

Spectra Link Pattern Control

Customer Product Manual

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- English -

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This document contains important safety information
Be sure to read and follow all safety information in this
document and any other related documentation.



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Section 1

Safety

Read this section before using the equipment. This section contains recommendations and practices applicable to the safe installation, operation, and maintenance (hereafter referred to as "use") of the product described in this document (hereafter referred to as "equipment"). Additional safety information, in the form of task-specific safety alert messages, appears as appropriate throughout this document.



WARNING! Failure to follow the safety messages, recommendations, and hazard avoidance procedures provided in this document can result in personal injury, including death, or damage to equipment or property.

Safety Alert Symbols

The following safety alert symbol and signal words are used throughout this document to alert the reader to personal safety hazards or to identify conditions that may result in damage to equipment or property. Comply with all safety information that follows the signal word.



WARNING! Indicates a potentially hazardous situation that, if not avoided, can result in serious personal injury, including death.



CAUTION! Indicates a potentially hazardous situation that, if not avoided, can result in minor or moderate personal injury.

CAUTION! (Used without the safety alert symbol) Indicates a potentially hazardous situation that, if not avoided, can result in damage to equipment or property.

Responsibilities of the Equipment Owner

Equipment owners are responsible for managing safety information, ensuring that all instructions and regulatory requirements for use of the equipment are met, and for qualifying all potential users.

Safety Information

- Research and evaluate safety information from all applicable sources, including the owner-specific safety policy, best industry practices, governing regulations, material manufacturer's product information, and this document.
- Make safety information available to equipment users in accordance with governing regulations. Contact the authority having jurisdiction for information.
- Maintain safety information, including the safety labels affixed to the equipment, in readable condition.

Instructions, Requirements, and Standards

- Ensure that the equipment is used in accordance with the information provided in this document, governing codes and regulations, and best industry practices.
- If applicable, receive approval from your facility's engineering or safety department, or other similar function within your organization, before installing or operating the equipment for the first time.
- Provide appropriate emergency and first aid equipment.
- Conduct safety inspections to ensure required practices are being followed.
- Re-evaluate safety practices and procedures whenever changes are made to the process or equipment.
- For installation of this equipment, the safety of any system incorporating the equipment is the responsibility of the assembler of the system. Customer is responsible for providing the main disconnect switch or circuit breaker per their local electric code. The equipment needs to be located near the parent machine's switch or circuit breaker, so it can be easily accessible.

User Qualifications

Equipment owners are responsible for ensuring that users:

- receive safety training appropriate to their job function as directed by governing regulations and best industry practices
- are familiar with the equipment owner's safety and accident prevention policies and procedures
- receive equipment- and task-specific training from another qualified individual

NOTE: Nordson can provide equipment-specific installation, operation, and maintenance training. Contact your Nordson representative for information.

- possess industry- and trade-specific skills and a level of experience appropriate to their job function
- are physically capable of performing their job function and are not under the influence of any substance that degrades their mental capacity or physical capabilities

Applicable Industry Safety Practices

The following safety practices apply to the use of the equipment in the manner described in this document. The information provided here is not meant to include all possible safety practices, but represents the best safety practices for equipment of similar hazard potential used in similar industries.

Intended Use of the Equipment

- If the equipment is used in a manner not specified by Nordson, the protection provided by the equipment may be impaired.
- Use the equipment only for the purposes described and within the limits specified in this document.
- Do not modify the equipment.
- This equipment is a programmable control system, intended to actuate adhesive applicators to dispense adhesive patterns onto a substrate.

Instructions and Safety Messages

- Read and follow the instructions provided in this document and other referenced documents.
- Familiarize yourself with the location and meaning of the safety warning labels and tags affixed to the equipment. Refer to "Safety Labels and Tags" at the end of this section.
- If you are unsure of how to use the equipment, contact your Nordson representative for assistance.

Installation Practices

- Install the equipment in accordance with the instructions provided in this document and in the documentation provided with auxiliary devices.
- Ensure that the equipment is rated for the environment in which it will be used. This equipment has not been certified for compliance with the ATEX directive nor as nonincendive and should not be installed in potentially explosive environments.
- Ensure that the processing characteristics of the material will not create a hazardous environment. Refer to the Safety Data Sheet (SDS) for the material.
- If the required installation configuration does not match the installation instructions, contact your Nordson representative for assistance.
- Position the equipment for safe operation. Observe the requirements for clearance between the equipment and other objects.
- Install lockable power disconnects to isolate the equipment and all independently powered auxiliary devices from their power sources. Refer to **Equipment Shutdown** for more information.
- Properly ground all equipment. Contact your local building code enforcement agency for specific requirements.
- Ensure that fuses of the correct type and rating are installed in fused equipment.
- Contact the authority having jurisdiction to determine the requirement for installation permits or inspections.

Operating Practices

- Familiarize yourself with the location and operation of all safety devices and indicators.
- Confirm that the equipment, including all safety devices (guards, interlocks, etc.), is in good working order and that the required environmental conditions exist.
- Use the personal protective equipment (PPE) specified for each task. Refer to “Equipment Safety Information” or the material manufacturer’s instructions and SDS for PPE requirements.
- Use properly rated hearing protection when operating applicators. Noise emission levels can reach a maximum of 99 dB(A).
- Do not use equipment that is malfunctioning or shows signs of a potential malfunction.
- Do not use equipment with an open or missing enclosure. All openings require a fitting or plug.

Maintenance and Repair Practices

- Allow only personnel with appropriate training and experience to operate or service the equipment.
- Perform scheduled maintenance activities at the intervals described in this document.
- Relieve system hydraulic and pneumatic pressure before servicing the equipment.
- De-energize the equipment and all auxiliary devices before servicing the equipment.
- Use only new Nordson-authorized refurbished or replacement parts.
- Read and comply with the manufacturer’s instructions and the SDS supplied with equipment cleaning compounds.

NOTE: SDSs for cleaning compounds that are sold by Nordson are available at www.nordson.com or by calling your Nordson representative.

- Confirm the correct operation of all safety devices before placing the equipment back into operation.
- Dispose of waste cleaning compounds and residual process materials according to governing regulations. Refer to the applicable SDS or contact the authority having jurisdiction for information.
- Keep equipment safety warning labels clean. Replace worn or damaged labels.
- Nordson supplied power cords (US and EU) have a locking feature at the plug to meet the IP rating of the unit. Refer to Parts section for replacements.

Equipment Safety Information

This equipment safety information is applicable to the following types of Nordson equipment:

- hot melt and cold adhesive application equipment and all related accessories
- pattern controllers, timers, detection and verification systems, and all other optional process control devices

Equipment Shutdown

The safety of any system incorporating this equipment is the responsibility of the assembler of the system.

Locate the Safety Disconnect Device in close proximity to this equipment.

To safely complete many of the procedures described in this document, the equipment must first be shut down. The level of shut down required varies by the type of equipment in use and the procedure being completed. If required, shut down instructions are specified at the start of the procedure. The levels of shut down are:

Relieving System Hydraulic Pressure

Completely relieve system hydraulic pressure before breaking any hydraulic connection or seal. Refer to the melter-specific product manual for instructions on relieving system hydraulic pressure.

De-energizing the System

Isolate the system (melter, hoses, applicators, and optional devices) from all power sources before accessing any unprotected high-voltage wiring or connection point.

1. Turn off the equipment and all auxiliary devices connected to the equipment (system).
2. To prevent the equipment from being accidentally energized, lock and tag the disconnect switch(es) or circuit breaker(s) that provide input electrical power to the equipment and optional devices.

NOTE: Government regulations and industry standards dictate specific requirements for the isolation of hazardous energy sources. Refer to the appropriate regulation or standard.

Disabling the Applicators

NOTE: Adhesive dispensing applicators are referred to as “guns” in some previous publications.

All electrical or mechanical devices that provide an activation signal to the applicators, applicator solenoid valve(s), or the melter pump must be disabled before work can be performed on or around an applicator that is connected to a pressurized system.

1. Turn off or disconnect the applicator triggering device (pattern controller, timer, PLC, etc.).
2. Disconnect the input signal wiring to the applicator solenoid valve(s).
3. Reduce the air pressure to the applicator solenoid valve(s) to zero; then relieve the residual air pressure between the regulator and the applicator.

Additional Safety Information:

It is the responsibility and obligation of the assembler of the system (not Nordson) to:

- You must have the ability to stop unintentional actuation of applicator's solenoid.
 - Provide the appropriate safety interlock to prevent applicator's solenoid from firing.
 - Provide safety interrupt driver signal to solenoids and/or pneumatic discharge to solenoids.
- Provide safe energy disconnect or isolation valve.
- Provide the appropriate training and policy information regarding lockout and tagout procedures.
- Refer to the Purgung section of this manual for additional safety information.
- Make use of Nordson supplied strain reliefs and plugs and cables entering or exiting the unit. There should be no openings in the unit. Failure to use Nordson supplies voids IP rating.
- When mounting the unit - all fasteners must be properly tightened and secured. Maximum unit weight is approximately 22.7 k (50 lbs)
 - Nordson supplied VESA mount includes threadlocker with mounting fasteners
- Although only one NEMA Style power cord is supplied, an EU style power cord will be available for purchase from Nordson. Both power cords have a locking feature at the plug to meet the IP rating of our equipment. Failure to make use of the Nordson supplied power cords voids the IP rating of this equipment.
- Not rated for ATEX environments

General Safety Warnings and Cautions

Table 1-1 contains the general safety warnings and cautions that apply to Nordson hot melt and cold adhesive equipment. Review the table and carefully read all of the warnings or cautions that apply to the type of equipment described in this manual.

Equipment types are designated in Table 1-1 as follows:

HM = Hot melt (melters, hoses, applicators, etc.)

PC = Process control

CA = Cold adhesive (dispensing pumps, pressurized container, and applicators)

General Safety Warnings and Cautions (contd)

Table 1-1: General Safety Warnings and Cautions

Equipment Type	Warning or Caution
HM	 WARNING! Hazardous vapors! Before processing any polyurethane reactive (PUR) hot melt or solvent-based material through a compatible Nordson melter, read and comply with the material's SDS. Ensure that the material's processing temperature and flashpoints will not be exceeded and that all requirements for safe handling, ventilation, first aid, and personal protective equipment are met. Failure to comply with SDS requirements can cause personal injury, including death.
HM	 WARNING! Reactive material! Never clean any aluminum component or flush Nordson equipment with halogenated hydrocarbon fluids. Nordson melters and applicators contain aluminum components that may react violently with halogenated hydrocarbons. The use of halogenated hydrocarbon compounds in Nordson equipment can cause personal injury, including death.
HM, CA	 WARNING! System pressurized! Relieve system hydraulic pressure before breaking any hydraulic connection or seal. Failure to relieve the system hydraulic pressure can result in the uncontrolled release of hot melt or cold adhesive, causing personal injury.
HM	 WARNING! Molten material! Wear eye or face protection, clothing that protects exposed skin, and heat-protective gloves when servicing equipment that contains molten hot melt. Even when solidified, hot melt can still cause burns. Failure to wear appropriate personal protective equipment can result in personal injury.
HM, PC	 WARNING! Equipment starts automatically! Remote triggering devices are used to control automatic hot melt applicators. Before working on or near an operating applicator, disable the applicator's triggering device and remove the air supply to the applicator's solenoid valve(s). Failure to disable the applicator's triggering device and remove the supply of air to the solenoid valve(s) can result in personal injury.
HM, CA, PC	 WARNING! Risk of electrocution! Even when switched off and electrically isolated at the disconnect switch or circuit breaker, the equipment may still be connected to energized auxiliary devices. De-energize and electrically isolate all auxiliary devices before servicing the equipment. Failure to properly isolate electrical power to auxiliary equipment before servicing the equipment can result in personal injury, including death.

Continued...

Table 1-1: General Safety Warnings and Cautions (contd)

Warning or Caution	Warning or Caution
HM, CA, PC	 WARNING! Risk of fire or explosion! Nordson adhesive equipment is not rated for use in explosive environments and has not been certified for the ATEX directive or as nonincendive. In addition, this equipment should not be used with solvent-based adhesives that can create an explosive atmosphere when processed. Refer to the SDS for the adhesive to determine its processing characteristics and limitations. The use of incompatible solvent-based adhesives or the improper processing of solvent-based adhesives can result in personal injury, including death.
HM, CA, PC	 WARNING! Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others and can damage to the equipment.
HM	 CAUTION! Hot surfaces! Avoid contact with the hot metal surfaces of applicators, hoses, and certain components of the melter. If contact can not be avoided, wear heat-protective gloves and clothing when working around heated equipment. Failure to avoid contact with hot metal surfaces can result in personal injury.
HM	CAUTION! Some Nordson melters are specifically designed to process polyurethane reactive (PUR) hot melt. Attempting to process PUR in equipment not specifically designed for this purpose can damage the equipment and cause premature reaction of the hot melt. If you are unsure of the equipment's ability to process PUR, contact your Nordson representative for assistance.
HM, CA	CAUTION! Before using any cleaning or flushing compound on or in the equipment, read and comply with the manufacturer's instructions and the SDS supplied with the compound. Some cleaning compounds can react unpredictably with hot melt or cold adhesive, resulting in damage to the equipment.
HM	CAUTION! Nordson hot melt equipment is factory tested with Nordson Type R fluid that contains polyester adipate plasticizer. Certain hot melt materials can react with Type R fluid and form a solid gum that can clog the equipment. Before using the equipment, confirm that the hot melt is compatible with Type R fluid.

Other Safety Precautions

- Do not use an open flame to heat hot melt system components.
- Check high pressure hoses daily for signs of excessive wear, damage, or leaks.
- Never point a dispensing handgun at yourself or others.
- Suspend dispensing handguns by their proper suspension point.

First Aid

If molten hot melt comes in contact with your skin:

1. Do NOT attempt to remove the molten hot melt from your skin.
2. Immediately soak the affected area in clean, cold water until the hot melt has cooled.
3. Do NOT attempt to remove the solidified hot melt from your skin.
4. In case of severe burns, treat for shock.
5. Seek expert medical attention immediately. Give the SDS for the hot melt to the medical personnel providing treatment.

Manufacturing Cybersecurity Statement

Some Nordson Corporation equipment is wireless-network enabled, conveniently allowing for remote control and monitoring. However, hackers have expanded their craft, focusing on wireless-network enabled manufacturing equipment in their attempts to steal, change, or destroy data as well as to cause production slowdowns, or even halt them altogether. The results have been costly in terms of lost data and revenues.

Ultimately, It is up to you to take the necessary cybersecurity measures for your organization, which includes having a proven, tested, and maintained Corporate Cybersecurity Policy in place. Nordson Corporation is not liable for unauthorized access and data loss/theft.

Types of Cyberattacks

The following are just some of the more common cyber threats:

- Internal attacks — a disgruntled employee can cause a great deal of harm.
- Phishing — email that fakes a trusted sender and prompts for access.
- Ransomware / Cross-Site Scripting (XSS) — similar to phishing, but more deceptive.
- Drive-by download — visiting an infected site installs malware.
- Advanced Persistent Threat (APT) — a hidden threat from a hacker that can steal data.
- Distributed Denial of Service (DDoS) — an attempt to overload the network with false messages.

What You Can Do to Prevent Cyberattacks

- Keep current with software and firmware updates from Nordson.
- Make sure you have a defined, tested, and maintained Corporate Cybersecurity Policy.
- Use a professional to help you develop your Corporate Cybersecurity Policy. Although some companies rely on their own personnel for network security, there are many professional cybersecurity companies in the marketplace to help you define, test, and maintain your network security and your Corporate Cybersecurity Policy. Below are some suggested policies to include in your Corporate Cybersecurity Policy:

Network Security Policy	Remote Access Policy
Data Classification Policy	Mobile Device Policy
Wireless Policy	Password Policy
Incident Response Policy	Network Access Policy
Confidential Data Policy	Physical Security Policy
Wireless-Network Enabled Manufacturing/Industrial Equipment Policy	

- Use data encryption.
- Use segmented networks to keep damage localized, instead of widespread.
- Include firewalls between segmented networks.

Nordson Security Options for Preventing a Cyberattack

In addition to your Corporate Cybersecurity Policy, Nordson provides the following software security options to help curb the likelihood of a cyberattack:

- Disabling the ability to broadcast the Service Set Identifier (SSID) of a controller
- Disabling write access from a network interface
- Making use of current Internet security protocols, such as Wi-Fi Protected Access (WPA) and pre-shared key (PSK)
- Limiting the number of clients accessing a controller
- Disabling the ability to access the Nordson external web server

Section 2

Equipment Installation



WARNING! Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



WARNING! Do not use equipment with an open or missing enclosure. All openings require a fitting or plug.



WARNING! For installation of this equipment, the safety of any system incorporating the equipment is the responsibility of the assembler of the system. Customer is responsible for providing the main disconnect switch or circuit breaker per their local electric code. This unit needs to be located near the parent machine's switch or circuit breaker, so it can be easily accessible.

In this Section

This section details the following:

- Getting Started
- Mounting the Equipment
- Connecting the Equipment
- Wiring the Terminal Blocks
- Accessing the User Interface
- Starting the Spectra Link Pattern Controller

Getting Started

Unpack the pattern controller. The box contains the following:

- Safety information document
- A template for the Vesa mount
- One small screwdriver
- One 3mm hex driver
- Four ports
- Two Ethernet connectors
- Two 8-pin position connectors
- One 12-pin position connector (triggers)
- One 7-pin position connector (encoder)
- One 4-pin position connector (standard Input/output)

Order of installation

1. Unpack and mount the pattern controller
2. Wire and install the position connectors
3. Connect power and start the pattern controller
4. Commission the pattern controller

The following sections detail each installation step in greater detail.

NOTE:

- Do not use equipment with an open or missing enclosure. All openings require a fitting or plug.

Mounting the Equipment

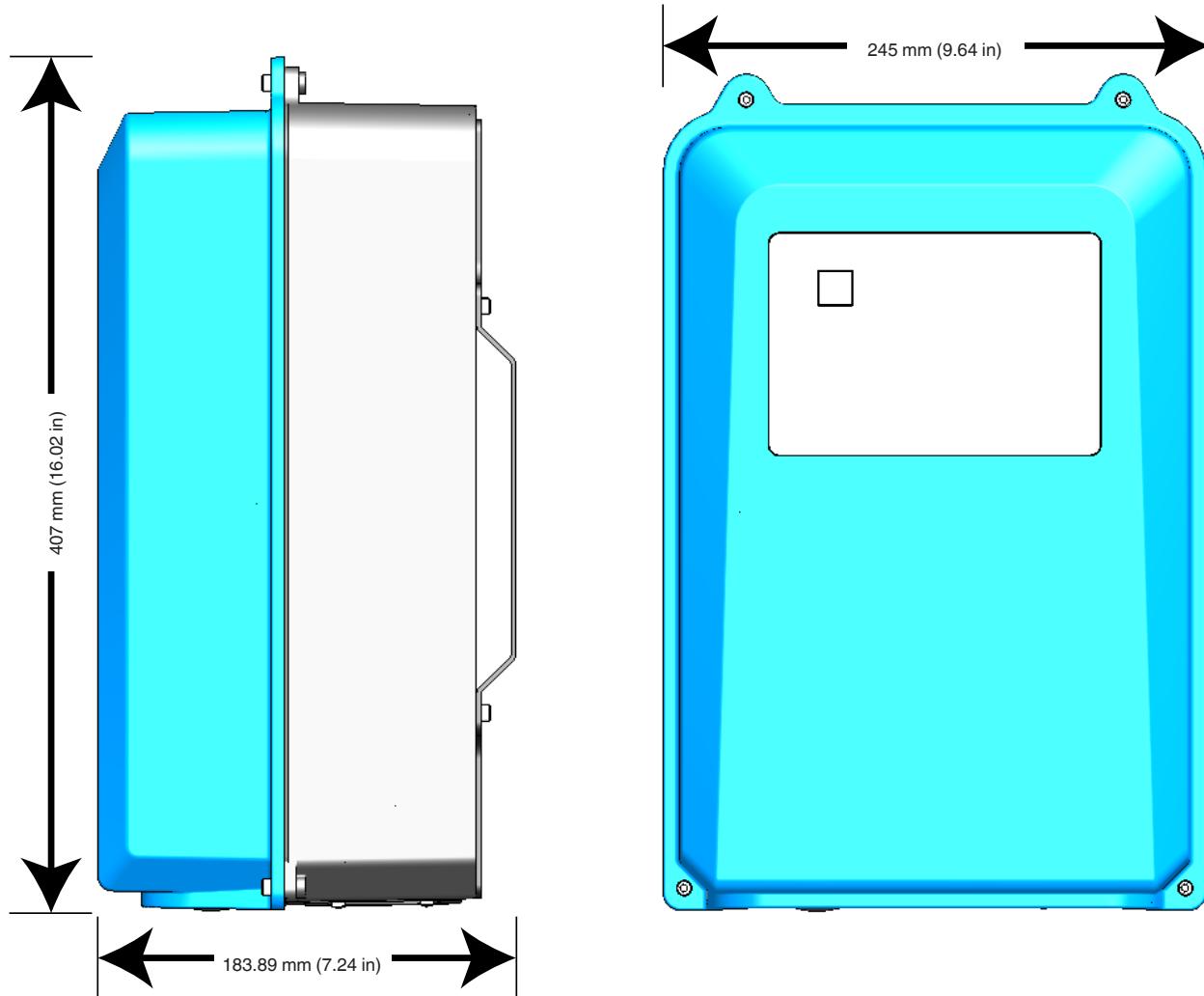
Using the Vesa mount template document included with the ship-with kit, mark the location of the screw holes on the mounting surface and secure the pattern controller with customer-supplied thread lockers.

Optionally, you can mount the pattern controller on a din rail using the Nordson din rail service kit, part number 1132438:

NOTES:

- Refer to **Appendix B** for equipment and installation specifications.
- The clips should support 12.72 kg (28 lbs). which is 4 times the weight of the equipment which is 3.18 Kg (7 Lbs).
- The supplied VESA mount adapter utilizes threadlocker with mounting fasteners.
- Customer is responsible for strain relief of cables entering the unit.

Equipment Dimensions



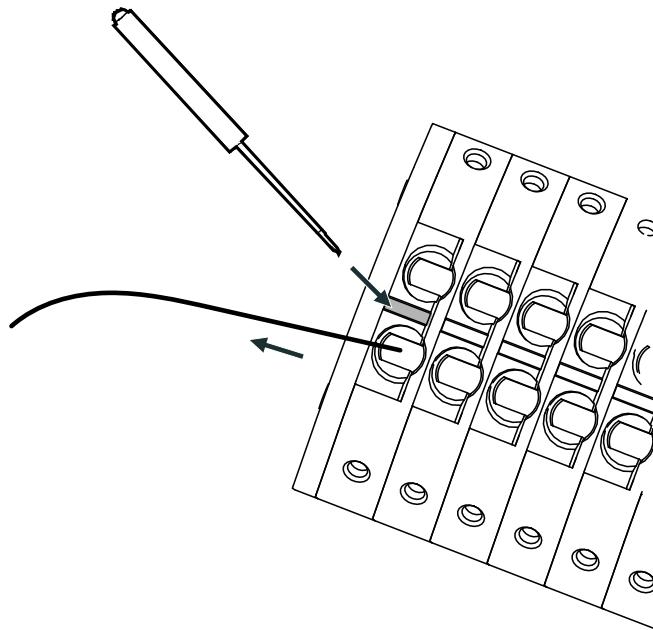
Connecting the Equipment



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

General Wire Gage and Wiring Instructions

- **Wire gage:** Between 0.25 mm^2 (24 AWG) and 0.82 mm^2 (18 AWG)
- **Wire preparation:** Strip off 10mm (0.40 in) from the ends to expose the wire.
- **Inserting Wires:** Although you can insert the wire into either the top or bottom row, it is recommended that you use the bottom row. Push wire in the appropriate slot. Check by lightly tugging on the wire to make sure it does not come out.
- **Removing Wires:** Using the provided small screw driver, press down on the middle slot and pull the wire out as shown.



NOTE:

- For small gauge stranded wire 0.50 mm^2 (20 AWG or smaller), press the release button to open the clamp before inserting the wire.

Routing Wires through the Strain Relief

Refer to the Figure 2-1

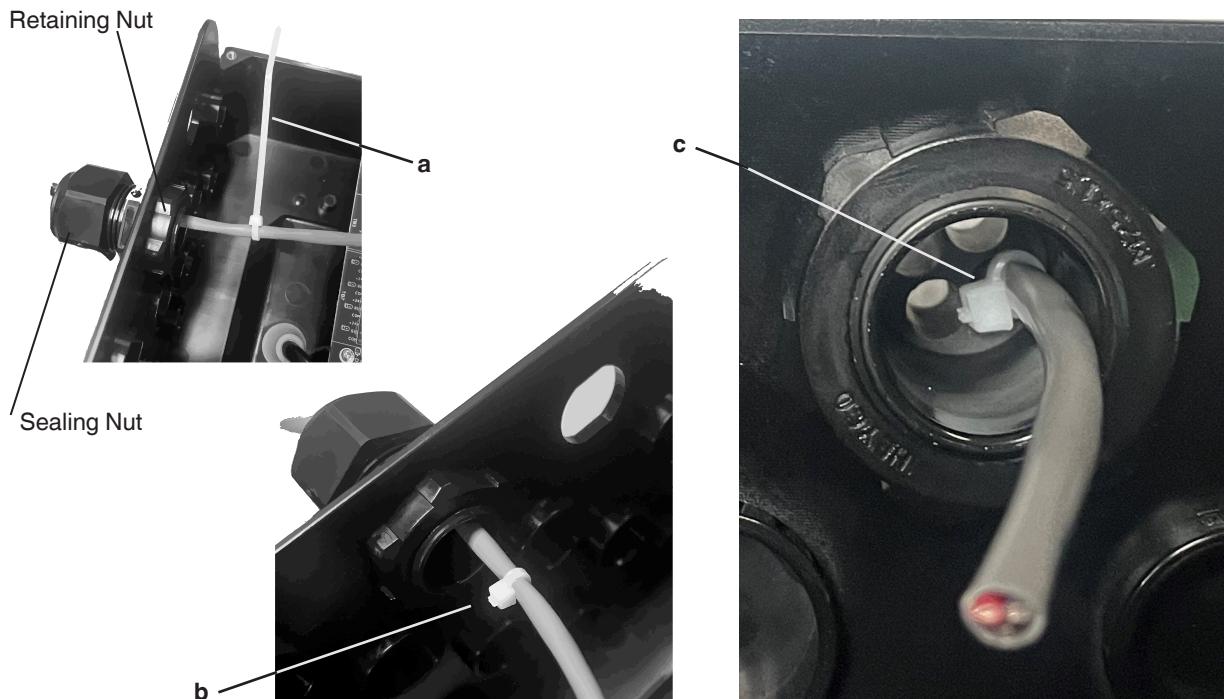
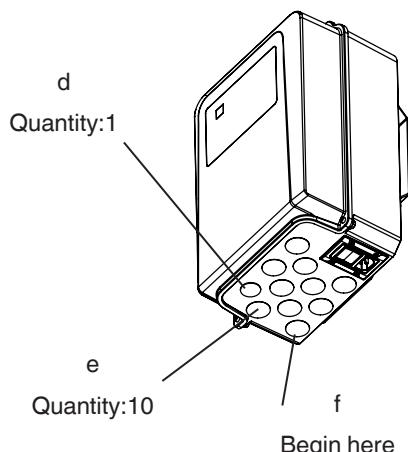


Figure 2-1: Strain Relief routing

1. Select a port where you want the wires to exit the enclosure.
2. (d) is reserved for the USB expansion, kit p/n 1132549. Start with the back strain relief (f). Remove the back retaining nut, then screw the strain relief into the portal you selected. Secure the strain relief in place by installing the back retaining nut.
 - Retaining nut torque: 8.5-9.0 Nm (75-80 in-lbs)
3. Route the wires through the strain relief. Do the following to continue:
 - Securely install the supplied zip tie around the wire (a).
 - Using a cutter, remove the zip tie strap, so that it is flush with the zip tie head (b)
 - From outside the enclosure, pull the wire so that it is flush with the inside of the strain relief. The zip tie head should prevent the wire from being pulled out of the enclosure.
4. Tighten the sealing nut of the strain relief down to fully compress the insert.
 - Sealing nut torque: 9.0-9.6 Nm (80-85 in-lbs)
 - For (d), reserved for USB.
 - For (e) single orifice, cable diameter range: 0.21" (5.3mm) – 0.334" (8.5mm)
 - For (e), four orifice, cable diameter range per orifice: 0.065" (1.65mm) - 0.230" (5.84mm)



Wiring the Terminal Blocks

The following sections detail each identified item.

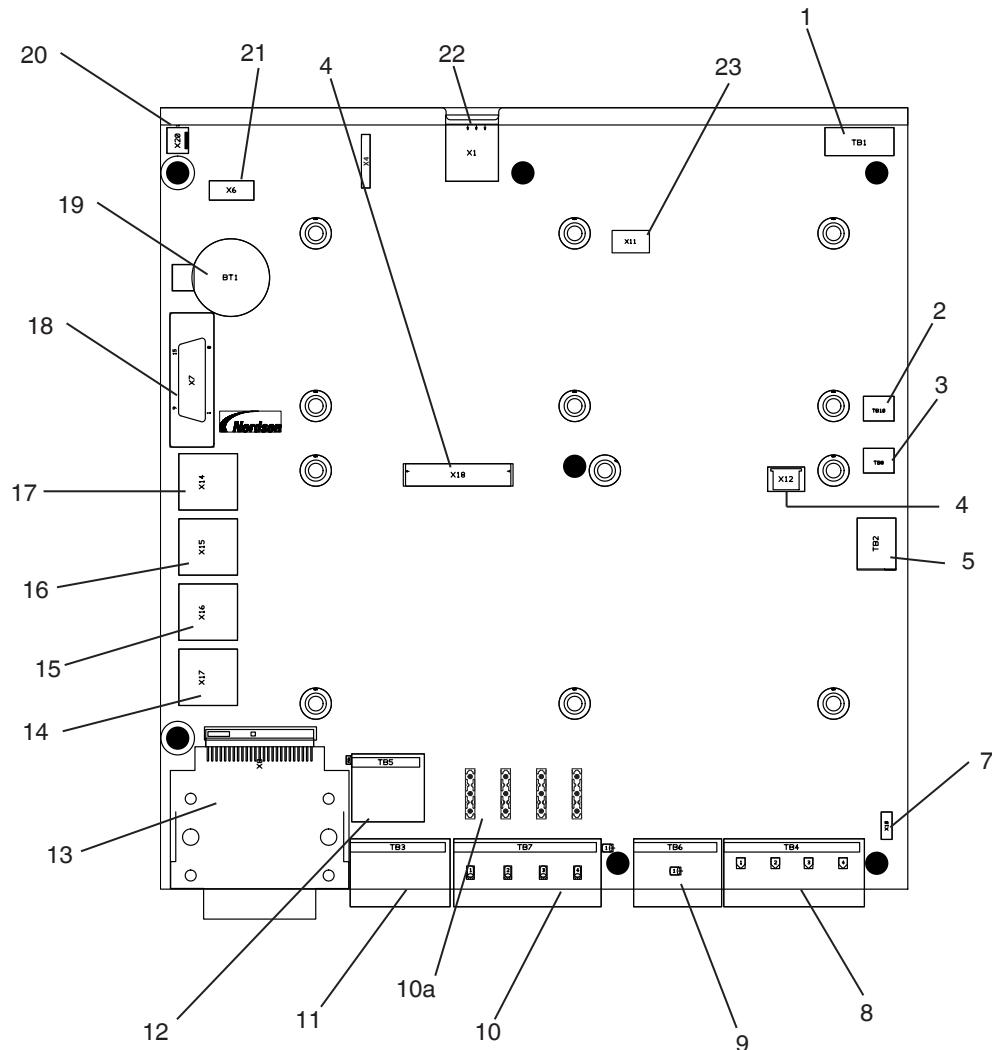


Figure 2-2: Main Pattern Board.

NOTES:

- For item 2 (TB10) & item 3 (TB8):
 - Use wire gauge 0.25 mm^2 (24 AWG) - 1.50 mm^2 (16 AWG)
 - Minimum temperature rating of wire: 75C
 - Wire conductor: Copper
 - Minimum voltage rating: 300V
 - Torque: 0.23-0.45 Nm (2-4 in-lbs)

Item Figure 2-2	Connector Number	Description	Refer to...
1	TB1	Main power to the pattern controller (pre-installed)	Refer to Connecting Main Power
2	TB10	Power for the external HMI	Refer to kit P/N 1132644
3	TB8	Power for external purge	Future release.
4	X12 X18	Connector for the applicator and trigger expansion board.	---
5	TB2	Applicator power interlock.	Refer to Applicator Power Interlock for more information.
7	X10	Ground. (pre-installed)	---
8	TB4	Standard applicators (1-4)	Refer to Connecting Standard Applicators 1-4
9	TB6	Encoders (Requires Encoder license)	Refer to Connecting Encoders
10	TB7	Standard triggers (1-4)	Refer to Connecting Triggers
10a	---	Trigger jumpers	
11	TB3	Runup (Requires Encoder license)	Refer to Connecting Runup Output
12	TB5	Standard Input/Output	Refer to Connecting Standard Digital Input and Output
13	X8	External communication card	Future release
14	X17	Ethernet External Purge	Future release
15	X16	Ethernet HMI	Refer to kit P/N 1132644
16	X15	Ethernet (Networking)	Refer to the Defining Network Settings
17	X14	Ethernet, typically for PLC communications	Refer to the Defining Network Settings
18	X7	WiFi module	Refer to kit P/N1129986
19	BATT:BR2032	Internal 3V battery BR2032.	Refer to Replacing the Internal Battery
20	X20	Internal Fan Kit	Refer to kit P/N 1132297
21	X6	USB	Refer to: • Backing-up, Restoring and Upgrading • Kit P/N1132549
22	X1	Micro SD card	---
23	X11	Connector for the Legacy Input/Output board.	Refer to kit P/N 1132466
24	X4	PCA LED	---

Connecting Main Power

The pattern controller is shipped with the main power connector pre-installed, making use of a V-Lock interlocking system that is IP54 rated.

- The external power connector from the factory is the US power cord (NEMA 5-15), part number 1132376.
- The optional EU power cord (CEE 7/VII) can be ordered from Nordson, part number 1132377

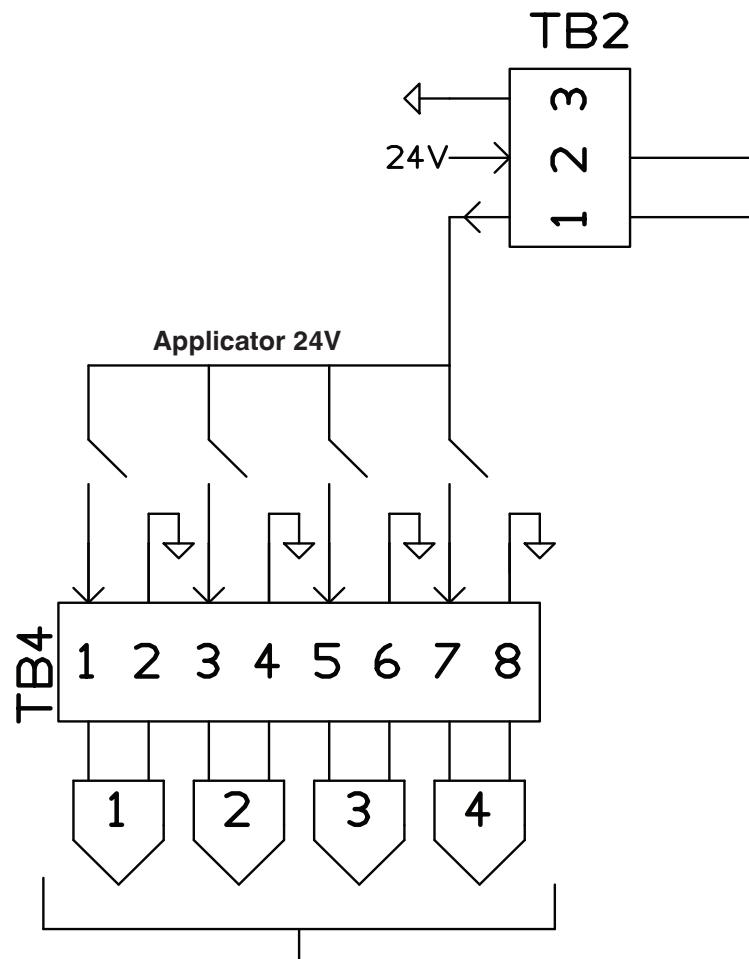
NOTES:

- Refer to Appendix B for the Spectra Link Pattern Controller System Specifications.
- IP54 rating only with V-Lock power corset.

Connecting Standard Applicators 1-4

Refer to Figure 2.2, call out 8 (TB4)

Wire the 8pin connector as follows:



NOTES:

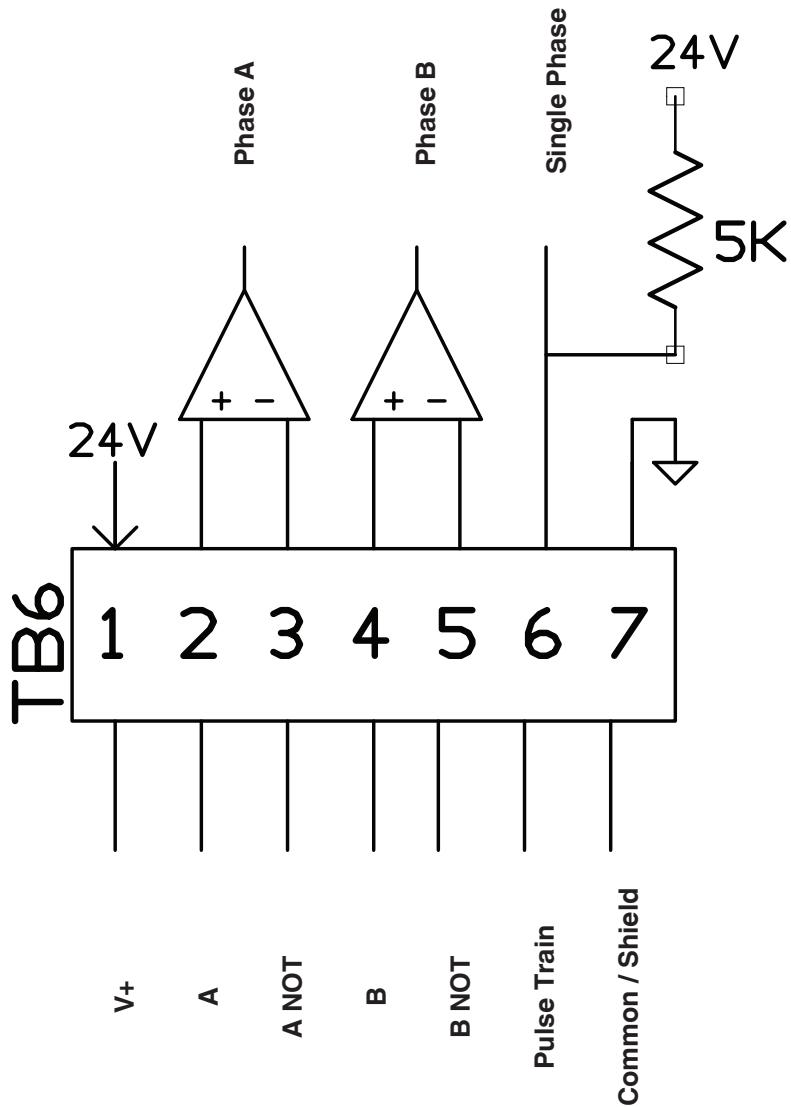
- Use wire gauge 0.25 mm² (24 AWG) - 2.5 mm² (14 AWG).
- Minimum temperature rating of wire 75C
- Wire conductor: Copper
- Minimum voltage rating: 300V
- Each Applicator output is 24V 2A rated. There is a total of 4A available to be distributed among the standard applicators 1-4 as well as applicators 5-8 if you install the 4-channel expansion kit (P/N 1132445) using the internal power supply.
- An external power supply with a higher power limit can be installed to TB2 on the Main PCA, bypassing the internal power supply, but in doing so the UL certification will be void. Contact Nordson for more information.

