

QPix 420

Microbial Colony Picking System

User Guide

QPix 420 Colony Picking System User Guide

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Safety Information

The safety information section provides information on the safe use of the instrument. It includes the use of user-attention statements in this guide, a key to understanding the safety labels on the instrument, precautions to follow before operating the instrument, and precautions to follow while operating the instrument.

Read and observe all warnings, cautions, and instructions. Remember, the most important key to safety is to operate the instrument with care.



WARNING! If the instrument is used in a manner not specified by Molecular Devices, the protection provided by the equipment might be impaired.

Warnings, Cautions, Notes, and Tips

All warning symbols in the user guide are framed within a yellow triangle. An exclamation mark is used for most warnings. Other symbols can warn of other types of hazards such as biohazard, electrical, or laser safety warnings as are described in the text of the warning.

When warnings and cautions are displayed in this guide, be careful to follow the specific safety information related to them.

The following user-attention statements can be displayed in the text of Molecular Devices user documentation. Each statement implies a particular amount of observation or recommended procedure as described:



WARNING! A warning indicates a situation or operation that could cause personal injury if precautions are not followed. The warning symbol can vary depending on the warning. The definition of the symbol is included in the text of the warning.



CAUTION! A caution indicates a situation or operation that could cause damage to the instrument or loss of data if correct procedures are not followed.

















Note: A note calls attention to significant information.



Tip: A tip provides useful information or a shortcut but is not essential to the completion of a procedure.

Symbols on the Instrument

Symbol	Indication
	Indicates a warning for a situation or operation that could cause personal injury if precautions are not followed. There are specific details written next to the warning symbol.
	Potential biohazard.
	Potential electrical-shock hazard from a high-voltage source. All safety instructions must be read and understood before proceeding with the installation, maintenance, and servicing of all modules.
	Potential heat hazard.
	Strong magnetic field.
	Instrument manufacture date.
	CSA certification.
	European technology conformity.
	United Kingdom technology conformity.
	Compliance with Chinese RoHS Pollution Control Requirements.
	This symbol is required in accordance with the Waste Electrical and Electronic Equipment (WEEE) Directive of the European Union. You must not discard this electrical or electronic product or its components in domestic household waste or in the municipal waste collection system. For products under the requirement of the WEEE directive, contact your dealer or local Molecular Devices office for the procedures to facilitate the proper collection, treatment, recovery, recycling, and safe disposal of the device.
	There is an authorized representative in the European community.
	Instrument manufacturer.
<p>Info for USA only: California Proposition 65</p>  <p>WARNING Cancer & Reproductive Harm www.P65Warnings.ca.gov</p> <p><small>C26135-AA</small></p>	Compliance with California Proposition 65, which requires businesses to warn Californians about significant exposures to chemicals that cause cancer, birth defects or other reproductive harm.

Before Operating the Instrument

Make sure that everyone involved with the operation of the instrument has:

- Received instruction in general safety practices for laboratories.
- Received instruction in specific safety practices for the instrument.
- Read and understood all Safety Data Sheets (SDS) for all materials being used.

Electrical Safety

To prevent electrically related injuries and property damage, inspect all electrical equipment before use and immediately report all electrical deficiencies. Contact Molecular Devices Technical Support to service equipment that requires the removal of covers or panels.



WARNING! HIGH VOLTAGE. Within the instrument is the potential of an electrical shock hazard existing from a high-voltage source. All safety instructions must be read and understood before proceeding with the installation, maintenance, and servicing of all modules.

Do not remove the instrument covers. To prevent electrical shock, use the supplied power cords only and connect to a properly grounded wall outlet.

The instrument must be connected to a properly grounded power outlet to protect from the risk of electric shock. The main chassis of the instrument is grounded together with all related electrical components.

Do not remove the fixed covers, as there are no user-serviceable parts inside. All electrical work must be referred to Molecular Devices approved service personnel.

In the event of a liquid spillage into the main cavity of the instrument, disconnect the mains power supply before trying to clean up.

If the external covers on the instrument are removed, the power supply does not automatically stop.



WARNING! HIGH VOLTAGE Power off the instrument and disconnect the power cord before you do maintenance procedures that require removal of a panel or cover or disassembly of an interior instrument component.

Do not try to use the instrument until all covers are replaced.

To provide access for disconnecting power from the instrument, maintain a 66 cm (26 in.) minimum clearance area on the right side of the instrument.

To protect against fire hazard, replace the fuses only with the same type and rating as the original factory-installed fuses.

Ultraviolet (UV) Light Safety

The instrument door automatically locks whenever you run a process. The door prevents UV light from passing through during operation.

As a safety measure, if the door is open, an electromagnetic switch prevents the instrument from running. Never tamper with this switch, as it serves two purposes:

- It prevents the motors from running to reduce the potential of physical damage.
- It disables the UV light to prevent the risk of damage from UV radiation.

Magnet Safety

Persons with external or implanted medical devices need to evaluate the risks related to these devices before entering an area where the instrument is in use. Keep magnetic storage devices or strips, such as hard drives and credit cards, away from the instrument.

Interactions with metallic objects can create pinch hazards.

External or Implanted Medical Device Safety

Motors and their related drives and cabling are sources of electromagnetic fields.

Persons with external or implanted medical devices must evaluate the risks related to these devices before entering an area where the instrument is in use. Keep magnetic storage devices or strips, such as hard drives and credit cards, away from the instrument.



WARNING! Due to the presence of electromagnetic fields, if you wear an external or implanted medical device, keep 305 mm (1 ft) away from the drive magnets.

Chemical and Biological Safety

Normal operation of the instrument can involve the use of materials that are toxic, flammable, or otherwise biologically harmful. When using such materials, observe the following precautions:

- Handle infectious samples based on good laboratory procedures and methods to prevent the spread of disease.
- Observe all cautionary information printed on the original containers of solutions before their use.
- Dispose of all waste solutions based on the waste disposal procedures of your facility.
- Operate the instrument in accordance with the instructions outlined in this guide, and take all the required precautions when using pathological, toxic, or radioactive materials.
- Splashing of liquids can occur. When working with potentially hazardous liquids, take applicable safety precautions, such as wearing safety glasses and protective clothing.
- Observe the applicable cautionary procedures as defined by your safety officer when using hazardous materials.
- Observe the applicable cautionary procedures as defined by your safety officer when using flammable solvents in or near a powered-up instrument.
- Observe the applicable cautionary procedures as defined by your safety officer when using toxic, pathological, or radioactive materials.



WARNING! BIOHAZARD. If a biohazard is used with the instrument, the area must be clearly marked with an applicable biohazard sign.



WARNING! Never use the instrument in an environment where potentially damaging liquids or gases are present.

Moving Parts Safety

To prevent injury due to moving parts, observe the following:

- Never try to exchange labware, reagents, or tools while the instrument is operating.
- Never try to physically restrict the moving components of the instrument.
- Keep the interior of the instrument clear to prevent obstruction of the movement.

The motors use high-powered magnets. The linear drive units and encoders are delicate, so be very careful with them. To prevent serious damage to the instrument or its auxiliary parts, follow the preparation instructions in this guide before every process.

The instrument door automatically locks whenever you run a process. The door prevents UV light from passing through during operation.

As a safety measure, if the door is open, an electromagnetic switch prevents the instrument from running. Never tamper with this switch, as it serves two purposes:

- It prevents the motors from running to reduce the potential of physical damage.
- It disables the UV light to prevent the risk of damage from UV radiation.

In an emergency, press the Emergency Stop button on the front of the instrument to immediately stop all motion and turn off the instrument. Before you can restart the instrument, you must pull out the Emergency Stop button and then press the Start button.



WARNING! Do not obstruct or otherwise prevent access to the Emergency Stop button.

Motors and their related drives and cabling are sources of electromagnetic fields. Keep magnetic storage devices or strips, such as hard drives and credit cards, away from the instrument covers.



Note: Observe all warnings and cautions listed for all external devices attached to or in use during the operation of the instrument. See the applicable user guide for the operating and safety procedures of that device.

Heat and Burn Safety

The instrument is fitted with a high-temperature halogen dryer. The casing can become hot during the drying cycle.



WARNING! The casing of the halogen dryer can become hot during the drying cycle. Before touching this area, make sure that the dryer has had time to properly cool to a safe temperature.

Cleaning and Maintenance

Observe the cleaning procedures outlined in this guide for the instrument.

Do the following before you clean equipment that has been exposed to hazardous material:

- Contact the applicable Chemical and Biological Safety personnel.
- Review the Chemical and Biological Safety information contained in this guide. See [Chemical and Biological Safety on page 10](#) for details.

Avoid spilling liquids on the system. Fluid spilled into internal components creates a potential shock hazard. Wipe up all spills immediately. Do not operate the system if internal components have been exposed to spilled fluid. Unplug the instrument if there is a fluid spill in the instrument and contact Technical Support.

