4next TECHNOLOGY SYSTEMS

USER MANUAL

NXT-D4 I/O MODULE

MODBUS DIGITAL MODULE

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1 General description

The NXT family of devices is designed for capturing galvanically isolated digital signals and converting them into digital data. This data is made available through the ModBus RTU communication protocol, ensuring simple and reliable integration into industrial automation and control systems.

The device is configured via **NFC** using a mobile device and our **IBridge App**.
The configuration has the following features:

- No knowledge of programming languages required
- Configuration is simple via the APP and NFC interface

The models of the NXT family

- **NXT-A4**: 4 analog inputs and 4 analog outputs, analog inputs are configurable in Voltage [0-24V], Current [0-200mA] and NTC [°C]
- **NXT-D16**: 16 digital inputs or outputs configurable in groups of 4
- **NXT-M2**: 2 analogue inputs, 2 digital inputs or digital outputs with all the features listed above
- **NXT-D4**: 4 digital inputs or outputs configurable via ModBusRTU

2 Specifications

CPU	I/O
Arm® Cortex-M0®+ 32-bit RISC	Signal LED
512 Kbytes Flash ROM	NFC interface
144 Kbytes RAM	No. 1 galvanically isolated RS485 serial port (on terminals)
	No. 4 Digital Inputs/Outputs
MECHANICAL	**ENVIRONMENTAL**
Dimensions: 90 x 17 x 60 mm, 1 DIN module	Operating Temperature: -20°C ÷ 60°C
IP21 plastic enclosure for DIN rail	Relative humidity: 0 to 80% non-condensing
NUTRITION AND CONSUMPTION	
Power supply: 12-24 VDC	
Average power consumption: < 1 W	

SAFETY INFORMATION

- **Do not install NXT modules near medical devices such as pacemakers or hearing aids.**
- **NXT modules must not be used on board aircraft.**
- **Do not install NXT modules near oil stations, fuel depots, chemical plants, or flammable sites.**
- **NXT modules may generate interference when used near televisions, radios, or personal computers.**

3 Quick Start Guide

Wiring and installing the NXT-D4 is very simple.
This guide briefly explains how to make electrical connections and settings for initial access.

3.1 Serial

To access the device, the serial channel is used to read the device data in ModBus RTU. Connect the RS485 cables as shown in the following figure (Fig.1)

3.2 Digital inputs/outputs

To wire the inputs and outputs, use one of the available pins (1-4) and connect the cables as shown in the following figure

Fig. 3.3: RS485 ModBus A+(+) B- (-)

Fig. 3.1: COM(+24Vdc) GND (-24Vdc)

Fig. 3.2 Digital connection 1-4 (+)

(Fig.3-2 and 3-3) powering 24 Vdc on COM+ and the common ground in GND.

3.3 Power Supply

Connect the NXT-D4 to a 12-24VDC power supply as shown in Fig.3-4.

Fig. 3-4

4 Access and configuration

The NXT-D4 is equipped with NFC technology, making it easy to configure ModBus parameters and connect to a ModBus Master device instantly.

4.1 APP IBridge

With IBridge you can scan the device directly with your phone and derive its basic parameters.

4.2 ModBus

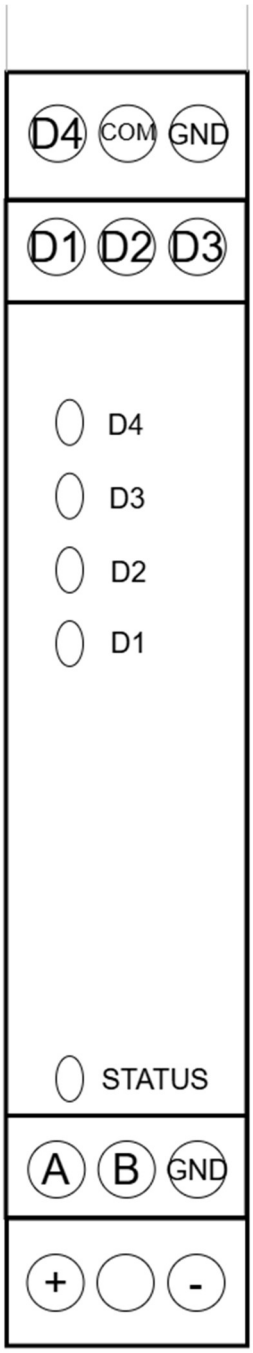
Once the parameters have been configured, it is possible to connect to the NXT-D4 via the RS485 serial channel with a ModBusRTU Master device.

