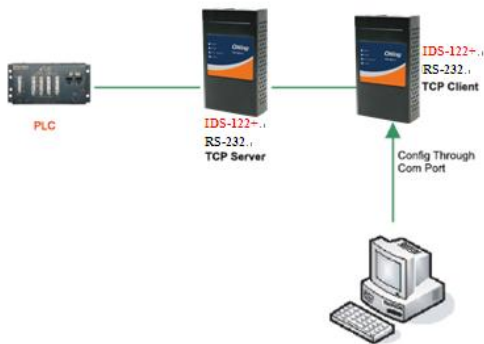
4.1.1   Install DS-Tool

Follow the steps below to install the tool.

Step 1: Run the Setup program by clicking **Start** after selecting the folder for DS-Tool.
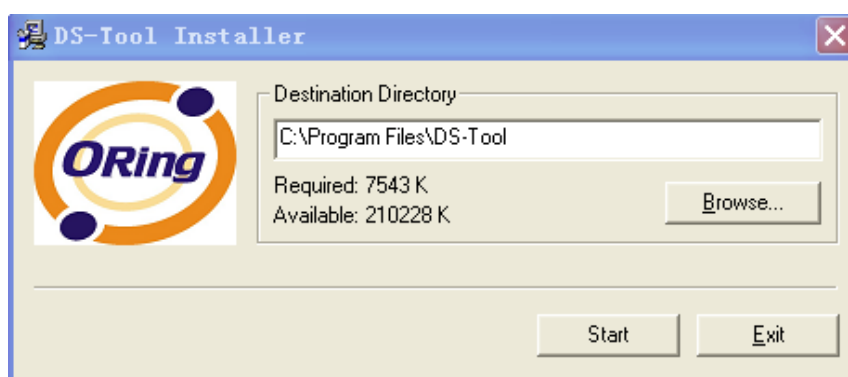
Step 2: When installation completes successfully, click **OK**.
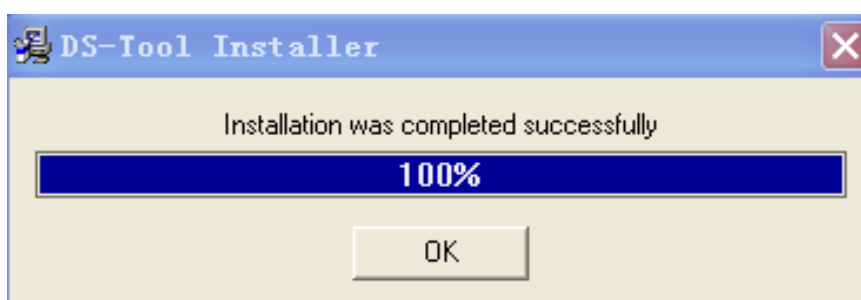
Step 3: You can launch the tool right immediately by checking **Launch DS-Tool Now** or launch it later by checking **Launch DS-Tool Later.**

4.1.2   Using DS-Tool
Explore device servers

DS-Tool will broadcast to the network and search all available DS devices in the network automatically. The default IP address of the device is "**192.168.10.2**". Select the device you wish to use and press **Add** button.

You can set a static IP address or use the DHCP client mode to acquire an IP address automatically. Click **OK** and the device will be added.
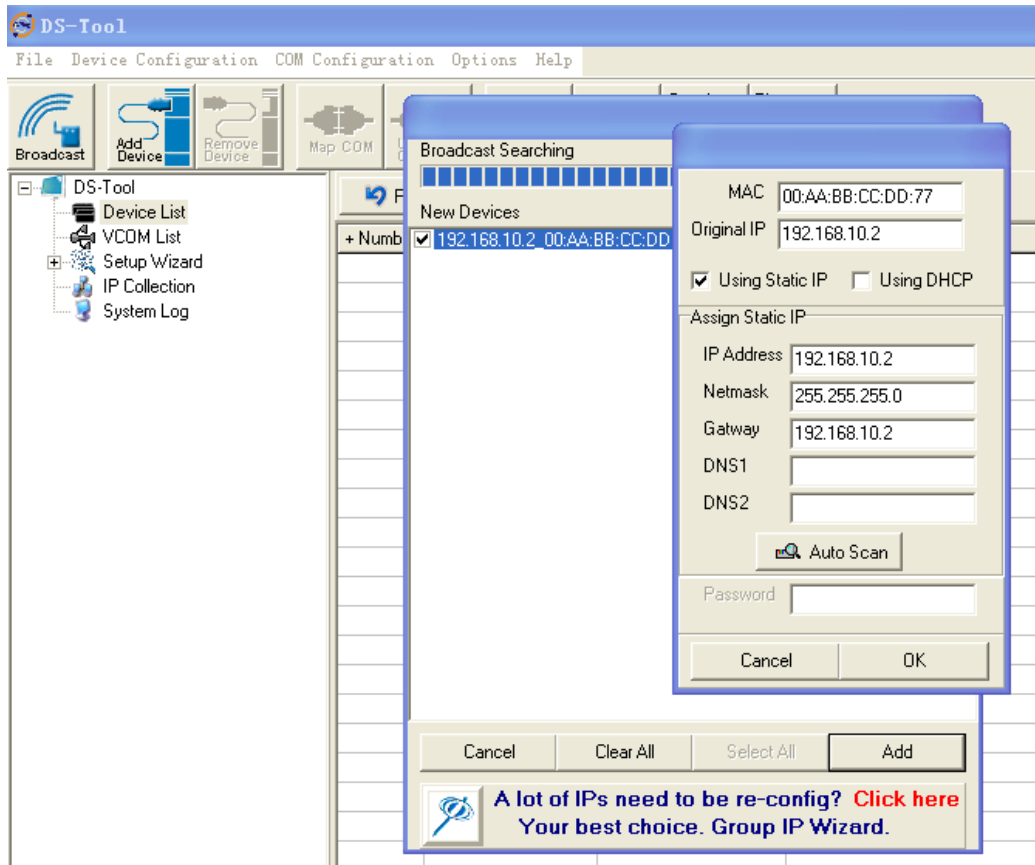
4.1.3   Configure Device Servers
4.1.3.1 General

