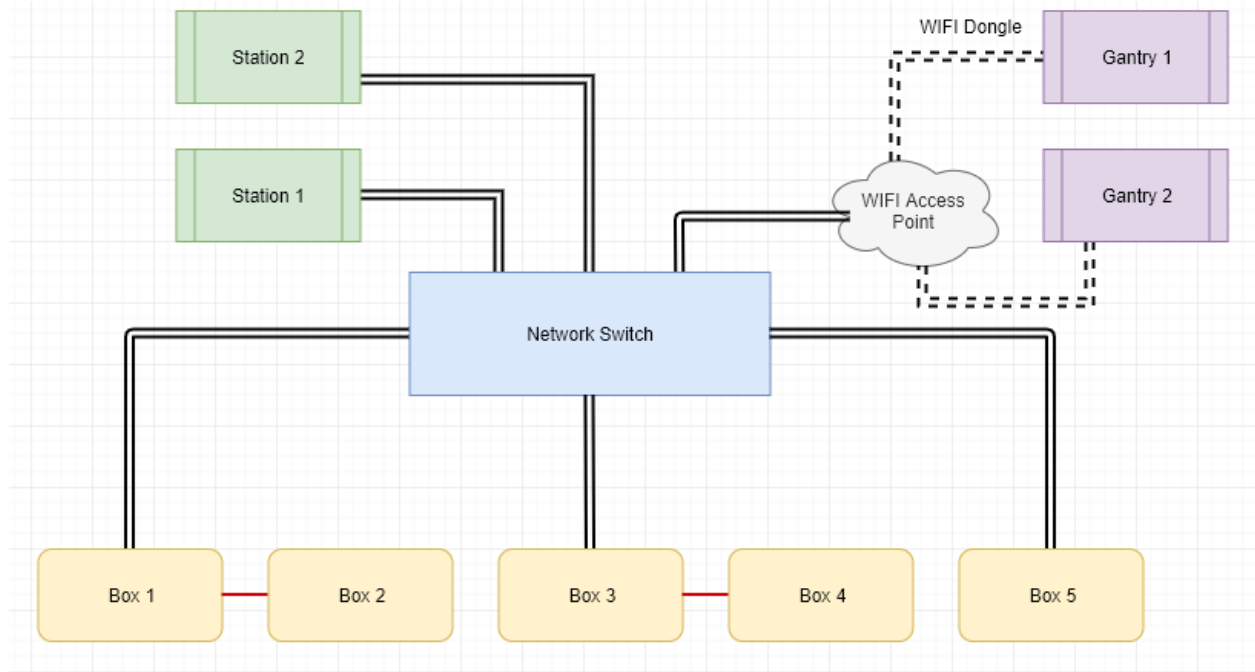


Network Overview

This is considered a private network and does not offer any connection to the internet.

Figure 1: Overall Network Topology for Version Gen 3



IP Scheme

IP Addresses

IP addresses are reserved for the various bits of hardware. The PLCs, stations, and gantry computers all have IP addresses within a specific range. This ensures no device can conflict with another. The subnet mask used is 255.255.255.0. IP addresses that are not on this subnet will not be able to communicate with other devices on the network.

10.0.1.1 – 10.0.1.150: Logic controllers – set as a static IP address

10.0.1.151 – 10.0.1.155: Stations – set as a static IP address

10.0.1.156 – 10.0.1.160: Gantry PCs – set dynamically by the wireless access point

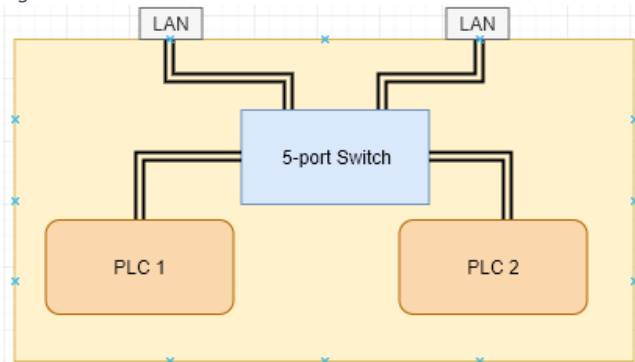
IP conflicts

More than one device cannot have the same IP address. This is known as an “IP conflict.” If this happens neither device will be communicating on the network. Resolving this issue is as simple as ensuring every device has a unique IP address.

