



Axiom™ Series

X-1022

Dual Conveyor Dispensing System

*Addendum to
Axiom X-1000 Series Operations Manual
P/N 392889, Revision D*

Note: *In the event of conflict between the manual specified above and this addendum, this addendum shall have precedence.*

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1 Introduction

Overview

This addendum addresses additional information necessary for configuring, operating, and programming the Axiom X-1022 Dual Conveyor Dispensing System and covers the following topics:

- System Features
- Dual Conveyor Setup
- Theory of Operation
- Positioning the Conveyor
- Fluidmove Programming for Dual Lane Systems

Refer to the *Axiom X-1000 Series Operations Manual*, the *Axiom X-1000 Series Installation and Service Manual*, and the Fluidmove User Guide for additional information.

Safety First

Operation of your Axiom X-1022 Dispensing System involves heat, air pressure, electrical power, mechanical devices, and the use of hazardous materials. It is essential that personnel servicing or operating the dispensing system fully understand all hazards, risks, and safety precautions. Refer to the *Safety* section of the *Axiom X-1000 Series Operations Manual* for additional information.

Specifications

Refer to the *Axiom X-1000 Series Installation and Service Manual* for system specifications.

Maintenance and Troubleshooting

Recommended maintenance and troubleshooting procedures are described in the *Axiom X-1000 Series Operations Manual* and the *Axiom X-1000 Series Installation and Service Manual*.

System Features

The X-1022 Dispensing System comes fully equipped with all features of the standard X-1000 Dispensing System. In addition to the basic X-1000 features, the X-1022 is equipped with the following:

- A second conveyor
- A second conveyor controller
- Six (6) lift table/heating stations
- An additional pneumatics block

In addition to the features above, the X-1022 includes:

- Additional interconnect cabling and power cords to accommodate the additional conveyor controller, heating station, and conveyor components.
- Heater cartridges that operate at 600 watts each without the need for a second input power source.

System components are shown in Figure 1-1 through Figure 1-7. The item numbers associated with the descriptions correspond to the callout numbers in the illustrations. Refer to the *Axiom X-1000 Series Operations Manual* for detailed descriptions and operating instructions.

Front View Features

This subsection contains functional descriptions of X-1022 components shown in Figure 1-1 through Figure 1-4.

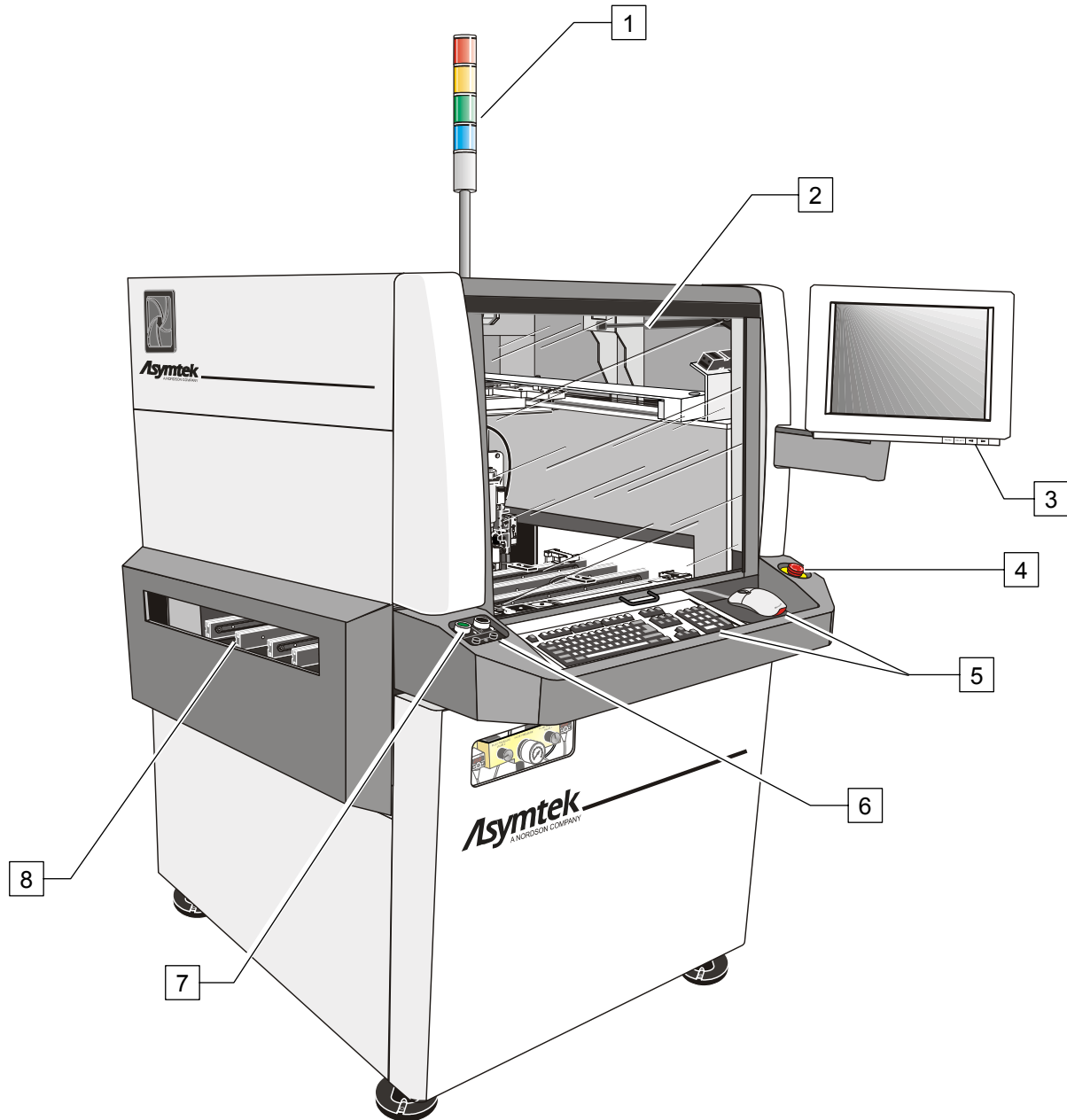


Figure 1-1A X-1022 Front View (Typical)

