

Appendix 13: Connecting to the Internet

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Introduction

This article will go over the steps to connect the controller to the internet.

Objectives

- Show how to connect to the internet via PLCnext Engineer
- Show how to connect to the internet via SSH connection
- Test the internet connection

Procedure

Connect to the internet

This section will explain the process to connect the controller to the internet using PLCnext Engineer and SSH connection.

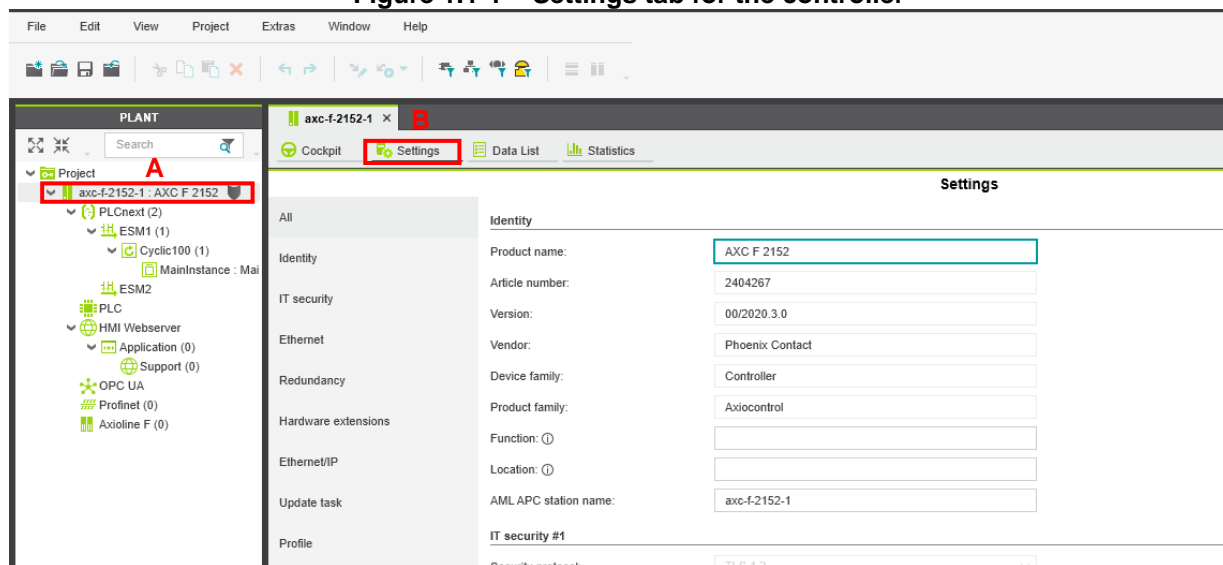
NOTE: You must know the IP address of your router/cellular modem! (By default the IP address is the x.x.x.1 for routers)

1.1 – PLCnext Engineer:

1. Inside PLCnext Engineer, double click the axc-f-2152-1 in the plant window (A), then click the Settings tab (B).

If you are not familiar with PLCnext Engineer, refer to the Quick Start Guide.

Figure 1.1-1 – Settings tab for the controller



2. On the left of the settings window, click Ethernet (A), then change the IP address assignment mode to manual (B) as shown in Figure 1.1-2.

Figure 1.1-2 – Ethernet tab for the controller

The screenshot shows the 'axc-f-2152-1' Settings page. The left sidebar has a red box labeled 'A' around the 'Ethernet' tab. The main content area is titled 'Settings' and 'TCP/IP [Profinet]'. A red box labeled 'B' highlights the 'IP address assignment mode' dropdown menu, which is set to 'automatic'. Other fields include IP address (192.168.1.10), Subnet mask (255.255.255.0), Gateway (empty), Name of station (axc-f-2152-1), and DNS hostname (axc-f-2152-1).

Settings	
TCP/IP [Profinet]	
IP address assignment mode: ①	automatic
IP address: ①	192 . 168 . 1 . 10
Subnet mask:	255 . 255 . 255 . 0
Gateway:	
Name of station: ①	axc-f-2152-1
DNS hostname: ①	axc-f-2152-1

- Once manual is selected, you can then change the IP address if needed.

