NP301

User Manual

Statement

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Agreement

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Revision History

Version No.	Date	Reason
V1.0.0	2011.07	Creating Documents
V3.1.0	2011.11	Modify Documents

Notes

In reading this manual, please pay attention to the following symbols,

： Information necessary to explain.

：Special attention.

Content

Chapter 1   Summarize

1.1 Introduction

NP301 serial device server is designed to make your serial devices internet ready instantly. It provides 1 port RS232/485/422 (RS232, DB9M; RS485/422, 5 bit terminal block) and 1 port 10/100Base-T(X).It makes them ideal choice for connecting decentral serial devices and Host computer to an IP based Ethernet, making it easily and conviniently for your management. Its software can be setting and updating by serial program group in the application. It supports TCP, UDP, ARP, ICMP, DHCP and Windows Native COM, LLF functions.

What's more, NP301 serial devices server provides powerful management configuration tools based on Windows, guiding users' configuration of the devices step by step. All configurations can be done by network and serial port, supporting communication across gateway and router. In addition, it allows users to configure flexibly IP address, Server or Client mode, size of packet, etc.

NP301 serial device sever is designed with EMC protection, and power supply have overcurrent and overvoltage protection. These make it woking stably in hazardous environment.

Easy wall and DIN-Rail mounting.

1.2 Products Features

➢   Adopt 32 bit ARM processor

➢   Support 3-in-1 RS-232/RS-485/RS-422 serial interface

➢   Support 10/100M

➢   Support 300bps-115.2Kbps

➢   Support TCP, UDP, ARP, ICMP, HTTP and DHCP protocol

➢   Support across gateway, router communication

➢   Support standard TCP/IP SOCKET

➢   Support Windows serial interface driver mode

➢   Support Virtual serial driver access and auto connect once the network disconnect

➢   Support network and serial interface configuration mode

➢   Low consumption design

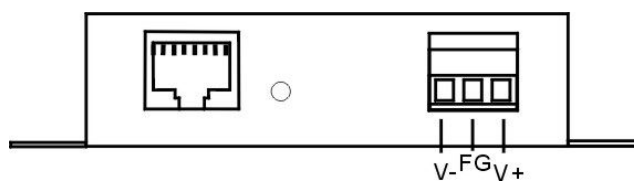➢   Support DIN-Rail or wall mounting installation

➢   Working termperature: -40～75℃

Chapter 2　　Hardware description
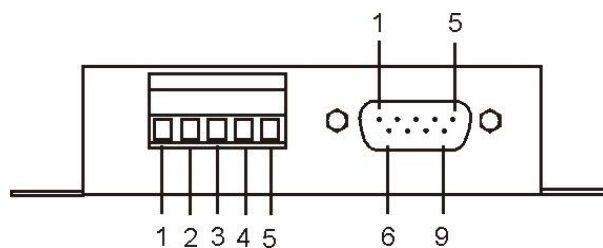
2.1 Panel description
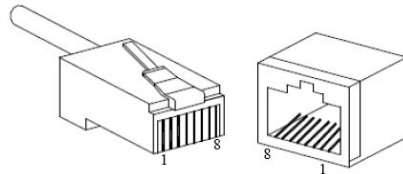
Front panel:
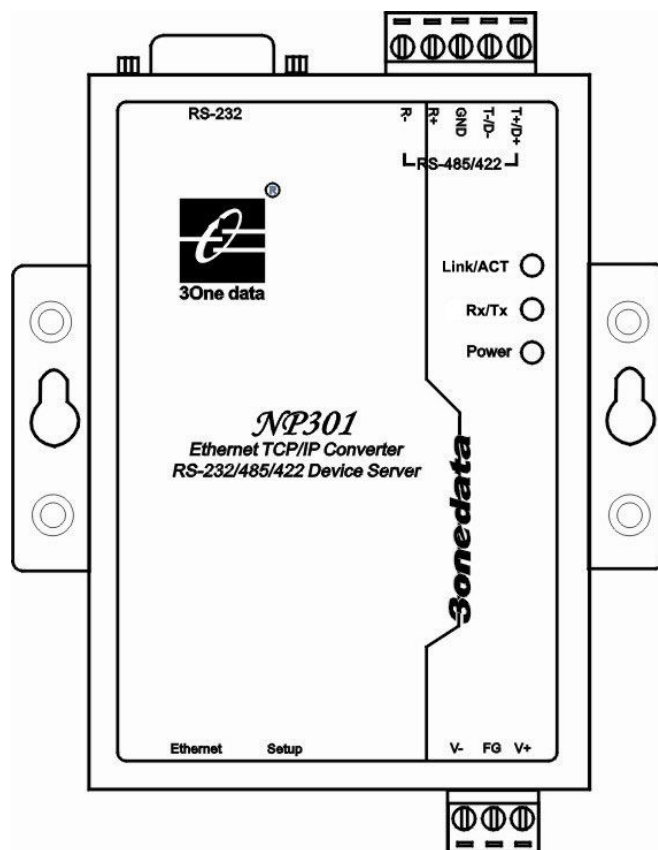
Top panel:

Underside panel:

2.2 Interface description

2.2.1 10/100Base-T(X) Ethernet port:

The 10/100BaseT(X) ports located on NP302 series front panel. The pin of RJ45 port display as below. Connect by UTP or STP. The connect distance is not more than 100m. 100Mbps is used 100Ωof UTP , 10Mbps is used 100Ωof UTP 3,4,5.