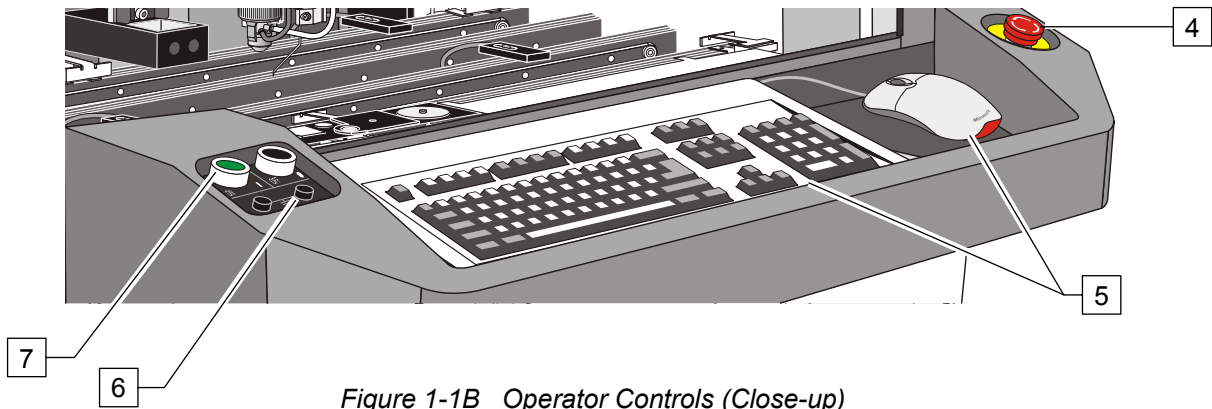
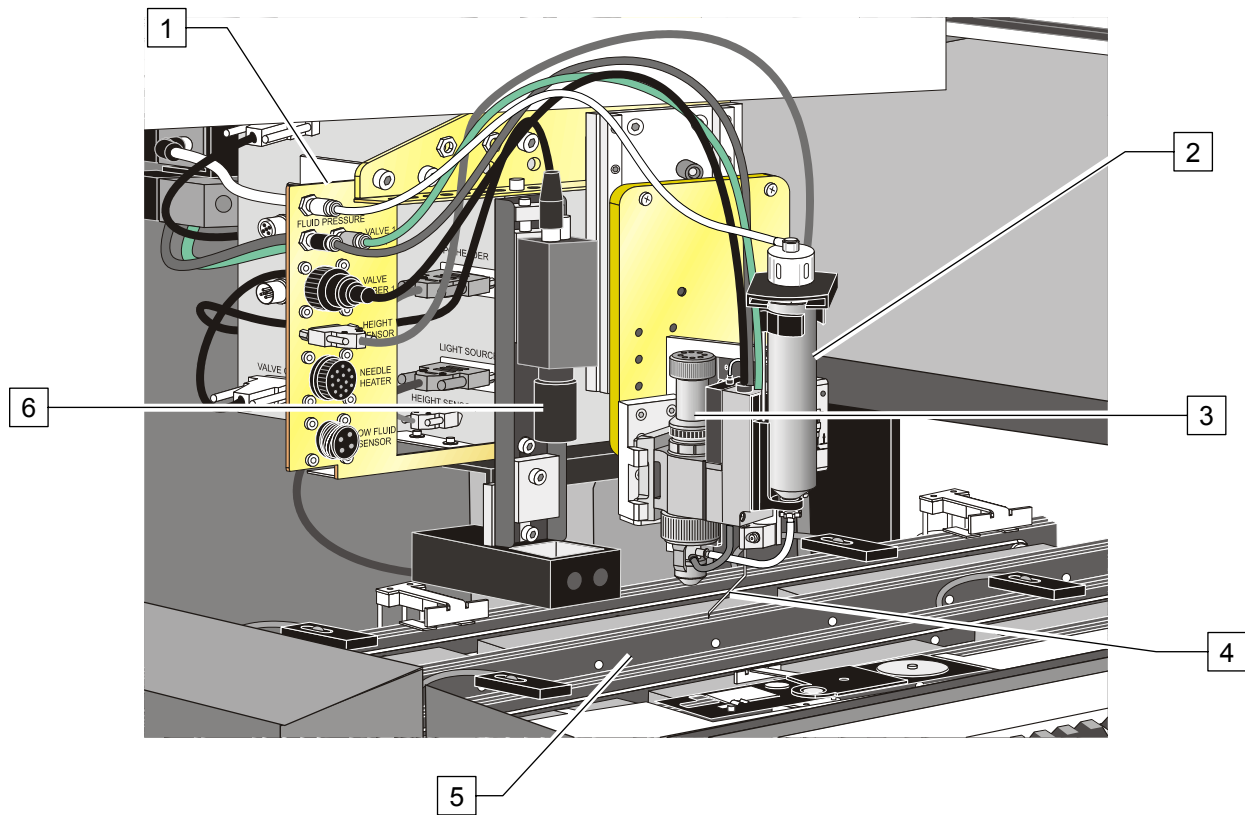


Figure 1-1B Operator Controls (Close-up)

Table 1-1 Front View Features

Item No.	Component	Description
1	Light Beacon	The Light Beacon is a warning device for the operator. The beacon signals a dispensing status condition by displaying a colored light and/or issuing an audible tone. Refer to the <i>Axiom X-1000 Operations Manual</i> for additional information.
2	Hood/Window	The Hood/Window allows access to the dispensing area. Opening the hood/window during a production run activates the interlock safety feature, which disables all dispensing head motion. Dispensing may be adversely affected if the hood/window is opened during actual dispensing.
3	Monitor	The LCD Flat-Panel Monitor provides the operator with Fluidmove software displays and a view of the work area through the system camera.
4	Front Emergency Machine Off Button (EMO)	The EMO button is a built-in safety feature located on both the front panel and back panel of the dispensing system. Activating the EMO vents all pressure in the pneumatic system, de-energizes the servo power supply capacitors, and cuts power to all system components except the computer and monitor.
5	Mouse/Keyboard	The computer system is equipped with an optical mouse and an ASCII-compatible keyboard.
6	ESD Grounding Strap Connectors	Grounding straps worn by the operator or technician plug into these jacks to prevent electrostatic discharge (ESD) damage to workpieces and dispensing system electronics during dispensing operations and servicing.
7	ON/OFF Buttons	The ON and OFF buttons are momentary push buttons located on the left side of the operator's console. When pressed, the green ON (I) button illuminates and switches on power to the dispensing system mechanics. When the OFF (O) button is pressed, the dispensing activity shuts down and the air pressure is vented, but the computer and monitor power is not affected.
8	Dual Lane Conveyors	The Dual Lane Conveyors allow parts to be conveyed from upstream systems, to the dispensing station, and then to downstream systems. Both conveyors are SMEMA compatible and have an adjustable rear rail.

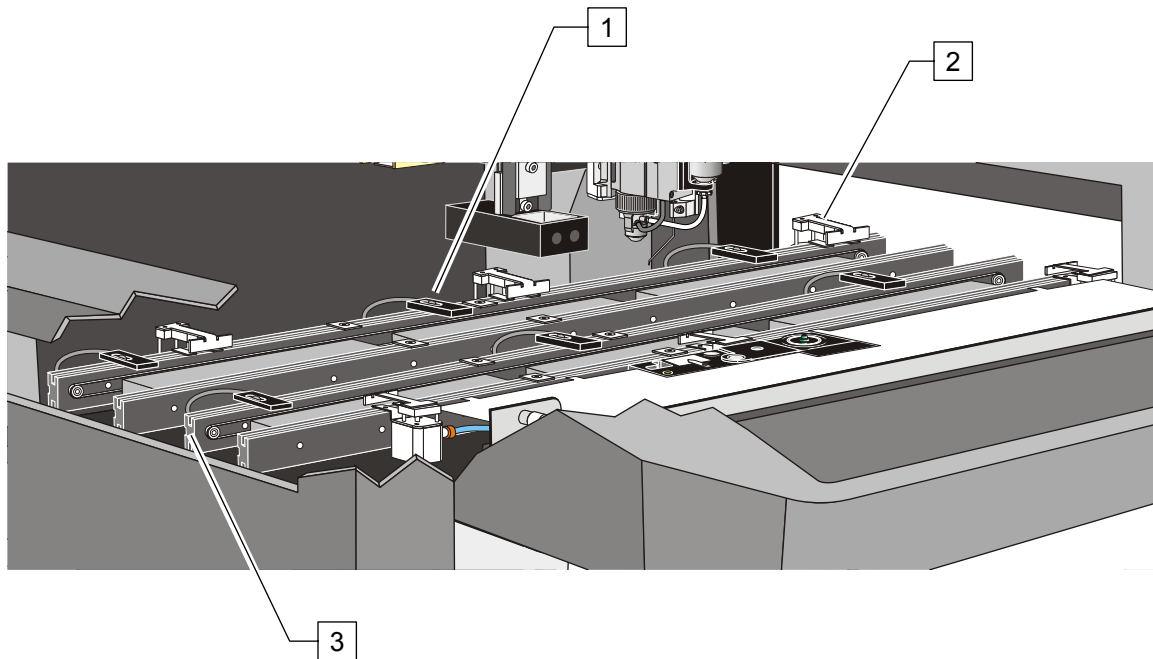
Dispensing Area (Close-up)



Item No.	Component	Description
1	Bulkhead	The Bulkhead supports electrical and pneumatic connectors for accessories on the dispensing head.
2	Fluid Syringe	The Fluid Syringe is mounted on the dispensing valve and contains the fluid to be dispensed. The fluid manufacturer packages the fluid in the syringe according to the requirements of your application.
3	Dispensing Valve (DJ-9000 shown)	The Dispensing Valve also referred to as a pump or jet (depending on the mode of operation) dispenses the fluid onto the workpiece.
4	Height Sensor	The Height Sensor is a device that measures substrate height and sends a signal to the system computer. The height information is used to position the dispensing needle at an exact distance above the workpiece surface.
5	Impingement Heater Tooling	Impingement Heater Tooling blows warm air onto the underside of the workpiece. Heat is used during the actual dispensing process to control the flowrate and cure of the fluid dispensed.
6	Vision System	The miniature, high-resolution, black and white camera and its vibration resistant lens are part of the Vision System. They are mounted on the dispensing head and are used to view work surfaces.