Perform only the maintenance tasks described in this guide. Contact a Molecular Devices service engineer to inspect and perform a preventive maintenance service on the instrument each year. See [Obtaining Support on page 203](#).



WARNING! BIOHAZARD. It is your responsibility to decontaminate components of the instrument before you return parts to Molecular Devices for repair. Molecular Devices does not accept items that have not been decontaminated where it is applicable to do so. If parts are returned, they must be enclosed in a sealed plastic bag stating that the contents are safe to handle and are not contaminated.

For approved cleaning and maintenance procedures, see [Maintenance on page 189](#).

With the QPix® 420 Microbial Colony Picking System from Molecular Devices, you can control selective microbial colony picking. Multiple users can select and collect microbial colonies from various receptacles using the QPix instrument with the QPix Microbial Colony Picking System Software.

Before you operate the instrument or perform maintenance operations, make sure you are familiar with the safety information in this guide. See [Safety Information on page 7](#).

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Functionality of the QPix 420 System

The QPix 420 system is part of the QPix 400 series. The QPix 420 system offers a range of features to accommodate various requirements for picking of microbial colonies including multiple imaging modes, organism-specific pins, agar height sensor, and specific algorithms to detect variable biological samples. Other functions include sample rearraying, replication, color screening, and gridding. See [Replacement Parts and Optional Extras on page 209](#).

The QPix 420 system is useful for working with applications such as protein engineering, protein evolution, directed or enzyme evolution, protein expression, transformation, and sub-clone management.

The QPix 420 system is available with white light or fluorescent imaging. Color filters, such as for blue-white screening, are available in combination with white light imaging.

Multiple fluorescent filters ensure compatibility with a wide range of fluorescent cloning dyes and proteins and enable the system to reveal unique information about individual colonies. Fluorescent imaging is available as an option.

After colonies are located using a CCD camera, they are picked at high speed from source receptacles and then inoculated into pre-filled 96-well or 384-well plates. Colonies of interest can be rearrayed from a library into new plates.

To optimize these systems, Molecular Devices has developed a range of plastic consumables for use with the instrument. The destination plate bed enables versatile use of shallow, standard, and deep-well plates in various combinations. Organism-specific pins can be ordered to optimize the efficiency of transfer.

You can log all your processes such as picking, replicating, and re-arraying with the QPix 420 system Microbial Colony Picking System. The software lets you tag important samples to enhance the history, location, and extra details of sample-specific data.

Picking Microbial Colonies

The QPix 420 system can automatically pick more than 3000 colonies per hour. This is done with an integrated vision, detection, and analysis hardware and software system and a 96-pin head assembly, all custom designed by Molecular Devices.

To identify potential colonies, the source plate is imaged in multiple frames using a CCD camera. These images are processed to produce a single, large image of the colonies on the source receptacle. Specific colonies are then selected for picking using feature-selection parameters, such as size, shape, and proximity.

The instrument picks from a range of source receptacles including large QTrays, OmniTrays, and standard Petri dishes using the optional source receptacle holders. Pick colonies of an adequate size. Expect 97% pick-efficiency with colony sizes between 1 mm to 1.5 mm. See [Replacement Parts and Optional Extras on page 209](#).

A fluorescent imaging head is also available. This head uses an LED-based light source and preset filter pairs for selecting fluorescence excitation and emission wavelengths, and a sensitive monochrome CCD camera for image acquisition. The fluorescence head can also be used for white light imaging using the transmitted light source below the source plate holder. The fluorescent imaging system lets you add fluorescent intensity parameters in the selection criteria.



WARNING! If the instrument is used in a manner not specified by Molecular Devices, the protection provided by the equipment might be impaired.

Filters

The QPix 420 system supports the following filter options:

Filter Pair/Setting in User Process	LED Source Color	Excitation Filter Name	Excitation Filter Specs	Emission Filter Name	Emission Filter Specs	Sample Fluorophores
Ultra Violet (377/447)	UV - 360	DAPI	FF01-377/50-25	DAPI	FF02-447/60-25	DAPI/ Hoechst
Blue (457/536)	BLUE - 455	FITC	FF02-475/50-25	FITC	FF01-536/40-25	FITC / GFP
Green (TxRed) (531/624)	GREEN - 516nm	TxRed	FF01-531/40-25	TxRed	FF01-624/40-25	Texas Red/ Rhodamine
Red (628/692)	RED - 635nm	Cy5	FF02-628/40-25	Cy5	FF01-692/40-25	CY5
Green (Cy3) (531/593)	GREEN - 516nm	TxRed	FF01-531/40-25	Cy3	FF01-593/46-25	DsRed/ CY3



Note: Contact Molecular Devices for customized options.

Chapter 2: QPix 420 System Instrument Overview

2

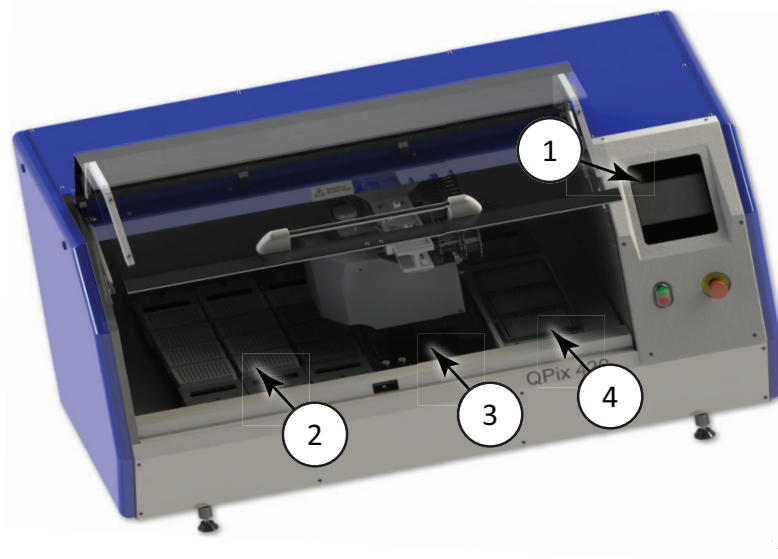
The QPix 420 Microbial Colony Picking System is constructed within a welded steel framework.

Before you operate the instrument or perform maintenance operations, make sure you are familiar with the safety information in this guide. See [Safety Information on page 7](#).

The instrument door automatically locks whenever you run a process. The door prevents UV light from passing through during operation.

The bed of the instrument contains source and destination receptacle positions.

The bed also contains wash baths which clean the pins before and during a process. See [Setting Up Wash Baths on page 29](#).



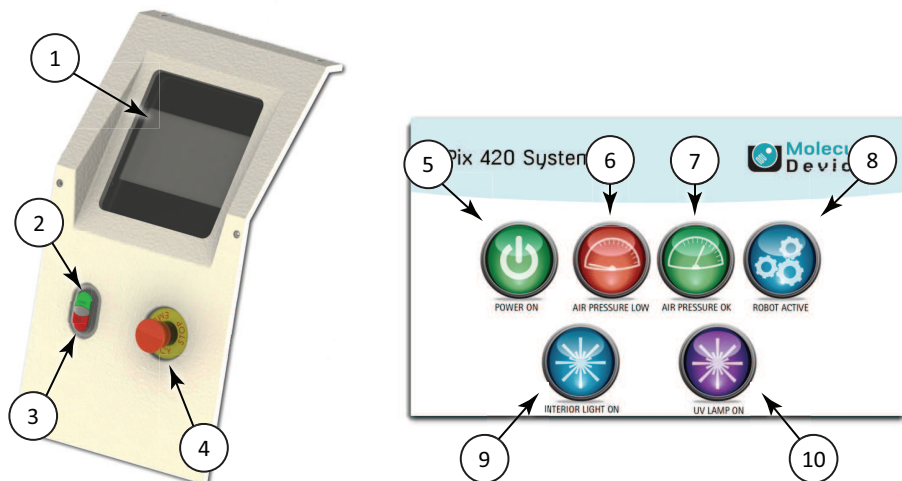
QPix 420 Microbial Colony Picking System

Item	Description
1	Front panel
2	Plate holder
3	Imaging table
4	Wash bath

For information to clean and prepare the instrument, see [Sanitizing the Instrument Interior on page 33](#).

For information on regular instrument maintenance, see [Maintenance on page 189](#).