Connecting Encoders

Refer to Figure 2.2, call out 9 (TB6)

Use of an encoder requires an Encoder license, part number 1132400

Wire the 7 pin connector as follows:

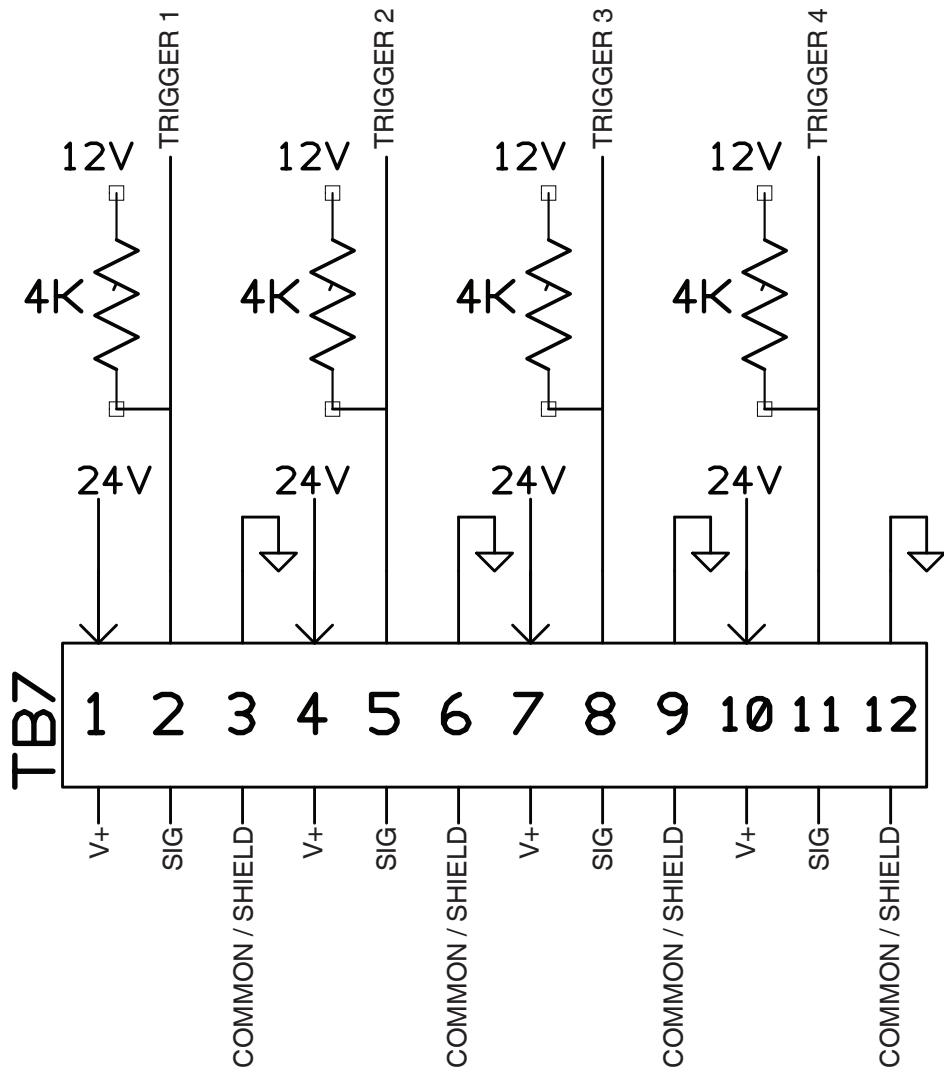


NOTES:

- Use wire gauge 0.25 mm² (24 AWG) - 1.5 mm² (16 AWG).
- Minimum temperature rating of wire 75C
- Wire conductor: Copper
- Minimum voltage rating: 300V

Connecting Triggers

Refer to Figure 2.2, call out 10 (TB7) Wire the 12 pin connector as follows:



NOTES:

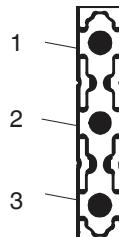
- Use wire gauge 0.25 mm² (24 AWG) - 1.5 mm² (16 AWG).
- Minimum temperature rating of wire 75C
- Wire conductor: Copper
- Minimum voltage rating: 300V

Changing Trigger Jumpers

Refer to Figure 2.2, call out 10a. You can modify the trigger jumper for each installed trigger.

Refer to the documentation that came with your trigger for more information.

The default jumper setting is NPN/PNP (jumper on 2 and 3)

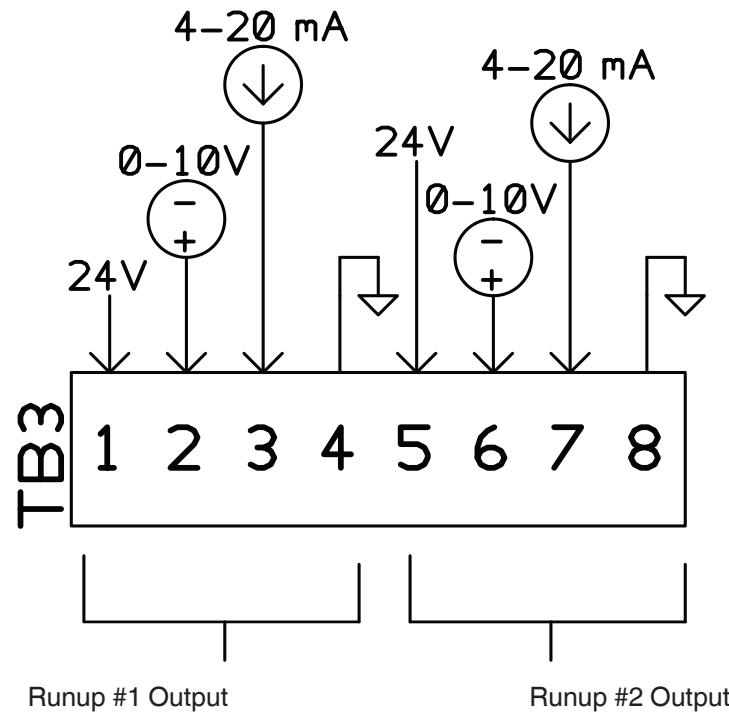


Option	Jumpers
Line Driver	1 and 2
NPN/PNP	2 and 3

Connecting Runup Output

Refer to Figure 2.2, call out 11 (TB3)

Wire the 8 pin connector as follows:



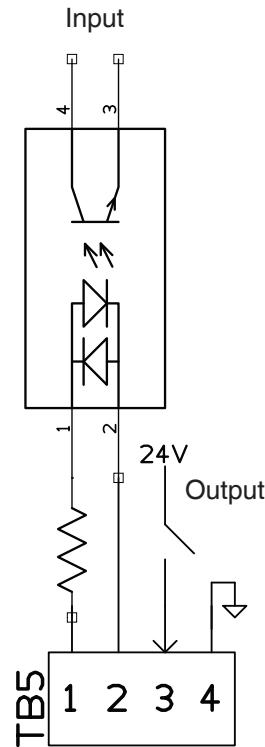
NOTES:

- Requires the Encoder license. Part number 1132400
- Use wire gauge 0.25 mm² (24 AWG) - 1.5 mm² (16 AWG).
- Minimum temperature rating of wire 75C
- Wire conductor: Copper
- Minimum voltage rating: 300V

Connecting Standard Digital Input and Output

Refer to Figure 2.2, call out 12 (TB5)

Wire the 4 pin connector as follows:



NOTES:

- By default, there is only one digital input, with a default assignment of **Remote Enable** and one digital output, with a default assignment of **Ready**.
- Purchase the I/O Expansion kit, part number 1132446 to add an additional 8 inputs and additional outputs.
- Use wire gauge 0.25 mm² (24 AWG) - 2.5 mm² (14 AWG)
- Minimum temperature rating of wire 75C
- Wire conductor: Copper
- Minimum voltage rating: 300V

Accessing the User Interface

The following details how you can access the Spectra Link pattern controller graphical user interface.

Accessing the User Interface from...	Refer to ..
External HMI - part number 1129200	Connecting the External Display
Direct Ethernet Connection	Connecting from your PC
WiFi	
PLC	Networking

Connecting the External Display

Refer to Figure 2-2, call out 2 or 3

1. Connect power to TB10 (call out 2)
2. Connect the Ethernet cable from the display to X16 (call out 15)
3. Mount the display. You can purchase the Din Rail kit, P/N1132309 or mount to a user supplied stand.

Connecting from your PC

Refer to Figure 2-2

There are two options:

Option #1 - Purchasing (if permitted by your country) the WiFi kit, part number 1129986.

- Install the WiFi module to X7 (call out 18)
- Navigate to **System Settings | Networking | WiFi** and enable both the **SSID broadcast On** and **WiFi On**. The default broadcast name is *myNordsonAP*. The default password is *Nordson321*
- From your computer, phone or tablet, enter the following IP number: 192.168.243.1 from a browser (Chrome is recommended).

Option #2 - Direct Ethernet connection from Spectra Link to your PC.

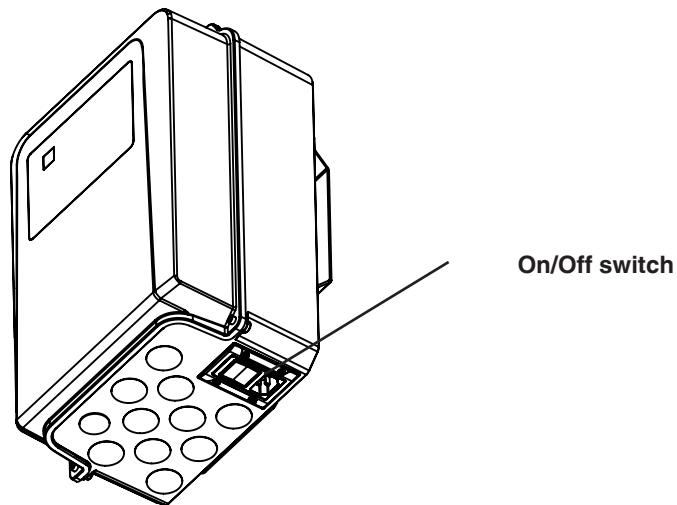
- Connect an Ethernet cable from your PC to the Spectra Link main board X16 (call out 15)
- Enter the following IP number: 192.168.223.1 from a browser (Chrome is recommended).

Starting the Spectra Link Pattern Controller

Before Starting the Spectra Link

- All fasteners must properly tightened and secured.
- Nordson provides the VESA mount adapter, which utilizes threadlocker with mounting fasteners.
- VESA mount and clips need to support weight at least 3.18 kg (28 lbs)
- You are responsible for strain relief of cables entering our unit. Refer to **Routing Wires through the Strain Relief** for detailed instructions.

Refer to the figure below for the location of the On/Off switch.



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Section 3

Commissioning

Commissioning Spectra Link



WARNING! Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



WARNING! Do not use equipment with an open or missing enclosure. All openings require a fitting or plug.



WARNING! For installation of this equipment, the safety of any system incorporating the equipment is the responsibility of the assembler of the system. Customer is responsible for providing the main disconnect switch or circuit breaker per their local electric code. This unit needs to be located near the parent machine's switch or circuit breaker, so it can be easily accessible.

In this Section

This section details the following:

- Theory of Operation
- What you need to Know Before Starting the Commissioning Wizard
- Getting Started - Commissioning
- Migrating from Spectra 30
- Cloning Multiple Spectra Link Pattern Controllers
- Migrating from EPC15/30 or LogiComm

Theory of Operation

The following describes the general theory of the Spectra Link Pattern Controller.

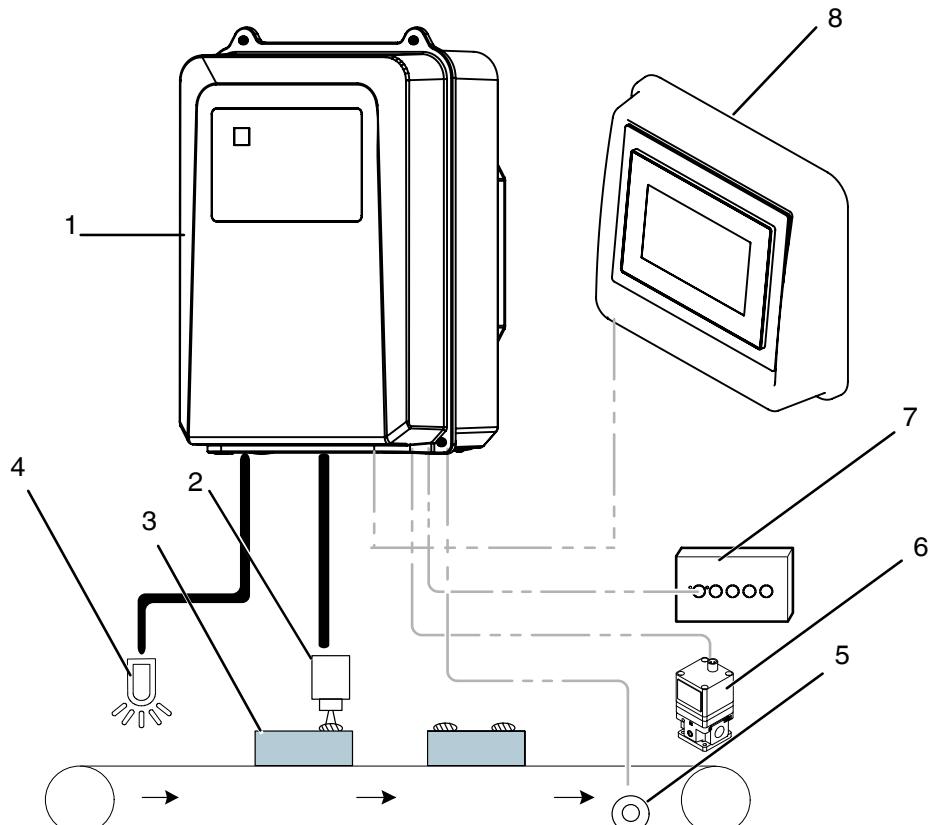


Figure 3-1: General Theory of Operation

Item	Description
1	Spectra Link Pattern Controller <ul style="list-style-type: none"> • Time or optional distance mode is selected and defined. • Trigger settings are defined. • Triggers are assigned to applicators. • A bead pattern is defined.
2	Applicator
3	Product
4	Trigger
5	Encoder Used for Distance/Runup mode. (Optional)
6	Pressure runup transducer. (Optional)
7	PLC interface. (Optional)
8	External Display (Optional)

About Centralized Monitor and Control of Multi-Functional Equipment

BBconn System Network Integration allows you to monitor and control any combination of up to four Spectra Link pattern controllers or ProBlue Flex melters from a single display. This integration allows the production line to operate as a more integrated and efficient system.

Refer to <https://nordson.info/Spectralink>- section **BBconn System Network Integration** manual for setup and configuration information.

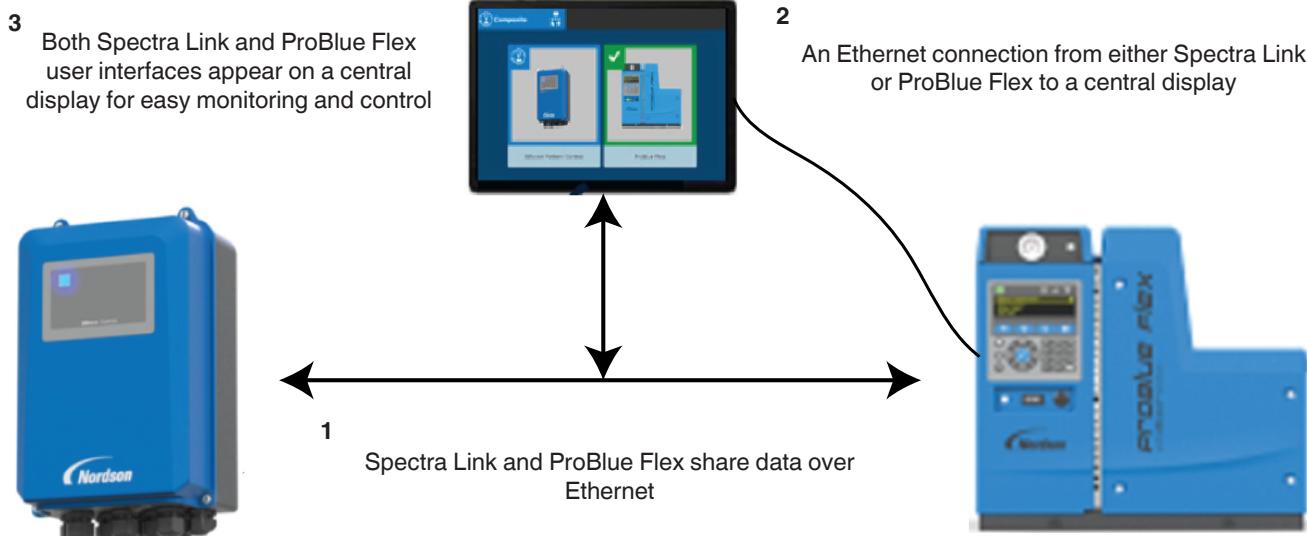


Figure 3-2: Theory of BBconn System Integration

BBconn System Integration	Description
Adhesive On Logic	<p>Production automatically starts when:</p> <ul style="list-style-type: none"> • BBconn System Integration is enabled • The Adhesive On Melter Run is enabled • The ProBlue Flex system status is RUN • All Spectra Link requirements to achieve Adhesive On state has been met
Enhanced Auto-Setback Functionality	<p>Production automatically enters Setback when:</p> <ul style="list-style-type: none"> • BBconn System Integration is enabled • Pattern Controller has been selected as the Automatic System Setback Source • The ProBlue Flex System Setback Delay time has been met.

What you need to Know Before Starting the Commissioning Wizard

Although most Commissioning Wizard steps are straight forward, some components may require some additional information before starting the commissioning Wizard. The following table details some important information you should know before starting the Commissioning Wizard.

Item	Description
Trigger Polarity	Which product detection method (light-on or dark-on) you want to use to start/stop dispensing adhesive events.
Will you be using an encoder? This defines the operation mode.	If your production line makes use of an encoder, it is assumed the Encoder License was ordered and installed at the factory by Nordson prior to shipping. If not, you can order and install the Encoder License yourself, any time after commissioning Spectra Link - P/N 1132546. If you have an encoder wired and detected by Spectra Link, but you do not have the Encoder License installed, the only available Operation mode is Time-based.
If you have an encoder and encoder license	<ul style="list-style-type: none"> • You will need to know the Encoder Type: Single or Quad phase • When scaling, verify the line is running in a forward direction.
Scaling Method	<ul style="list-style-type: none"> • If you have an encoder and encoder license, the default operation mode is Distance. • If you do not have an encoder license, the default is Time-based. However, you can make use of the Scaled-Time-based operation mode. Refer to About Operation Modes for more information.
Installed applicator type	Knowing the actual applicator type allows Spectra Link to optimize output performance.
Do you need more than one Input and Output?	By default, Spectra Link includes 1 input and 1 output. With the purchase of the Legacy IO kit (P/N 1132446) you can expand the number of inputs to a total of 9 and the number of outputs to a total of 3.

NOTES

- After commissioning, you can make any changes by running the Commissioning Wizard again, or navigating to the appropriate part of the user interface.
- Refer **Installing the Encoder License** for more information.

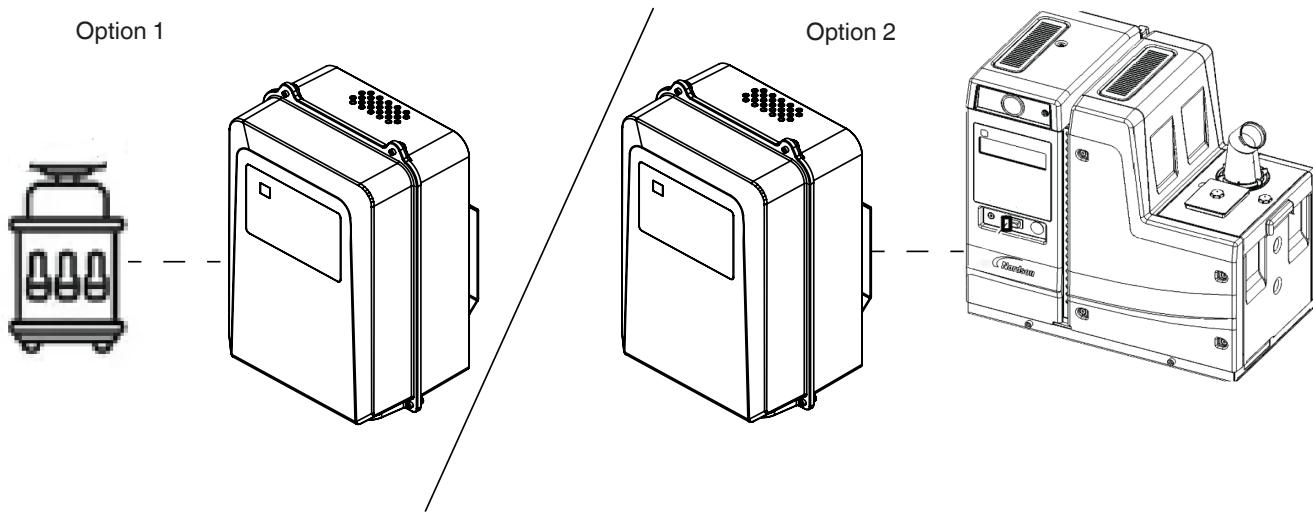
About Operation Modes and Scaling

The following table details the operation mode and scaling options based on whether or not you have an encoder and Encoder License installed.

Encoder Installed?	Encoder License installed?	Operation Mode	Description
No	No	Time (Default) (Pure-Time)	<p>Dispenses adhesive bead patterns based on the line running at a known constant speed, and:</p> <ul style="list-style-type: none"> How long in milliseconds (ms) it takes for the product to pass from the centerline of the trigger to the centerline of an applicator (GTO) How long in milliseconds (ms) it takes for Spectra Link Pattern Controller to dispense the adhesive bead pattern you created on a product. <p>NOTE:</p> <ul style="list-style-type: none"> There is no scaling required. Dispensing of adhesive patterns is only based on time.
No	No	Time Scaled Time	<p>Similar to Time mode, but scaled like Distance. Creating a scale based on either the product length or the known constant production speed of the line, thereby allowing you to program the Spectra Link Pattern Controller in distance (mm or inches) even though you do not have an encoder.</p> <p>NOTES:</p> <ul style="list-style-type: none"> An encoder is not installed. You must know the constant production speed of the line: <ul style="list-style-type: none"> Use a hand tachometer. Refer to the documentation that came with the conveyor to find the constant production speed of the line.
Yes	Yes	Distance (Default)	<p>Dispenses adhesive bead patterns based on the line running at a constant or variable speed, and:</p> <ul style="list-style-type: none"> The distance in millimeters (mm) or inches a product has to travel to pass from the centerline of the trigger to the centerline of an applicator (GTO) The distance in millimeters (mm) or inches it takes for Spectra Link Pattern Controller to dispense the adhesive bead pattern you created on a product. <p>NOTES:</p> <ul style="list-style-type: none"> When scaling, the line speed must be constant. The Spectra Link Controller can automatically adjust system pressure if: <ul style="list-style-type: none"> You have an external pressure transducer. Setup and define the Spectra Link Runup settings thereby maintaining the accurate dispensing of adhesive output based on the speed of the line.

About Pressure Management and Runup

There are 2 options to convert an encoder signal to an analog (0-10V or 4-20mA) signal to make use of the runup option:



Option 1	Option 2
<p>Spectra Link:</p> <ul style="list-style-type: none"> • You must have an encoder, an encoder license and an external pressure transducer • Spectra Link must be running the latest software. https://emanuals.nordson.com/adhesives/software/Spectralink.html • Wire an external pressure transducer to Spectra Link (TB3). Refer to Connecting Runup Output for more information. Take note if you are using 0-10V or 4-20 mA. You will need to know this information when wiring the external transducer. • Define your 2-point runup curve. Refer to About Runup for more information. 	<p>Spectra Link:</p> <ul style="list-style-type: none"> • Must have an encoder and encoder license. • Spectra Link must be running the latest software. https://emanuals.nordson.com/adhesives/software/Spectralink.html • Wire from Spectra Link runup, either 1 or 2 (TB3). Refer to Connecting Runup Output for more information. Take note if you are using 0-10V or 4-20 mA. You will need to know this information when wiring the ProBlue Flex, ATS board (TB5) • (Optional) Define your 2-point runup curve. Refer to About Runup for more information. <p>ProBlue Flex</p> <ul style="list-style-type: none"> • Must have the P4 pressure option installed. The P4 pressure option includes the ATS board. • <i>ProBlue Flex must be running the latest software. https://emanuals.nordson.com/adhesives/software/pbflex.html</i> <p>Spectra Link and ProBlue Flex</p> <p>0-10V</p> <ul style="list-style-type: none"> • Spectra Link TB3 terminal 2 (runup 1) or terminal 6 (runup 2) to ProBlue Flex ATS terminal 2 SIG (TB4 for ATS P/N 1127173 or TB5 for ATS P/N 1129737). • Spectra Link TB3 terminal 4 (runup 1) or terminal 8 (runup 2) to ProBlue Flex ATS terminal 3 COM (TB4 for ATS P/N 1127173 or TB5 for ATS P/N 1129737). <p>4-20mA</p> <ul style="list-style-type: none"> • Spectra Link TB3 terminal 3 (runup 1) or terminal 7 (runup 2) to ProBlue Flex ATS terminal 2 SIG (TB4 for ATS P/N 1127173 or TB5 for ATS P/N 1129737). • Spectra Link TB3 terminal 4 (runup 1) or terminal 8 (runup 2) to ProBlue Flex ATS terminal 3 COM (TB4 for ATS P/N 1127173 or TB5 for ATS P/N 1129737). • Go to Home System Settings Preferences and update the Line Speed Source (0-10V or 4-20mA). • Define your 2 or 3-point runup curve. Refer to the ProBlue Flex documentation more information.

Getting Started - Commissioning

Commissioning is the process of defining basic operation, preference and machine settings.

NOTES:

- You must have already completed wiring the Spectra Link Pattern controller, including Input/Output and at least one Applicator. Triggers and encoders are optional .
- Setup and configuration of virtual triggers and encoders is done after completing the Commissioning Wizard. Refer to **Virtual Triggers and Encoders - Theory of Operation** for more information.

Commissioning the Spectra Link Pattern Controller

Upon first starting the Spectra Link Pattern Controller the Commissioning Wizard automatically starts. If the **Home** screen appears, instead of the Commissioning Wizard, you can restart the Commissioning Wizard by navigating from the **Home** | **System Settings** | **Preferences** and touch the **Commissioning Wizard** button.

1. Language selection.

Do the following to continue:

Load Setting Option	Description
-> Start Wizard	Screen-by-screen for the basic settings. When done, you can verify your selections from the Summary screen.
Load Settings from USB	Use this option if you already have a .NOR file from Spectra 30 or another Spectra Link unit. When done, the Home screen appears. Touch  Menu then touch System Summary to review all system settings.

2. Date and Time Settings.

- Select which Date and Time format you want to use.
- Enter the current date and time.

NOTE

- You must manually change the system time to accommodate time changes specific for your location.

3. Trigger Settings.

Item	Description
Installed	<p>Touch to place a check mark next to a trigger channel (number) that you want to be available in the user interface when associating an applicator to a trigger to dispense a bead pattern.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • It is not necessary for the system to Detect a trigger for you to select it as Installed. • A trigger that is Detected is automatically Installed. • It is expected that you have already wired the trigger to the main PCA board previous to starting Spectra Link. However, you can connect a trigger at any time after the initial commissioning. Refer to Connecting Triggers for more information.
Detected	<p>Indicates the trigger is wired and sufficient current is available to make a detectable connection.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • You may not see the Detected check mark if the trigger is controlled with a PLC, or due to insufficient power to detect that trigger. Although a trigger may not be detected, you can still mark it as installed (check mark), thereby making it available in the user interface for you to use.
Polarity	<p>Decide which product detection method to start/stop dispensing adhesive events.</p> <p>Light On - Trigger signal activated when leading edge detected.</p> <p>Dark On - Trigger signal deactivated when leading edge detected.</p>

NOTES

- If you did not wire/install any triggers, then Spectra Link assumes you want to make use of virtual triggers, which you must setup and define after completing the **Commissioning Wizard**. The only available bead type is **Continuousness**, without *Knife Cut* settings. However, you must purchase the **Advanced Pattern License**. Refer to **Installing an Encoder or Pattern License** for more information.
- At least one trigger must be installed when scaling the system. You can scale by speed or manual.
- You can update trigger settings at any time after commissioning. Refer to chapter **Fine-Tuning the Operation Mode, Applicators, Triggers and Runup** for more information.

Task	Location in the User Interface
Polarity	
Masking	<p>#</p> <ul style="list-style-type: none"> • Home, touch  (trigger) icon • Home System Settings Trigger / select a trigger number • Home System Settings Component Configuration / Triggers / select a trigger number, then touch Configure
<ul style="list-style-type: none"> • Trigger Memory • Trigger Filter • GTO Mode 	Home System Settings Machine Settings
Master Trigger Switch On/Off	<ul style="list-style-type: none"> • Home System Settings Component Configuration / Triggers / select a trigger number

4. **Encoder Settings.** Refer to **About Operation Modes and Scaling** for more information.

Do the following to continue:

If ...	Then do the following:
you have an encoder, but not the Encoder License installed	
you have neither an encoder nor the Encoder License installed	Touch the -> button to continue. The default operation mode is (pure) time-based.
you have an encoder, and the Encoder License installed	<p>Touch the Test button. Run the encoder in a forward direction, then touch OK to continue with the encoder test evaluation. The Test runs for 15 seconds. When done, the following information is displayed:</p> <p>Short Detected: Yes or No</p> <p>Power Detected: Yes or No. (If No, the encoder is powered externally, or an external device is generating the encoder signal, such from a PLC.)</p> <p>Pulses Detected: Yes or No</p> <p>Invalid Signal: Yes or No</p> <p>Type : Quad Phase or Single Phase</p> <p>Reverse: Disabled or Enabled</p> <ul style="list-style-type: none"> Touch the -> to continue. <p>NOTES:</p> <ul style="list-style-type: none"> The Test automatically selects the Type of encoder. The Reverse toggle is only available for Quad encoders. If the Quad Phase encoder is running backwards, the commissioning software automatically enables the Reverse option.

The following pertains only if you have an encoder installed.

Encoder Status	Description
Installed	<p>Touch to place a check mark next to a Encoder that you want to be available in the user interface.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • If you are using the Distance operation mode, it is required for at least one encoder channel (number) to have a check mark in the Installed check box, indicating that it is available to use in the user interface. • Uninstalling or removing the check box mark for an Installed encoder, changes the operation mode from Distance to Time (pure-time). • It is not necessary for the system to Detect an encoder for you to select it as Installed. • An encoder that is Detected will automatically be Installed. • It is expected that you have already wired the encoder to the main PCA board previous to starting Spectra Link. However, you can connect an encoder at any time after the initial commissioning. Refer to Connecting Encoders for more information.
Detected	<p>Indicates the encoder is wired and sufficient current is available to make a detectable connection.</p> <p>NOTE:</p> <p>You may not see the Detected check mark if the encoder is controlled with a PLC, or due to insufficient power for the encoder. Although an encoder may not be detected, it is available for use.</p>

NOTES:

- You can setup and define a virtual encoder after completing the Commissioning Wizard. Refer to **Virtual Triggers and Encoders - Theory of Operation** for more information.
- You can update encoder settings at any time after commissioning. Refer to chapter **Fine-Tuning the Operation Mode, Applicators, Triggers and Runup** for more information.

Task...	Location in the User Interface
<ul style="list-style-type: none"> • Encoder Type • Reverse • Advanced Quad Phase Encoder Settings 	<ul style="list-style-type: none"> • Home System Settings Encoder • Home System Settings Component Configuration / Encoders, then touch Configure
Master Encoder Switch On/Off	<ul style="list-style-type: none"> • Home System Settings Component Configuration / Encoders

5. Applicator Settings.

Applicator Status	Description
Installed	<p>Touch to place a check mark next to a applicator channel (number) that you want to be available in the user interface when associating an applicator to a trigger or optional encoder to dispense a bead pattern. Then select the following:</p> <p>Applicator Type: If you do not know the applicator type, select the default Standard Pneumatic. You can also look on the actual applicator itself for this information. Knowing the exact applicator type improves the performance and accuracy when dispensing adhesive.</p> <p>Trigger: Select the available trigger you want to associate with the selected applicator.</p> <p>NOTES:</p> <ul style="list-style-type: none"> It is required for at least one applicator channel (number) to have a check mark in the Installed check box, indicating that it is available to use in the user interface. It is not necessary for the system to Detect an applicator for you to select it as Installed. An applicator that is Detected is automatically Installed. It is expected that you have already wired the trigger to the main PCA board previous to starting Spectra Link. However, you can connect a trigger at any time after the initial commissioning. Refer to Connecting Triggers for more information.
Applicator Type	Select the applicator type from the drop-down list. Spectra Link Pattern Controller uses this information to optimize dispensing performance and accuracy.
Encoder	(Optional) Select which installed AND enabled encoder you want to associate with an applicator.

NOTES

- You can update applicator settings at any time after commissioning. Refer to chapter **Fine-Tuning the Operation Mode, Applicators, Triggers and Runup** for more information.

Task	Location in the User Interface
<ul style="list-style-type: none"> Enable/Disable Trigger assignment Applicator Trigger Offset, (GTO) Encoder assignment (See Note) Runup Zone (See Note) Applicator Type (applicator) Compensation enable/disable and settings 	<ul style="list-style-type: none"> • Home, touch  (applicator) icon • Home System Settings Applicator / <i>select an applicator number</i> • Home System Settings Component Configuration / Applicators / <i>select an applicator number, then touch Configure</i>
Master Applicator Switch On/Off	<ul style="list-style-type: none"> • Home System Settings Component Configuration / Applicators / <i>select an applicator number</i>

NOTE

- The Encoder (assignment) and Runup Zone options are only available if you have an encoder and the Encoder License installed.

6. Scale and Units.

Touch which system units you want to use for scaling and bead pattern creation.

- If your Operation mode is Time (pure time), then touch **->** to continue
- If your Operation mode is Distance or Time (Scaled Time) then touch either **mm** or **inch**.

The following table items are available if you selected **mm** or **inch** as your **System Units**. Select your method for scaling you want to use, then touch **Scale** to continue and enter or select the requested information.

NOTE

- If you have a Quad Phase encoder and if the Product Length or Line Speed scaling fails, touch the Commissioning Wizard back button and toggle the **Reverse** option.

Scaling Method	Description
Product Length	<ul style="list-style-type: none"> • For scaling purposes only, make sure the product does not have any cutouts, as each cutout will be interpreted as new leading/trailing/edges. Cover the product with one continuous sheet of paper. • Select the Scaling Trigger number from the drop-down menu that will be used to detect the product. • Enter the length of the product, from leading to trailing edge. • Enter the number of products you want to use for scaling purposes. The default is 3 products. Typically a greater number increases the scaling accuracy. <p>Start the line, then touch Start Scaling. When done, a popup message appears displaying the pulses per selected unit of measure. Touch OK to continue.</p>
Line Speed	<ul style="list-style-type: none"> • Make sure the production line is running at a constant speed. • The Line Speed Scaling screen displays the Current Line Speed, but it is strongly recommended use a hand tachometer to accurately measure the speed of the line. You can also refer to the documentation that came with the conveyor line. • Input Estimated Line Speed - Enter the measured or documented constant line speed. <p>Touch Start Scaling. When done, a popup message appears displaying the pulses per selected unit of measure. Touch OK to continue.</p>
Manual	<ul style="list-style-type: none"> • Enter the known scaling pulses per unit of measure. You may find this in the documentation that came with the encoder, or it may be on the encoder itself.

7. Machine Settings.

Item	Description
Recipe	Decide if you want to make use of more than one set of pattern settings. For example, you can have a set of settings and patterns for large rectangle boxes, and another recipe for small square boxes. This is also required if you want to make use of the Remote Input Recipe feature. The optional Legacy Input/Output board is also required, part number 1132446. Refer to Managing Recipes and About Remote Recipe Inputs for more information.
Auto Start Adhesive Power Up	Decide if you want to automatically start dispensing adhesive when all system and hardware conditions are met for RUN production. This eliminates the need for you manually touch the Adhesive On button from the Spectra Link Home page.
Adhesive Start Speed	Enter the production line speed you want the Spectra Link Pattern Controller to <i>start</i> dispensing the adhesive bead pattern. NOTE: Requires Encoder License.
Adhesive Stop Speed	Enter the production line speed you want the Spectra Link Pattern Controller to <i>stop</i> dispensing the adhesive bead pattern. NOTE: Requires Encoder License.
Palletize	Decide if you want the to palletize or stack a large number of products, typically of the same size on pallets for secure storage or transportation.
Trigger Memory	<ul style="list-style-type: none"> • If enabled: (the default) <ul style="list-style-type: none"> • For Distance Mode Operation: When an Adhesive Stop Speed condition exists, then upon returning to above the Adhesive Start Speed setting, the adhesive bead pattern is dispensed to products between the trigger and the applicators, including products underneath the applicator. • For Time/Time (Scaled Time): When a condition forces the system to exit a Run state, upon returning to a Run state, the adhesive bead pattern is dispensed to products between the trigger and the applicators, including products underneath the applicator. • If disabled: <ul style="list-style-type: none"> • For Distance Mode Operation: When an Adhesive Stop Speed condition exists, then upon returning to above the Adhesive Start Speed setting, the adhesive bead pattern is NOT dispensed to products between the trigger and the applicators. • For Time/Time (Scaled Time): When a condition forces the system to exit a Run state, upon returning to a Run state, the adhesive bead pattern NOT dispensed to products between the trigger and the applicators.

8. Input and Output Settings

By default, there is only one Input, with a default assignment of *Remote Enable* and one Output, by default *Ready*.

