



User Manual

nanowF

Revision 1a

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Overview and Installation

Overview

The nanoWF is a WiFi communication module that allows the labZY devices to connect to wireless networks. The nanoWF module weighs 10 g and has dimensions approximately 50x25x7 mm³. Fig. 1.1 shows the nanoWF seen from the label side of the module. The label displays the part number (NA0521) and the 12 digit serial number of the module.

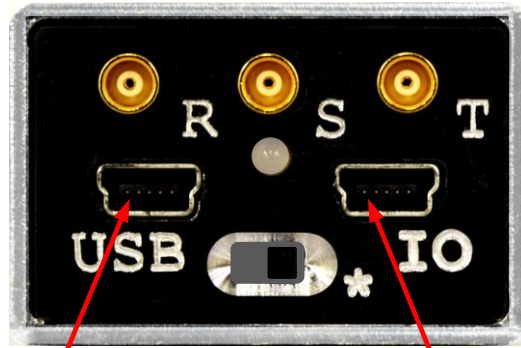


Figure 1.1 nanoWF module, label side.

The nanoWF is designed to work with labZY devices with firmware versions greater than 30 and having an even last digit. For example nanoWF will work fine with firmware versions 30.20 or 50.22 but will not work with versions 30.19 or 40.15.

Hardware Installation

The nanoWF must be connected to the IO ports of the labZY devices. The labZY devices must be powered by external power supply delivering enough current to power both the labZY device and the attached nanoWF module. Fig. 1.2 shows the IO port and the port to connect external power (POWER) of different labZY devices. Note that the external power to nanoPSD and nanoTDCR is supplied through the USB port, while for the other devices the external power is supplied through a dedicated port. **In the later case it is IMPORTANT that the external power is NOT APPLIED when the IO port is connected to a USB port of a computer!.**



POWER

nanoWF

a)



nanoWF

POWER

b)



nanoWF

POWER

c)

Figure 1.2 IO port and the POWER connector; a) nanoPSD and nanoTDCR, b) nanoMCA-II (SP), c) nanoMCA (SP), nanoXRS, and nanoDPP

To connect physically the nanoWF module to nanoPSD or nanoTDCR an extension cable is required. It is also recommended to use extension cables with other devices as this places the nanoWF on a distance from the labZY device reducing any possible electromagnetic interference. In the following description a connection via extension cable is considered.

Follow these steps to connect the nanoWF to labZY device.

1. If the labZY device is powered, turn it off either using the power switch or unplugging the cable supplying power (e.g. USB cable).
2. Plug the nanoWF to the female end of the extension cable.
3. Plug the other end of the extension cable into the labZY device.
4. Apply power to the labZY device using an external power supply.

Upon powering the nanoWF module on the side opposite to the label side an orange LED light comes on as shown in Fig. 1.3.



Figure 1.3 Power-on indicator of nanoWF module.

nanoWF Setup

Connecting to nanoWF Server

Network Connection

After the nanoWF is powered on it will initialize its local server and will broadcast the name of the server. It make take few minutes until the name of the nanoWF server is visible. On a Windows computer open the Network connection center to see the available servers. If seen by the computer, the nanoWF wireless server will be identified as nanoWiFi_XXXXXX, when XXXXXX are the last six digits of the serial number of the nanoWF module. For example, the server of the nanoWF module with serial number 0080A3A04298 will be identified as nanoWiFi_A04298 as shown in Fig. 2.1.1.