This page enables you to perform general configuration for the device, includes the device

name, SNTP server, and auto IP report.

Label	Description
Device Name/Location	You can input the device name or related information in this field. By clicking **Locate On**, you can locate the serial server's position.
Using SNTP Time Server	If you want to set the time via a SNTP time server, check the box and input related information such as the SNTP server domain name or IP address and the port number, and select a time zone.
Auto IP Report	Check the **Auto IP Report** box if you want to receive IP report regularly. By Clicking the **Get Current Host**, you will get your local IP address. Input a value in the Report Interval time based on how often you want the device server to report its status.

4.1.3.2 Networking

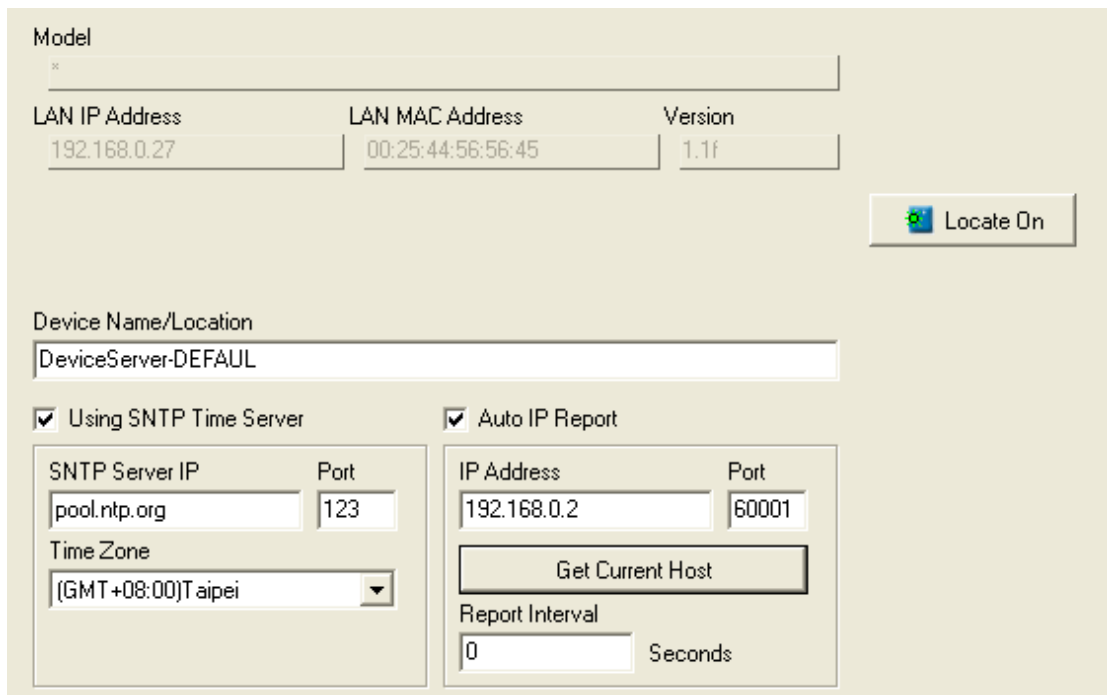You must assign a valid IP address for the device before attaching it in your network environment. Your network administrator should provide you the IP address and related settings. The IP address must be unique within the network (otherwise, DS will not have a valid connection to the network). You can choose from three possible "**IP configuration**" modes: Static, DHCP/BOOTP. The factory default IP address is "**192.168.10.2**"

Label	Description
Using Static IP	Manually assign an IP address to the device.
Using DHCP/BOOTP	Check this box to have the IP address automatically assigned by a DHCP server in your network.
IP Address	Enter the IP address of the device

Netmask	All devices on the network must have the same subnet mask to communicate on the network.
Gateway	Enter the IP address of the router in you network.
DNS1/2	Enter the IP addresses of the primary and secondary DNS servers, The DNS server translates domain names into IP address.

4.1.3.3 Upgrade Firmware

You can find up-to-date firmware from ORing's website. To update firmware for the device, save the firmware file in your host PC, and then specify the file location by clicking on the Browsing button and continue operation by pressing Update.

