

## **Wireless connection to a CNC (with a serial port RS232C)**

Below you can get a description on how to connect a CNC with a serial port RS232C to a PC via a **wireless** network (or Ethernet).

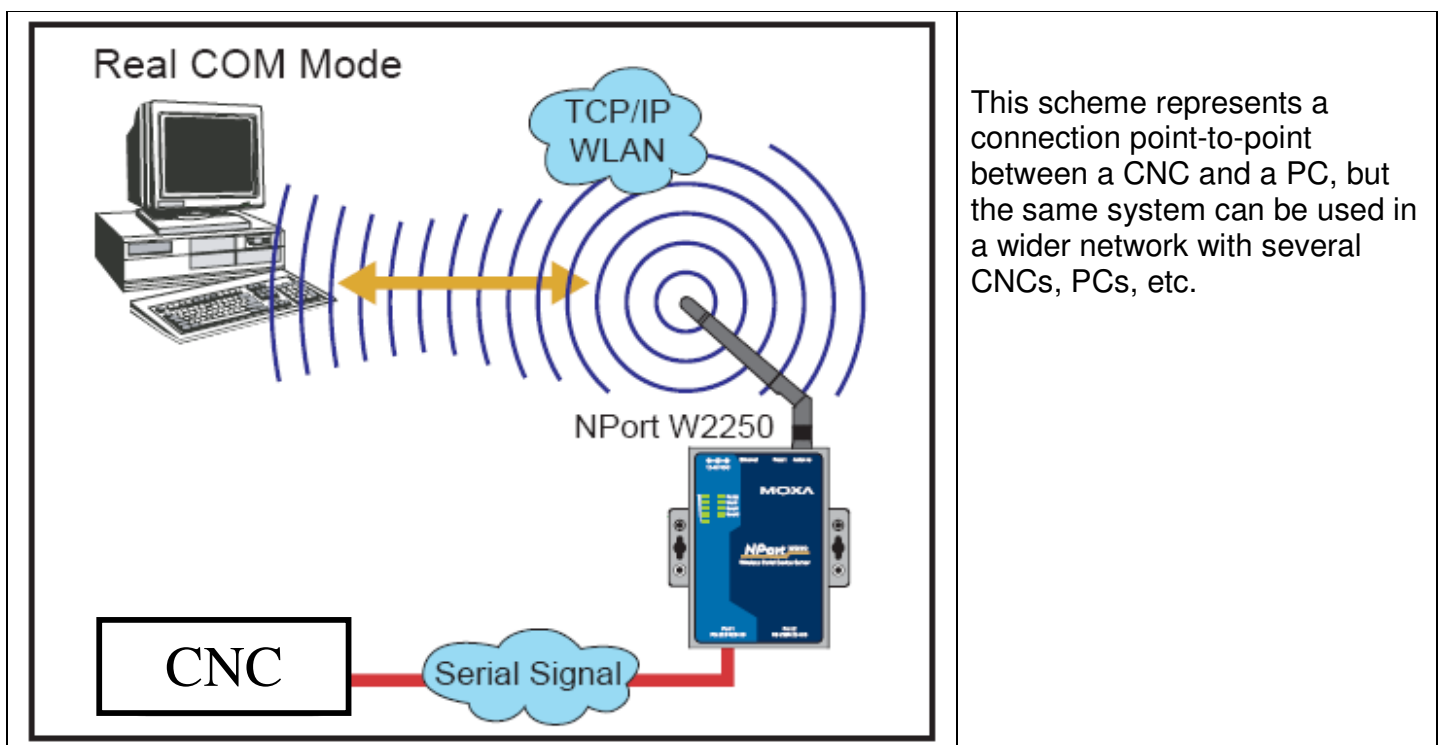
The serial communication RS232C has **important drawbacks**:

- Usually it requires making a direct cable to connect the CNC and PC (point to point cable).
- Over long distances the transmission of data is not reliable
- The number of connections to serial port on a PC is limited (usually 1 or 2), in many cases none is **not available!!!**.

In order to solve these problems it is recommended to use a wireless network (or to an Ethernet network if available).

It is possible to connect the serial port RS232C from the CNC to a wireless network by using a converter device that it possible to find easily in the market. These devices allow you to send the data it receives to the serial port RS232C through a wireless network, and vice versa.

Below you a get the necessary steps to achieve the wireless connection between a CNC with a serial port RS232C and a PC by using a Wireless converter device RS232C from MOXA: **NPort W2250** (or other similar).



### **STEP 0: Necessary equipment**

In order to establish a wireless communication between the CNC and PC as described above it is necessary to have the following:

1) CNC with RS232 serial port.

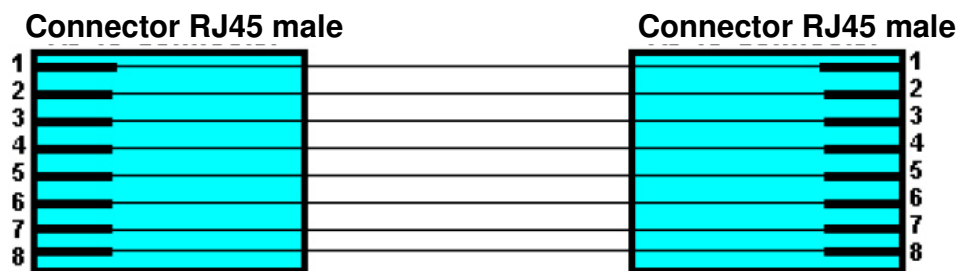
2) PC with Windows XP, or Windows 7.

It is **NOT necessary** to have RS232 serial port in the PC.

3) Wireless Server **NPort W2150/2250** or similar. In the case of model **NPort W2150** , a device would be necessary for each CNC. In the model **NPort W2250** it is possible to connect up to 2 CNC.

4) CD that includes the “**driver**” to be installed on the PC, usually the NPort W2150/2250 is supplied with mentioned CD. It is also possible to download from the Web page of the manufacturer MOXA ([www.moxa.com](http://www.moxa.com)).