Front Panel Controls and Display

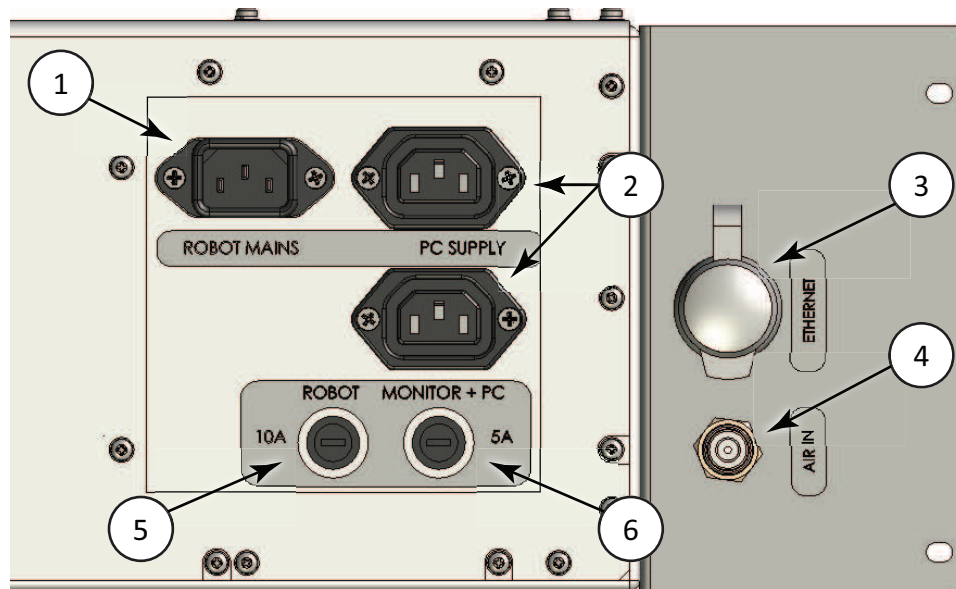


Front Panel Controls and Display

Item	Description
1	LCD indicator panel
2	START button
3	STOP button
4	Emergency Stop button
5	Power is on
6	Air pressure is low
7	Air pressure is correct
8	The instrument is running a process (not applicable for Instrument Utilities)
9	The interior light is on
10	The UV light is on

Instrument Connections

The power, data, and compressed air connections are on the right side of the instrument.



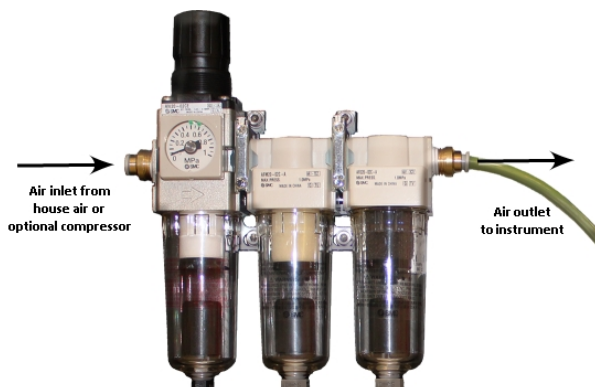
Connection Ports and Fuses

Item	Description
1	Power Inlet: Instrument Mains
2	Power Outlets: Computer and Monitor
3	Ethernet port
4	Compressed air inlet
5	Fuse carrier: Instrument Mains
6	Fuse carrier: Computer and Monitor

The main power inlet and the computer and monitor power outlets are separately fused.

Compressed Air Supply

Compressed air is required for the picking movement of the picking pins. Laboratories with built-in compressed air systems can connect directly to the filter-regulator inlet on the side of the QPix instrument. Alternatively, you can connect an optional oil-free compressed air unit that draws air from the local environment and delivers it to the instrument through the filter-regulator inlet. Use only 6 mm OD polyurethane pneumatic hose rated for more than 100 psi to connect to the air inlet.



CAUTION! The filter-regulator is factory set to 0.69 MPa (100 psi) at 60 liters per minute. Do not adjust the regulator. See [Technical Specifications on page 213](#).

Using Barcodes

If you use barcodes, the following barcode parameters are required:

- Use a legible barcode of the following types: 1D (linear) barcodes with code 11, 39, 93 and 128.



- Do not use special characters, such as hyphens, in the barcode. Special characters can cause missed reads and other errors downstream.
- Place the barcode centrally on one of the short sides of the plate.

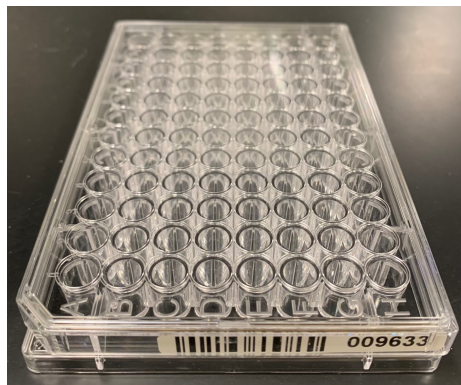


Plate With Barcode

For troubleshooting, see [Troubleshooting Barcodes on page 207](#).

Computer System Requirements

The QPix Microbial Colony Picking System Software version 2.7.3 and higher requires the following computer specifications:

Minimum Computer System Requirements

Item	Description
Operating System	Windows 11 Windows 10, 64-bit Windows 7, 32-bit
Memory	8 GB RAM
Data Connection	10/100 Ethernet port
Camera Connection	USB 2.0 port




CAUTION! Do not replace the computer operating the system with one of your own. Also do not replace the operating system on the provided computer. The computer supplied with your system includes hardware and driver components specifically configured to control your instrument.



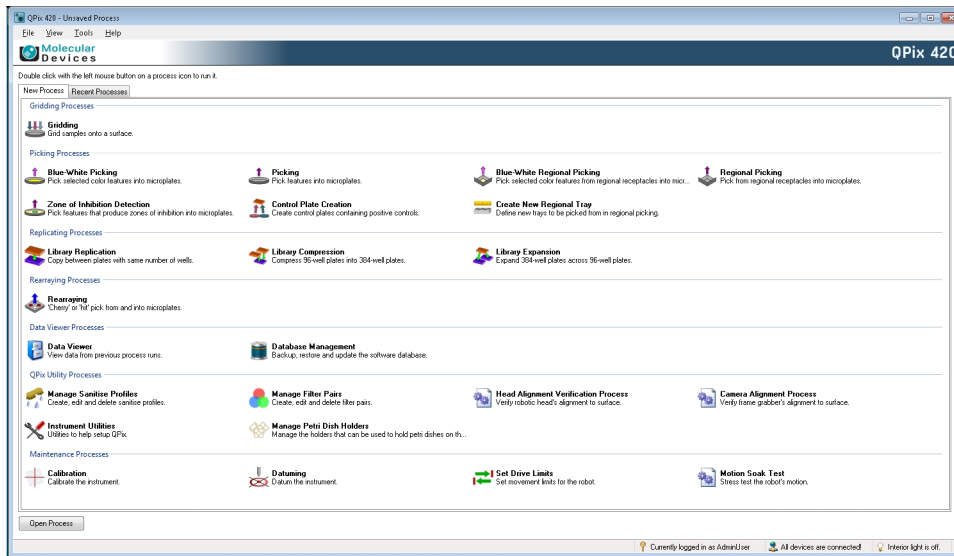
Chapter 3: QPix Microbial Colony Picking System Software Overview



The QPix® Microbial Colony Picking System Software controls the QPix 420 Microbial Colony Picking System.

To start the software, from the computer desktop, double-click the  **QPix Microbial Colony Picking System Software** icon.



When the software starts, the Navigation page displays with the New Process tab selected. The processes that appear depend on the modules that are installed.



The Navigation page has the following tabs:

- Select the **New Process** tab to display options to create and manage processes and for system maintenance. See [New Process Options on page 23](#).
- Select the **Templates** tab to display the list of saved templates to use to create new processes.
- Select the **Recent Processes** tab to display the list of recently opened processes.

Click **Open Process** at the bottom of the page to display the **Open** dialog where you select and open saved process files.

Double-click the **Interior Light** icon in the bottom-right corner to turn the interior light  **Interior light is on.** and  **Interior light is off.** . The interior light is not used for imaging and turns off during imaging.

Menu Options

The menu options on the Navigation page depend on the view and selections on the page.

File Menu

- **Open Process:** Displays the Open dialog where you select and open a saved process file.
- **Save Process:** Saves the settings for the current process. For a new process the Save As dialog displays where you select the save location and name the file.
- **Save Process As:** Displays the Save As dialog where you select the save location and name the file. Use this to save a copy of the process.
- **Close Process:** Closes the process.
- **Save As Template:** Displays the Save As dialog where you save the settings from the process as a template for new processes.
- **Recent Processes:** Displays the list of recently opened processes.
- **Switch User:** Logs the current user off so a different user can log on in a multiple user environment.
- **Exit:** Shuts down the software.

View Menu

- **Properties:** Displays the properties of the routine before you start the routine.
- **Progress:** Displays the progress of a running routine.
- **Administrative Properties:** Allows you to change the Properties view and default values.

Tools Menu

- **Configuration:** Displays the Edit Configuration dialog.



Note: Only trained personnel should configure these settings.

- **Hardware Model View:** Displays an interactive 3-D model of the instrument.
- **Prepare Error Report:** Starts the Error Reporting Wizard to create a data file that contains the configuration and recent log files to help troubleshoot a problem.

