DICE GEN-II INK SUPPLY SYSTEM

Procedure to upgrade the ink supply vacuum system

For DICE systems using the GEN-II Ink Supply. These systems have support modules and use two regulators to determine the vacuum pressure in the ink supply reservoir and weir chambers.

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Versions

Version	Notes	Personnel	Date
1.0	Initial Release Modular Ink Supply User Manual	RCR	4/10/2017

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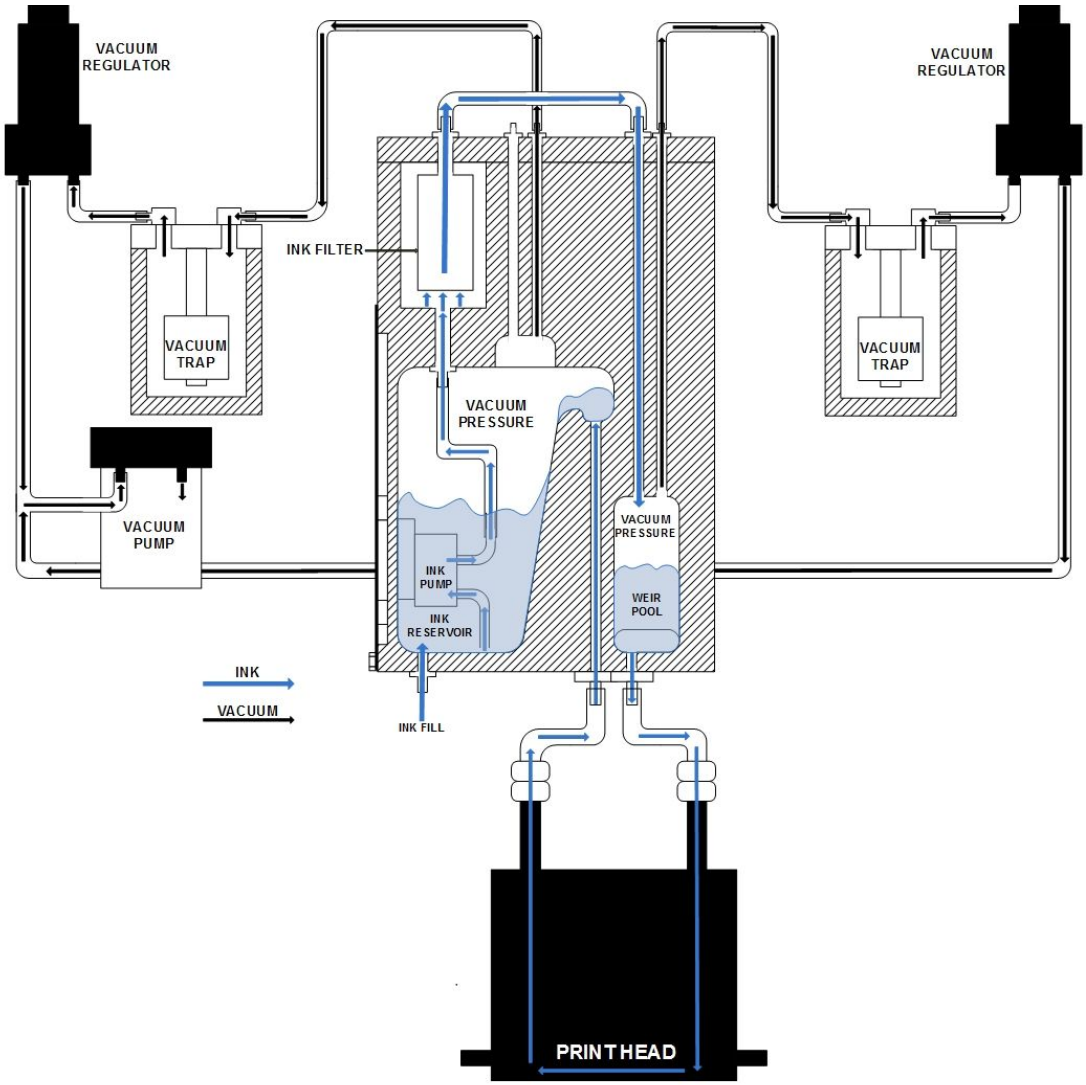
Purpose

The purpose of this procedure is to walk current DICE users through a simple upgrade to their printing systems. The upgrade aims to solve one main problem; ink being pulled into the weir vacuum line.