5) Ethernet crossed cable to connect the PC to the **NPort W2150/2250** and be able to make the necessary adjustments in it. Usually the **NPort W2150/2250** is supplied with mentioned cable. The details of the cable is the following:



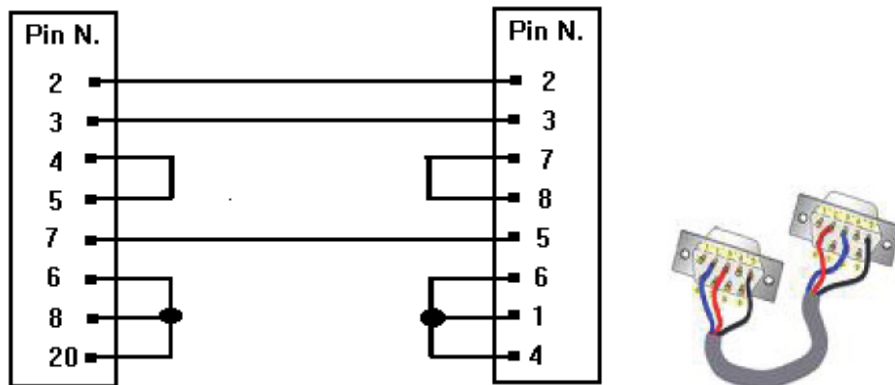
6) RS232C cable to connect the CNC with the **NPort W2150/2250**.  
Below you can get the details of cable connection.

**CNC side**

Connector DB-25 (25 pin male)

**PC side**

Connector DB-9 (9 pin female)



7) Communication Program “**Open communication for FANUC**”.

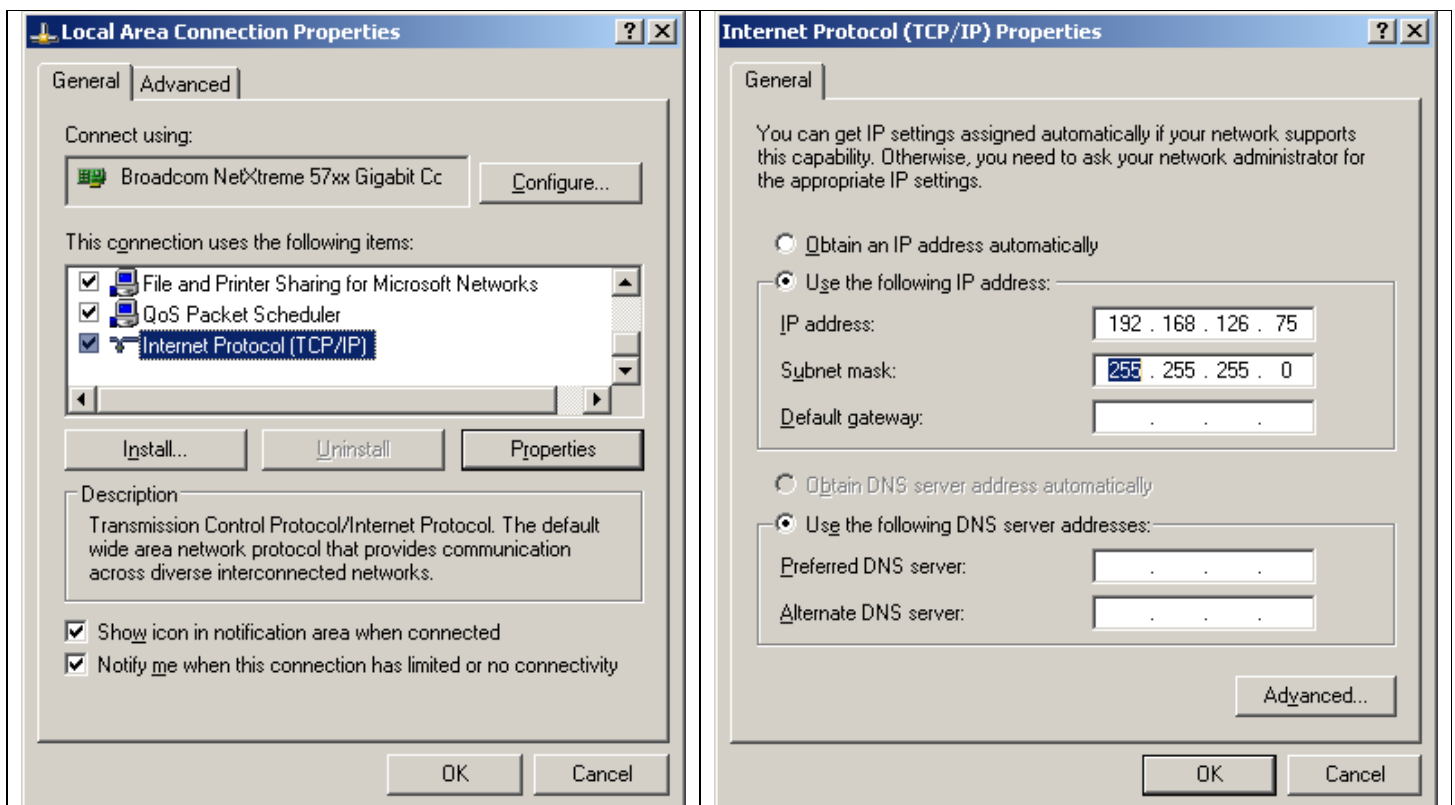


## **STEP 1: Set up of NPort W2250**

First, configure the NPort W2250 as any wireless device WLAN. The IP addresses by default for the Ethernet connection (LAN) and wireless (WLAN) of the **NPort W2250** are the following:

Network Interface	IP Configuration	IP Address	Netmask
LAN	Static	192.168.126.254	255.255.255.0
WLAN	Static	192.168.127.254	255.255.255.0

You can usually configure this device using an Ethernet cable and establishing a communication point-to-point between the **NPort W2250** and the computer. The adjustment in the PC could be the following:



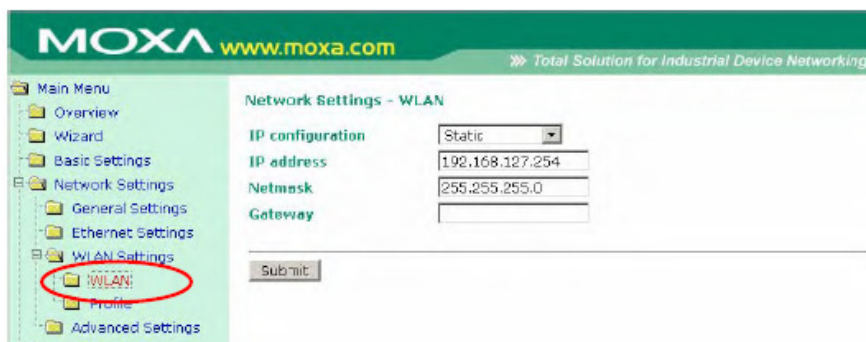
Once established the Ethernet connection, we can access the configuration menu of the **NPort W2250** by using “**Internet Explorer**” or another similar application as shown in the next screen: In the “Address” field you can type the default **IP address** of the **NPort W2250** that is:

<http://192.168.126.254>

Then we should be able to see the setting display similar to that shown below:



Once we have entered the settings menu, we can change the necessary settings. For example we can change the default address of the **wireless network WLAN** in the case of wanting to include the device within an existing network.