Figure 1-2 X-1022 Dispensing Area

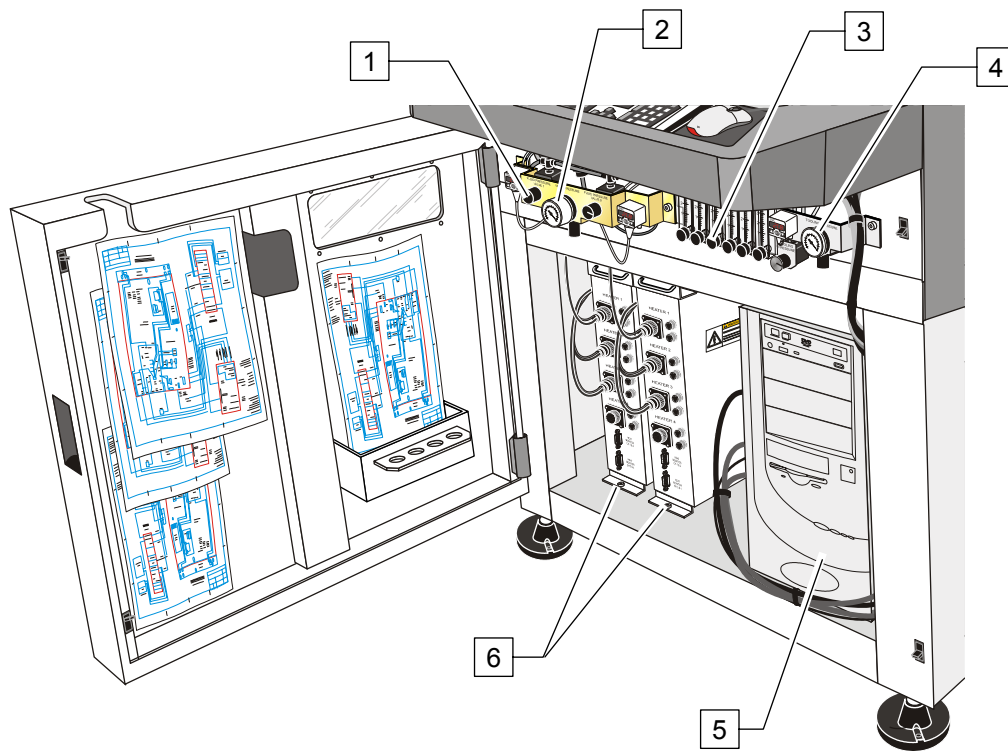
Dual Conveyors



Item No.	Component	Description
1	Board Sensor	Fiber-array Board Sensors mounted on top of the conveyor rail detect the presence of the workpiece at each conveyor station and report it to the Conveyor Controller.
2	Stop Pin	The Stop Pins are pneumatic devices that physically stop the workpiece at a specific conveyor station. The Conveyor Controller, in conjunction with the Fluidmove software, controls the stop pins.
3	Conveyor Rails	The Conveyor 1 front rail is fixed. The Conveyor 2 front rail is manually adjustable to allow pitch variations between Conveyor 1 and Conveyor 2. Conveyor 1 and Conveyor 2 rear rails move independently toward the back and front of the dispensing system.

Figure 1-3 Dual Conveyor (Close-up)

Front Cabinet

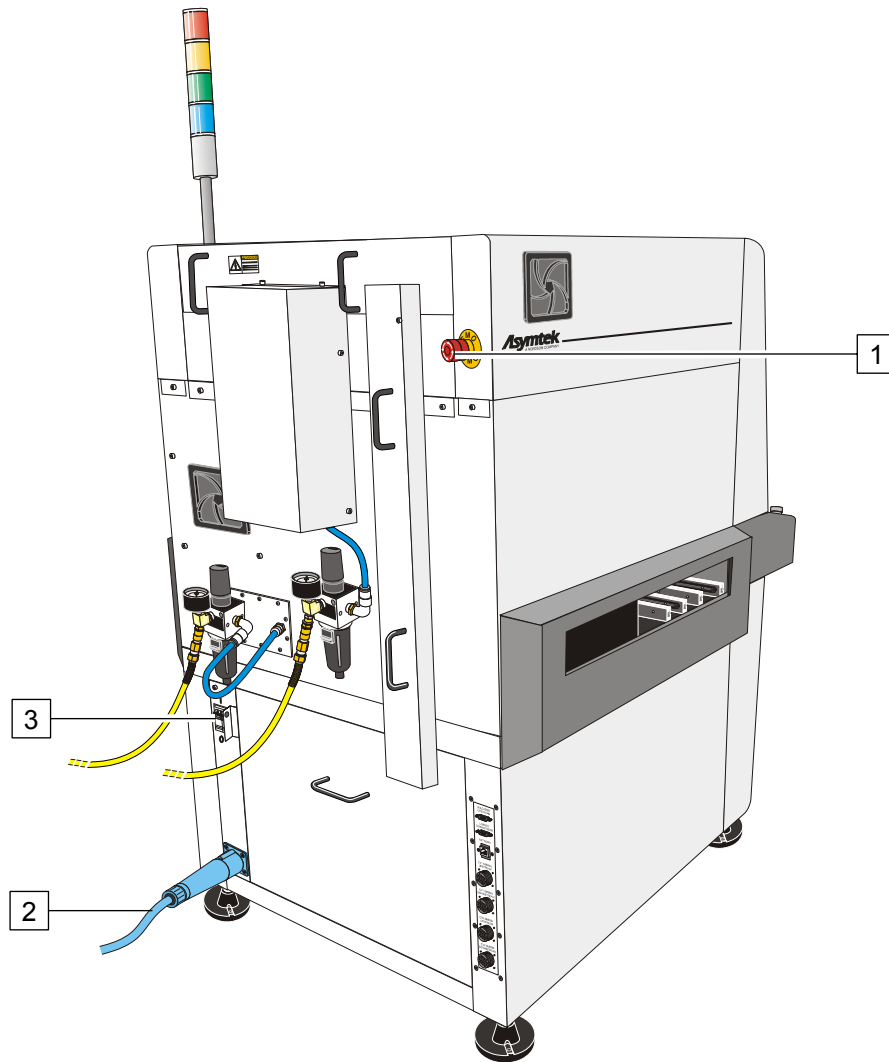


Item No.	Component	Description
1	Precision Fluid Air Regulator and Gauge	The Valve 1 Fluid Air Regulator and Gauge set consists of a precision regulator and a digital gauge and controls air pressure for the Dispensing Valve 1 fluid syringe on the Dispensing Head. There is also a Valve 2 Fluid Air Regulator and Gauge set used for systems configured with the Dual-Action Dispensing Head. Each Fluid Air Regulator receives air from the Main Air Regulator located on the back panel of the dispensing system.
2	Valve Air Regulator and Gauge	The Valve Air Regulator and Gauge controls the air pressure supplied to the Dispensing Valve.
3	Flowmeters for Impingement Tooling	Individual flowmeters are provided for each station to adjust the air flow for each heater.
4	Tooling Air Regulator and Gauge	The Tooling Air Regulator and Gauge controls the air pressure being supplied to the conveyor stop pins and lift tables/clamp bars. The regulator receives air from the Main Air Regulator located at the back of the dispensing system.
5	Computer	The industry-standard Computer runs the Fluidmove dispensing software, enables programming and production operations, and controls all major components.
6	Conveyor/Heater Controller	The Conveyor/Heater Controller manages all conveyor-related functions. Systems equipped with dual-lane conveyors will have two conveyor controllers one for each lane. The second conveyor controller is connected to the COM1 port of the computer.