4.1.3.4 Save/Load

This page allows you to save the current configuration file to any local drive or any network drive to which your management computer can connect.
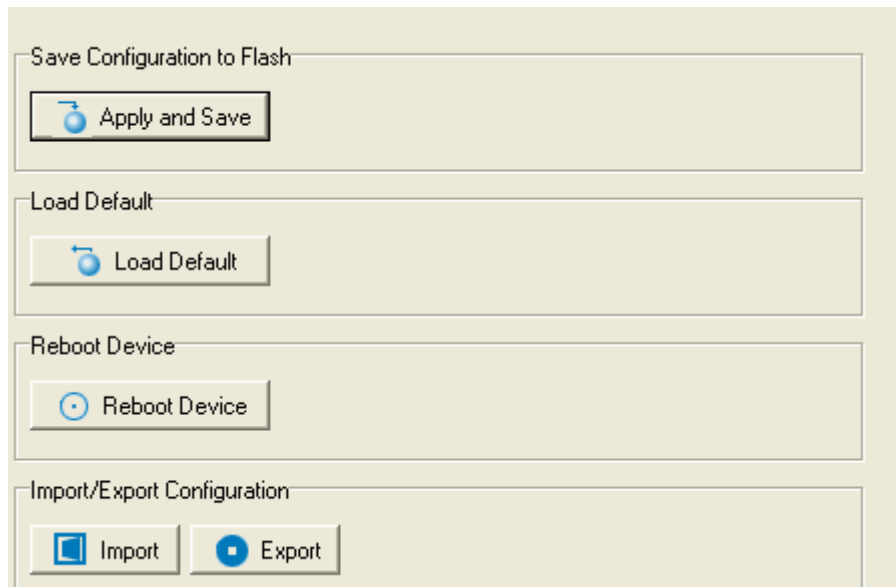
Label	Description
Apply and Save	Click this button will save all applied settings into the flash of the appliance
Load Default	All parameters changes to factory's default except network

	settings. If you want to load all factory default, you need to press **Reset** button on the device (Hardware restore).
Reboot Device	Click this button will reboot device and need to broadcast again in order to search the device (warm start).
Import Configuration	Click this button will retrieve saved configuration file and apply it to in current device
Export Configuration	Saving the current parameters to a file and export it to a current host.

4.1.4 Configure Serial Port

You can configure the settings for each serial port by clicking on the port number in the left panel of the window. Once you click on a port, the following screen will show up in the right panel.
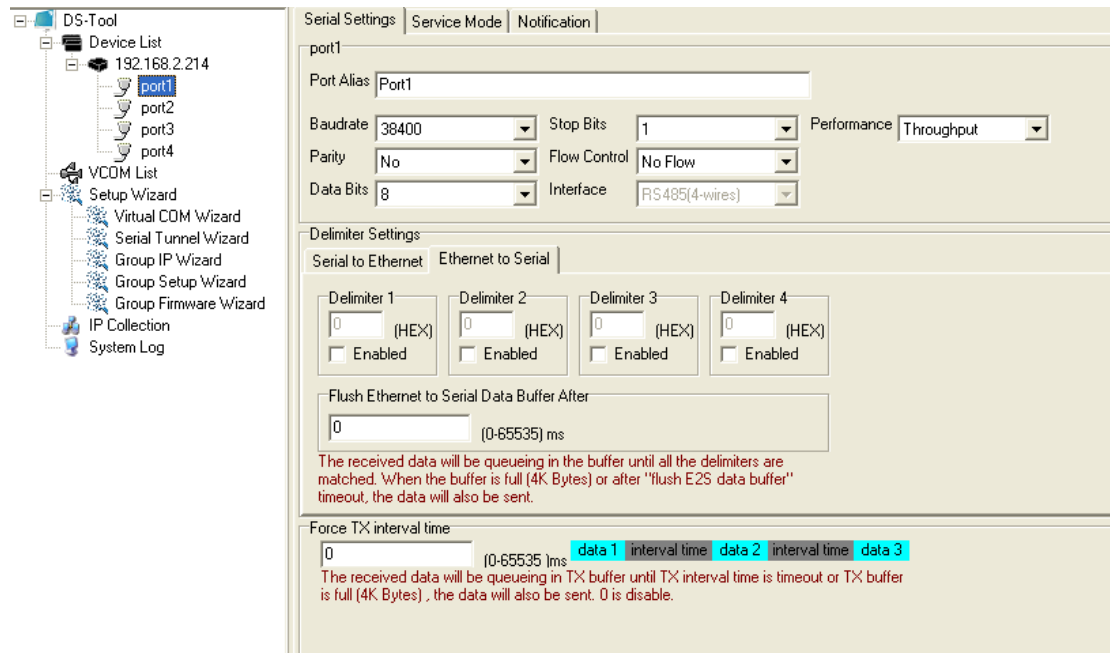
4.1.4.1 Serial Settings

The page allows you to configure serial parameters, serial communication modes, data packing options, and event notifications.