Select the type of network. If the connection is going to be point-to-point with a single PC and a single CNC, then you can select “ad-hoc Mode”, but if you are connecting the device among an existing network, you should select as “**Infrastructure Mode**”. It is recommended to use “**Infrastructure Mode**” because it is also valid to connect to a single PC - CNC.

The image contains two screenshots of the MOXA web interface, specifically the 'Wireless LAN Profile' configuration page. The top screenshot shows the 'Network type' set to 'Ad-hoc Mode' and the 'Profile name' set to 'ad-hoc'. The bottom screenshot shows the 'Network type' set to 'Infrastructure Mode' and a list of profiles (Profile1, Profile2, Profile3) under the 'Priority' section. The 'Profile' option in the left sidebar is highlighted in red in both screenshots.

**MOXA** www.moxa.com Total Solution for Industrial Device Networking

Main Menu  
Overview  
Wizard  
Basic Settings  
Network Settings  
General Settings  
Ethernet Settings  
WLAN Settings  
WLAN  
Profile  
Advanced Settings

Wireless LAN Profile

Wireless LAN Profile

Network type: Ad-hoc Mode

Profile name: ad-hoc

General Security

Submit

**MOXA** www.moxa.com Total Solution for Industrial Device Networking

Main Menu  
Overview  
Wizard  
Basic Settings  
Network Settings  
General Settings  
Ethernet Settings  
WLAN Settings  
WLAN  
Profile  
Advanced Settings  
Serial Port Settings  
System Management  
System Monitoring  
Save Configuration  
Restart

Wireless LAN Profile

Wireless LAN Profile

Network type: Infrastructure Mode

Use up/down to sort the profile list. (\*: Active profile, X: Disabled profile)

Priority: High

Profile1  
Profile2  
Profile3

General Security

Up Down

Connect rule: Signal strength of AP

Low signal strength reconnect: None

Submit

Set the **SSID** (Service Set Identifier) , is a name included in all packets on a wireless network (Wi-fi) for identifying them as part of this network.  
The **SSID** by default of the **NPort W2250** is : “**Default**”

It is also possible to add security PASSWORD or a key (**WEP**) to enter the network :

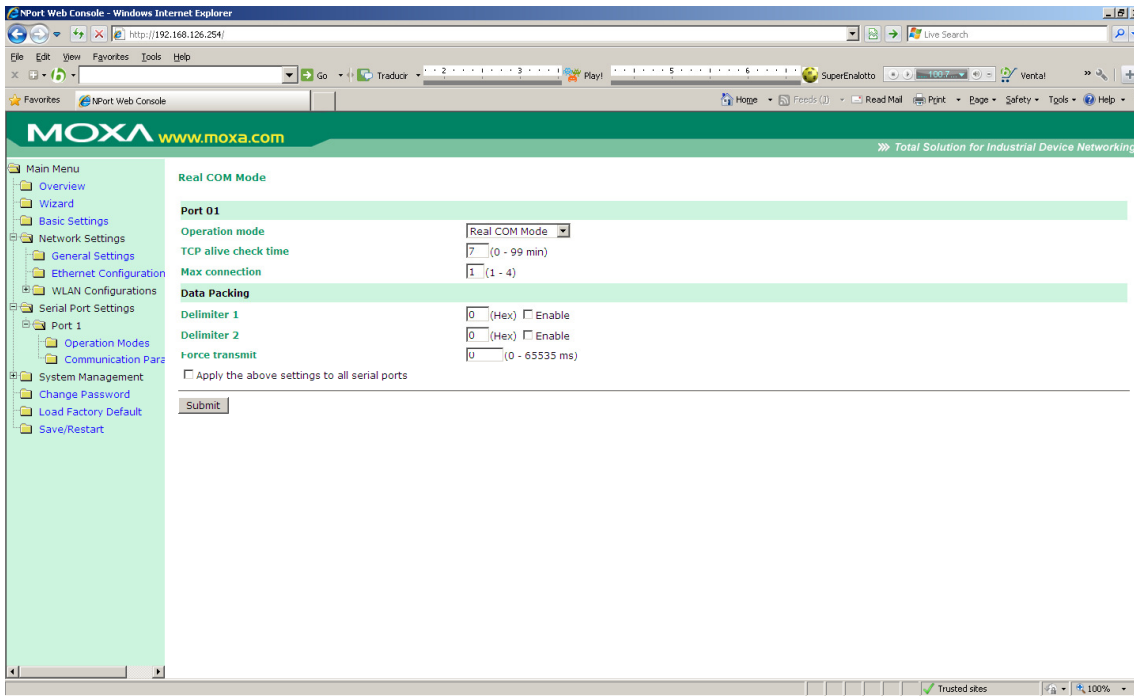
In Infrastructure Mode

The first screenshot shows the 'Wireless LAN Profile' configuration page. The left sidebar has a tree view with 'Profile' highlighted under 'WLAN'. The main content area has a 'Wireless LAN Profile' section with a 'Network type' dropdown set to 'Infrastructure Mode'. Below this is a table of profiles: Profile1 (Active), Profile2 (Disabled), and Profile3 (Disabled). The 'Security' tab is selected, and a red arrow points to it. The 'Connect rule' is set to 'Signal strength of AP' and 'Low signal strength reconnect' is set to 'None'. A 'Submit' button is at the bottom.

The second screenshot shows the 'WLAN Profile Properties' page. The left sidebar has a tree view with 'Profile' highlighted under 'WLAN'. The main content area has a 'WLAN Profile Properties' section with a 'Security Properties' subsection. The 'Profile name' is 'Profile1', 'Authentication' is 'Open System', and 'Encryption' is 'Disable'. 'Back' and 'Submit' buttons are at the bottom.

Initially you can use, “**Open system**” selection to establish easily a communication. Once you set the connection you can add the necessary securities.

To establish a wireless communication CNC-PC but emulating a communication similar to a direct cable RS232C , it is necessary to adjust the device as “**Real COM Mode**” .





Set the RS232C communication parameters.  
For instance:

**Baud rate:** “19200” .

If the CNC does not allow this speed or there are problems with data transmission it is recommended to reduce speed to 9600 or 4800 .

**Data bits:** “7” .

Necessary to use ISO code in the CNC.

**Stop bits:** “2”.

**Parity:** “Even”.

Necessary to use ISO code in the CNC.