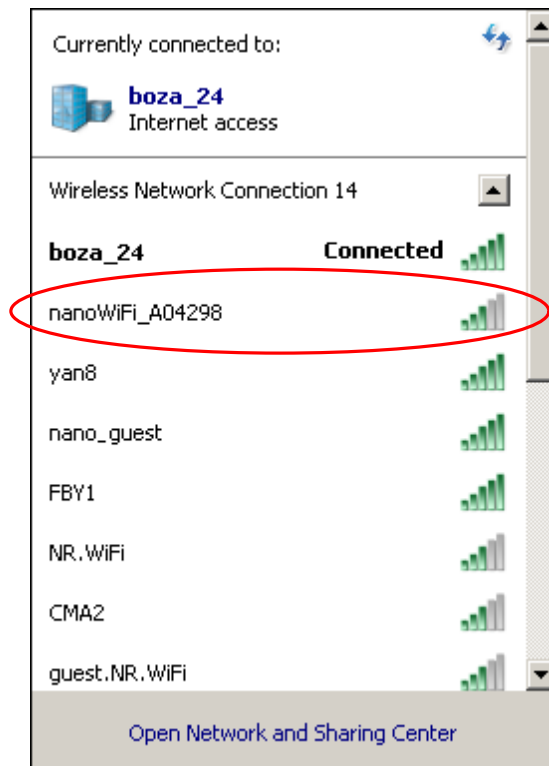


Figure 2.1.1. nanoWF server identification.

Once the server is identified connect to it. The connection is secured by a key. The computer will display a dialog asking for the security key as displayed in Fig. 2.1.2. Enter the key that is provided by labZY an included in the nanoWF package and press OK. If you misplace the key, please contact support@labzy.com.

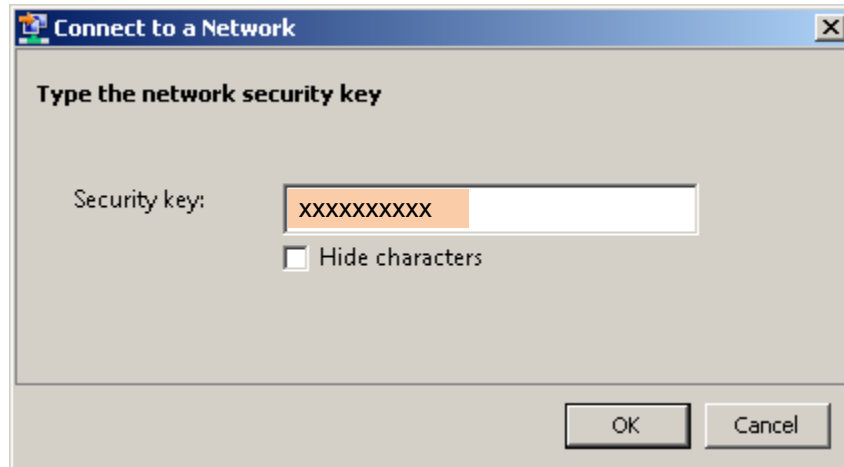


Figure 2.1.2. Security key dialog

Server Login

After the computer connects to the nanoWF wireless server it is necessary to login to the server to setup the nanoWiFi. Open a Web browser and in the address field type 192.168.0.1, press ENTER (Fig. 2.1.3).



Figure 2.1.3. nanoWF server address

The browser connects to the server and the Authentication dialog will be displayed as shown in Fig. 2.1.4. Enter default user name **admin** and the password **PASSWORD**. Press the OK button.

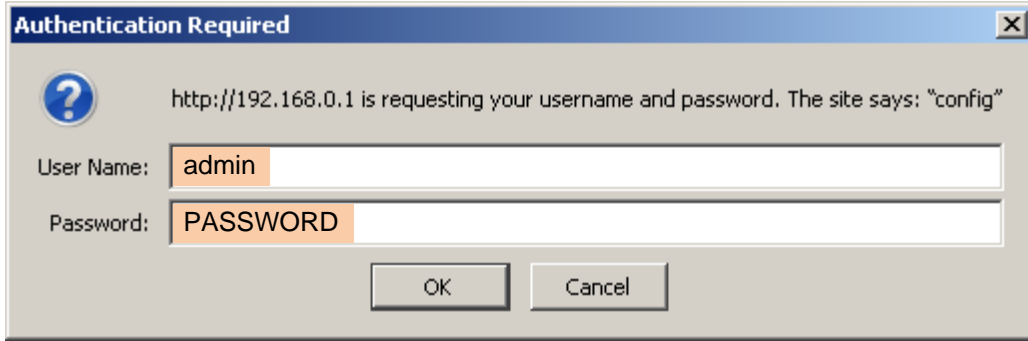


Figure 2.1.4. Authentication dialog.