Label	Description
Port Alias	Port alias enables the device server to easily identify the serial devices connected to it. Enter an identifying name to be identified by the connected device.
Baud rate	Baud rate is the rate at which data is transferred over a serial link. When setting the baud rate to 9600bps, the serial port will transfer a maximum of 9600 bits per second. You can select a baud rate from the drop-down list which ranges from 110bps to 460800bps
Parity	Parity is a simple form of error detection which guards data on the cable between the connected devices and the serial port. Available options include: **None**: parity checking is not performed and the parity bit is not transmitted. **Odd**: the number of mark bits in the data is counted, and the parity bit is asserted or unasserted to obtain an odd number of mark bits. **Even**: the number of mark bits in the data is counted, and the parity bit is asserted or unasserted to obtain an even number of

	mark bits.
	Mark: the parity bit is always set to the mark signal condition (logical 1)
	Space: the last transmitted data bit will always be a logical 0
Data Bits	Choose the number of data bits to transmit. You can configure data bits to be 5, 6, 7, or 8. Data is transmitted as a series of five, six, seven, or eight bits (five and six bit data formats are used rarely for specialized communications equipment).
Stop Bits	Choose the number of bits used to indicate the end of a byte. You can configure stop bits to be 1 or 2(1.5). If Stop Bits is 1.5, the stop bit is transferred for 150% of the normal time used to transfer one bit. Both the computer and the peripheral device must be configured to transmit the same number of stop bits.
Flow Control	Serial communication consists of hardware flow control and software flow control, so called as the control is handled by software or hardware. **XOFF** and **OXN** is software flow control while **RTS/CTS or DTR/DSR** is hardware flow control. Choose **XOFF** to tell the computer to stop sending data; then the receiving side will send an XOFF character over its Tx line to tell the transmitting side to stop transmitting. Choose **XON** to tell the computer to begin sending data again; then the receiving side will send an XON character over its Tx line to tell the transmitting side to resume transmitting. In hardware flow control mode, when the device is ready to receive data, it sends a CTS (Clear To Send) signal to the device on the other end. When a device has something it wants to send, it will send a RTS (Ready To Send) signal and waits for a CTS signal to come back its way. These signals are sent apart from the data itself on separate wires.
Interface	Choose an interface for your serial device. Available interfaces include **RS-232, RS-422, RS-485(2-wires), and RS-485(4-wires),**
Performance	**Throughput**: guarantees highest transmission speed. **Latency**: guarantees shortest response time.
Delimiter Settings	**Serial to Ethernet / Ethernet to Serial** For advanced data packing options, you can specify

	delimiters for Serial to Ethernet and / or Ethernet to Serial communications. You can define max. 4 delimiters (00~FF, Hex) for each way. The data will be hold until the delimiters are received or the option. **Flush Serial to Ethernet data buffer** times out. **0** means disable. Factory default is **0**. **Flush Data Buffer After:** The received data will be queuing in the buffer until all the delimiters are matched. When the buffer is full (4K Bytes) or after "**flush S2E data buffer**" timeout the data will also be sent. You can set the time from 0 to 65535 seconds.
Force TX Interval Time	Force TX interval time is to specify the timeout when no data has been transmitted. When the timeout is reached or TX buffer is full (4K Bytes), the queued data will be sent. **0** means disable. Factory default value is **0**.

4.1.4.2 Service Mode

Virtual COM Mode

In Virtual COM Mode, the driver establishes a transparent connection between host and serial device by mapping the port of the serial server serial port to a local COM port on the host computer. Virtual COM Mode also supports up to 5 simultaneous connections, so that multiple hosts can send or receive data by the same serial device at the same time.

Label	Description
Data Port	Set the port number for data transmission.
Idle Timeout	When a serial port stops data transmission for a defined period of time (Idle Timeout), the connection will be closed and the port will be freed and try to connect with other hosts. **0** means the function is disabled which is also the factory default value. If multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send a TCP alive-check package in each defined time interval (Alive Check) to remote host to check the the status of TCP connections. If the TCP connection is not alive, the connection will be closed and the port will be freed. **0** means the function is disabled which is also the factory default value.
Max Connection	The number of max connections can be supported simultaneously is **5**; default values is **1**.
Map Virtual COM	Select a Virtual COM name to map on.

TCP Server Mode

In TCP Server mode, the serial port on the device server is assigned a unique port number. The host computer initiates contact with the device server, establishes the connection, and receives data from the serial device. Five simultaneous connections are supported in this mode, enabling multiple hosts to collect data from the same serial device at the same time.

Label	Description
Data Port	Set the port number for data transmission.
Auto Scan	Scan the data port automatically.
Idle Timeout	When a serial port stops data transmission for a defined period of time (Idle Timeout), the connection will be closed and the port will be freed and try to connect with other hosts. **0** means the function is disabled which is the factory default value. If multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send a TCP alive-check package in each defined time interval (Alive Check) to remote host to check the TCP connection. If the TCP connection is not alive, the

	connection will be closed and the port will be freed. **0** means the function is disabled which is the factory default value**.**
Max Connection	The number of maximum connections can be support simultaneously is **5**; default values is **1**.
Destination Host	Input the IP address of the host.

TCP Client Mode

In TCP Client mode, the device can establish a TCP connection with the server by the method you have settled (Startup or any character). After the data has been transferred, the device can disconnect automatically from the server by using the TCP alive check time or idle time settings.

Label	Description
Destination Host	Input the IP address of the host.
Port	Set the port number of data port.
Idle Timeout	When a serial port stops data transmission for a defined period of time (Idle Timeout), the connection will be closed and the port will be freed and try to connect with other hosts. **0** means the function is disabled which is the factory default value. If multilink is configured, only the first host connection is effective for this setting.

Alive Check	The serial device will send a TCP alive-check package in each defined time interval (Alive Check) to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. **0** means the function is disabled which is the factory default value.
Connect on Startup	The TCP Client will build a TCP connection once the connected serial device is started.
Connect on Any Character	The TCP Client will build a TCP connection once the connected serial device starts to send data.