**Flow control:** “XON/XOFF”.

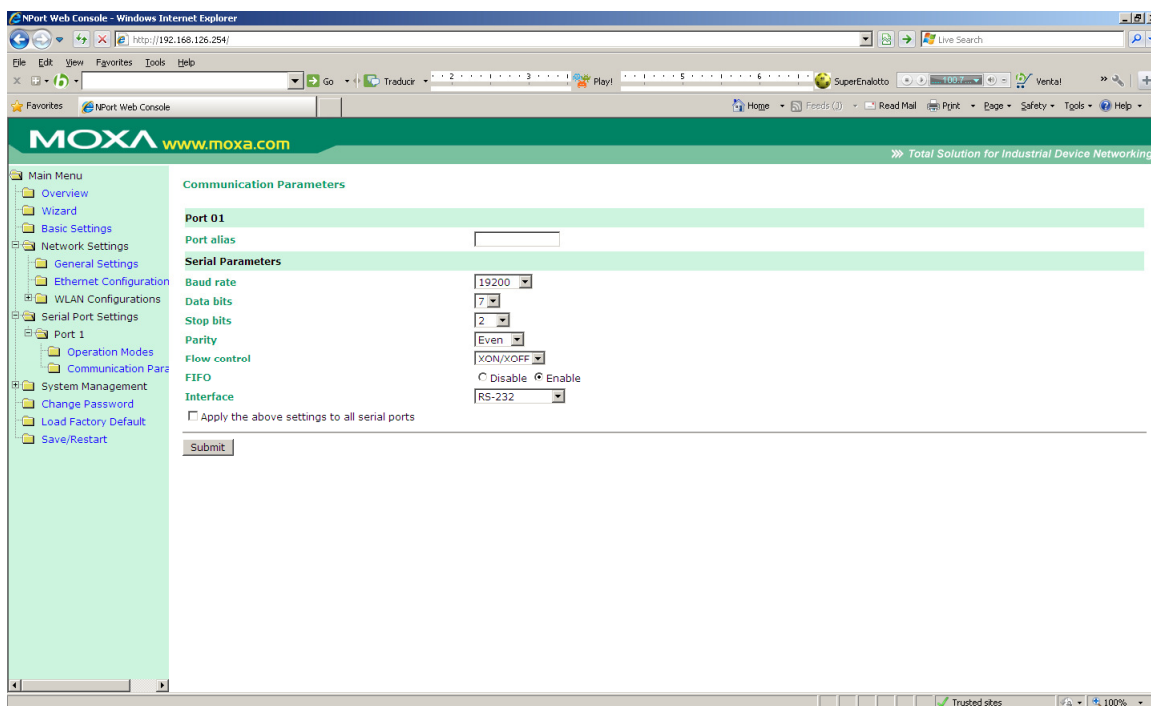
This setting corresponds to “Software” protocol on the adjustment of the “**Open Communication for FANUC**”. Both adjustments must match.

**FIFO:** “Enable”.

**Interface:** “RS232”.

### Important Note:

These settings should match those of the **CNC** and the adjustments in the communication program “**Open Communication for FANUC**” selected in the “**Configuration**” menu.



## **STEP 2: Establish wireless communication**

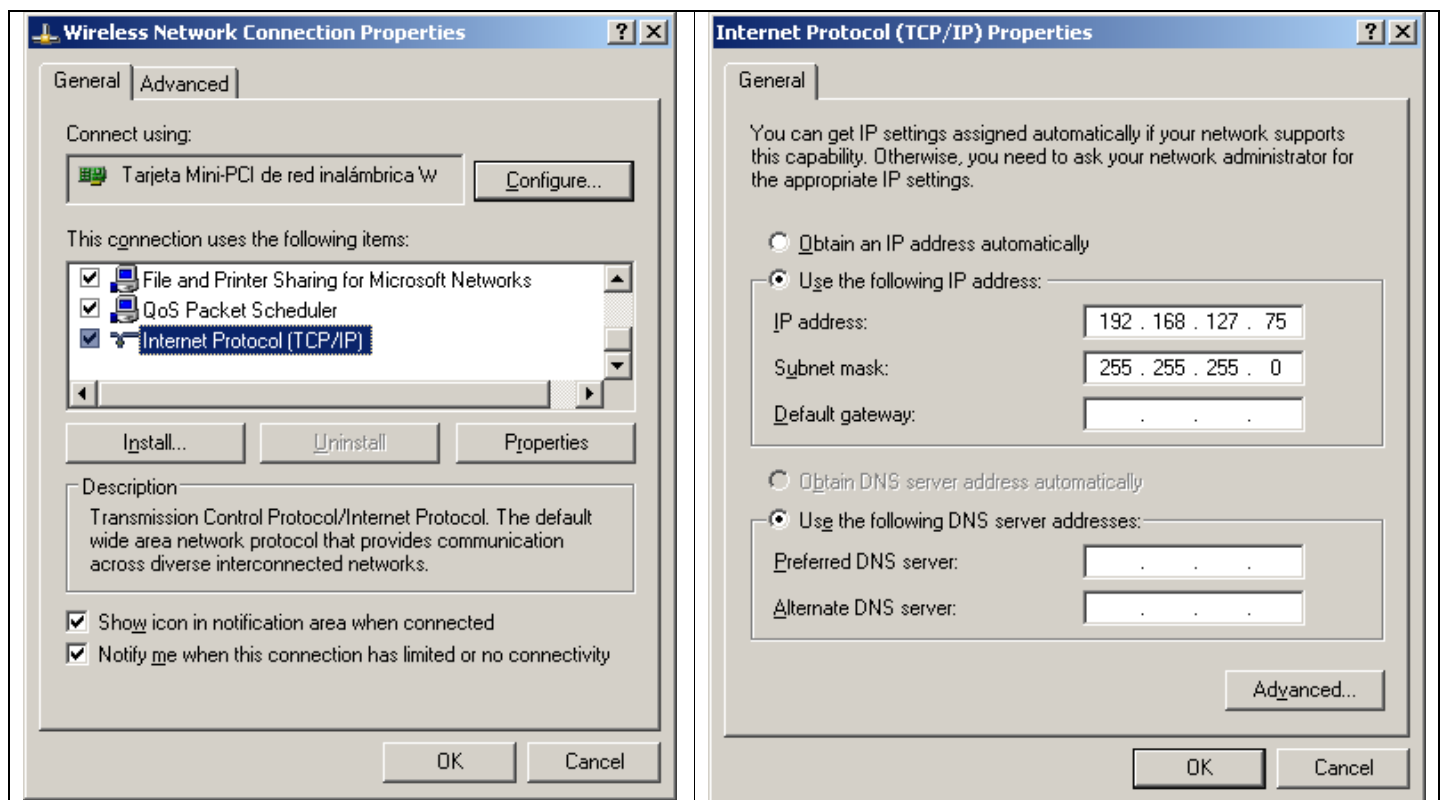
Once you've made the adjustments in the **NPort W2250**, it is possible to exit from the setting menu and disconnect the Ethernet cable connected to the PC for that purpose.