Figure 1-4 Front Cabinet

Rear View Features

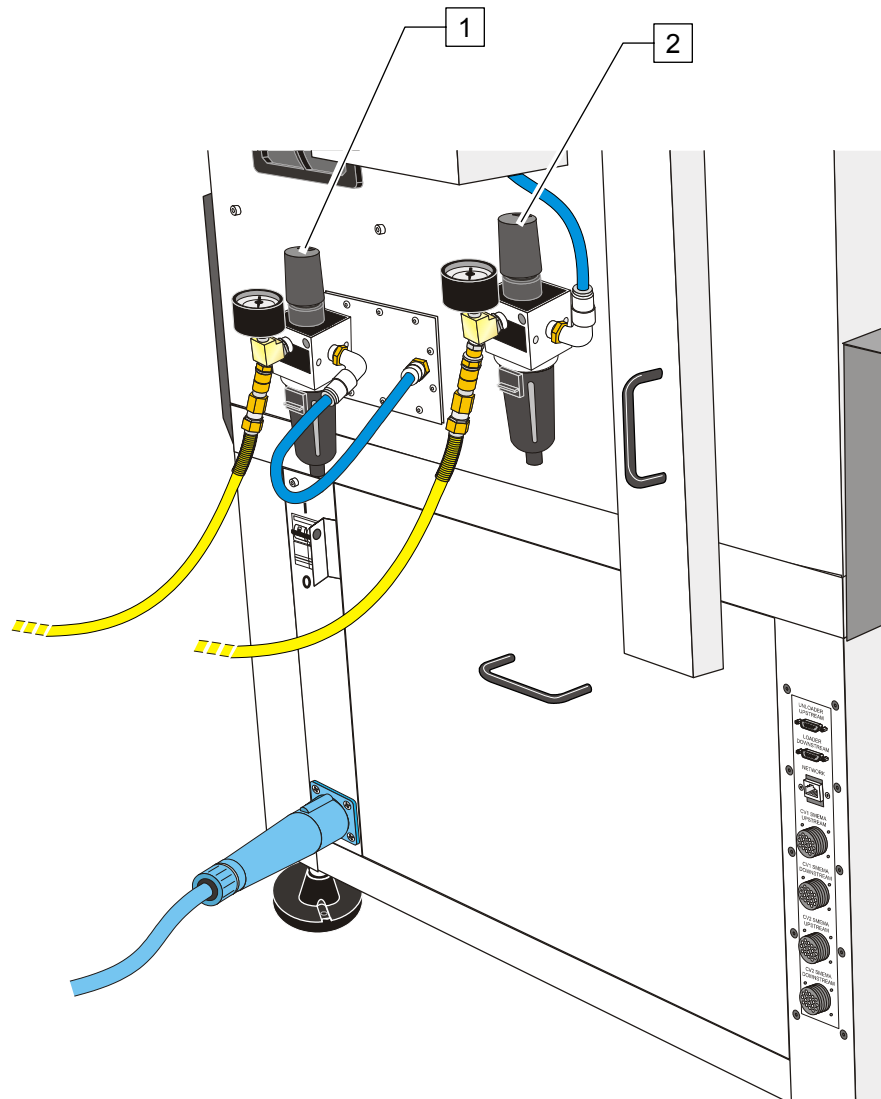
This subsection contains functional descriptions of X-1022 components shown in Figure 1-5 through Figure 1-7.



Item No.	Component	Description
1	Rear Emergency Machine Off Button (EMO)	The EMO button is a built-in safety feature located on both the front panel and back panel of the dispensing system. Activating the EMO vents all pressure in the pneumatic system and cuts power to all components, including the computer and monitor.
2	Main Power Cord	The Main Power Cord connects the dispensing system to the facility power supply.
3	Main Circuit Breaker	The Main Circuit Breaker is the main power switch for the dispensing system. It controls the flow of facility AC power supplied to the power manager.
	Power Manager (not shown)	The Power Manager is located in the rear cabinet and receives power through the main power inlet and supplies power to the power supply, the system computer, and the conveyor controller.

Figure 1-5 Rear View (Typical)

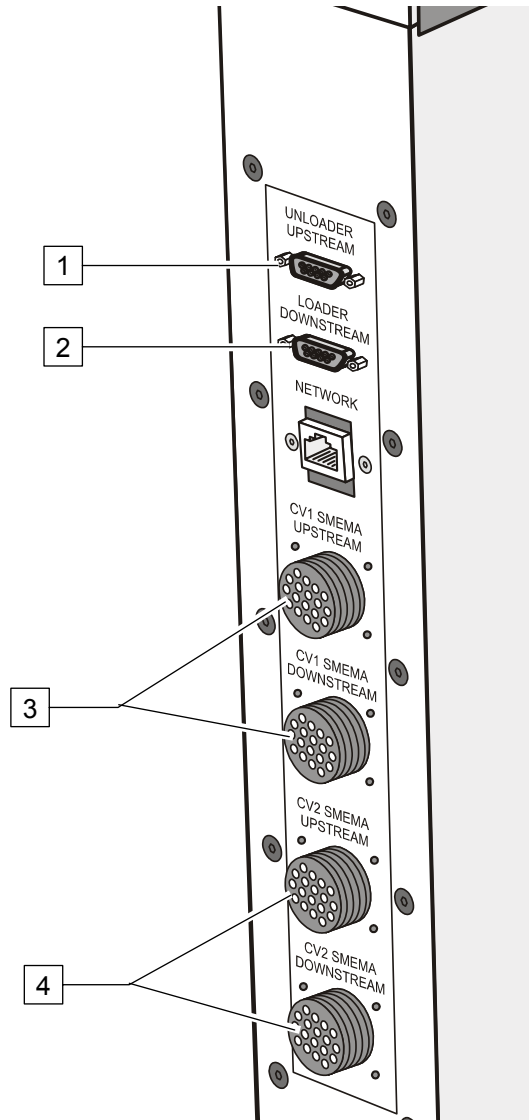
Pneumatic Regulators and Gauges



Item No.	Component	Description
1	Main Air Regulator and Gauge	The Main Air Regulator and Gauge controls the air pressure supplied to all other system regulators. The regulator contains an air filter and water trap to ensure that only clean, dry air enters the system.
2	Impingement Heater Air Regulator and Gauge	The Impingement Heater Air Regulator and Gauge set supplies air to the impingement flowmeters which regulate the air flow to the impingement heaters.

Figure 1-6 Pneumatic Regulators and Gauges

Rear Connections



Item No.	Component	Description
1	Unloader Upstream	Used for programming purposes on upstream unloaders.
2	Loader Downstream	Used for programming purposes on downstream loaders.
3	Conveyor 1 SMEMA Connections	The upstream/downstream SMEMA connectors allow for SMEMA communication between the dispensing system and upstream and downstream machines, such as loaders and unloaders.
4	Conveyor 2 SMEMA Connections	

Figure 1-7 Rear Connections

2 Installation

Refer to the *Installation* section of the *Axiom X-1000 Series Installation and Service Manual* for standard installation and setup procedures. In most cases, system configuration is performed at the Asymtek factory. Typical Dual Conveyor settings are shown below.

Dual Conveyor Setup

To configure the Conveyor:

1. Power on the dispensing system and start Fluidmove as described in the *Axiom X-1000 Series Operations Manual*.
2. In the Fluidmove Main Window, select **Configuration>Setup Conveyors**.
 - ▶ The Setup Conveyors Window (Figure 2-1) opens.

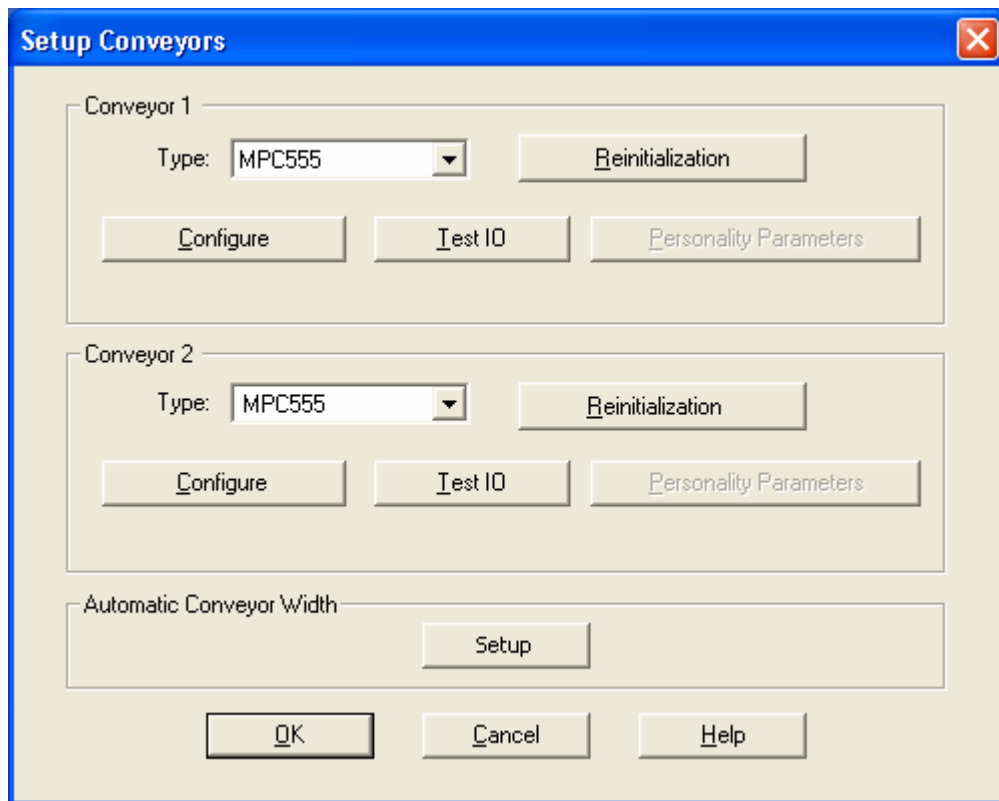


Figure 2-1 Setup Conveyors Window

3. Select **MPC555** from the drop-down list for Conveyor 1 type.
4. Select **MPC555** from the drop-down list for Conveyor 2 type.
5. Click **Configure** for Conveyor 1.
 - ▶ The Conveyor Configuration Window (Figure 2-2) opens.