UDP Mode

Compared to TCP communication, UDP is faster and more efficient as you can unicast or multicast data from the serial device server to host computers, and the serial device can also receive data from one or multiple host.

Label	Description
Listening Port	IP port for listening incoming messages
Destination Host Begin / End	If there are more than one destination hosts, specify the IP address range by inputting a value in destination host IP begin / end fields. You can also auto scan the sending port number of the device
Sending Port	IP port for sending outgoing messages

For Modbus mode settings, please refer to the next section.

4.2 Web Management

The device can be managed via a built-in web server which supports Internet Explorer (Internet Explorer 5.0 or above versions) and other Web browsers such as Chrome. Therefore, you can manage and configure the device easily and remotely. You can also upgrade firmware via a Web browser. The Web management function not only reduces network bandwidth consumption, but also enhances access speed and provides a user-friendly viewing screen.

Note: By default, IE5.0 or later version do not allow Java applets to open sockets. You need to modify the browser setting separately in order to enable Java applets for network ports.

Management via Web Browser

Follow the steps below to manage your device via a Web browser

System Login

1. Launch an Internet Explorer.
2. Type http:// and the IP address of the device. By default, this is 192.168.10.2. Then press **Enter**.
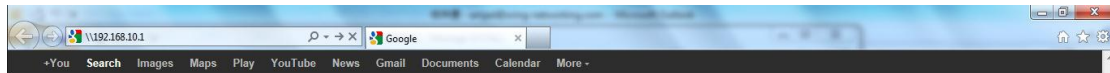
3. A login screen appears.
4. Log in with the default user name "admin". By default, no password is required; however, you can set up a password later in the management page.
5. Press **Enter** or click **OK**, the management page appears.
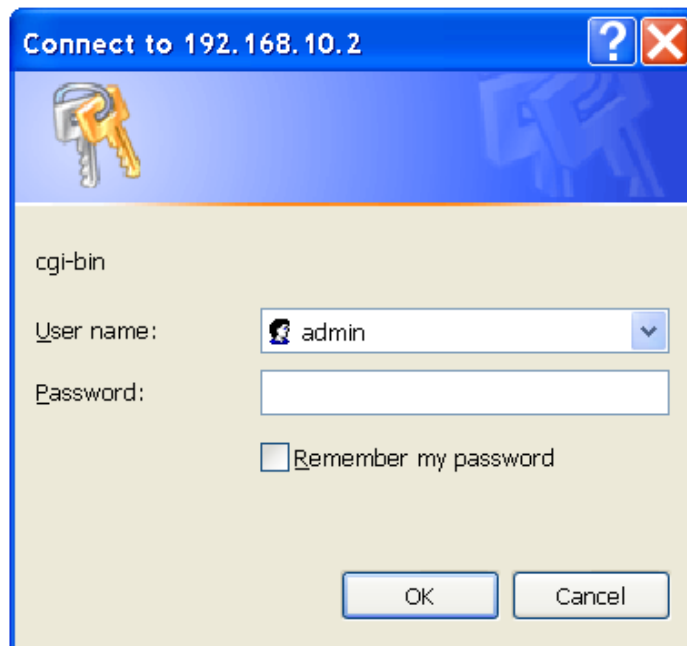
Note: you can use the following default values:

IP Address: **192.168.10.1**

Subnet Mask: **255.255.255.0**

Default Gateway: **192.168.10.254**

User Name: **admin**

After logging in, you will see the information of the device as below.
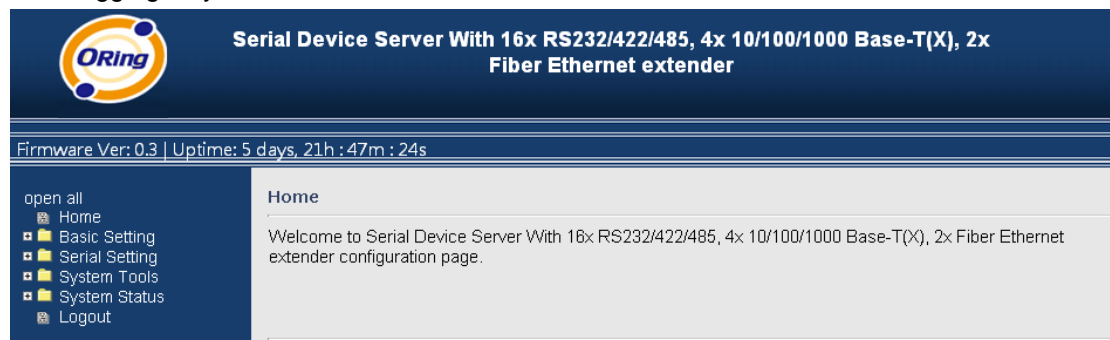
On the left hand side of the management interface shows links to various settings. Clicking on the links will bring you to individual configuration pages.

4.2.1 Basic Settings

4.2.1.1 LAN

This page allows you to configure the IP settings of the LAN for the device. The LAN IP

address is private to your internal network and is not visible to Internet.