Help Menu

- **About:** Displays the software version numbers.
- **Online Support:** Displays the support web page when the computer has an internet connection.

New Process Options

The New Process tab on the Navigation page provides options to create and manage processes and system maintenance. The processes depend on the system licenses.

Gridding Processes

- **Gridding:** Deposits liquid samples from one or more source plates to one or more destination surfaces using either agar filled QTrays or filters. See [Gridding Processes on page 171](#).

Picking Processes

- **Picking:** Picks colonies from receptacles using the standard process. See [Picking Processes on page 39](#).
- **Blue-White Picking:** Picks blue or white colonies from receptacles using the standard process. See [Blue-White Picking Processes on page 63](#).
- **Zone of Inhibition Detection Picking:** Picks colonies with detectable zones of inhibition from receptacles using the standard process. See [Zone of Inhibition Detection Picking Processes on page 83](#).
- **Regional Picking:** Picks colonies from receptacles using the regional process. See [Regional Picking Processes on page 99](#).
- **Blue-White Regional Picking:** Picks blue or white colonies from receptacles using the regional process. See [Blue-White Regional Picking Processes on page 117](#).
- **Control Plate Creation:** Creates a batch of plates that contain control samples. These are created by picking colonies from source receptacles into destination wells. See [Control Plate Creation Processes on page 135](#).
- **Create New Regional Tray:** Adds new plate definitions to the regional picking plate type database that you can select for use in the regional picking process. See [Manage Regional Tray Processes on page 149](#).

Replication Processes

- **Library Replication:** Duplicates samples from one plate to a different plate of the same format. See [Replication Processes on page 153](#).
- **Library Compression:** Replicates samples from 96-well plates to 384-well plates.
- **Library Expansion:** Replicates samples from 384-well plates to 96-well plates.

Rearranging Processes

- **Rearranging:** Re-deposits liquid samples between one or more source and destination plates to consolidate selected wells into plates in an ordered fashion. See [Rearranging Processes on page 163](#).

Data Viewer Processes

- **Data Viewer:** Allows you to search and view a process or routine that was previously run on the instrument. See [Data Viewer Processes on page 183](#).
- **Database Management:** Allows engineers or trained users to update the database or do an automatic backup of the database.

QPix Utility Processes

- **Manage Sanitise Profiles:** Sets up the Sanitise profiles that are required by various experimental needs. You must create at least of one Sanitise profile before you can do a picking routine. See [Creating and Editing Sanitise Profiles on page 35](#).
- **Camera Alignment Process:** Calibrates and correctly aligns the camera to get pin-to-spot precision, relating the image pixel co-ordinates with the instrument x and y coordinates. Do this process whenever the head returns to the actuator or whenever the actuator is hit, as this can have a negative effect on picking precision. See [Aligning the Camera on page 196](#).
- **Instrument Utilities:** Allows you to do several maintenance and cleaning activities.
- **Manage Petri Dish Holders:** Allows you to set either an original source-holder tray or a new spring-loaded adjustable holder tray as the default source-holder tray per source holder tray type, such as OmniTray, 1-way, 4-way, or 5-way petri dish holders. Only one style per holder type can be set as the default, either the original style, or the adjustable style.

Maintenance Processes



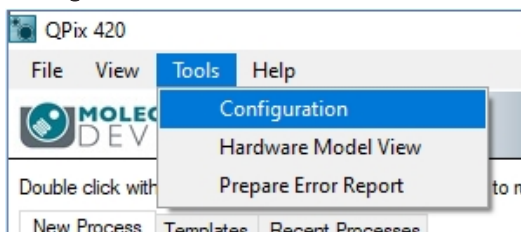
Note: Only trained personnel should configure these settings.

Integrating QPix Microbial Colony Picking System Software With QPix Insights Software

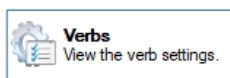
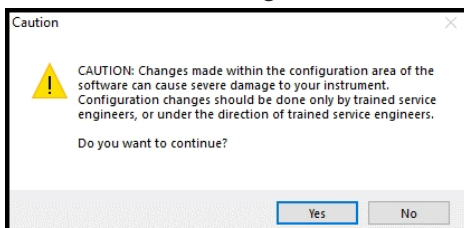
When you use the QPix Microbial Colony Picking System Software with the QPix® Insights Software, you must configure the QPix Microbial Colony Picking System Software to integrate the two software applications.

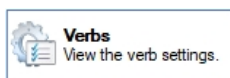
To configure the software integration:

1. In the QPix Microbial Colony Picking System Software, click the **Tools** menu and select **Configuration**.

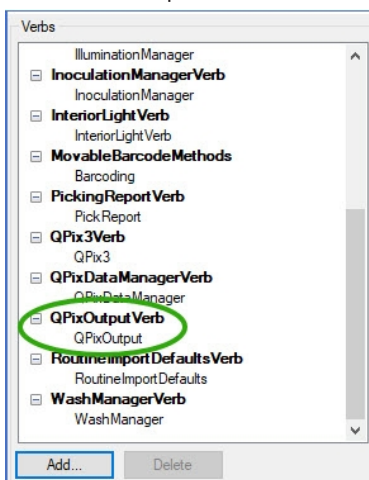


2. On the Caution message, click **Yes**.

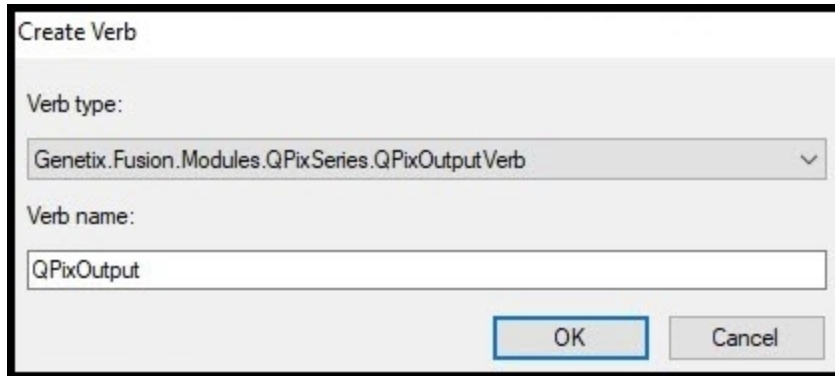


3. Double-click the  icon to display the Verbs dialog.
4. In the Verbs dialog, if the **QPixOutput** verb exists integration is enabled and no additional steps are required.

If the QPixOutput verb does not exist, do the following:



- Click **Add** to display the Create Verb dialog.

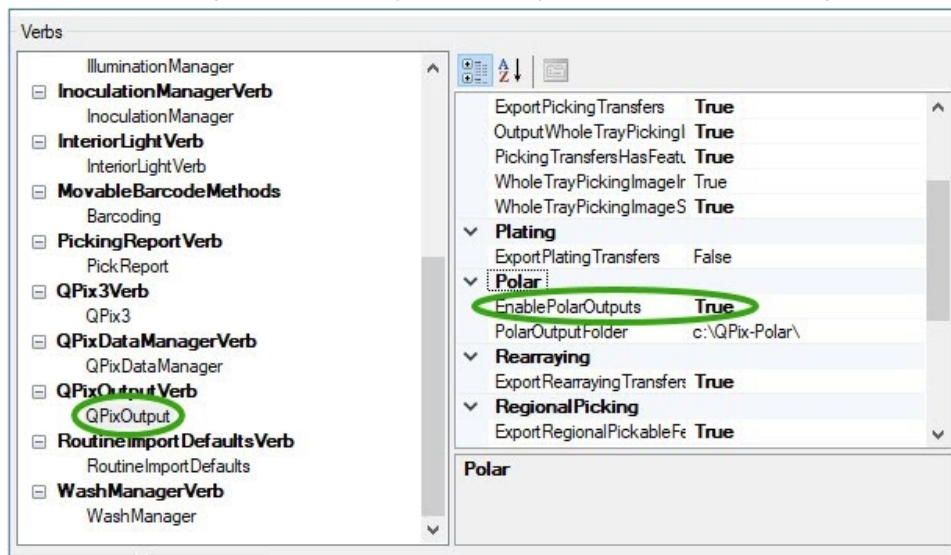


- Click the **Verb Type** drop-down and select **Genetix.Fusion.Modules.QPixSeries.QPixOutput Verb**.
- In the **Name** field, enter **QPixOutput**.



Note: QPixOutput is case sensitive.

- Click **OK** to display the Verbs dialog.
- In the Verbs dialog, click **QPixOutput** to display the Properties on the right.



- In the Properties, under Polar, set **EnablePolarOutputs** to **True** and note the location of the PolarOutputFolder (c:\QPix-Polar\).
 - Click **Close** to display the Edit Configuration dialog.
 - On the Edit Configuration dialog, click the **X** on the top right to close the dialog.
 - Open Windows Explorer and confirm that the **c:\QPix-Polar** folder exists. If not create it.
- For instructions about the QPix Insights software, see [QPix Insights Software](#).