Under normal operation, the DICE Gen-II Ink Supply recirculates ink from the weir chamber, through one or more printheads, and into a reservoir chamber as displayed in the image below.



You will notice that both the reservoir and weir chambers are under negative pressure (vacuum.) This prevents ink from falling out of the printhead nozzle plate. You will also notice that the reservoir chamber is under greater vacuum (more negative) than the weir. This facilitates the ink flow from the weir to the reservoir.

Under steady-state operation this system is very stable. Once a vacuum seal has been created, the ink supply will continue to circulate indefinitely without degrading or becoming unstable and loosing vacuum. When starting up a dormant system however, or shutting a system down for a long weekend, the system can fall out of the required operating parameters.

Often, when the required vacuum is broken it is caused by air entering the printhead nozzle plate. This results in air being pulled into the reservoir because it is pulling harder (more negative pressure here.) As a result, the reservoir vacuum is broken and it falls to close to ambient pressure.

At this point, the weir chamber actually has a greater vacuum pressure than the reservoir does. As a result, the weir can pull ink through the pump in the reservoir, through the filter and into the weir. If this is allowed to happen without purging, the weir will continue to pull vacuum until ink is pulled up into the vacuum line itself. The ink can even reach the support module and require cleaning before being put back into production use.

To prevent this problem, we are adding a check valve inside the support module for each ink supply. This check valve allows the ink supply to continue to operate correctly under normal conditions. If the reservoir vacuum ever drops below the weir vacuum level however, the check valve between the two chambers will open and the reservoir will see the weir vacuum pressure. Now both chambers are at the same negative pressure, and no ink will be pulled in either direction.

A purge will now correct your vacuum problem without requiring an operator to clear the vacuum line or ink trap on the support module.

This is a simple upgrade that should be easily executed by any operator or maintenance personnel. The rest of the document will outline the procedure for the upgrade.

Tools Required

There are very few tools required for this upgrade. You will simply need a cutting tool, like the side cutter seen below.

You will also need a check valve assembly like the one seen below. This will be provided by PPSI in an assembled condition.

This assembly includes two stainless steel T-fittings and a one way air flow valve, all connected by silicone pneumatic tubing.