Now you have to adjust the communication parameters for the wireless connection card in the PC, considering that the IP address of the **NPort W2250** for the wireless network, if it has not been changed, is by default:

**IP address:** 192.168.127.254

**Mask:** 255.255.255.0

For example, the following setting in the PC could be used for a wireless communication:

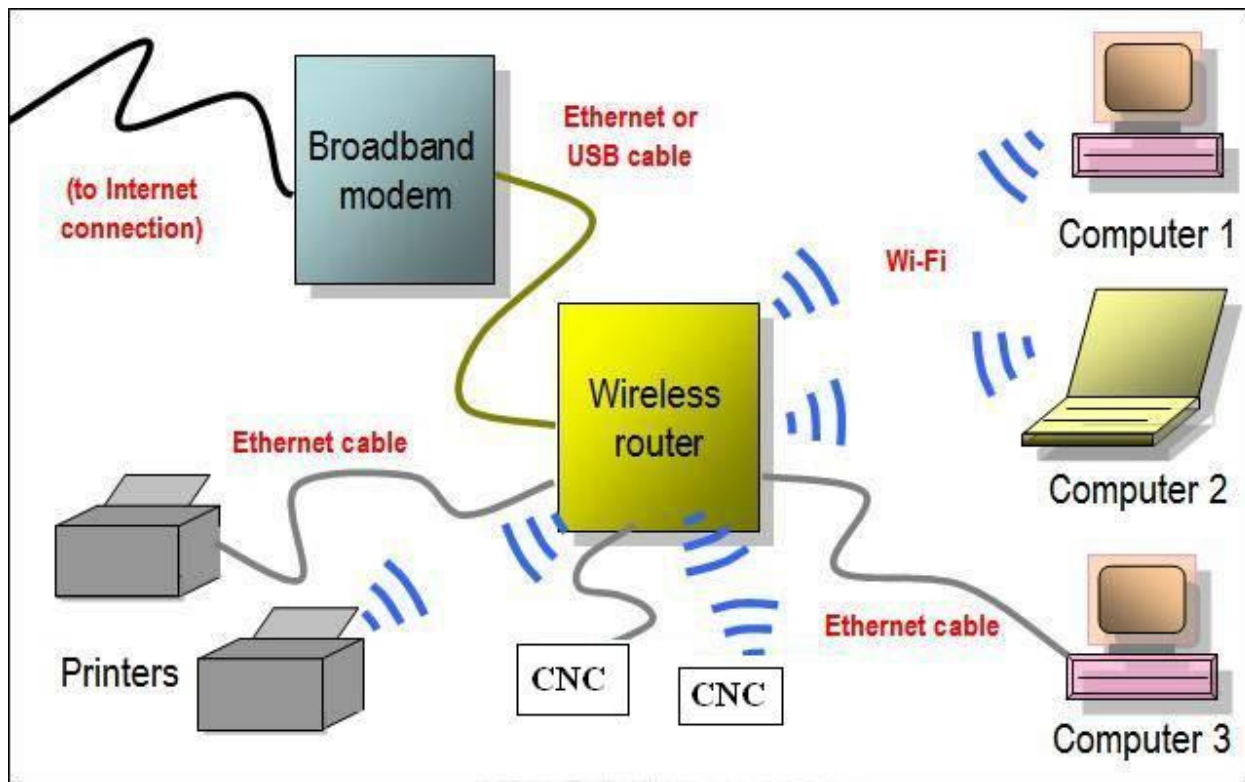


Once you have established the necessary data, your PC should be able to detect the wireless device **NPort W2250** connected.

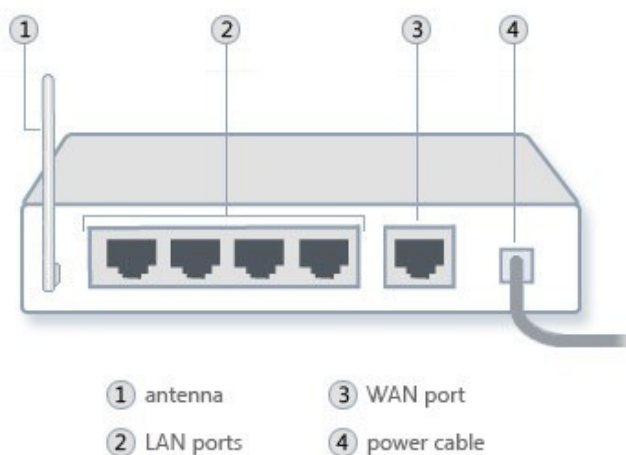
In the PC it is possible to find the wireless devices available in the environment and connect to the new device as with any other wireless device entering the data of **SSID** (Service Set Identifier) and **PASSWORD** previously prefixed in the **NPort W2250**. The **SSID** by default of the **NPort W2250** is : **"Default"**.

If you have selected the **NPort W2250** as “**Infrastructure Mode**”, it is possible to include the device **NPort W2250** within an existing network by introducing the appropriate IP addresses.

A typical simple network could be the following:



What has been described above should be sufficient to establish a wireless connection between the PC and the **NPort W2250** and continue to the next step.



This could be an example of a wireless router.

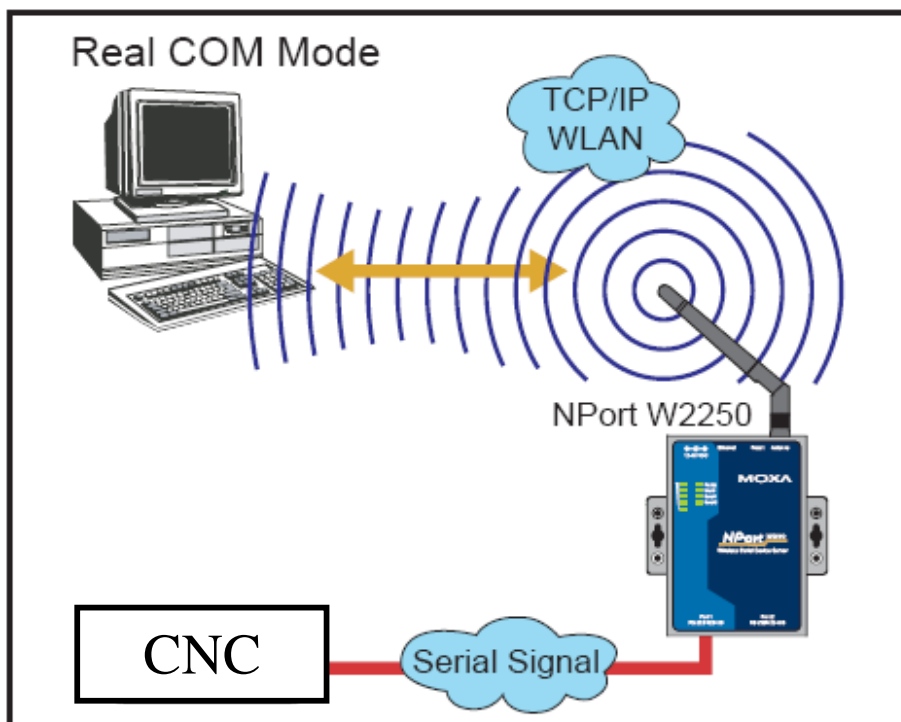
### **STEP 3: Install the “Nport driver” program in the PC**