NOTE: The IP address of the controller must be on the same subnet as the router/cellular modem!

- In the Gateway field as shown in Figure 1.1-3 enter the IP address of your router/cellular modem.

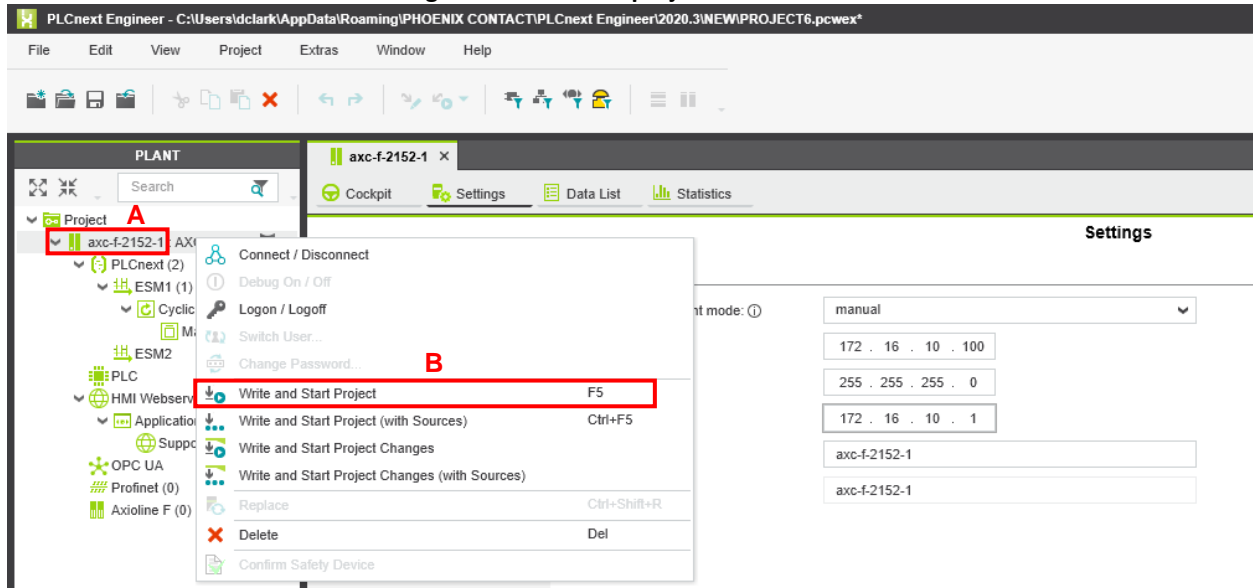
Figure 1.1-3 – Gateway IP address

The screenshot shows the 'TCP/IP [Profinet]' settings page. The 'IP address assignment mode' is set to 'manual'. The 'Gateway' field is highlighted with a blue box and contains the IP address '172.16.10.1'. Other fields include IP address (172.16.10.100), Subnet mask (255.255.255.0), Name of station (axc-f-2152-1), and DNS hostname (axc-f-2152-1).

TCP/IP [Profinet]	
IP address assignment mode: ①	manual
IP address: ①	172 . 16 . 10 . 100
Subnet mask:	255 . 255 . 255 . 0
Gateway:	172 . 16 . 10 . 1
Name of station: ①	axc-f-2152-1
DNS hostname: ①	axc-f-2152-1

- If the IP address is the same, write the project to the controller as shown in Figure 1.1-4. Otherwise skip to step 6.