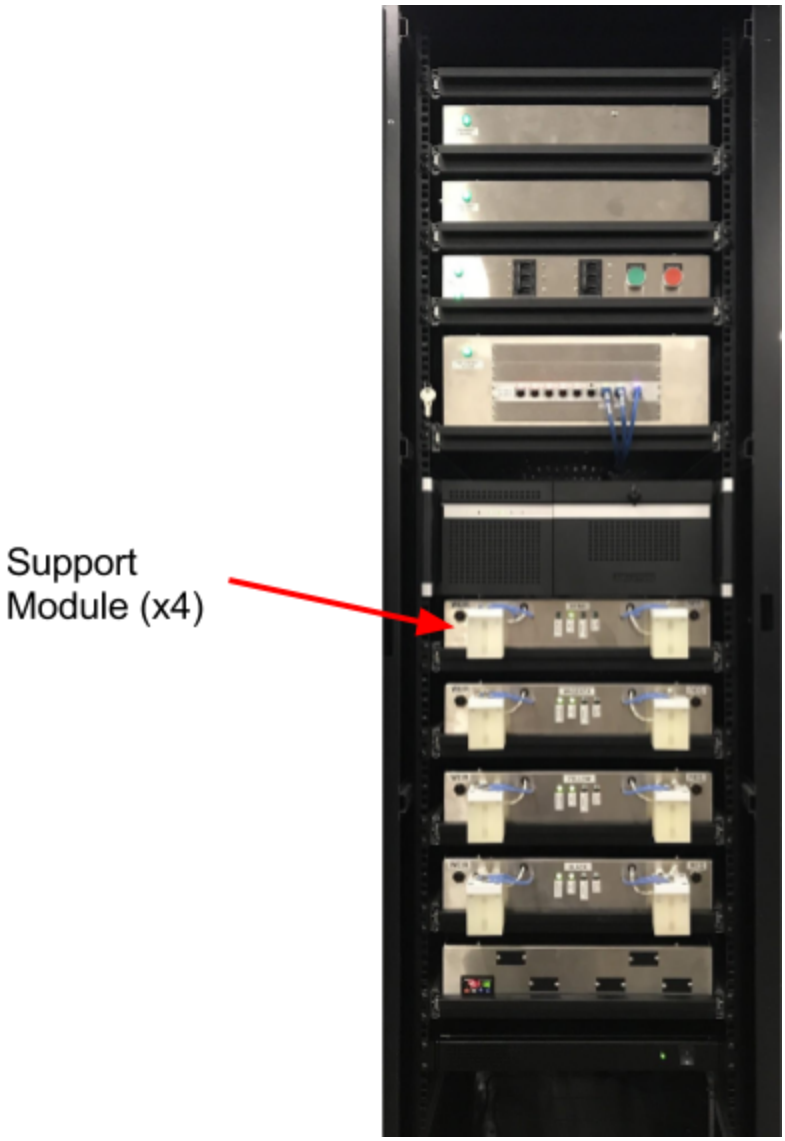
Overview

In this procedure we will add the one way airflow valve to each support module in your DICE system. This will allow vacuum to pull the valve open in the event that the reservoir drops below the weir, but will allow the ink supply to function normally as long as the reservoir vacuum is more negative than the weir vacuum.