Upon successful authentication the following page (Fig. 2.1.5) will be displayed

The screenshot shows the "xPico® Wi-Fi" status page. The top left has a navigation menu with items like QuickConnect, Status (selected), AES Credentials, CLI Server, CPM, Clock, Device, Diagnostics, Discovery, File System, HTTP Server, Line, Modem Emulation, Monitor, NTP, Network, Power, Radio, SPI, Tunnel, User, and WLAN Profiles. The top right has the LANTRONIX logo and a [Logout] link. The main content area is a table of system information:

Product Information		
Product Type:	xPicoWifi	
Firmware Version:	1.5.0.0R43	
Build Date:	Mar 2 2018 (14:59:06)	
Serial Number:	0080A3A04276	
Uptime:	0 days 00:03:53	
Permanent Config:	saved	
Network Settings		
MAC Address:	00:80:A3:A0:42:76	
Interface ap0		
State:	Up	
SSID:	nanoWiFi_A04276	
Security Suite:	WPA2	
IP Address:	192.168.0.1/24	
Interface wlan0		
Connection State:	Connected	
Active WLAN Profile:	labZY	
IP Address:	192.168.1.60	
Default Gateway:	192.168.1.69	
Hostname:		
Primary DNS:	<None>	
Secondary DNS:	<None>	
Line Settings		
Line 1:	921600, None, 8, 1, Hardware Protocol: Tunnel	
Line 2:	9600, None, 8, 1, None Protocol: Command Line	
Tunneling		Accept Mode
		Connect Mode
Tunnel 1:	Waiting	Disabled
Tunnel 2:	Inhibited	Inhibited

At the bottom of the page, it says: Copyright © Lantronix, Inc. 2007-2018. All rights reserved.

Figure 2.1.5. Status page of the nanoWF server.

Setting Wireless LAN (WLAN)

Profile

nanoWF uses profiles to connect to wireless networks (WLAN). Select the **WLAN Profiles**. A WLAN Profile Management page will open as shown in Fig. 2.2.1. The nanoWF comes with a preset profile called **labZY**. The labZY profile can be deleted. However, it is recommended to keep the profile for support purposes.

The screenshot shows the 'xPico Wi-Fi' interface for 'WLAN Profile Management'. The sidebar on the left lists various system settings, with 'WLAN Profiles' highlighted. The main content area displays a table with one profile named 'labZY' and a 'Delete' checkbox. Below the table is a text input field labeled 'Create new WLAN Profile'. On the right side, there is a [Logout] link and a help section explaining the page's functionality, including instructions on how to edit, delete, and create profiles.

Figure 2.2.1. WLAN Profile Management.

The labZY profile, if kept, must be disabled by first clicking on the profile name **labZY** and then select the radio button **Disabled** in the **State** field of the page that opens (Fig. 2.2.2).

WLAN Profile labZY Configuration

Basic	
Network Name:	<input type="text" value="nano"/>
State:	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
Security	
Suite:	<input type="text" value="WPA2"/>
WPAx Key Type:	<input type="text" value="Passphrase"/>
WPAx Passphrase:	<input type="text" value="●●●●●●●●"/>
WPAx Encryption:	<input checked="" type="checkbox"/> CCMP <input type="checkbox"/> TKIP
Advanced	
TX Power Maximum:	<input type="text" value="17"/> dBm
Power Management:	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled

Figure 2.2.2. Disabling the labZY profile.

