

# NR500 Series Industrial Cellular VPN Router

## Application Note 041

### Modbus Slave

**Version:** V1.0.0  
**Date:** Jul 2019  
**Status:** Confidential



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# 1. Introduction

## 1.1 Overview

This document contains information regarding the configuration and use of Modbus Slave.

This guide has been written for use by technically competent personnel with a good understanding of the communications technologies used in the product, and of the requirements for their specific application.

## 1.2 Compatibility

This application note applies to:

**Models Shown:** NR500 series.

**Firmware Version:** V1.1.0(ddcaac4) or newer

**Other Compatible Models:** None

## 1.3 Version

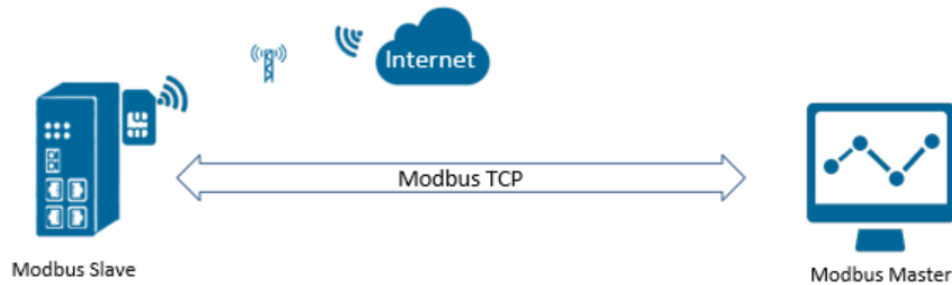
Updates between document versions are cumulative. Therefore, the latest document will include all the content of previous versions.

Release Date	Doc. Version	Firmware Version	Change Description
2019/07/18	V1.0.0	V1.1.0(ddcaac4)	First released

## 1.4 Corrections

Appreciate for corrections or rectifications to this application note, and if any request for new application notes please email to: [support@navigateworx.com](mailto:support@navigateworx.com)

## 2. Topology



1. NR500 router runs as Modbus Slave with static public IP address with SIM card.
2. Modbus Master connect to NR500 router (Modbus Slave) via TCP connection.
3. Modbus Master read the statue of Digital IO and control DO.

*Note: For this Application Note will run the software "Modbus Poll" to simulate Modbus Master.*

### 3. Digital IO Register Table

Index	Item	Function	Address (Decimal)	Quantity	Value
1	Digital Input 1	02 Input Status	13800	1	00 - Low 01 - High
2	Digital Input 2	02 Input Status	13801	1	00 - Low 01 - High
3	Digital Output 1	01 Coil Status	13802	2	00 - Low 01 - High 02 - Pulse
4	Digital Output 2	01 Coil Status	13804	2	00 - Low 01 - High 02 - Pulse
5	DO1 Pulse Width	03 Holding Registers	13806	1	Default:500(ms) range:1~1000
6	DO2 Pulse Width	03 Holding Registers	13807	1	Default:500(ms) range:1~1000

#### Example: Read DI Status

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Quantity
Tx	01 90	00 00	00 06	01	02	35 E8	00 01

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Byte length	Value
Rx	01 90	00 00	00 04	01	02	01	01

#### Example: Read Do Status

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Quantity
Tx	04 81	00 00	00 06	01	01	35 EA	00 02

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Byte length	Value
Rx	04 81	00 00	00 04	01	01	01	02

#### Example: Control Do-Output Pulse

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Quantity	Byte length	Value
Tx	07 29	00 00	00 08	01	0F	35 EA	00 02	01	02

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Quantity
Rx	07 29	00 00	00 06	01	0F	35 EA	00 02