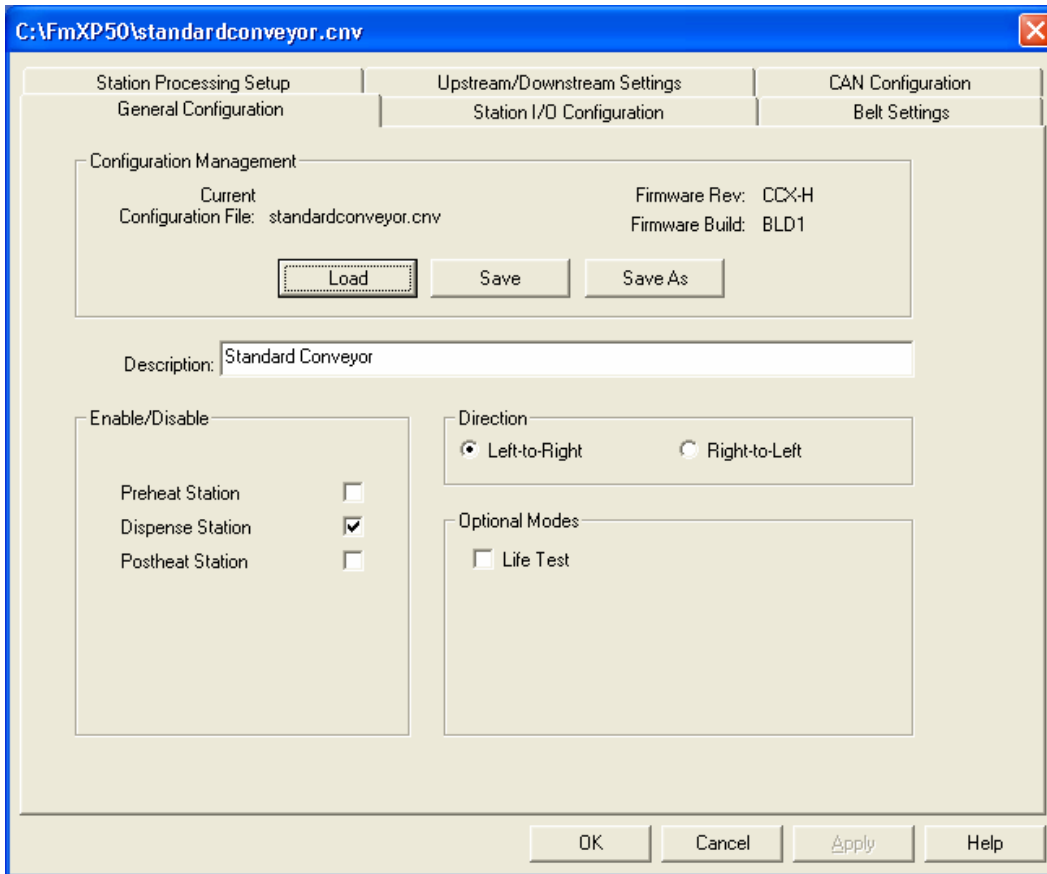


Figure 2-2 Conveyor Configuration Window

6. In the **Enable/Disable** section under the General Configuration tab, click the appropriate checkbox to enable the stations. A checkmark in the box indicates the station is enabled.



NOTE The conveyor style is configured at the factory. If a style change is required, contact Asymtek Technical Support.

7. Click **OK**.
 - ▶ The Conveyor Configuration Window closes and you return to the Setup Conveyor Window.
8. Click **Configure** for Conveyor 2 (Figure 2-1).
9. Repeat Steps 6 and 7 for Conveyor 2.
10. Click **OK**.
 - ▶ The Conveyor Configuration Window closes and you return to the Setup Conveyor Window.
11. Click **OK** to return to the Fluidmove Main Window.

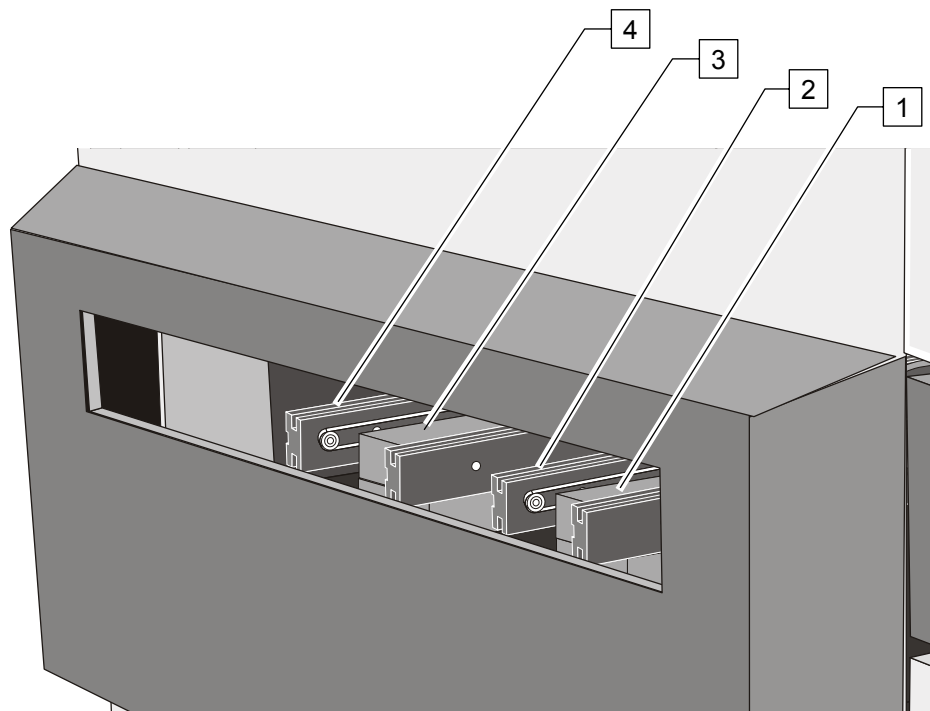
3 Operation

Theory of Operation

The X-1022 Dispensing System generally operates the same as the standard X-1000 Series systems with the exception of the conveyor movement.

Positioning the Conveyor

When necessary, an operator can use Fluidmove position (jog) controls to adjust conveyor rail width for each conveyor, reposition the workpiece X-axis location on the conveyor, and reposition the dispensing head in the X, Y, and Z-axes. The Conveyor 1 front rail is fixed. The Conveyor 2 front rail is manually adjustable to allow pitch variations between Conveyor 1 and Conveyor 2. Both of the rear rails move independently toward the back or front of the machine. See Figure 3-1.