The setup pages of the nanoWF in most cases will display two buttons after a value or a control change. The **Apply** button will cause the changes to apply only for the current session. If the nanoWF resets (power cycling) the changes will be ignored at the new session. To make the changes permanent the **Submit** button must be pressed.

Press the **Submit** button to disable **labZY** profile permanently. Press **WLAN Profiles** in the left vertical menu to return to the WLAN Profile Management page.

Next a new WLAN profile must be created so that the nanoWF can connect to your wireless network. In the WLAN Profile Management page there is a field displaying "Create new WLAN Profile". In this field type a name of the profile, e.g. MyWLAN as shown in Fig. 2.2.3. Press the **Apply** button.

WLAN Profile Management

View or Edit	Delete
<u>labZY</u>	<input type="checkbox"/>
<input type="text" value="MyWLAN"/>	

Figure 2.2.3. Creating new WLAN profile.

The Submit command will be executed after the profile is set and the nanoWF connects successfully to the your WLAN. The name of the new profile will be displayed in the WLAN Profile Management page (Fig. 2.2.4). Click on the name of the newly created profile, e.g. MyWLAN.

WLAN Profile Management

Created WLAN Profile Instance MyWLAN.
 The changes have been successfully applied.
WARNING: The changes will not persist after reboot unless you submit.

View or Edit	Delete
<u>labZY</u>	<input type="checkbox"/>
<u>MyWLAN</u>	<input type="checkbox"/>

Figure 2.2.4. Newly created profile (MyWLAN).

A setup page of the new profile (MyWLAN) will be displayed as in Fig. 2.2.5.

WLAN Profile MyWLAN Configuration

Basic	
Network Name:	<input style="width: 90%;" type="text" value="boza_24"/>
State:	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
Security	
Suite:	None ▼
TX Power Maximum:	<div style="border: 1px solid gray; padding: 2px;"> None WEP <input style="width: 50px;" type="text"/> dBm WPA WPA2 </div>
Power Management:	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled

Figure 2.2.5. WLAN profile setup page.

In the field **Network Name** enter the name of your wireless network (SSID). In our example the name is boza_24. Make sure you enable the profile by checking the **Enabled** radio button in the field **State**.

The next step is to set the security requirements of your network. Choose the **Security Suite** from the drop-down selection as shown in Fig. 2.2.5. If the security suite requires a passphrase the dialog will be modified as depicted in Fig. 2.2.6.

WLAN Profile MyWLAN Configuration

Basic	
Network Name:	boza_24
State:	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
Security	
Suite:	WPA2
WPAx Key Type:	Passphrase
WPAx Passphrase:	●●●●●●●●●●
WPAx Encryption:	<input type="checkbox"/> CCMP <input checked="" type="checkbox"/> TKIP
Advanced	
TX Power Maximum:	17 dBm
Power Management:	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled

Figure 2.2.6. WLAN profile with security.

Enter the **Passphrase** required to connect to you WLAN. Select the **Encryption** that your WLAN uses. The **TX Power Maximum** should be **17** and the **Power Management** should be **Disabled**. Press **Apply** button.

The new profile is now active and the nanoWF will make an attempt to connect to your WLAN. If the connection is successful a green LED light will be lit as shown in Fig. 2.2.7. The green light will be ON as long as the nanoWF is connected to your WLAN.

IMPORTANT: If the newly created profile successfully connects the nanoWF to the WLAN the **Submit** button should pressed to store the profile in the non-volatile memory (Flash) of the nanoWF. Once the new profile is permanently stored the nanoWF will upon powering automatically connect to your WLAN when in range.

