



NPM301Z Serial Server Module

Quick Installation Guide

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Preface

The quick installation guide of NPM301Z serial server module introduces:

- Product features
- Hardware description

Readers



This manual mainly suits for the engineers as follows:




- Network administrator responsible for network configuration and maintenance
- On-site technical support and maintenance staff
- Hardware engineer

Text Format Convention

Format	Description
" "	Words with " " represent interface word. e.g.: "Port number".
>	Multi-level path is separated by ">".Such as open the local connection path description: Open "Control Panel > Network Connection > Local Connection".
Light blue font	It represents the words clicked to achieve hyperlink. Font color as: " Light blue ".
About this chapter	The "About This Chapter" section provides links to each section and corresponding principles/operating chapters in this chapter.

Icon Convention

Format	Description
 Notice	Remind the announcements in the operation, improper operation may result in data loss or equipment damage.
 Warning	Pay attention to the notes on the mark, improper operation may cause personal injury.

Format	Description
 Note	Conduct a necessary supplements and explanations for the description of operation content.
 Key	Configuration, operation or tips for device usage.
 Tips	Pay attention to the operation or information for ensuring success device configuration or normal working.

Revision History

Version NO.	Revision Date	Revision Description
01	2011-1-1	Product release
02	2013-9-7	Document upgrade
03	2018-1-8	Document upgrade

Contents

PREFACE	1
CONTENTS	1
1 PRODUCT OVERVIEW	1
1.1 PRODUCT INTRODUCTION	1
1.2 PRODUCT FUNCTION.....	1
2 PRODUCT FEATURE	3
3 HARDWARE DESCRIPTION	5
3.1 PIN DISTRIBUTION	5
3.2 ETHERNET PORT DESCRIPTION	8
3.3 POWER SUPPLY PORT DESCRIPTION.....	8
3.4 SERIAL PORT AND I/O PORT DESCRIPTION.....	8
3.5 PIN DESCRIPTION OF LED INDICATION	9
3.6 OTHER PIN DESCRIPTION	10
3.7 DESCRIPTION OF OTHER MODULE FUNCTIONS	10
4 MECHANICAL DIMENSIONAL DRAWING	11
5 PERFORMANCE AND PARAMETER	13

1 Product Overview

1.1 Product Introduction

NPM301Z is a high-performance embedded serial to Ethernet module. With embedded network transformer, it can implement self-adaptive 10Base-T/100Base-TX Ethernet port after adding an RJ45 port. Its serial port has communication rate of 300 bps-115200bps and multiple operating modes like TCP Server, TCP Client, TCP Auto, UDP and Real COM. It supports up to 4 connections and other functions such as domain name visiting.

All settings of NPM301Z module can be achieved through serial port and network. The module can be used as a communication processor between serial device and PC, or remote communication between multiple serial devices. It can be widely used in PLC control and management, building automation, medical care automation system, measuring instrument, and environment power monitoring system.

1.2 Product Function

- Adopt 32-bit ARM processor
- Support self-adaptive 10/100M Ethernet interface
- Support AUTO MDI/MDIX, using crossed or cut-through network cable for connection
- Support 300bps-115200bps wire speed non-blocking communication
- Support low power consumption mode and high performance mode.
- Support multiple operating modes like TCP Server, TCP Client, TCP Auto, UDP

and Real COM driver. Operating port, destination IP address and port are all configurable

- Support WEB server management, which is convenient for client to configure webpage
- Support AT command, convenient for user's secondary development
- Support DNS, can meet the requirement of achieving communication via domain name
- Support virtual serial port drive access mode and automatic recovery and reconnection from network interrupt
- Flexible serial port data framing setting, can meet user's various requirements for data partition
- Support SOCKET operating modes (TCP Server, TCP Client, UDP etc.)
- TCP supports multi-connection, enable up to 4 users to manage the device with embedded module simultaneously
- In UDP mode, it supports stand-alone and multi-computer communication, enable multiple users to manage the device with embedded module simultaneously
- Support multiple configurations like SOCKET, serial port and WEB
- Support both local and remote system firmware upgrade
- -40~85°C operating temperature

2 Product Feature

TCP/UDP Direct Programmatic Access

NPM301Z module supports TCP/UDP Ethernet direct access mode of standard API interface form such as WINSOCK. It can implement all control and transmission process through easy programming. In most cases, direct programmatic access, which could achieve error-free connection, is the best solution.

