DG-A6 Serial Port Server
User Manual

Kyland Technology (Shanghai) Co., Ltd.

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Version: 1.2

Revision History

Version	Author	Revisor	Date	Contents of revision
V1.1	Bruce Li	Bruce Li	8/15/2016	Add Network Bridge function in 3.3. Netowrk Settings page. Eth0/eth1 and eth4/eth5 can be configured as two independent Bridges respectively.
V1.2	Bruce Li	Bruce Li	22/09/2016	1. Function update in chapter 3.3 Network Configuration, change network bridge to virtual NIC binding. 2. Add “Firmware Update” in chapter 3.8

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Table of Contents

1. Product Introduction

1.1. Overview

DG-A6 series serial port server is an industrial designed 1U 19”rack-mount device. It supports 8 RS-232/RS485/RS422 serial ports and optional additional 8 RS-485 serial ports. It provides full network access ability with independent 6 10/100M Ethernet ports. Each Ethernet port can be mapped freely to access indicated RS232/RS485/RS422 serial port of the device. Furthermore, multiple network clients can transparently and concurrently access to specified serial port for redundancy. It is important to support back-up power supply in industrial environment, and hence DG-A6 series serial port server supports dual AC/DC power inputs by internally using independent power modules for extra reliability. DG-A6 series serial port sever is also a value-added intelligent device to run 3rd part software based on Linux. The built-in hardware encryption chips will help 3rd part developing group to protect their custom software binding to the device.

Figure 1.1-1 Schematic view of front panel of DG-A6

Figure 1.1-2 Schematic view of rear panel of DG-A6

1.2. Packing information and open-box inspection

- **Packing information**

Check the packing list for details.

- **Open-box inspection**

Before unpacking, place the box on a stable surface and pay attention to the orientation of packing box with right side up, so as to prevent DG-A series gateway products from droping out when the box is opened.

After unpacking, count the quantity of items (including main device, device accessories, user manual, and optical disk, etc.) according to the packing list, and inspect the appearance of device.

1.3. Key features

- High performance of 800MHz processor
- 512M DDR3 RAM, 512M Flash
- 6 x 10/100M independent Ethernet ports
- Built-in RTC and buzzer
- Built-in temperature sensor
- Built-in hardware encryption
- 1U, 19” inch, fan-less design
- Configurable redundant LAN access to serial ports
- Support dual AC/DC power inputs
- Support extreme operating temperature range of -40 ℃ to 85 ℃

1.4. Specifications

Performance

CPU: Cortex-A8 800MHz processor
RAM: 512MB DDR3 SDRAM
Flash: 512MB Flash

Ethernet Interface

LAN: 6 x 10/100M 8-pin RJ45
Magnetic Isolation: 1.5KV built-in

Serial Interface & Signal

Number of Ports: 8 or 16
RS-485-2w: D+, D-, GND
RS-485-4w/RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-232: TxD, RxD, GND
Serial Line Protection: 15KV ESD for all signals
Flow control: ADDC® (Automatic Data Direction Control) for RS-485

LED

System: PWR, RUN, FAILURE
Serial: TXD, RXD
LAN: ACT, LINK (RJ45)
P0-P3: Custom programmable

RTC

RTC: RTC with backup-battery

Physical Characteristics

Housing: SECC (1mm)
Weight: 6kg

Dimension: 440×300×45mm
Installation: 19’’ rack mounting

Environmental Limits

Operating temperature: -40℃～85℃
Operating humidity: 5～95% RH
Storage temperature: -40℃～85℃
Vibration resistance: 1G@IEC-68-2-6,sine wave, 5~500 Hz, 1 Oct./min,1 hr/axis
Shock resistance: 5G@IEC-68-2-27,half-sine wave, 30 ms

Power Requirements

Input voltage: 85~264 VAC/77~300VDC (for HV model) /9~30VDC (for DC model)
Power Consumption: < 6 W

Standards and Certifications

EMI: EN 55022 Class A
EMC: EN 55024
EN 61000-4-2(ESD) Level3
EN 61000-4-4(EFT) Level4
EN 61000-4-5(Surge) Level3
CE Certification

Software

OS: Embedded Linux Kernel 3.6
Network Protocols: TCP, UDP, IPv4, SNMPv1/v2/v3, ICMP, ARP, HTTP, DHCP, NTP, NFS, SMTP, Telnet, FTP, TFTP, PPP, PPPoE
Security Protocols: HTTPS, SSH, PAP, CHAP
Watchdog: Programmable
WEB Configuration： YES
3rd Part Software Development Kit

- GNU C/C++ library
- GNU C/C++ cross-compiler
- API Library (WDT, RTC, Buzzer, temperature sensor, hardware encryption access etc.)

Reliability

Alert: Built-in buzzer
Temperature: Built-in temperature sensor
Watchdog: WDT monitoring
MTBF: >50000 hours

Warranty

Warranty Period: 5 years, see http://www.kyland.com/support/zhibaozhengce.html

2. Installation and wiring

2.1. Overview

This chapter mainly describes how to install and connect the product effectively.DG-A6 uses rackmount installation.

2.2. Installation of DG-A6

DG-A6 can be directly mounted on a standard 19-inch rack. Use 4 screws and a pair of L-shaped metal brackets to fix the device on the rackmount rail and make sure device shellground is well earthed. See figure below:

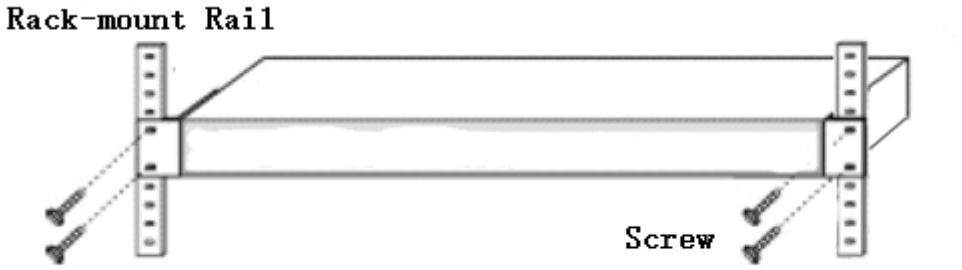


Figure 2.2 Schematic diagram of rack mounting of DG-A6

2.3. Wiring of DG-A6

2.3.1. Power connection

The standard power input voltage of DG-A6 is 9~36VDC or 85~264VAC/77~300VDC, and please connect the power source of the device in strict accordance with the following steps:

- Connect the power line and earth wire to the power socket of the device;
- Check status of PSW indicator lamp for DG-A6 working power supply;
- In case of any abnormality, please turn off the power or directly unplug the power cord as soon as possible, and then seek for technical support from our company.