**Example: Modify the width of the output pulse -- 500ms (The current output is Pulse to modify the width)**

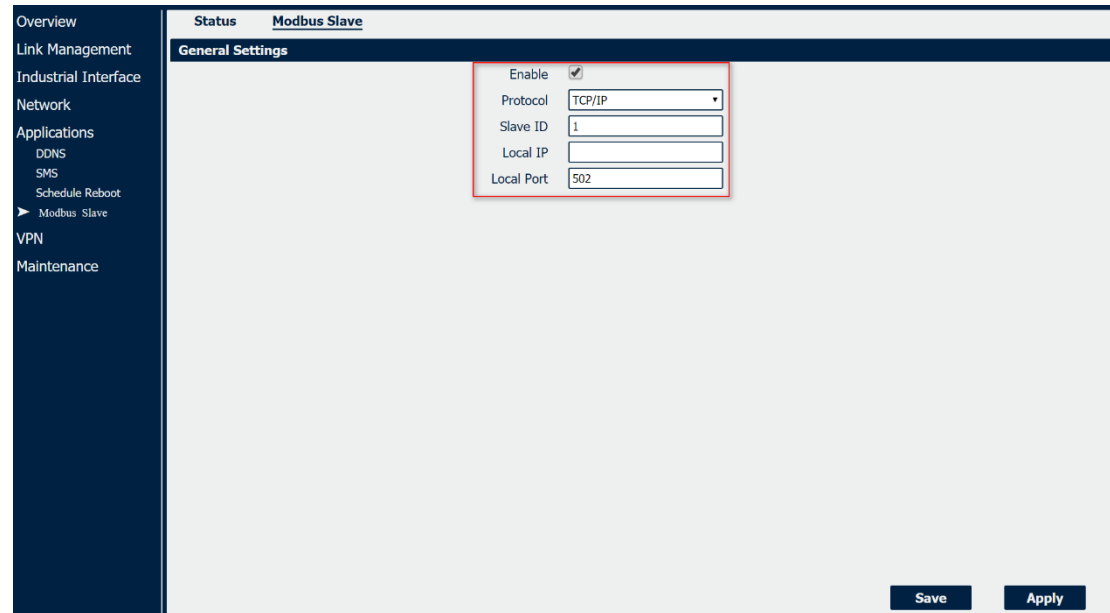
Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Tx	07 2C	00 00	00 06	01	06	35 EE	01 F4

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Rx	07 2C	00 00	00 06	01	06	35 EE	01 F4

## 4. Configuration

### 4.1 NR500 Pro Configuration

1. Go to **Application>Modbus Slave**, enable Modbus Slave feature like below:



The screenshot shows the 'Modbus Slave' configuration page. The left sidebar contains navigation options: Overview, Link Management, Industrial Interface, Network, Applications (with sub-items DDNS, SMS, Schedule Reboot, and Modbus Slave), VPN, and Maintenance. The main content area is titled 'Status Modbus Slave' and 'General Settings'. A red box highlights the following settings:

Enable	<input checked="" type="checkbox"/>
Protocol	TCP/IP
Slave ID	1
Local IP	
Local Port	502

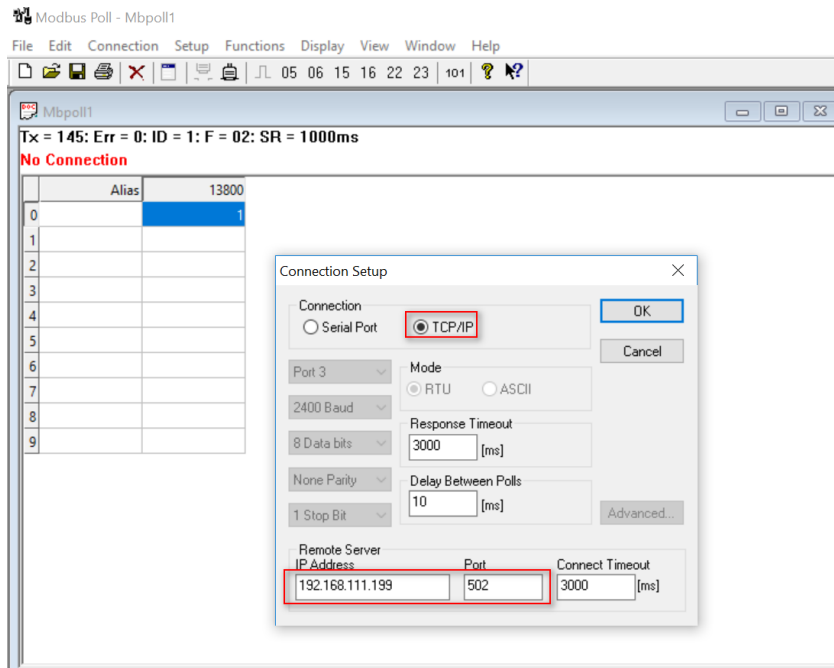
At the bottom right of the configuration area, there are two buttons: 'Save' and 'Apply'.