NOTES:

- You can purchase the optional Legacy I/O board (kit P/N 1132446) which provides an additional eight inputs and an additional two outputs.
- The Legacy I/O board is required if you want to make use of the Remote Recipe feature.

9. Name this unit

Enter an easily identifiable name for this unit.

10. Review and Finish

Review the settings. You can touch <- button to go back and make changes. If you are satisfied with the settings, touch **FINISH**.

NOTES

- You can restart the Commissioning Wizard at any time by navigating from the **Home screen** | **System Settings** | **Preferences** and touching the **Commissioning Wizard** button.
- Refer to the chapter **Fine-Tuning the Operation Mode, Applicators, Triggers and Runup** for more information.

Migrating from Spectra 30

It is strongly recommended that you upgrade your Spectra 30 software to the latest version before creating a backup.

You can download the latest version of Spectra 30 by logging into your BBconn account, or from <https://emanuals.nordson.com/adhesives/software/Spectralink.html>

1. From the Spectra 30 unit, create a backup file and save it to a FAT32 formatted USB drive. Refer to the Spectra 30 manual, P/N 1124631 for more information about upgrading software and creating a backup.
2. Shut down the Spectra Link pattern controller, then tag and lockout the main power to the unit.
 - Remove the cover using a 3mm hex driver and insert a FAT32 formatted USB with the Spectra 30 backup (.NOR) file.
3. Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On and do the following:

Upon First Time Starting the Spectra Link Pattern Controller (Commissioning Wizard)	Using the Restore Method
<ul style="list-style-type: none"> • The Wizard automatically starts. Touch the language you want to use. Touch -> to continue. • Touch Load Settings from USB. By default, the most recent backup file is selected. 	<ul style="list-style-type: none"> • Navigate from Home Tools Backup/Restore/Reset • Touch Restore. You can ignore the Networking option as there are no networking setting from Spectra 30 that are relevant for Spectra Link Pattern Controller. • Touch Continue.

4. Touch **OK**. When done, the system automatically reboots itself.

NOTES

- Touch **☰ Menu** then touch **System Summary** to review all system settings.
- When done, the **Home** page appears, along with a popup message indicating **Restore Complete**.

Cloning Multiple Spectra Link Pattern Controllers

Use the **Restore** feature to clone multiple Spectra Link controllers.

All Spectra Link controllers must be on the same or latest software version. You can download the latest version of the Spectra Link Pattern Controller from <https://emanuals.nordson.com/adhesives/software/SpectraLink.html>

1. From the *source* Spectra Link Pattern Controller, define and configure the settings and recipes you want to use and clone to other Spectra Link Pattern Controllers.
2. Do the following to continue:
 - If you have the optional USB kit (P/N 1132549) then insert a FAT32 formatted USB drive. Proceed to step 4.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the cover using a 3mm hex driver and insert a FAT32 formatted USB. Refer to Figure 2-2, callout number 21 (X6) When done, replace the cover.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.
3. Do the following to perform a backup. The backup creates a .NOR file containing all the settings and optional recipes that you want to use on the target Spectra Link Pattern Controllers.
 - Navigate from **HOME | Tools | and touch Backup/Restore/Reset.**
 - Touch **Backup**.
 - Decide if you want to include all networking settings from the source Spectra Link Pattern Controller.
 - Touch **Continue**. A .NOR file is created and placed in a BACKUP folder on the USB drive. The BACKUP folder is automatically created if one does not exist. The file name is SPECTRALINK_[yyyy-mm-dd_24hr time, including seconds] For example SPECTRALINK_2024-03-20_180529.NOR
4. Do the following to continue:
 - If you have the optional USB kit (P/N 1132549) then remove the USB drive. Proceed to step 5.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the USB drive. Replace the cover using a 3mm hex driver.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller.
5. Go to the target Spectra Link Pattern Controller that you want to clone. Repeat step 2.

6. Do the following to continue:

Upon First Time Starting the Spectra Link Pattern Controller (Commissioning Wizard)	If you have already completed the Commissioning Wizard
<ul style="list-style-type: none"> The Wizard automatically starts. Touch the language you want to use. Touch -> to continue. Touch Load Settings from USB. By default, the most recent backup file is selected. 	<ul style="list-style-type: none"> Navigate from Home Tools Backup/Restore/Reset Touch Restore. You can ignore the Networking option as there are no networking setting from spectra30 that are relevant for Spectra Link Pattern Controller. Touch Continue.

7. Do the following to continue:

- If you have the optional USB kit (P/N 1132549) then remove the USB drive.
- If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the USB drive. Replace the cover using a 3mm hex driver.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller.

NOTES

- Touch **☰ Menu** then touch **System Summary** to review all system settings.
- When done, the **Home** page appears, along with a popup message indicating **Restore Complete**.

Migrating from EPC15/30 or LogiComm

You must write down the settings from your EPC15/30 or LogiComm unit and using the Spectra Link Pattern Controller Commissioning Wizard input those settings. Refer to **Commissioning a Pattern Controller** for more information.

Some required or available settings in Spectra Link Pattern Controller may be called something else or may not have been available in previous Nordson pattern controllers.

You will need the following information:

Item	Required Information
Basic Settings	<ul style="list-style-type: none"> Time and date format
Applicator	<ul style="list-style-type: none"> Applicator Type Channel or port number Trigger number association
Trigger	<ul style="list-style-type: none"> Polarity
Encoder (optional, and requires the Encoder license)	<ul style="list-style-type: none"> Single or Quad phase Direction of the line/encoder
Scaling	<ul style="list-style-type: none"> System unit (ms, mm or inches) Scaling based on Line speed or manual
Machine Settings	<ul style="list-style-type: none"> Recipes (option) Auto Start Adhesive Power Up Adhesive Start and Stop Speed
Input/Output	<ul style="list-style-type: none"> Input and output number and assignments Invert Input or Output number assignments

What to do Next

The following chapters detail what you need to start producing adhesive patterns.

- Fine-tune applicator settings
- Fine-tune trigger settings
- Define which pattern type you want to use
- Fine-tune the bead pattern to best suit your production needs
- Change which Operation Mode (Time, Distance, Scaled Time) you want to use
- Perform a test production run
- (Optional) Save to a recipe.

Section 4

About the User Interface

In this Section

This section details the following:

- About the Home Screen
- System Status and Applicator Sub System State
- Sub System State
- Applicator and Trigger State and Status
- Trigger State and Status
- About Real-Time Output
- Setting Up, Viewing and Resetting Real-Time Output Counters
- Using the Navigation Bar

About the Home Screen

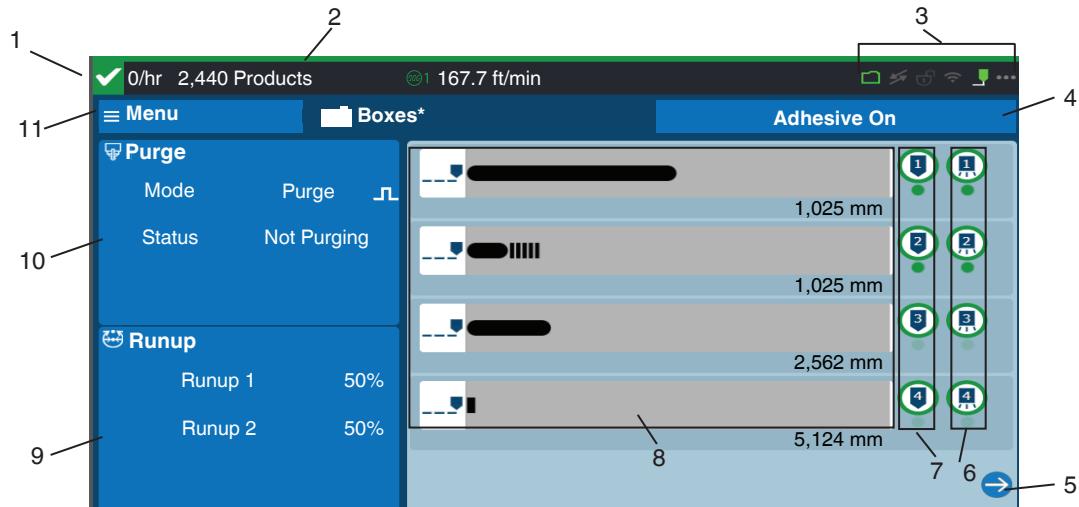


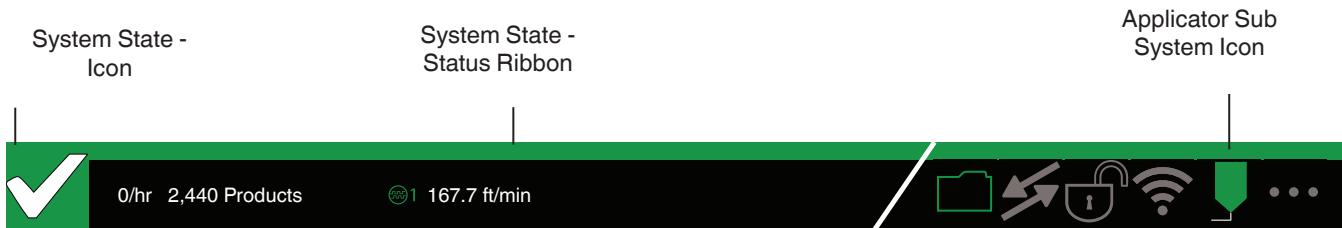
Figure 4-1: The Home Screen

The following sections detail each Home screen item in more detail.

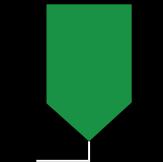
Item	Description	Refer to...
1	System status	System Status and Applicator Sub System State
2	Real-time output and optional encoder speed. Touch \ominus (item 5) to view output counters from all applicators, as well as to select which applicator output you want to display.	Setting Up, Viewing and Resetting Real-Time Output Counters
3	Sub system status	System Status and Applicator Sub System State
4	Master Adhesive On/Off control	---
5	View second Home Page view - Applicator/Trigger real-time output counter.	---
6	Trigger status. Touch to configure.	Fine-Tuning the Operation Mode, Applicators, Triggers and Runup
7	Applicator status. Touch to configure.	Fine-Tuning the Operation Mode, Applicators, Triggers and Runup
8	Selected pattern associated with the applicator. Touch to configure.	<ul style="list-style-type: none"> Managing Patterns Customizing the Home Screen
9	(Optional Runup Tile) Real-time information. Touch to configure. Requires license.	<ul style="list-style-type: none"> About Runup Customizing the Home Screen
10	Purge Tile. View current purging status. Touch for purge options.	Purging
11	Menu drop-down. Use this for navigating between Home , Recipes , Event Log , Active Alarms , Run Time Settings , Purge , Tools and System Summary	---

System Status and Applicator Sub System State

The following details the relationship between the **System State** and the **Applicator Sub System icon**.



System State			Applicator Sub System Icon		
System State Icon	System State - Status Ribbon Color	Flash?	Applicator Sub System Icon	Applicator Sub System Icon Color	Applicator Dispensing?
	Run - Green	No		Green	An applicator is ready to dispense.
	Idle - Blue	No		Gray	No. Master Adhesive control is Off
	Ready - Green	Yes		Green	No. Waiting for Line speed signal.
	Ready - Green	Yes		Green	No. Waiting for remote (I/O or PLC) Adhesive enable signal.
	Ready - Green	Yes		Green	No. Waiting for melter Run signal

System State			Applicator Sub System Icon		
System State Icon	System State - Status Ribbon Color	Flash?	Applicator Sub System Icon	Applicator Sub System Icon Color	Applicator Dispensing?
	 Yellow - Alert Ready	No		Green	No. Waiting for component or system issue to be resolved. Refer to Troubleshooting for more information.
	 Yellow - Alert Off	No		Gray	No. Master Adhesive control is Off. Resolve component or system issue. Refer to Troubleshooting for more information.
	 Yellow - Alert Run	No		Green	Yes, but a component or system issue is preventing proper adhesive dispensing. Refer to Troubleshooting for more information.
	 Red - Fault	No		Gray	No. A major system or component has failed. Refer to Troubleshooting for more information.
	 Red - Machine Stop	Yes		Gray	No. There is a problem detected on the line which has caused the Machine Stop output to go active. Refer to Troubleshooting for more information.

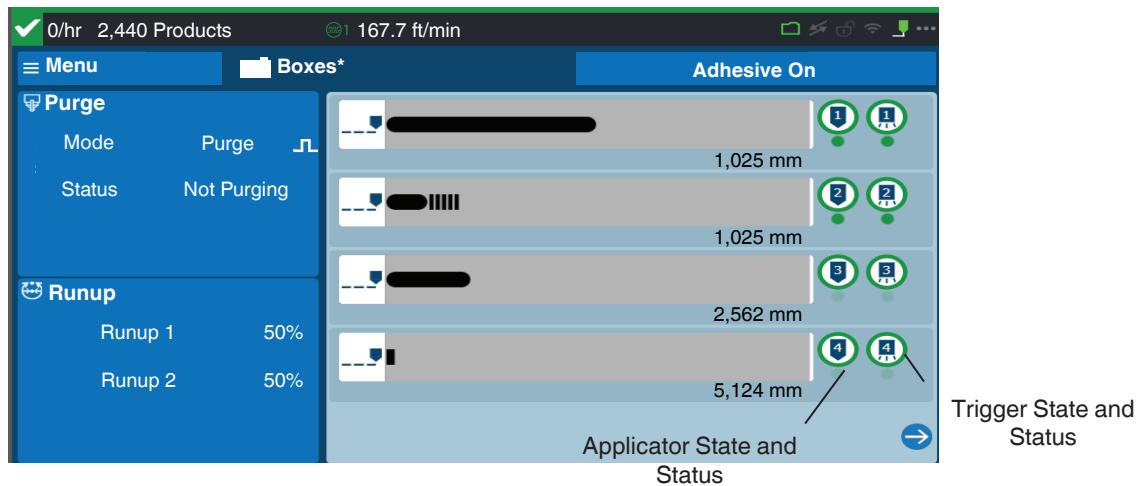
Sub System State

Refer to the **System Status and Applicator Sub System State** for more information about the Applicator sub system state and status.



Sub System Icon	Description	Sub System Icon	Description
	WiFi - On		Remote control using either I/O or PLC is enabled. Refer to Locking Out Communications for more information.
	WiFi - Off		Remote control using either I/O or PLC is disabled.
	User management is enabled. System locked. (Future release)		Recipe - On See Managing Recipes for more information.
	User management is enabled. System unlocked. (Future release)		Recipe - Off
	User management is disabled. System unlocked. (Future release)		

Applicator and Trigger State and Status



Applicator State and Status

Sub System Icon	Description	Sub System Icon	Description	Sub System Icon	Description
	Applicator [number]- Run Dispensing.		Applicator [number]- Alert/Run Dispensing, but there is an issue with this applicator. Refer to Troubleshooting for more information.		Applicator [number]- Fault Not dispensing. There is a major issue with this applicator. Refer to Troubleshooting for more information
	Applicator [number]- Ready Not dispensing, waiting for other conditions to be met.		Applicator [number]- Alert Not dispensing. There is an issue with this applicator. Refer to Troubleshooting for more information.		Applicator [number]- Off The applicator has been switch off or is not available. Refer to Troubleshooting for more information.

Trigger State and Status

Sub System Icon	Description	Sub System Icon	Description	Sub System Icon	Description
	Trigger [number] Active.		Trigger [number] Alert. Active, but there is an alert condition with this trigger. Refer to Troubleshooting for more information.		Trigger [number] Fault. Not active. A fault condition exists with this trigger. Refer to Troubleshooting for more information.
	Trigger [number] Not active.		Trigger [number] Alert. Not active. There is an issue with this trigger. Refer to Troubleshooting for more information.		

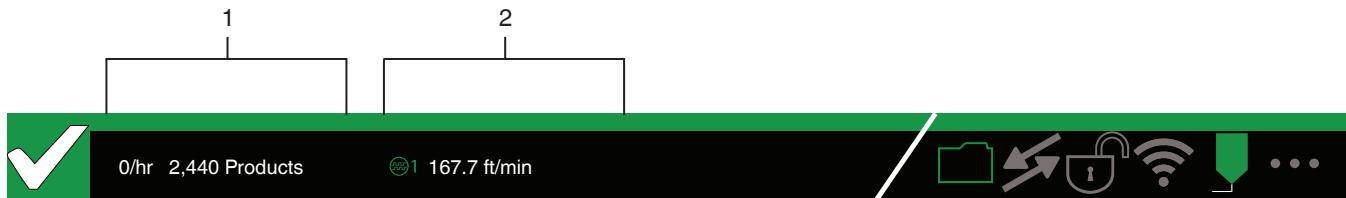
About Real-Time Output

Use the real-time section of the status bar to do the following:

- View user-defined applicator number or trigger number to view real-time production output per hour and number of products.
- View current speed for all detected encoders. (License required)

NOTE:

- Touch the  button to view output from all applicators and triggers, as well as to reset the counters.



Item	Description	Refer to...									
1	<p>Output of the selected applicator or trigger number, displayed in number of products per hour and total number of products since the last reset.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • The product count number automatically resets itself after reaching 4,294,967,295. • The hourly counter does not automatically reset itself. 	Setting Up, Viewing and Resetting Real-Time Output Counters for more information.									
2	<p>Real-time encoder speed.</p> <table border="1"> <thead> <tr> <th>Icon</th><th>Color</th><th>Description</th></tr> </thead> <tbody> <tr> <td> 1</td><td>Green</td><td>The encoder speed is at or above the Adhesive Start Speed setting.</td></tr> <tr> <td> 2</td><td>Blue</td><td>The encoder speed is at or below the Adhesive Start or Stop Speed setting.</td></tr> </tbody> </table> <p>NOTE: Viewing real-time encoder data requires user-supplied encoders and a Nordson license.</p>	Icon	Color	Description	 1	Green	The encoder speed is at or above the Adhesive Start Speed setting.	 2	Blue	The encoder speed is at or below the Adhesive Start or Stop Speed setting.	Refer to Machine Settings for more information.
Icon	Color	Description									
 1	Green	The encoder speed is at or above the Adhesive Start Speed setting.									
 2	Blue	The encoder speed is at or below the Adhesive Start or Stop Speed setting.									

Setting Up, Viewing and Resetting Real-Time Output Counters

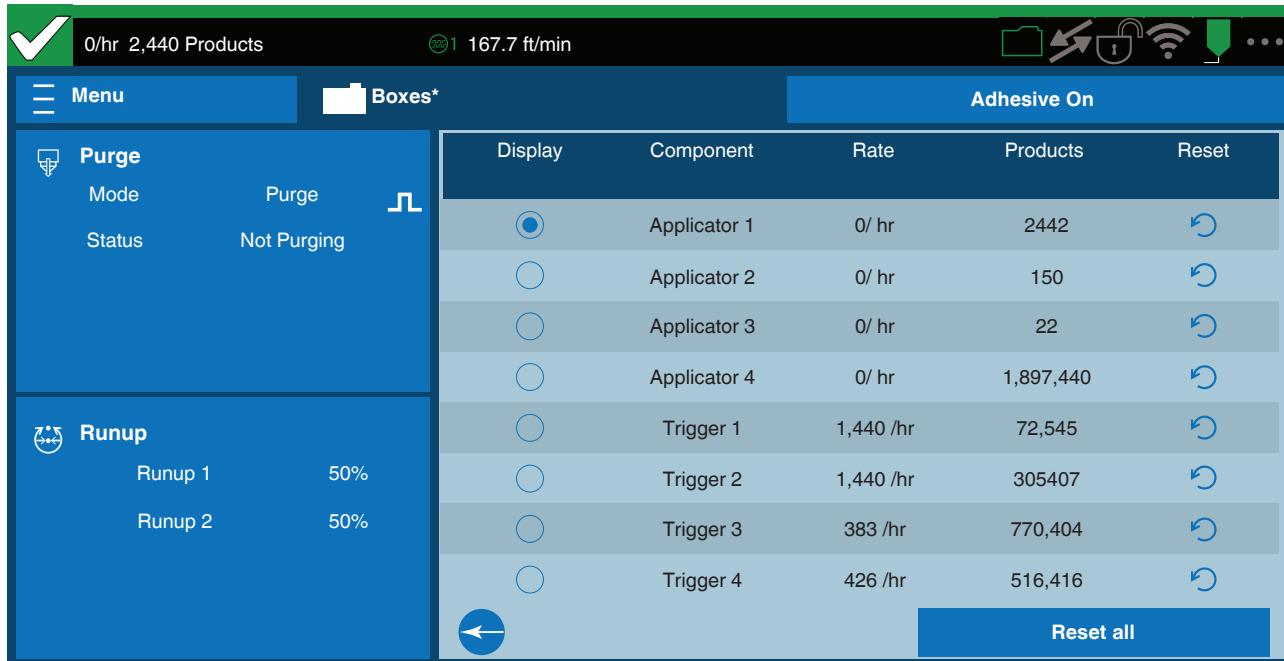


Figure 4-2: The Home Screen (Counter View)

1. From the **Home** screen, touch the \ominus button.
2. Do the following to continue:

To	Do the following
Select one Applicator or trigger you want to see real-time output from the top status bar.	Touch the \odot radio button to select the applicator or trigger number you view real-time output on the status bar.
Reset a specific applicator or trigger counter.	Touch the ⟳ next to the applicator or trigger number that you want to reset the counters.
Reset all applicator and trigger counters at the same time.	Touch the Reset All button.

NOTES:

- The product count number automatically resets itself after reaching 4,294,967,295.
- You can make the Counter view the default. Refer to **Customizing the Home Screen** for more information.

Using the Navigation Bar

The Navigation bar is available from any screen.

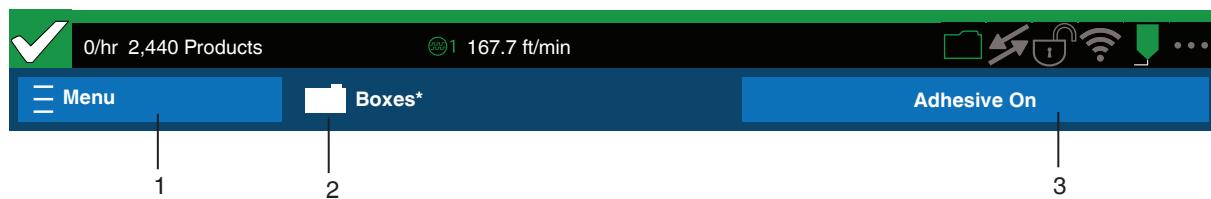


Figure 4-3: Navigation Bar from the **Home** screen

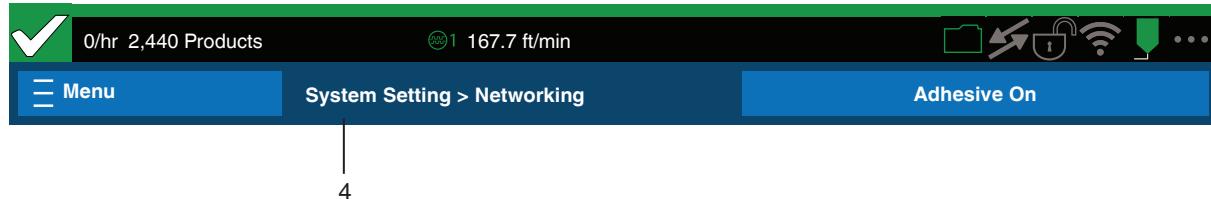


Figure 4-4: Navigation Bar from any other screen

Item	Description	Refer to for more information
1	Menu Touch to access drop-down navigation menu	About the User Interface
	Home	
	Recipes (if enabled) (System Settings Machine Settings)	
	Event Log	
	Active Alarms - displays	
	Run Time Settings	
	System Settings	
	Purge	
	Tools	
2	Displays currently loaded recipe and status (Home screen only)	About the Home Screen
3	Adhesive On / Adhesive Off toggle button.	
4	Breadcrumb navigation.	

Customizing the Home Screen

1. Touch  **Menu** then navigate to **System Settings | Preferences | Customize Home**.
2. Decide which additional two tile options you want to see on the **Home** page. Tiles allow you to quickly and easily access or monitor Spectra Link options, such as, **Purge**, **Runup**, **Palletize** and **Stop**.

NOTES:

- Refer to Figure 1-1, items 9 and 10.
- By default, the **Purge** tile is selected.
- You can only display a maximum of 3 tiles.

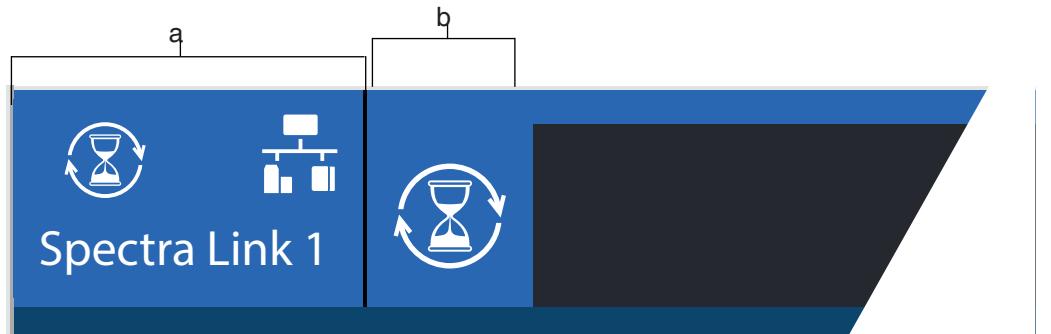
Tile Option	Refer to...
Purge (default)	Purging Options
Runup	About Runup
Palletize	Setting Up Palletization
Stop	About Machine and Feed Stop Settings

3. Touch  to select which **Home** page view you want to see. The default is the **Pattern** view (refer to Figure 1-1) Optionally, you can select the **Counter View**. Touch **Done** to return to the **Home** page.

Working with BBconn System Network

Refer to **About Centralized Monitor and Control of Multi-Functional Equipment** for more information.

When you navigate to a unit within the BBconn system Network, the top navigation bar looks like this:



Touch the BBconn System Network Status icon.

Item	Description
a	<ul style="list-style-type: none"> Displays the BBconn System Network Status. Touch this area to return to the BBconn System Network Home page.
b	<p>Displays the state of the specific unit.</p> <p>NOTE:</p> <ul style="list-style-type: none"> This area is not touchable.

Accessing the BBconn System Network Home page

There are two ways to access the BBconn System Network Home page:

1. Touch the Status button (a).
2. Touch  **Menu** then touch **BBconn System**

Locating Equipment

- Touch  **Menu** then **Find System**.
 - A popup message box appears and the status light of the equipment flashes for up to 2 minutes, or until you close the popup message.

Section 5

Managing Patterns



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

In this Section

This section details the following:

- Pattern Control Theory and Terminology
- Common Pattern Screen Controls
 - Normal Pattern
 - Dots Pattern
 - Random Length Pattern

Patterns requiring a license

- EcoBead
- AutoDot
- Continuous
- Random Length (Mirror)
- Random Length (Dots)

Pattern Control Theory and Terminology

The following explains the pattern control terminology and operation.

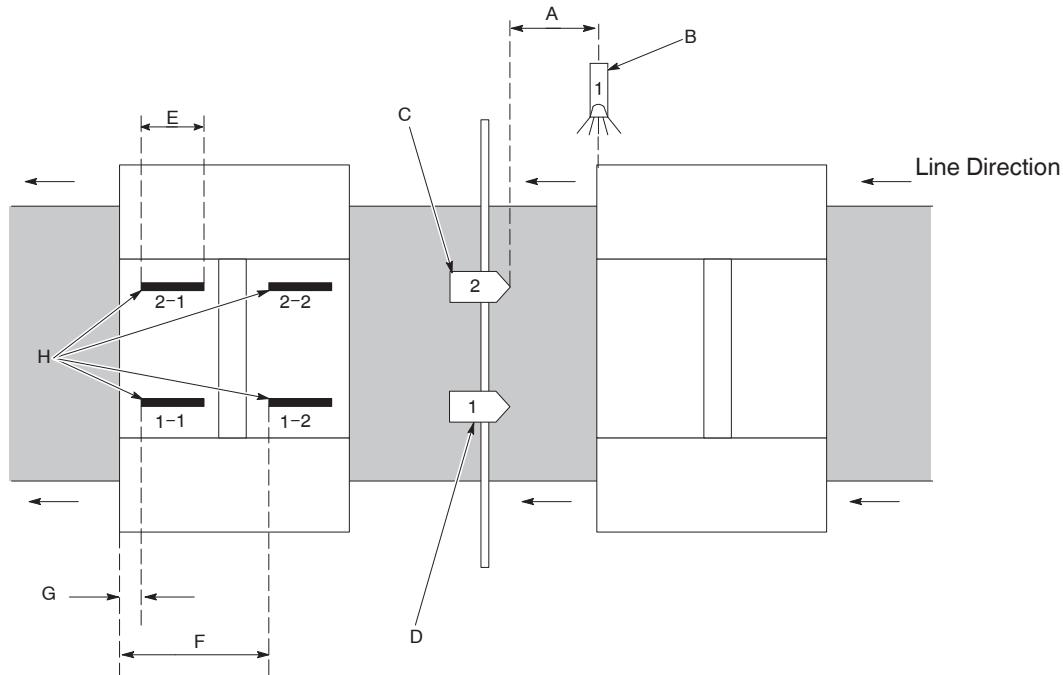


Figure 5-1: Detailed Theory of creating a pattern

Term	Figure Referenced Letter	Example	Description
<---	---	---	Direction of the line
Applicator (Gun)-to-trigger offset (GTO)	A	Distance A	The distance between the applicator and the trigger that is associated with the applicator.
Trigger	B	Trigger 1	A trigger that detects products as they move on the production line.
Applicator	C and D	Applicators 1 and 2	One or more applicators used to apply a single pattern.
Bead duration	E	Distance F	The distance from the start to the end of the bead.
Bead delay	F and G	• Distance F and G	The distance from the leading edge of the product to the start of the bead.
Pattern Set	---	All beads from applicators 1 and 2	All patterns generated by all of the applicators.
Pattern	---	• Bead 1-1 and 1-2 • Bead 2-1 and 2-2	Adhesive beads generated by an applicator.
Bead	H	• Bead 1-1 (from applicator 1) • Bead 1-2 (from applicator 1) • Bead 2-1 (from applicator 2) • Bead 2-2 (from applicator 2)	A continuous segment of adhesive or, in the case of a stitched or dot bead, a segment of adhesive that has been divided into sub-beads.

NOTES:

- You must use a unique trigger channel as well as either a physical or virtual encoder if the different line segments vary in speed.
- Product length scale must be performed with a trigger that is on the same conveyor (line segment) as the encoder being scaled.
- Product length is measured based on the trigger and encoder assigned.
- Adhesive start/stop settings are not global, rather they are defined based on the applicator's individual encoder/virtual encoder assignment.

Types of Patterns

The Spectra Link Pattern Controller supports the following patterns

- Normal Pattern
- Dots Pattern
- Random Length Pattern

Patterns requiring a license

- EcoBead
- AutoDot
- Continuous
- Random Length (Mirror)
- Random Length (Dots)

The following section details each pattern in greater detail.

NOTES:

- Refer to **Installing an Encoder or Pattern License** for more information.
- You must have decided on which mode of operation, time or distance, you want to use. Refer to **Fine-Tuning the Operation Mode, Applicators, Triggers and Runup** for more information.

Common Pattern Screen Controls

The following details the common pattern screen controls for all pattern types. Refer to the specific information for the bead type you want to use.

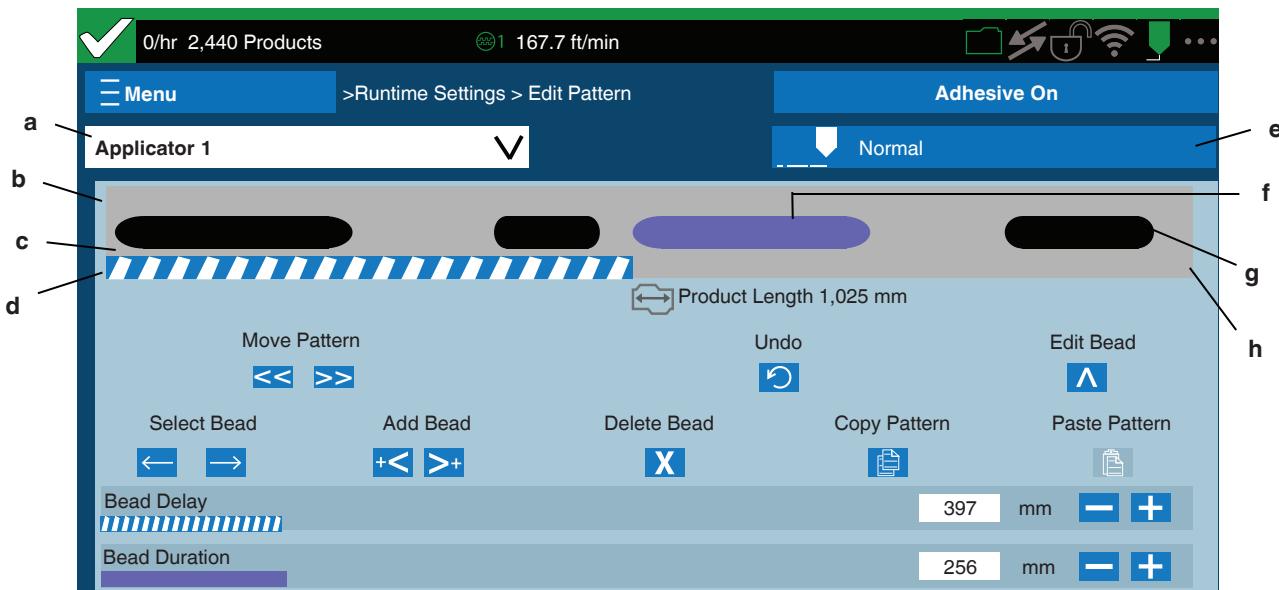


Figure 5-2: Common Pattern Screen Controls (Normal Bead Pattern displayed.)

General information about the Normal Pattern Screen

Item	Description
a	Applicator indicator and selector. Once you have selected a bead type and created a pattern, you can copy/paste the bead pattern to another applicator.
b	Front of product.
c	Adhesive area (gray background) of the product.
d	Bead delay indicator.
e	Pattern indicator and selector
f	Selected bead indicator. The selected bead changes from black to purple. You can only select one bead at a time. Select a bead to move, delete, change bead delay or duration.
g	Bead.
h	Back of product.

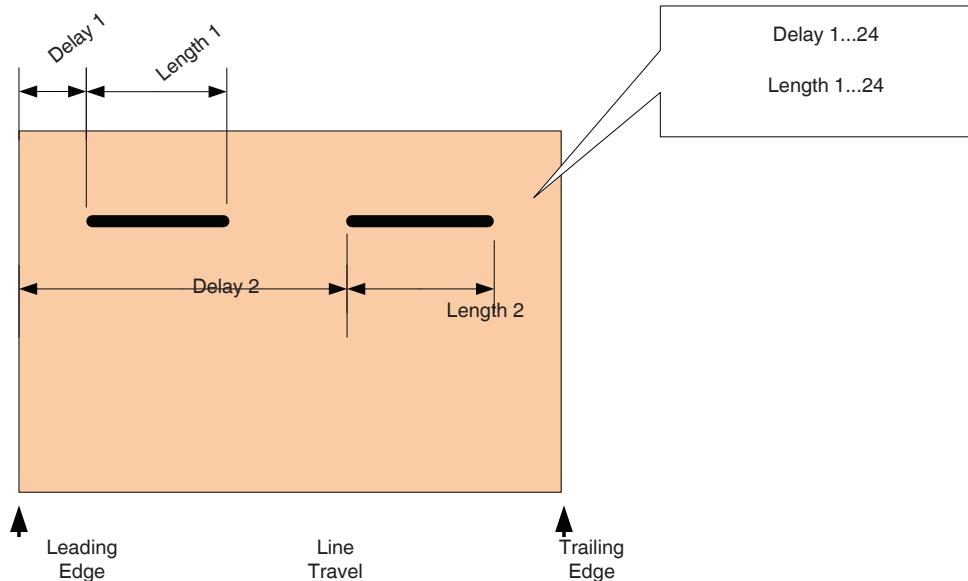
Button	Description
	Move the entire pattern forward (to the right) in 1 <i>System Unit</i> increments. The default is <i>System Unit</i> is <i>ms</i> ,
	Move the entire pattern backward (to the left) in 1 <i>System Unit</i> increments. The default is <i>System Unit</i> is <i>ms</i> ,
	Undo up to 50 previous actions to a pattern.
 Expand	Touch Expand to display options:
	<ul style="list-style-type: none"> • Add, remove and delete a bead. • Select a bead. • Copy/Paste a pattern from one applicator to another. • Edit bead properties.
	Select the next bead to the right. The bead changes color from black to purple.
	Select the previous bead to the left. The bead changes color from black to purple.
	Add a bead to the right of the selected bead.
	Add a bead to the left of the selected bead. You can add up to 25 beads.
	Delete the selected Bead. You can only delete one bead at a time.
	By default, just the bead type, pattern is copied. Refer to the note below for additional information.
	From the Applicator drop-down list, select an applicator then touch the Paste button. Refer to Copy for details.

NOTES:

- By default, only the pattern itself is copied/pasted. However, if you select the **Copy and Paste includes Applicator Settings** check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

Normal Pattern

Normal patterns (the default) are generated when the line speed is above the start speed.



Creating, Updating and Copying Normal Patterns

1. From the **Home** screen, select a pattern corresponding to an applicator you want to create or modify.
2. From the Pattern Type drop-down menu, select **Normal**.
3. Do the following to continue:

Item	Description
 Expand  Contract	Touch the Edit button to expand the screen. Refer to Common Pattern Screen Controls for more information.
Bead Delay	<p>The delay, in either time (ms) or distance (mm or inches), from the leading edge of the product to the beginning of each bead in the pattern.</p> <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
Bead Duration	<p>The length of the bead, in either time (ms) or distance (mm or inches).</p> <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. <p>NOTE:</p> <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.