Label	Description
Device Name	Enter the name of your device
Protocol	Choose to use static or DHCP protocols. Choose DHCP if your ISP dynamically assigns an IP address on connection. Choose static if the ISP provides you with a static (permanent) IP address and does not assign it dynamically. You need to set up IP address, subnet mask, and gateway information from your ISP.
IP Address	The IP address of the LAN. The default value is 192.168.10.1
Subnet Mask	The subnet mask of the LAN. The default value is 255.255.255.0
Gateway	Enter the IP address of default gateway.
DNS Server 1/2	Enter a valid IP address of the primary DNS server and a valid

	IP address of the secondary DNS server.
G5/G6 SFP Speed	Select a speed for the SFP port.

4.2.2 Serial Setting

4.2.2.1 Serial Configuration

This page allows you to configure serial port parameters.

	Port1 ▼	
Port Alias	Port1	
Interface	RS232 ▼	
Baud Rate	38400 ▼	
Data Bits	8 ▼	
Stop Bits	1 ▼	
Parity	None ▼	
Flow Control	None ▼	
Force TX Interval Time	0	ms
Performance	⦿ Throughput ○ Latency	

Label	Description
Port Alias	Enter the COM port number that modem is connected to
Interface	Choose an interface for your serial device. Available interfaces include **RS-232, RS-422, RS-485-2W, and RS-485-4W**.
Baud Rate	Choose a baud rate in the range between 110 bps and 11520 bps
Data Bits	Choose the number of data bits to transmit. You can configure data bits to be 5, 6, 7, or 8. Data is transmitted as a series of five, six, seven, or eight bits (five and six bit data formats are used rarely for specialized communications equipment).

Stop Bits	Choose the number of bits used to indicate the end of a byte. You can configure stop bits to be 1 or 1.5(2). If Stop Bits is 1.5, the stop bit is transferred for 150% of the normal time used to transfer one bit. Both the computer and the peripheral device must be configured to transmit the same number of stop bits.
Parity	Chose the method of detecting errors in transmission. Parity control bit modes include None, Odd, Even, Mark, and Space. **None**: parity checking is not performed and the parity bit is not transmitted. None is the most common parity setting with error detection handled by a communication protocol. **Odd**: the last data bit transmitted will be a logical 1 if the data transmitted had an odd amount of 0 bits **Even**: the last data bit transmitted will be a logical 1 if the data transmitted had an even amount of 0 bits. **Mark**: the parity bit is always set to the mark signal condition (logical 1) **Space**: the last transmitted data bit will always be a logical 0
Flow Control	Serial communication consists of hardware flow control and software flow control, so called as the control is handled by software or hardware. XOFF and OXN is software flow control while RTS/CTS or DTR/DSR is hardware flow control. Choose **XOFF** to tell the computer to stop sending data; then the receiving side will send an XOFF character over its Tx line to tell the transmitting side to stop transmitting. Choose **XON** to tell the computer to begin sending data again; then the receiving side will send an XON character over its Tx line to tell the transmitting side to resume transmitting. In hardware flow control mode, when the device is ready to receive data, it sends a CTS (Clear To Send) signal to the device on the other end. When a device has something it wants to send, it will send a RTS (Ready To Send) signal and waits for a CTS signal to come back its way. These signals are sent apart from the data itself on separate wires.
Force TX Interval Time	This setting will specify the timeout when no data has been transmitted. When the timeout is reached or TX buffer is full (4K Bytes), the queued data will be sent. **0** means disable. Factory default value is **0**.

| Performance | **Throughput**: This mode is optimized for the highest transmission speed.
Latency: This mode is optimized for the shortest response time. |

4.2.2.2 Port Profile

Label	Description
Local TCP Port	Indicates the TCP port the device uses to listen to connections, and that other devices must use to contact the device. To avoid conflicts with well-known TCP ports, the default is set to **4000**.
Command Port	Indicates the listen TCP port for IP-Serial Lib commands from the host. In order to prevent a TCP port conflict with other applications, the user can set the Command port to another port if needed.
Flush Data Buffer After	The received data will be queuing in the buffer until all the delimiters are matched. When the buffer is full (4K Bytes) or after "Flush Data Buffer After" times out the data will also be sent. You can set the time from **0** to **65535** seconds.
Delimiter	For advanced data packing options, you can specify delimiters for Serial to Ethernet and / or Ethernet to Serial communications. You can define max. 4 delimiters (00~FF, Hex) for each way. The data will be hold until the delimiters are received or the option **Flush Serial to Ethernet data buffer** times out. **0** means disable. Factory default is **0**.

4.2.2.3 Service Mode
Virtual COM Mode

In Virtual COM mode, the driver establishes a transparent connection between the host and the serial device by mapping the port of the serial server to a local COM port on the host computer. Virtual COM mode also supports up to 5 simultaneous connections, so that multiple hosts can send or receive data by the same serial device at the same time.

	Port1 ▼
Data Encryption	○ Enable ● Disable
Service Mode	Virtual COM Mode ▼
Idle Timeout	0 (0~65535)seconds
Alive Check	40 (0~65535)seconds
Max Connection	1 ▼ max. connection (1~5)

Label	Description
Data Encryption	Click **Enable** and the data will be encrypted with SSL.
Idle Timeout	When serial port stops data transmission for a defined period of time (Idle Timeout), the connection will be closed and the port will be freed and try to connect with other hosts. **0** indicate disable this function. Factory default value is **0**. If Multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send TCP alive-check package in each defined time interval (Alive Check) to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. **0** indicate disable this function. Factory default is 0.
Max Connection	The number of maximum connections can be supported. The maximum value is **5**, default values is **1**.