2. Click Save>Apply.

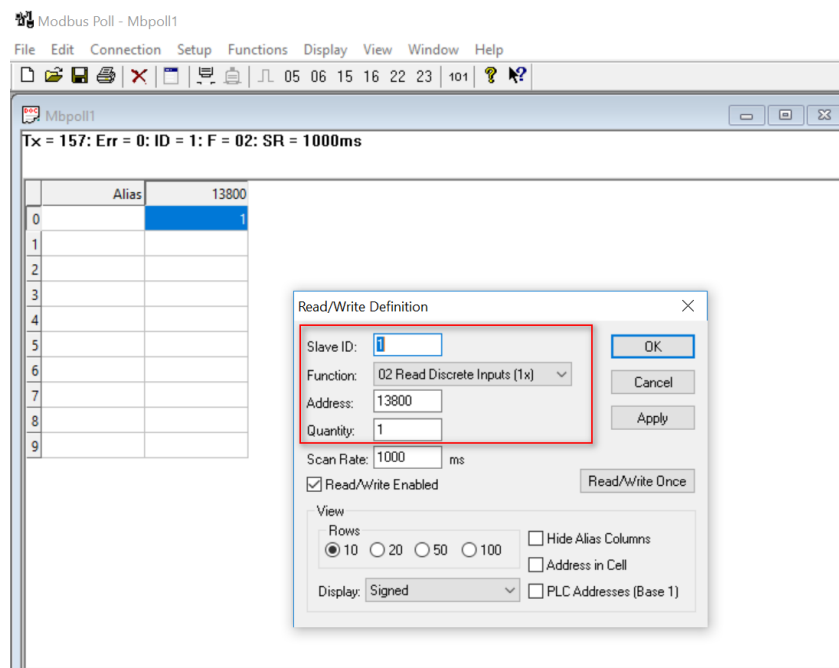
## 5. Testing.