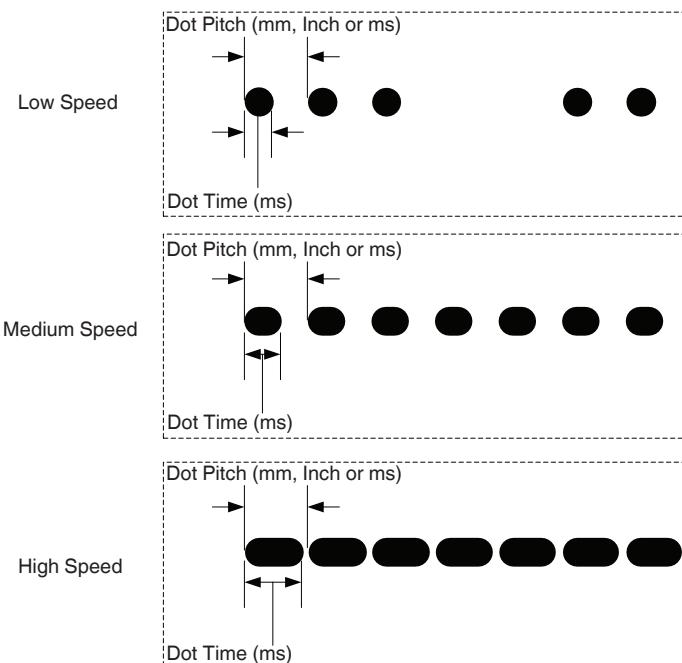
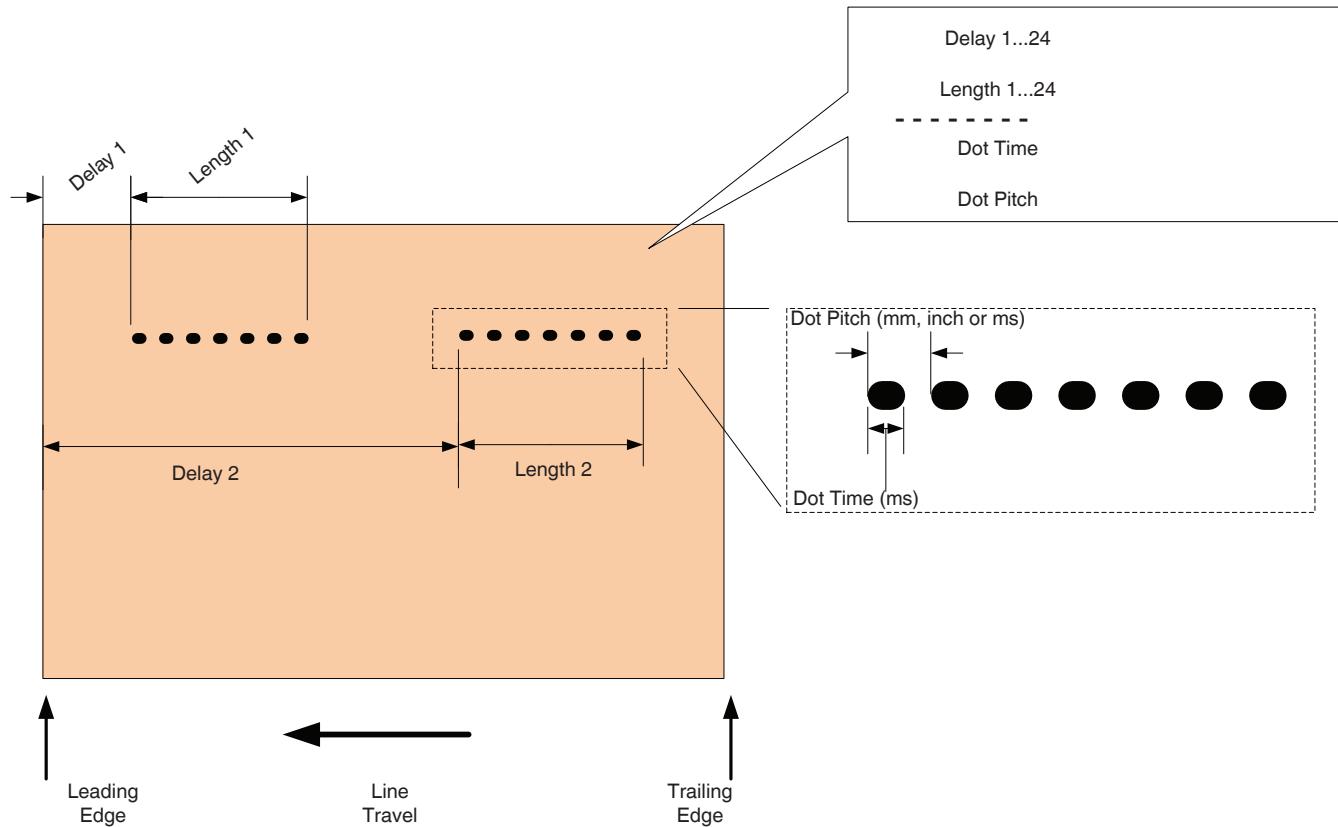
4. All actions are automatically saved when you navigate to another screen.

NOTES:

- Refer to **Common Pattern Screen Controls** for more information.
- By default, only the pattern itself is copied/pasted. However, if you select the *Copy and Paste includes Applicator Settings* check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

Dots Pattern

A dot pattern provides a constant weight (volume) dots of adhesive spaced by a user determined time or distance.



NOTE:

- High Speed dots can run together to create a solid bead.

Creating, Updating and Copying Dot Patterns

1. From the **Home** screen, select a pattern corresponding to an applicator you want to create or modify.
2. From the Pattern Type drop-down menu, select **Dots**.
3. Do the following to continue:

Item	Description
 Expand  Contract	<p>Touch the Edit button to expand the screen. Refer to Common Pattern Screen Controls for more information.</p>
Bead Delay	<p>The delay, in either time (ms) or distance (mm or inches), from the leading edge of the product to the beginning of each bead in the pattern.</p> <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. <p>NOTE:</p> <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.
Bead Duration	<p>The length of the bead, in either time (ms) or distance (mm or inches).</p> <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. <p>NOTE:</p> <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.
Dot Time	<p>The amount of time the applicator dispenses adhesive per dot. This results in a consistent volume of dispensed adhesive regardless the line speed.</p> <ul style="list-style-type: none"> • Touch the  to increase one ms. • Touch the  to decrease one ms
Dot Pitch	<p>The distance between the starting position of the dots in either time (ms) or distance (mm or inches)..</p> <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. <p>NOTE:</p> <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.

4. All actions are automatically saved when you navigate to another screen.

NOTES:

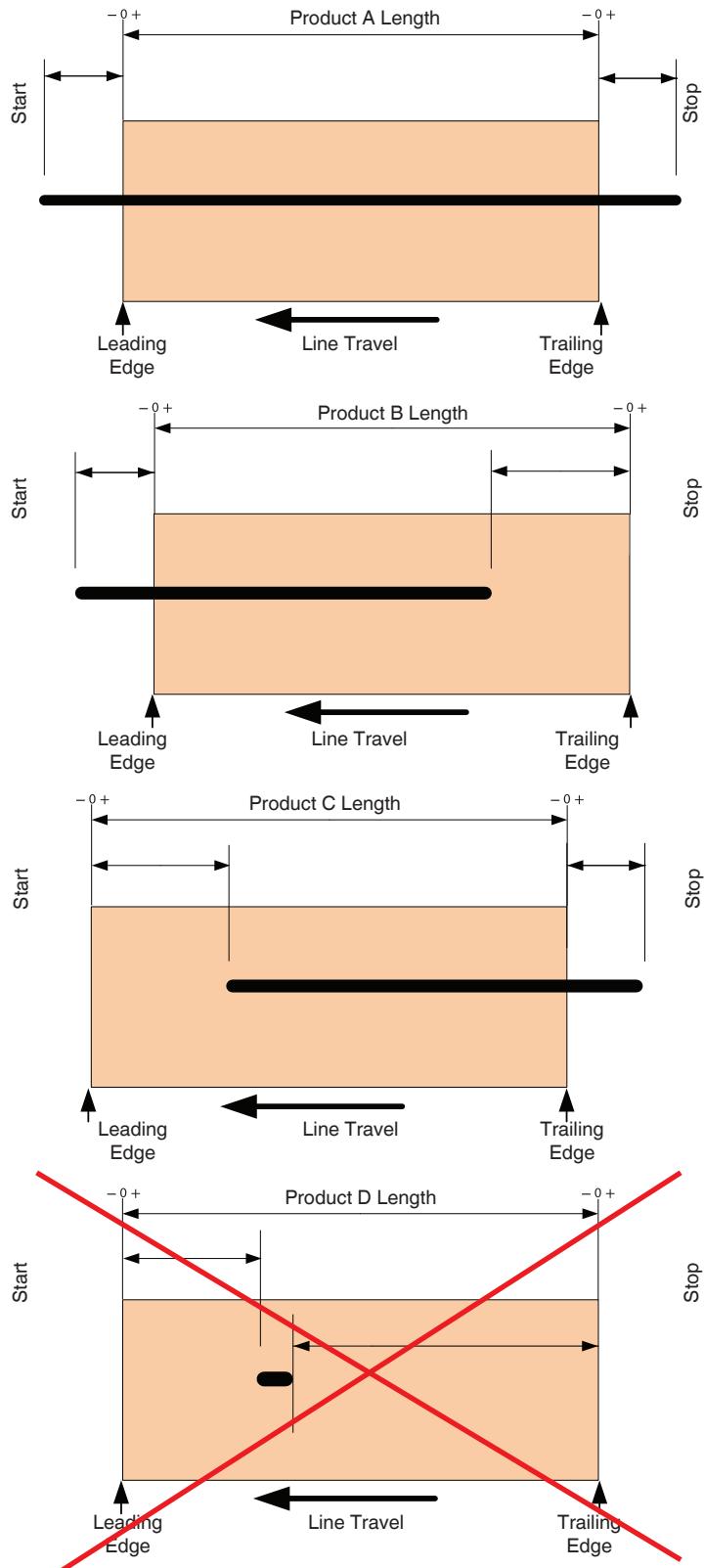
- Refer to **Common Pattern Screen Controls** for more information.
- By default, only the pattern itself is copied/pasted. However, if you select the *Copy and Paste includes Applicator Settings* check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

Random Length Pattern

The random-length bead mode provides a way to mix products of differing length on the production line during the same production run. For example, when alternating between short and long products on the production line, The Spectra Link Pattern Controller automatically determines the length of each product as it passes the trigger and then sizes the beads to fit the product. Although each bead is continuous, a bead margin can be specified at each end of the product where adhesive will not be applied.

NOTES:

- When performing random length end gaps, the GTO must be larger than the end gap. Anything less and the end gap can only be performed to the GTO value.
- As the product passes under the trigger to the applicator, the end of the product is detected. The applicator must be switched off. If the end gap was greater than the GTO, then the applicator should have been turned off sooner.

**NOTE:**

- If the addition of the **Start** and **End** values is less than the product length, then adhesive is not dispensed.

Creating, Updating and Copying Random Patterns

1. From the **Home** screen, select a pattern corresponding to an applicator you want to create or modify.
2. From the Pattern Type drop-down menu, select **Random Length**.
3. Do the following to continue:

Item	Description
 Expand  Contract	Touch the Edit button to expand the screen. Refer to Common Pattern Screen Controls for more information.
Start	The beginning product offset location where you want start dispensing the bead pattern. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
End	The ending product offset location where you want end or stop dispensing the bead pattern. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. NOTE: <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.

4. All actions are automatically saved when you navigate to another screen.

NOTES:

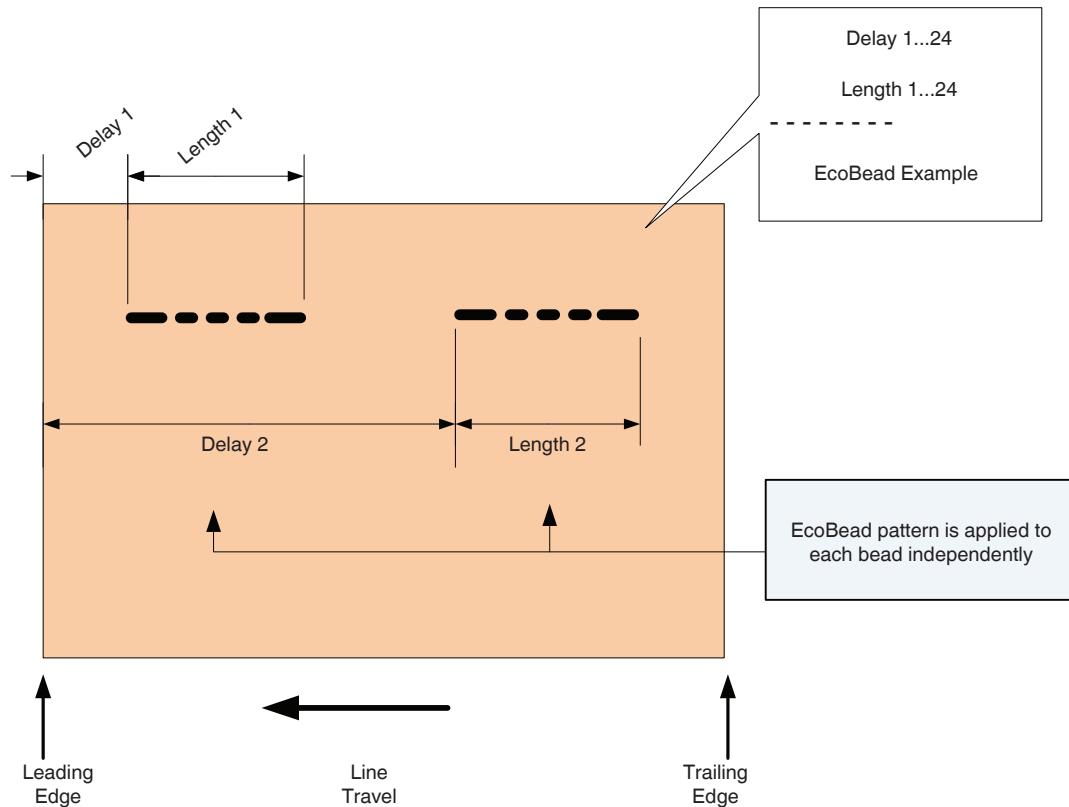
- Refer to **Common Pattern Screen Controls** for more information.
- By default, only the pattern itself is copied/pasted. However, if you select the *Copy and Paste includes Applicator Settings* check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

EcoBead Pattern

Select one of nine predefined stitched adhesive patterns, resulting in a maximum adhesive savings of up to 60% while still maintaining adhesive bond integrity, depending on the adhesive you are using.

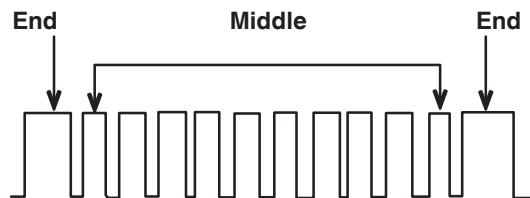
NOTE:

- To make use of this pattern, you must purchase a pattern license. Go to <https://bbconn-license.nordson.com/> and select **Spectra Link Pattern Control** and select P/N 1132949. This gives you access to all patterns.



About EcoBead Adhesive Savings and Patterns

The following details the available EcoBead patterns and potential adhesive savings.



Pattern Style	End (%)	Middle (%)	30%	40%	50%	60%
A	10	5				
B	10	10				
C	15	5				
D	15	10				
E	15	15				
F	20	5				
G	20	10				---
H	20	15				---
I	20	20		---	---	---

Creating, Updating and Copying EcoBead Patterns

1. From the **Home** screen, select a pattern corresponding to an applicator you want to create or modify.
2. From the Pattern Type drop-down menu, select **EcoBead**.
3. Do the following to continue:

Item	Description
 Expand  Contract	Touch Edit Pattern to expand the screen. Refer to Common Pattern Screen Controls for more information.
Bead Delay	The delay, in either time (ms) or distance (mm or inches), from the leading edge of the product to the beginning of each bead in the pattern. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
Bead Duration	The length of the bead, in either time (ms) or distance (mm or inches). <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
Adhesive Savings	Select from the drop-down list, the percent of adhesive savings you want to achieve.
Eco Pattern	Assigning an EcoBead pattern to an applicator results in a user-defined amount of adhesive savings compared to a normal pattern.

4. All actions are automatically saved. When done, navigate to another screen.

NOTES:

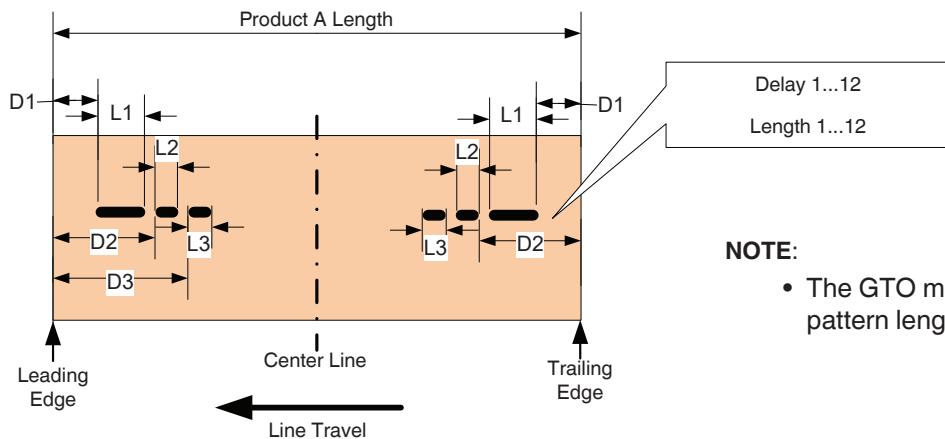
- Refer to **Common Pattern Screen Controls** for more information.
- By default, only the pattern itself is copied/pasted. However, if you select the *Copy and Paste includes Applicator Settings* check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

Random Length (Mirror)

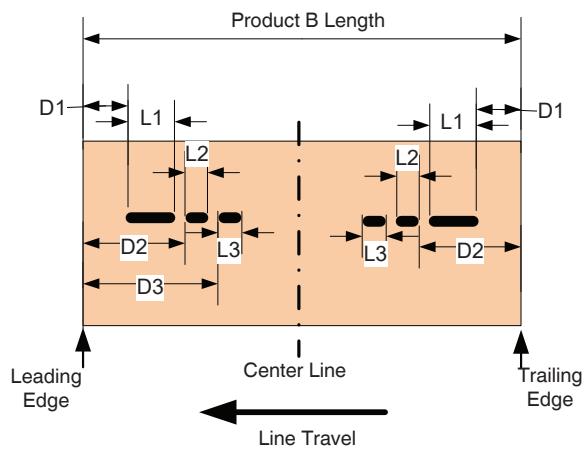
Random Length (Mirror) places the pattern on the leading edge and a mirror image on the trailing edge.

NOTE:

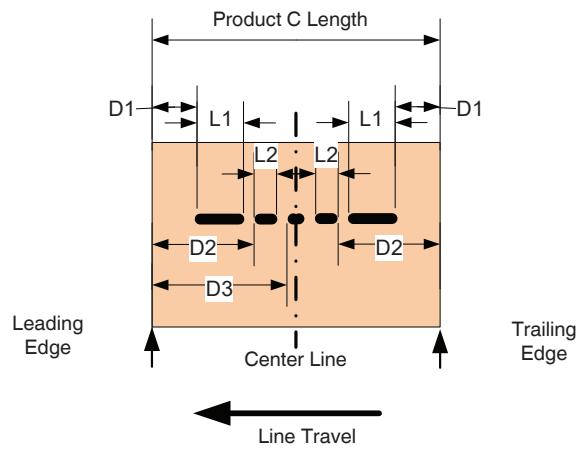
- To make use of this pattern, you must purchase a pattern license. Go to <https://bbconn-license.nordson.com/> and select **Spectra Link Pattern Control** and select P/N 1132949. This gives you access to all patterns.

**NOTE:**

- The GTO must be at least 1/2 the longest pattern length

**NOTE:**

- If the Product Length is less than twice the pattern length, then the pattern will be clipped. Refer to Product C Length picture. Bead 3 is clipped short.



Creating, Updating and Copying Random Length (Mirror) Patterns

1. From the **Home** screen, select a pattern corresponding to an applicator you want to create or modify.
2. From the Pattern Type drop-down menu, select **Random Length (Mirror)**.
3. Do the following to continue:

Item	Description
 Expand  Contract	Touch the Edit button to expand the screen. Refer to Common Pattern Screen Controls for more information.
Bead Delay	The delay, in either time (ms) or distance (mm or inches), from the leading edge of the product to the beginning of each bead in the pattern. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
Bead Duration	The length of the bead, in either time (ms) or distance (mm or inches). <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. NOTE: <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.

4. All actions are automatically saved when you navigate to another screen.

NOTES:

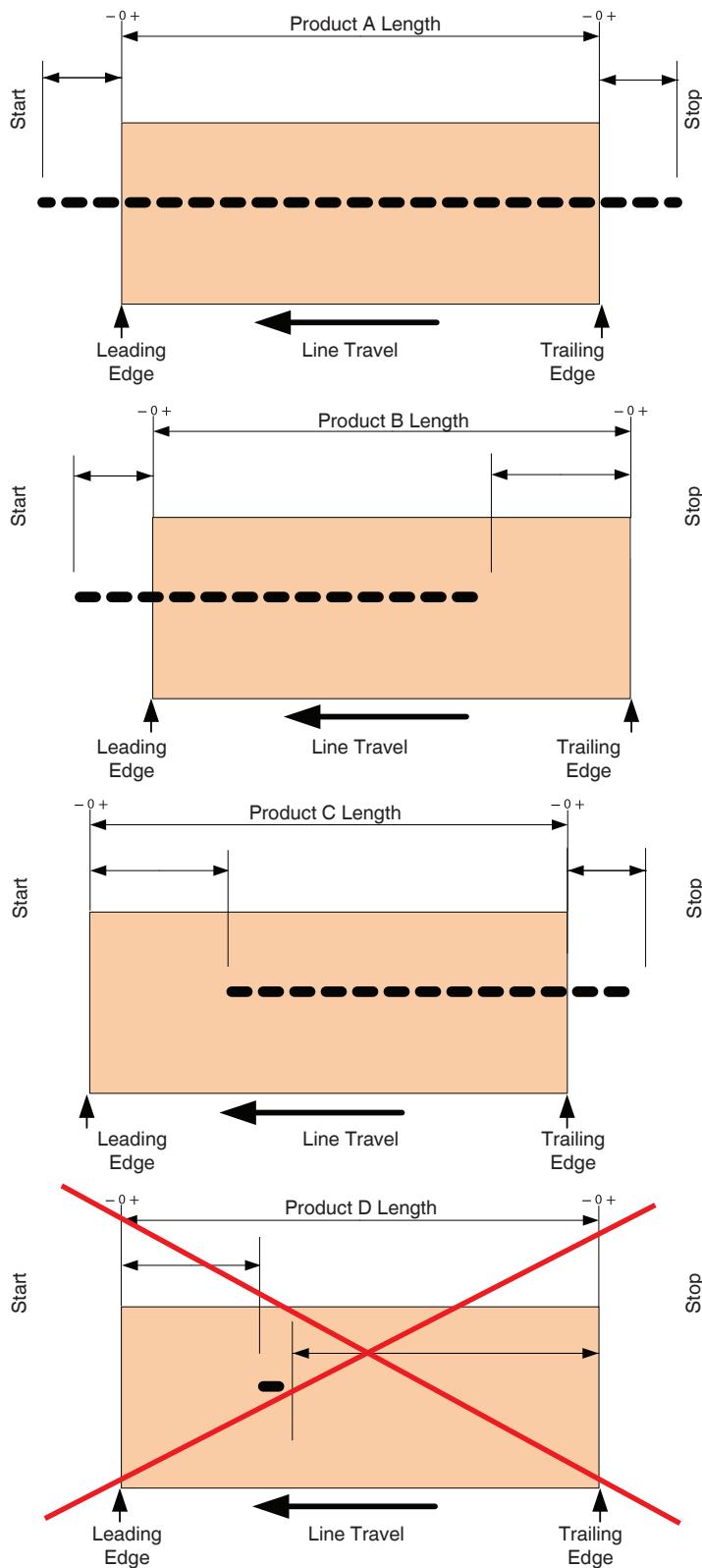
- Refer to **Common Pattern Screen Controls** for more information.
- For *Random Length Mirror*, the **Trigger Mask** value must be shorter than the shortest product length. Refer to **Fine-Tuning Trigger Settings** for more information.
- By default, only the pattern itself is copied/pasted. However, if you select the *Copy and Paste includes Applicator Settings* check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

Random Length (Dots)

Random Length (Dots) is the same as random length, the only difference is that the dispensed adhesive is a dotted. A gap set at the leading and trailing edges of the product where adhesive is not applied.

NOTE:

- To make use of this pattern, you must purchase a pattern license. Go to <https://bbconn-license.nordson.com/> and select **Spectra Link Pattern Control** and select P/N 1132949. This gives you access to all patterns.

**NOTE:**

- The bead changes from solid to dot when the speed of the line is reduced. This can be in the middle of dispensing a bead on a product.

NOTE:

- If the addition of the **Start** and **End** values is less than the product length, then adhesive is not dispensed.

Creating, Updating and Copying Random Length (Dots) Patterns

1. From the **Home** screen, select a pattern corresponding to an applicator you want to create or modify.
2. From the Pattern Type drop-down menu, select **Random Length (Dots)**.
3. Do the following to continue:

Item	Description
 Expand  Contract	Touch Edit Pattern to expand the screen. Refer to Common Pattern Screen Controls for more information.
Start	The beginning product offset location where you want start dispensing the bead pattern. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
End	The ending product offset location where you want end or stop dispensing the bead pattern. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. NOTE: <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.
Dot Time	The amount of time the applicator dispenses adhesive per dot. This results in a consistent volume of dispensed adhesive regardless the line speed. <ul style="list-style-type: none"> • Touch the  to increase one ms. • Touch the  to decrease one ms
Dot Pitch	The distance between the starting position of the dots in either time (ms) or distance (mm or inches). <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. NOTE: <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.

4. All actions are automatically saved when you navigate to another screen.

NOTES:

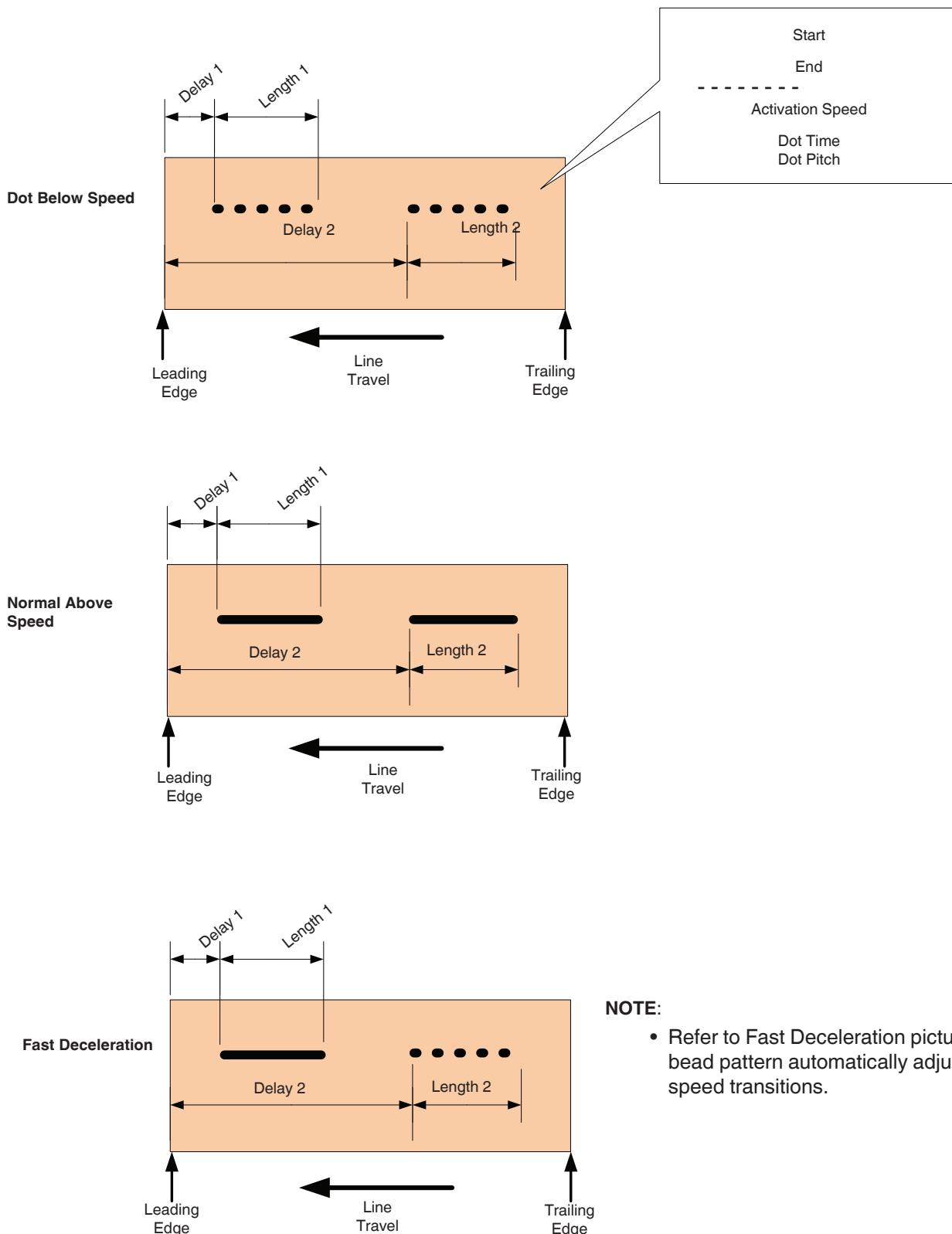
- Refer to **Common Pattern Screen Controls** for more information.
- By default, only the pattern itself is copied/pasted. However, if you select the *Copy and Paste includes Applicator Settings* check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

AutoDot

The AutoDot pattern type dispenses dot beads when the system is set at a lower activation speed and dispenses solid beads when the system is set above the activation speed. This bead type is used to relieve residual pressure after a sudden machine stop.

NOTE:

- To make use of this pattern, you must purchase a pattern license. Go to <https://bbconn-license.nordson.com/> and select **Spectra Link Pattern Control** and select P/N 1132949. This gives you access to all patterns.

**NOTE:**

- Refer to Fast Deceleration picture. The bead pattern automatically adjusts during speed transitions.

Creating, Updating and Copying AutoDot Patterns

1. From the **Home** screen, select a pattern corresponding to an applicator you want to create or modify.
2. From the Pattern Type drop-down menu, select **AutoDot**.
3. Do the following to continue:

Item	Description
 Expand  Contract	<p>Touch the Edit button to expand the screen. Refer to Common Pattern Screen Controls for more information.</p>
Bead Delay	<p>Determines the delay, in either time (ms) or distance (mm or inches), from the leading edge of the product to the beginning of each bead in the pattern.</p> <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. <p>NOTE:</p> <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.
Bead Duration	<p>The length of the bead, in either time (ms) or distance (mm or inches).</p> <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure. <p>NOTE:</p> <ul style="list-style-type: none"> • Refer to Commissioning the Spectra Link Pattern Controller for more information.
Dot Time	<p>The amount of time the applicator dispenses adhesive per dot. This results in a consistent volume of dispensed adhesive regardless the line speed.</p> <ul style="list-style-type: none"> • Touch the  to increase one ms. • Touch the  to decrease one ms

Item	Description
Dot Pitch	<p>The distance between the starting position of the dots in either time (ms) or distance (mm or inches)..</p> <ul style="list-style-type: none"> Touch the  to increase one (system unit) of measure. Touch the  to decrease one (system unit) of measure. <p>NOTE:</p> <ul style="list-style-type: none"> Refer to Commissioning the Spectra Link Pattern Controller for more information.
Normal Above Speed	<p>The speed which results in a Normal Bead Pattern when the line speed is at or above the defined line run speed.</p> <p>The unit of measure is always in ms (time) regardless of which operation mode (time, distance or scaled time) you are using.</p> <ul style="list-style-type: none"> Touch the  to increase one ms. Touch the  to decrease one ms
Dot Below Speed	<p>The speed which results in a Dot Bead Pattern when the line speed is at or below the defined speed.</p> <ul style="list-style-type: none"> Touch the  to increase one (system unit) of measure. Touch the  to decrease one (system unit) of measure. <p>NOTE:</p> <ul style="list-style-type: none"> Refer to Commissioning the Spectra Link Pattern Controller for more information.

4. All actions are automatically saved when you navigate to another screen.

NOTES:

- Refer to **Common Pattern Screen Controls** for more information.
- By default, only the pattern itself is copied/pasted. However, if you select the **Copy and Paste includes Applicator Settings** check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

Continuous

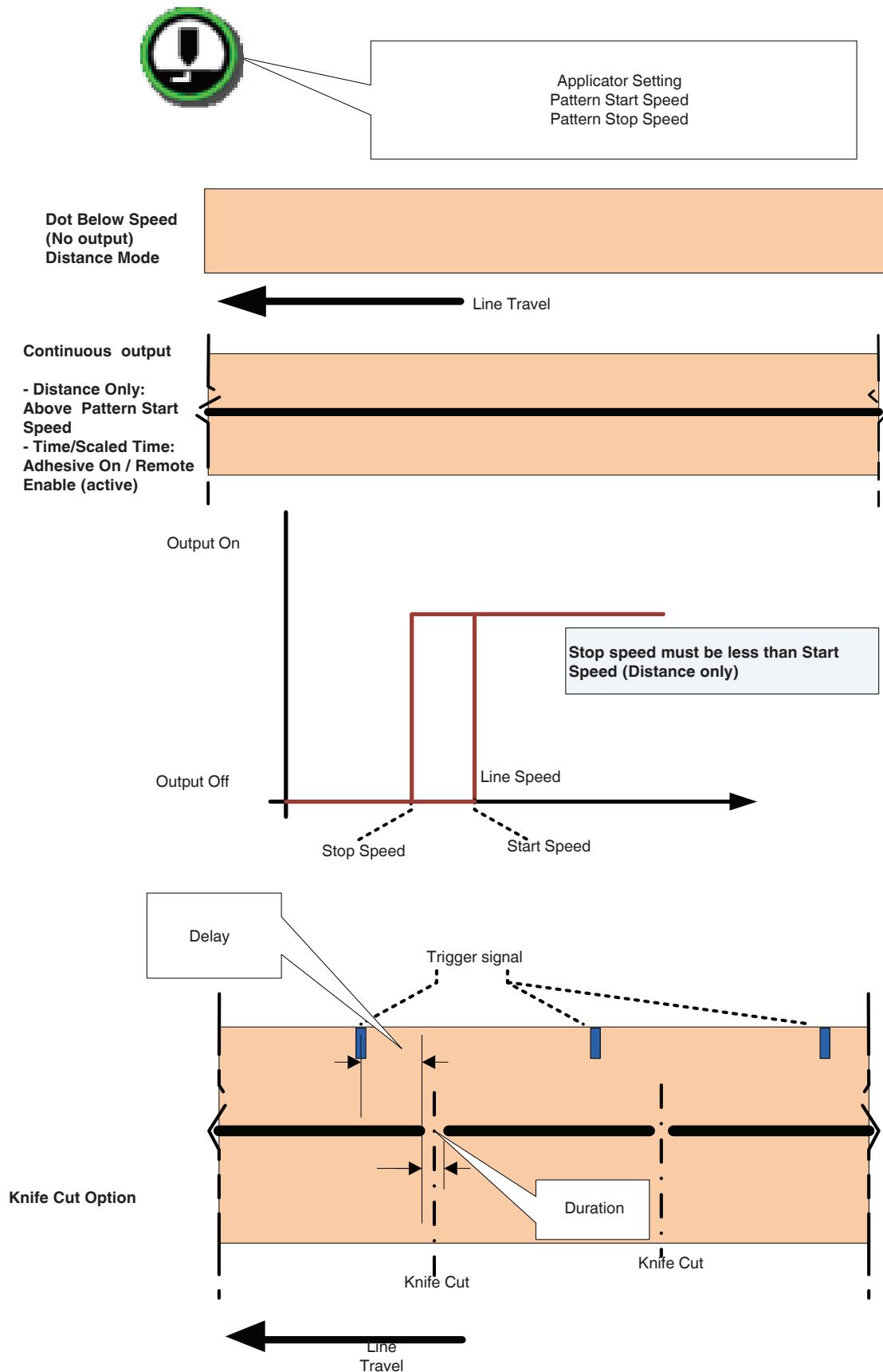
The Continuous pattern type provides a continuous adhesive bead, although you can include a pause in the dispensing, (known as Knife Cut) based on a trigger signal.

The operation of the Continuous bead depends on your operation mode.

- If you are using the Distance, then you can define when to start/stop dispensing adhesive based on line speed.
- If you are using Time or scaled time, then dispensing the Continuous bead occurs whenever the Adhesive On button is either manually touched, or if you activate the Remote Enable input.

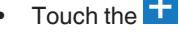
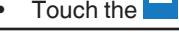
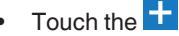
NOTE:

- To make use of this pattern, you must purchase a pattern license. Go to <https://bbconn-license.nordson.com/> and select **Spectra Link Pattern Control** and select P/N 1132949. This gives you access to all patterns.



Creating, Updating and Copying Continuous Patterns

1. From the **Home** screen, select a pattern corresponding to an applicator you want to create or modify.
2. From the Pattern Type drop-down menu, select **Continuous**.
3. Do the following to continue:

Item	Description
 Expand  Contract	Touch the Edit button to expand the screen. Refer to Common Pattern Screen Controls for more information.
Start Speed (Distance mode only)	Enter the line speed when you want to start dispensing the Continuous bead. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
Stop Speed Distance mode only)	Enter the line speed when you want to stop dispensing the Continuous bead. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
Knife Cut	Use this option to include a pause in dispensing a continuous bead. NOTES: <ul style="list-style-type: none"> • You can make use of the <i>Knife Cut</i> option in any Operation Mode • The Knife Cut option requires a trigger. • Refer to Commissioning the Spectra Link Pattern Controller for more information.
Item	Description
Knife Cut Delay	Enter the time or distance, once a product is detected by a trigger, to start the pause in dispensing the continuous bead. <ul style="list-style-type: none"> • Touch the  to increase one (system unit) of measure. • Touch the  to decrease one (system unit) of measure.
Knife Cut Duration	Enter the time/distance of the pause (or duration) from dispensing the Continuous bead. <ul style="list-style-type: none"> • Touch the  to increase one ms. • Touch the  to decrease one ms

4. All actions are automatically saved when you navigate to another screen.

NOTES:

- Refer to **Common Pattern Screen Controls** for more information.
- By default, only the pattern itself is copied/pasted. However, if you select the *Copy and Paste includes Applicator Settings* check box, then all applicator settings, including any enabled and defined Advanced Applicator settings, such as applicator compensation, virtual trigger and virtual encoder settings are copied to its new applicator channel.
 - If virtual trigger or encoder is copied/pasted to a different applicator channel, the previous applicator association is automatically updated to the new applicator channel. Refer to **Changing System Preferences** for more information.

Section 6

Fine-Tuning the Operation Mode, Encoders Applicators, Triggers and Runup



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

In this Section

This section details the following:

- Fine-Tuning Encoder Settings
- Fine-Tuning Applicator Settings
 - About Applicator Compensation
 - Setting Up and Using Virtual Triggers
- Fine-Tuning Triggers
 - About Trigger Masks and Filters
 - About Runup
 - Troubleshooting False Trigger Events

Fine-Tuning Encoder Settings

The following table details which encoder settings and the location in the user interface.

There are two ways to access the encoder screen, but only the **Home | System Settings | Component Configuration | Encoders** allow you to decide which encoder you want to be available (visible) in the user interface. This is similar to a master control for each encoder.

Task...	Location in the User Interface
<ul style="list-style-type: none"> Encoder Type Reverse Advanced Quad Phase Encoder Settings 	<ul style="list-style-type: none"> Menu System Settings Encoder Home System Settings Component Configuration / Encoders, then touch Configure
Master Encoder Switch On/Off	Menu System Settings Component Configuration / Encoders

Refer to **About Operation Modes and Scaling** for more information.