Item	Description
1	Conveyor 1 Front Rail (Fixed)
2	Conveyor 1 Rear Rail (Adjustable)
3	Conveyor 2 Front Rail (Adjustable)
4	Conveyor 2 Rear Rail (Adjustable)

Figure 3-1 Conveyor (Close-up)



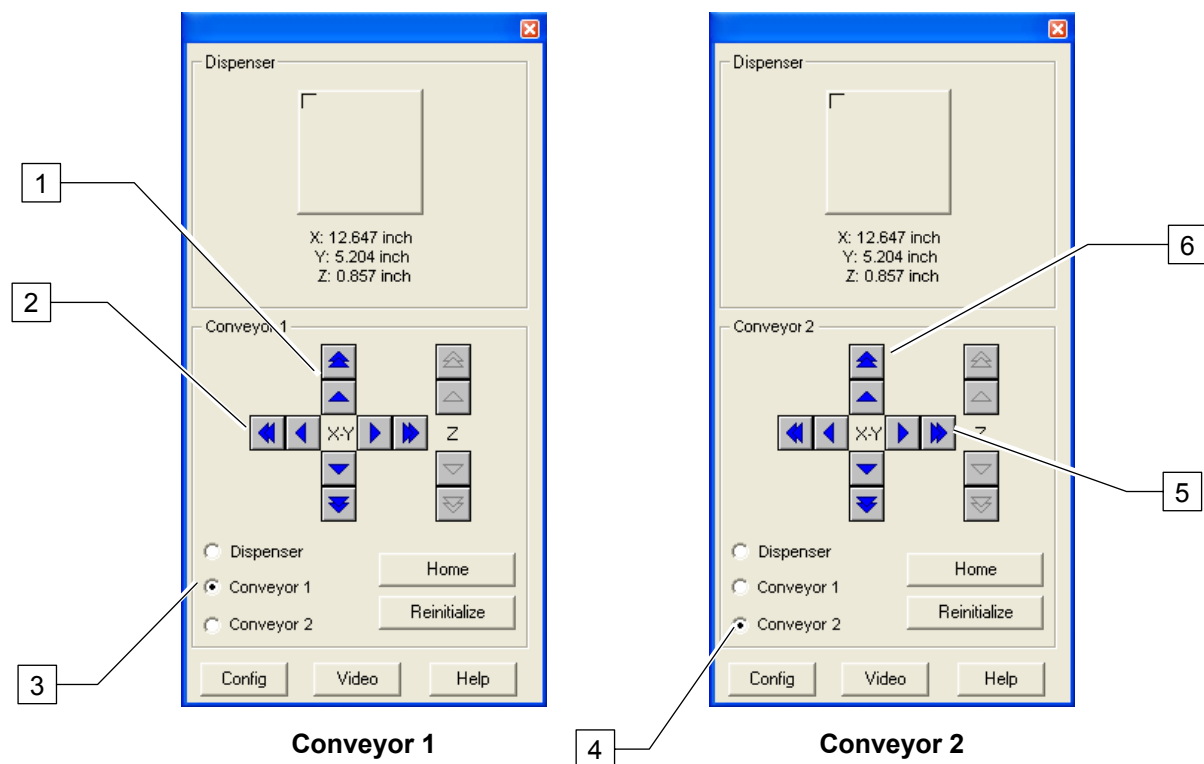
NOTE The following procedures assume that the dispensing system and computer have been turned on as specified in the *Axiom X-1000 Series Operations Manual*.

To operate position controls with the Mouse:

1. In the Fluidmove Main Window, click on **Jog**.
 - ▶ The Position Controls dialog box opens. See Figure 3-2.
2. Click on the **Conveyor 1** radio button to activate the Conveyor 1 position controls, click on the **Conveyor 2** radio button to activate the Conveyor 2 position controls, or click on the **Dispenser** radio button to activate the Dispensing Head position controls.



NOTE The selected jog device is indicated in the bottom right-hand corner of all major windows.





Item	Description
1	Conveyor 1 Y-axis Controls (rear rail forward and backward movement)
2	Conveyor 1 X-axis Controls (belt left and right movement)
3	Radio Buttons (Conveyor 1 selected)
4	Radio Buttons (Conveyor 2 selected)
5	Conveyor 2 X-axis Controls (belt left and right movement)
6	Conveyor 2 Y-axis Controls (rear rail forward and backward movement)

Figure 3-2 Conveyor Position Controls

3. Conveyor 1 position controls operate as follows:
 - ▶ On the X-Y control panel, the arrows pointing to the **Left** move the Conveyor 1 belt to the left and the arrows pointing to the **Right** move it to the right.
 - ▶ On the X-Y control panel, the arrows pointing **Up** move the Conveyor 1 rear rail toward the back of the dispensing area and the arrows pointing **Down** move the rear rail toward the front of the dispensing area.
4. Conveyor 2 position controls operate as follows:
 - ▶ On the X-Y control panel, the arrows pointing to the **Left** move the Conveyor 2 belt to the left and the arrows pointing to the **Right** move it to the right.
 - ▶ On the X-Y control panel, the arrows pointing **Up** move the Conveyor 2 rear rail toward the back of the dispensing area and the arrows pointing **Down** move the rear rail toward the front of the dispensing area.



NOTE The single arrows  and double arrows  move the conveyor rail or belt different distances per mouse click.

To operate position controls using Keyboard commands:

1. Press [**Ctrl + J**] to open the Position Controls dialog box.
2. Using the Mouse, click on the **Conveyor 1** radio button to activate the Conveyor 1 position controls, click on the **Conveyor 2** radio button to activate Conveyor 2 position controls, or click on the **Dispenser** radio button to activate the Dispensing Head position controls.
3. Press the appropriate keys to jog the selected device (Conveyor 1, Conveyor 2, or Dispensing Head).



NOTE Refer to the *Axiom X-1000 Series Operations Manual* for a detailed explanation of Position Control Commands for the Dispensing Head and Conveyors.


Fluidmove Programming for Dual Lane Systems

Fluidmove programming differs slightly for the X-1022 Dual Lane Dispensing Systems. There is only one program (workpiece) origin for both conveyors. In addition, all program commands must be placed in a Conveyor Block. Program commands for both conveyors may be placed directly in the Workpiece pattern. When placing the commands directly in the Workpiece pattern, there is only one origin and one set of fiducials for both conveyors. However, for more precise dispensing, you may create separate patterns for Conveyor 1 and Conveyor 2. This allows you to define an origin and fiducials for each pattern in addition to those defined for the Workpiece pattern. Both methods are explained in the following sections.




NOTE For detailed information about programming, refer to the *Fluidmove User Guide* or Online Help.

Creating a Program for Dual Lane Conveyor Systems

 **NOTES** Programming setup is a recommended routine to be performed prior to beginning a programming session. Programming setup consists of defining fluid and vision files, setting workpiece alignment options, and defining fiducials.

For more information on programming setup and defining fiducials, refer to the *Fluidmove User Guide* or Online Help.

To create a basic program:

1. Select **Teach a Program** from the Fluidmove Main Menu.
 - ▶ The Programming Window opens. The last loaded program also opens.
2. To create a new program, select **File>New** from the menu bar or click on the **Program Wizard**  icon.
 - ▶ The Create Workpiece dialog box (Figure 3-3) opens.

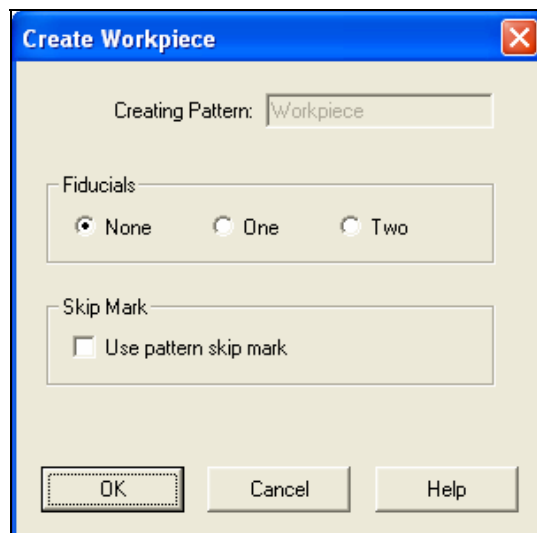



Figure 3-3 Create Workpiece Dialog Box

 **NOTE** In this example, we will not define fiducials. When creating your own program, select the fiducial setup alignment that best fits your pattern type. If your pattern contains Skip Marks, activate the **Use Pattern Skip Mark** feature.

3. In the Fiducials section of the Window, select **None**.
4. Click **OK**.
 - ▶ A Teach Window opens asking you to “Teach Workpiece Origin.” See Figure 3-4.

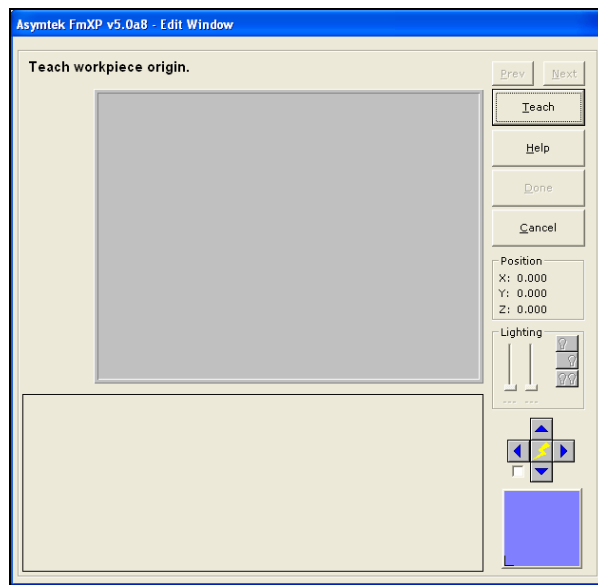


Figure 3-4 Teach Workpiece Origin

5. Use the position controls to move the dispensing head to the Workpiece (program) origin.
6. Click on **Teach** and then on **Done**.
 - ▶ A Teach Window opens asking you to “Teach Substrate Height.” See Figure 3-5.