☆ Note: It's recommended to complete the power connection and debugging of DG-A6 device before connection with network and serial devices.

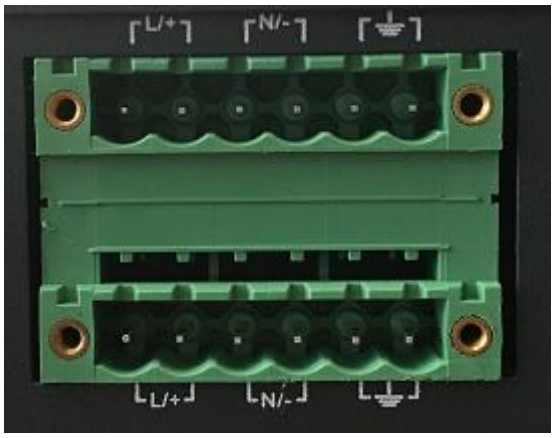


Figure 2.3.1 Pinout diagram of power input

2.3.2. Network connection

DG-A6 provides 6 independent 10/100Base-T Ethernet ports in its standard configuration, and the factory default configuration is show in the table below:

Ethernet Port	NIC Name	IP address	Subnet mask	Default gateway
LAN1	Eth0	192.168.0.111	255.255.255.0	192.168.0.1(Please change the default gateway in accordance with each network interface for normal use)
LAN2	Eth1	192.168.1.111	255.255.255.0	
LAN3	Eth2	192.168.2.111	255.255.255.0	
LAN4	Eth3	192.168.3.111	255.255.255.0	
LAN5	Eth5	192.168.5.111	255.255.255.0	
LAN6	Eth4	192.168.4.111	255.255.255.0	

2.3.3. Serial Connection

DG-A6 supports 8 or 16 serial channels of RS-232/422/485 communication. For 8-channel DG-A6, all channels support RS-232/422/485. For 16-channel DG-A6, only first 8 channels support RS-232/422/485, the rest 8 channels only support 2-wire RS-485.

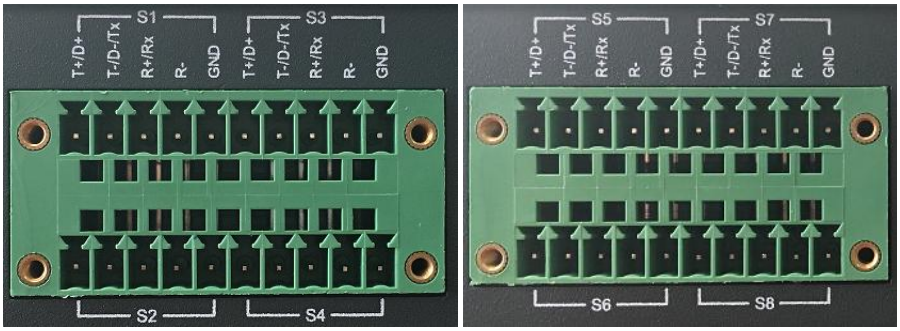


Figure 2.3.3-1 Pinout diagram of ports S1~S8

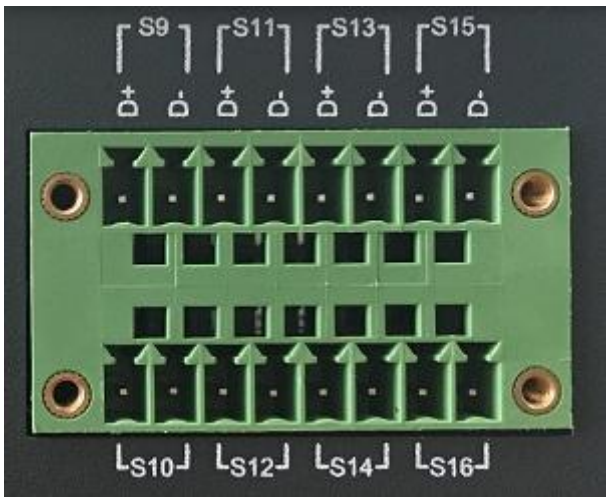
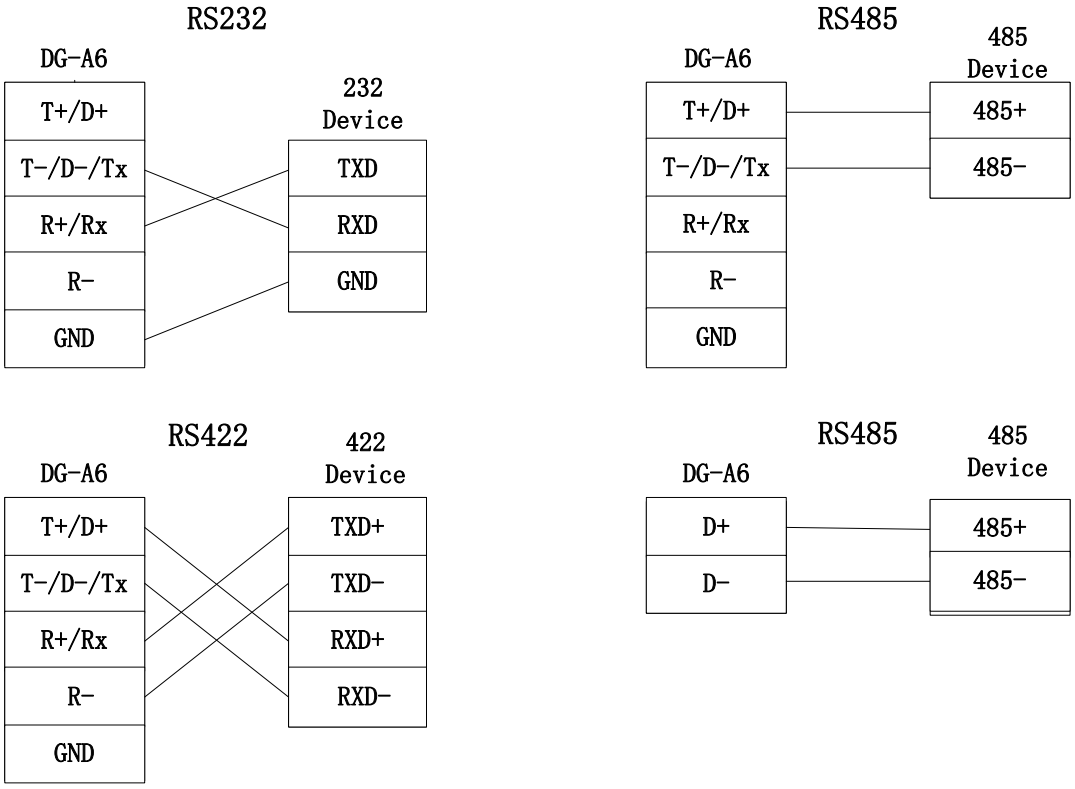