Although you should have already defined the encoder settings during the initial commissioning, you can change these settings if you replace the encoder, added the Encoder License, or if you start receiving encoder alarm messages.

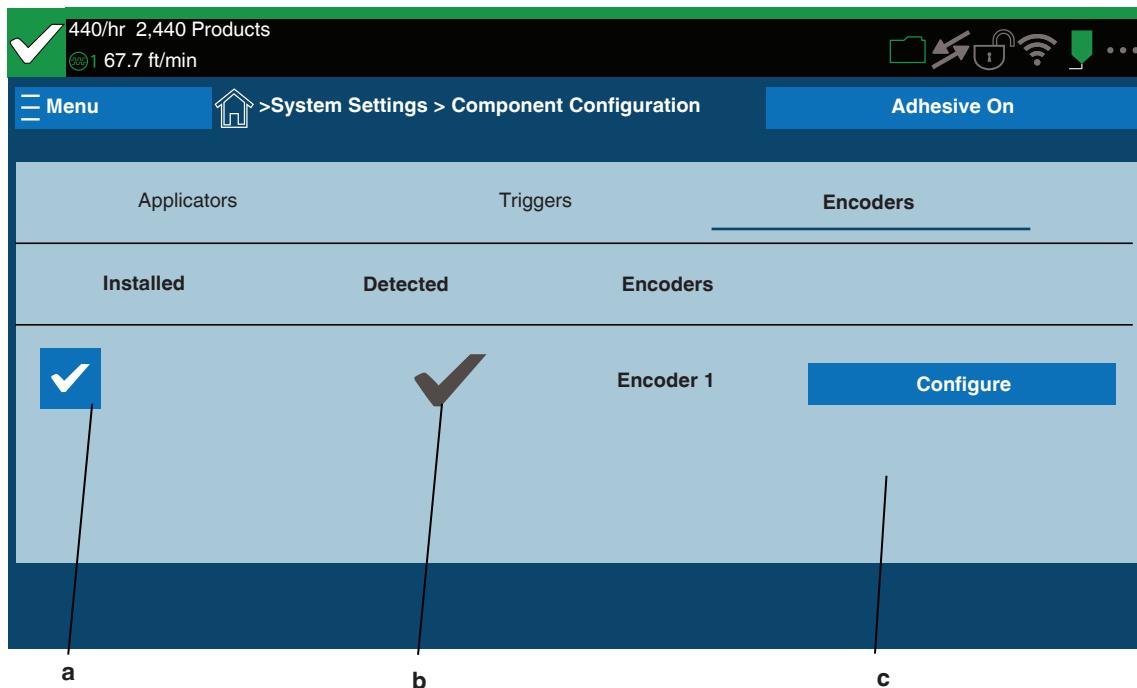
1. Access the *Encoder* screen either from the **Commissioning Wizard** or by navigating from **Home | System Settings | Encoder**
2. Select which Encoder type you have, **Single Phase** or **Quad (Quadrature) Phase**. Refer to the documentation that came with the Encoder for the correct selection.
3. Run the line for at least 5 seconds in the direction of production. Verify the line speed displayed is positive. If not, touch the **Reverse** toggle option to enable it.

NOTES:

- When using the **Commissioning Wizard**, it automatically detects the type of encoder you have installed, as well as the direction of the encoder. It is strongly recommended that you verify the encoder type yourself. If you access the Encoder screen from **System Settings | Encoder**, the system does not perform any automatic encoder type detection.
- If you get one or more of the following alarm messages; EN-04, EN-05 or EN-07: first verify the wiring. Otherwise, you must replace the Quad encoder. You can make the Quad encoder work like a Single Phase thereby allowing for production to continue until you are able to replace it. Refer to **Re-wiring a quad phase encoder to a single phase** for more information.
- Make sure the encoder is properly and securely mounted.

Managing Master Encoder On/Off Control

Use the Master Encoder Control to either switch On or Off an encoder thereby making the encoder available or not for selection to scale and to accurately dispense the adhesive bead on a variable speed production line.



1. **☰ Menu | System Settings | Component Configuration | Encoders**
2. Do the following to continue to define and fine-tune encoders:

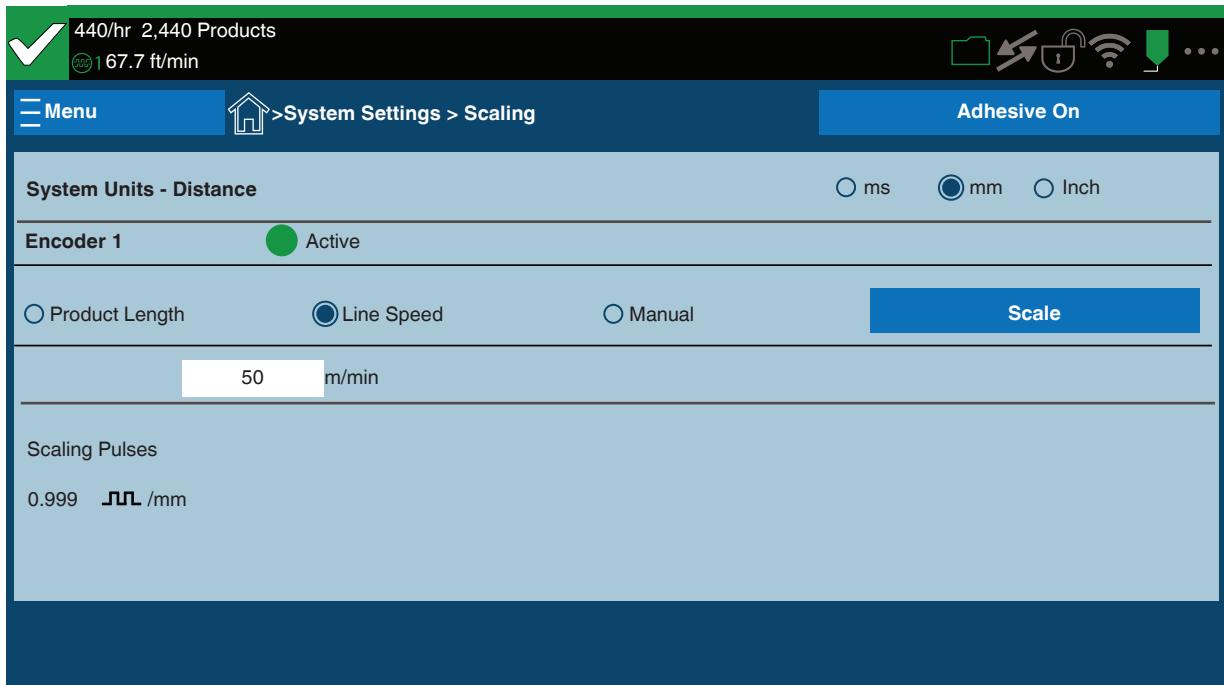
Item	Description
a	<p>Touch to place a check mark next to a Encoder that you want to be available in the user interface.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • If you are using the Distance operation mode, it is required for at least one encoder channel to have a check mark in the Installed check box, indicating that it is available to use in the user interface. • Uninstalling or removing the check box mark for an Installed encoder, changes the operation mode from Distance or Scaled Time to Pure Time. • It is not necessary for the system to Detect an encoder for you to select it as Installed. • An encoder that is Detected will automatically be Installed. • It is expected that you have already wired the encoder to the main PCA board previous to starting Spectra Link. However, you can connect an encoder at any time after the initial commissioning. Refer to Connecting Encoders for more information.
b	<p>Indicates the encoder is wired and sufficient current is available to make a detectable connection.</p> <p>NOTE:</p> <p>You may not see the Detected check mark if the encoder is controlled with a PLC, or due to insufficient power for the encoder. Although an encoder may not be detected, it is available for use.</p>
c	<p>Touch to fine-tune the encoder settings.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • The encoder must be switched On to Configure.

Scaling

Refer to **About Operation Modes and Scaling** for more information.

NOTES:

- If you select **ms** (Pure Time) the Scaling screen is blank, as scaling is not necessary.
- The image below appears if you select **mm** or **inch** as your **System Units**.
 - If you have an encoder installed, the operation mode is *distance*.
 - If you do not have an encoder installed, the operation mode is *scaled time*.



1. Access the *Scaling* screen either from the **Commissioning Wizard** or by touching **Menu** | **System Settings** and touching the **Scaling** button.

2. Select either mm or Inch, then select which method of scaling you want to use, then touch **Scale** to continue and enter or select the requested information.

Scaling Method	Description
Product Length	<ul style="list-style-type: none"> Select the Scaling Trigger number from the drop-down menu that will be used to detect the product. Enter the length of the product, from leading to trailing edge. Enter the number of products you want to use for scaling purposes. The default is 3 products. Typically a greater number increases the scaling accuracy. <p>Start the line, then touch Start Scaling. When done, a popup message appears displaying the pulses per selected unit of measure. Touch OK to continue.</p>
Line Speed	<ul style="list-style-type: none"> Make sure the production line is running at a constant speed. The Line Speed Scaling screen displays the Current Line Speed, but it is strongly recommended use a hand tachometer to accurately measure the speed of the line. You can also refer to the documentation that came with the conveyor line. Input Estimated Line Speed - Enter the measured or documented constant line speed. <p>Touch Start Scaling. When done, a popup message appears displaying the pulses per selected unit of measure. Touch OK to continue.</p>
Manual	<ul style="list-style-type: none"> Enter the known scaling pulses per unit of measure. You may find this in the documentation that came with the encoder, or it may be on the encoder itself. <p>NOTE:</p> <ul style="list-style-type: none"> Do not select Manual if you are using the Time - Scaled Time operation mode.

3. When done, navigate to another screen. Settings are automatically saved.

Troubleshooting Scaling

If the system status icon looks like (a) and flashing, AND the encoder icon is blue with the line speed indicating a negative number (b), this indicates your Quad Encoder is running backwards and adhesive is not being dispensed.



Do the following to resolve this issue:

- **☰ Menu** | **System Settings** | **Encoders** and toggle the **Reverse** option.
- **☰ Menu** | **System Settings** | **Scaling** and retry scaling.

Fine-Tuning Applicators

The following table details which applicator settings and the location in the user interface.

There are three ways to access the applicator screen, but only the **Home | System Settings | Component Configuration | Applicators** allows you to decide which applicators you want to be available (visible) in the **Applicator** selection drop-down list. This is similar to a master control for each applicator.

Task	Location in the User Interface	Refer to...
<ul style="list-style-type: none"> Enable/Disable Trigger assignment Applicator Trigger Offset, (GTO) Encoder assignment (See Note) Runup Zone (See Note) Applicator Type 	<ul style="list-style-type: none"> ☰ Menu, touch  (applicator) icon ☰ Menu System Settings Applicator / select an applicator number ☰ Menu System Settings Component Configuration Applicators/ select an applicator number, then touch Configure 	Fine-Tuning Applicator Settings
<ul style="list-style-type: none"> Virtual Trigger Virtual Encoder 	<ul style="list-style-type: none"> ☰ Menu, touch  (applicator) icon Advanced Settings 	About Virtual Triggers About Virtual Encoders
<ul style="list-style-type: none"> (applicator) Compensation enable/disable and settings 	<ul style="list-style-type: none"> ☰ Menu System Settings Applicator / select an applicator number Advanced Settings ☰ Menu System Settings Component Configuration Applicators/ select an applicator number, then touch Configure Advanced Settings 	Fine-Tuning Advanced Applicator Compensation Settings
Master Applicator Switch On/Off	<ul style="list-style-type: none"> ☰ Menu System Settings Component Configuration Applicators/ select an applicator number 	Managing Master Applicator Control

NOTES:

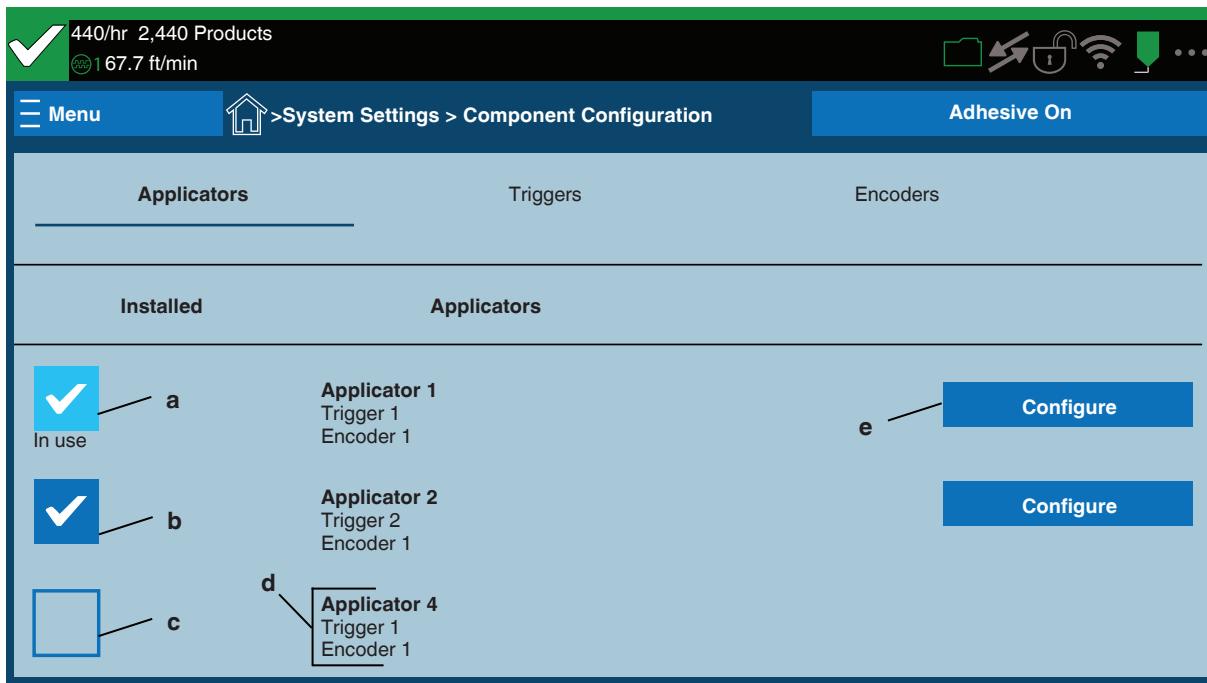
- You can expand to an additional 4 applicator and trigger channels with the 4 Channel Expansion Kit, P/N 1132445.
- The Encoder (assignment) and Runup Zone options are only available if you have an encoder and the Encoder License installed.

Managing Master Applicator On/Off Control

Use the Master Applicator Control to either switch On or Off an applicator channel (number) thereby making the applicator available or not available for selection to fine-tune or to associate with a trigger when creating a bead pattern.

NOTE:

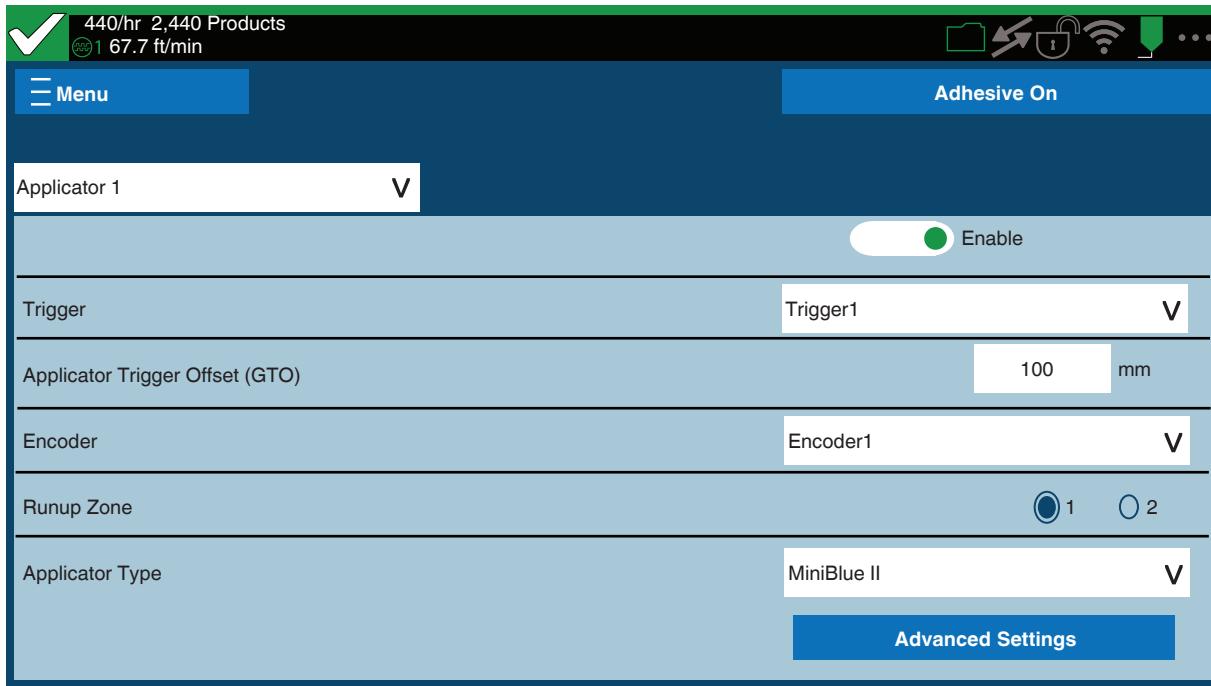
- It is expected that you have already wired the applicators to the main PCA board previous to starting Spectra Link. However, you can connect a trigger at any time after the initial commissioning. Refer to Connecting Triggers for more information.



1. Touch **☰ Menu** | **System Settings** | **Component Configuration** | **Applicators**
2. Do the following to continue to define and fine-tune applicators:

Item	Description
a	Indicates the Applicator is switched On and is currently In Use , in the creation of a bead pattern. NOTE: <ul style="list-style-type: none"> • You cannot switch Off any applicator that is In Use. To Switch Off an In Use applicator, you must disable the applicator. Refer to Fine-Tuning Applicator Settings for more information.
b	Indicates the applicator is <i>switched On</i> and is available in the user interface, but is currently disabled.
c	Indicates the applicator may or may not be wired to the main PCA board. If the applicator is wired, and the check box is empty, the applicator will not be available in the user interface for selection.
d	Displays the applicator channel (number), trigger association and encoder if applicable.
e	Touch to fine-tune the applicator settings. NOTE: <ul style="list-style-type: none"> • An applicator must be switch On to Configure.

Fine-Tuning Applicator Settings



There are three ways to access the applicator screen:

1. Navigate to the *Applicator* screen.

- **☰ Menu** | **Home** screen - touch  where the # represents the applicator number channel.
- **☰ Menu** | **System Settings** | **Applicators**
- **☰ Menu** | **System Settings** | **Component Configuration** | **Applicators** | **Configure**. Select an applicator channel (number) and then touch **Configure**

2. Do the following to continue to define and fine-tune applicators:

Item	Description	Default	Minimum	Maximum
Applicator selector	Select an applicator you want to configure from the drop-down list box. NOTES: <ul style="list-style-type: none"> Only those applicators with an <i>Installed</i> check mark in the <i>Component Configuration</i> screen are available or visible in Applicator drop-down list. Spectra Link Pattern Controller requires at least one applicator and physical trigger installed and available or a virtual trigger enabled and defined. 	---	---	---
(Applicator) Enable/ Disable	Although installed and available, you can decide to disable an applicator. All applicator settings are saved even when disabled.	Disabled	---	---
Trigger	Select the available trigger you want to associate this applicator. NOTE: <ul style="list-style-type: none"> If you enabled the corresponding Virtual Trigger (Advanced Settings) for this applicator, the name of the virtual trigger is displayed, but cannot be changed. To associate a different trigger, you must first disable the virtual trigger associated with the applicator. (System Settings Applicator Advanced Settings) 	---	---	---
Applicator Trigger Offset (GTO)	GTO (Gun or Applicator) Trigger Offset is the distance from the center line of the applicator's nozzle to the center line of the trigger. The unit value depends on which <i>Operation Mode</i> you selected (Time, Scaled Time or Distance). Refer to Fine-Tuning the Operation Mode, Applicators, Triggers and Runup for more information. NOTE: <ul style="list-style-type: none"> If you plan to make use of Recipes, navigate from Home System Settings GTO Mode, and select Recipe. This allows you to define the GTO on a per recipe basis. 	MM: 100 Inch: 3.9 MS: 100	MM: 0 Inch: 0 MS: 0	MM: 9999 Inch: 9999 MS: 99999
Only available if you have the Encoder License, and if the Encoder is installed and enabled.				
Encoder	Select from the drop-down list the encoder or virtual encoder you want to associate with this applicator. Only available if you have the Encoder License, and if the Encoder is installed and enabled.	---	---	---
Runup (zone)	Select which Runup zone you want to associate with this applicator. You can assign multiple applicators to a runup zone. Refer to About Runup more information.	(Zone 1)		
Applicator Type	Select the type or model of the applicator from the drop-down list. If you are not sure, locate the applicator and look for the model name on the applicator itself. Knowing the Applicator Type allows the Spectra Link Pattern Controller to automatically populate the compensation On/Off times for accurate adhesive dispensing. NOTE: <ul style="list-style-type: none"> If you cannot locate the applicator type or model, select Standard Pneumatic. You may need to adjust the Compensation settings for accurate adhesive dispensing. 	Standard Pneumatic	---	---
Advanced Settings	Refer to Fine Tuning Applicator Settings for more information.	---	---	---

Fine-Tuning Advanced Applicator Compensation Settings

Compensation values are set automatically based on your applicator type selection. You can change these values if you do not know the applicator type or if the default compensation times are not sufficient.

Use the compensation option to adjust for any shift in patterns as the line speed changes from ramp-up/ramp-down operation. This shift may cause the adhesive dispensing of the bead pattern on the product to be inaccurate, either on the leading edge (Delay On) or trailing edge (Delay off).

1. Navigate to the *Applicator* screen.

- **Home** screen - touch  where the # represents the applicator number channel. Touch **Advanced Settings**.
- **Home | System Settings | Applicators** Select an applicator channel (number) and then touch **Advanced Settings**.
- **Home | System Settings | Component Configuration | Applicators | Configure**. Select an applicator channel (number) and then touch **Configure**.

2. Do the following to continue:

To avoid the trial-by-error process of trying to figure the correct applicator compensation values, do the following:

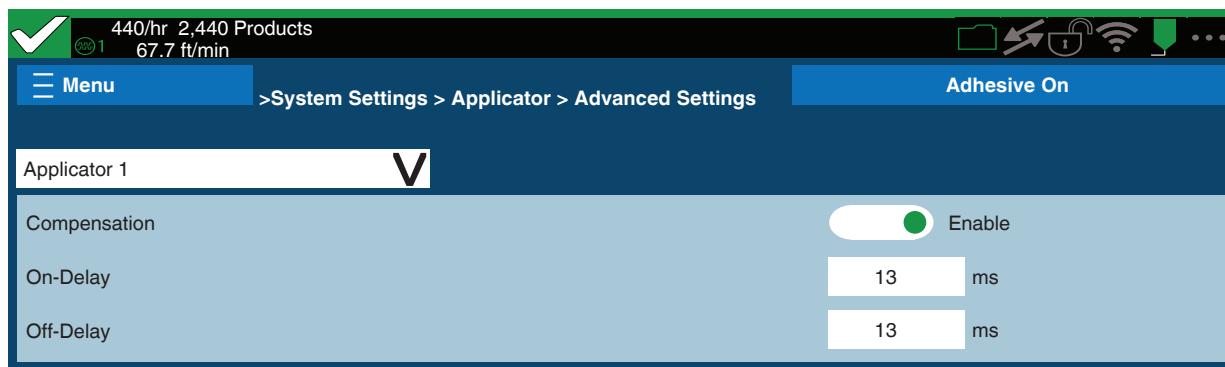
- Set both the **Delay On** and **Delay Off** to zero.
- Run the line at a very low (or minimum) speed and dispense the adhesive pattern on products.
- Run the line at a very high (or maximum) speed and dispense the adhesive pattern on products.
- Measure (between the slow and fast runs) the shift in the leading and trailing edge of the bead on the products.
- Convert the pattern shift to time MS

MM to MS	Inch to MS
$ms = \text{Edge Shift (mm)} * 60 / \text{Line Speed (m/min)}$	$ms = \text{Edge Shift (in)} * 5000 / \text{Line Speed (ft/min)}$

- a. Enter the **Delay On** and **Delay Off** values, and repeat the test.

NOTES:

- The Spectra Link Pattern Controller automatically calculates the best or typical compensation rate based on the applicator type selection.
- If the patterns shift backward as the line speeds up, a greater compensation time is needed
- If the pattern shifts forward as the line speeds up, a lesser compensation time is needed.



Item	Description	Default	Minimum	Maximum
Compensation	Compensation values are set automatically based on your applicator type selection. However you can adjust for any shift in patterns as the line speed changes from ramp-up/ramp-down operation. This shift may cause the adhesive dispensing of the bead pattern on the product to be inaccurate, either on the leading edge (Delay On) or trailing edge (Delay off). Refer to About Applicator Compensation for more information.	Enabled	---	---
On Delay	Changes how long the applicator will remain active for accurate adhesive dispensing on the leading edge of the bead.	13 ms	0 ms	25 ms
Off Delay	Changes how long the applicator will remain active for accurate adhesive dispensing on the trailing edge of the bead.	13 ms	0 ms	25 ms

NOTES:

- The Advanced Virtual Trigger settings are only visible if you have purchased the advanced pattern license.
- The Advanced Virtual Encoder settings are only visible if you have purchased the advanced pattern license, and if you have a physical encoder installed.
- Refer to **Setting up Virtual Triggers** and **Setting up Virtual Encoders** for more information.

Fine-Tuning Triggers

The following table details the trigger settings and their locations in the user interface.

There are three ways to access the trigger screen, but only the **Home | System Settings | Component Configuration | Triggers** allows you to decide which triggers you want to be available (visible) in the **Trigger** selection drop-down list. This is similar to a master control for each trigger.

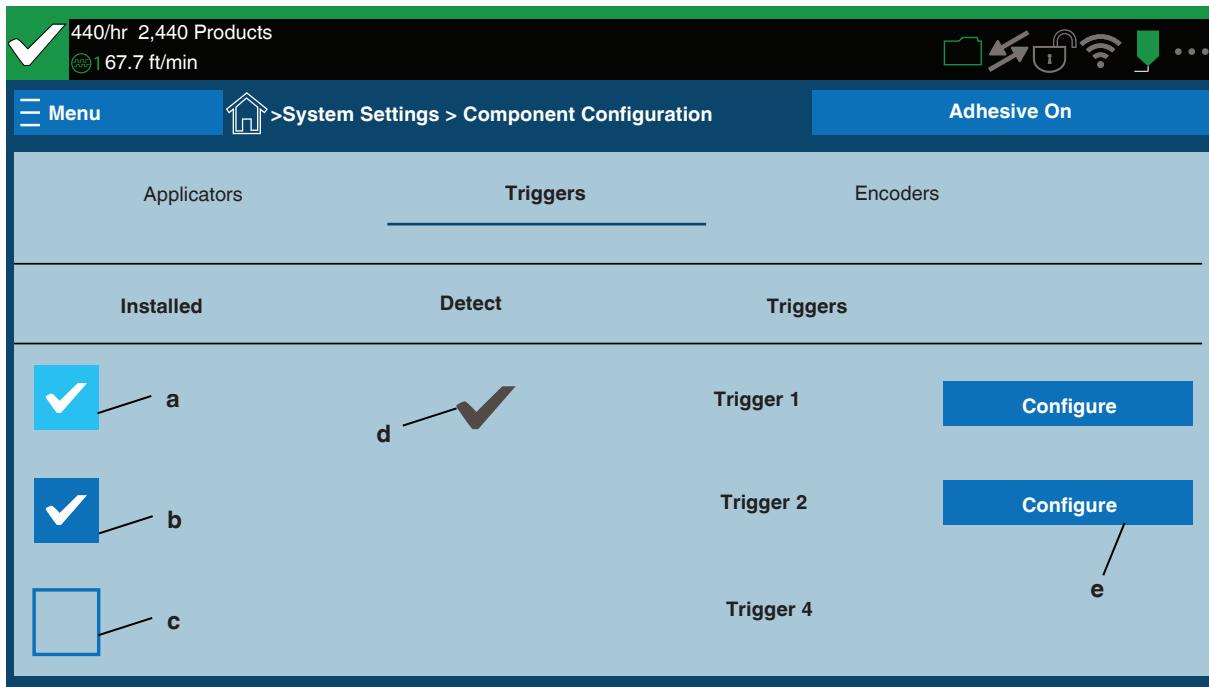
Task	Location in the User Interface	Refer to...
Polarity	 #	Fine-Tuning Trigger Settings
Masking	<ul style="list-style-type: none"> ☰ Menu Home, touch / \ (trigger) icon ☰ Menu System Settings Trigger / select a trigger number Home System Settings Component Configuration / Triggers / select a trigger number, then touch Configure 	Fine-Tuning Trigger Settings
Under Length/Over Length	 #	Fine-Tuning Trigger Settings
<ul style="list-style-type: none"> Trigger Memory Trigger Filter GTO Mode Blocked Trigger 	☰ Menu System Settings Machine Settings	Defining Machine Settings
Master Trigger Switch On/Off	☰ Menu System Settings Component Configuration / Triggers / select a trigger number	Managing Master Trigger Control

Managing Master Trigger On/Off Control

Use the Master Trigger Control to either switch On or Off a trigger channel (number) thereby making the trigger available or not available for selection to fine-tune or to associate with an applicator when creating a bead pattern.

NOTES:

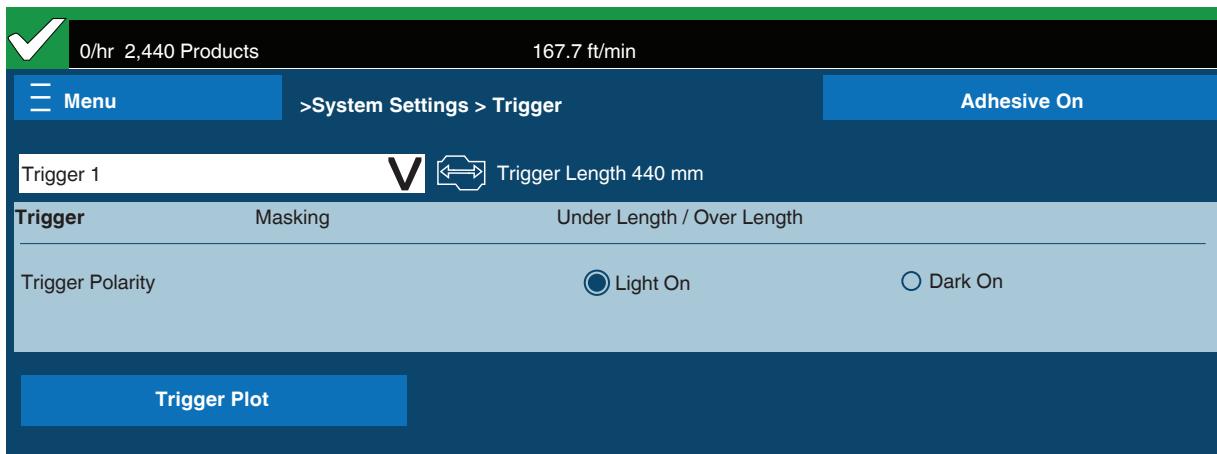
- It is required for at least one trigger channel (number) to have a check mark in the Installed check box, indicating that it is available to use in the user interface.
- It is not necessary for the system to Detect a trigger for you to select it as Installed.
- A trigger that is Detected is automatically Installed.
- It is expected that you have already wired the trigger to the main PCA board previous to starting Spectra Link. However, you can connect a trigger at any time after the initial commissioning. Refer to Connecting Triggers for more information.



1. Touch **☰ Menu** then navigate to **System Settings | Component Configuration | Triggers |**
2. Do the following to continue to define and fine-tune applicators:

Item	Description
a	Indicates the Trigger is switched On and is currently In Use . NOTE: <ul style="list-style-type: none"> • You cannot switch Off any trigger that is In Use. To Switch Off an In Use trigger, you must change the bead pattern applicator association to another trigger. Unlike applicators, triggers cannot be enabled/disabled, they are either switched On/Off.
b	Indicates the trigger is <i>switched On</i> and is available in the user interface, but is not currently associated with any applicator, or is but the applicator associated with the pattern is disabled. Refer to Fine-Tuning Applicator Settings for more information.
c	Indicates the trigger may be available to switch On , if it was properly wired to the Spectra Link main board. Refer to the Installation chapter for more information.
d	Indicates the trigger is wired and sufficient current is available to make a detectable connection. NOTE: <ul style="list-style-type: none"> • You may not see the Detected check mark if the trigger is controlled with a PLC, or due to insufficient power for that trigger. Although a trigger may not be detected, you can still mark it as installed (check mark), thereby making it available in the user interface for you to use.
e	Touch to fine-tune the trigger settings. NOTE: <ul style="list-style-type: none"> • An trigger must be switched On to Configure.

Fine-Tuning Trigger Settings



There are three ways to access the **Trigger** screen:

1. Navigate to the *Trigger* screen.

- **Menu** | Home screen - touch **#** where the # represents the trigger number channel.
- **Menu** | System Settings | Trigger
- **Menu** | System Settings | Component Configuration | Triggers | Configure

2. Do the following to continue to define and fine-tune applicators:

Item	Description	Default	Minimum	Maximum
Trigger selector	<p>Select the trigger you want to configure from the drop-down list box.</p> <p>NOTES:</p> <ul style="list-style-type: none"> Only those triggers with an <i>Installed</i> check mark in the <i>Component Configuration</i> screen are available or visible in Trigger drop-down list. Spectra Link Pattern Controller requires at least one applicator and trigger to be installed and available for setup and configuration. 	---	---	---
Trigger				
Trigger Polarity	<p>Light On - Trigger signal activated when leading edge detected.</p> <p>Dark On - Trigger signal deactivated when leading edge detected.</p>	Light On	---	---

Masking					
Item	Description	Default	Minimum	Maximum	
Active Masking	Read-only value, displaying the longest mask (Trigger Mask or Pattern Mask) value in time or distance.	---	---	---	
Masking	Enable this option to prevent a trigger signal for a predetermined distance or time. Use this setting when the product contains a cutout, such as for an envelope with a window. Refer to About Trigger Masks and Filters for more information.	Disabled	---	---	
Trigger Masking	Enter the distance or time where you want to prevent a trigger signal causing unwanted dispensing of adhesive associated with one or more applicators on the product NOTES: <ul style="list-style-type: none"> The masking function is ignored if the entered distance/time is shorter than the actual bead length/time. For <i>Random Length Mirror</i>, the Trigger Mask value must be shorter than the shortest product length. 	0 mm 0 inch 0 ms	1 mm 0 inch 0 ms	10,000 mm 393.7 inches 99,999 ms	
Under Length / Over Length					
Item	Description	Default	Minimum	Maximum	
Captured Trigger Length	Touch to have Spectra Link automatically calculate and enter the trigger length. Typically the trigger length is the product length. NOTE: <ul style="list-style-type: none"> Although you can manually enter the trigger length value, it is strongly recommended that you allow Spectra Link to calculate this value. If needed, you can fine-tune the trigger length by adjusting the Under/Over Tolerance values. 	---	MM: 1 Inch: 0.1 MS: 1	MM: 10,000 Inch: 393.7 MS: 99,999	
Under Length / Over Length	Enable the Under Length and Over Length options to allow a trigger alarm to occur if the trigger-detected product is shorter or longer (in time or distance) than expected, resulting in products not receiving the expected amount of adhesive on the intended location. NOTES: <ul style="list-style-type: none"> By default, Under Length and Over Length alarms are system Alerts, but you can reconfigure this alarm as a Fault. Refer to Changing Alarms Levels and Masking Alarms for more information. You can optionally use this option with Stop Settings to either cause a Machine Stop or Feed Stop. Refer to Defining Stop Settings for more information. <ul style="list-style-type: none"> If you enable Stop Settings, and if an alarm is detected, you will get both a Stop alarm and by default a system Alert alarm. This setting is not available for virtual triggers. 	Disabled	---	---	

Item	Description	Default	Minimum	Maximum
Under Length Tolerance	<p>Enter the reduced tolerance (offset) time or distance from the Captured or manually entered Trigger Length value, to prevent an Under Length alarm.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • Refer to Minimum Trigger Length. • If the calculated Over Length Tolerance value is greater than the Captured or manually entered Trigger Length, then the Maximum Trigger Length is 0 (zero) 	---	MM: 1 Inch: 0.1 MS: 1	MM: 10,000 Inch: 393.7 MS: 99,999
Minimum Trigger Length	Displays the read only calculated value tolerance (offset) value for Under Length Tolerance. (Captured or manually entered Trigger Length value <i>minus</i> the Under Length Tolerance = Minimum Trigger Length)	---	---	---
Over Length Tolerance	<p>Enter the increased tolerance (offset) time or distance from the Captured or manually entered Trigger Length value, to prevent an Over Length alarm.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Refer to Maximum Trigger Length. 	---	MM: 1 Inch: 0.1 MS: 1	MM: 10,000 Inch: 393.7 MS: 99,999
Maximum Trigger Length	Displays the read only calculated value tolerance (offset) value for Over Length Tolerance. (Captured or manually entered Trigger Length value <i>plus</i> the Over Length Tolerance = Maximum Trigger Length)	---	---	---
Trigger Plot				
Trigger Plot	Use the Trigger Plot feature to troubleshoot the overall performance and accuracy of the dispensing of adhesive on products. Refer to Diagnosing Trigger Performance for more information.	---	---	---

About Trigger Masks and Filters

The purpose of a **trigger mask** is to prevent the unwanted trigger activation and adhesive bead pattern dispensing, caused by one or more of the following:

- A cut out in the product.
- Reflective ink printed on the product.
- The operation of a mechanical device, such as a carton carrier's arm that is detected by the trigger.

The purpose of a **trigger filter** is to remove electronic noise from mechanical switches causing unwanted trigger activation and adhesive bead pattern dispensing .

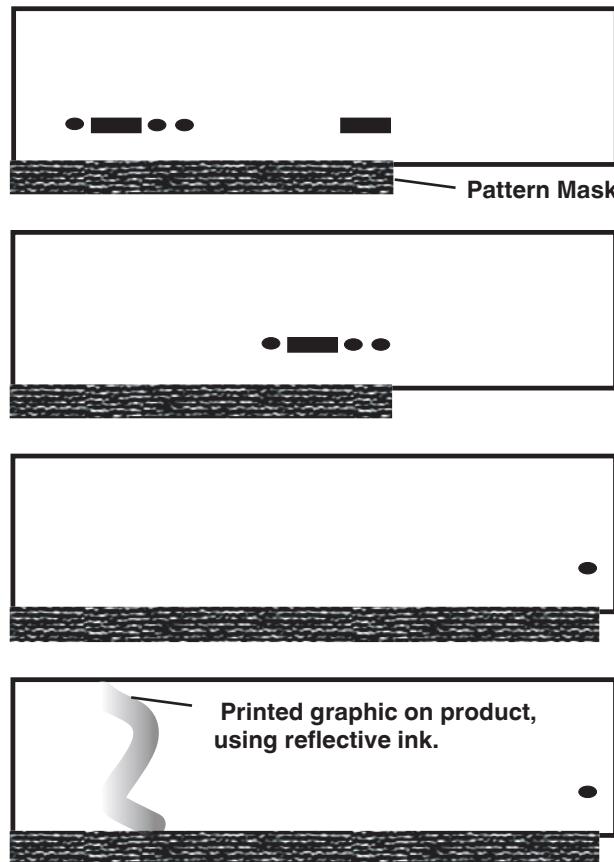
The following sections detail masks and filters in greater detail.