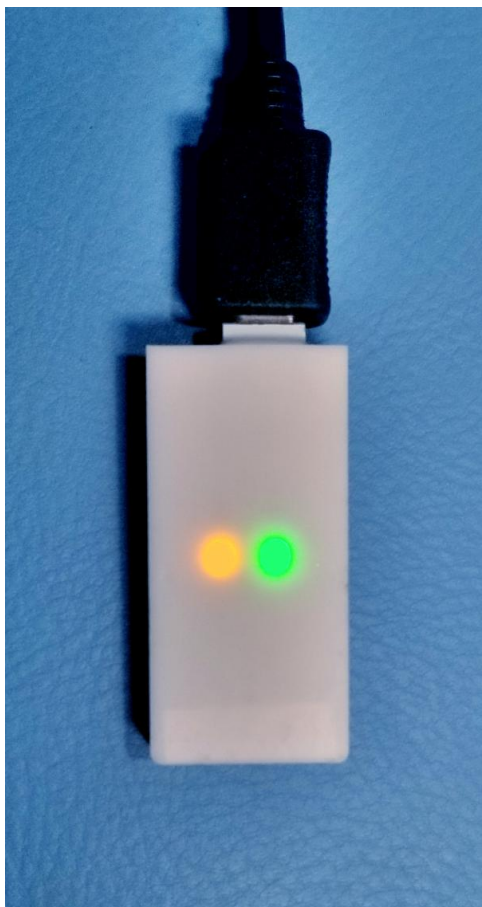



Figure 2.2.7. Successful connection of the nanoWF to a profile WLAN, green light is on.

Network Interface

The default network configuration of nanoWF uses IP that is assigned by the DHCP server of your network. This IP address is dynamic and may change every time the nanoWF connects to your WLAN. The IP address of the nanoWF is used to create a com port through which the labZY devices communicate with the computer. If the IP of the nanoWF changes from session to session the com port associated with the nanoWF must be reconfigured. This is time consuming operation which can be avoided if your WLAN allows the use of **static IPs**. If nanoWF is configured with a static IP than only once a com port will be set to work with the static IP. The nanoWF if connected to your WLAN will always be available at the corresponding com port. To set static IP for nanoWF open the **Network** page from the left vertical menu, Fig. 2.2.8.

- QuickConnect
- Status 
- AES Credentials
- CLI Server
- CPM
- Clock
- Device
- Diagnostics
- Discovery
- File System
- HTTP Server
- Line
- Modem Emulation
- Monitor
- NTP
- Network**
- Power
- Radio
- SPI
- Tunnel
- User
- WLAN Profiles

ap0 **wlan0**

Interface wlan0 Status

Property	Status	
Status:	No link	
MAC Address:	00:80:A3:A0:42:98	
	<input type="button" value="[Renew]"/>	
	Current	After Reboot
State:	Enabled	Enabled
DHCP Client:	Enabled	Enabled
IP Address:	(DHCP)	(DHCP)
Default Gateway:	(DHCP)	(DHCP)
Hostname:		
Primary DNS:	(DHCP)	(DHCP)
Secondary DNS:	(DHCP)	(DHCP)
MSS:	1460 bytes	1460 bytes

[\[Logout\]](#)

This shows the status of the network **Interface** on the device. When DHCP fails to discover an IP Address, a new address will automatically be generated using AutoIP. This address will be within the 169.254.x.x space.

ap0 will always use the assigned static IP.

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Figure 2.2.8. Network Page

Click on **wlan0**. Press the **Link** button to display the link status as shown in Fig. 2.2.9. Verify that the active WLAN profile is the profile you created to connect to your WLAN.