For configuration go to section 5.3 and for mapping the device to the 5.4.

5 NXT-D4

5.1 Terminals

Below is the mapping of the device's pins:



Digital Input/output 4 – COM (+24Vdc) – GND(0Vdc)

Digital input/output 1 – Digital Input/output 2 – Digital Input/output 3

RS485 – ModBus

Power (12-24Vdc)

5.2 Links

The inputs and outputs can be individually configured via ModBus commands:

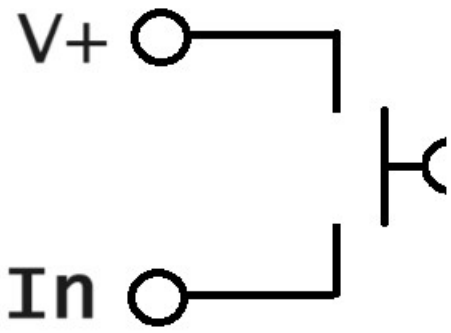
IO1 IO2 IO3 IO4

5.2.1 Digital Inputs

5.2.1.1 Mode1: Dry Contact

The contact must be made between the V+ terminal (24Vdc) and the desired input between the D1/D2/D3/D4, using the common ground GND as a reference:

Example:



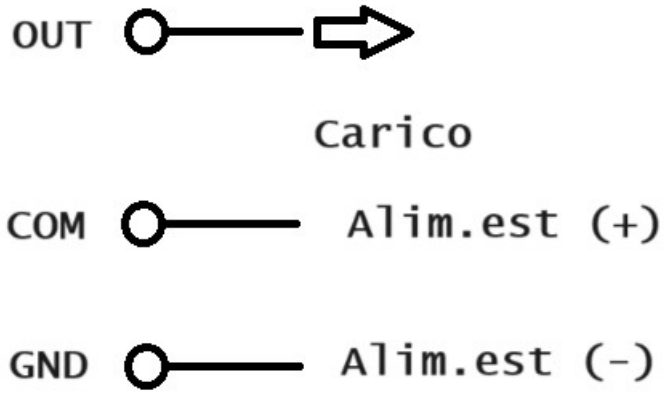
5.2.2 Meter Input

There are 4 counter inputs and are available on inputs 1 to 4.

5.2.3 Digital Outputs

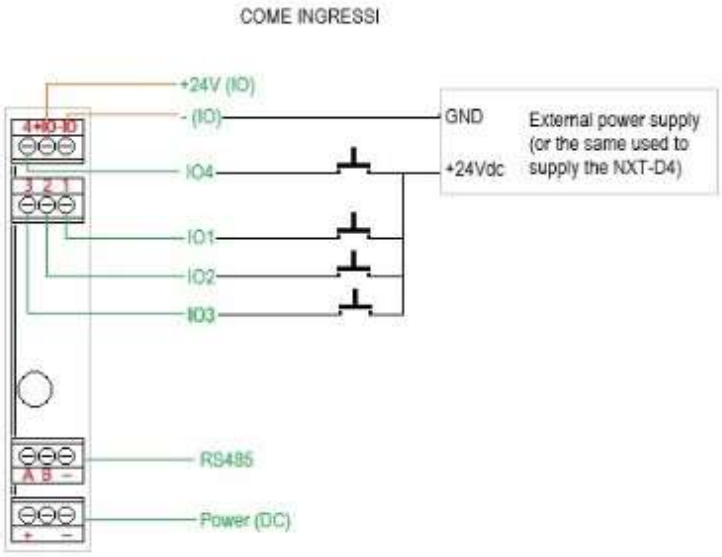
The digital outputs can be configured via ModBus commands and need to be powered externally.