The QPix 420 Microbial Colony Picking System must be located in a well-ventilated area. The instrument is installed by approved personnel with the software pre-installed on the system computer. See [Technical Specifications on page 213](#).

Before you operate the instrument or perform maintenance operations, make sure you are familiar with the safety information in this guide. See [Safety Information on page 7](#).

Start-Up and Shutdown Procedures

Before you use the instrument, confirm the following:

- The Emergency Stop button on the front of the instrument is pulled out. The instrument cannot start if the button is pushed in.
- The instrument bed is clear of obstructions and loose items.
- All motor tracks are free of obstructions.
- There are no obstructions to the movement of the head.
- The acrylic door is properly closed.
- The instrument power cord is properly connected.
- The air pressure delivered to the filter regulator inlet is from 0.69 MPa to 0.83 MPa (100 psi to 120 psi).

If you use a standalone air compressor, confirm that the compressor power cord properly connected.

Powering On the System

To power on the system:

1. Confirm all the tasks listed in Pre-Power-Up Check List.
2. Power on the air source.
 - If you use a laboratory built-in air system, verify that the air pressure is from 0.69 MPa to 0.83 MPa (100 psi to 120 psi) and then switch on the control valve.
 - If you use a standalone air compressor, switch on the compressor and then verify that the air pressure is from 0.69 MPa to 0.83 MPa (100 psi to 120 psi).

3. Push the **Start** button on the front panel.


The Power On icon displays on the front panel. If the power to the system does not turn on, it is likely that the door is open or the Emergency Stop button is pushed in.

The instrument cycles through the various startup processes indicated on the front panel.

4. Check that the Air icon on the front panel displays indicates that the air pressure from the air source is sufficient to operate the instrument.
5. Switch on the computer and wait for it to initialize the operating system and to discover the local network that connects the instrument to the computer.



Note: If you start the software before the network has been discovered, a message displays that it cannot find the instrument.

6. After the computer finishes initialization, double-click the  **QPix Microbial Colony Picking System Software** icon to start the software.

Every time you use the instrument, the three axes sequentially run through their Initialize drives routine. This allows the drives to find their respective home positions. The system must complete this routine without interference to ensure that there is no damage to the instrument or its auxiliary equipment.

Shutting Down the System

To shut down the system:

1. In the QPix Microbial Colony Picking System Software, on the Navigation page, click **File > Exit** to close the software.
2. Shut down and turn off the computer.
3. Push the **Stop** button on the instrument front panel to switch off the instrument.
4. Disconnect the power cord to the instrument.
5. Turn off the air source.
 - If you use a laboratory built-in air system, turn off the control valve.
 - If you use a standalone air compressor, turn off the compressor or disconnect the power cord.

Emergency Stop

In an emergency, press the Emergency Stop button on the front of the instrument to immediately stop all motion and turn off the instrument. The location of the Emergency Stop button is shown in front panel controls.

Before you restart the instrument, you must pull out the Emergency Stop button and then press the Start button.

-
- ✱ **Tip:** To indicate if the Emergency Stop is engaged, check for a yellow ring visible around the base of the red button. If the yellow ring is visible, the Emergency Stop is disengaged, and the instrument can start.



Preparing to Run Processes

You should do regular and thorough cleaning and maintenance of the QPix 420 instrument to ensure that it functions correctly. See [Maintenance on page 189](#).

Before you run a process:

1. Manually clean the instrument interior. See [Cleaning the Instrument on page 190](#).
2. Install and fill the wash baths with a suitable quantity of the defined solutions.
3. Start the instrument and the software.
4. Install the correct picking head for the application. See [Changing the Head on page 30](#).
5. Do a Sanitise process. See [Running Sanitise Processes on page 33](#).
6. Do a UV Sanitise process. See [Running UV Sanitise Processes on page 34](#).
7. Prepare plates, QTrays, OmniTrays, or Petri dishes based on the application.
8. Select and run the process. See [New Process Options on page 23](#).

Setting Up Wash Baths

The Instrument contains three wash baths on the right side of the instrument bed. Use the wash baths for the Sanitise process and the Sanitise profiles for most other processes. See [Sanitizing the Instrument Interior on page 33](#).

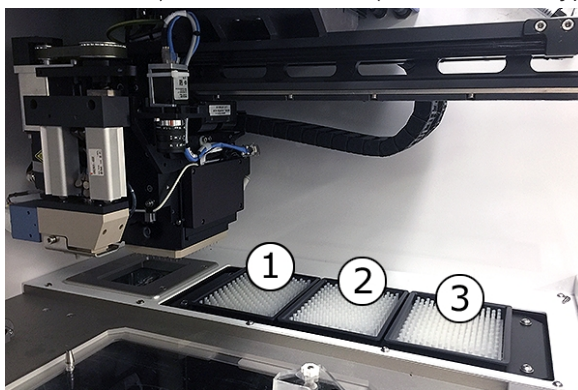


Note: Before you run a process that uses the wash baths, verify the locations and solutions of the wash baths and also the wash cycles that are required for use. Always top off the wash baths with their defined cleaning fluids and then wipe down the surfaces of the instrument interior.

Fill the wash baths with fluid until the brushes are covered and configure the baths correctly.

For a typical picking process, put the following solutions in the indicated wash baths:

- Wash Bath 1 (furthest from front): 70% ethanol
- Wash Bath 2 (middle wash bath): Sterile water
- Wash Bath 3 (closest to the front): 0.1% sodium hypochlorite



CAUTION! Bleach can cause corrosion if it is left in the instrument for too long. Remove the bleach from the instrument immediately after its use. In general, bleach is required only for difficult-to-sterilize organisms.

Changing the Head

The head is housed in an actuator system that permits easy exchange and set-up of the head. Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software **Change Head** process to safely move the actuator.

To change the head:

1. From the Navigation page under **Utility Processes**, double-click the **Instrument Utilities** icon to display the Instrument Utilities page.
2. Double-click the **Change Head** icon to display the Change Head dialog.
3. Make sure that the bed is clear of obstructions and that the door is closed, then click **Move to Load Position**.
4. When the message displays, click **OK** to move the actuator into position near the front of the instrument.
5. Open the door.
6. Install or remove the head without touching the camera or other electronics on the underside of the actuator assembly.
7. Close the door.
8. In the Change Head dialog, click **Move to Park Position**.
9. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
10. Click **Next** to display In the Instrument Utilities page.
11. Click **Next**.

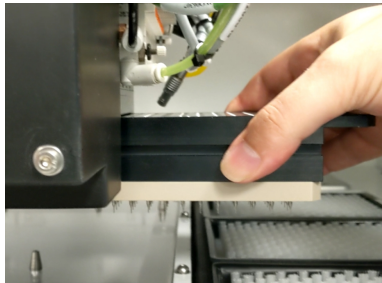
Removing the Head

To remove the head:

1. Unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly.



2. Grab the handle on the right and slide the head out of the actuator.



3. Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.

Installing the Head

To install the head:

1. Hold the head by its handle with the pins pointing down and then on the right, slide the head into the actuator assembly.
2. Attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.





Chapter 5: Sanitizing the Instrument Interior



Before you start a new process, You should manually clean the QPix 420 Microbial Colony Picking System interior. See [Cleaning the Instrument on page 190](#).

The Sanitise process uses a pre-defined Sanitise profile. You can create new Sanitise profiles and edit existing profiles to meet the needs of your applications. See [Creating and Editing Sanitise Profiles on page 35](#).





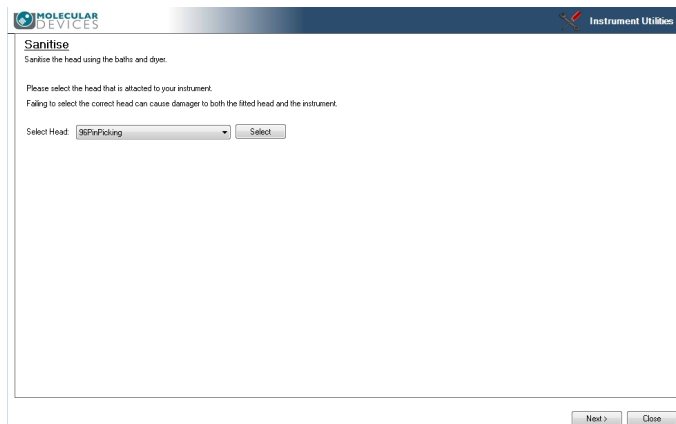
Note: You should do a regular and thorough preparation and cleaning of the instrument to ensure that it continues to function correctly.

Running Sanitise Processes

The Sanitise process cleans and sanitizes the picking pins on the installed picking head. Before running a Sanitise process, Molecular Devices recommends that you manually clean the instrument interior.