Figure 2.3.3-2 Pinout diagram of serial ports S9~S16

Pin assignment definition is illustrated below:

Port No.	Serial Mode	Pin assignment	Pin assignment definition		
			RS232	RS422	RS485
S1~S8	RS232/485/422	T+/D+	NONE	RS422 Transmit-	RS485 Data+
		T-/D-/Tx	RS232 Transmit	RS422 Transimit+	RS485 Data -
		R+/Rx	RS232 Receive	RS422 Receive+	NONE
		R-	NONE	RS422 Receive-	NONE
		GND	Signal ground	NONE	NONE
S9~S16	RS485	D+	RS485 Data+		
		D-	RS485Data-		

Wiring guidance for connecting DG-A6 to RS-232/422/485 devices:



3. Serial port server configuration

3.1. Login

Connect PC and LAN1(Eth0) with Ethernet cable, and then open web browser（Firefox or Google Chrome is preferred）, type 192.168.0.111 in the address bar and enter to Login interface shown below:

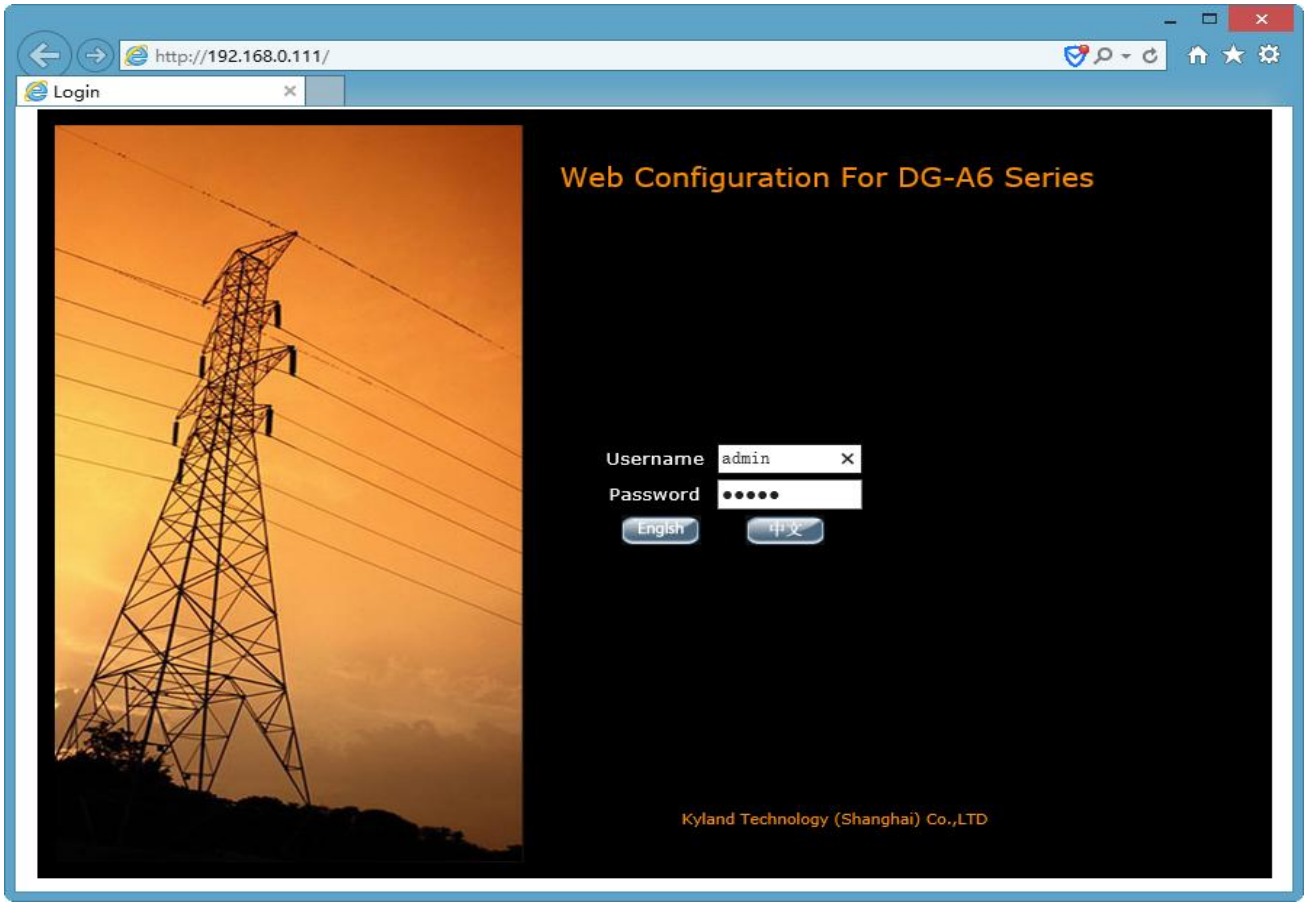


Figure 3.1 Login page

The default user name is: admin and the default password is: admin. The main configuration interface will be shown after successfully login.