### 5.1 Read Digital Input Status

1. Run software "Modbus Poll" to connect to NR500 (Modbus Slave), like below:  
(Path: Connection>Connect)

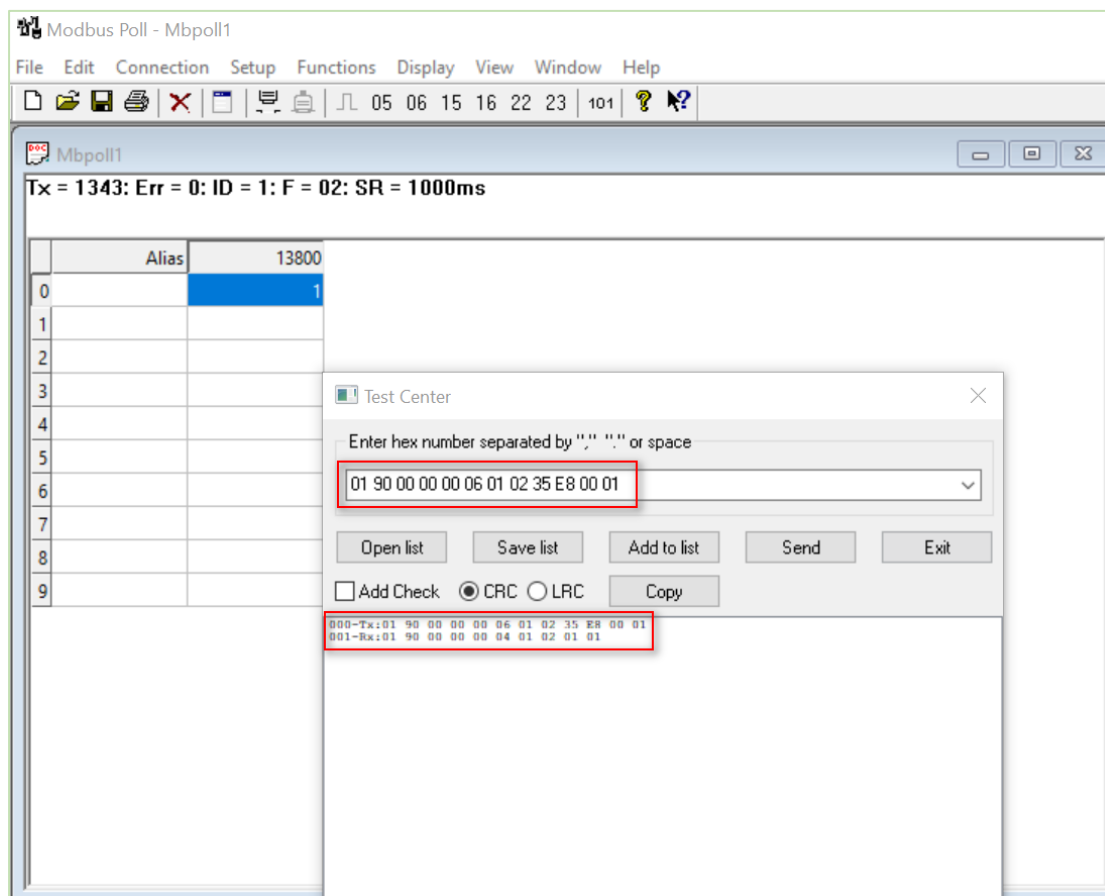


(Path: Setup>Read/Write Definition)





- Send the command to read the status of DI1:  
(Path: Functions>Test Center)

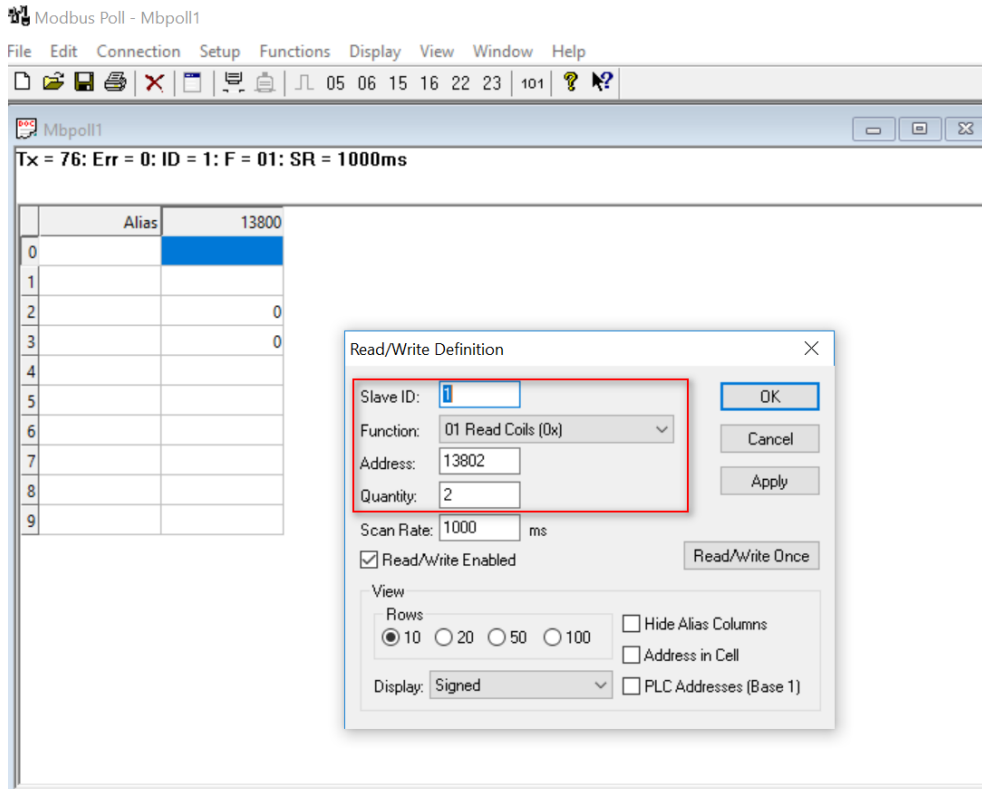


The reply Value is "01", DI1 status is "High". Test successfully.