RJ45 port support automatic MDI/MDI-X operation. It connects the PC, Server, Converter and HUB by straight–though cable wiring. Pin 1, 2, 3, 6 Corresponding connection in MDI. 1→3, 2→6, 3→1, 6→2 are used as cross wiring in the MDI-X port of Converter and HUB. 10Base-T is used in MDI/MDI-X, the definition of Pin in the table as below.

pin	MDI signal	MDI-X signal
1	TX+	RX+
2	TX-	RX-
3	RX+	TX+
6	RX-	TX-
4, 5, 7, 8	—	—

Note："TX±" transmit data±, "RX±" receive data±, "—"not use

2.2.2 RS-232/485/422 Serial interface
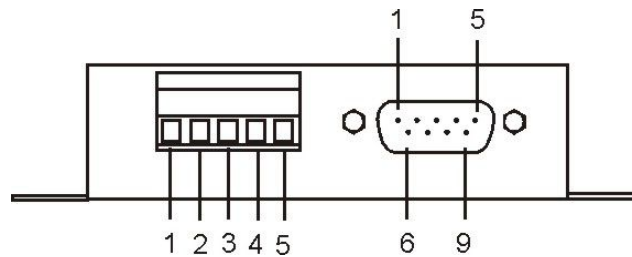
RS-485/422 side is 5 bit terminal block. The PIN definition is as follows:

serial number	1	2	3	4	5
RS-422	T+(A)	T-(B)	GND	R+(A)	R-(B)
RS-485	D+	D-	GND		

RS-232 side is DB9 male. The PIN definition is as follows

Serial number	1	2	3	4	5	6	7	8	9
Name	NC	RxD	TxD	DTR	GND	DSR	RTS	CTS	NC

2.3 Power supply description
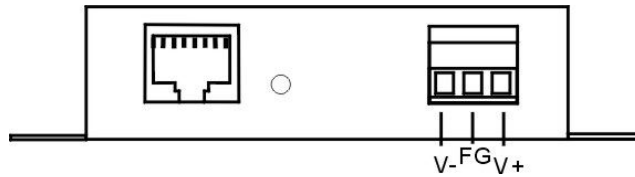
9～48VDC wide voltage power input, the consumption is about 1.4W

2.4 LED Indicator

NP301 has 3 LED Indicator, include Power, Link/ACT, Rx/Tx, the meaning is as follows:
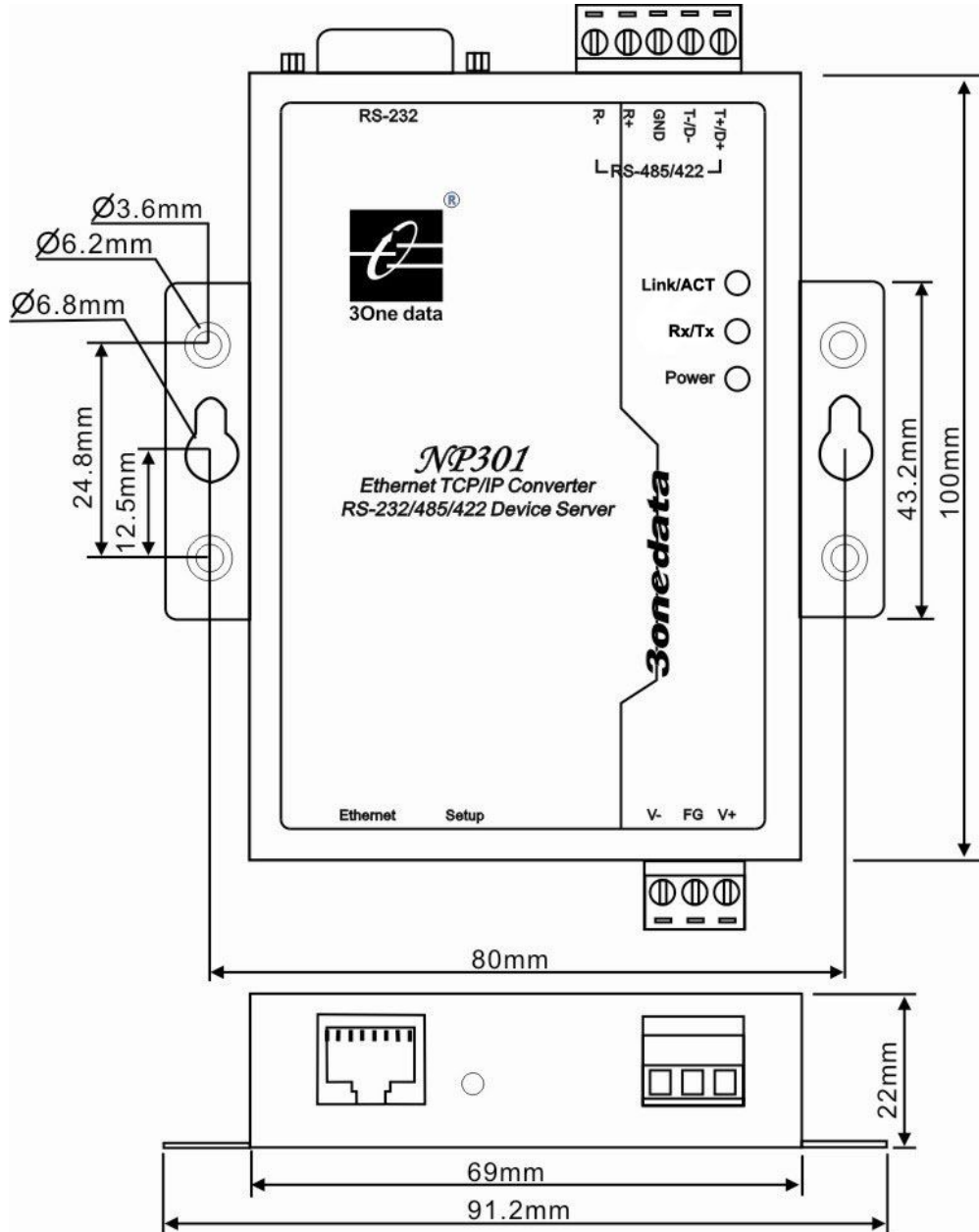
Power input steadily: Power LED bright all along