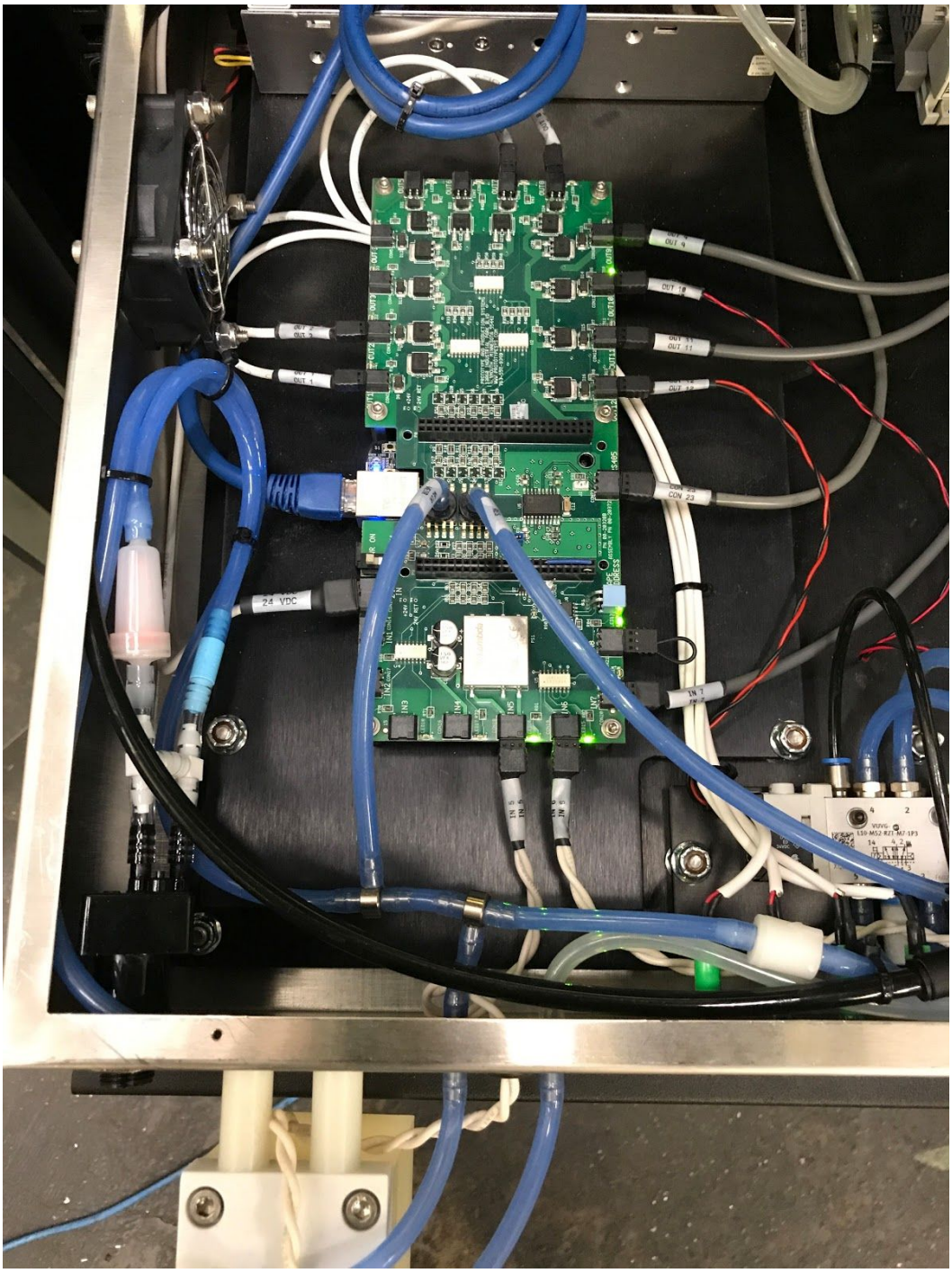
Procedure

Step by step with pictures how we will complete the procedure.

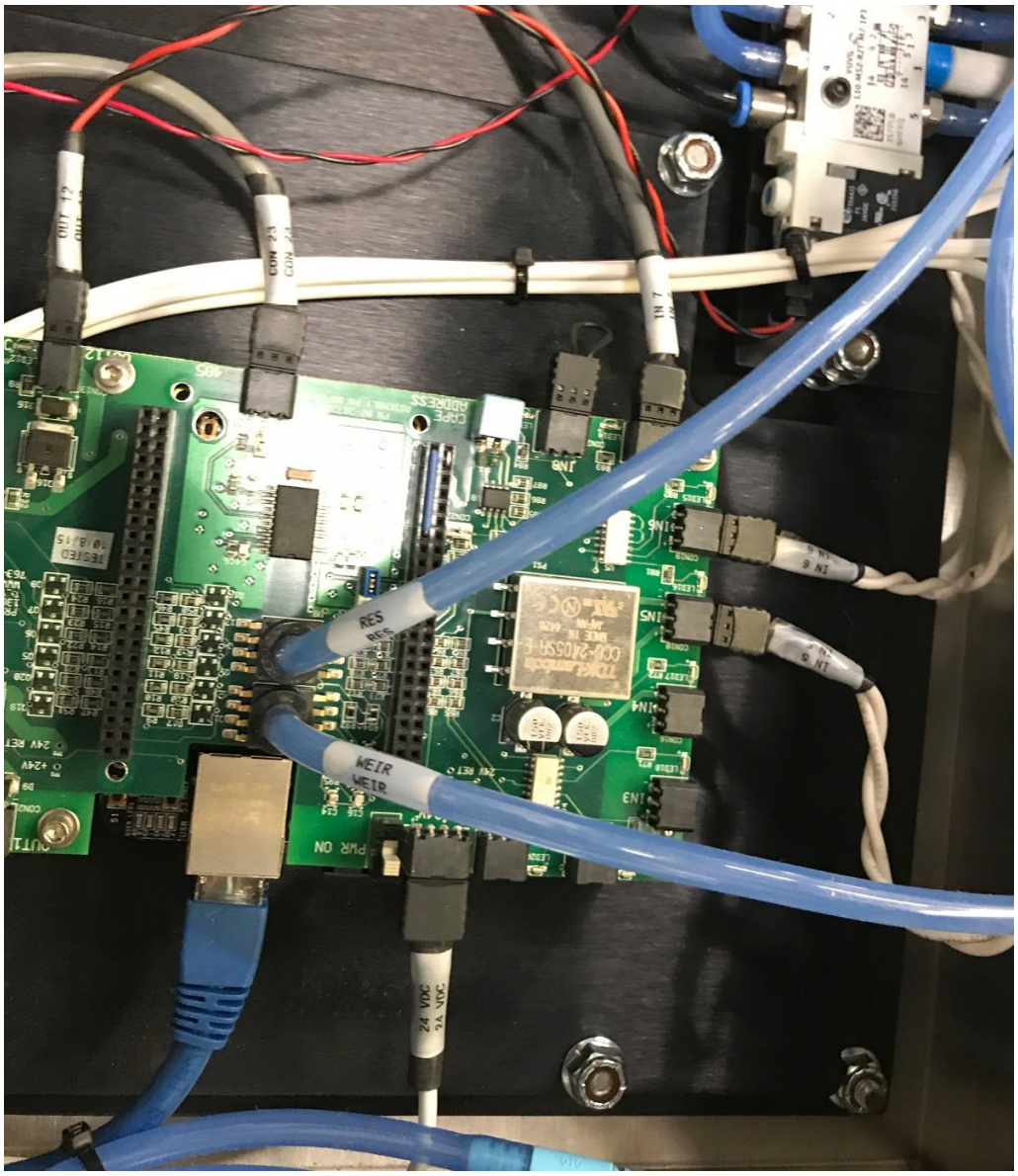
1) Cover the heads on your system by putting them over a drip tray or placing a drip pan below them. This will vary by system.
2) Turn off the recirculation pumps on each of the ink supplies.
3) Allow the ink level in the weir to drop to about zero as the reservoir fills.
4) Find the support modules located inside the control rack. There is one for each color being printed. These may be mounted horizontally in a 19" rack like the one seen below, or vertically in older systems.