Hardware

5-Port Switch

Figure 2: Inside a Control Box



The 5-port switch is found inside every control box. There are two PLCs in each control box. These PLCs connect to the 5-port switch. The two LAN ports on the outside of the box are also wired to this same switch. This setup allows you to daisy-chain multiple boxes together (although you should only do a maximum of two boxes chained together).

Make sure the cable going from the PLC to the 5-port switch is plugged into the correct port on the controller. There are two ports that look identical but serve completely different purposes. One is marked “LAN” and the other is “MJ1/2”. The Ethernet cable should go from the “LAN” port on the controller to any open port on the 5-port switch.

24-Port Unmanaged Switch

The 24-port unmanaged switch is mounted underneath the table and connects all of the PLCs in the control boxes to all of the stations. It does not assign any IP addresses to devices connected to it. This is because the logic controllers have to be set statically and are unable to receive an IP address from a switch. With the stations also connected to this switch, they too must be set statically.

WIFI Access Point

The WIFI access point device connects to the 24-port unmanaged switch and allows Wizard PDS computers mounted on a press head to communicate with the pins. Since the access point is its own managed device, we are able to allow the access point to assign an IP address within a given range. This means that a PC mounted on the press head will be assigned IP addresses between 10.0.1.156 and 10.0.1.160.

The name of the access point (SSID) is not broadcast. This ensures that other devices are unable to see the access point in the list of available networks to wirelessly connect to. The device can still be connected to, but the SSID must be known and typed in manually (along with the security password).

WIFI USB Adapter (Dongle)

The WIFI access point communicates with a dongle (USB-powered WIFI adapter).

Troubleshooting

How do I know what computer I'm on?

Check the computer's IP address. The IP address will tell you if you are connected wirelessly or directly to the unmanaged switch.

Everything is connected but I can't ping the controllers.

Make sure the device's IP address starts with "10.0.1." If it does not, the next steps depend on the computer. If this is a *Wizard PDS* computer hardwired to the table's Ethernet switch, you will need to manually set the IP address and the subnet mask. If this is a Wizard PDS computer mounted to a press head, make sure the network device is set to obtain an IP address automatically. The access point is setup to assign the correct IP addresses to devices connected to it.

The PLCs keep showing as disconnected.

1. Make sure the Ethernet cables have been reseated at both ends. If there is excess sawdust or other debris at the connector make sure to gently blow the debris away with canned air. Never use compressed air as it will force contaminants into components. Blowing with your mouth can cause moisture to enter components and is not a safe practice.
2. Cycle power to the affected control box(s) and the 24-port unmanaged switch. If you are still seeing issue, open up one of the control boxes and make sure everything is cabled correctly and in the right ports.
3. Perform a ping that will continue until you stop it. We want to make sure the response times stay in the single digits and there are no dropped packets. The command "ping <ip_address> -t" will continue to ping the device until you press the keys "ctrl" and "c" at the same time.

Everything is working but I can't ping the other computers.

Sometimes a customer's IT department will make sure certain features are turned off. These changes can be automated by something called "Group Policy" that is being maintained by the customer. Ping traffic is handled by a protocol called ICMP. If this is turned off in the firewall settings of the computer, you will not be able to ping the computer you are checking. This is because the computer receiving the PING request cannot send the response back.

You can attempt to communicate with another computer through the "telnet" command in Command Prompt. This feature isn't always turned on. However you can go into Windows Features and turn the Telnet Client on. The command looks like the following: telnet <ip_address> <port>. As long as the port is open on the other computer a telnet connection will open with that device. To close the connection simply type "close" at the "Microsoft Telnet>" prompt.

PLCs are disconnected.

The PLC(s) that are disconnected will tell you which box is affected. If 4 PLCs in a row are not communicating, this will tell you that the two boxes are daisy-chained together and its communication to the first box in the chain is broken.

1. Make sure there is power to the box, and cycle the power.
2. Reseat the cable at both ends (control box and unmanaged switch).
3. Make sure there are no IP conflicts. If there are, use the DIP switches on the control boxes to change the IP address to something unique that is not shared with any other device (just make sure you are within the correct IP range).

Sometimes you need to make sure you are working with known-working equipment.

Try a network cable from a working control box on the affected one. If connectivity comes up fine you know the cable is bad and needs to be replaced. You can also check the cable by plugging the possibly affected cable into a working control box.

Lastly make sure everything in the box is cabled correctly and reseated. The goal is to check the pieces to see what works and what doesn't work. Start with the easy items and work your way to harder equipment. If a port on the 24-port switch or 5-port switch is bad they can either plug things into a different port and/or RMA the equipment. It's also possible certain PLCs need to be replaced.