Once established wireless communication between the PC and the **NPort W2250** we can proceed to the next step to be able to send and receive data from the CNC.

Install the “**Nport driver**” that provides the manufacturer that allows you to generate a virtual connection between the serial port (COM) and the IP connection.

This “**Nport driver**” allows you to generate a virtual serial port in PC and associate it with an IP connection either wireless or Ethernet.

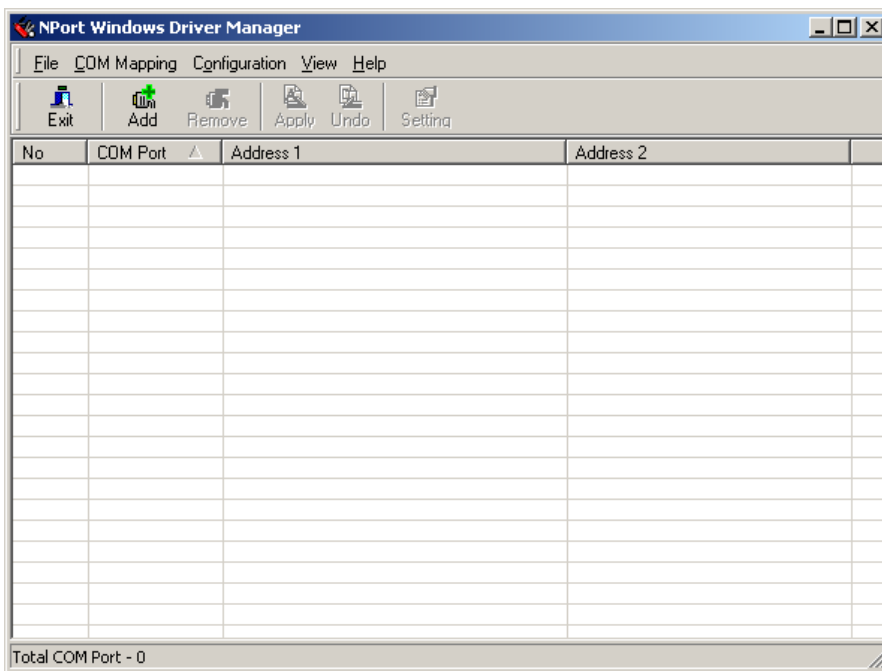
This connection mode is usually called **Real COM mode**.



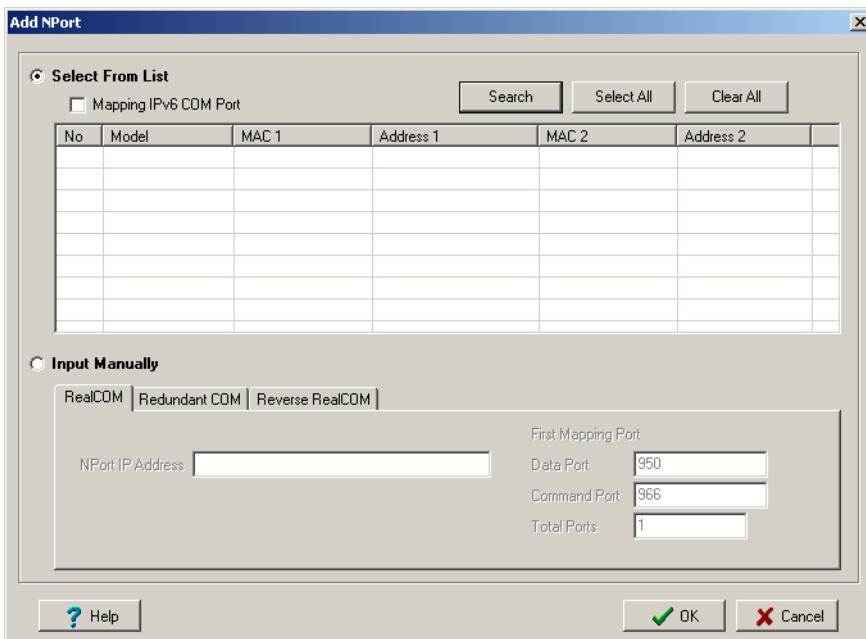
Install the “**Nport driver**” from the manufacturer of the **NPort W2250** following the relevant instructions.

Once properly installed the driver it is possible to run the associated application “**Nport Windows Manager**” and set up an association of the IP address of the **NPort W2250** to the virtual serial port (**COM**) in the PC.

When you run the application “**Nport Windows Manager**” , you will see the following screen:

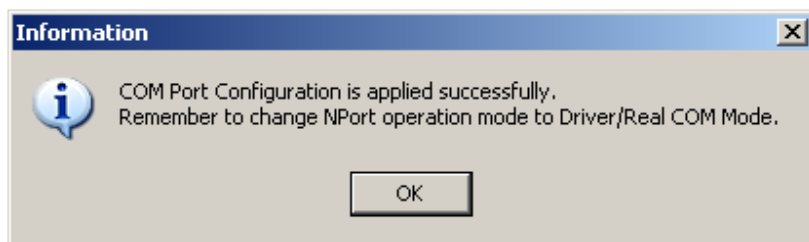


Click “**Add**”:

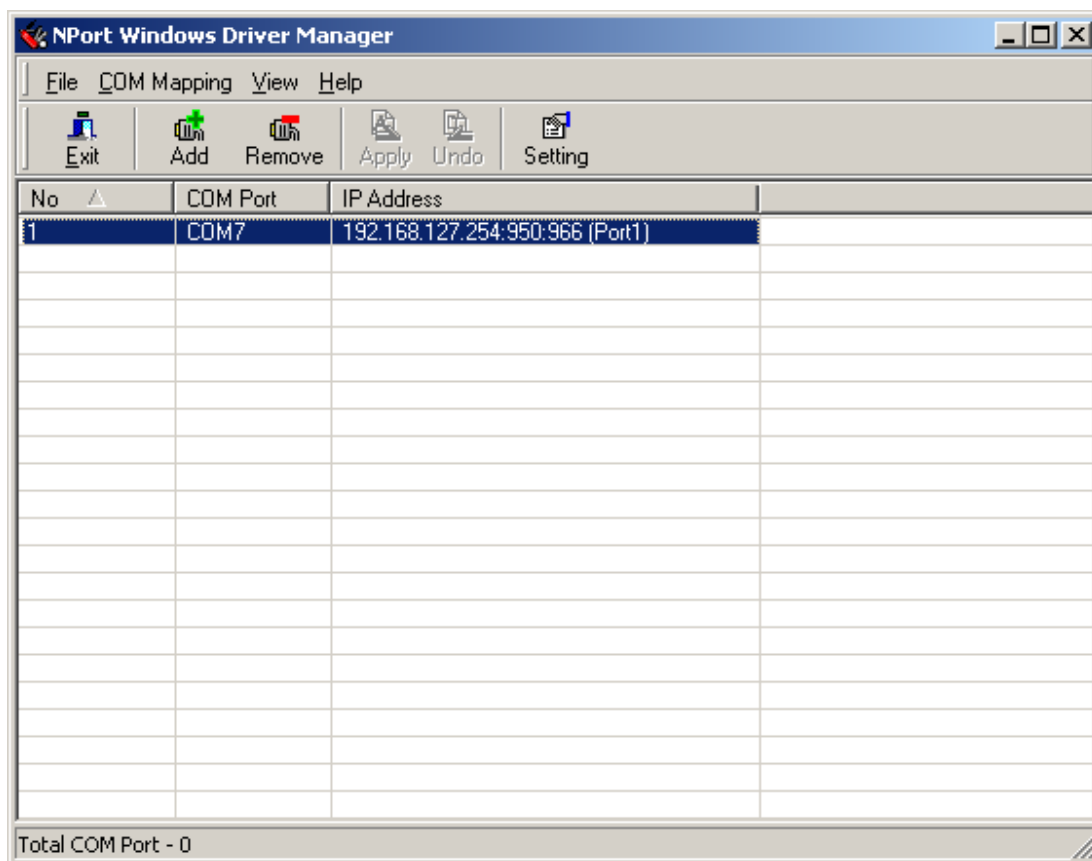


If you click “**Search**” it application should automatically find the **NPort W2250** connected and its IP address automatically. It is also possible to do so manually. It is not necessary to change “**Data port**” and “**Command port**” by default (950.966 ) unless you use those port for other purpose.

Activate the **COM** port to associate it with the **IP address** of the **NPort W2250**. Once the serial **COM port** has been assigned to the corresponding **IP address**, a pop-up message should indicate that it has been carried out with success:



For example, in the next adjustment the virtual serial port RS232C "**COM7**" from the PC has been assigned to an IP connection **192.168.127.254** (by default) of the **NPort W2250**.



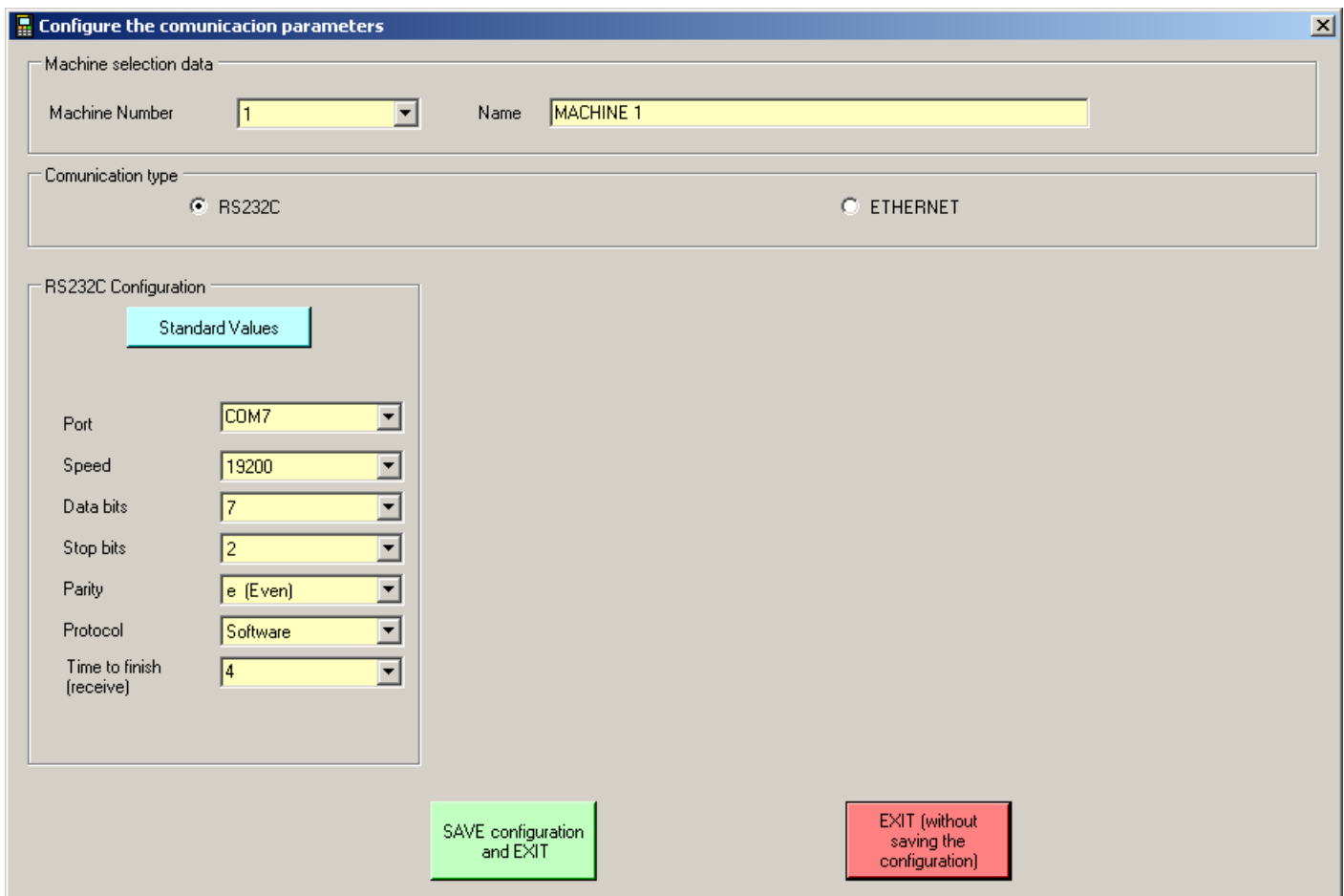
Once made the association of the serial port in the PC (virtual "**COM7**" in the example) to an IP address in the **NPort W2250** (**192.168.127.254** in the example) , it is possible select it in the communication program as any serial real port. It is important that this adjustment has been done satisfactorily (**without errors**).