Figure 3.2 Web console page

3.2. Basic settings

Authentication notification

Every device will be authenticated by manufacturer before dispatching. If the device is unauthenticated or in some cases the authentication file is lost, you will see the figure below reminding you to enter authentication code. Unauthenticataed device will be unable to be activated. In this case, please contact us for authentication.

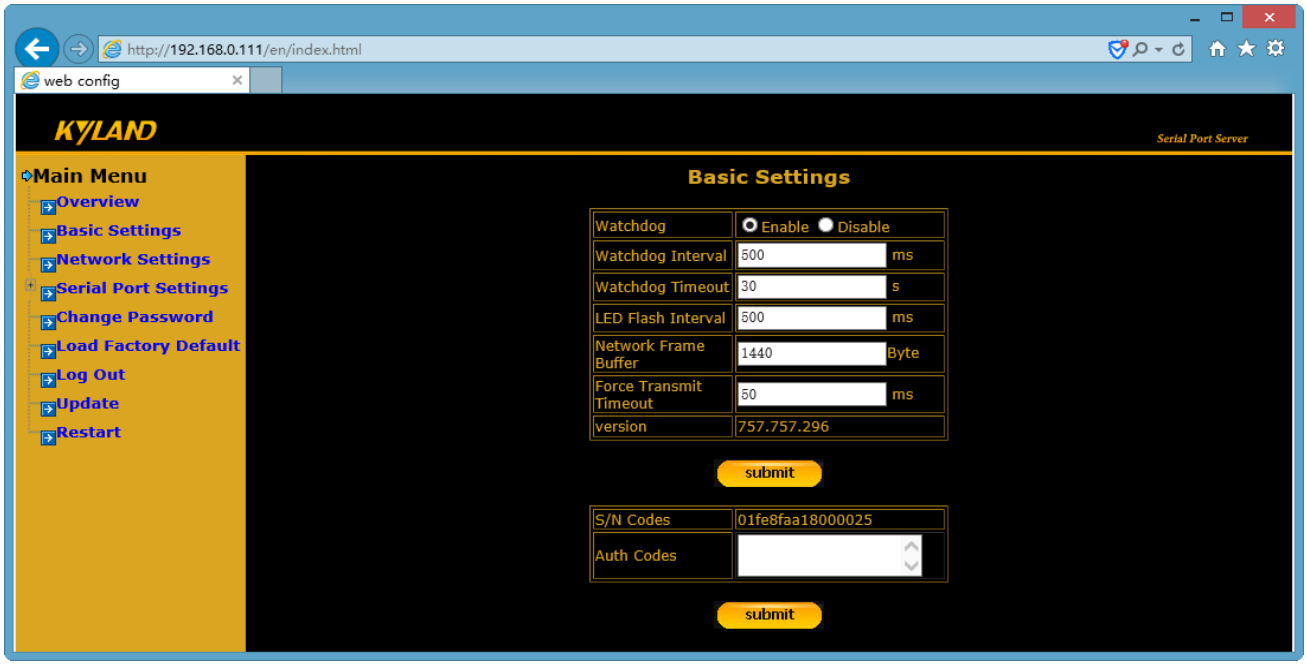


Figure 3.2-1 Authentication notification page

You can configure “Watchdog”, “LED”, etc. in basic settings in main menu.The details are illustrated below:

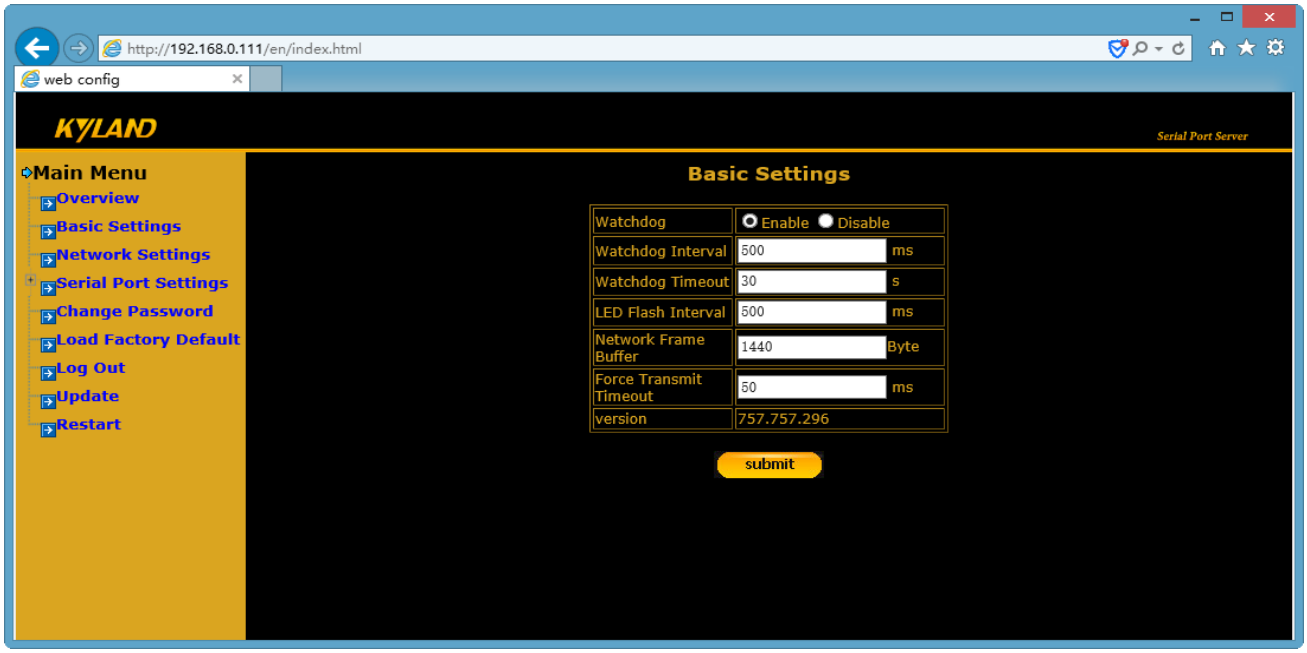


Figure 3.2-2 Basic settings page

Basic settings parameters definition

Parameters	Range	Description
Watchdog interval	10~60000(ms)	Interval between two resetting watchdogby programme, default is 500ms
Watchdog timeout	10~300(s)	Watchdog reset timeout, default is 120s
LED flashing frequency	500~1000（ms）	Default is 500ms
Network frame buffer	1~1448（byte）	Maximum size of serial data can be transmitted to network, default is 1440 bytes
Force transmit timeout	10~10000（ms）	This parameter refers to the interval between two received serial data. If the gap of two receviced serial data is shorter than the setting value then the serial data will be accumulated in the buffer until it exceeds the buffer size, otherwise the data accumulated in the buffer will be sent out to network. Default is 50ms

3.3. Network settings

You can configure IP address for certain network interface, subnet mask and default gateway in the network settings in the main menu. Besides, DG-A6 supports multiple network interface card binding function, which binds two or more network interfaces to one virtual network interface card, making each network interface bound share one or more IP address. In terms of DG-A6, only one virtual network interface card can be configured (bond 0), whose MAC address can be modified by users as long as no conflict occurs with other MAC addresses. The default MAC address for virtual NIC is 11:22:33:44:55:66. The maximum number of network interfaces can be bound to virtual NIC is 6, and please beware that each network interface you bind should be in the same subnet and should not conflict with other IP addresses on other NICs(which must be in different subnet).

There are two options for binding mode:

Option 1(default option): means fault-tolerance (active-backup), which provides network redundancy. In terms of all network interfaces bound to virtual NIC, only one interface is working at one time, and the others will be in backup state. When the main link is down, the

backup link will be up.

Option 0: means load-balance (round robin). All network interfaces bound to virtual NIC are working and each shares the same network load. Note: LAN5 and LAN6 do not support this option.

See figure below:

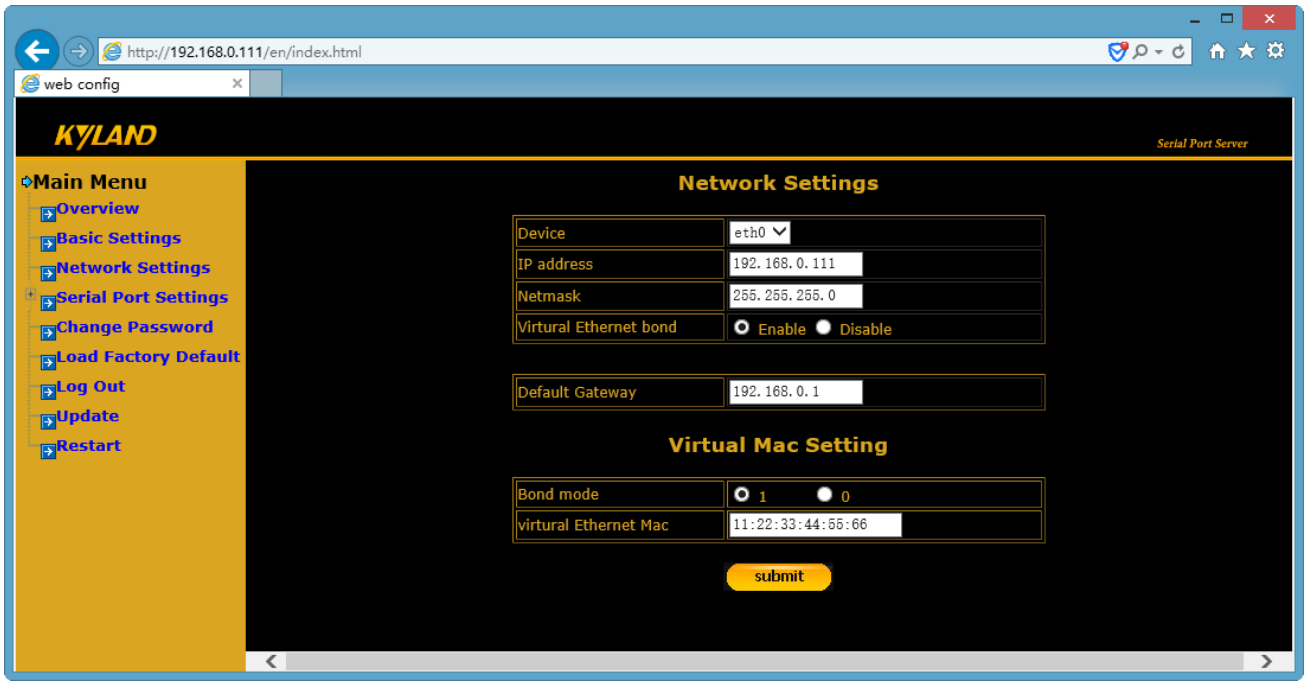


Figure 3.3 Network settings page

3.4. Serial settings

You can configure all serial ports' parameters, e.g. baud rate, serial mode, network mode, etc. in the serial settings in the main menu. See figure below:

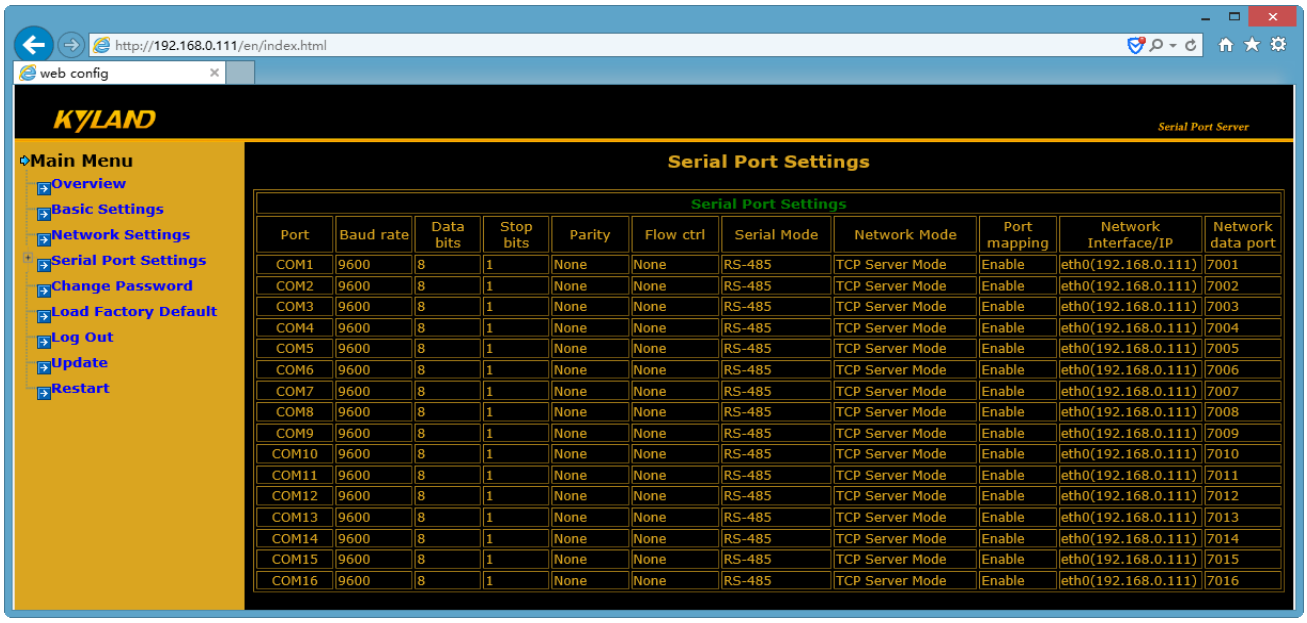


Figure 3.4-1 Serial settings overview page

Click any COM to enter to the configuration panel, and then you can modify parameters here. See figure below:

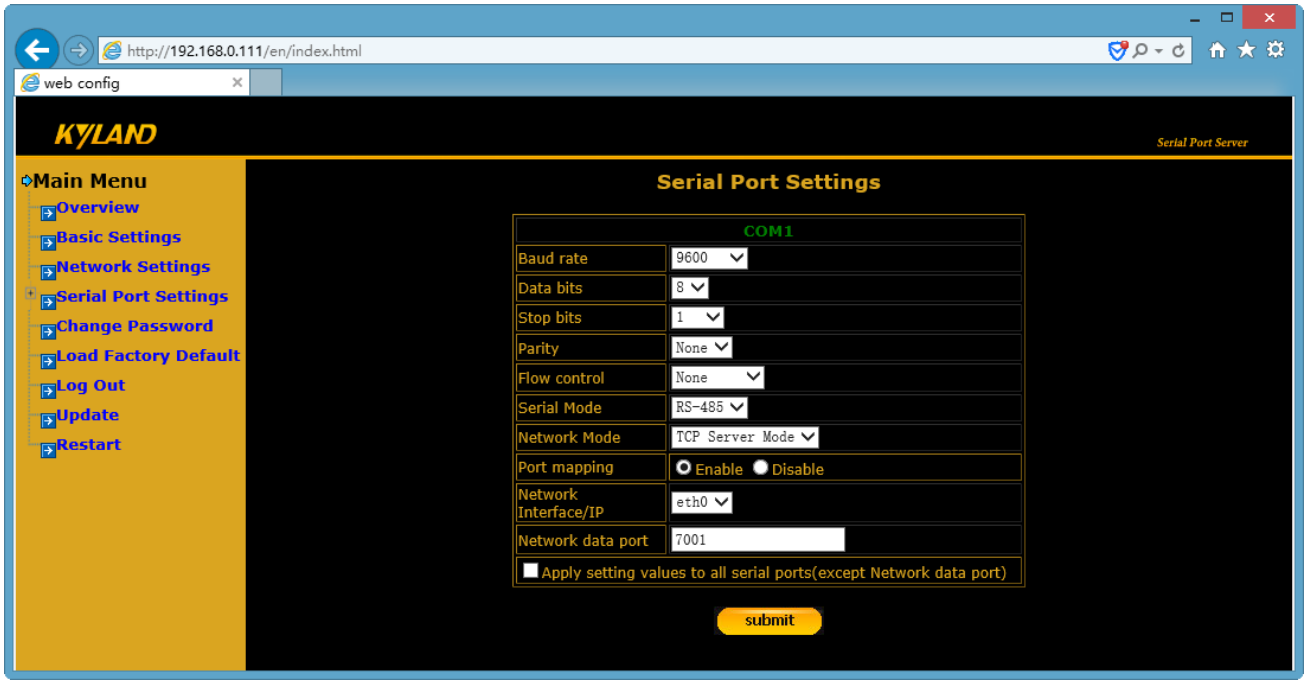


Figure 3.4-2 Serial port settings page

Parameters and descriptions:

Parameters	Function description
Baud rate	300bps to 115200 bps
Data bits	5,6,7,8
Stop bits	1,1.5,2
Parity	None, Odd, Even,Mark
Flow control	None, XON/XOFF,Hardware
Serial mode	RS-422，RS-485，RS-232
Network mode	TCP server，TCP client，UDP Mode
Port mapping	Enable（to map the serial port to corresponding network port）,Disable
Network Interface/IP	eth0~eth3 and Any（no specific network interface is assigned, any interface can be used at the same time）
Network data port	0~65535
Apply above settings to all ports	(Except network data port)

Note: After completing serial configuration, please enable port mapping. In TCP Server mode, please select the network interface you want to map, “ANY” means that any interfaces within eth0 and eth1 can be used at the same time.In TCP Client mode and UDP mode, you need to enter the destination IP address. Each network port can be and only be mapped to one serial port in TCP Server mode.