About The Pattern and Trigger (user-defined) Masks

Pattern Mask: Spectra Link automatically (not user defined) includes a mask value beginning from the leading edge of a product, through the end of the bead pattern, which may or may not be the end of the product.

The following illustrates how the Pattern Mask works.

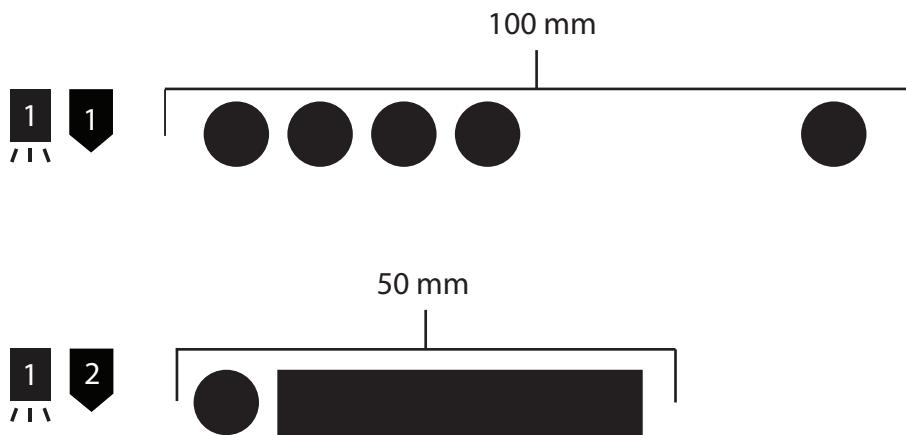
- All pictures show how the Spectra Link interprets the Pattern Mask based on your design of the bead pattern.



- The bottom picture includes a graphic, printed using reflective ink on the product. Since the Pattern Mask begins at the leading edge of the product and ends at the end of the bead pattern, the entire length of the product is masked, therefore ignoring the printed graphic that would have otherwise activated the trigger

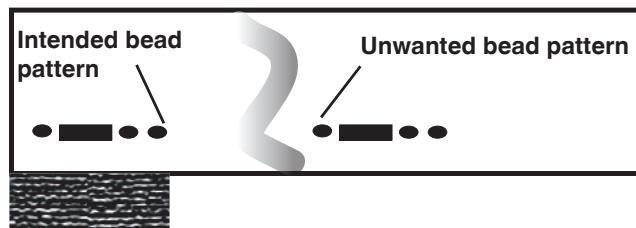
NOTES:

- You cannot disable this mask.
- The user interface does not graphically show this mask.
- If you have two applicator channels, each with its own unique pattern, but share the same trigger channel, the Pattern Mask length will be which ever bead pattern is longest. For example:
 - If the length of the bead pattern for applicator #1 is 50mm and the 2nd applicator bead pattern is 100mm, then the Pattern Mask will be 100mm for **both** bead patterns.

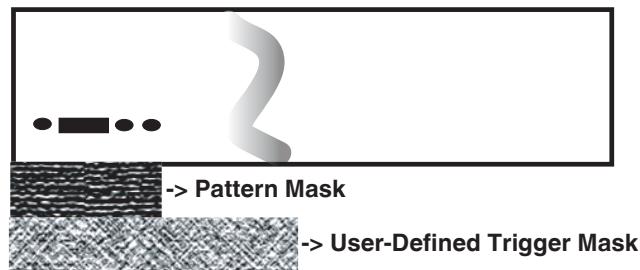


Trigger Mask: Optional. Use the Trigger mask if the bead pattern design does not span the entire length of the product, **and** if there is a possibility of an erroneous trigger event, such as a printed graphic using reflective ink.

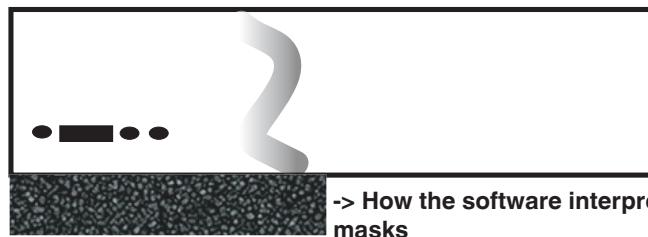
The following illustrates how the Trigger Mask works.



- Displays how the Pattern Mask only protects the integrity of the bead pattern itself, which does **not** include the entire length of the product.
 - Since the product includes a graphic and is not protected by the Pattern Mask, the leading edge of the graphic activates the trigger causing the unwanted bead pattern following the printed graphic.



- Displays both the Pattern Mask and a User-Defined Trigger Mask, which includes the graphic.
 - The combination of both the Pattern Mask and the User-Defined Trigger Masks protect the intended bead output, ignoring the graphic that would have otherwise activated the trigger.



-> How the software interprets the masks

- Displays how the Spectra Link software interprets both masks (middle picture). To the software, there is only one mask.
- The “Active Mask” is the longer of the two. The Pattern Mask indicates 0 when the Adhesive is Off. The trigger mask (if enabled) indicates “Active Mask.”

NOTES:

- The user interface does not graphically show this mask.
- The value is based on your scaling units of measure, which could be either time (ms) or distance (mm or inches).
- When entering the time or distance value, make sure not to extend this mask too far past the trailing edge of the product as it may interfere with detecting the leading edge of the next product on the line.
- Each installed/detected trigger can have the same or different trigger mask value.
- The Random bead types and the Continuous bead pattern do not include a pattern mask.

Understanding Trigger Filtering

Trigger Filter. Optional and user defined. Use trigger filtering to remove electrical noise from a mechanical switch, such as a limit switch, that may cause an unwanted trigger signal anywhere on the line causing an unwanted trigger event, resulting in the restarting of a pattern sequence.

A trigger can detect electrical noise anywhere on the line. The length of the noise (peak and valley) is automatically measured (in ms). Refer to Figure 6-1. (h) is electronic noise on the line.

NOTES:

- The user-defined trigger filter value applies to all installed/detected triggers.
- Trigger filtering units is only in time (ms). If available, use an oscilloscope to get a precise measurement of distance (in time) between the peaks and valleys. Otherwise, use the trial and error method to get the results you want.
- Entering a value of zero (0) disables this feature.

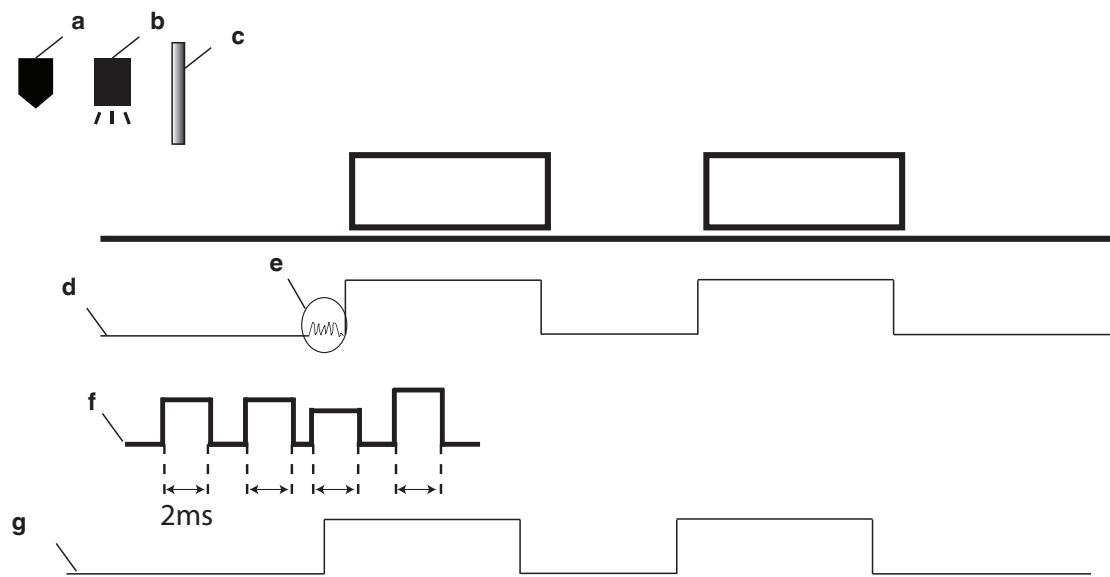


Figure 6-1:

Item	Description
a	Applicator
b	Trigger
c	Limit Switch
d/e	Signal, showing the electronic noise from the Limit Switch (c)
f	Close up of the electronic noise
g	Signal after trigger filtering

About Runup

Use runup to maintain a consistent adhesive pattern output within the defined 2-point curve.

- Have the Encoder license.
- You have wired main Pattern Controller board for runup.

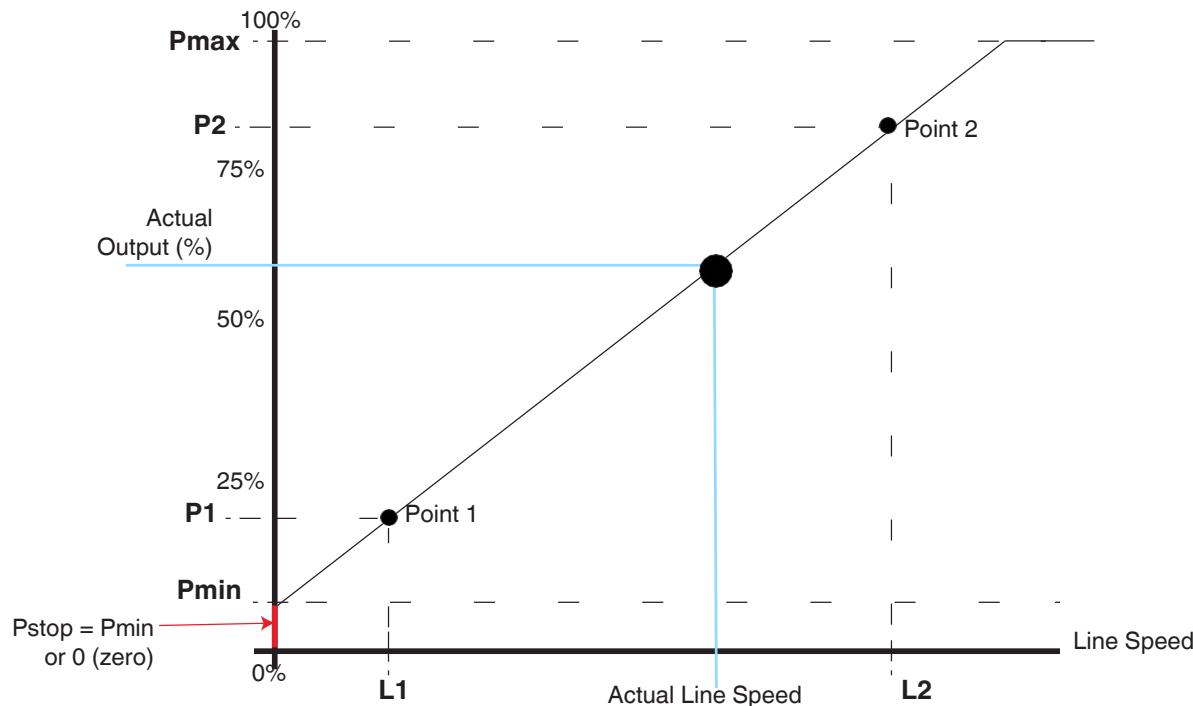
NOTE:

- Refer to the installation section, Connecting Runup for more information.

Understanding the 2-Point Graph

Refer the 2-point graph below.

- Runup does not control the speed of the line, nor the pressure. All Runup pressure settings are defined as a percentage.



Entering 2-Point Curve Output Settings

1. **Menu** | Runtime Settings | Runup.

Entering Runup Point 1

- Low Speed Output (P1) - Run the line at the **slowest** production speed.

Default	Minimum (Calculated Value)	Maximum (Calculated Value)
0%	Minimum Runup Output Value (represented as %)	Maximum Runup Output Value(represented as %)

- Low Line Speed (L1): Record the line at the **slowest** production speed.

Distance	Default	Minimum	Maximum
Feet/Minute			1968.5
Meters/Minute	0	0	600

Entering Runup Point 2

- High Speed Output (P2) - Run the line at the **Fastest** production speed.

Default	Minimum (Calculated Value)	Maximum (Calculated Value)
100%	Minimum Runup Output Value (represented as %)	Maximum Runup Output Value(represented as %)

- High Line Speed (L2) Record the line at the **fastest** production speed.

Distance	Default	Minimum	Maximum
Feet/Minute	328.1		1968.5
Meters/Minute	100	0	600

Entering Runup Limits:

4. Enter the Maximum Runup (Pmax) value you want to use.

Default	Minimum (Calculated Value)	Maximum
100%	Whichever value is greater: • Low Speed Output Value • High Speed Output Value • Runup Purge Percentage	100%

5. Enter the Minimum Runup (Pmin) value you want to use.

Default	Minimum	Maximum (Calculated Value)
0%	0%	Whichever value is lesser: <ul style="list-style-type: none"> • Low Speed Output Value • High Speed Output Value • Runup Purge Percentage

Purge Runup Zone:

6. Enter the purge pressure, represented as a percent. The pressure is based on the capability of your external pressure device and the full Scale output:

Default	Minimum	Maximum (Calculated Value)
50%	0%	Whichever value is greater: <ul style="list-style-type: none"> • Low Speed Output Value • High Speed Output Value • Runup Purge Percentage

NOTE:

- Make sure to define the **Purge Runup Zone** for each applicator. Refer to **Fine-Tuning the Operation Mode, Applicators, Triggers and Runup** for more information.

Runup Encoder:

7. Decide which encoder (line) you want to associate these runup settings.
8. When done, navigate to another screen. Settings are automatically saved.

Troubleshooting False Trigger Events

It is strongly recommended that you test the placement and operation of the trigger and applicator while in production. You want to make sure the adhesive bead pattern is starting and stopping as intended.

While in production, take note of the trigger operation. Assuming the default trigger polarity (Light On), the trigger light indicator should illuminate when it detects the leading edge of the product and stays on until the end of either the bead pattern or product.

If the trigger indicator light flashes quickly on and off either before, during or after reaching the end of the product, then unintended adhesive output may occur.

Where the operation of a mechanical device, such as a carton carrier's arm is detected by the trigger. If possible, move either the trigger or the mechanical device to a different location where the physical device does not interfere with the trigger.

Section 7

System Operation Settings



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

In this Section

This section details the following:

- Purging
- Managing Recipes
- About Remote Recipe Inputs
- Defining Machine Settings
- Defining Network Settings
- Locking Out Communications

Purging

Warnings and Hazards



WARNING! Failure to follow the safety messages, recommendations, and hazard avoidance procedures provided in this section can result in personal injury, including death, or damage to equipment or property.



WARNING! Only qualified personnel should purge applicators, and wear the appropriate PPE (Personal Protective Equipment) such as safety glasses and heat resistant gloves.



WARNING! If you have an encoder purge pressure can be defined based on the runup settings. Setting the **Purge Runup Zone** to 0% means max runup air pressure will be used when purging.



WARNING! If you do not have an encoder, it is YOUR responsibility to regulate air pressure to applicators when purging.



WARNING! Nordson Corporation is not responsible for any personal injury, including death, or damage to equipment or property as a result of purging. You must follow your corporate policy and procedures when purging.



WARNING! It is the responsibility and obligation of the qualified personnel to make sure no personnel are exposed to hazard and safety systems are satisfied before purging.

Purging Options

Purging is the process of removing trapped air or material from the adhesive applicator or nozzle, or relieves system pressure when the applicator is turned on.

There are two methods of purging:

- From the user interface
- From an external purge circuit connected to a purge configured input on the Legacy IO Board.

Purging from Spectra Link Pattern Controller



WARNING! Refer to **Warnings and Hazards**. Failure to follow the safety messages, recommendations, and hazard avoidance procedures provided in this section can result in personal injury, including death, or damage to equipment or property.

NOTES:

- If you have an encoder, purge pressure is defined based on the **Purge Runup Zone**. Refer to **About Runup** for more information.
- If you do not have an encoder, it is YOUR responsibility to regulate air pressure to applicators when purging.

1. Touch  then navigate from **Home | Purge**
2. Select which applicator or applicators you want to purge.
3. Decide which purge option you want to use:

Purge Mode	Description
Purge	Touch and hold the applicator button down to purge. When the button is released, purging stops.
Hammer	Touch and hold the applicator button down to purge in fast 50 ms pulses. When the button is released, purging stops.
Flush	Touch the applicator button down to purge. When the button is touched again, purging stops.

Managing Recipes

A recipe is a collection of operation mode (time or distance) applicator, trigger, bead or dot pattern settings, and optional runup settings to make sure the adhesive pattern output is precisely dispensed on products on a conveyor line.

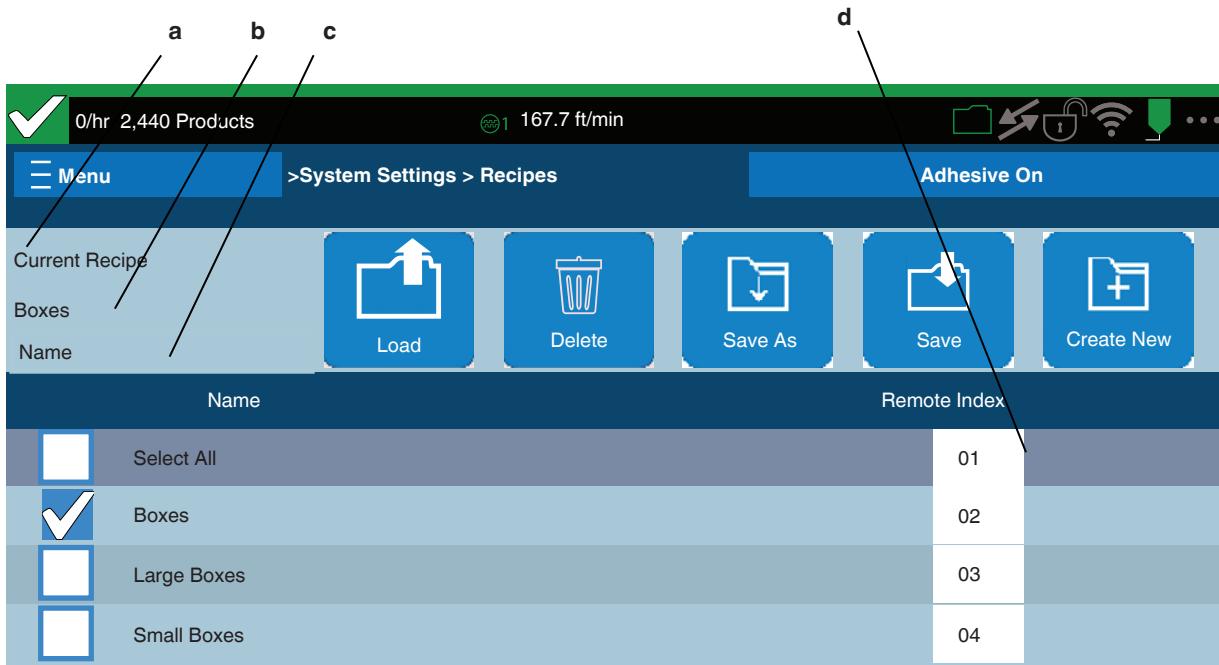
Use recipes if you have multiple products of varying sizes, shapes and adhesive pattern requirements, that you can switch between production schedules.

Although settings are automatically saved in real-time, they are not automatically saved to a recipe. An asterisk appears next to the recipe name or number, indicating that the recipe was modified, but not yet saved. You must save those changes; otherwise, those changes will be lost the next time the pattern controller is power-cycled or when another recipe is loaded.

You can remotely load a recipe if you have the optional Legacy Input/Output. Refer to **Managing Recipes** and **About Remote Recipe Inputs** for more information.

NOTES:

- By default, recipes are disabled. However, you can enable recipes either from the Commissioning Wizard or from **System Settings | Machine Settings**.
- Distance mode and runup requires an Encoder license.
- You must first create a recipe name then save the settings.
- You can have a maximum of 50 recipes.
- You can import/export all recipes using the backup/restore method. Refer to **Backing Up/Restoring/Resetting** for more information.



Item	Description
a	Indicates the currently loaded recipe.
b	Indicates that changes have been made, but not saved. If you load another recipe, all changes will be lost.
c	Touch to view a sorted list of recipes based on name (alphabetical A-Z) or Remote Index number. 1-31.
d	<p>User defined.</p> <ul style="list-style-type: none"><li data-bbox="722 1017 1375 1039">If you are making use of Remote Recipe Input, you can optionally enter the corresponding number (order) of the remote recipe index number.<li data-bbox="722 1039 1375 1060">If you are not making use of Remote Recipe Input, you can enter any number you want to make sorting more meaningful.

Creating, Loading and Saving Recipes

- You must first touch **Create New** to create a recipe name then **Save** the settings to that recipe name.

1. Do one of the following to access the **Recipes** screen:
 - Touch  **Menu** then **Recipes**.
 - Navigate from **Home** | **System Settings** | **Recipes**

NOTE:

- If you do not see **Recipes**, then navigate from **Home** | **Machine Settings** and enable **Recipes**

2. Decide what you want to do:

Option	Description
 Load	<p>Select the check box corresponding to an existing recipe that you want to modify or use.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • If you make changes, an Asterisk appears next to the recipe name on both the Home and Recipes screen. You must either Save or Save As to retain the changes for future use.
 Delete	<p>Permanently remove the selected recipe or recipes.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • You cannot delete a recipe that is currently loaded.
 Save As	<p>Select the check box corresponding to an existing recipe that you want to save with identical settings, but to a different name.</p>
 Save	<p>Save changes to the existing recipe.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • If a recipe is controlled using Remote Recipe Input, the Save button is disabled. To allow saving changes to a Remote Recipe Input, navigate to Home Machine Settings and enable Remote Recipe Save.
 Create New	<p>Enter a unique name for your new recipe, then define the settings you want to use. When done, touch Save.</p>

Defining Inputs and Outputs

By default, the Spectra Link Pattern Controller has only 1 input, and 1 output.

You can purchase the optional Legacy I/O kit P/N 1132446 to include an additional 8 inputs and additional 4 outputs.

Standard Input (S1)			
#	Default Assignment	Description	
S1	Not assigned	You can select Remote Enable , which allows you to enable Adhesive On from a remote location.	
Standard Output (S1)			
S1	Ready	Indicates the system is waiting for signal to start production.	
Legacy Input (L1- L8)			
L1	5 Bit Remote Recipe (LBS)	Typically reserved for remote recipe assignments. Refer to About Remote Recipe Inputs for more information. However, you can also use these inputs for remote purging.	
L2	Remote Recipe Reserved		
L3			
L4			
L5			
L6	Remote Purge Applicator 1	Allows you to purge only from Applicator 1, based on your purge specifications. Refer to Purging for more information.	
L7	Remote Purge Applicator 1	Allows you to purge only from Applicator 2, based on your purge specifications. Refer to Purging for more information.	
L8	Remote Purge (All)	Allows you to purge all enabled applicators, based on your purge specifications. Refer to Purging for more information.	
Legacy Output (L1- L4)			
L1	Alert	Indicates a system or component Alert condition. Production continues, but there is a possible issue with the adhesive pattern output or system component.	
L2	Fault	Indicates a system or component fault condition. Production stops. A major system or fault condition exists and requires immediate attention.	
L3	Machine Stop	Refer to About Machine and Feed Stop Settings for more information.	
L4	Feed Stop		

About Remote Recipe Inputs

Use Remote Recipe to load a recipe from a remote location using a PLC by toggling input bits high and low.

You must have the following:

Item	Location
Legacy I/O	Contact your Nordson sales representative. Kit P/N 1132446
Recipes (Enabled)	Home Machine Settings Recipes
Remote Recipe Save (Enabled)	Home Machine Settings Remote Recipe Save NOTE: <ul style="list-style-type: none">Enabling this option allows you to save changes to a recipe controlled using Inputs (Remote Recipe).

NOTES:

- If you delete a recipe that is assigned to a remote recipe index, you must manually unassign the remote recipe index or assign a new recipe.
- You cannot load a new recipe from the local user interface while in Remote Recipe Management. To do so, you must disable the input assigned for remote recipe or manually switch all inputs to their OFF position.
- If a remote recipe is loaded, then all recipe management options are disabled unless you enable the **Remote Recipe Management (System Settings | Preferences)**, with the exception of Loading a recipe.
- Inverting one input for remote recipe management, inverts all remote recipe management inputs. Inputs not used for remote recipe management are not affected.

Assigning and Using Remote Recipe Inputs

- Make sure your system has the Legacy I/O board installed and properly wired.
- Make sure you have Recipes enabled and optionally Remote Recipe Save.

1. **Create a New** recipe, name it, and configure the system with the appropriate Applicator, Trigger and Operation Mode (Time or Distance/Runup) settings.
2. Save the recipe.
3. Navigate to **Home | System Settings | System I/O | Input**. Select **Legacy**, located in the upper left-hand corner.
4. Decide how many inputs you want to reserve for Remote Recipe.

Selection	Number of Recipes
2-Bit Remote Recipe	3
3-Bit Remote Recipe	7
4-Bit Remote Recipe	15
5-Bit Remote Recipe	31

Select a recipe you want to assign to a Remote Index number that corresponds to your Remote Recipe Input selection. For example, if you selected 2-Bit Remote Recipe from the Input screen, then you can assign a recipe to Remote Recipe Index 1, Remote Recipe Index 2 and Remote Recipe Index 3.

5. Select the index number and manipulate the bits (High and Low) to load the recipe you want to use.

NOTE:

- The lowest input number used for remote recipe management is the lowest significant bit (LSB) when selecting a recipe.

The following table details the input bits and their sequence required to remotely load a recipe

Remote Recipe Index #	5-bit	4-bit	3-bit	2-bit	
0	Low	Low	Low	Low	Low
1	Low	Low	Low	Low	High
2	Low	Low	Low	High	Low
3	Low	Low	Low	High	High
4	Low	Low	High	Low	Low
5	Low	Low	High	Low	High
6	Low	Low	High	High	Low
7	Low	Low	High	High	High
8	Low	High	Low	Low	Low
9	Low	High	Low	Low	High
10	Low	High	Low	High	Low
11	Low	High	Low	High	High
12	Low	High	High	Low	Low
13	Low	High	High	Low	High
14	Low	High	High	High	Low
15	Low	High	High	High	High
16	High	Low	Low	Low	Low
17	High	Low	Low	Low	High
18	High	Low	Low	High	Low
19	High	Low	Low	High	High
20	High	Low	High	Low	Low
21	High	Low	High	Low	High
22	High	Low	High	High	Low
23	High	Low	High	High	High
24	High	High	Low	Low	Low
25	High	High	Low	Low	High
26	High	High	Low	High	Low
27	High	High	Low	High	High
28	High	High	High	Low	Low
29	High	High	High	Low	High
30	High	High	High	High	Low
31	High	High	High	High	High

NOTE:

- If you **invert** the Input, reverse the displayed polarity for each bit.

Defining Machine Settings

Machine settings are global settings that are typically defined once. The following table details the available **Machine Setting** options.

1. Touch  **Menu** then navigate from **Home** | **System Settings** | **Machine Settings**. Do one of the following to access the **Recipes** screen:
 2. Refer to the following table for Machine Setting options.

Option	Description	Default	Minimum	Maximum
Adhesive Start Speed	<p>Allows dispensing of the adhesive pattern to <i>start</i>, only when the user-defined speed is exceeded.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • This setting is only available if you have the Encoder license and the encoder is installed. • You can set this to 0 (zero) meaning that dispensing of the adhesive pattern occurs at any line speed, including when the line is not moving. 	1.5 m/min 4.92 ft/min	0	600 m/min 1968.5 ft/min
Adhesive Stop Speed	<p>Allows dispensing of the adhesive pattern to <i>stop</i>, only when the user-defined speed is not exceeded.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • This setting is only available if you have the Encoder license and the encoder is installed. • You can set this to 0 (zero) meaning that dispensing of the adhesive pattern never stops, including when the line is not moving. 	1 m/min 2/ft/min	0	600 m/min 1966/m/min
Recipes	<p>Allows you to create and save recipes.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Required if you want to make use of Remote Recipe Input. Refer to Managing Recipes and About Remote Recipe Inputs for more information. 	Disabled	---	---
Remote Recipe Save	<p>Allows you to Save changes to a recipe controlled using Remote Recipe.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • The Recipes option must be enabled. 	Disabled	---	---
Auto Start Adhesive Power Up	<p>Changes the system state from Ready to RUN.</p> <ul style="list-style-type: none"> • No faults • Dispensing occurs when the production line is above the Adhesive Start Speed (Encoder only) setting. 	Disabled	---	---

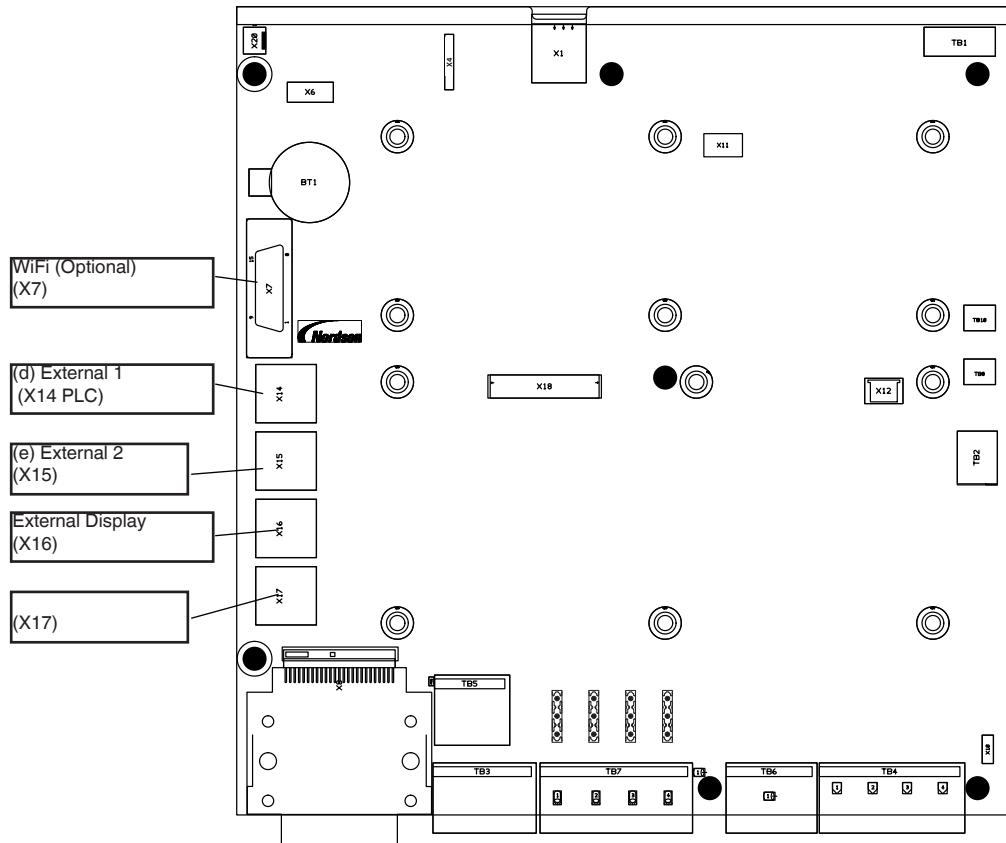
Option	Description	Default	Minimum	Maximum
Remote Enable also Enables Purge	<p>Prevents purging if the default system input, S1 (Remote Enable) condition is False, indicating one of the following has happened:</p> <ul style="list-style-type: none"> • The Adhesive button is OFF • The S1 input has been changed to be false. <p>Under these conditions, you cannot purge from the local or remote user interface (PLC or inputs). All conditions must be met to purge remotely.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • The S1 input must be assigned to Remote Enable. If the S1 input is Not Assigned, then this setting is not visible. 	Enabled	---	---
Palletize	Palletization is the process of stacking large quantities of similar size products onto a pallet for secure storage or transportation purposes. Refer to Setting Up Palletization for more information.	Disabled	---	---
Trigger Memory	<ul style="list-style-type: none"> • If enabled: (the default) <ul style="list-style-type: none"> • For Distance Mode Operation: When an Adhesive Stop Speed condition exists, then upon returning to above the Adhesive Start Speed setting, the adhesive bead pattern is dispensed to products between the trigger and the applicators, including products underneath the applicator. • For Time/Time (Scaled Time): When a condition forces the system to exit a Run state, upon returning to a Run state, the adhesive bead pattern is dispensed to products between the trigger and the applicators, including products underneath the applicator. • If disabled: <ul style="list-style-type: none"> • For Distance Mode Operation: When an Adhesive Stop Speed condition exists, then upon returning to above the Adhesive Start Speed setting, the adhesive bead pattern is NOT dispensed to products between the trigger and the applicators. • For Time/Time (Scaled Time): When a condition forces the system to exit a Run state, upon returning to a Run state, the adhesive bead pattern NOT dispensed to products between the trigger and the applicators. 	Enabled	---	---
Trigger Filter	<p>Eliminates electrical or mechanical noise by filtering signal pulses or gaps.</p> <p>Eliminates or reduces electronic interference on the trigger by ignoring a pulse every 1 ms by default.</p>	1 ms	0	25.5 ms

Option	Description	Default	Minimum	Maximum
Blocked Trigger	<p>Enable this option to detect if any trigger signal remains active for a longer than expected time or distance, resulting in products not being properly detected and therefore not receiving adhesive.</p> <p>A block trigger could be caused by dirt or debris is on the trigger itself, or there may be an issue the way products are placed on the conveyor line, causing products to overlap or to be placed in the wrong orientation.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • You can optionally use this option with Stop Settings to either cause a Machine or Feed Stop. Refer to Defining Stop Settings for more information. • This setting is not available for virtual triggers. Refer to Virtual Triggers and Encoders - Theory of Operation for more information. 	Disabled	---	---
Blocked Trigger	Block trigger values	1000 mm 393.7 inches 300 seconds	1 mm 0.01 inches 1 second	1000 mm 393.7 inches 300 seconds
GTO Mode	<p>There are 3 GTO modes to choose from:</p> <p>Single - Provides a single GTO value per applicator. Not saved to recipe.</p> <p>Multiple - EPC30 - Same as Single GTO Mode, except the GTO value is stored in the recipe</p> <p>Recipe - Sets the GTO based on a matrix where each distance to each trigger for an applicator can be uniquely defined.</p>	Single	---	---
Compensation Sampling Rate	<p>WARNING! Only qualified Nordson technicians should attempt to change this setting.</p> <p>A low setting makes the reaction to sudden line speed changes very fast. A high number makes the system more yielding to sudden line speed changes.</p>	50 ms	10 ms	100 ms
Adhesive On Melter Run	<p>Requires BBconn System Network to be enabled. Refer to https://nordson.info/Spectralink - Product Title: BBconn System Network – Customer Product Manual for more information.</p> <p>Start dispensing the bead pattern when:</p> <ul style="list-style-type: none"> • The Adhesive On Melter Run option is enabled. • Any ProBlue Flex melters within the BBconn System Network are in a RUN state. • All conditions are met on the Spectra Link pattern controller for Ready. 	Disabled	---	---
Hammer Speed	Select the speed you want the applicator to cycle.	Fast	---	---

Defining Network Settings

The following section details how to connect this pattern controller to your network or graphical user interface so you can remotely monitor controller.

There are four Ethernet ports on the Main board, but only the two top ports, X14 and X15 can be configured for external networking use.



Since X14 is typically used for PLC communications, you can, for example, separate X14 and X15 network traffic by configuring X15 to use different network settings. By doing so, X15 could be used for Web Server Graphical User Interface access while X14 can be continue to be used for PLC access. Network traffic would be segregated or separated.

NOTE:

- X14 PLC is typically dedicated for PLC connectivity.

Setting Up Networking

1. Touch **☰ Menu** then navigate from **Home** | **System Settings** | **Network Settings** | **Public Wired Networks**.
2. Decide the following:
 - Do you want to enable the **BBconn System Network Configuration**, which allows you to monitor and control multiple ProBlue Flex melters and Spectra Link pattern controllers from a single display panel. Refer to manual part number 1132672 for setup information.
 - Do you want to have a dedicated PLC communication Ethernet port (X14)
 - Yes - enable **Two Public Ethernets**
 - No - leave **Two Public Ethernets** disabled, the default.

If Two Public Ethernets is Disabled	If Two Public Ethernets is Enabled
<p>X14 and X15 share the following:</p> <ul style="list-style-type: none"> • Default Gateway: 192.168.3.1 • Public IP: 192.168.3.1 • Public Subnet IP: 255.255.255.0 	<p>X14:</p> <ul style="list-style-type: none"> • Default Gateway: 192.168.3.1 • Public IP: 192.168.3.1 • Public Subnet IP: 255.255.255.0 <p>X15:</p> <ul style="list-style-type: none"> • Default Gateway: 192.168.5.1 • Public IP: 192.168.5.1 • Public Subnet IP: 255.255.255.0

- Do you want to make use of DHCP for X14 and X15?
 - Yes - enable **DHCP**
 - No - leave **DHCP** disabled, the default.
3. When done, navigate to another screen. Settings are automatically saved.

Setting Up WiFi

WiFi allows you to monitor and manage the Spectra Link Pattern Controller from a remote location using the Web Server Graphical User Interface. The limited broadcast range is about 15 meters (50 feet) with a clear and straight line-of-site. Any obstructions, such as a wall or a corner may limit this range.

NOTE:

- WiFi connectivity to Nordson equipment can be impacted by other equipment operating within the same 2.4GHz channel. If you are not getting the desired performance, change the Channel setting.

1. Touch  **Menu** then navigate from **Home | System Settings | Network Settings | WiFi**.

2. Enter or select the WiFi settings you want to use:

Option	Description	Default	Minimum	Maximum
Number of Clients	Number of WiFi users you want to grant access to the melter at any one time	2	1	4
Channel	The channel that corresponds to the frequency of the WiFi you are using	6	1	11
SSID	WiFi Service Set Identifier, such as the Network ID	10-digit serial number of the unit	1 alphanumeric character	32 alphanumeric characters
Security Mode	Type of security, if any, you want to use	WPA /PSK	Select Open if you do not want to restrict network access to this unit.	
Access Code	Enter access code	Nordson321	8 characters	63 characters
WiFi On	Toggle (enable or disable) WiFi.	Disabled	---	
SSID Broadcast On	Toggle (enable or disable) SSID Broadcast, which enables the WiFi module to broadcast its SSID.	Enabled		

3. When done, navigate to another screen. Settings are automatically saved.

NOTES:

- The factory default SSID for a unit is the melter's 10-digit serial number. The factory default access code for a unit is Nordson321.
- To prevent accidentally locking you out, when connected to the unit using X14, X15 or wirelessly, the Web Server settings are hidden.
- If you have more than one Spectra Link Pattern Controller in the same location, make sure each unit has a unique SSID name and that they are using different WiFi channel numbers.
- Follow your corporate security policy regarding access codes. Although it is convenient to have one access code for multiple WiFi-enabled units, however, it also makes the unit less secure and vulnerable to unauthorized access.