If **Interface** is selected the Status page as in Fig. 2.2.10 will be displayed. This page indicates that after reboot all WLAN IPs will be obtained using DHCP.

ap0 **wlan0**

Interface **Link**

Status

WLAN wlan0 Status

Property	Status
Connection State:	Connected
BSSID:	20:e5:2a:55:30:44
SSID:	boza_24
Active WLAN Profile:	MyWLAN
Encryption:	CCMP
Security Suite:	WPA2
Channel:	11
RSSI:	-56 dBm

Figure 2.2.9. WLAN Link Status.

ap0 **wlan0**

Interface **Link**

Status Configuration

Interface wlan0 Status

Property	Status	
Status:	Link up	
MAC Address:	00:80:A3:A0:42:98	
	[Renew]	
	Current	After Reboot
State:	Enabled	Enabled
DHCP Client:	Enabled	Enabled
IP Address:	192.168.1.141/24	(DHCP)
Default Gateway:	192.168.1.14	(DHCP)
Hostname:		
Primary DNS:	192.168.1.14	(DHCP)
Secondary DNS:	0.0.0.0	(DHCP)
MSS:	1460 bytes	1460 bytes

Figure 2.2.10. WLAN Interface Status.

To disable DHCP and setup static IP it is first necessary to obtain from the administrator of your WLAN an available static IP address for the nanoWF, the Default Gateway IP and the IP of the Primary DNS. To enter this information press **wlan0**, then press **Interface** and at last press **Configuration**. The page to configure the interface of the WLAN will be displayed as in Fig. 2.2.11.

ap0	wlan0
Interface Link	
Status	Configuration

Interface wlan0 Configuration

State:	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
DHCP Client:	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
IP Address:	<input type="text" value="111.222.333.444"/>
Default Gateway:	<input type="text" value="111.222.333.000"/>
Hostname:	<input type="text"/>
Primary DNS:	<input type="text" value="111.222.333.000"/>
Secondary DNS:	<input type="text" value="<None>"/>
MSS:	<input type="text" value="1460"/> bytes

Figure 2.2.10. WLAN Interface Configuration.

In the Interface Configuration page check the **Disable** button in the DHCP Client field. Enter the IP addresses obtained from your WLAN administrator in the corresponding field. Press **Submit** button.

User Management

The final step of the nanoWF setup is to manage the users that may manage the nanoWF. To enter the User Management page press select USER from the left vertical menu. The User Management page will be displayed (Fig 2.3.1).

The screenshot shows the 'User Management' page in the xPico Wi-Fi interface. The page has a header with the 'xPico Wi-Fi' logo and the 'LANTRONIX' brand name. A left sidebar contains a list of system settings, with 'User' highlighted in orange. The main content area is titled 'User Management' and contains a table with two columns: 'View or Edit' and 'Delete'. The table lists two users: 'admin' and 'labZY', each with a checkbox in the 'Delete' column. Below the table is a text input field labeled 'Create new User' and a 'Submit' button. On the right side of the page, there is a '[Logout]' link and a block of instructional text explaining how to view, edit, delete, or create users.

View or Edit	Delete
admin	<input type="checkbox"/>
labZY	<input type="checkbox"/>

Create new User

Submit

[Logout]

This page allows view, edit, delete or creation of a user on the device. Select a user for editing by clicking its name; this takes you to the Configuration web page.

Delete one or more users by checking their delete checkboxes, then hit the **Submit** button to remove them from Flash.

Create a new user by entering a name in the text box. The new user initially has no access rights. Up to 4 users may be created.

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Figure 2.3.1. User Management page.

There are two preset users. The default **admin** user and **labZY**. You may delete or keep the default user admin. If you decide to keep and use the admin user you must change its password to prevent unauthorized management of the nanoWF.

To change the password and the privilege of any user just click on the user name. A page will open that has only two fields - Password and Privilege (Fig 2.3.2).

User admin Configuration

Password:	<input type="password" value="••••••••"/>
Privilege:	Admin ▾

Figure 2.3.2. User Configuration page.

A new user can be created from the User Management page. It is important that at least one user has Admin privileges. It is strongly recommended that the labZY user is preserved without modifications. labZY can provide to its customers emergency login through labZY user. This especially important if an user misplaces his/her own login information.

All other settings of nanoWF should be kept as set by labZY. Changing these settings may disable the communication between nanoWF and the attached labZY device.