Network connect naturally: Link/ACT LED bright all along

Serial interface has data receive: Rx/Tx LED blinking

Chapter 3　　Appearance dimension

Unit：mm

Chapter 4　Performace and parameter

LAN：

➢ Standard: 10Base-T，100Base-TX

➢ Protocol: Support　TCP, UDP, APR, ICMP and DHCP protocol

➢ Signal: Rx+,Rx-,Tx+,Tx-

➢ Speed: 10/100Mbps

➢ Working: Full-duplex and half-duplex

➢ Working mode: Support Server and Client

➢ Transmission; 100m

➢ Protection: 1.5KV ESD

➢ Connector: RJ45

Serial interface:

➢ Serial interface number: 1 port RS-232,1 port RS-422/485

➢ RS-232 signal: TXD,RXD,RTS,CTS,DTR,DSR,GND

➢ RS-422 signal: T+（A）,T-(B),R+(A),R-(B),GND

➢ RS-485 signal: D+（A）,D-(B),GND

➢ Parity bit: None,Even,Odd,Space,Mark

➢ Data bit: 5bit,6bit,7bit,8bit

➢ Baud rate: 300bps～115200bps

➢ Flow control: RTS/CTS or XON/XOFF

➢ Direction control: RS485 side adopt ADDC technology, auto text and control data transfer direction

➢ Loading: RS-485/422 side support 32 nodes (customize 128 nodes) loopback

➢ Transmission: RS-485/422 side 1200M,
　　　　　　　　RS-232 port 15M

➢ Interface protection: 1500W surge protection, 15KV static protection

➢ Interface type: RS-232 side DB9 male，RS-485/422 side 5 bit terminal block

Power supply:

➢ Power input: 9~48VDC

➢ Consumption: Approx 1.4W

Environment:

➢ Working temperature: -40℃~75℃

➢ Storage termperature:-40℃~85℃

➢ Humidity: Relative humidity 5%~95%（no condensation）

Structure:

➢ Color: Black and Blue

➢ L×W×H: 100mm×69mm×22mm

➢ Material: Iron（Shell）

➢ Weight: 530g

Chapter 5　Web management function

Before configuration NP301, please make sure your PC have installed necessary software and configure the network reasonable.

The lowest requirements of user PC is as follows:
- Installation operation system（as Windows XP/2000, Windows 7 etc）
- Installation Ethernet card
- Installation Web broswer（Up to IE6.0）
- Installation and startup TCP/IP protocol

5.1 Network settings

NP301 default IP address: 192.168.1.254, subnet mask: 255.255.255.0. When access NP301 through WEB browser. The IP address of the NP301 and PC must be in the same Local Area network. You can modify PC's or NP301's IP address to make sure that they are in the same Local Area Network. Operating process can follow method 1 or method 2 as below:

Method 1: Modify PC's IP address.

➢ Click Start->Control panel->network connections->Local area Connection->Properties->Internet protocl （TCP/IP）Setting PC's IP address: 192.168.1.X（X is expect 254, from 2 to 253）.

➢ Click "OK", IP address modified successful.

The Windows system operation interface is as figure 5-1:
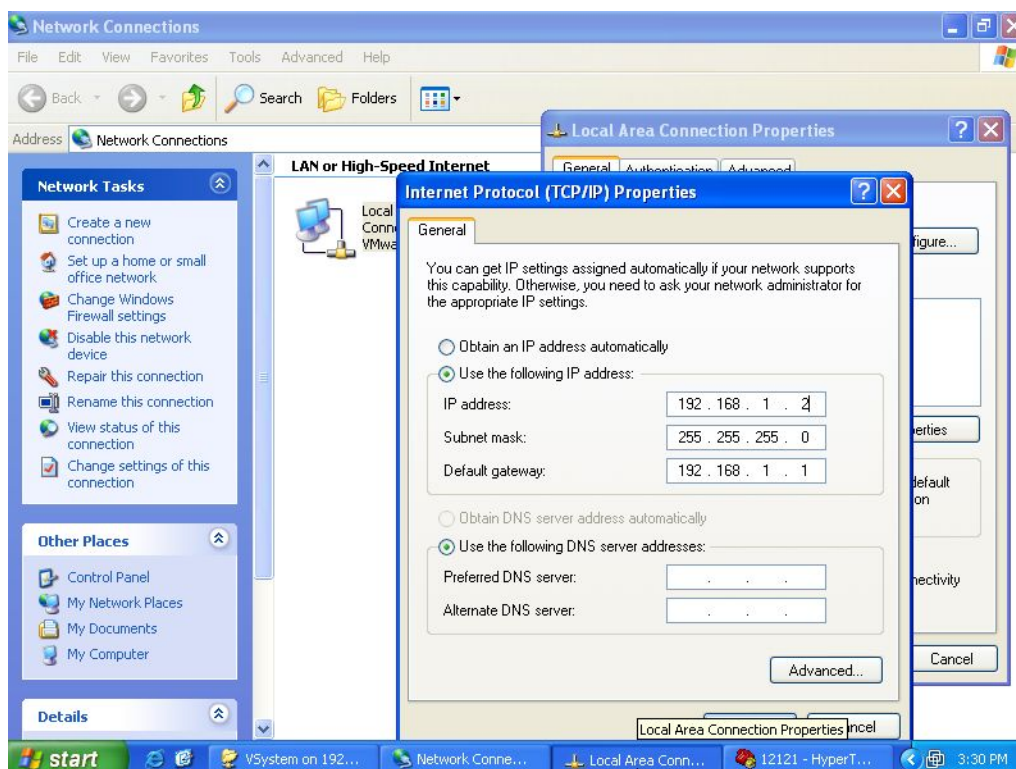
（Figure 5-1）

Method 2: Modify NP301's address through our VSP manager software

➢ Install the VSP manager software on the PC.

➢ Enter into VSP Manager management interface, click "Search" to search the NP301.

➢ After searched the NP301, move the mouse to the NP301, click right key, modify the NP301's IP address, make sure NP301 and PC must be in the same Local Area network

5.2 Function menu

Main menu includes 3 parts: Device information, Serial interface setting and system tools, main content is each function of NP301, we will introduce it and setting method particularing in this section.

Menu	Page layout	Function
Device information	Device information	Modify deivce name and descrption
	Network information	Modify deivce IP address, subnet mask, gateway, DNS etc.
Mode setting	Serial interface setting	Setting serial interface working mode, data bit, stop bit, parity bit, baudrate, data frames, character spacing, CtrlBreak default output time
	Working mode setting	Setting working mode, Local port, destination address, destination port, connection mode, connection alive etc, option sessions
	AT command settings	Enter into AT mode 3 mode, I/O Port Triggering（user can not configure in hardware type）, CtrlBreak Triggering, character string Triggering
System tools	Resume factory	Resume the device into the status when leaved factory.
	Configuration files	Download or upload setting files（Save Configuration files, batch setting NP301 fastly）
	System upgrade	Upgrade device software
	Device reset	Reset NP301
	User name and password	Modify user name and password

5.3 Log in Web interface

Before access NP301 through IE browser, please make sure PC and device in the same Local Area Network or can access through router.

Operation method:

1. Click IE with right key, click "Properties", empty temporarily files and history record.

2. Open IE, input the IP address of the NP301 in the addressbar, click "Enter", enter into user name and password interace as figure 5.2.

（Figure 5.2）

3. Input user name and password, "Enter", enter into NP301 interface as figure 5.3.

Web setting interface divide as: 1. Title area 2. Menu bar 3. Setting area. Click menu of the mean bar, can enter into relevant interface, setting area display the status of the NP301 and can configuration.
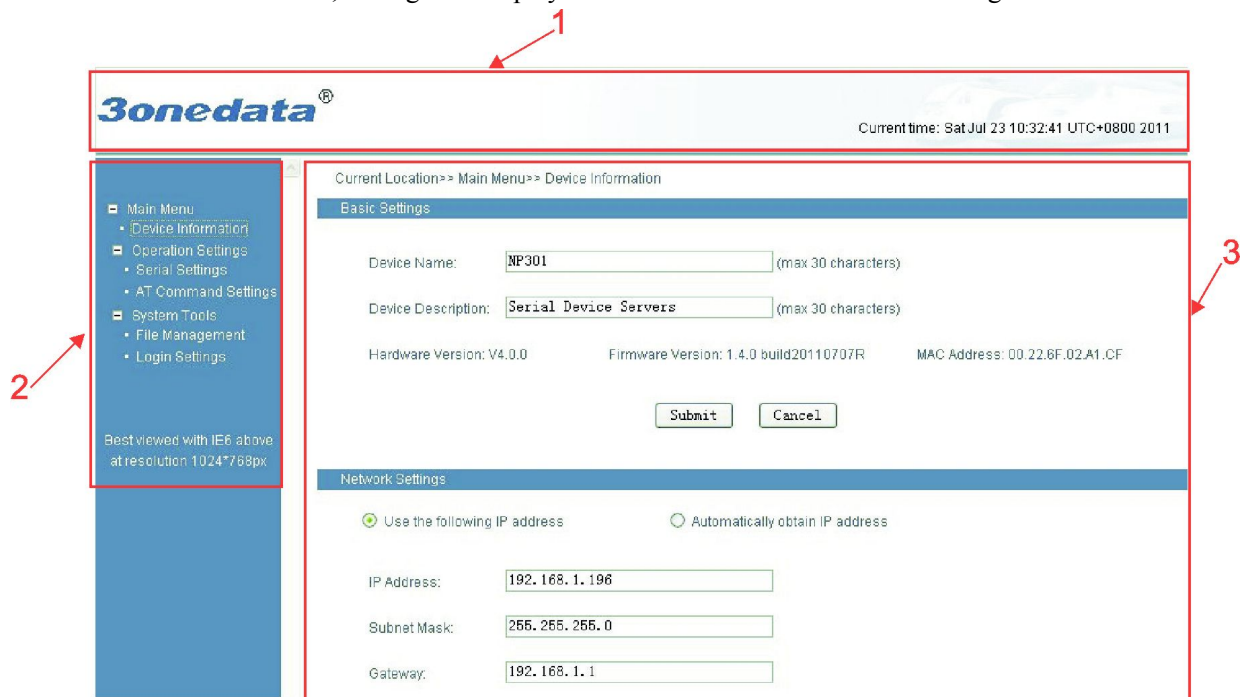
（Figure 5.3）

If user name or password input incorrectly 3 times continuously, you must access afresh.

5.3.1 Device information.

Device information included device name, device description, hardware version, software version, MAC address as figure 5.4.

Device name

Named a different name for each device in the network, it can support Chinese characters, not more than 30 bytes. It can input capital letter and lowercase, Chinese characters, special character，underline, middle line.

Device description

Describe the device, not more than 30 bytes.

5.3.2 Network information

Device address setting supports 2 modes，DHCP and static IP address, When opening DHCP function，IP address of the device can be obtained by software VSP manager software. If it is needed to connect Domain Name System, please fill in available gateway and DNS address.

IP address

IP address is a 32 bits length address provided the device that connect to the Internet. IP address has 2 filed: net-id and host-id，IP address can set in static IP or DHCP.

Subnet Mask

Mask is an IP address corresponding 32 bit number, it has 1 and 0. Mask can divide IP address into 2 parts: subnet addresses and host computer addresses. 1 bit in IP address and mask correspond subnet address.

Default gateway

The default gateway in the Host computer usually called Default route. Default route is the route chosen by the router when destination address of IP packet cannot find the existance of other routes. All packets of destination address not in router's routing table will use the default route.

DNS address

DNS full name is Domain Name Server, the function is easy to remember the DNS. It resolves to the IP address internet can identify. If our device need to visit some Host device, it need to use this server to resolve an IP address.As figure 5.5。

（Figure 5.4）

⚠ :
If it need to set DHCP "automatically obtain IP address", please ensure DHCP Server is already in the network.and can obtain IP address successfully. After "automatically obtain IP address", it is need to use software VSP manager software to search the device and obtain the IP address of the device.
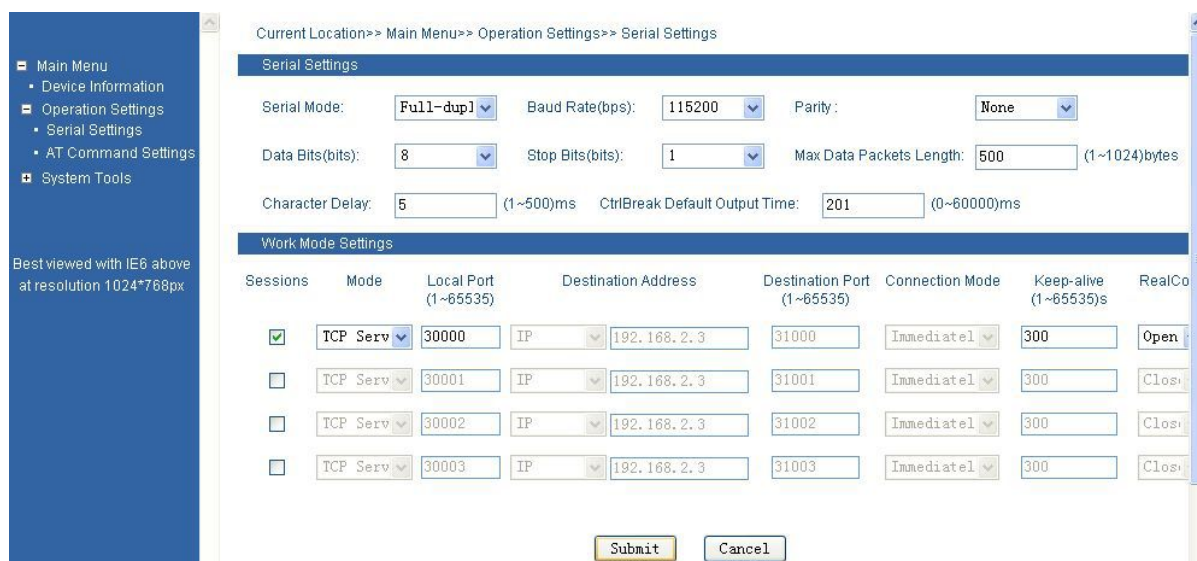
5.4 Mode settings

5.4.1 Serial port setting.

Serial interface setting menu:

Serial interface setting menu	Data optional	Function decription
Working mode	Full duplex/half duplex	
Baud rate（bps）	300-115200（10 baud rate optional）	
Parity bits	None,Even,Odd,Mark,Space	
Data bits（bits）	5,6,7,8	
Stop bits(bits)	1,2	
Data frames(bytes)	1-1024	
Character spacing（ms）	1-500	
CtrlBreak default output time（ms）	0-60000	

Enter into NP301's Web interface, click [Serial Setting], choose the required configuration in the corresponding drop-down menu.。Serial settings Web interface as figure 5.5。When NP301 communicate with serial interface device, NP301's setting is as follows:。

（Figure 5.5）

Some items related with serial settings： [Serial Mode]、[Baud Rate]、[Parity]、[Data Bits]、[Stop bits]、[Max Data Packets Lenth] and [Character Delay]，CtrlBreak Default Output Time. The meaning of these configuration options are explained below,

Serial Mode：It is similiar to full and half duplex mode of Ethernet.

Baud rate: It is a parameter to check the communication speed. It shows to transfer how many bits in 1 second. For example, 300 baud rate means have 300 bits transferred in 1 second.

Parity bits: It is a simple method to checkout fault in seral communication, have 4 types:

Even, Odd, Mark, Space

Data bits: It is a parmeter to check the actual data bits in communication. When PC send a Packet, actual data is not 8 bits, the standard is 5, 6, 7, 8.

Stop bits: The last bit of the single Packet, Typical bit is 1, 1.5 and 2. NP301's stop bit is 1, 2.

Data frames: The frame length that serial interface data convert into Ethernet data, within the range of setting time, it forwardes when data is equal to or longer than the setting frames. Available setting value ranged from1 to 1024.

Character spacing: The wait time when serial interface send data do not 1 data frames. If up to this time and do not have data, then send automatic.

CtrlBreak default output time: Setting CtrlBreak default output time.

5.4.2 Work mode settings

Work mode settings menu:

Work mode settings menu	Data optional	Function decription
Sessions	1-4	
Working mode	TCP Client TCP Server UDP TCP Auto	
Local Area ports	1-65535	
Destination address		
Destination ports	1-65535	
Connection mode	Immediately Data trigger	
Keep-alive	1-65535 s	

Sessions：Each serial port of serial device servers can support 1-4 sessions. It means serial port of serial device server send the received data to Ethernet through socket. More than one of the sessions means serial port of serial device server sends the received data to Ethernet through more than one socket. sessions enable to use by checking the corresponding box.

1. TCP client

As TCP Client side, serial device server will connect forwardly to TCP/IP network equipment, such as PC. It need to setup to tell serial device server to connect which network address and TCP port number when conditions is matched. After creating socket, serial device server will sent the data received from each serial port through socket On the contrary, the data received from socket will be sent to the corresponding serial port.

TCP Client setting option: [Destination address], [Destination port], [Connection mode] And [Keep-alive]
The explanation of these setting is as follows

[Local port]
The setting has the correlation with TCP Server.

[Destination address]
The IP address or domain name address that NP301 will connect, both of them can corresponde the host computer address on the Internet

[Destination port]
The TCP port number that NP301 will connect

[Connection mode]
Connection mode has 2 types: Immediately and Data trigger
Immediately: When NP301 have power supply, it will connect immediately, if connection cut off, it will connect immediately.
Data trigger: Once NP301 receive the data, it will connect immediately.

[Keep-alive]
Setting the vacancy time for connection cut off automatic, if there do not have data transfer, NP301 connection will cut off. If set "0", means do not care how much time vacancy, NP301 do not cut off voluntary. The range is 1-65535s. Default is 300s

The figure below is the configuration interface of TCP Client Mode. Session 1 is setting to local address available for router."192.168.2.168" , the "Destination Port" connected to serial port is host computer 192.168.2.168" 31000 port, Connection mode is Immediately, Keep-alive time is 300 seconds, please pay attention to pure TCP Client、TCP Server、UDP or TCPAuto mode. Please close RealCom. Session 3 is setting to Internet address available for router "www.test.com"（the choice this time is DNS）the "Destination Port" connected to serial port is host computer "www.test.com" 31002 port，Connection mode is Immediately, Keep-alive time is 300 seconds, click "Submit', setting successful.

Sessions	Mode	Local Port (1~65535)	Destination Address		Destination Port (1~65535)	Connection Mode	Keep-alive (1~65535)s	RealCo
☑	TCP Clie ∨	30000	IP ∨	192.168.2.168	31000	Immediatel ∨	300	Open
☑	TCP Clie ∨	30001	IP ∨	192.168.2.168	31001	Immediatel ∨	300	Clos
☑	TCP Clie ∨	30002	Domain ∨	www.test.com	31002	Immediatel ∨	300	Clos
☑	TCP Clie ∨	30003	Domain ∨	www.test.com	31003	Immediatel ∨	300	Clos

Submit   Cancel

（Figure 5.6）

2. TCP server

TCP Server, Passive connect, one pivotal parameter is [Local port], have relationship with other setting,

need combine setting.

[Local port]

NP301 provide TCP port can be connect by other TCP/IP node, the TCP port have the relationship with the NP301's relevant seial interface.

The figure as follows is TCP Server setting interface, Session 1 set local port is 30000, external TCP port connect NP301through this port. Connection keep-alive time is 300 second。 Click "Submit", setting successful as figure 5.7.

（Figure 5.7）

3．UDP

Under the UDP work mode. NP301 is server and also client, the relavant setting is "Local port", "Destination address" and "Destination port". It can support point to point and multicast UDP, setting method is the same as TCP.

4．TCP Auto

In this Mode, serial device server can act as server or client. Before setting this Mode, please ensure related parameters are correct when you turn on the server mode, client mode is automatically disconnected.

5．RealCom

RealCom Mode support TCP Server、UDP and TcpAuto these 3 types，Choose "open" or "close" to enable this function under RealCom. After opening RealCom, users can make connection through Windows Hyper Terminal. Generally RealCom need to open.

（Figure 5.8）

5.4.3 AT Command Mode

By setting "way to enter into AT order Mode", users can use these entering ways to enter into AT Command Mode.

There are 3 kinds of ways to enter into AT Command Mode, firstly, I/O port trigger，secondly, Ctrl+Break trigger，thirdly, Character strings trigger(Hex).

| way to AT Order Mode	Instruction	Function Description
I/O port trigger	Entering into AT Command Mode by hardware	
CtrlBreak trigger	When opening this mode, click Ctrl+PauseBrack to enter to AT Command Mode.	
Character strings trigger(Hex)	Entering corresponding character strings by serial port assitant to enter into AT Command Mode.	

[I/O port trigger]

By triggering the corresponding pin, you can enter the AT command setting mode. By default, 24 pin is high level. Inputing a low level, you can enter AT Command Mode through I/O port trigger.

[CtrlBreak trigger]

Open Virtual Serial Port, click "Ctrl+PauseBreak", then open Web page of NP301, click [Operation Settings/AT Command Settings] to enter into AT Commande Mode page. It is enabled by the second way. As Figure 5.9.

[Character strings trigger (Hex))]

By setting "Character" in "Character Strings Trigger (Hex)". "Serial Settings", The way is to send predefined characters to serial port through software to enter into AT Command Settings Mode.As Figure 5.9，By setting 2 Ways, "Ctrl+PauseBreak" and "Character Strings Trigger(Hex)", any one of these kinds can enter into AT Command Mode.
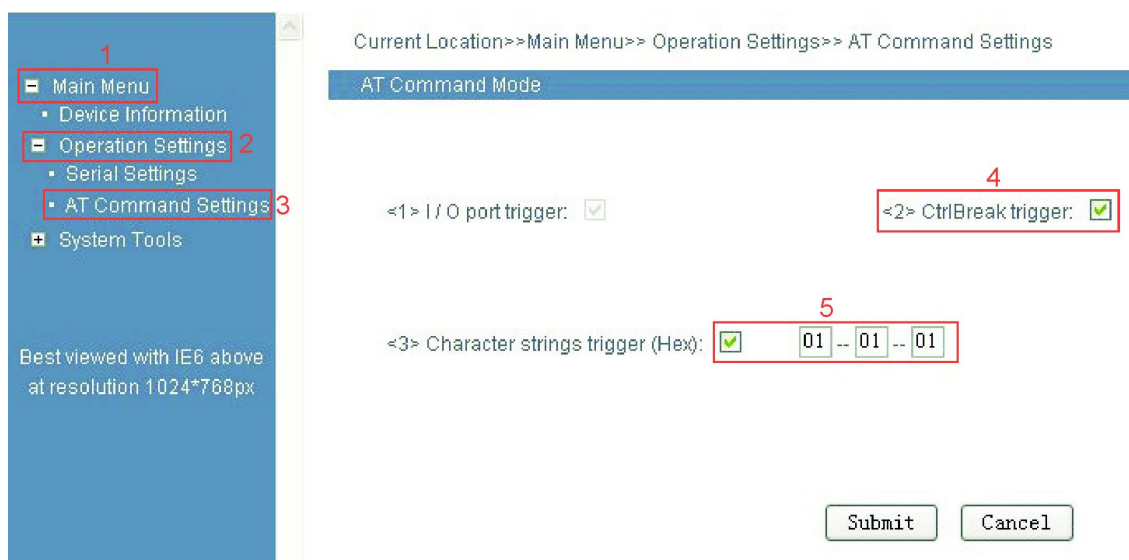
(Figure 5.9)

After setting the "way to enter into AT Command Mode", then open the Hyper Terminal to execute AT command, as shown below,

Turn the computer, on the Windows interface, click "Start/All Programs/Accessories/communication", run a terminal emulation program to create a new connection. To take Hyper Terminal in Windows XP for example, as shown in Figure 5.10, type in a new name of the connection in a text box named "name", then click

"OK" button.

（ Figure 5.10）

Choose connecting serial port. Choose connecting serial port under"Connect using"（pay attention to the chosen serial port is consistent with the port connected with the configuration cable），Click "OK"。As figure 5.11。
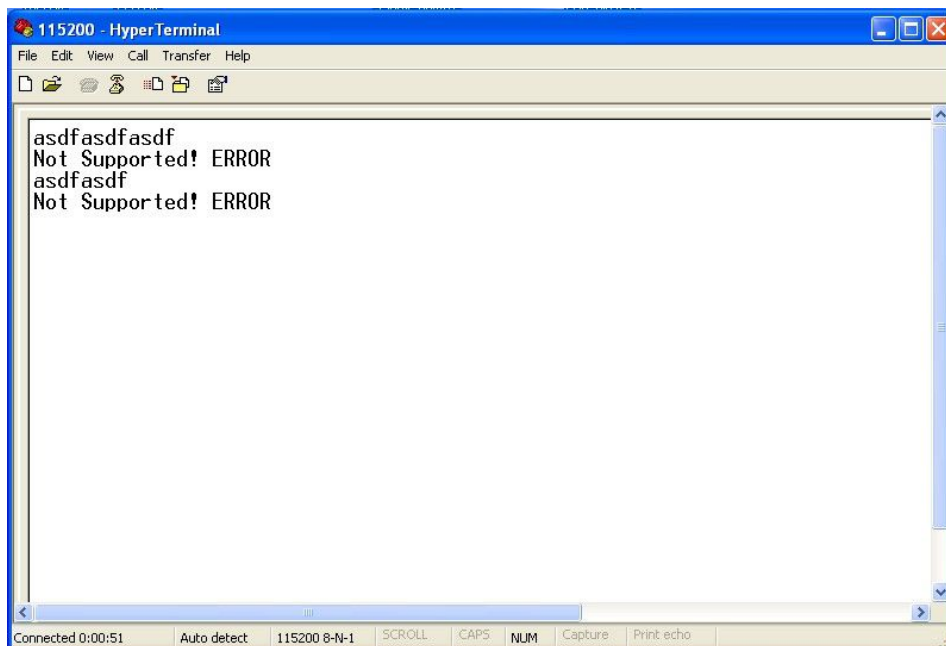

（ Figure 5.11）

Set serial port parameters. As shown in Figure 5.12， set the "Bits per second" in the"Properties" of serial port is 115200bit/s，"Data bits" is 8，"parity" is None，"Stop Bits" is 1，"Flow Control" is None. Click "OK" button to enter to "Hyper Terminal" Window.
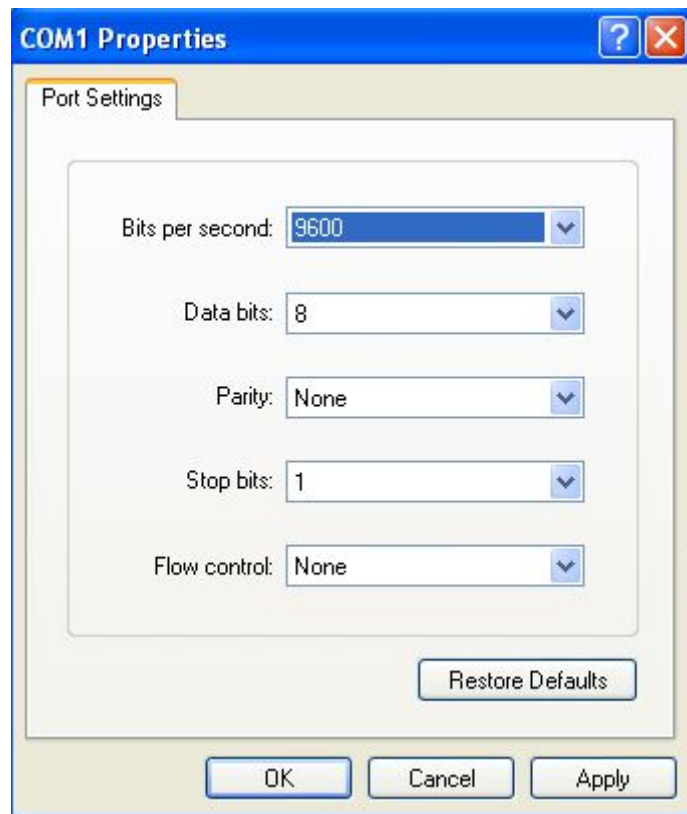
（Figure 5.12）

As figure 5.13, click again"Ctrl+Break", at the same time click "Enter" until blinking cursor appears on the screen. In this time you can input AT configuration order through Hyper Terminal. Specific command format and configuration reference 5.5.
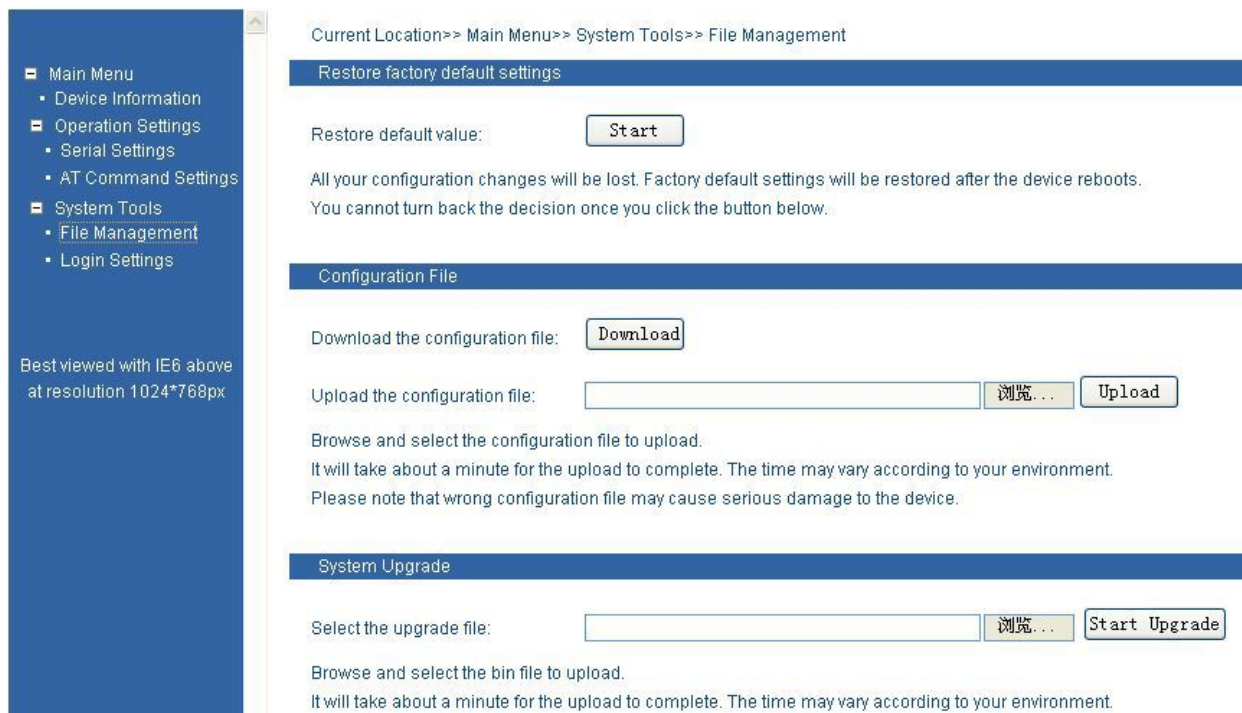

（Figure 5.13）

5.5 System tools

System tools menu

System tools menu	Function	Description
File management	Restore factory default settings	
	Configuration file	
	System upgrade	
	System reset	
Login settings	Modify user name and passwrod	

5.5.1 File management

The menu included 5 functions: Restore factory default settings, download configuration files, upload configuration files, system upagrde, system restart as figure 5.14:

（Figure 5.14）

1. Restore factory default settings

Click "System tools"

Click "File management"

Choice "Restore default value"

Click <Start> b

Alarm "Restore factory default file "192.168.1.254" will cover your configuration, please confirm Yes or No？"

It will open a new interface, input "192.168.1.254" to make a new configuration.

2. Download configuration files

Click "System tools"

Click "File management" label

Chocie download configuration files.

Click <Download>

Choice directory and name to save the files

3. Upnload configuration files

Click "System tools"

Click "File management"

Chocie upnload configuration files.

Click <Browse>, Choice the upload files.

Click <Upwnload>

After updating, it will open a new interface "System status".

4. System upgrade

Click "System tools"

Click "File management

Choice "Select the upgrade files".

Click <Browse>, Choice the upload files.

Click<Start Upgrade>.

Notice "Forbid power supply cut off in upgradeing", then start to upgrade.

After updating, it will open a new interface "System status".

5. System restart

Click <Restart>, after 20 second,   click menu bar and back to the WEB login interface, please save the configuration before restart, otherwise, configuration information will be lost.

⚠ :

> Upgrade file type must be.bin, to avoid upagrde failure, please do not do any operation in upgrading. Please do not operate device, forbid to click Web interface. Please restart the deivce and try again if the upgrade intermit.

5.5.2 User name and password

Click [System Tools/Login settings] menu, User can modify the user name and password as figure 5.15:
Operation method:

1. Through User name: admin, Password: admin, Enter into WEB interface, Click "Show all" in the function menu, choice user nam and password, enter into login settings interface.

2. Input new user name and password and retype password in the login settings.

Current Location>> Main Menu>> System Tools>> Login Settings

Login settings

Login's Name: _____

Login's Password: _____

Retype password: _____

Submit   Cancel

（Figure 5.15）

3. Input finished, click "Submit", Password modified successful, it will go to the information page automatic