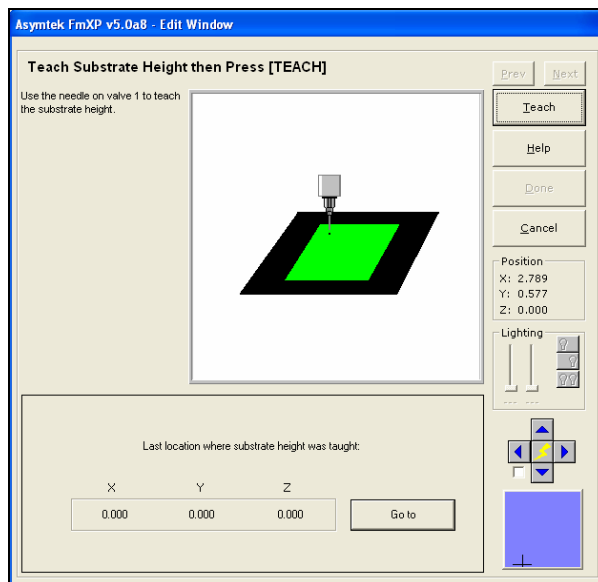


Figure 3-5 Teach Substrate Height

7. Use the position controls to move the dispensing valve to the appropriate substrate height.
8. Click on **Teach** and then on **Done**.
9. You will then be prompted to run machine offsets.
10. When complete, the Programming Window (Figure 3-6) opens.
 - ▶ All Fluidmove programs contain a Workpiece pattern. The Workpiece pattern may contain dispensing commands as well as commands to execute additional patterns.

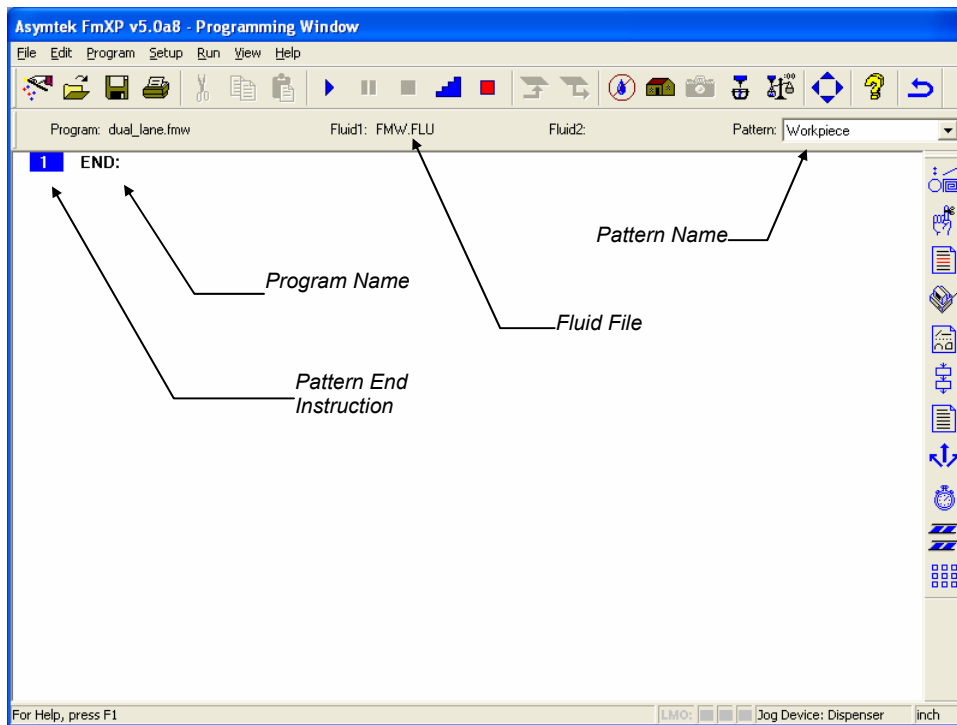



Figure 3-6 New Program Window - Workpiece Pattern

To place a program command in a Conveyor Block:

1. In the Fluidmove Main Window, select **Teach a Program**.
 - ▶ The Programming Window opens.
2. Click on the **Conveyor**  button on the Program Commands toolbar.
 - ▶ The Conveyor drop-down menu (Figure 3-7) opens.

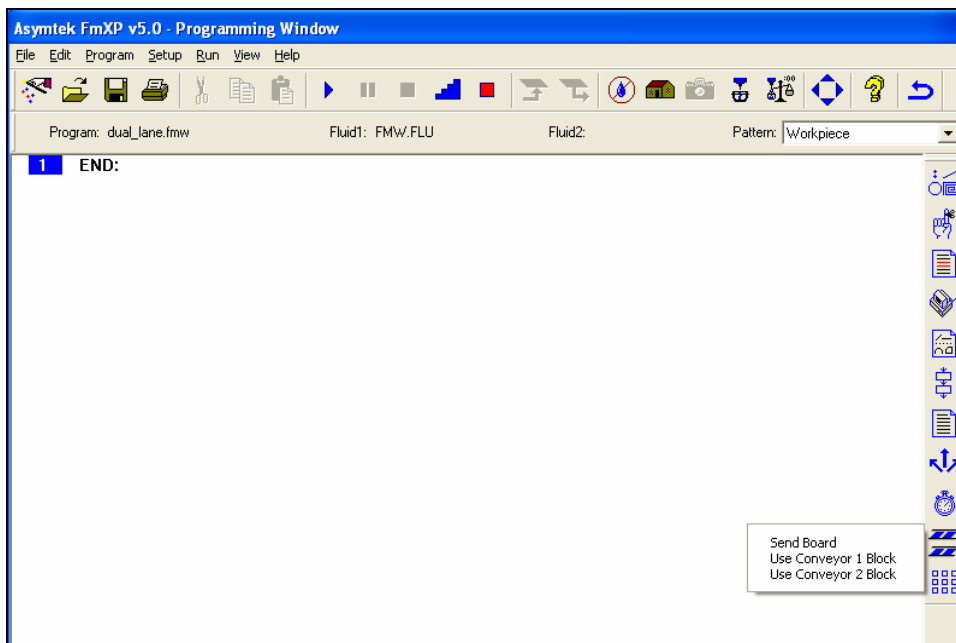



Figure 3-7 Programming Window - Conveyor Block Commands

3. Select **Use Conveyor 1 Block** or **Use Conveyor 2 Block** depending on where you want to dispense.
 - ▶ A Conveyor Block command similar to the one below will be inserted into your program.
 - 1 **USE CONVEYOR 1:**
 - 2 **END USE CONVEYOR:**
4. Move the cursor to the beginning of the **END USE CONVEYOR** command.
5. Click on the **Dispense Elements**  button on the Program Commands toolbar.
 - ▶ A Teach Window opens.
6. Select the element you want to program from the Dispensing Elements toolbar and follow the screen prompts.
7. Click on **Done** when you are finished.
 - ▶ The dispensing command should be inserted between the **Use Conveyor 1** and **End Use Conveyor** commands.
8. Save the program.
 - ▶ A sample program is shown in Figure 3-8.