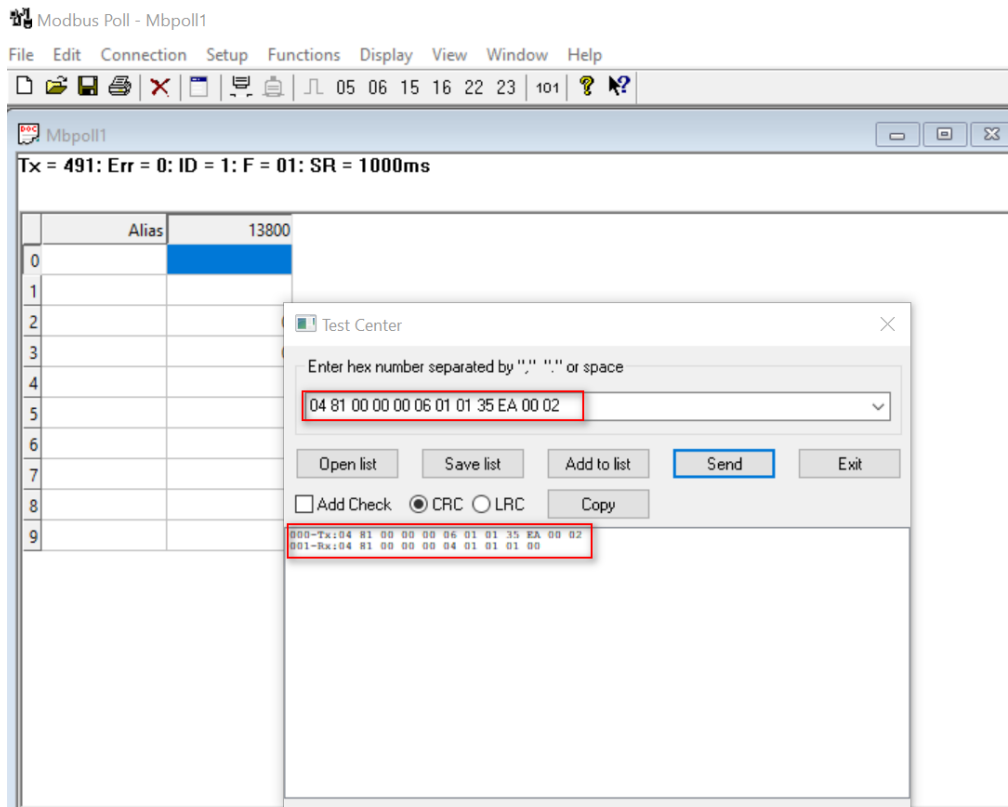
*Note: The meaning of "Tx" and "Rx" command, please refer to "Digital IO Register Table".*

## 5.2 Read Digital Output Status

- Set the Function Code to "01", Address is "13802" and Quantity is "2":  
(Path: Setup>Read/Write Definition)