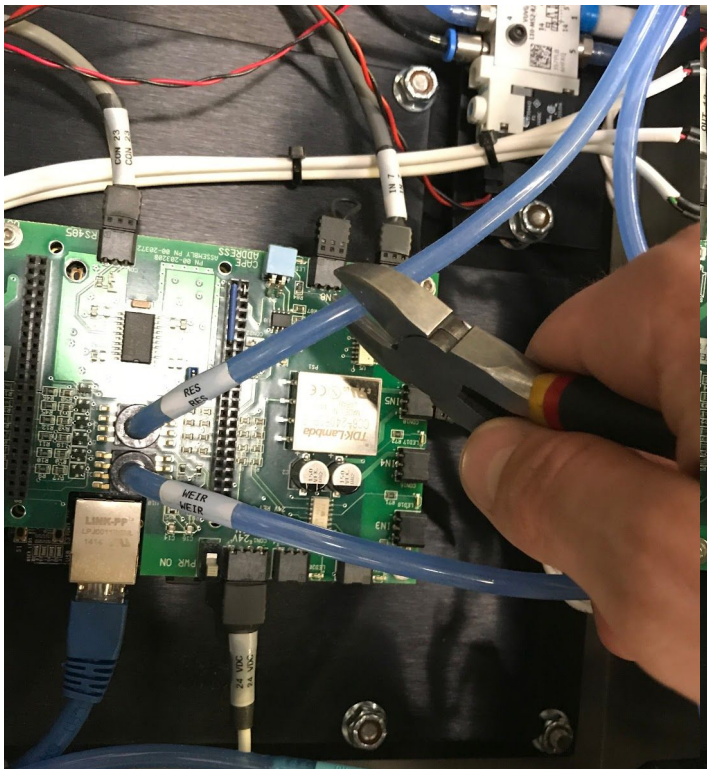
5) Open the first support module by removing the top cover. You will see the internals of the module, similar to the image below.