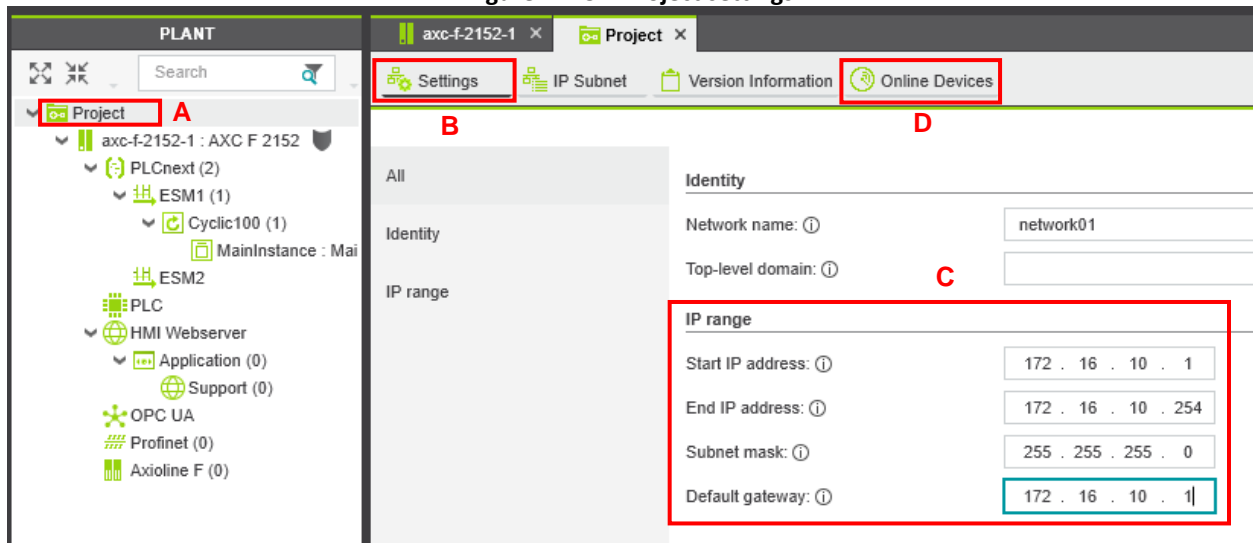
Figure 1.1-4 – Write project to controller



- If the IP address differs, go to the Project tab in the Plant window (A), then Settings (B) and ensure the IP range (C) is correct for your controller as shown in Figure 1.1-5.

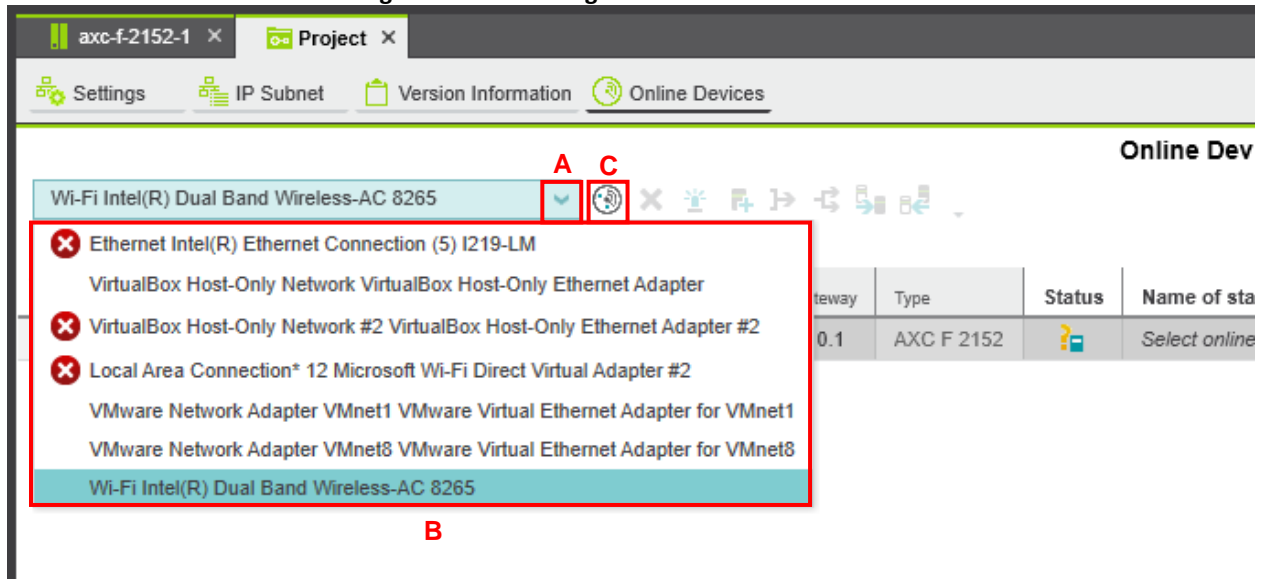
Ex: If the IP address of the controller is 192.168.1.10, then: Start IP: 192.168.1.1, End IP: 192.168.1.254, Subnet Mask: 255.255.255.0, Default Gateway: IP address of router/cellular modem.

Figure 1.1-5 – Project settings



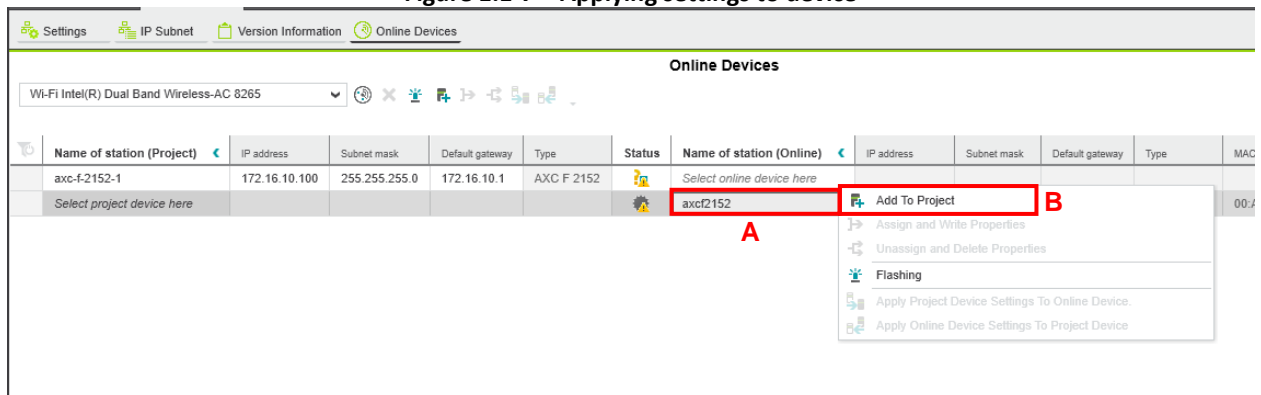
7. Now go to the Online Devices tab (D) in Figure 1.1-5.
8. Once there select the correct Network Adapter by clicking the dropdown (A) and selecting the correct network adapter (B). Once selected, hit the radar dish to search for a controller on the network (C) as shown in Figure 1.1-6.

Figure 1.1-6 – Finding controllers on the network



9. Once the network is scanned, the device(s) will populate as shown in Figure 1.1-7. To apply the settings we just changed to the device, right click on the device (A) and select Add to Project (B).

Figure 1.1-7 – Applying settings to device



10. Once the status symbol shows a check mark the settings have been applied to the device.

1.2 – SSH Connection:

If you do not know how to use PuTTY (used in this example), refer to Appendix 3, 4, and 5.

NOTE: The IP address of the controller must be on the same subnet as the router/cellular modem!