To run a Sanitise process:

1. On the Navigation page under Utility Processes, double-click  **Instrument Utilities** to display the Instrument Utilities page.
2. Double-click  **Sanitise** the Sanitise page.
3. Click the **Select Head** drop-down and select the head to use.





4. Click Select and select a Sanitise profile. To create a new Sanitise profile, see [Creating and Editing Sanitise Profiles on page 35](#).
5. Confirm the Sanitise profile information related to the locations and solutions of the wash baths match the wash cycles, and that the wash baths are filled with a suitable quantity of the required solutions. See [Setting Up Wash Baths on page 29](#).
6. Confirm that the bed is clear and the door is closed.
7. For the **Wash Speed**, select either **Fast** or **Slow**.
8. Click **Wash** and wait for the wash cycles to complete.
9. When the process finishes, click **Next** to display the Instrument Utilities page.
10. Click **Next**.

Running UV Sanitise Processes

The UV Sanitise process uses ultra-violet light to sanitize the instrument interior. Before you run a UV Sanitise process, you should manually clean the instrument interior.

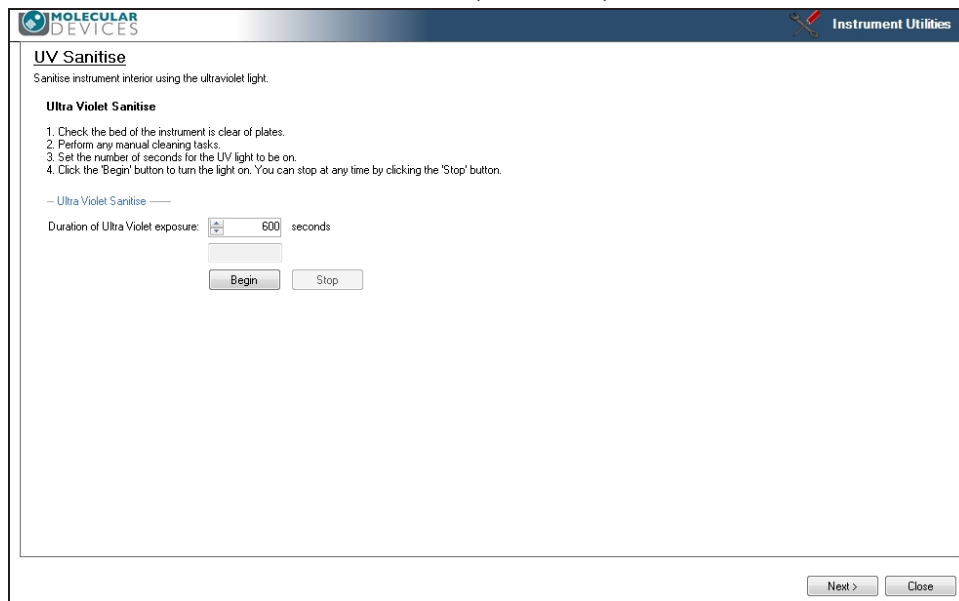
To run the UV Sanitise process:

1. On the Navigation page under Utility Processes, double-click  **Instrument Utilities** to display the Instrument Utilities page.


2. Double-click  **UV Sanitise** to display the UV Sanitise dialog.

3. Select a **Sanitise Profile**.

4. In the **Duration of Ultra Violet Exposure** field, enter the duration for the UV light to remain on. The default duration is 600 seconds (10 minutes).



5. Confirm that the bed is clear and the door is closed.

 **Tip:** The door locks while the UV light is on for added safety. The door is made from acrylic, which prevents UV light from passing through during operation.

 **CAUTION!** Prolonged UV light exposure can damage the Bio Imaging tray.

6. Click **Begin** to turn the UV light on, and then wait for the UV light to turn off. If you must stop the process, click **Stop** to turn off the UV light.
7. When the process finishes, click **Next** to display the Instrument Utilities page.
8. Click **Next**.

Creating and Editing Sanitise Profiles

The QPix 420 Microbial Colony Picking System provides a default Sanitise profile. You should edit the default profile to suit your needs.

Sanitise profiles consist of two types of wash cycles: Multi Stage and Single Stage. Wash cycles can contain one or more wash-bath steps.

Manage Sanitise Profiles

Edit, delete or create a new sanitise profile to be used in the licensed processes.

— Profiles —

Default Sanitise Profile

Empty

Multi Stage Example

New

Delete

— Stages —

First and Main Wash Cycle

v

Edit

— Steps —

Bath Name	Bath Cycles	Dry Time (seconds)	Wait After Drying (seconds)
WashBath3	v 5	0	0
WashBath2	v 5	0	0
WashBath1	v 5	5	5

Add

Remove

*** Tip:** You cannot edit Sanitise profiles when you set up a routine for a process. You can only edit Sanitise profiles from the Manage Sanitise Profiles page.

The recommended Default Sanitise Profile uses the following wash procedure:


1. **WashBath1**—Five (5) cycles of 70% ethanol with 5 seconds drying and a 5 second delay.
2. **WashBath2**—Five (5) cycles of sterile water.
3. **WashBath3**—Five (5) cycles of 0.1% sodium hypochlorite.

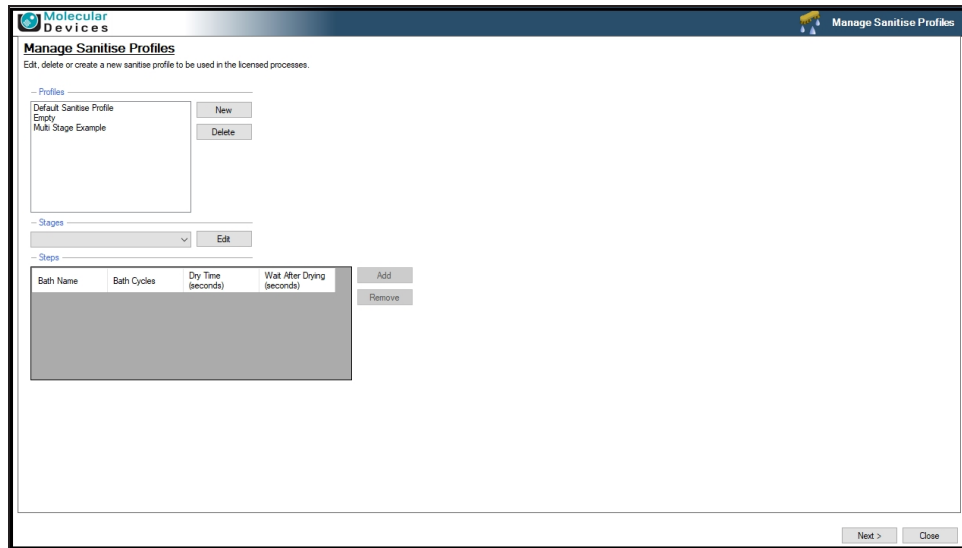
See [Setting Up Wash Baths on page 29](#).

Creating Sanitise Profiles

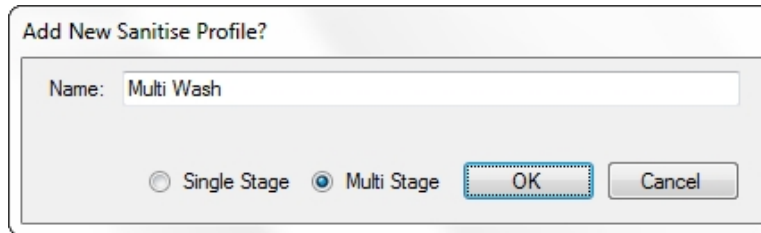
Use the Manage Sanitise Profiles page to create, edit, or delete Sanitise profiles.

To create a new Sanitise profile:

1. On the Navigation page under Utility Processes, double-click  **Manage Sanitise Profiles** to display the Manage Sanitise Profiles page.
2. Click **New** to display In the Add New Sanitise Profile dialog.



3. In the **Name** field, enter the profile name.




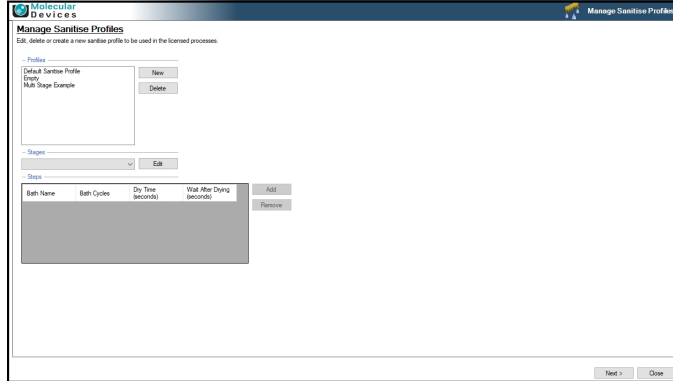
4. Select a profile option:
 - Select **Single Stage** to use the same wash cycle before and during a routine.
 - Select **Multi Stage** to use different wash cycles before and during a routine.
5. Click **OK** to display the Sanitise profile in the Profiles table along with all other Sanitise profiles.