3.5. Change password

You can change the login password by entering change password in the main menu. After setting up new password, please submit and restart server and re-login using the new password. See figure below:

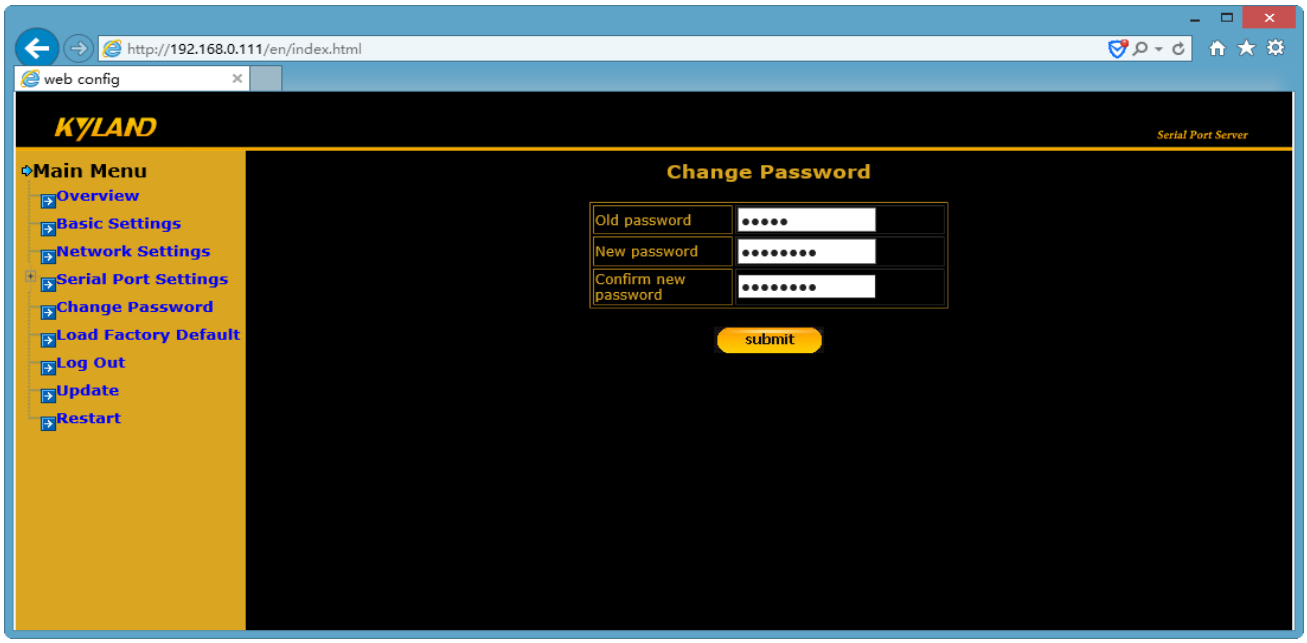


Figure 3.5 Change password page

3.6. Load factory default

Click “Load factory default” in the main menu and submit to load the default settings after rebooting. See figure below:

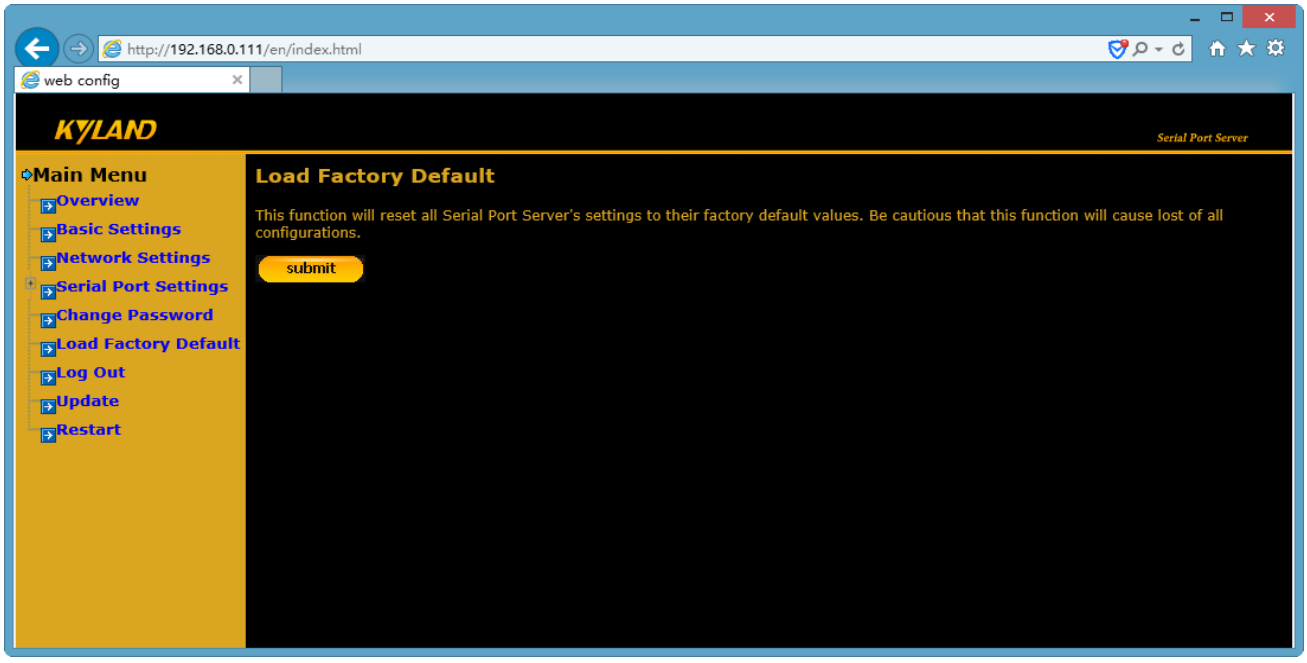


Figure 3.6 Load factorydefalt page

3.7. Log out

Click Log out in the main menu to quit the web configuration page.