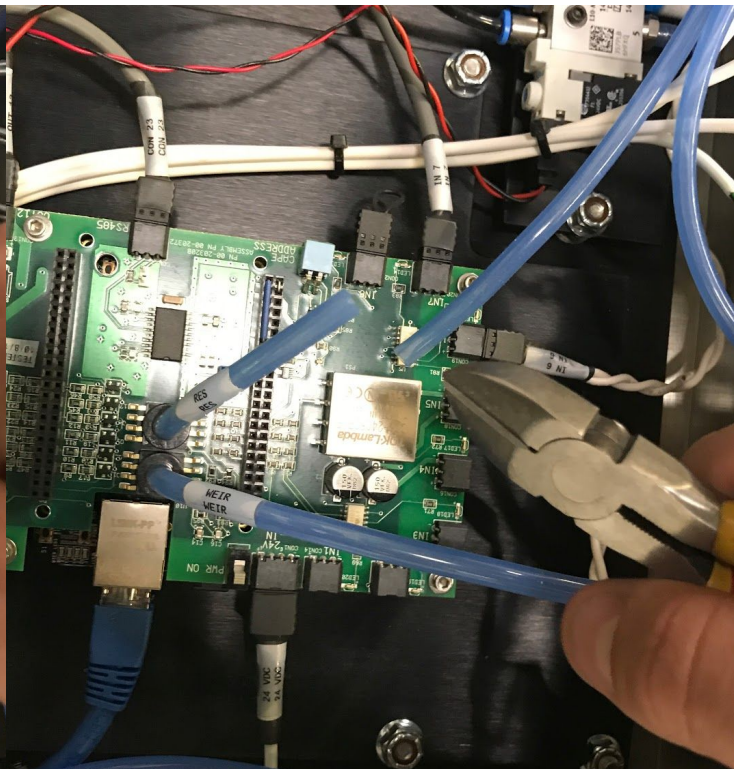


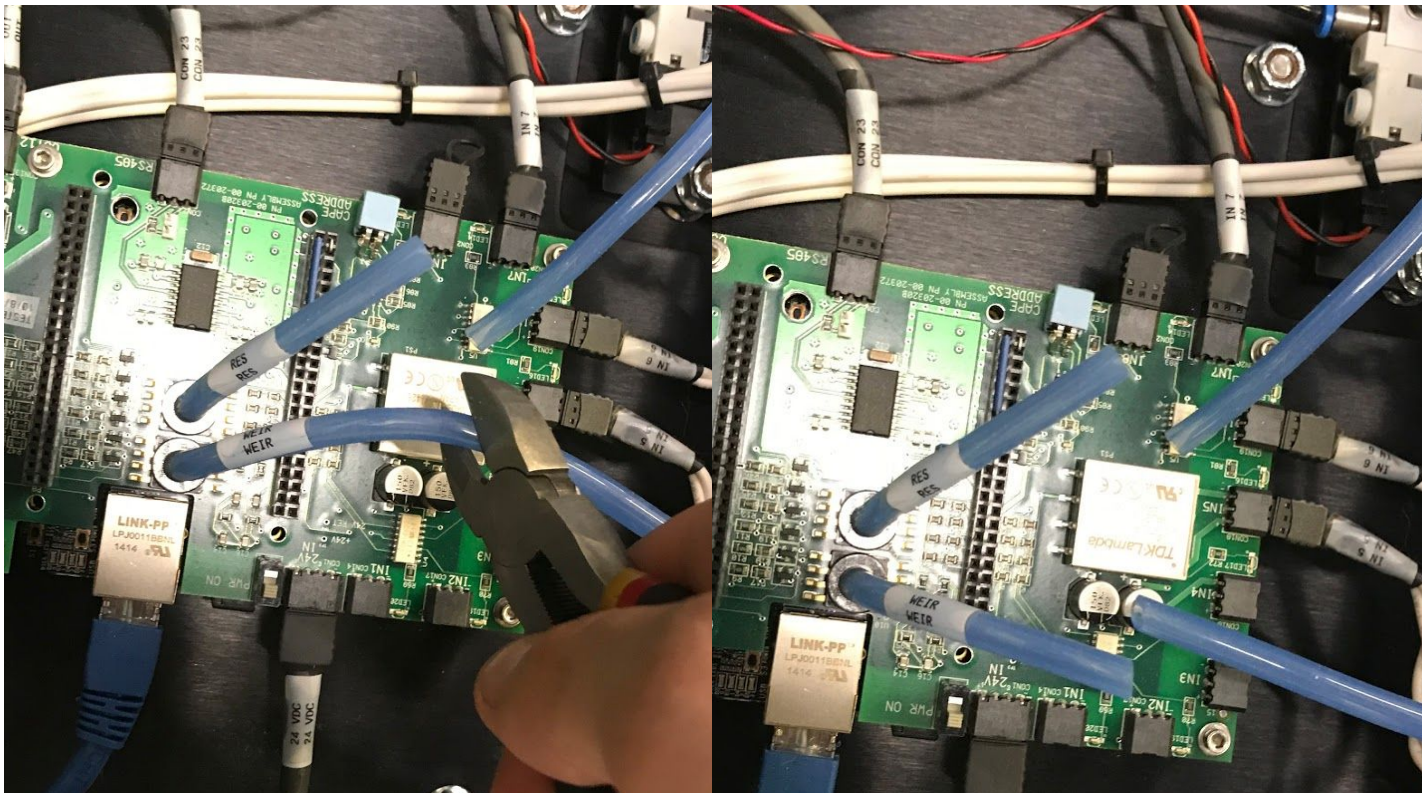
In the center of the above image is a green circuit board. This is the support module I/O board. It controls the ink supply, turning on pumps and initiating purge cycles. It also reads the vacuum levels on the reservoir and weir. The two blue pneumatic tubes terminating at the circuit board are the points at which this vacuum is measured. Reservoir on the right, weir on the left. Below is another view of the same assembly.