Computer Setup

COM Port Redirector

The communication between the labZY software (labZY-MCA, labZY-PSD and labZY-TDCR) and the labZY devices is through COM ports. The COM ports map different interfaces (USB, Ethernet, WiFi, Bluetooth) . Using COM ports eliminates the need to install drivers specifically tailored for the labZY software. The COM port implementation in Windows based computer is robust and well established.

The COM Port Redirector is a software application that allows the creation of COM ports and their mapping to nanoWF and nanoET. The CPR setup files and a Quick Start Guide are located in the subfolder "COM_PORT_REDIRECTOR_4303" located in the folder "innanoET+nanoWF". Alternatively, the latest version of the software and the documentation can be downloaded from www.lantronix.com.

To install the CPR follow the instruction in the CPR Quick Start guide.

COM Port Setup

Before setting the COM port make sure that the computer and nanoWF are connected to the same WLAN.

Launch the CPR application and create a COM Port as outlined in the CPR Quick Start guide. Select the newly created port, e.g. Com 180. The selection of the port will be indicated with a green arrow on the left of the COM Port name. All parameters of the COM Port settings will be displayed in red (Fig. 3.2.1).

Execute the "Search For Devices" command of the CPR application. The CPR will list all found devices in the "Device List" window (Fig. 3.2.2). To identify the nanoWF module take a note of the number in the field "HW Address". The number (Ignoring ":") should match the serial number of the nanoWF, e.g. 0080A3A04276.

Double click the IP Address of the nanoWF device. The "Host" field of the COM Port (e.g. Com 180) will be filled with the IP of the nanoWF. The TCP Port, however, will be set to "Unknown" (Fig. 3.2.3 a). **IMPORTANT:** Replace **Unknown** with **10001** which is the TCP Port for both nanoET and nanoWF (Fig. 3.2.3 b). Press the "Save" button of the CPR. . Close the CPR. The settings of the newly created port will be saved and the port will be available for use by the labZY software applications. The settings of the port will be memorized by the computer and will be available after reboot of the computer.