2. Send the command to read the status of DI1:  
(Path: Functions>Test Center)

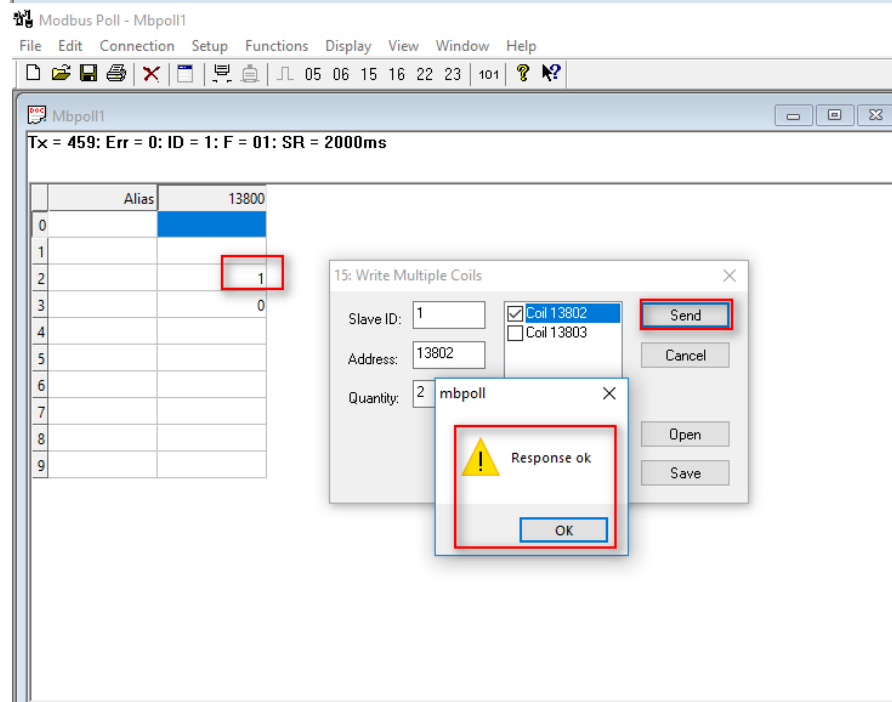
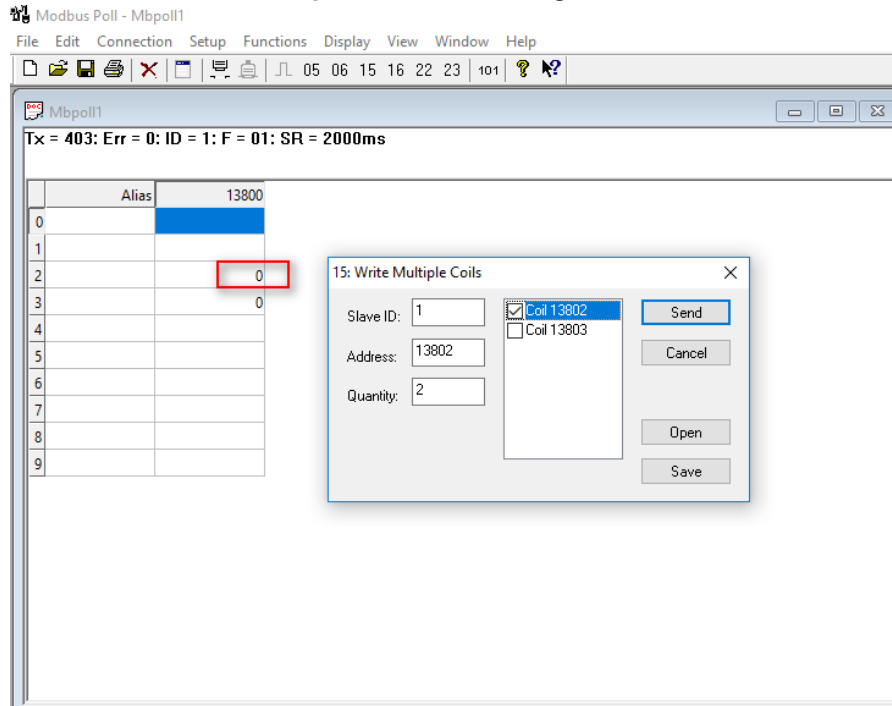


The reply Value is "00", DO1 status is "Low". Test successfully.

Note: The meaning of "Tx" and "Rx" command, please refer to "Digital IO Register Table".

## 5.3 Control Digital Output

Go to **Functions>15:Write Multiple Coils**, to change the DO statue from "0" to "1".



Test successfully.