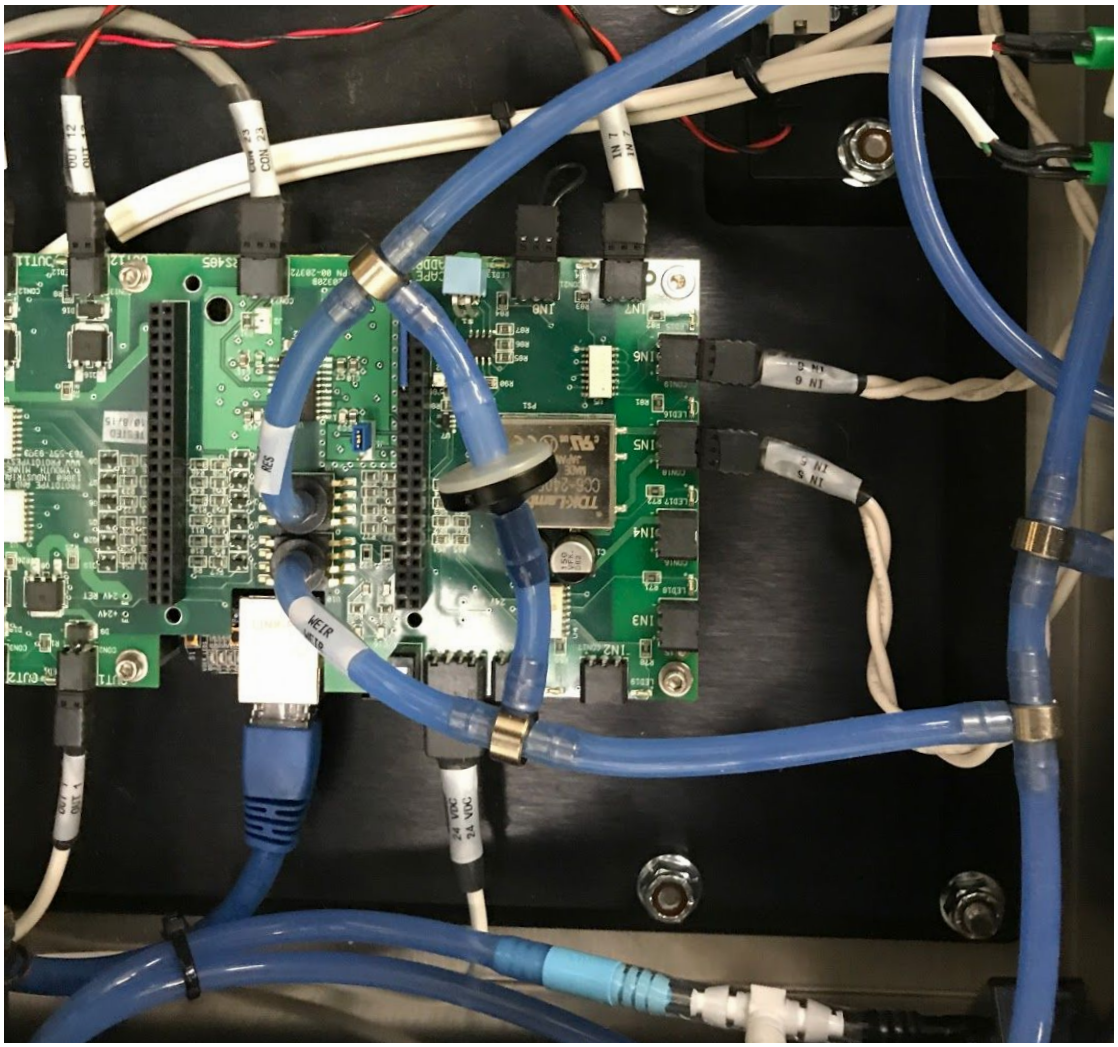
6) We will now cut both vacuum lines as seen in the images below.






RES
WEIR
LINK-PP
WEIR
LINK-PP

7) We will now install the one way flow valve supplied by PPSI as seen in the image below.



The flow direction is from the white side of the valve to the black side. Top to bottom as seen in the image above. Make sure the black side of the valve attached to the weir, and the white side attaches to the reservoir.

8) The installation is now complete. Place the cover back on the support module.
9) Repeat these steps for each support module in your system.
10) When all modules are complete, turn the recirculation pumps back on and continue to use the system as normal.

Appendix A: Contact Information

Please address any comments or questions to:

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