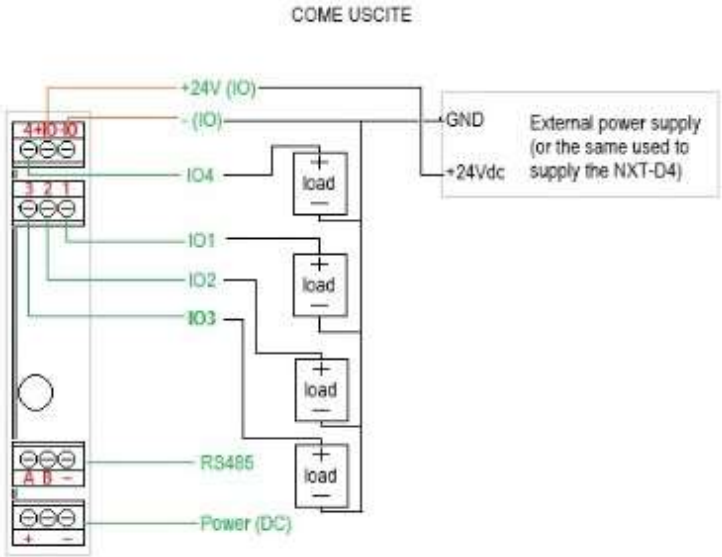
5.2.3.1 External power supply



"An external 24 Vdc power supply is connected between the GND and COM connectors. OUTPUTS D1, D2, D3 and D4 send the signal to the load, which must be connected to the GND of the same external power supply."

Example:





5.3 Configurations

5.3.1 Choosing Digital Output

You can select the digital outputs to be enabled by sending a value to address 101 via the Modbus write commands:

- Single write 0x06 function
- Multi-write 0x10 function

Individually they are:

Exit	**Value**
Q4	8
Q3	4
Q2	2
Q1	1

To activate one or more outputs, simply **add up their values**. Example:

- To activate D1 only, type 1.
- To turn off all of them, type 0.
- To activate **D3 and D1**, do 4 + 1 = 5.

N.B. When an output is active, the corresponding digital input will no longer be available (it is disabled).

5.3.2 Configuration command

(see section 5.4 for register mapping)

The configuration command allows you to **modify** or **save** the main parameters of the device, such as:

- **Serial** Speed
- **Serial parameters** (parity, stop bits, etc.)
- **ModBus Address**

These parameters are contained in **registers 901–904**.

Register **900** represents the **configuration command**, while registers **901–904** contain data to be read, modified or saved.

Accepted values in the 900 register:

Value	Function
0	Logs 901–904 are automatically updated with data saved in the current configuration. The values present cannot be changed.
1	Registers 901–904 become writable. You can edit its content.
2	Values currently in logs 901–904 are saved in the device configuration.

N.B. Until the value 2 is written to the 900 register, the data changed in the 901–904 registers is not permanently saved. A reboot of the device without saving results in the loss of the changes, resulting in the revert to the previous values.

5.3.3 ModBus Communication Setup

To change the communication parameters of the device (address, serial speed and serial parameters), the **900**, **901**, **902** and **904 registers are used**.

Important:
You cannot edit registers 901, 902, and 904 unless you first enable writing by writing 1 to the register **900**. This log controls access to the configuration (see section 5.3.2).