The Sanitise profile requires a minimum of one wash-bath step to make it useful in a process or routine. Click **Edit** to add wash-bath steps to the Sanitise profile.

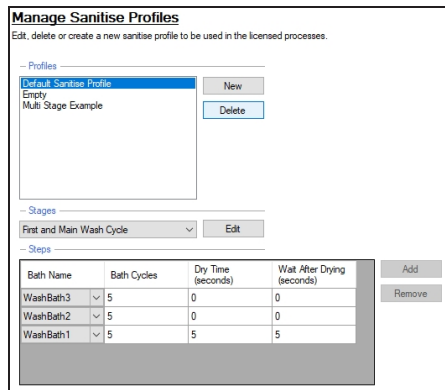
Editing Sanitise Profiles

To edit a Sanitise profile:

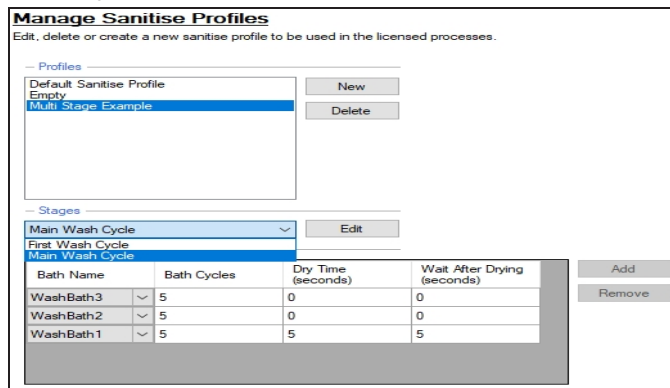
1. On the Navigation page under Utility Processes, double-click  **Manage Sanitise Profiles** to display the Manage Sanitise Profiles page.



2. In the Profiles table, select the profile to edit.
 - If the profile is a Single Stage profile, the Stages list displays First and Main Wash Cycle.



- If the profile is a Multi Stage profile, the Stages list includes First Wash Cycle and Main Wash Cycle.



- In the Stages list, select the wash stage to edit and click **Edit**.

- In the Steps area:
 - Click **Add** to add a new wash-bath step to the end of the list.
 - Select a step and click **Remove** to delete a wash-bath step.
- In the Bath Name list, select a wash bath. See [Setting Up Wash Baths on page 29](#).
 - WashBath1**—furthest from front, typically 70% ethanol.
 - WashBath2**—middle wash bath, typically sterile water.
 - WashBath3**—closest to the front, typically 0.1% sodium hypochlorite.
- In the **Bath Cycles** column, enter the number of times to wash the picking pins for the step.
- In the **Dry Time** column, enter the number of seconds to dry the pins with the halogen dryer.
- In the **Wait After Drying** column, enter the number of seconds to wait before moving on to the next step, or ending the wash routine if this is the last step.
- Continue to add or remove steps for the wash stage.
- Click **Save**.



Note: When you edit a Multi Stage profile, make sure to define wash steps for both the First Wash Cycle and the Main Wash Cycle.

- Click **Next** to display the Navigation page.



Note: Before you run a process that uses the wash baths, verify the locations and solutions of the wash baths and also the wash cycles that are required for use. Always top off the wash baths with their defined cleaning fluids and then wipe down the surfaces of the instrument interior.

Deleting Sanitise Profiles

To delete a Sanitise profile:

- On the Navigation page under Utility Processes, double-click the **Manage Sanitise Profiles** icon to display the Manage Sanitise Profiles page.
- In the **Profiles** table, select the profile to delete.
- Click **Delete**.
- On the Confirm Profile Deletion message, click **Yes**.
- Click **Next** to display the Navigation page.

The QPix 420 Microbial Colony Picking System can pick colonies from receptacles using either standard picking or regional picking. You can set up control wells for the destination plates before you run a picking process.

The following options are available on the Navigation page under Picking Processes:

- **Picking:** Picks colonies from receptacles using the standard process described in this chapter.
- **Blue-White Picking:** Picks blue or white colonies from receptacles using the standard process. See [Blue-White Picking Processes on page 63](#).
- **Zone of Inhibition Detection Picking:** Picks colonies with detectable zones of inhibition from receptacles using the standard process. See [Zone of Inhibition Detection Picking Processes on page 83](#).
- **Regional Picking:** Picks colonies from receptacles using the regional process. See [Regional Picking Processes on page 99](#).
- **Blue-White Regional Picking:** Picks blue or white colonies from receptacles using the regional process. See [Blue-White Regional Picking Processes on page 117](#).
- **Control Plate Creation:** Creates a batch of plates that contain control samples. These can be created by picking colonies from source receptacles into destination wells. See [Control Plate Creation Processes on page 135](#).
- **Create New Regional Tray:** Adds new plate source definitions to the regional picking plate type database for use in the regional picking process. See [Manage Regional Tray Processes on page 149](#).



Note: Before you run a picking process, you should do the cleaning and set up procedures in [Preparing to Run Processes on page 29](#).

If this is the first picking process, you must edit or create a Sanitise profile to use with the picking process. See [Creating and Editing Sanitise Profiles on page 35](#).

Depending on the features of your system, you can use either white light or fluorescence imaging for the picking processes. If you have a white light only system and want to add fluorescence capability, contact your Molecular Devices representative. See [Obtaining Support on page 203](#).




Note: If your system has a fluorescence imaging module and you run a picking process that uses white light only, the process takes longer than a white light picking process on a white light only system, since the fluorescence imaging module captures more images during the process.

Creating and Editing Picking Processes

The procedures to create and edit standard or regional picking processes are very similar. The regional picking process has more options to define the regions for picking. If this is the first picking process, you must edit or create a Sanitise profile to use with the picking process. See [Creating and Editing Sanitise Profiles on page 35](#).

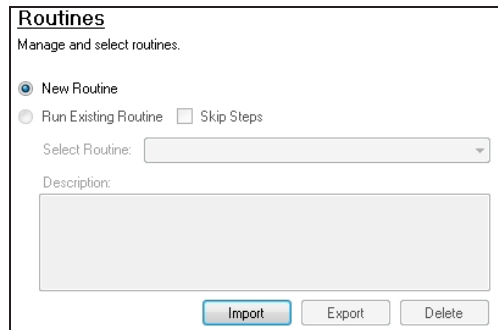
Opening the Picking Page

To open the Picking page:

1. On the Navigation page under Picking Processes, double-click  **Picking** to display the Picking page.
2. Click **Picking Type** drop-down:
 - Select **White Light** to use only white light to illuminate and identify the colonies to pick.
 - Select **White Light and Fluorescent** to use white light to illuminate and identify colonies, and fluorescent light to determine the colonies to pick. This option is available only for instruments with a fluorescence imaging module.
3. Click **Apply**.
4. Click **Start** to home the drives and display the Routines dialog.

Selecting Picking Routines

Use the Routines dialog to select a picking routine.



To select a picking routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit. Select the **Skip Steps** checkbox to run the routine without making changes.
3. Click **Import** to import a routine. See [Importing Routines on page 41](#).
4. Click **Export** to export the routine you select. See [Exporting Routines on page 41](#).
5. Click **Delete** to delete the routine you select.
6. Click **Next**.
 - If you select New Routine or Run Existing Routine and leave the Skip Steps checkbox clear, see [Selecting Barcode Options and Filter Pairs for Fluorescent Imaging on page 41](#).
 - If you select Run Existing Routine and you select the Skip Steps checkbox, see [Viewing the Settings Summary on page 46](#).

Importing and Exporting Picking Routines

The Select Routine list displays the routines that match the type of routine you are creating. For example, a white light and fluorescent imaging routine is not included in the Select Routine list if you are creating a White Light only routine.

Importing Routines

To import a routine:

1. Export the routine from the other computer in .xml format.
2. Save the export file on the system computer.
3. On the system computer, click **Import**.
4. Locate and select the file.
5. Click **Import** to add the routine to the database.

If the routine is of the same type as the one you are creating, then the imported routine displays in the Select Routine list.

Exporting Routines

To export a routine:

1. Click **Export**.
2. Navigate to the location that you want to save the .xml file.
3. You can change the name of the file.
4. Click **Export** to save the routine in .xml format.

Selecting Barcode Options and Filter Pairs for Fluorescent Imaging

When you create or edit a routine for white light only, the Barcodes page displays.

If you create or edit a routine for white light and fluorescent imaging, the Barcodes and Filter Pair page displays. This option is available only for instruments with a fluorescence imaging module.

Selecting Filter Pairs

Select a fluorescent excitation and emission pair from the Filter Pair list. This option is available only for instruments with a fluorescence imaging module.