Not allowed to mapping Virtual COM from web

TCP Server Mode

In TCP Server mode, IMG is configured with a unique port combination on a TCP/IP network. In this case, IMG waits passively to be contacted by the device. After the device establishes a connection with the serial device, it can then proceed with data transmission. The TCP Server mode also supports up to 5 simultaneous connections, so that multiple device can receive data from the same serial device at the same time.

	Port1 ▾
Data Encryption	○ Enable ◉ Disable
Service Mode	TCP Server Mode ▾
TCP Server Port	4000
Idle Timeout	0 (0~65535)seconds
Alive Check	40 (0~65535)seconds
Max Connection	1 ▾ max. connection(1~5)

Label	Description
Data Encryption	Click **Enable** and the data will be encrypted with SSL.
TCP Server Port	Set the port number for data transmission.
Idle Timeout	When serial port stops data transmission for a defined period of time (Idle Timeout), the connection will be closed and the port will be freed and try to connect with other hosts. **0** indicate disable this function. Factory default value is **0**. If Multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send TCP alive-check package in each defined time interval (Alive Check) to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. **0** indicate disable this function. Factory default is **0**.
Max Connection	The number of maximum connections can be supported. The maximum value is **5**, default values is **1**.

TCP Client Mode

In TCP Client Mode, the device can establish a TCP connection with the server by the method you set (Startup or any character). After the data has been transferred, the device can disconnect automatically from the server by using the TCP alive check time or idle timeout settings.

Port1 ▼	
Data Encryption	○ Enable ● Disable
Service Mode	TCP Client Mode ▼
Destination Host	0.0.0.0 : 4000
Idle Timeout	0 (0~65535)seconds
Alive Check	40 (0~65535)seconds
Connect on	● Startup ○ Any Character
Destination Host	Port
1.	65535
2.	65535
3.	65535
4.	65535

Label	Description
Destination Host	Set the IP address of host and the port number of data port. .
Idle Timeout	When serial port stops data transmission for a defined period of time, the connection will be closed and the port will be freed and try to connect with other hosts. **0** indicates disable this function. Factory default value is **0**. If multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send TCP alive-check packages in each defined time interval to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. **0** indicate disable this function. Factory default is **0**.
Connect	**Startup**: the TCP Client will build TCP connection once the connected serial device is started. **Any Character:** the TCP Client will build TCP connection once the connected serial device starts to send data.

UDP Mode

Compared to TCP communications, UDP is faster and more efficient. In UDP mode, you can uni-cast or multi-cast data from the serial device server to host computers, and the serial device can also receive data from one or multiple host.

Label	Description
Listen Port	Allows the user to set a new TCP port number to listen on rather than the default value of the device
Host Start/End IP	If there are more than one destination hosts, specify the IP address range by inputting a value in **Host Start** / **End IP**. You can also auto scan the sending port number of the device
Send Port	Set the send port number.

Modbus RTU Slave Mode

The Modbus RTU Slave mode allows communications between a host computer and a slave device. After a host computer sends a command, the slave device processes the command and returns a response to the host computer. This process is repeated, allowing the host computer to monitor and control controller operation.

Label	Description
TCP Server Port	Indicates the port used for the Modbus/TCP communication
Max Connection	The total number of remote TCP/IP clients allowed to connect to this server.

Max Try Time	The maximum number of request retries performed serially.
Request Pause	The delay between serial requests in milliseconds
Response Wait	The serial response timeout in milliseconds
Idle Timeout	Enter a TCP connection timeout in seconds. When no Modbus/TCP data is received within this timeout, the TCP connection will be dropped.

Modbus RTU Master Mode

The ModBus RTU Master mode is used to connect to the serial device which runs as RTU slave. Serial port server will connect to the remote TCP Server, which is also called Modbus TCP Slave.

Label	Description
Destination Host	Set the IP address of host and the port number of data port. .
Idle Timeout	When serial port stops data transmission for a defined period of time, the connection will be closed and the port will be freed and try to connect with other hosts. **0** indicate disable this function and is also the factory default value. If multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send TCP alive-check packages in each defined time interval to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. **0** indicate disable this function. Factory default is **0**.

Modbus ASCII Slave Mode

Modbus ASCII Slave mode works the same as Modbus/RTU Slave mode, except that the data format is Modbus/ASCII.

	only the first host connection is effective for this setting.
Alive Check	The serial device will send TCP alive-check packages in each defined time interval to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. **0** indicate disable this function. Factory default is **0**.

4.2.3 System Tools

4.2.3.1 Login Setting

User Authentication

Login settings.

Login Name:	admin
Old Password:	
New Password:	
Confirm New Password:	

Label	Description
Login Name	This field shows the current login username.
Old Password	Enter the password you currently use to login the system if any.
New Password	Enter a new login password. Acceptable characters of this field contains '**0-9**', '**a-z**', '**A-Z**' and must be between 0 and 15 characters in length.
Confirm New Password	Retype the new password for confirmation. Acceptable inputs of this field contains '**0-9**', '**a-z**', '**A-Z**' and must be between 0 and 15 characters in length.

4.2.3.2 Date & Time

In this page, you can set the date & time of the device. A correct date and time will help the system log events. You can set up a NTP (Network Time Protocol) client to synchronize date & time with a NTP server on the Internet.