#### **STEP 4: Establish Wireless communication CNC - PC**

Verify that the serial port RS232C of the CNC is connected to the **NPort W2250** device through the RS232C cable.

Configure the application exactly in the same way as we would work with a real serial port by setting up the serial port to use. The number of port (**COM7** in the example), must match the defined in the previous step.

The communication parameters such as “**baud rate**”, “**data bits**”, “**stop bits**” and “**parity**”, must match the established in step 1, and the ones set in the CNC.



**Configure the communication parameters**

Machine selection data

Machine Number: 1 Name: MACHINE 1

Communication type

☒ RS232C ☐ ETHERNET

RS232C Configuration

Standard Values

Port: COM7

Speed: 19200

Data bits: 7

Stop bits: 2

Parity: e (Even)

Protocol: Software

Time to finish (receive): 4

SAVE configuration and EXIT

EXIT (without saving the configuration)

Once you have set the communication parameters, it should be possible to send and receive data from the serial port in the same way as you would do it with by a normal cable connection.

Look up at the **Operator's manual** of program for more details.

Test the connection by selecting “**Send\_to\_CNC**” or “**Receive\_from\_CNC**” in the communication program.

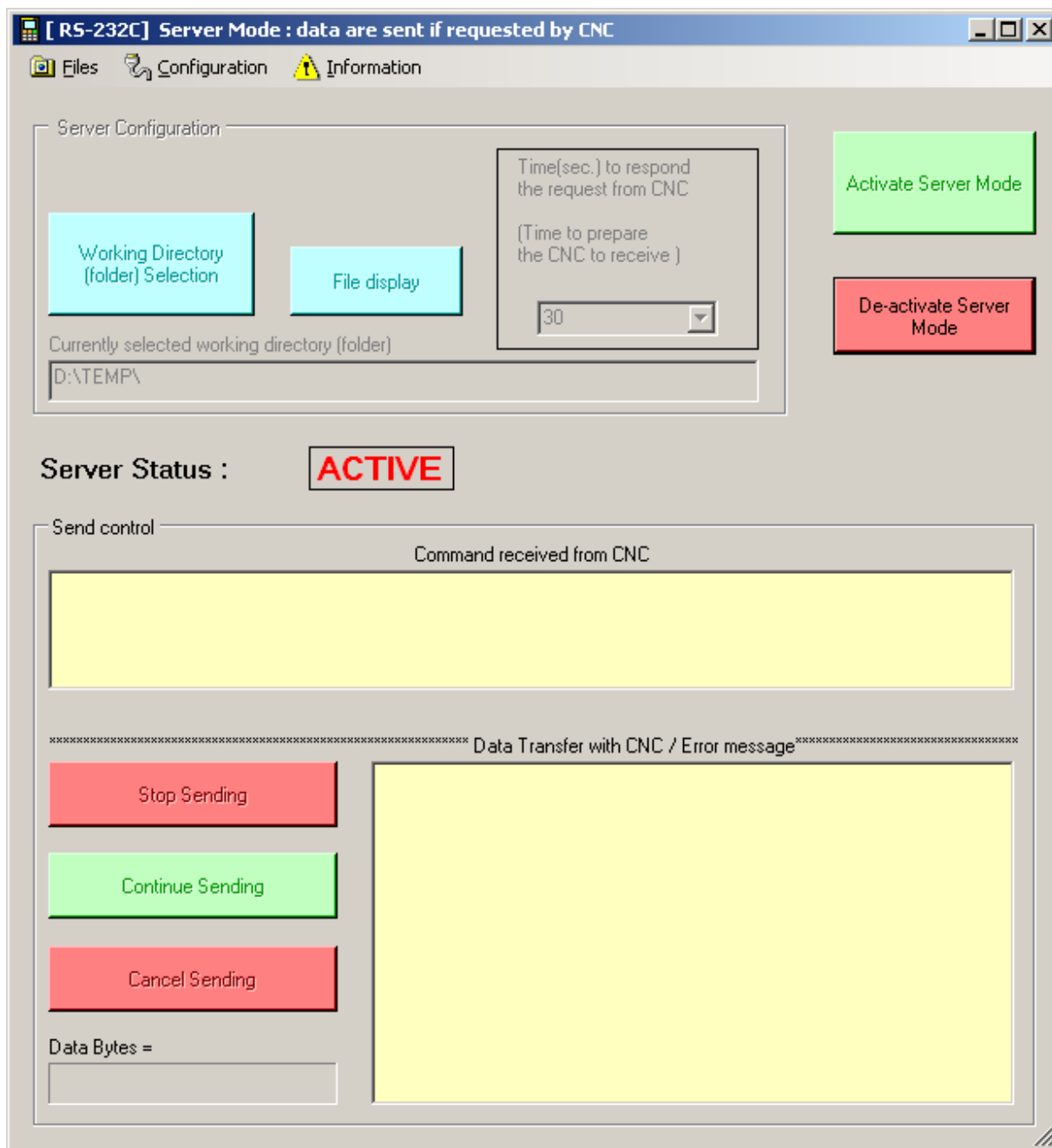
The wireless connection with CNC is especially useful when using the PC in “**CNC server mode**” as the data transfer commands etc. are entirely done from the CNC . This way it is not necessary to go and back to the computer each time you want to send or receive data etc.

To operate this way select “**CNC server mode**” as indicated below:



Once you have selected this operation mode, select the working directory on the PC as well as the response time scheduled for the computer to respond the request from the CNC.





After doing mentioned adjustments, click “**Activate Server Mode**”.

In this mode it is possible to handle the files in your PC from the CNC and carry out the following operations:

- Request the PC to send the file list in the PC to the CNC.
- Request the PC send a program to the CNC
- Request to send a program to the PC and save it with the desired name.
- Request to delete a file in the computer.
- Request to rename a file in the PC .
- Request to copy a file to the PC.

Look at the “Operation manual” of “Open communications for FANUC CNC” or click the “Information” in the previous menu for more details:

