LAN-200 Install & Configuration Guide

1. Introduction

Tucor controllers use serial data communications to talk and the LAN-200 ("-200") converts the serial data to Ethernet data. The -200 is typically installed within the cabinet of the controller and is connected to the controller by a ribbon. Setting up a -200 can be complex. The connection is over an Ethernet network and that network is often connected to the Internet. Establishing the connection means you must configure the -200 to work with both your network, and, if desired, the Internet. So, it may be helpful to understand how these things work, as discussed here. If you simply want to configure the -200, skip to the "LAN-200 Overview**LAN-200 Overview**" section.

2. Technical Discussion

2.1. Modems

A modem is a device that connects you to your Internet Service Provider (ISP), such as Verizon, Comcast, etc. The connection between you and the internet is known as a wide area network (WAN). Each modem is assigned a public/external IP address.

2.2. Routers

A router creates a local area network (LAN), allowing connected devices to communicate with each other and, if connected to a modem, with the internet. The router serves two main purposes:

- It directs the data from every computer either to the other computers on the LAN, or out to the Internet. That is, it *routes* the communications.
- The router also filters the data, and thus acts as a firewall, hiding and protecting the LAN's computers from intruders on the Internet.

2.3. IP Addresses: Internal & External

2.2.1 *External IP*

The external IP address allows devices around the internet to find you.

2.2.2 *Internal IP*

The internal IP address is what your router dishes out to all the devices connected to it. It handles all the routing for data packets that travel in and out of the network.

2.4. Network Connections

When you sign up for internet service you usually use an Internet Service Provider (ISP). Your ISP provides you with a modem. The modem is typically connected to a router or even has one built in. When the modem is powered on, the ISP's server sees that the modem is online, and the server will provide the modem with an IP address (the public/external IP address). Depending upon your ISP and service agreement, this address may change (dynamic), or it may always be the same (static). Static IPs are usually more expensive.

2.5. Assigning Internal Addresses

The router must be configured with the local (internal) addressing scheme. The group that manages the Internet has set aside certain IP ranges that are used solely for internal addresses. One set often used is 192.168.xxx.xxx, where the xxx ranges from 1-255. So, roughly speaking, if your router is set up as 192.168.2.1, you would be able to connect 253 computers to your router; that is, from 192.168.2.2 – 192.168.2.254.

When a computer is turned on, it sends a request to the router asking to be assigned an IP address. The router gives the computer one from its list of available IPs (e.g., anywhere from 192.168.2.2 through 192.168.2.254). This is called DHCP, or dynamic addressing. In our case, we need to have a fixed, or static, IP address, one that does not change. This will ensure that when we try to "call" the Tucor controller from a computer we know in advance what the IP number is. We must assign the fixed address to the LAN-200 when we configure it. This can be done either by changing the IP address of the LAN-200 or, by creating a reservation within the router that always assigns the same internal IP address to the LAN-200 based on its physical MAC address.

2.6. External Connections

If you want to connect to a controller (the remote) over the Internet from a PC (the local), you must know how to contact the remote router; that is, you must know the remote's external IP. As mentioned above, that is given to you by your ISP. To determine your external IPv4 address, go to www.whatismyipaddress.com.

2.7. Ports

Ports are like doors to the inside of a computer. When your PC sends out some data to the internet, it not only uses the IP address, but it also sends the data out through a specific port, and it is sent back to a specific port. There are over 64000 port numbers that PC programs can use. To connect to a LAN-200, it is assigned a port number during configuration.

When connecting over the internet, the router needs to know where to send the inbound data. To start, a port on the router must be opened. When data arrives on that port, we direct the router to send it to the LAN-200's internal IP address – this is called port forwarding. Port forwarding is frowned on by many IT departments, since it opens a door

into your network; however, we have seen no proof that it poses any problems, since it is directed only to the LAN-200. Regardless, check with your IT people to make sure it is OK. Setting up port forwarding depends upon your router: see your router documentation for specifics. Additionally, visit www.simpleportforwarding.com for additional information on routers.

2.8. <u>Review</u>
- Modems:
  - o Connect you to the internet.
- Routers:
  - o Defines and manages the internal addresses.
  - o Manages the data flow from internal to external IP addresses, and vice versa.
- External IP addresses:
  - o Addresses seen from outside the router (internet or WAN).
  - o Assigned by your ISP.
- Internal IP addresses:
  - o Addresses seen from inside the router (LAN).
  - o Usually automatically assigned by your router (DHCP) but using a fixed (static) IP will override the router.
- Ports:
  - o Used by programs to manage data flow between PCs and the internet.

3. LAN-200 Overview

The LAN-200 (-200) allows you to communicate with a Tucor irrigation controller via the Internet. Communication to the controller is done through any web browser (except Internet Explorer), via Tucor's RealNet server (subscription required).

NOTE: The first version of the RKD controller has a "pointer style" knob. When using the -200 on this model, a serial cable and power board are required. Please contact your distributor or Tucor for further details.

3.1. <u>Getting Started</u>
  i. Complete and return the RealNet subscription form to Tucor.
  ii. Confirm that you have all the necessary components:
     a. LAN-200 board
     b. Flat ribbon cable, 14-pin
     c. Ethernet cable (Cat5, Cat5e, Cat6)
     d. Mounting hardware
  iii. Configure the LAN-200 to conform to your LAN requirements.
  iv. Enable port forwarding in the router.

3.2. <u>Determine the LAN-200 Configuration</u>

The -200 must be configured for your specific network. This consists of selecting an available IP address within your LAN and either programming that into the -200 or reserving the address

in the router. An IP addressing scheme is unique to each LAN and is discussed in some detail below, but it is a complex subject.

If you have any doubts about what values are necessary to program the -200, please contact your IT department or call Tucor. You will need the following information for configuring the -200:

   a.   LAN-200 barcode number: _____

   b.   LAN (internal) addressing scheme: _____

   c.   Gateway IP address: _____

   d.   Subnet mask: _____

   e.   Desired internal IP address of LAN-200: _____

   f.   Port: _____

   g.   Serial protocol: ☐ Xon/Xoff (RKx)   ☐ RTS/CTS (TWC-NV Web (TWI))

To configure port forwarding, you will also need the router's:

   h.   Internal IP address: _____

   i.   Login: _____

   j.   Password: _____

3.3. Determine the Local Addressing Scheme and Available IP Address

The local addressing scheme is a series of IP addresses that is unique to your LAN. The PC being used to gather this information must be on the same network subnet as the -200 will be installed on. There are two way to do this. Method A uses the Netscan program. Method B is more advanced but should work in all cases.

3.3.1   Method A
   i.   Obtain the Netscan program from Tucor.
   ii.   Install the Netscan program.
   iii.   Run Netscan (do not update).
   iv.   Click on the "Auto Detect IP Range" button (do not use the default range addresses).
   v.   Click the "Start Scanning" button. A list of all the devices on your network will appear along with their IP address and MAC address.
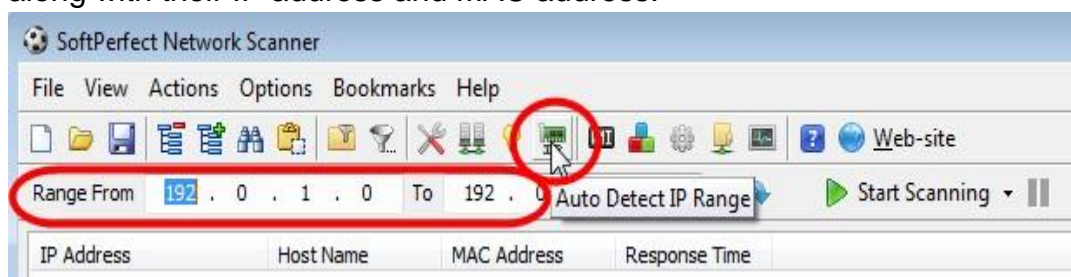
vi.   If the LAN-200 is set to Static (shipped before 1/1/2021):

➢   Find an IP address that is not being used and write that down. That is, the last set of three numbers must be unique to your LAN. That set will usually be from 000 – 254, so any number within that will work. We recommend using a number in the 040-059 range.

If the LAN-200 is set to DHCP (shipped after 1/1/2021):

➢   Find the MAC address of the LAN-200 on the Netscan list and write down the assigned IP address. This will be the address that a reservation rule will be created for within the router.

vii.   Continue to Section 4.

3.3.2   Method B

i.   Open DOS.
  ➢   Windows key + R, type "cmd" without the quotes and press the Enter key.
ii.   Type "ipconfig /all" without the quotes. Note the space before the /.
iii.   Under "Local Area Connection" or "Ethernet" section, note the IP Address, Subnet Mask, and Default Gateway. If the subnet mask is 255.255.255.0 (almost always the case), then your local addressing scheme will be the leftmost three groups (octets) of your IP address, and the right-most numbers in your scheme will range from 1 – 255. For example, in the image below, the scheme is 192.168.80.xxx. That is, IPs on our example network (below) will range from 192.168.80.1 – 192.168.80.255. Your scheme will be different! Again, usually they will be from xxx.xxx.xxx.001 thru xxx.xxx.xxx.255, where the x's are from your IP address.
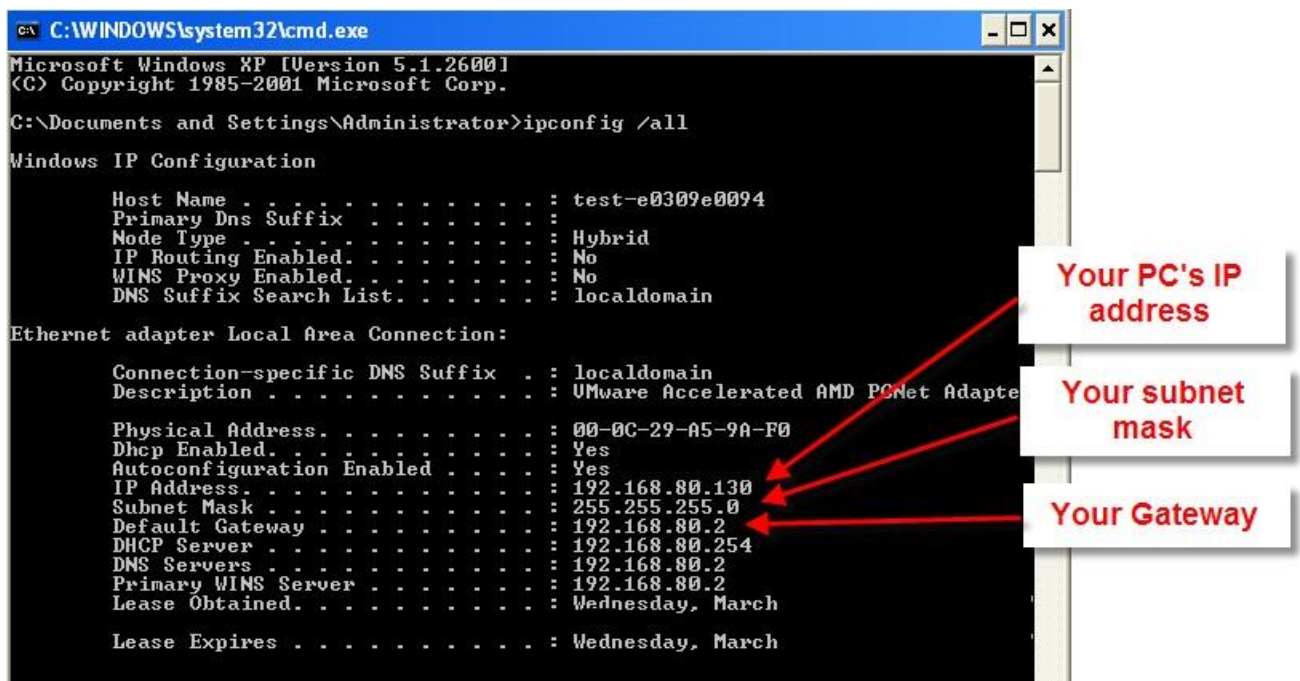
iv.   You now need to find an available IP. Obtain, install (but do not update), and run the Netscan program. This will scan your network for available IPs. Enter the IP ranges to scan through as found in the last step and click the "Start Scanning" button. Choose an IP that is not in the displayed list, that is, the last set of numbers must be unique to your LAN. That set will usually be from 000 – 254, so any number within that will work. We recommend using a number in the 040-059 range.

3.4. Port

The final parameter required is a port number. We suggest using a port number of 14xxx, where xxx is the last three numbers of your chosen IP address. For example, if you chose 192.168.3.55 as the IP address, use 14055 for the port number.

4. **LAN-200 Installation**

The LAN-200 is designed to be installed in a standard Tucor cabinet. With it you should have also received a 14-pin ribbon cable, an Ethernet cable, and mounting hardware.

    i.   Power off the controller and disconnect the power.
    ii.   If installed, remove the bottom cover panel, and take a photo.
    iii. Remove the controller faceplate from the cabinet, disconnecting any wires if necessary. Take a photo after you have removed the controller.
    iv.   Mount the LAN-200 using the included mounting hardware. The mounting style will vary based on cabinet and controller type. You should have received one of the following:
        1. Two plastic snap-in standoffs, hex spacer nut, and one M4 screw.

2. Two hex standoffs, two M3 screws, hex spacer nut, and one M4 screw.
3. Two #4-40 screws and one #8-32 screw.

v.   Insert the ribbon cable into the NV I/F port of the LAN-200. The cable is keyed and can only be inserted one way.
vi. Insert the ribbon cable into the connector on the back of the controller. It is also keyed and can only be inserted one way.
vii. Replace the controller faceplate. Use caution not to hit the -200.
viii. Temporarily reinstall two of the faceplate screws to hold the controller in place.
ix. Connect the -200 to your network using an Ethernet cable.
x.   Reconnect and power on the controller.

5. LAN-200 Connection

The LAN-200 configuration page is accessed through any standard web browser. You will need a PC with admin rights connected to the same internal/local area network. The method used will depend on whether the LAN-200 is set to Static or DHCP.

5.1. Static

i.   Open DOS.
    ➢ Windows key + R, type "cmd" without the quotes and press the Enter key.
ii. Type "ipconfig" without the quotes. This will show you the IP address of your PC.
iii. Type: "route add 192.168.222.222 mask 255.255.255.255 <IP address>" without the quotes and enter your IP address obtained from the last step without the < >.
iv. Open a web browser and navigate to 192.168.222.222. Continue to Step 6.

  i. Open a web browser and navigate to the IP address of the LAN-200 as found in Section 3.3.1. Continue to Step 6.

6. LAN-200 Configuration

The LAN-200 configuration is access through a web browser by entering its IP address into the address bar. LAN-200s set to static have a default IP address of 192.168.222.222. LAN-200s set to DHCP will be assigned an IP address by your router. To determine the IP address, run the Netscan program.

6.1. Main Menu

  i. Enter the username and password.
- Username: admin
- Password: CEAMd

  ii. Click the Login button.

6.2. Status

  i. Status shows the hostname, firmware version, used memory, network traffic, and uptime.

  ii. The only field that can be changed is the hostname. You may wish to change this to something that will be recognized by IT later. Click the Set button to enter the change.

  iii. Click on the Network tab.

6.3. Network

    i.   IP addressing method

- **Static** means that the -200 defines its own IP address to the router. Using this method requires defining the rest of the Network boxes using info gathered earlier in these instructions.
- **DHCP** means that the router assigned the -200 with an IP address. Enabling DHCP will gray out the remaining Network boxes since they are not needed.

    ii.   IP address

- This is the IP address that the -200 will be assigned.

    iii.   Netmask

- This is the value shown in the "ipconfig" DOS window. It's typically 255.255.255.0.

    iv.   Gateway IP

- This address tells the -200 how to reach the internet. It was also shown in the "ipconfig" DOS window. It is typically the internal IP address of the modem (e.g.: 192.168.1.1).

    v.   DNS 1 & DNS 2

- These addresses tell the -200 how to convert domain names to IP addresses. Often one is the Gateway IP and the other is a known DNS IP address. If you are uncertain, use either or both of the following:
  - 4.2.2.2
  - 8.8.8.8

    vi.   MAC address

- This is the physical address of the -200 and cannot be changed. It is used by Tucor to configure your account on RealNet.

    vii.   Click on the Submit button after making changes.

    viii.   Click on the Serial tab.

6.4. <u>Serial</u>

    a. Serial defines the communications between the -200 and the controller. Flow control is the only value that needs to be changed.
- RKx = XOn/XOff
- TWC-NV = RTS/CTS

    b. Leave all other settings at their default values:
- Baud = 9600
- Char size = 8
- Parity = None
- Use two stop bits = not checked
- XOn char = 11
- XOff char = 13

    c. Click the Submit button.

    d. Click on the Server tab.

6.5. <u>Server</u>

    i. Server defines how the data reaches Tucor's server. The only value that may need to be changed is the Local Port number. This is the port ("door") that is forward from your router to the -200. Typically, it is best to leave both Remote and Local the same so that all data traffic is on the same port.

    ii. If you have multiple -200s on the same network, you will need to change the Local port to match the specified inbound port of the router.

    iii. Some routers allow forwarding an inbound port to a local part. In this case, the -200's Local port will be left unchanged. Instead, you would specify the inbound port *to the router* as being 14000 and have the router forward to port 8070 of the -200.

    iv. Do not change the Remote port or the Remote IP values.
- Remote port number = 8070
- Remote IP Address or Name =
  - cims.crysberg.com
  - 194.239.152.126

    v. Click on the Submit button.

    vi. Click on the Email tab.

6.6. <u>Email</u>

    i. Sender Name may be changed to give you a better idea of which controller is sending the alarm.

    ii. Sender Address is the email address from whom you will receive an email alarm. It must be a valid address. Use alarm@tucor.com if you are unsure.

    iii. SMTP Server port should be set to 26 for LAN-200s.

    iv. SMTP Server address should be either:
- cmwg.crysberg.com
- 194.239.152.112

    v. SMTP Username is supplied by Tucor based on your RealNet subscription. Enter is exactly as provided.

> vi.   SMTP password is supplied by Tucor based on your Username. Enter it exactly as provided.
> vii. Click the Submit button.
> viii. Click on the Various tab.

6.7. Various

> i. Connect to CIMS
>   - RKx = Unchecked
>   - TWC-NV = Checked
> b. Send UPD message to CIMS should be checked.
> c. Send Email should be checked if you want to receive email alarms.
> d. Click on the Submit button.
> e. Click on the Activate button in the bottom-left corner. The LAN-200 will reboot and the webpage should refresh. If the IP address of the -200 was changed, your browser will redirect to the new IP.

6.8. Password

> i. Password
>   - It is not recommended however, to change the password of the LAN-200, enter the current password and then the new one twice. It is case sensitive.
>   - Click the Change button after changing.
> b. Session timeout
>   - Defines the length of idle time before logging you out. The default value is 5 minutes. This value must be between 1-15 minutes.
>   - Click on the Submit button.

6.9. Upgrade

> i. This page is for upgrading the firmware of the LAN-200. Should that be necessary, instructions will be sent.

7. Port Forwarding

Local area networks typically connect to the Internet through routers. To gain access to a -200 the router must redirect the incoming request (from the Internet) to the -200's internal IP address. You must configure the router for "port forwarding". There are many different types of routers and it is beyond the scope of this document to cover them all. A Linksys router will be shown as an example, but other devices should follow similar steps.

Typically, you must know the logon and password for your brand of router. There are defaults, but they will likely have been changed. You must also know what IP and port the LAN-200 is set to and the desired external port. This must eventually be entered on the RealNet form supplied to Tucor. Bear in mind that not all companies will permit "holes" in firewalls. The operation may be best handled by your IT staff. Please contact them if you have any questions about its implementation.

The easiest port forwarding method is to a program called "Simple Port Forwarding" which can be found at www.simpleportforwarding.com. Otherwise, follow the instructions below.

i. Note the setup of the -200, specifically the assigned IP address and port number. See above, Section IV.
ii. Open your router configuration. Usually this can be done by opening a web browser and typing in the Gateway address (Section III.5.a) into the address bar. See your router documentation for help.
iii. Go to the Port Forwarding section. In our Linksys example, it is under Applications & Gaming. Your router may be different and port-forwarding information can be found at www.portforward.com.

For additional support, please contact Tucor directly:
1-800-272-7472   *www.tucor.com*