Label	Description
NTP	Enables or disables NTP function
NTP Server 1	The primary NTP server
Port	Enter the port name
Time Zone	Select the time zone you are located in

4.2.3.3 Device Restart

This page allows you to configure restart settings for the device.

Label	Description
Restart Now	Click to restart the device via warm reset

4.2.3.4 Firmware Upgrade

ORing launches new firmware constantly to enhance device performance and functions. To upgrade firmware, download new firmware from ORing's website to your PC and install it via Web upgrade. Make sure the firmware file matches the model of your device. It will take several minutes to upload and update the firmware. After upgrade completes successfully, reboot the device.

Firmware Upgrade

Do NOT power off the Device while
upgrading!
Current Firmware Version: 0.10

選擇檔案　未選擇任何檔案
Start Web Upgrade

⚠️ During firmware upgrading, do not turn off the power of the device or press the reset button.

4.2.3.5 Save/Restore Configurations

This page allows you to save configurations or return settings to previous status. You can download the configuration file from the Web. Note: users using old versions of Internet Explorer may have to click on the warning on top of the browser and choose **Download File**.

Save/Restore Configurations

Save/Restore Configurations.

Save Current Configurations
Save

Restore previous saved configurations
Restore Mode: Web Restore ▼
選擇檔案　未選擇任何檔案   Web Restore

Restore factory default settings
Restore Factory Default Settings

Label	Description
Save	Click to save existing configurations as a file for future usage.

Restore Mode	You can restore configurations to previous status by installing a previous configuration file. To do this, choose **Web Restore** or **Tftp Restore**. If you choose **Web Restore**, you need to choose a file and click **Web Restore**. If you select **Tftp Restore**, fill in a Tftp server IP address and the file name before clicking **Tftp Restore**.
Restore Factory Default Setting	Click to reset the device to the factory settings. The device will reboot to validate the default settings.

4.2.3.6 Miscellaneous

This page enables you to run ping test which will send out ping packets to test if a computer is on the Internet or if the WAN connection is OK. Enter a domain name or IP address in the destination box and click **Ping** to test.

Miscellaneous

Miscellaneous utilities.

Ping Test: Destination: [   ] [Ping]
Ping Test Result:

4.2.4 System Status

4.2.4.1 System Info

This page displays the detailed information of the device including model name, description, firmware version, WAN, LAN and wireless settings.

System Info

System Info.

Model:	RDS-3166G	
Model Description:	Serial Device Server With 16x RS232/422/485, 4x 10/100/1000 Base-T(X), 2x Fiber Ethernet extender	
LAN:	IP Address	192.168.2.205
	Subnet Mask	255.255.255.0
	MAC Address	00:AA:BB:CC:DD:10

Technical Specifications

ORing Device Server Model	RDS-3166G	RDS-3086G
Physical Ports		
10/100/1000Base-T(X) Ports in RJ45 Auto MDI/MDIX	**4**	
100/1000Base-X with SFP port	**2**	
RS-232 Serial Console Port	RS-232 in RJ45 connector with console cable. 115200bps, 8, N, 1	
Serial Ports		
Connector (10-pin RJ48)	RJ48 x 16	RJ48 x 8
Operation Mode	RS-232/422/485	
Serial Baud Rate	50 bps to 921.6 Kbps	
Data Bits	7, 8	
Parity	odd, even, none, mark, space	
Stop Bits	1, 1.5, 2	
RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND	
Flow Control	XON/XOFF, RTS/CTS, DTR/DSR	
Network Protocol		
Protocol	ICMP, IP, TCP, UDP, DHCP, BOOTP, SSH, DNS, SNMP V1/V2c, HTTPS	ICMP, IP, TCP, UDP, DHCP, BOOTP, SSH, DNS, SNMP V1/V2c, HTTPS, SMTP, DDNS, PPPoE
LED indicators		
Power indicator	Green On: Power is on	
10/100/1000Base-T(X) RJ45 port indicator	Green for Link/Act indicator. Dual color LED for speed indicator : Green for 1000Mbps, Amber for 100Mbps, Off for 10Mbps	
LED Display System (Front panel)	Serial TX / RX LEDs: Green for Serial port transmitting data, Amber for Serial port receiving data G1~G6 : Green for port Link/Act Fault : indicate unexpected event occurred	
Power		
Power Input	100-240VAC with power socket	
Power consumption (Typ.)	14.4 watts.	13.4 Watts
Overload current protection	Present	
Physical Characteristic		
Dimension (W x D x H)	443.7 (W) x 211.5 (D) x 44 (H) mm	
Weight (g)	2891 g	
Environmental		
Storage Temperature	-40 to 85ºC (-40 to 185ºF)	
Operating Temperature	-40 to 70ºC (-40 to 158ºF)	
Operating Humidity	5% to 95% Non-condensing	
Regulatory approvals		
EMI	FCC Part 15, CISPR (EN55022) class A, EN50155 (EN50121-3-2, EN55011, EN50121-4)	
EMS	EN61000-4-2 (ESD) EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS),	

	EN61000-4-8, EN61000-4-11
Shock	IEC60068-2-27
Free Fall	IEC60068-2-32
Vibration	IEC60068-2-6
Safety	EN60950-1
Warranty	5 years