Wirelessly Connecting to the Web Server Graphical User Interface

You must have the following:

- To prevent accidentally locking you out, when connected to the Spectra Link pattern controller using X14, X15 or wirelessly, the Web Server settings are hidden.
- The country that you are using the melter in must allow for WiFi connectivity.
- Make sure the *SSID Broadcast On* (*System Settings | Network WiFi*) is enabled, so you can view and select it from the list. Optionally, you can disable it, but you must enter the SSID when prompted by your web-enabled device.
- WiFi is enabled and that you know the SSID and pass code if required.

1. From most any laptop or device that is WiFi enabled, select the Spectra Link Pattern Controller from the WiFi list by its 10-digit serial number
2. From an Internet browser (Chrome is recommended) enter the Nordson Web Server IP address; 192.168.243.1

Defining Web Server Access

1. Touch  **Menu** then navigate from **Home | System Settings | Network Settings | Web Server**
2. Select which Web Server options you want to use.

Option	Description	Default	Notes
External Web Access	Toggle (enable or disable) External Web Access. When enabled, it allows remote (read/write) access to the Spectra Link graphical user interface either through a WiFi or using an Ethernet (x14 or X15) connection	Enabled	---
External Web Access Read Only	Toggle (enable or disable) External Web Access Read Only. When enabled, it allows remote (read only) access to the Spectra Link graphical user interface either through a WiFi or an Ethernet (x14 or X15) connection	Disabled	Disabled means remote users can view and make changes. Enabled means read-only access.

3. When done, navigate to another screen. Settings are automatically saved.
4. From an Internet browser (Chrome is recommended) enter the Nordson Web Server IP address; 192.168.223.1.

Defining PLC Access

1. Touch  **Menu** then navigate from **Home** | **System Settings** | **Network Settings** | **PLC**
2. Select and enter the following.

Option	Description	Default
PLC Access	When enabled, allows remote (read/write) access to the Spectra Link inputs.	Enabled
PLC Access Read Only	When enabled, allows remote Read only access to the Spectra Link inputs.	Disabled
Profinet Station Name	Enter the Profinet station name. The station name rules: <ul style="list-style-type: none"> - Can contain letters and numbers - Letters must be lower case. - Can contain a hyphens (-) and periods (.) - Cannot begin or end with a hyphen (-) or a period (.) - Cannot begin with the character string “port-xyz” (x, y, z = 0 to 9) - Cannot have the form of an IP address n.n.n.n (n = 0 - 255) 	splink-pnio

3. When done, navigate to another screen. Settings are automatically saved.

Locking Out Communications



WARNING! It is the responsibility and obligation of only qualified personnel to make sure no personnel are exposed to any hazards.

Activating (locking out) **Communication** prevents any remote (Input or PLC) write or execute commands to the Spectra Link Pattern Controller. Typically, you would activate communication (lockout) while performing maintenance on the system,

The default is disabled, meaning full access is permitted.



WARNING! De-energize the equipment and all auxiliary devices before servicing the equipment.

NOTE:

- While Communication (lockout) is active, remote read (view only) is allowed.

1. Touch  **Menu** then navigate from **Home** | **Tools** | **Communication**
2. Touch the slider to activate Communication (lockout).

Setting Up Palletization

Palletization is the process of stacking large quantities of similar size products onto a pallet for secure storage or transportation purposes. Instead of using non-recyclable plastic, typically an adhesive specifically for palletization is used on the top of the boxes, thereby stabilizing the stack, while not damaging the tops of each product. The top level of the product stack does not get adhesive.

NOTES:

- You can assign the Palletization tile to the **Home** screen, so you can monitor this process in real time.
- When setting up palletization, the **Adhesive On** must be *Off*.
- At least one trigger must be commissioned and enabled.
- You cannot use a virtual trigger for palletization.
- You can increase or decrease either the **Adhesive Count** or the **Skip Count** in real-time to accommodate the remaining products in the production run.
 - If for example you need to remove or add a product to the palletization line, you can either  (increase) or  (decrease) the count.

1. Touch  then navigate to **System Settings | Machine Settings** and enable Palletize. The default is disabled.
2. Touch  then navigate to **Runtime Settings** and touch Palletization.

3. Do the following to continue:

Option	Description	Default	Minimum	Maximum
Palletizing Trigger	Select which trigger you want to use for Palletizing.	The first trigger commissioned and installed.	---	---
Target (product) Adhesive Count	<p>Enter the consecutive number of products that will receive adhesive, excluding the products at the top of the stack.</p> <p>For example, if the stack is 6 products wide on a pallet, by 6 products stacked vertically, the Target (product) Adhesive Count would be 30.</p> <p>NOTE:</p> <ul style="list-style-type: none"> The addition of the Target (product) Adhesive Count AND the Target (product) Skip Count equals the total number of products on the pallet. 	10	1	511
Target (product) Skip Count	<p>Enter the total number of products on the top level of the stack. These products will not get adhesive.</p> <p>For example, if the stack is 6 products wide on a pallet, by 6 products stacked vertically, the Target (product) Skip Count would be 6.</p> <p>NOTE:</p> <ul style="list-style-type: none"> The addition of the Target (product) Adhesive Count AND the Target (product) Skip Count equals the total number of products on the pallet. 	10	1	511

3. When done, navigate to another screen. Settings are automatically saved.

About Machine and Feed Stop Settings

There are two types of **Stop** conditions:

Stop Type	Description	Default
Machine Stop	<p>Machine Stop is most often used with an E-Stop (Emergency Stop). This is when a fast stop of the machine must be done for safety or mechanical reasons. It might be a jam, but most often it is an E-Stop.</p> <ul style="list-style-type: none"> Automatically switches Adhesive Off. Products in the queue do not receive dispensed adhesive. 	Disabled
Feed Stop	<p>Feed Stop is used when a soft stop of the products feeding the production line is needed. This may be to perform manual minor mechanical adjustments or simply to stop production for poor quality.</p> <ul style="list-style-type: none"> Adhesive remains On. Products in the queue receive dispensed adhesive. 	Disabled

NOTES:

- **Machine Stop** and **Feed Stop** are independent of each other. For example, under **Machine Stop**, you can select *Blocked Trigger* and under **Feed Stop**, you also select *Blocked Trigger*. In this case, when a blocked trigger event occurs, you will get both a **Feed Stop AND a Machine Stop** at almost the same time. Ultimately, the Adhesive is switched off.
 - It is recommended that you do not select the same stop event (*System Alerts, Blocked Trigger, Trigger Over/Under Length and System Faults*) from both **Machine Stop** and **Feed Stop** as it may unintentionally cause production to halt.
- The use of the optional Legacy IO board (kit P/N 1132446) is required. By default, the Legacy IO board, L1 is assigned for Fault. However, you could connect multiple wires for multiple tasks, to include illuminating a light tower and to switch power off to the conveyor line from a single output. However, so as not to assign too many tasks to one output, the Legacy IO includes the following outputs:
 - The Legacy Output, L3 is the default output for Machine Stop.
 - The Legacy Output, L4 is the default output for Feed Stop.
- Stop events are logged in the Event Log.

Defining Stop Settings

1. Touch  **Menu** then navigate to **System Settings | Stop Settings**
2. Decide which **Stop Setting**, **Machine Stop** or **Feed Stop** you want to use.
 - You can decide what causes a Stop condition from one or more of the following events

Stop Event	Description	Refer to...
System Alerts	Any system generated Alert.	Troubleshooting Alarms
Blocked Trigger	The trigger remains activated longer than the user-defined amount of time or distance. This may be caused by dirt or debris on the trigger itself, or if products are not properly aligned or oriented on the conveyor line. NOTE: Blocked Trigger must be enabled and defined.	Machine Settings
Trigger Over Length	The trigger remains activated longer than the user-defined amount of time or distance. This may be caused by products not properly aligned or oriented on the conveyor line. NOTE: Under Length/Over Length must be enabled and defined.	Fine-Tuning Trigger Settings
Trigger Under Length	The trigger remains activated shorter than the user-defined amount of time or distance. This may be caused by products not properly aligned or oriented on the conveyor line. NOTE: Under Length/Over Length must be enabled and defined.	
System Faults	Any system generated Fault. Since a Fault condition has a higher priority than a Stop condition, the system state initially indicates a Fault, until you clear it, then the system will indicate a Stop condition, which you must clear separately and from a different location. <ul style="list-style-type: none"> • You can clear a Machine Stop from: System Settings Stop Settings Machine Stop and touch Clear Stop • You can clear a Feed Stop from: System Settings Stop Settings Feed Stop and touch Clear Stop 	Clearing a Stop Alarm

NOTES:

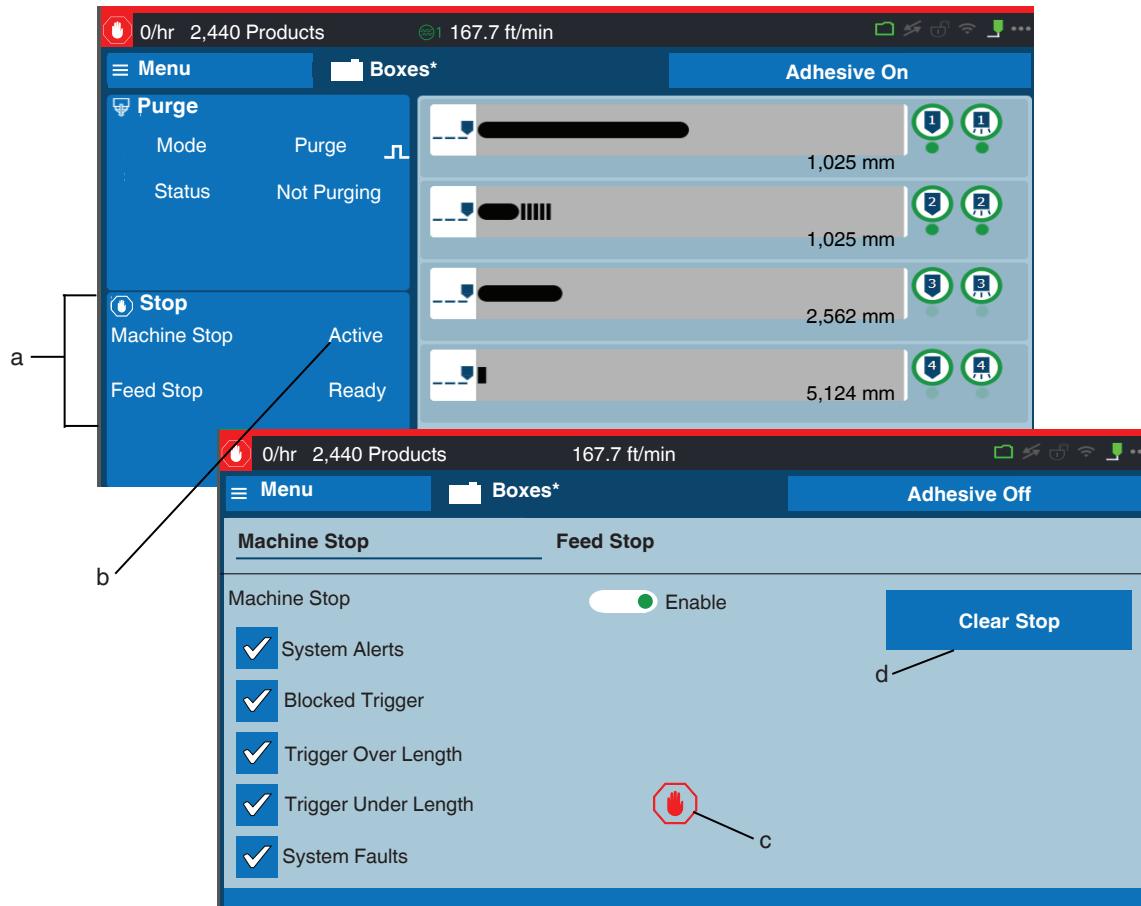
- Stop Settings apply only to actual triggers, not virtual triggers, that have been assigned to an applicator.
- You will only receive a machine stop alarm if the appropriate Stop setting is enabled, defined and Spectra Link is in a Run (dispensing adhesive) condition.

Clearing a Stop Alarm

It is recommended that you Customize your Home page, (**System Settings** | **Preferences** | **Customize Home**) to include the **Stop** tile (a). Refer to **Customizing the Home Screen** for more information.

NOTE:

- If you do not have the Stop tile on the Home page, touch  **Menu** then navigate to **System Settings** | **Stop Settings**
- Depending on which **Stop** alarm was triggered (Machine Stop, Feed Stop or both) you will see *Active* it in the Stop tile. (b)
- Clicking on the **Stop** tile brings you to **System Settings** | **Stop Settings** page, where you will see a Stop icon (c) next to the appropriate **Machine Stop** or **Feed Stop** item that caused the Stop.
- Touch **Clear Stop** (d) to clear the Stop condition.



Changing System Preferences

You can change the system preferences you initially defined when you initially commissioned Spectra Link.

1. Touch  **Menu** then navigate to **System Settings | Preferences**
2. Decide which settings you want to change.

Item	Description
Name	Enter an easily identifiable name for this unit.
Language	Select the language you want to use when using Spectra Link. NOTE: The on-screen keyboard is only in English.
Copy and Paste Includes	You can automatically include the following settings each time you copy and paste a pattern. NOTE: The default is to copy the pattern only. <ul style="list-style-type: none"> • Applicator (enabled or disabled) • (Applicator) Compensation if enabled and defined. • Trigger (assignment, including all virtual trigger settings) • Applicator Trigger Offset (GTO) • Applicator Enable/Disable • Applicator Type • Encoder (if operation mode is Distance) or Virtual Encoder if defined. • Runup Zone (if operation mode is Distance and Runup was defined) NOTE: if you copy a pattern that uses Applicator 1 and if the trigger assignment is Virtual Trigger 1, then when copying to Applicator 3, the following happens: <ul style="list-style-type: none"> • Applicator 3 becomes enabled, even if it was previously disabled. • The trigger assignment becomes Virtual Trigger 3
Time Format	You can choose between 12hr and 24hr formats.
Date Format	You can choose between the following: <ul style="list-style-type: none"> • DD/MM/YYYY • MM/DD/YYYY • YYYY/MM/DD
Date	Enter the current date.

Section 8

Event Log and Troubleshooting



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

In this Section

This section details the following:

- About the Event Log and Active Alarms
- Clearing an Alarm
- Troubleshooting Alarms
- Applicator Alarms
- Encoder Alarms
- Pattern Alarms
- Trigger Alarms
- General System Alarms
- Changing Alarm Levels and Masking Alarms
- Re-wiring a quad phase encoder to a single phase

About the Event Log and Active Alarms

- The **Event Log** ( **Menu** then touch **Event Log**) displays in chronological order by date and time, all *Alerts*, *Faults*, *Informational* messages as well as *Events*, such as when a setting was changed and which recipe was loaded.

NOTES:

- The Event Log is view-only and cannot be exported into a spreadsheet.
- The maximum number of event log size is 256 events. Older event log entries are automatically dropped from the display when newer events are recorded.
- To share the event log with technical support, create a backup and forward the .NOR file to Nordson Technical Support.
- The **Active Alarm** ( **Menu** then touch **Active Alarms**) to view only Alerts, Faults and Machine Stop alarms, as well as to clear all alarms.

NOTES:

- You can only clear an Alert, Fault or Machine Stop alarms from the **Active Alarms** screen by touching the **Clear All** button.
- Unless you resolve the issue, just clearing an alarm will not resolve the alarm. Refer to either the Troubleshooting section of this manual or read the troubleshooting information contained within the popup message alarm itself.
- The Active Alarm screen is view-only and cannot be exported into a spreadsheet.
- The maximum number of event log entries is 128 alarms. Once exceeded, older alarms are replaced with newer alarms.
- Alerts automatically clear after 30 seconds, as long as no other alert alarm occurs within those 30 seconds.

Clearing an Alarm

1. Touch  **Menu** then touch **Active Alarms**.
2. Scroll to the bottom of the screen and touch the **Clear All** button.

Troubleshooting Alarms

Refer to the following tables to resolve alarms.

Applicator Alarms

Alarm Code	Alarm Type	Short Description	Details	Troubleshooting Tips
AP-01	Fault	Applicator [#] output overload.	<p>The current in applicator [#] exceeded the allowable limit of 2 Amps.</p> <p>This is usually caused by an overload or short-circuit condition.</p>	<ul style="list-style-type: none"> • Disconnect the applicator and cable. • Clear the fault from the Home Active Alarms and touch the Clear All button. • Check applicator cables and wiring for possible wear. • Reconnect the Applicator • If the fault persists, replace the applicator or solenoid. • If multiple applicators are connected to the output. Then reduce the number of applicators and try again.
AP-02	Alert	Applicator [#] output open circuit.	Current not detected when applicator [#] was enabled.	<ul style="list-style-type: none"> • Check for loose, worn or broken applicator cables. • Replace applicator or solenoid. • Disable unused applicator channels.
AP-05	Fault	At least one trigger must be commissioned and enabled	Either replace the Four Channel Expansion Board, if it was removed or failed, or reassign an available trigger to applicator <<#>>.	<ul style="list-style-type: none"> • The existing applicator and trigger assignments are retained until you change the assignments, perform a factory reset/restore or load a new recipe.

Encoder Alarms

Alarm Code	Alarm Type	Short Description	Details	Troubleshooting Tips
EN-01	Fault	Encoder [#] power supply overload.	Power supply current for encoder [#] exceeded the allowable limit.	<ul style="list-style-type: none"> Disconnect encoder. Clear the fault from the Home Active Alarms and touch the Clear All button. Check cables and wiring for possible wear. Reconnect the encoder, if fault persists replace the encoder.
EN-02	Alert	Encoder [#] disconnected or low power.	Current is below minimum current required for detecting an encoder.	<ul style="list-style-type: none"> Check for loose, worn or broken encoder cables. Check the power rating for the encoder and the power supply.
EN-03		Encoder [#] exceeded threshold for running backwards.	---	Encoder [#] needs to be reversed in the encoder settings screen.
EN-04		Invalid encoder [#] signal.	<ul style="list-style-type: none"> Sudden invalid speed changes. Sporadic reverse pulses. 	<ul style="list-style-type: none"> Disconnect the Encoder. Check for loose, worn or broken encoder cables. Reconnect the encoder. If the signal issue persists replace the encoder.
EN-05		Quadrature encoder [#] signal - missing phase.	---	<ul style="list-style-type: none"> Wrong encoder type selected. Check encoder cables for wear. Replace encoder.
EN-06		Encoder [#] signal - maximum frequency limit.	---	<ul style="list-style-type: none"> Change encoder wheel or gearing. Use a lower resolution encoder.
EN-07	Fault	Encoder [#] signal - erratic.	---	<ul style="list-style-type: none"> Check that the encoder is securely mounted. Check encoder cables for wear. Replace encoder.

Pattern Alarms

Alarm Code	Alarm Type	Short Description	Details	Troubleshooting Tips
PA-01	Alert	Applicator [#] pattern performance error.	The output pattern exceeds the on/off capability of the applicator.	<ul style="list-style-type: none"> • Create longer pattern beads. • Increase gaps between beads. • Use a longer dot time setting. • Lower the line speed.
PA-02	Alert	Applicator [#] pattern compensation error.	Applicator trigger offset (GTO) compensation setting exceeds the capabilities of the applicator.	Increase applicator trigger offset (GTO).
PA-03	Alert	Applicator [#] pattern mirror length error.	Applicator trigger offset (GTO) is too short for programmed mirror length pattern.	Increase applicator trigger offset (GTO) distance.
PA-04	Fault	Trigger [#] product queue overflow.	<ul style="list-style-type: none"> • Maximum number of queued products exceeded. • Additional products will be ignored. 	<ul style="list-style-type: none"> • Move the trigger [#] closer to the assigned applicator or applicators [#]. • You must redefine your applicator trigger offset (GTO). • Increase product spacing. • Check for proper trigger operation.

Trigger Alarms

Alarm Code	Alarm Type	Short Description	Details	Troubleshooting Tips
PH-01	Fault	Trigger [#] power supply overload.	Trigger [#] power supply current exceeds allowable limit of <<current_limit>> mA, causing an overload or short-circuit condition.	<ul style="list-style-type: none"> Disconnect the trigger. Clear the alarm from the Home Active Alarms and touch the Clear All button. Check trigger cables and wiring for possible wear. Reconnect the trigger, if the alarm persists replace the trigger.
PH-02	Alert	Trigger [#] power supply open circuit.	Trigger [#] no power supply current detected.	<ul style="list-style-type: none"> Trigger is not connected properly or has been disconnected. Reconnect it. Check for loose, worn, or broken trigger cables. Replace trigger.
PH-03	Alert	New trigger [#] detected.	---	A trigger was detected on a trigger channel that was not previously configured.
PH-04	Fault	Trigger [#] blocked, activation exceeded limit.	<ul style="list-style-type: none"> Time: Trigger [#] exceeded trigger timeout setting. Distance: Trigger [#] exceeded the maximum trigger length setting. 	Check trigger alignment and sensitivity.
PH-05	Alert	Invalid trigger [#] signal.	---	<ul style="list-style-type: none"> Check trigger alignment and sensitivity settings. Make sure the trigger is properly connected. Check trigger cables for wear. Replace trigger.
PH-10	Alert	Trigger [#] Product Clipping	Product clipping has occurred on trigger [#] that is assigned to Applicator [#].	<ul style="list-style-type: none"> Check the pattern to be sure it is defined correctly on the product. Check trigger position and signal calibration. Verify the product is not jammed or skewed.

General System Alarms

Alarm Code	Alarm Type	Short Description	Details	Troubleshooting Tips
SB-01	Fault	System Warning	---	Power cycle the unit. If alarm persists, replace board.
SB-03	Alert	System Warning <<failure code>>.	---	Power cycle the unit. If the alarm persists, perform a software upgrade or factory reset.
SB-04	Alert	Maximum internal operating temperature exceeded	---	Install fan kit, P/N 1132297.
SB-05	Alert	Power supply low voltage.	The system power supply voltage has dropped below the minimum operating limit	Make sure the power connection is seated properly If intermittent, a brownout condition exists. However, if persistent replace the power supply or change power source.
SB-08	Fault	4 Ch. Expansion (P-ENG2) Board Not Supported	This software version does not support the 4 Ch. Expansion (P-ENG2) board. Upgrade the unit.	---
SB-06	Fault	[board name] Software Mismatch	All boards do not have the same software version, Upgrade the unit.	Download an upgrade file from and put the file on a USB stick and then perform system software upgrade.
ST-01	Alert	USB File error - USB full.	---	<ul style="list-style-type: none"> • Use a different USB. • Delete some files from the USB.
ST-02	Alert	USB File error - Corrupt file.	---	Try again or use a different USB.
ST-05	Alert	Recipe file error.	File check failed when recipe was opened.	Delete the recipe and recreate it.
DG-03	Fault	Downgrade Failed	---	---
DG-04	Fault	P-ENG[#] communication error.	Internal communication has been lost. Adhesive is switched off.	---

Alarm Code	Alarm Type	Short Description	Details	Troubleshooting Tips
PW-01	Fault	24V Out overload fault.	24V current to triggers, encoders and runup has exceeded the allowable limit of 1.5 Amps.	<ul style="list-style-type: none"> Disconnect, triggers, encoders, runups. Clear the alarm from the Home Active Alarms and touch the Clear All button Check trigger, encoder, and runup cables and wiring for possible wear. Reconnect one at a time, trigger or encoder or runup. When a alarm occurs, replace the component that alarmed. Verify total component loads do not exceed the rated current.
PW-02	Fault	Expansion 24V Out overload fault.	HMI current exceeds allowable limit of 1.5 Amps.	<ul style="list-style-type: none"> Disconnect HMI. Clear the alarm from the Home Active Alarms and touch the Clear All button. Check HMI cables and wiring for possible wear. Reconnect the HMI Verify HMI load does not exceed the rated current.
PW-03	Fault	24V HMI overload fault.	HMI current exceeds allowable limit of 1.5 Amps.	<ul style="list-style-type: none"> Disconnect HMI. Clear the alarm from the Home Active Alarms and touch the Clear All button. Check HMI cables and wiring for possible wear. Reconnect the HMI Verify HMI load does not exceed the rated current.
PW-05	Alert	The USB load current exceeded the allowable limit.	Use a different USB. Replace the USB extension cable (if equipped).	---
PW-06	Alert	The 24V system voltage exceeded the allowable limit.	Check power supply cable for damage or bad connections. Replace power supply.	---
PW-07	Alert	Fan Power Supply Overload.	Check fan wiring for possible wear. Replace the fan.	---
PW-08	Alert	Applicator power is missing. Applicators will not dispense.	Check jumper or power supply connected to TB2.	---
UG-01	Fault	Upgrade Failed	Make sure the .dat file is not corrupt and try again.	---

Input/Output Alarms

Alarm Code	Alarm Type	Short Description	Details	Troubleshooting Tips
IO-01	Alert	System power supply overload.	The main power supply exceeds the allowable current 6.25 A.	<ul style="list-style-type: none"> • Make sure all applicators, triggers, encoders and system outputs do not exceed their ratings. • Check wiring and cables for wear. Replace cables as needed. • If the applicator loads are causing the alert, use a separate power supply for the applicators.
IO-04	Alert	Remote Recipe does not exist.	A recipe was selected using the remote inputs. No recipe has been created for the selected recipe number. Previous recipe remains active.	---
IO-05	Fault	Standard System Output Overload.	The load current for the standard system output has exceeded the allowable limit of 500 mA.	<ul style="list-style-type: none"> • Disconnect standard system output load. • Clear the alarm from the Home Active Alarms and touch the Clear All button. • Check standard output cables and wiring for possible wear. • Reconnect the standard system output load, if alarm persists replace the load component. • Verify the standard output load does not exceed the rated current.
IO-06	Fault	Optional System Output #1 Overload.		
IO-07	Fault	Optional System Output #2 Overload.		

Changing Alarm Levels and Masking Alarms

You can decide to escalate, deescalate or mask certain Applicator, Trigger, Encoder or System level alarms.

- An *alert* indicates that a component is not performing properly or an issue with the production output exists, Production continues but the output may not be as intended
- A *Fault* indicates that a component has failed, or a major issue with the production output exists, Production stops.

1.  **Menu** | **System Settings** | **Configurable Alarms**.
2. Select which component (Applicator, Trigger, Encoder or System) and decide which alarms you want to escalate or deescalate. The default alarm level is indicated for each alarm message. Only a select few alarms can be masked.
3. Changes are automatically saved when you navigate to a different screen.

NOTES:

- You can change or mask certain alarms for each trigger, or virtual trigger.
- If you have more than one encoder, each encoder can have different alarm levels defined.
- Escalating, deescalating or masking an alarm message is not recorded in the event log.
- Masking an alarm does the following:
 - Prevents a popup message from appearing
 - The system status does not change
 - The alarm event is NOT logged.

Re-Wiring a Quad Phase Encoder to a Single Phase

If you receive an alarm message indicating that either Phase A or Phase B is missing, you can convert the Quad phase encoder to a Single phase encoder to temporarily continue production until you can replace the encoder.



WARNING! Failure to follow the safety messages, recommendations, and hazard avoidance procedures provided in this section can result in personal injury, including death, or damage to equipment or property.



WARNING! Only qualified personnel should purge applicators, and wear the appropriate PPE (Personal Protective Equipment) such as safety glasses and heat resistant gloves.

1. Shut down the Spectra Link pattern controller, then tag and lockout the main power to the unit.
 - Remove the cover using a 3mm hex driver and.
2. Refer to Figure 2.2, call out 9 (TB6) to locate the encoder connector.
3. Using a small screwdriver, remove the appropriate phase, A or B that is causing the alarm messages. This is a trial and error process.
4. Replace the encoder connector, reinstall the cover using a 3mm hex driver.
5. Remove the lockout tag, restore power to the unit and switch the Spectra Link On.
6. Navigate from **Home | System Settings | Encoder** and touch **Advanced Settings**. Select the appropriate option from the drop-down list.

NOTE:

- You may need to repeat these steps again if you wired and selected the wrong non-working phase.

Diagnosing Trigger Performance

Use the trigger plot graph's to determine if the trigger working correctly and optimize the production by closing the gaps or validating that the size of the trigger /gaps are consistent with actual production output.

There are two types of graphs:

Speed and Product Length Graph:

- X axis is the product count, which is dynamic and up to 200 counts.
- Y axis is product length (in black) and line speed (in blue).
- Within the graph, the blue line is the speed, green is gap length, and black is product length.
- A legend for these colors is displayed beneath the graph.

Pareto Chart:

A Pareto chart is a type of chart that contains both bars and a line graph, where individual values are represented in descending order by bars, and the cumulative total is represented by the line.

- Y axis for the pareto chart is number of products.
- X axis displays up to 10 columns, each column representing a product with different product length.
- The columns should all total up to 100 products.
- This displays the products lengths of the most recent 100 trigger counts.

NOTE:

- You cannot plot virtual trigger performance.

Resolving High Speed and Filter Issues

Spectra Link has a default trigger filter of 1ms. This may present problems for high speed lines as valid product triggers or gaps may be undesirably filtered.

For example: at 60m/min, a gap or trigger of 1mm would be ignored (filtered). At a common speed of 300m/min a gap or trigger of 5mm would be ignored. In a high speed line running 600m/min, a trigger or gap of 10mm would be ignored.

This can present a problem when a small tick mark is printed on a spool which is in production at high speeds. It can also be a problem when products are pushed together causing a small gap.

The best solution is to disable this filter, (**System Settings | Machine Settings** and change the **Trigger Filter** value to 0 (zero), thereby allowing for small gaps and triggers at high speeds.

Section 9

System Administration



WARNING! Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



WARNING! Do not use equipment with an open or missing enclosure. All openings require a fitting or plug.



WARNING! For installation of this equipment, the safety of any system incorporating the equipment is the responsibility of the assembler of the system. Customer is responsible for providing the main disconnect switch or circuit breaker per their local electric code. This unit needs to be located near the parent machine's switch or circuit breaker, so it can be easily accessible.

In this Section

This section details the following:

- Backing Up/Restoring/Resetting
- Resetting to Factory Defaults
- Upgrading and Downgrading Software
- About User Management
- Viewing System Information

Installing an Encoder or Pattern License

Do the following to acquire an Encoder license:

1. From Spectra Link Pattern Control, touch  **Menu** then navigate to **Tools | System Configuration** and select **Original Factory Nameplate**.
 - Write down the Serial and Part numbers. You will need this information when ordering the license.
2. Go to <https://bbconn-license.nordson.com/> and select **Spectra Link Pattern Control**.
 - Complete the **System Information and Customer Information** sections. From the **Available Features** section, select *Encoder License (P/N 1132400), or (P/N 1132949) for the Pattern License*.
 - Decide if you want a **Request Quote** or if you want to submit a **P.O (Purchase Order) Number for Purchase**.
 - Click **Submit**.
3. You will receive the license key to the email address you entered in the Customer Information section.
4. From the Spectra Link Pattern Controller, touch  **Menu** then navigate to **Tools | System Configuration** and touch **Manage Licenses**.
5. Touch **Add**, then enter the license key.

NOTES:

- A reboot is not required.
- Removing a license, requires you to enter the license number.
- If you remove the encoder license, the system automatically changes the operation mode the default (pure) Time. All **System Settings** revert back to factory defaults.
- If you make use of one or more of the licensed patterns, and you remove the pattern license, the patterns are converted to the following:
 - EcoBead is converted to Normal
 - AutoDot is converted to Normal
 - Continuous is converted to Normal and the applicator will be disabled
 - Random Length (Mirror) is converted to Random Length
 - Random Length (Dots) is converted to Random Length

Backing Up Spectra Link

1. Do the following to start:
 - If you have the optional USB kit (P/N 1132549) then insert a FAT32 formatted USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the cover using a 3mm hex driver and insert a FAT32 formatted USB. Refer to Figure 2-2, callout number 21 (X6) When done, replace the cover.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.
2. Touch **≡ Menu** then navigate from to **Tools | Manage Licenses**
3. Touch **ADD** and enter the license number.
4. Refer to **Fine-Tuning the Operation Mode, Encoders Applicators, Triggers and Runup** for more information.

Backing Up/Restoring/Resetting

Backups are saved to a .NOR file (time and date stamp in the file name) to a /backup folder on the USB drive. If the folder does not exist, the system will automatically create it. The following are backed up:

- Runtime Settings
- System Settings
- Communications Settings, including the .PLC file
- Event log
- Machine Name, but only if the serial number and Unique ID of the unit matches the backup file

Backing Up Spectra Link

1. Do the following to start:
 - If you have the optional USB kit (P/N 1132549) then insert a FAT32 formatted USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the cover using a 3mm hex driver and insert a FAT32 formatted USB. Refer to Figure 2-2, callout number 21 (X6) When done, replace the cover.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.
2. Touch  **Menu** then navigate to **Tools | Backup/Restore/Reset** and touch **Backup**. A message indicating the success or failure of the backup appears.
3. Decide if you want to leave the USB drive inserted in the Spectra Link USB port. Refer to your corporate policy.
 - If you have the optional USB kit (P/N 1132549) then remove the USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the USB drive. Replace the cover using a 3mm hex driver.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.

Restoring Spectra from a Backup

1. Do the following to start:
 - If you have the optional USB kit (P/N 1132549) then insert a FAT32 formatted USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the cover using a 3mm hex driver and insert a FAT32 formatted USB. Refer to Figure 2-2, callout number 21 (X6) When done, replace the cover.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.
2. Touch  **Menu** then navigate from **Home** | **Tools** | **Backup/Restore/Reset** and touch **Restore**.
 - Decide if you want to Include Networking settings.
 - Touch **Continue**. A message indicating the success or failure of the restore appears.
3. Decide if you want to leave the USB drive inserted in the Spectra Link USB port. Refer to your corporate policy.
 - If you have the optional USB kit (P/N 1132549) then remove the USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the USB drive. Replace the cover using a 3mm hex driver.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.

NOTE:

Unless there are issues, you may not want to include **Network Settings** when you **Restore** or **Reset to Factory Default**. If you were connecting to the Web Server Graphical User Interface using Ethernet port X14 or X15 on the main board, restoring or resetting to factory defaults may prevent you from accessing the Web Server Graphical User Interface.

Resetting to Spectra Link to Factory Default

1. Touch  **Menu** then navigate from **Home** | **Tools** | **Backup/Restore/Reset** | **Reset to Factory Default**.
 - Decide if you want to Include Networking settings.
2. Touch **Continue**. The system automatically reboots.

Upgrading and Downgrading Software

It is strongly recommended that you perform a backup before continuing.

Upgrading Software

1. From your PC, navigate to <https://emanuals.nordson.com/adhesives/software/SpectraLink.html> to download the latest The Spectra Link Pattern Controller software.
 - Copy the .DAT file on the root of a FAT32 formatted USB drive.
 - It is strongly recommended that you perform a backup before continuing.
2. Do the following to continue:
 - If you have the optional USB kit (P/N 1132549) then insert a FAT32 formatted USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the cover using a 3mm hex driver and insert a FAT32 formatted USB. Refer to Figure 2-2, callout number 21 (X6) When done, replace the cover.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.
3. Do the following to continue:
 - If you are upgrading, and the .DAT version is newer than what you have currently installed, then the upgrade automatically starts.
 - If there is more than one .DAT file on the USB and you are downgrading or trying to reinstall the same version as what is already installed, then touch  **Menu** **Home** | **Tools** | **Change Software**. Select which version (.DAT file) you want to install from the drop-down list. Touch **OK**. The system automatically reboots itself and completes the installation.

4. Decide if you want to leave the USB drive inserted in the Spectra Link USB drive. Refer to your corporate policy.
 - If you have the optional USB kit (P/N 1132549) then remove the USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the USB drive. Replace the cover using a 3mm hex driver.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.

Downgrading Software

It is strongly recommended that you perform a backup before continuing.

1. Do the following to continue:
 - If you have the optional USB kit (P/N 1132549) then insert a FAT32 formatted USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the cover using a 3mm hex driver and insert a FAT32 formatted USB. Refer to Figure 2-2, callout number 21 (X6) When done, replace the cover.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.
2. Touch **☰ Menu** **Home** | **Tools** | **Change Software**. Select which version (.DAT file) you want to install from the drop-down list. Touch **OK**. The system automatically reboots itself and completes the installation.
3. Decide if you want to leave the USB drive inserted in the Spectra Link USB drive. Refer to your corporate policy.
 - If you have the optional USB kit (P/N 1132549) then remove the USB drive.
 - If you do not have the optional USB kit, then shut down the Spectra Link pattern controller, and tag and lockout the main power to the unit.
 - Remove the USB drive. Replace the cover using a 3mm hex driver.
 - Remove the tag and lockout, restore main power to the unit, and switch the Spectra Link Pattern Controller On.

NOTE:

- When downgrading, some features or options may not be available. Make sure to read the *Release Notes* associated with each software version.

About User Management

Use **User Management** to protect and maintain system integrity by requiring users to enter a pass code to change settings.

The following controls will always be available, even if **User Management** is enabled:

- Adhesive On/Off
- Purge
- Find System (if you have enabled the BBconn System Network.)

NOTE:

- You must enter the pass code to enable and disable User Management.



Sub System Icon	Description	Sub System Icon	Description
	User management is enabled. System locked. Requires pass code to make changes.		User management is enabled. System unlocked. The Timeout interval has not expired
	User management is disabled. System unlocked. Settings can be changed by anyone accessing the touch screen.		

Setting Up User Management

1. Touch  **Menu** then navigate to **System Settings | User Management**.

2. Do the following to continue:

To...	Description	Default	Range
Enable/Disable User	Enable or disable the User Management option.	Disabled	---
Access Code Timeout Interval	Upon entering the pass code, allow the system to remain unlocked after 60 seconds (the default) of no user interaction with the touch screen.	60 seconds	Minimum: 10 seconds Maximum: 900 seconds (15 minutes)
Modify Access Code	Change the default pass code from 1000 to whatever you want. When done, touch Modify .	1000	1 up to 4 digits NOTES: <ul style="list-style-type: none"> • The first number cannot begin with a 0 (zero).

3. When done, navigate to another screen. Settings are automatically saved.

Viewing System Information

Touch  **Menu** then navigate from **Home** | **Tools** | **System Configuration**.

You can view only the following information:

- Upgrade History
- Commissioning Dates
- Currently Installed Software Version
- Original Factory Nameplate, which includes the following:
 - Serial number
 - Part number
 - Date of Manufacture
 - Electrical Service and SCCR rating.

Typically, this is used for troubleshooting purposes.

Section 10

Setting Up Virtual Triggers and Encoders



WARNING! Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others, and damage to the equipment.



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



WARNING! Do not use equipment with an open or missing enclosure. All openings require a fitting or plug.



WARNING! For installation of this equipment, the safety of any system incorporating the equipment is the responsibility of the assembler of the system. Customer is responsible for providing the main disconnect switch or circuit breaker per their local electric code. This unit needs to be located near the parent machine's switch or circuit breaker, so it can be easily accessible.

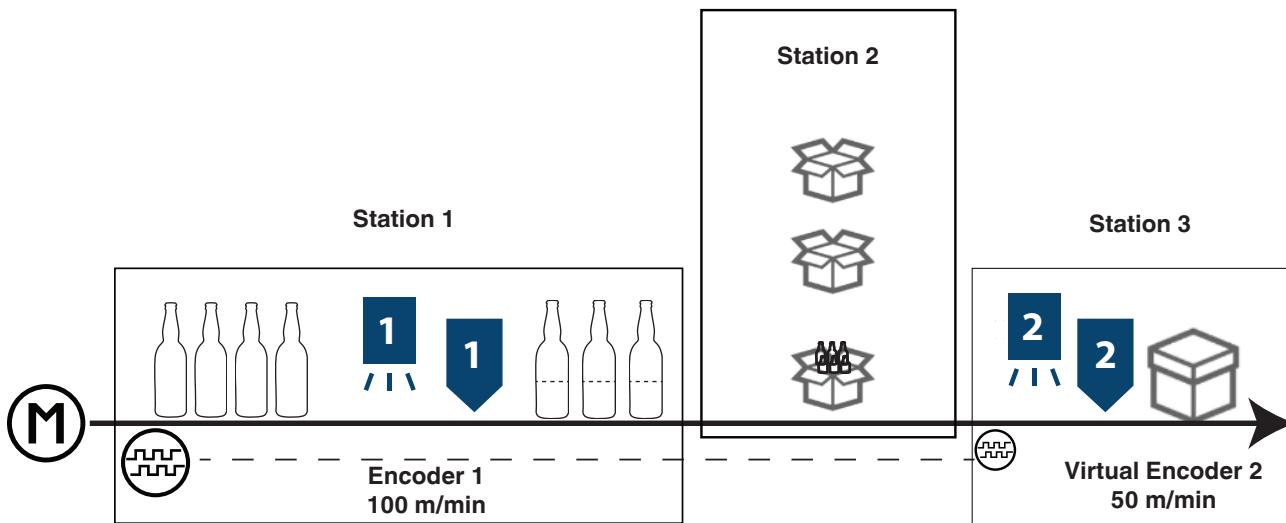
In this Section

This section details the following:

- Setting Up Virtual Triggers
- Setting Up Virtual Encoders

Virtual Triggers and Encoders - Theory of Operation

The following shows the theoretical usage of virtual encoders and a virtual trigger.



Station	Description
1	Bottles have already been filled, sealed and pasteurized.
2	Previously constructed open boxes travel down the line, where another machine picks up 6 bottles and places them inside the box.
3	<ul style="list-style-type: none"> The gear associated with Virtual Encoder 2 shares the same drive shaft as Encoder 1, but has a lower gear ratio, running at 50 m/min. The boxes are detected by a Trigger 2, where Applicator #2 dispenses bead of adhesive on the flap of the box to seal it and continues down the line for shipping or to the palletization station (not shown).

NOTES:

- Both virtual trigger and encoder functionality are applicator centric.
- The Advanced Virtual Trigger settings are only visible if you have purchased the advanced pattern license.
- The Advanced Virtual Encoder settings are only visible if you have purchased the advanced pattern license, and if you have a physical encoder installed.

About Virtual Triggers

Virtual triggers are software-generated, serving as alternatives to physical hardware triggers. Use a virtual trigger when you want a constant triggering for patterns. Similar to a continuous pattern, applicator output is controlled by speed (Adhesive Start/Stop), unit enable, or Adhesive On/Off.

A virtual trigger works like a physical trigger, but has the following benefits:

- Cost effective, as you do not have to purchase a virtual trigger, although you must purchase the *Advanced Patterns License*. Refer to **Installing an Encoder or Pattern License** for more information.
- Maintenance free and easy setup.
- Mix virtual and physical triggers on the same system.

The limitations include:

- The number of virtual triggers is limited to the number of installed applicators. For example, virtual trigger #3 can only be assigned to Applicator #3.
- Although any pattern type can be used, it is recommended that you use non-random length pattern types.
- Cannot use a virtual trigger for palletizing
- Trigger filter and product clipping options are not available.

NOTES:

- The Advanced Virtual Trigger settings are only visible if you have purchased the advanced pattern license.
- The virtual trigger generates a signal cycle that is 50% on and off, based on the defined product length.
- You can setup virtual triggers **after** completing the Commissioning Wizard.
- When the maximum number of products exceeds the product queue capacity, a PA-04 Fault occurs. To resolve, verify your GTO setting and if possible, increase the **Virtual Product Length** value.
- All patterns are supported.

About Virtual Encoders

Virtual encoders can be used either on the same production line segment or on different line segments, as long as the ratio is the same, or the shared gears share the same drive shaft as the physical source encoder.

A virtual encoder works like a physical encoder, but has the following benefits:

- Cost effective, as you do not have to purchase a virtual encoder, although you must purchase the *Advanced Patterns License*. Refer to **Installing an Encoder or Pattern License** for more information.
- You must have a physical encoder installed and setup before you can make use of a virtual encoder.
- The gears can have different ratios.
- Maintenance free and easy setup
- Mix virtual and physical triggers and encoders on the same common drive shaft production line.

The limitations include:

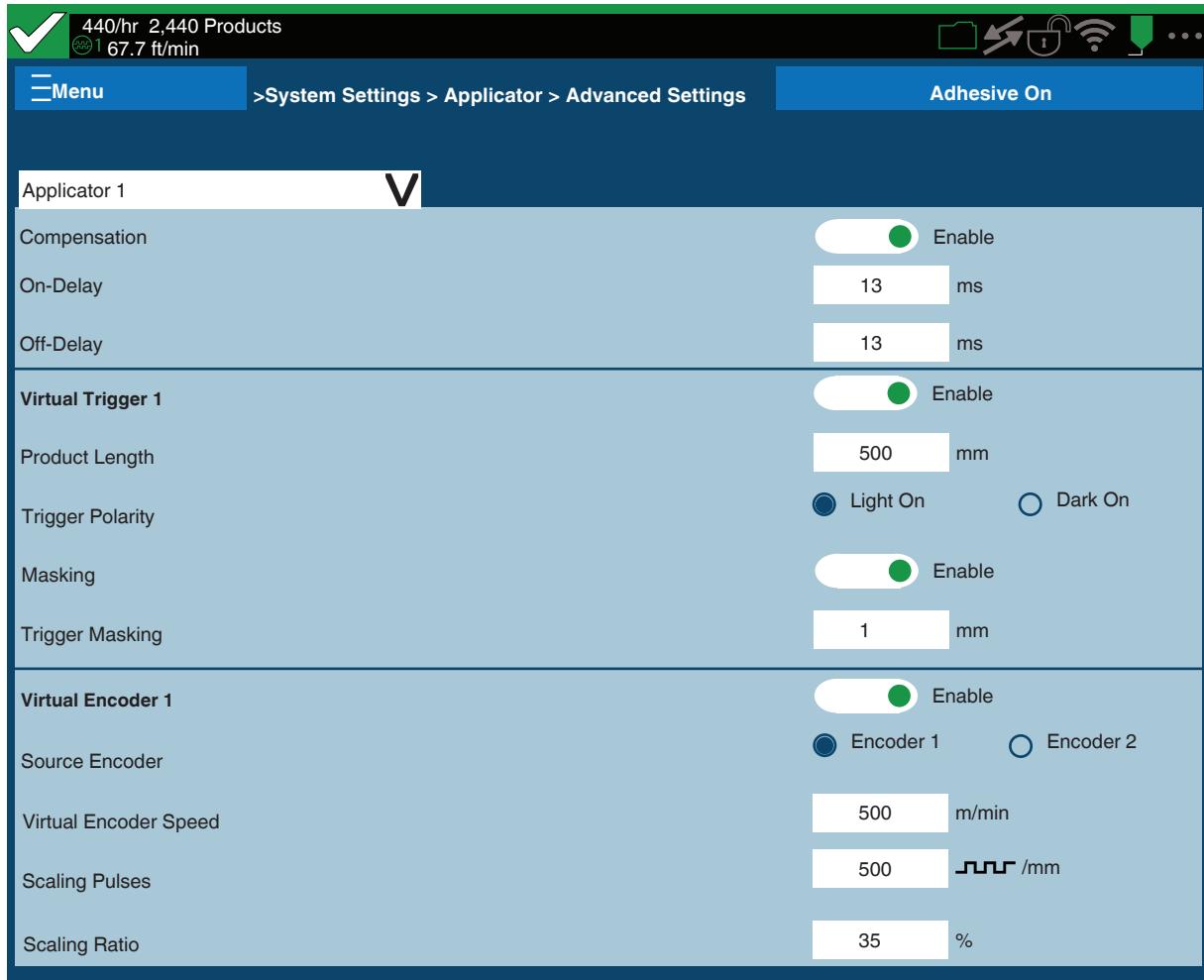
- The number of virtual encoders is limited to the number of installed applicators.
- You must have installed at least one encoder

NOTES:

- The Advanced Virtual Encoder settings are only visible if you have purchased the advanced pattern license, and if you have a physical encoder installed.
- You can setup virtual encoders **after** completing the Commissioning Wizard.
- It is recommended that you place the applicator's associated trigger on the same line segment as the applicator.

Setting Up Virtual Triggers and Encoders

Both Virtual Triggers and Encoders are associated with an installed applicator. The name of the virtual trigger or encoder is based on the applicator channel. For example, if you choose to associate a Virtual Trigger to applicator 1, then the Virtual Trigger is referenced in the user interface as *Virtual Trigger 1*. Similarity if you choose to associate a Virtual Encoder to applicator 1, then the Virtual Encoder is referenced in the user interface as *Virtual Encoder1*



1.  | System Settings | Applicator | Advanced Settings

#

- **Home** screen - touch  where the # represents the applicator number channel. Touch **Advanced Settings**.
-  | System Settings | Component Configuration | Applicators | Configure | Advanced Settings.

2. Do the following to define the Virtual Trigger or Virtual Encoder.

Defining Virtual Encoder Settings				
Item	Description	Default	Minimum	Maximum
Virtual Encoder # (Enable/Disable)	Decide if you want to make use of this virtual encoder associated with this applicator.	Disabled		
Source Encoder	Select which encoder you want to associate this virtual encoder. NOTES: <ul style="list-style-type: none"> • Spectra Link software version 2 and lower only supports one encoder, however later versions will support up to two encoders. • The number of virtual encoders is limited to the number of installed applicator channels. 	Encoder 1	---	---
Virtual Encoder Speed	Displays the speed (m/min or ft/min) based on the Scaling pulses and Scaling Ratio you previously entered.			
Scaling Ratio	Enter the scaling ratio, as a percent, for the virtual encoder gear. NOTE: <ul style="list-style-type: none"> • If not available, you can divide the number of teeth on the driven gear by the number of teeth on the driving gear , or alternatively, the output speed divided by the input speed 	100%	1 %	1000%

Item	Description	Default	Minimum	Maximum
Scaling Pulses	<p>Enter the Scaling pulses for the gear.</p> <p>NOTE:</p> <ul style="list-style-type: none"> You must know the following: <ul style="list-style-type: none"> Encoder PPR: Know the number of pulses the encoder produces for one full revolution (e.g., 200 PPR, 400 PPR). Gear Ratio: Determine the ratio between the input and output gears (e.g., 1:10, 1:20). Desired Resolution: Define the desired level of precision (for example, pulses per inch for linear motion, pulses per degree for rotational motion). Calculate the Scaling Factor - Linear Motion: <ul style="list-style-type: none"> Circumference: Calculate the circumference of the wheel or roller if the gear is driving a wheel or roller. Pulses per Revolution (PPR) of the encoder: Multiply the encoder's PPR by the gear ratio. Pulses per Unit of Linear Motion: Divide the circumference by the total pulses per revolution (encoder PPR * gear ratio). Calculate the Scaling Factor - Rotational Motion: <ul style="list-style-type: none"> Pulses per Revolution (PPR) of the encoder: Multiply the encoder's PPR by the gear ratio. Pulses per Degree/Unit of Rotation: Divide 360 degrees (or the desired rotational range) by the total pulses per revolution (encoder PPR * gear ratio). Example: <ul style="list-style-type: none"> Encoder: 200 PPR Gear Ratio: 1:10 Desired Resolution: Pulses per inch (linear motion) Wheel Diameter: 2 inches Calculations: <ul style="list-style-type: none"> Wheel Circumference: $2 * \pi * 1 = 6.28$ inches Total Pulses per Revolution: $200 \text{ PPR} * 10 = 2000$ pulses Pulses per Inch: $2000 \text{ pulses} / 6.28 \text{ inches} = 318.3 \text{ pulses/inch}$ 	2 pulses/mm 50.8 pulses/inch	0.001 pulses/mm 0.0254 pulses/inch	999 pulses/mm 25374 pulses/inch

Defining Virtual Trigger Settings				
Item	Description	Default	Minimum	Maximum
Virtual Trigger # (Enable/Disable)	Decide if you want to make use of this virtual trigger associated with this applicator.	Disabled		
Trigger Polarity	Light On - Trigger signal activated when leading edge detected. Dark On - Trigger signal deactivated when leading edge detected.	Light On	---	---
Product Length	Enter the length (in time or distance).	500 mm 19.7 inches 500 ms	1 mm 0.1 inch 1 ms	10,000 mm 393.7 inches 99,999 ms
Masking	Enable this option to prevent a virtual trigger signal for a predetermined distance or time. Use this setting when the product contains a cutout, such as for an envelope with a window. Refer to About Trigger Masks and Filters for more information.	Disabled	---	---
Trigger Masking	Enter the distance or time where you want to prevent a trigger signal from causing unwanted dispensing of adhesive associated with one or more applicators on the product NOTE:S <ul style="list-style-type: none"> The masking function is ignored if the entered distance/time is shorter than the Active Masking value. For <i>Random Length Mirror</i>, the Trigger Mask value must be shorter than the shortest product length. 	0 mm 0 inch 0 ms	0 mm 0 inch 0 ms	10,000 mm 393.7 inches 99,999 ms

Appendix A

Parts

Spectra Link Model Controller Parts List

Kits and Licenses

Part Number	Description
1132400	CONTROLLER, SPECTRA LINK,ENCODER
1132444	CONTROLLER, SPECTRA LINK,TIMEBASE
1129200	KIT,ACCESS,PB FLEX,TOUCH SCREEN
1132446	KIT, LEGACY IO, SPECTRA LINK
1132549	KIT, USB, SPECTRA LINK
1132438	KIT,DIN RAIL,SPECTRA LINK
1132441	LICENSE, ENCODER, SPECTRA LINK
1129094	KIT,ACCESSORY, PB FLEX, WIRELESS CARD

Main assembly

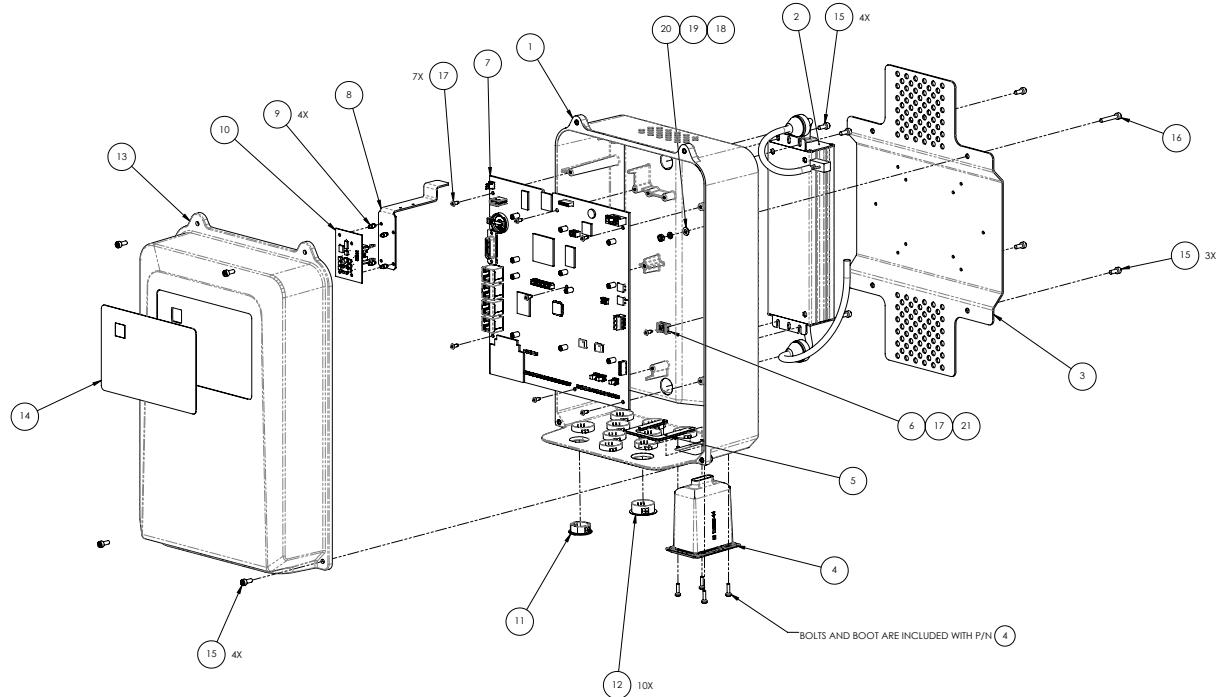


Figure A-1: Main assembly

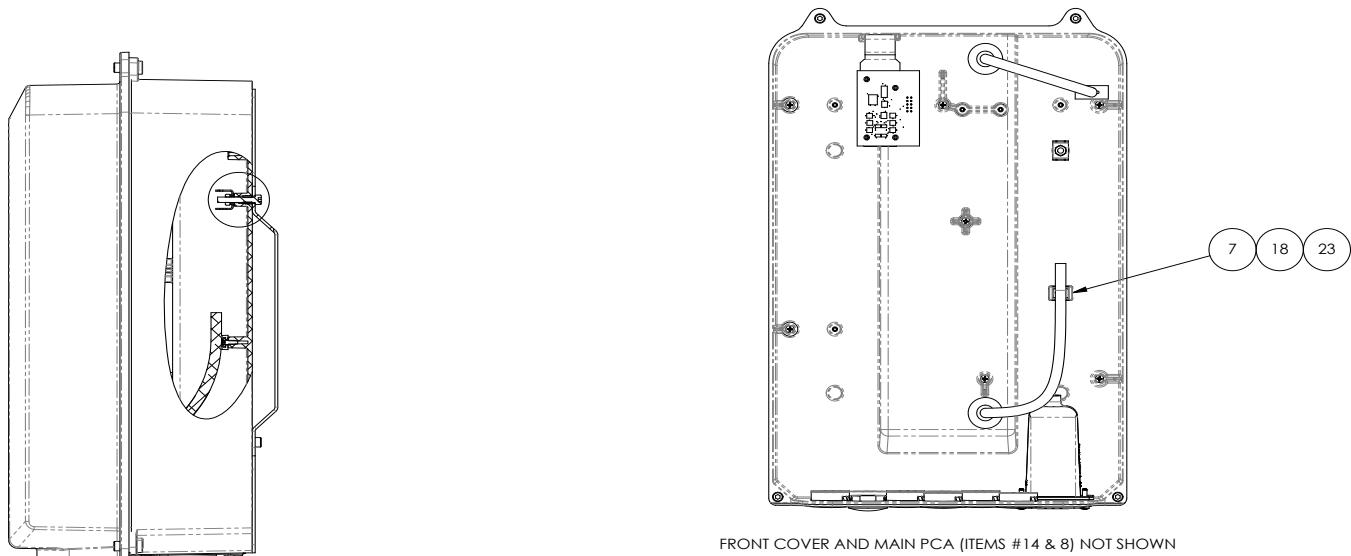


Figure A-2:

Figure A-3: Main assembly - rear view

Item	Part Number	Description	Quantity
1	1132215	COVER,REAR,BBCONN PC	1
2	1130016	HARNESS,POWER SUPPLY,UL,PB FLEX	1
3	1132247	MOUNT,VESA,BBCONN PC	1
4	1132379	CIRCUIT BREAKER,DG11 PEM,W/HARNESS, BPC	1
5	1132417	PLATE,NUT,BBCONN PC	1
6	182268	WIREMOUNT,CRADLE,NYLON,#6	1
7	1130912	PCA, MAIN, BBCONN PATT CNTRLR	1
8	1132249	BRACKET, LED,BBCONN PC	1
9	1132414	STANDOFF,.125,NYLON,SNAPLOCK	4
10	1132115	PCA, LED LICENSE, BBCONN PC	1
11	1122904	PLUG,DOME,.875,2D,BLACK	1
12	1622406	PLUG,DOME,1.00,BLACK	10
13	1132401	COVER ASSY,FRONT,BBCONN PC	1
14	1132483	TAG,FRONT COVER,BBCONN PC	1
15	1101669	SCREW,SHCS M4X10,GD12.9,ZN	11
16	1040003	SCR,SKT,M4X25,ZN	1
17	1127234	SCREW,M3X10,STL/ZNC,TORQ,THREADFORMING	8
18	983402	WASHER,FLT,M,NARROW,M4,STL,ZN	1
19	983403	WASHER,LK,M,SPT,M4,STL,ZN	1
20	1616549	NUT,HEX,M4X0.7,STL,ZN	1
21	939110	CABLETIE,3.9 IN,185F/85C,NYLON,NATURAL	1
22	1132324	CABLE,RIBBON,10POS,0.1CTR,6IN,POL	1

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Appendix B

Specifications

Spectra Link Pattern Controller System Specifications

System Specifications

Item	Specification
Maximum operational line speed	Time-based (no encoder)- Not available Distance (with encoder) - 100 KHZ frequency
Input voltage	100 - 240 VAC, 1.7 Amp maximum, Overvoltage CAT II, 1 Phase, 50/60 Hz
Internal power supply	Built-in 24 VDC
Units of measure	Inches or millimeters
Environment	<ul style="list-style-type: none"> Altitude up to 2 000 meters (6,562 feet) Ambient temperatures 0 °C (32 °F) to 50 °C (122 °F) 5-95% non-condensing MAINS supply voltage up to ±10 % of the nominal voltage (240V). Applicable POLLUTION DEGREE of the intended environment: 2
Internal Battery	<ul style="list-style-type: none"> Internal 3V battery (BR2032) CAUTION! Dispose of battery properly. Risk of fire, explosion, and burns. Do not recharge, disassemble, heat above 100 °C (212 °F), or incinerate.

Encoder

Distance and Time Based Pattern Controller

Item	Specification
Encoder Inputs	Single-ended NPN single-phase and differential quadrature encoders supported
Encoder scaling	Yes
Encoder power supply output	24 VDC, 250 mA maximum
Note: Encoder operation is optional.	

Graphical User Interface

The touchscreen is optional.

Item	Specification
Touchscreen (Optional)	7" graphic touchscreen
Password lockout	Enable or disable password lockout feature
Language support	Text for upgrade and diagnostics only

Inputs/Outputs

Additional inputs and outputs available. Legacy I/O, Kit part number: 1132446

Item	Specification
Digital input/output	Ready and alert outputs (24 VDC) Fault output (SPDT contact, 2 A maximum. 24VDC powered from an external UL listed power supply with LPS or Class 2 output)
Password lockout	Enable or disable password lockout feature
Language support	Text for upgrade and diagnostics only
Remote Recipe	Additional hardware required (kit 1132446)

Recipe Memory

Up to 50 recipes

Enclosure

Item	Specification
NOTE: Must use Nordson supplied power cord to maintain IP rating. Refer to Parts list for more information.	
Enclosure type	Type 1
Dimensions	Width: 245 mm (9.64 in) Height: 407 mm (16.02 in) Depth: 183.89 mm (7.24 in)
Weight	3.18 Kg (7 Lbs)
Enclosure IP rating	IP54 when used with supplied locking power cord. IP testing was not part of UL certification.
Temperature range	0 - 50C (32 - 122F)
CE approval	Yes
UL approval	Yes
ROHS WEEE	Yes
Environmental Conditions	Indoor use only

Patterns

Item	Specification
Pattern resolution	Time-based (no encoder)- 1 ms Distance (with encoder) - 1 mm 1000 KHZ frequency (scaling dependent)
Program memory	50
Independent pattern channels	4
Pattern type	Normal Dot Random length
Maximum beads per channel	24 per programmed channel output
Time mode	Available

Applicators

Item	Specification
Applicator outputs	24 VDC, 2 Amp maximum per channel (4 Amp maximum total for all channels 1-8 combined).
Compensation	Auto set based on applicator type selection (manual adjust)

Triggers

Item	Specification
Independent triggers	4
Product queuing	10
False trigger block	Yes
Stuck photocell detection	Yes
Signals accepted	NPN or PNP. 24 VDC line driver with jumper setting change, 3 mA current draw maximum
Trigger power supply output	24 VDC, 250 mA maximum per trigger

Runup

Requires the Encoder License, part number 1132400

Item	Specification
Runup Outputs	2
Number of point on a curve	2
Output type	4-20 mA and 0-10 V
Runup Loads	4-20 mA: equal to or less than 600 Ohms 0-10 V: equal to or less than 600 Ohms
Runup power supply	24 VDC, 250 mA maximum

Diagnostics

Item	Specification
Messages	Detailed text
Troubleshooting assistance	Troubleshooting tips included

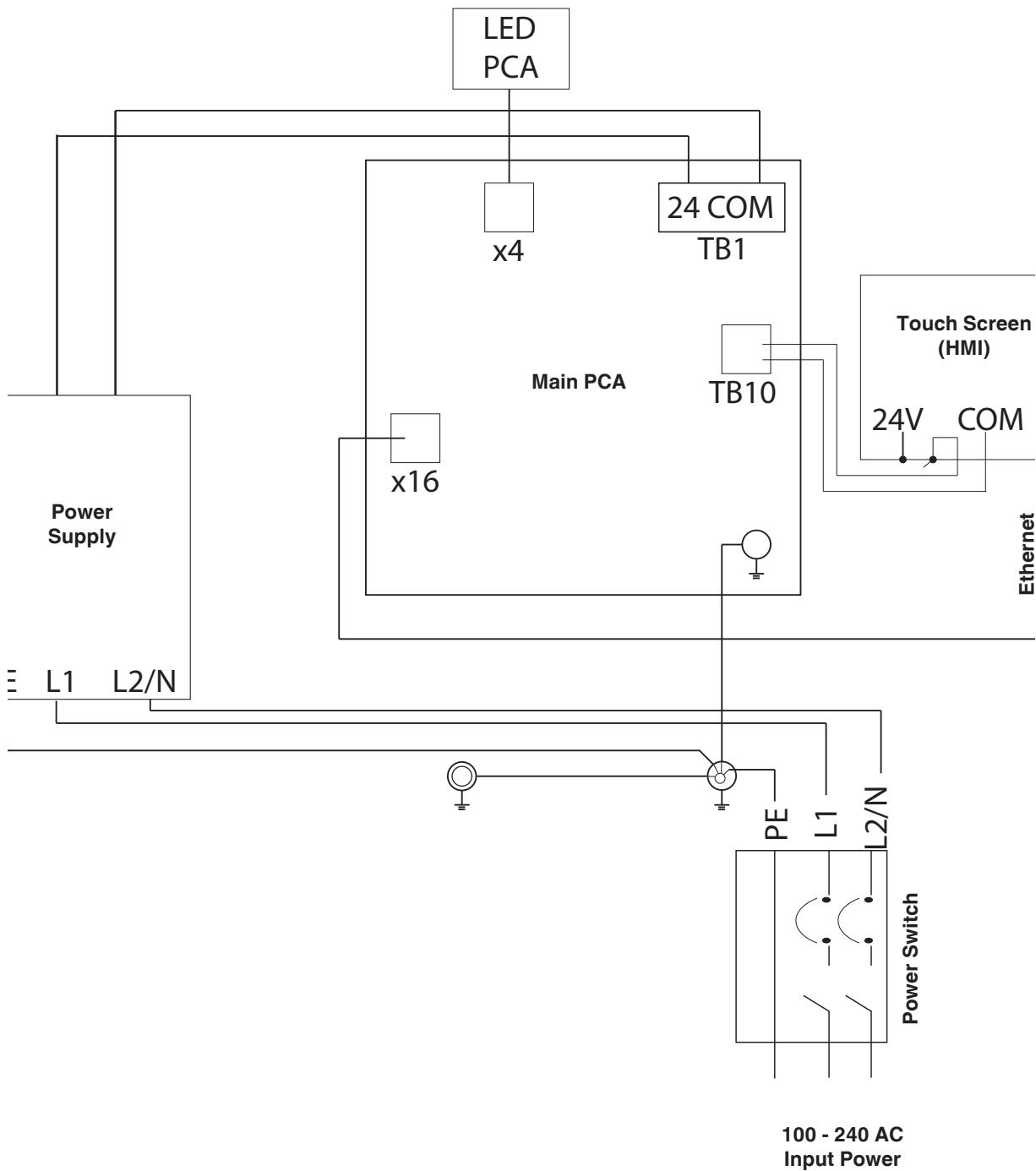
Add-on Software License

Encoder license. Part number 1132400

Pattern license. Part Number 1132949

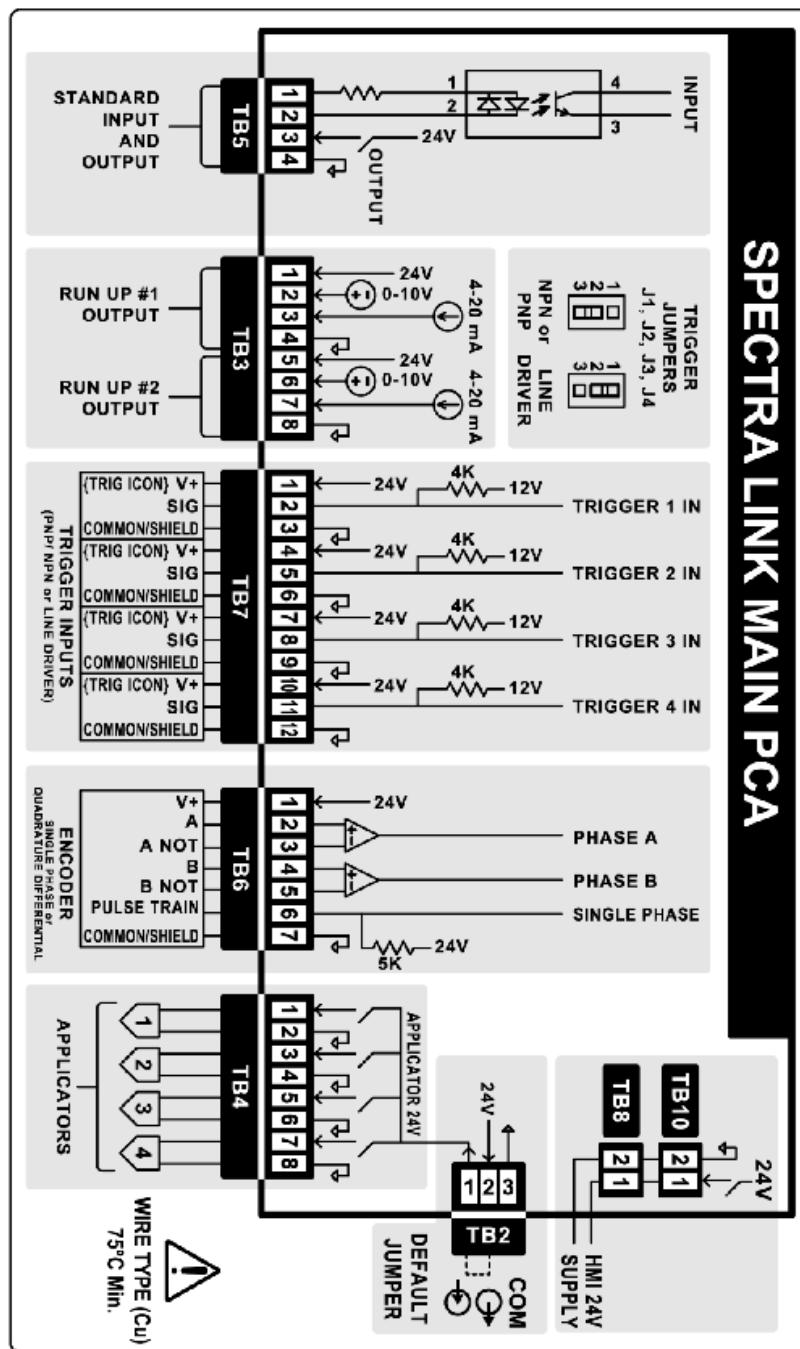
Schematics

System Schematics



Spectra Link Main PCA Map

Refer to the Installation chapter for wiring details.

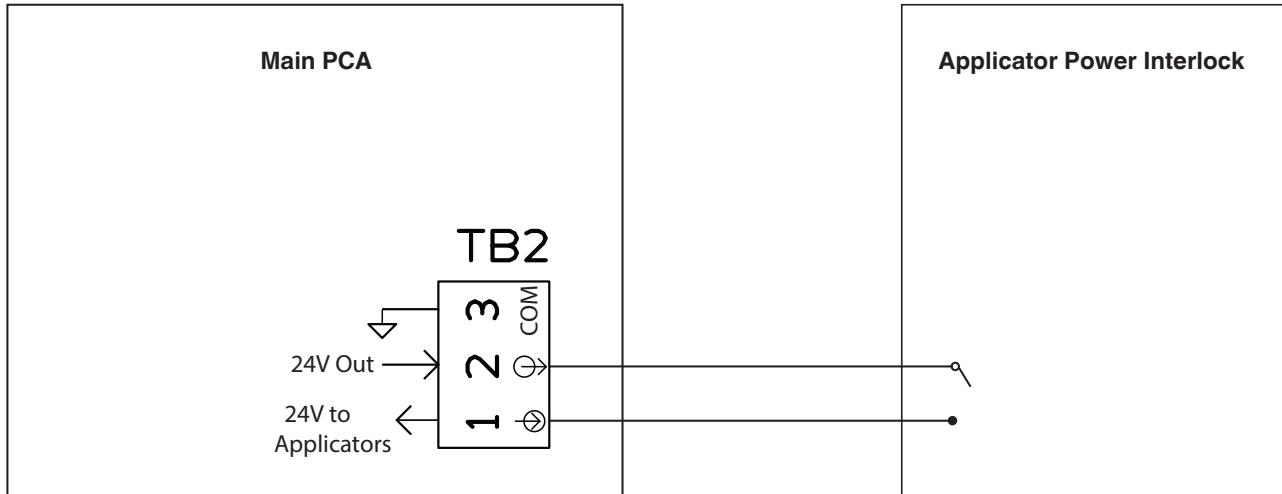


Connecting Applicator Interlock



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

Applicator Power Interlock



NOTES:

- TB2 is provided for access to all applicator solenoid power for the purpose of interlock
- Internal power supply interlock rated 24Vdc, 4A minimum. Remove jumper. Install interlock at TB2 positions 1 (INPUT) and 2 (OUTPUT).



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

1. Shut down the pattern controller, then tag and lockout power to the pattern controller.
2. Remove the front cover, 3mm hex driver.
3. Remove one of the strain reliefs and route the wire through it. Refer to **Routing Wires through the Strain Relief** for more information.
4. Do the following to continue:
 - Refer to Figure 2-2, item 5. Use a small screw driver to remove and discard the jumper.
 - From your external interlock device, connect and secure conductor and torque to 0.8 Nm (7.0 in-lbs) at TB2 position 1 and 2 (24 VDC INPUT/OUTPUT).
5. Tighten the retaining nut of the strain relief connector and zip tie around the wiring. Refer to **Routing Wires through the Strain Relief** for more information.
6. Remove the lockout tag, restore power, then start the pattern controller.

NOTES:

- The wire should be:
 - Wire gauge 0.34 mm² (22 AWG) - 4.0 mm² (12 AWG)
 - Minimum temperature rating: 75C
 - Wire conductor: Copper
 - Minimum voltage rating: 300V
 - Minimum current rating: 4A

Replacing the Internal Battery



WARNING! Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

1. Shut down the pattern controller, then tag and lockout power to the pattern controller.
2. Remove the front cover, 3mm hex driver,
3. (Refer to figure 2-1) On the main pattern controller board, Remove the old battery from BT1, then replace it with a new BR2032 battery.

CAUTION:

- Dispose of battery properly. Risk of fire, explosion, and burns. Do not recharge, disassemble, heat above 100 °C (212 °F), or incinerate.

NOTES:

- Check that coin cell battery is installed at BR2032 on the main board.
- Check battery voltage (2.5 VDC to 3.0 VDC).

Supplemental Information: I/O Ratings

Main Pattern Board Inputs

TB7-2	Trigger 1	0-24VDC	3mA	Digital input
TB7-5	Trigger 2	0-24VDC	3mA	Digital input
TB7-8	Trigger 3	0-24VDC	3mA	Digital input
TB7-11	Trigger 4	0-24VDC	3mA	Digital input
TB6-2	A	24VDC	0.09mA	Digital input
TB6-3	A_NOT	24VDC	0.09mA	Digital input
TB6-4	B	24VDC	0.09mA	Digital input
TB6-5	B_NOT	24VDC	0.09mA	Digital input
TB6-6	PULSE	24VDC	4.8mA	Digital input
TB5-1&2	INPUT 1	0-30VDC	16mA	Digital input

Main Pattern Board Outputs

TB7-1&3	Trigger 1	24VDC	200mA	Power Source
TB7-4&6	Trigger 2	24VDC	200mA	Power Source
TB7-7&9	Trigger 3	24VDC	200mA	Power Source
TB7-10&12	Trigger 4	24VDC	200mA	Power Source
TB6-1&7	Encoder 1	24VDC	200mA	Power Source
TB3-1&4	Run-up 1	24VDC	200mA	Power Source
TB3-2&4	Run-up 1 0-10V	0-10VDC	10mA	Analog Voltage
TB3-3&4	Run-up 1 4-20mA	10VDC	20mA	Analog Current
TB3-5&8	Run-up 2	24VDC	200mA	Power Source
TB3-6&8	Run-up 2 0-10V	0-10VDC	10mA	Analog Voltage
TB3-7&8	Run-up 2 4-20mA	10VDC	20mA	Analog Current
TB10-1&2	PURGE BOX	24VDC	750mA	Power Source
TB8-1&2	HMI	24VDC	750mA	Power Source
X20-1&3	FAN	5VDC	100mA	Power Source
X6 - 1&4	USB 5V	5VDC	500mA	Power Source
TB5-3&4	Output 1	24VDC	250mA	Digital Output

Main Pattern Board Switching Outputs

TB4-1&2	Applicator 1	24VDC	2A, inductive
TB4-3&4	Applicator 2	24VDC	2A, inductive
TB4-5&6	Applicator 3	24VDC	2A, inductive
TB4-7&8	Applicator 4	24VDC	2A, inductive
Note: TB4 Applicator Outputs in total cannot exceed 4 A			