3.8. Firmware Upgrade

If you want to update the firmware, please click the firmware update button in the main menu and choose the proper file, e.g. edpsts.upgrade.tgz, and then click submit to complete file upload. Then, restart the system to complete firmware upgrade.

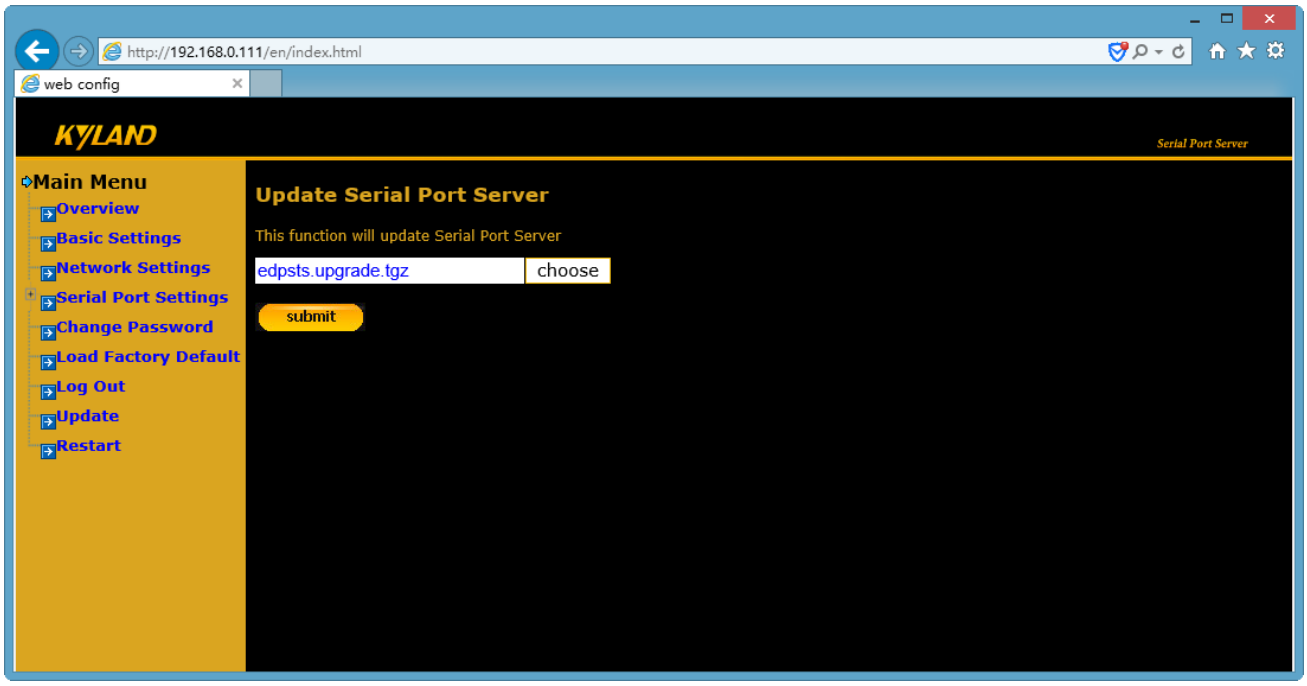


Figure 3.8 Upgrade page

3.9. Restart

Click Restart to reboot the system。To activate the modifications you need to submit settings and then restart system. See figure below

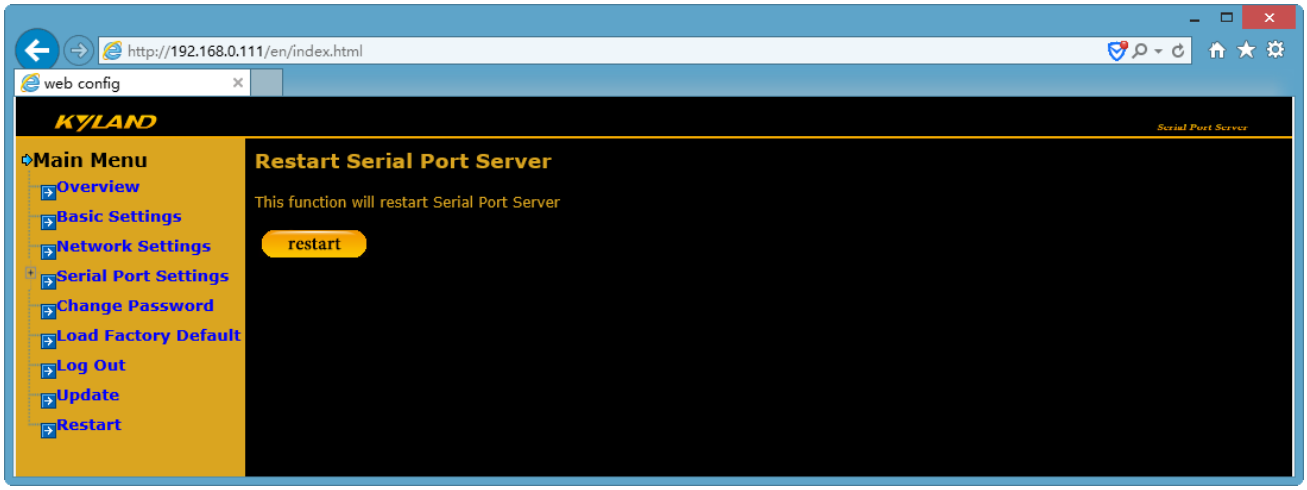


Figure 3.9 Restart page