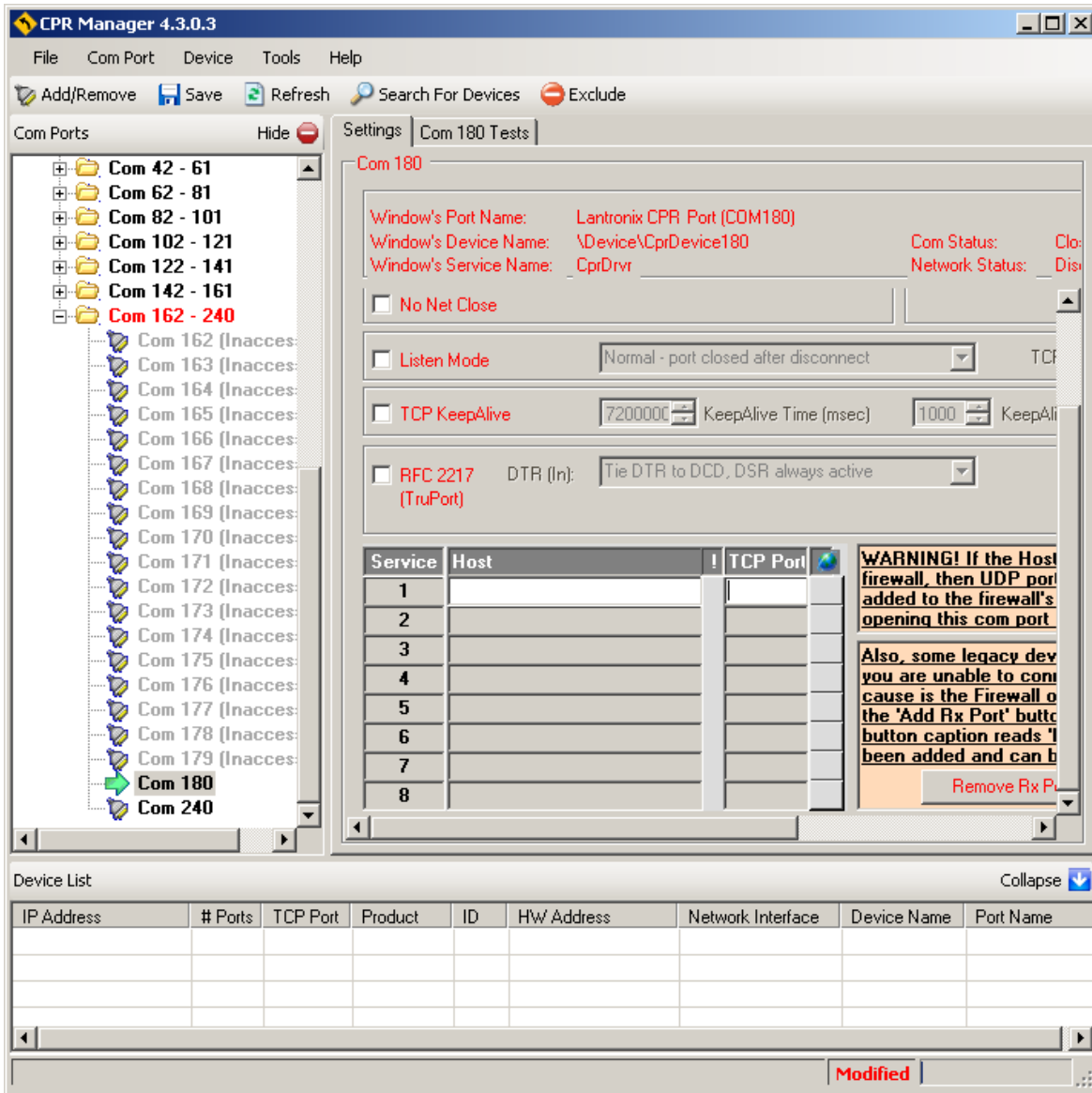


Figure 3.2.1. Setting a new COM Port.

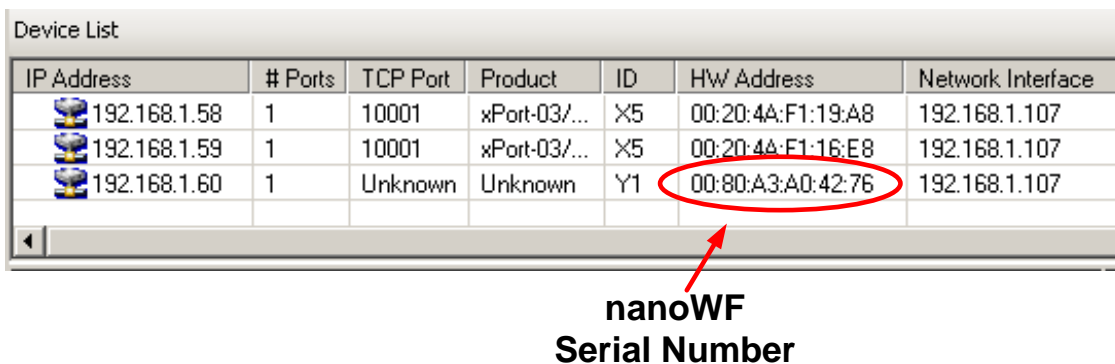


Figure 3.2.2. Identifying nanoWF module.

Service	Host	!	TCP Port
1	192.168.1.60		Unknown
2			
3			
4			

a)

Service	Host	!	TCP Port
1	192.168.1.60		10001
2			
3			
4			

b)

Figure 3.2.3. Setting the TCP Port.

The Lantronix web site www.lantronix.com has more information about xPico WiFi which is the main component of nanoWF.

If you need help, please, contact support@labzy.com.