Virtual Serial Port Access

For most serial devices based on serial port programmatic access, reprogramming is not always the best choice. NPM301Z module provides a virtual serial port access mode. User only needs to install the driver that comes with the product, and then multiple virtual serial ports would be created on PC. User software can transparently access remote serial port device by opening the serial port virtualized by software and need no complicate Ethernet access process. And all Ethernet control and transmission process related to NPM301Z module could be operated on the driver.

Interconnection of Two Serial Device Networking Servers

Sometimes user can extend serial port distance via Ethernet only. NPM301Z module supports this application, which is to implement point-to-point interconnection of two devices through easy settings and no need of programming and drivers.

Multiple Hosts Sharing One Serial Device Networking Server

In many cases, multiple users need to share data resources from one serial port; therefore, it needs multiple hosts to access one serial device networking server.

NPM301Z module could operate in this mode according to user's requirements, allowing multiple hosts to access one serial port at different times.

One Host Accessing Multiple Serial Device Networking Servers

Because of the scattered distribution of collecting devices, it usually needs one host to access multiple serial device networking servers in data collecting system. NPM301Z module provides two modes to support this situation: one is establishing multiple virtual serial ports for accessing different serial device networking servers respectively; the other is using one virtual port to access all serial device networking servers. User could reasonably choose those two modes according to their own features.

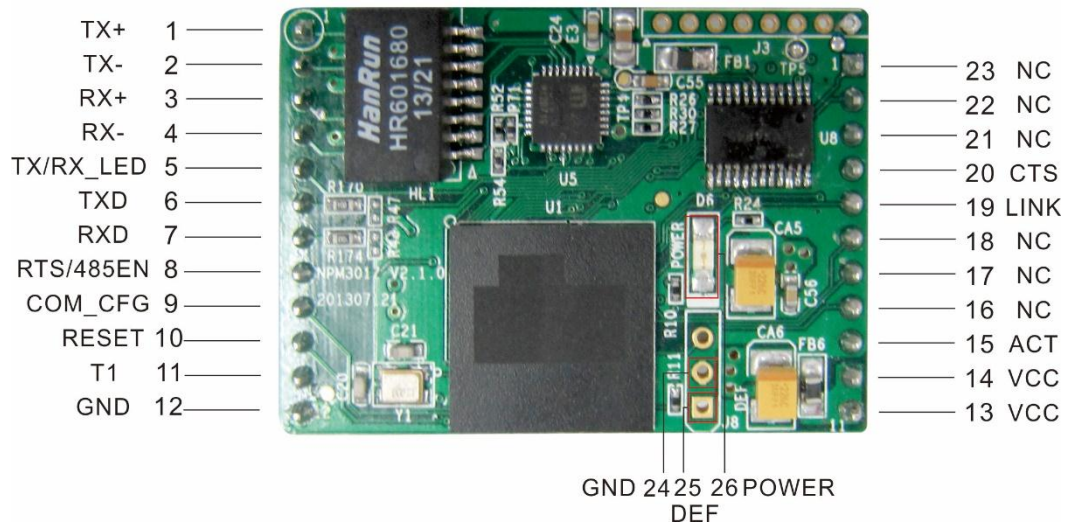
Support Cross-router Transmission

Routers are needed for connecting devices of both ends in many projects. NPM301Z module could cross router to connect opposite device easily. The setup process is quite easy as well.

3 Hardware Description

3.1 Pin Distribution

NPM301Z package pin diagram (top view):



Pin definition list of NPM301Z

Pin NO	Name	Pin NO	Name
1	TX+	2	TX-
3	RX+	4	RX-
5	TX/RX_LED	6	TXD
7	RXD	8	RTS/485EN
9	COM_CFG	10	RESET

Pin NO	Name	Pin NO	Name
11	T1	12	GND
13	VCC	14	VCC
15	ACT	16	NC
17	NC	18	NC
19	LINK	20	CTS
21	NC	22	NC
23	NC		

Detailed description of NPM301Z pin:

Pin NO	Name	Type	Description
1	TX+	Output	The positive end of Ethernet differential output signal
2	TX-	Output	The negative end of Ethernet differential output signal
3	RX+	Input	The positive end of Ethernet differential input signal
4	RX-	Input	The negative end of Ethernet differential input signal
5	TX/RX_LED	Output	Serial data transmission indicator
6	TXD	Output	(0-5V) TTL level output pin
7	RXD	Input	(0-5V)TTL level input pin
8	RTS/ 485EN	Output	Device request signal pins(RS-232 full duplex mode), LOW permit sending, when 485EN is valid, setting operation in half duplex mode, data direction control signal (RS-485 half duplex mode), its direction is controlled by module automatically. It is LOW and in receiving state when no data to send
9	COM_CFG	Input	Pin of AT commend setting. The module will be in AT commend mode when the pin is inputted low level of at least 200 microsecond continuously.

Pin NO	Name	Type	Description
10	RESET	Input	Pin of module reset. Low level is valid. The module will be in reset state when the pin is input low level of at least 200 microsecond continuously.
11	T1	-	Protective grounding
12	GND	-	Signal grounding
13	VCC	Input	Pin of power input, 5V ± 5% (123mA DC power supply in low power consumption mode, 186mA DC power supply in high performance mode)
14	VCC	Input	Pin of power input, 5V ± 5% (123mA DC power supply in low power consumption mode, 186mA DC power supply in high performance mode)
15	ACT	Output	Pin of Ethernet data transmission indication
16	NC	Reserved	Reserved
17	NC	Reserved	Reserved
18	NC	Reserved	Reserved
19	LINK	Output	Pin of Ethernet connection state indication
20	CTS	Input	Pin of device erasing sending signal, when CTS is valid, setting operation in full duplex mode, device will erase sending signal (RS-232 full duplex mode), LOW permit sending.
21	NC	Reserved	Reserved
22	NC	Reserved	Reserved
23	NC	Reserved	Reserved



Notice

Please hang the unused pin in the air during user design!

3.2 Ethernet Port Description

Name	Pin NO	Type	Description
TX+	1	Output	The positive end of Ethernet differential output signal
TX-	2	Output	The negative end of Ethernet differential output signal
RX+	3	Input	The positive end of Ethernet differential input signal
RX-	4	Input	The negative end of Ethernet differential input signal



Notice

NPM301Z module has internally integrated Ethernet communication transformer. User can achieve 10Base-T/100Base-TX Ethernet port by adding a RJ45 port only. Considering inevitable anti-interference performance, the module should be as close as possible to RJ45 port.

3.3 Power Supply Port Description

Name	Pin definition	Type	Description
VCC	13, 14	Input	Pin of power input, 5V \pm 5% (123mA DC power supply in low power consumption mode, 186mA DC power supply in high performance mode)

3.4 Serial Port and I/O Port Description

Name	Pin definition	Type	Description
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TXD	6	Output	(0-5V) TTL level output pin
RXD	7	Input	(0-5V) TTL level input pin
RTS/ 485EN	8	Output	Device request signal pin(RS-232 full duplex mode), LOW permit sending, when 485EN is valid, setting operation in half duplex mode, data direction control signal (RS-485 half duplex mode), its direction is controlled by module automatically. It is LOW and in receiving state when no data to send
CTS	20	Input	Pin of device erasing sending signal, when CTS is valid, setting operation in full duplex mode, device will erase sending signal (RS-232 full duplex mode), LOW permit sending.



Notice

All serial ports and I/O ports of NPM301Z conform to TTL level standard (can connect to interface chips like MAX232, MAX485 directly). The I/O port could be used as both output and input port. The maximum drive capability of each I/O port is 25mA.

3.5 Pin Description of LED Indication

Name	Pin NO	Type	Description
ACT	15	Output	Pin of Ethernet data transmission indication. This indicator blinks when data is being transmitted.
LINK	19	Output	Pin of Ethernet connection state indication. It would be bright when network link is normal.

3.6 Other Pin Description

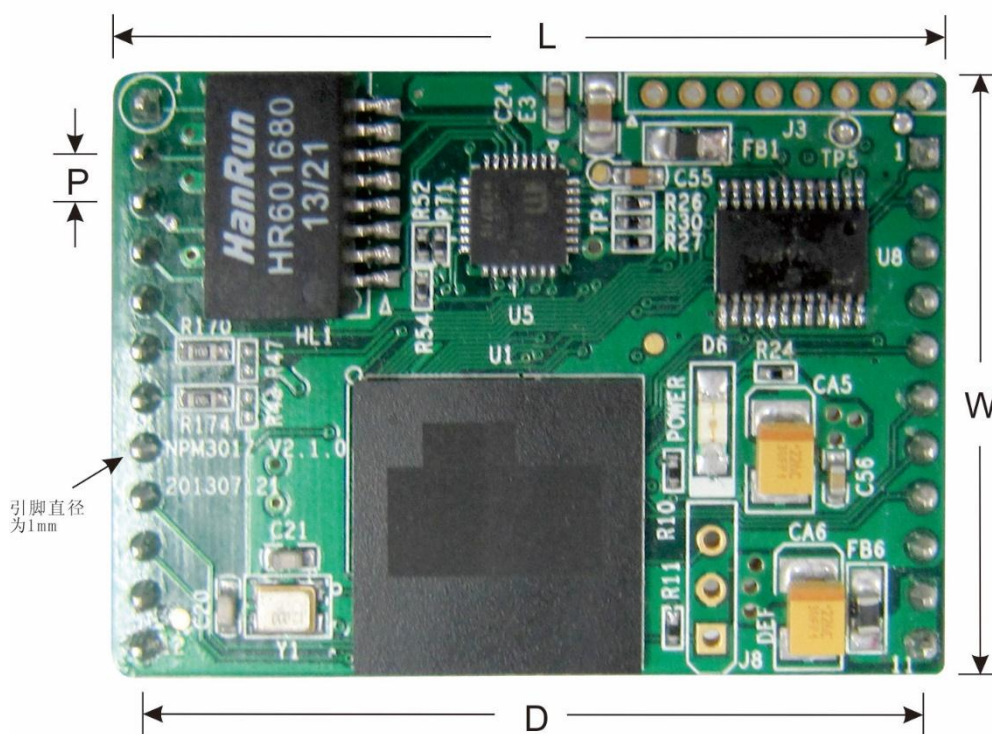
Name	Pin NO	Type	Description
COM_CFG	9	Input	Pin of AT commend setting. The module will be in AT commend mode when the pin is input low level of at least 200 microsecond continuously.
RESET	10	Input	Pin of module reset. Low level is valid. The module will be in reset state when the pin is input low level of at least 200 microsecond continuously.
T1	11	-	Pin of protective grounding
GND	12	-	Pin of signal grounding
NC	16, 17, 18, 21, 22, 23	Reserved	Reserved

3.7 Description of Other Module Functions

Name	Pin NO	Description
GND	24	Signal grounding (built-in chassis can be used matching with pin No. 25 and need no external connection)
DEF	25	Pin of restoring to factory setting. The module will restore to factory setting when the pin is short-circuited with pin No. 24 and input low level of at least 200 microseconds continuously.
POWER	26	Power supply indicator

4 Mechanical Dimensional Drawing

Top view and mechanical dimension of the module:



L	44.2mm	Length
W	31.6mm	Width
H	7mm	Height (do not include pin length, pin length 9mm)
D	40.8mm	The width between two rows of pins

P	2.54mm	Pin spacing
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5 Performance and Parameter

Ethernet port:

- Standard: 10Base-T/100Base-T
- Protocol: Support TCP, UDP, ARP, ICMP, HTTP, DHCP and DNS protocol
- Rate: 10M/100M
- Ways of operating: Full-duplex or half-duplex
- Operating mode: multiple operating modes like TCP Server, TCP Client, TCP Auto, UDP and Real COM driver are available in both low power consumption mode and high performance mode.

Serial port:

- Interface: TTL serial port(5V)
- TTL: TXD, RXD, CTS, RTS, GND
- Check bit: None, Even, Odd, Space, Mark
- Data bit: 5bit, 6bit, 7bit, 8bit
- Stop bit: 1bit, 1.5bit, 2bit
- Baud rate: 300bps-115200bps

Software:

- Configuration method: Web browser, Windows hyper terminal, BlueEyes_II management software

Power supply:

- Power input: 5VDC±5%
- Low power consumption mode
No-load: 0.62W@5VDC
Full-load: 0.59W@5VDC
- High performance mode
No-load: 0.93W@5VDC
Full-load: 0.91W@5VDC

Operating environment:

- Operating environment: -40~85°C, 5~95%RH(operating humidity)
- Storage temperature: -40~85°C, 5~95%RH(operating humidity)

Structure:

- Dimension (LxWxH): 44.2mmx31.6mmx16mm(includes pin) 12 pins on the left row, 11 pins on the right row, pin spacing is 2.54mm
- Weight: 9g

Warranty:

- Warranty period: 3 years

Certification description:

- Safety: UL508 (in the certification)
- Shock: IEC 60068-2-27
- Free fall: IEC 60068-2-32
- Vibration: IEC 60068-2-6

Please check 3onedata website for latest product certification trend



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