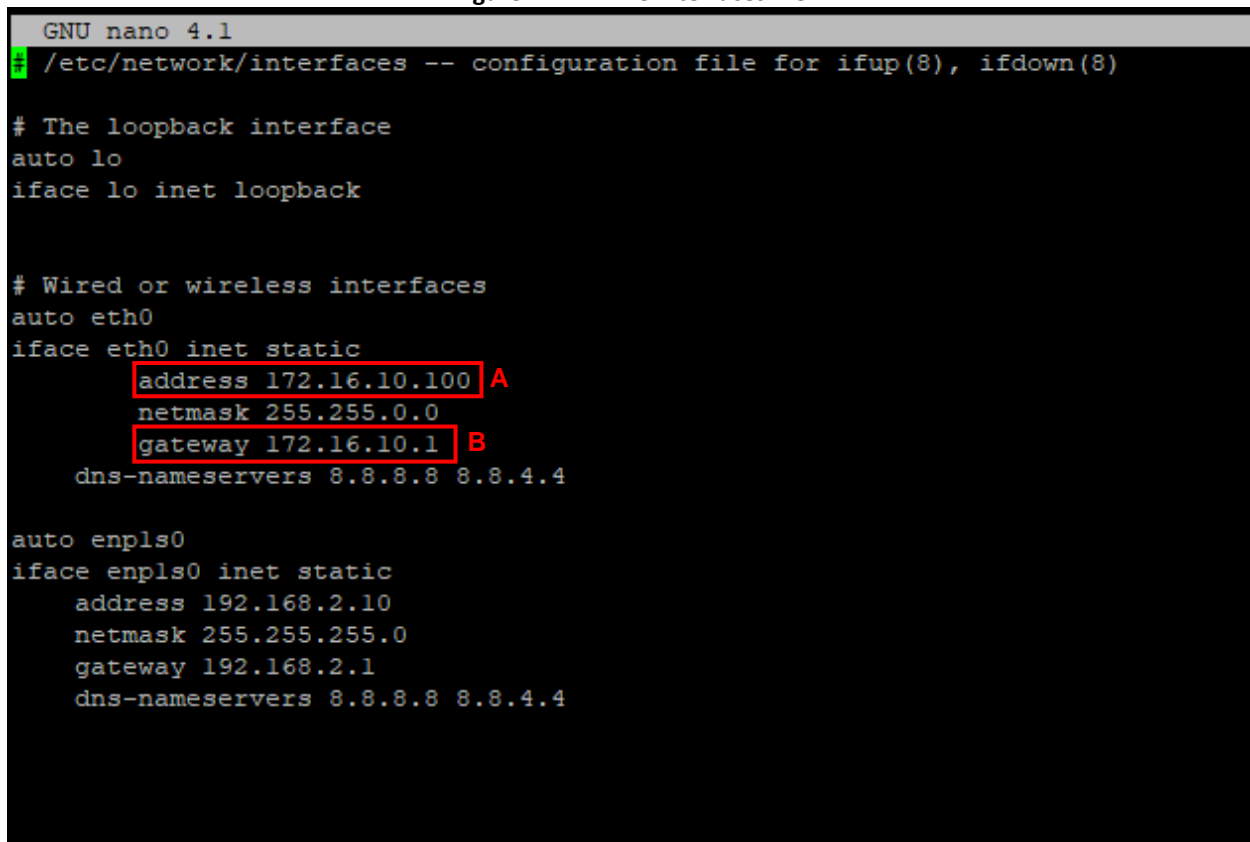
1. Connect to the controller using the current IP address (default is 192.168.1.10), log in as the root user and navigate to the `/etc/network/` directory.

2. Once in the `/etc/network/` directory, type the below command :

```
nano interfaces
```

3. Once inside the file, you can also change the IP address, or netmask of the controller if needed (A). For internet connection you will need to change the gateway IP address to the IP address of the router/cellular modem (B).

Figure 1.2-1 – The interfaces file



```
GNU nano 4.1
/etc/network/interfaces -- configuration file for ifup(8), ifdown(8)

# The loopback interface
auto lo
iface lo inet loopback

# Wired or wireless interfaces
auto eth0
iface eth0 inet static
    address 172.16.10.100 A
    netmask 255.255.0.0
    gateway 172.16.10.1 B
    dns-nameservers 8.8.8.8 8.8.4.4

auto enp1s0
iface enp1s0 inet static
    address 192.168.2.10
    netmask 255.255.255.0
    gateway 192.168.2.1
    dns-nameservers 8.8.8.8 8.8.4.4
```

4. Once this is changed, hold control and click the S key to save.
5. Once saved, hold control and click the X key to exit.