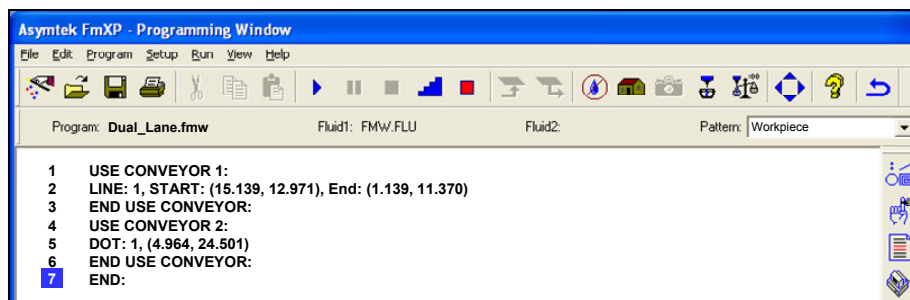


Figure 3-8 Sample Dual Conveyor Program

To create additional patterns:

1. Click on the **Pattern**  button on the Program Commands toolbar. See Figure 3-9.

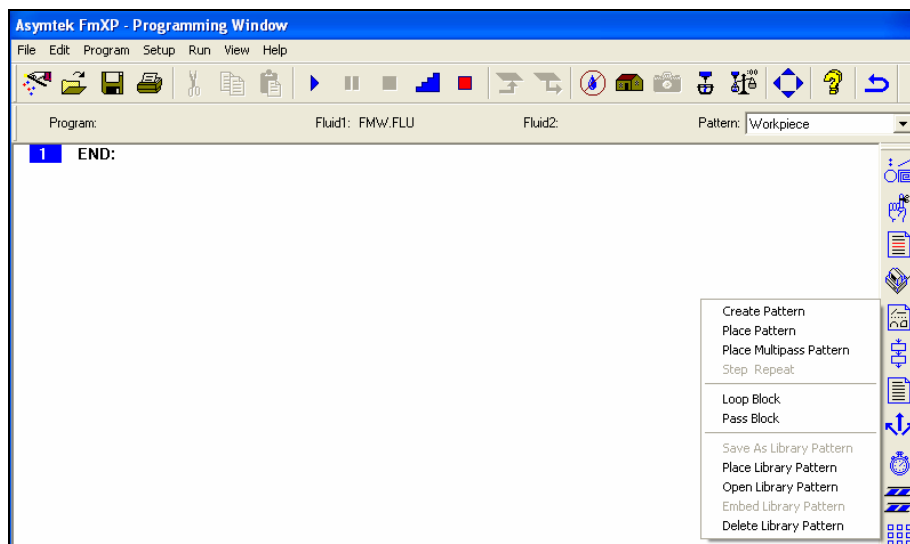


Figure 3-9 Creating a Pattern

2. Select **Create Pattern**.

- ▶ The Create Pattern dialog box (Figure 3-10) opens.

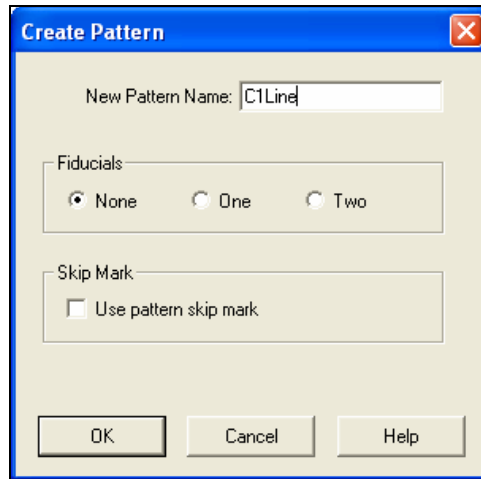


Figure 3-10 Create Pattern Dialog Box

3. For this example, enter **C1Line** as the name for the new pattern.
4. In the Fiducial section of the window, select **None** for no fiducials and click **OK**.
5. Repeat Steps 1 to 4 and create a pattern called **C2Dot**.

To add program commands to your pattern:

1. Click on the drop down arrow in the Pattern textbox and select **C1Line**. See Figure 3-11.

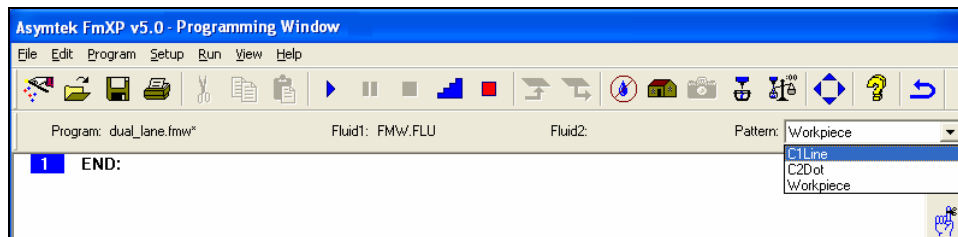



Figure 3-11 Selecting a Pattern

2. Insert program instructions into the C1Line pattern by clicking the appropriate icons on the Program Commands Toolbar and following the screen prompts. Refer to the *Fluidmove User Guide* for programming instructions.
3. Repeat Steps 1 and 2 to insert program instructions for the C2Dot pattern.

To place a pattern:

1. Make sure the Workpiece pattern is selected. Follow the steps above for instructions on selecting a pattern.
2. Click on the **Pattern**  button on the Program Commands toolbar. See Figure 3-9.
3. Select **Place Pattern**.
4. A Teach Window opens prompting you to select a pattern and teach the placement point.
5. Follow the screen prompts and click on **Done** when finished.
6. Sample program screens are shown in Figure 3-12.

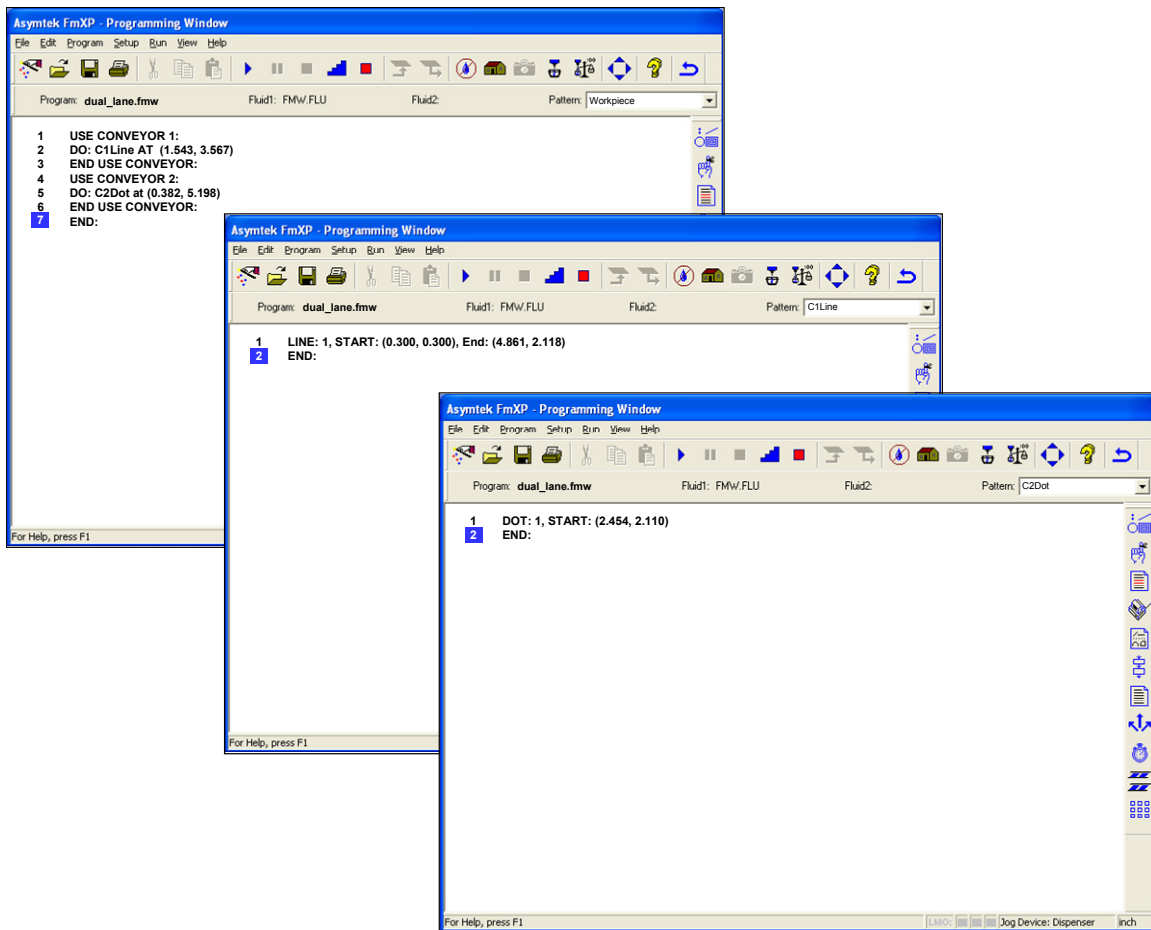


Figure 3-12 Placing Patterns



NOTE Conveyor Block Commands can only be placed in the Workpiece Pattern.

7. Refer to the *Fluidmove User Guide* or Online Help for instructions on running a program.



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