Logs to edit:

- **901** → Device ModBus Address (1 to 247)
- **902** → Serial rate in bits per second (e.g. 9600, 19200, 115200). This value is 2-register (32-bit).
- **904** → Serial parameters, encoded in a single value (bitmask):
    - Bit 0-1: Word length (0 = 8 bits)
    - Bits 2-3: stop bits (0 = 1 stop bit, 1 = 2 stop bits)
    - Bits 4-5: Parity (0 = none, 1 = even, 2 = odd)

Example value for register 904:

- 8 bits, 1 stop bit, no parity → 0 value
- 8 bits, 2 stop bits, no parity → value 4
- 8 bits, 1 stop bit, parity equal → value 16
- 8 bits, 2 stop bits, odd parity → value 36

Procedure for changing parameters

1. Write the value 1 to register 900 to enable editing.
2. Enter the new values in the 901, 902, and 904 registers.
3. Write the value 2 to register 900 to save the configuration.
4. (Optional) Write the value 0 to register 900 to block changes and reload saved data.

5.4 MODBUS register mapping

Parameters	Description	Supported ModBus read functions	Supported ModBus write functions	Address	Data size/type
HW TYPE	Board model identifier: 11=NXT-D4	HOLDING REGISTER 0x03 INPUT REGISTER 0x04		0	1 register UINT16
FW VERSION	Firmware version. The version is storead as major.minor.build where:major=bits 12-15, minor=bits 8-11, build=bits 0-7	HOLDING REGISTER 0x03 INPUT REGISTER 0x04		1	1 register UINT16
SLAVE ADDRESS	Current ModBus slave address	HOLDING REGISTER 0x03 INPUT REGISTER 0x04		5	1 register UINT16
ERROR	0 = no error, 1 = I/O error (overtemperature or overcurrent)	HOLDING REGISTER 0x03 INPUT REGISTER 0x04		7	1 register UINT16
DIGITAL INPUTS	Digital input state: bit0=input1, bit1=input2, ... bit3=input4	HOLDING REGISTER 0x03 INPUT REGISTER 0x04		100	1 register UINT16
DIGITAL OUTPUTS	Digital outputs state: bit0=out1, bit1=out2, ... bit3=out4	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	101	1 register UINT16
COUNTER INPUT 1	Counter of the input 1. It is incremented every time the input switches from inactive to active state	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	102	2 register UINT32
COUNTER INPUT 2	Counter of the input 2. It is incremented every time the input switches from inactive to active state	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	104	2 register UINT32
COUNTER INPUT 3	Counter of the input 3. It is incremented every time the input switches from inactive to active state	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	106	2 register UINT32
COUNTER INPUT 4	Counter of the input 4. It is incremented every time the input switches from inactive to active state	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	108	2 register UINT32
CONFIG COMMAND	0 = data on registers 901-904 refreshed from configurations1 = data on registers 901-904 can be changed2 = save data from registers 901-904 to configurations	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	900	1 register UINT16
CONF - SLAVE ADDRESS	Slave address	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	901	1 register UINT16
CONF - SERIAL SPEED	Serial speed in bps	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	902	2 register UINT32
CONF - SERIAL PARAMS	Bit 2-3: 0 = 1 stop bit, 1 = 2 stop bits Bit 4-5: 0 = parity none, 1 = parity even, 2 = parity odd	HOLDING REGISTER 0x03 INPUT REGISTER 0x04	HOLDING REGISTER 0x06 0x10	904	1 register UINT16

6 Return and repair

Return for repair or replacement must be authorized in advance by requesting an RMA number.

Email 4neXt (support@4next.eu) or your dealer/dealer with the following information:

- Company name and customer details (address, phone, fax, e-mail)
- Contact person
- Point of purchase
- P/N and S/N product details on the back of each product or on the original box
- Detailed description of the fault or anomaly detected.

4neXt will send the RMA number with which the customer can return the material for repair. Products must be shipped freight prepaid.

If the material arrives without the factory seals, it will automatically be considered "out of warranty".

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