6. Once the file is changed a reboot needs to be performed to make the IP address changes. Type the below command as root.

```
reboot
```

If you log out of the root user, you must type the below command:

```
sudo reboot
```


1.3 Testing the connection to the internet

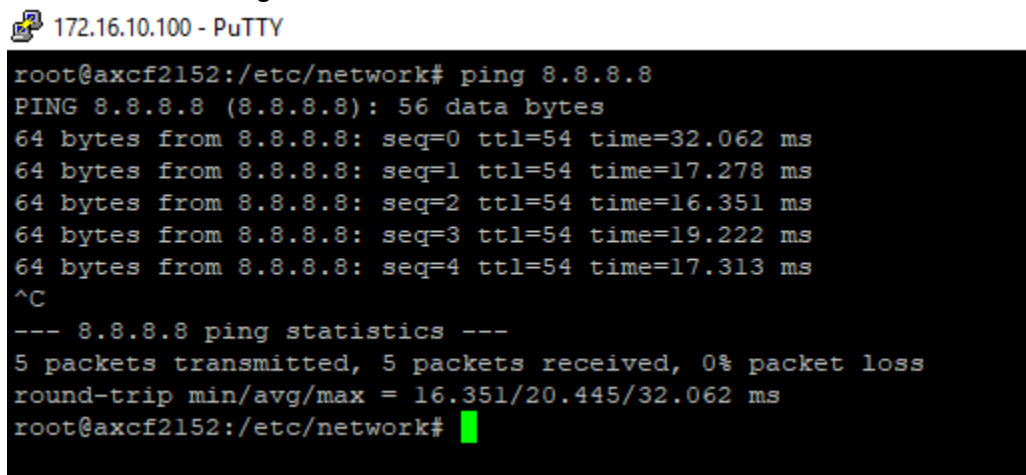
Testing the connection is not necessary, but it is a good idea to ensure all of your settings are correct for your controller.

If you do not know how to use PuTTY (used in this example), refer to Appendix 3

1. Log into the controller with PuTTY.
2. Type the below command:
`ping 8.8.8.8`
3. If the terminal returns results like Figure 2.1-1, you are connected to the internet! If you see the results in Figure 2.1-2, the controller cannot connect to the internet.
4. To exit the “ping” command, hold the control key and press the C key.

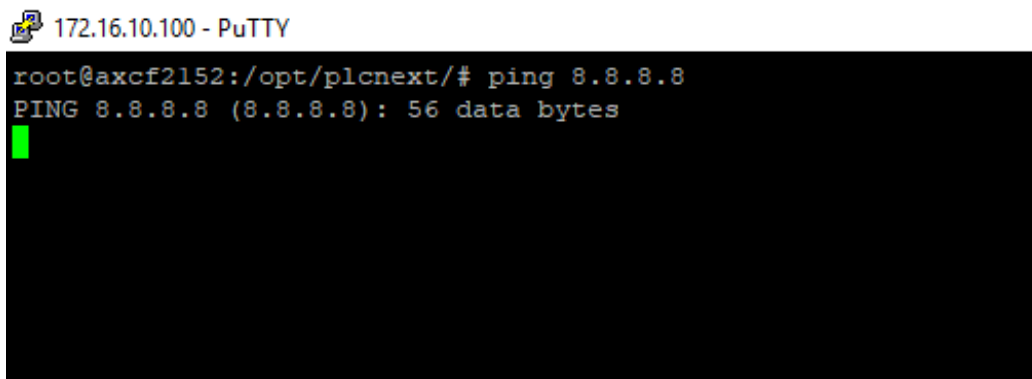
NOTE: If you are on a corporate server you will need to add your company’s DNS nameserver! Only possible to change this with SSH currently.

Figure 2.1-1 – Connection to the internet successful



```
172.16.10.100 - PuTTY
root@axcf2152:/etc/network# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=54 time=32.062 ms
64 bytes from 8.8.8.8: seq=1 ttl=54 time=17.278 ms
64 bytes from 8.8.8.8: seq=2 ttl=54 time=16.351 ms
64 bytes from 8.8.8.8: seq=3 ttl=54 time=19.222 ms
64 bytes from 8.8.8.8: seq=4 ttl=54 time=17.313 ms
^C
--- 8.8.8.8 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 16.351/20.445/32.062 ms
root@axcf2152:/etc/network#
```

Figure 2.1-2 – Connection to the internet failed



```
172.16.10.100 - PuTTY
root@axcf2152:/opt/plcnext/# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes

```