Using a Barcode Reader



Note: You should always use barcodes for accurate data tracking.

To use a barcode reader:

1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes.
2. Select a Read Failure Option to define the system response when a barcode cannot be read.
 - Select **Manual Prompt** to have the software display a dialog where you enter a barcode or name for the receptacle.
 - Select **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.



Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

- Select **Auto Generate** to allow the system to assign a barcode and continue the routine.
3. Use the Validation Barcode list to define the barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, a message displays.
 - To manually enter the barcodes, enter each barcode in the field below the list and then click **Insert**.
 - To import barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
 - To use a from the database, click **From Database**.
 - To remove a barcode from the list, select the barcode and click **Remove**.
 4. Click **Next** to define the destination receptacles.

Defining Unique Identifiers Without Barcodes

To define unique identifiers without barcodes:

- Clear the **Use Barcode Reader** checkbox to either have the software generate random barcodes or to define unique identifiers for source receptacles.

Random Identifiers

To have the software generate random identifiers:

1. Clear the **Use Barcode Reader** checkbox.
2. Select the **Generate Random Barcodes** checkbox to have the software generate random barcodes with the prefix Auto for the source receptacles. No other parameters are required for this option.

Manually Create Identifiers

To manually create an identifier list:

3. Clear the **Use Barcode Reader** checkbox.
4. Clear the **Generate Random Barcodes** checkbox.
5. Either:
 - In the text field below the list, enter an identifier and click **Insert**.
 - Click **Import** and then select the file from which to import the identifiers to import identifiers for the source receptacles from a text or .csv file.
 - Click **Generate List**. See below for additional steps.
6. Select an identifier in the list and click **Remove** to remove an identifier.

Generating an Identifier List

— Generate Barcode List —

Prefix:

Start Number:

Digit Padding:

Number To Generate:

Preview

First:

Last:

Generate Cancel

*** Tip:** The Preview area shows examples of the first and last generated identifiers.

To generate a barcode identifier list:

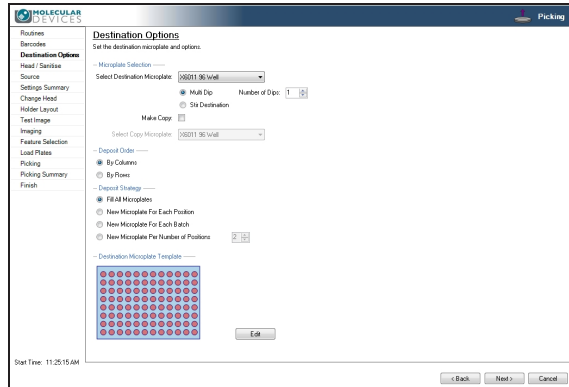
1. In the **Prefix** field, enter text to describe the identifier.
2. In the **Start Number** field, enter the first number to generate.
3. In the **Digit Padding** field, enter the number of digits in the generated number.
4. In the **Number to Generate** field, enter the number of identifiers to generate.
5. Click **Generate** to view the generated identifiers in the Barcodes list.
6. Click **Next** to define the destination receptacles.

Setting Destination Plate Options

Use the Destination Options page to set destination plate options.

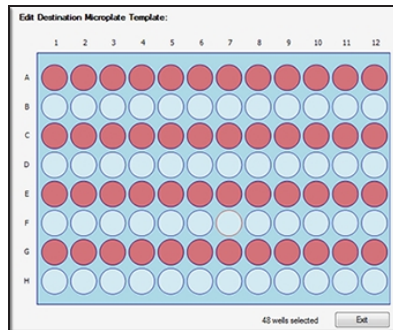
To set destination plate options:

1. Click the **Select Destination Microplate** drop-down and select the plate type to inoculate with the picked colonies. Contact Molecular Devices to add a new plate type to the list. See [Obtaining Support on page 203](#).



2. Select an option:
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins to dip the pins a number of times, (maximum 5 dips).
 - Select **Stir Destination** to stir the wells of the destination plate during inoculation.
3. Select the **Make Copy** checkbox, then click the **Select Copy Microplate** drop-down and select the plate type to use for a duplicate copy of the destination plate. This sends the picking head to inoculate a second plate without returning to re-pick the colonies. Doing so can decrease the efficiency of inoculation in the copy plate.
4. Select a Deposit Order:
 - Select **By Columns** to deposit the picked colonies by column.
 - Select **By Rows** to deposit the picked colonies by row.
5. Select a Deposit Strategy:
 - Select **Fill All Microplates** to fill every selected well of a destination plate before starting a new destination plate.
 - Select **New Microplate for Each Position** to start a new destination plate whenever the instrument starts picking from a different source QTray or Petri dish.
 - Select **New Microplate for Each Batch** to start a new destination plate whenever the instrument deck is loaded with new QTrays, OmniTrays, or other source plates.
 - Select **New Microplate Per Number of Positions** to start a new destination plate after the specified number of source plates is reached.

- Under Destination Microplate Template, click **Edit** to define the wells to dip or skip. You can skip wells you use as blank or control wells. This template is used for all the destination plates during the picking routine.



- To skip a well, click the well. Wells to skip show in light blue.
- To skip multiple contiguous wells, right-click and drag across the wells.
- To dip a well that you skip, click the well again. Wells to dip show in light red.

After you define the wells to dip or skip, click **Exit**.

- Click **Next** to define the picking head and the Sanitise profile.

Selecting the Head and Sanitizing Options

Use the Head and Sanitise page to select the head and sanitizing options.

To select the head and sanitizing options:

- Click the **Picking Head** drop-down and select the head to use for the picking routine.
- In the **Pin Columns (Rows) Before Inoculation** list, select the number of pins to use for picking in each column or row before transferring the picked colonies to the destination plate.

For the fastest transfer rate, select **All** to use all picking pins to pick colonies before inoculating the destination plate.

For smaller picking groups, the selections depend on the Deposit Order selection you made on the Destination Options page.

- If you select **By Columns**, you can pick colonies using from **1 to 11** columns.
- If you select **By Rows**, you can pick colonies using from **1 to 7** rows.

To run the wash routine from the Sanitise profile after each partial pick and inoculation, select the **Wash Between Partial Inoculation** checkbox. Clear the **Wash Between Partial Inoculation** checkbox to wait until all pins have been used for picking and inoculation before running the wash routine.

- In the **Destination** field, enter the distance above the bottom of the destination plate wells to dip the pins for the inoculation.
If you select **Make Copy** for the destination plate, enter a value for the copy.
- Click the **Sanitise Profile** drop-down and select the Sanitise profile to use for the picking routine.

If the profiles are not suitable for the picking routine, exit the picking process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).

- Click **Next** to define options for the source receptacle.

Setting Source Receptacle Options

Use the Source page to set source receptacle options.

To set source receptacle options:

1. Click the **Holder** drop-down and select the type of holder to use to hold the source receptacles on the instrument deck.



Tip: Source receptacles can only be placed in sequential positions.

2. Click the **Receptacle** drop-down and select the type of receptacle to use for the source. Only the receptacles applicable for the holder display in this list. The preview image displays a representation of the holder and receptacle.
3. In the **Positions** field, enter the number of receptacles to use for picking.
4. In the **Offset** field, enter the position of the first receptacle to be used for picking. The preview image displays the defined locations of the receptacles.



Note: If you use Validation barcodes, only one source receptacle displays, and the Positions and Offset fields are not available.

5. In the **Picking Depth Into Agar** field, enter the depth to insert the pins in the agar for picking.
6. Select the **Limit Max. Number of Features Per Position** checkbox. In the **Max. Number of Features Per Position** field, enter the maximum number of colonies to pick from a single QTray or Petri dish.



Note: Setting a limit for the maximum number of colonies on the Source page prevents selecting a maximum number on the Feature Selection page when you run the picking routine. See [Selecting Colonies for Picking on page 53](#).

7. Click **Next** to view a summary of the settings.

Viewing the Settings Summary

The Settings Summary page displays a summary of the picking routine settings. Review the summary details. To make changes, click **Back** until you return to the page where the changes can be made.

To print the summary, click **Print**.

MOLECULAR DEVICES	
Routines	<h3>Settings Summary</h3> <p>A summary of the settings for the run.</p> <p>Print</p> <h3>Barcode Settings:</h3> <p><input checked="" type="checkbox"/> Use Barcode Reader</p>
Barcodes	
Destination Options	
Head / Sanitise	
Source	
Settings Summary	
Change Head	

Click **Next** to change the head. See [Changing the Picking Head on page 61](#).

Changing the Picking Head

The Change Head page reminds you which picking to load, based on the Setting Summary routine you configure, and allows you to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Check the pin alignment and picking height before continuing.
9. Click **Next** to run the picking routine.

Running Picking Processes

After you configure the picking routine, you can run the process on the instrument.



Note: Before you run a picking process, it is important that you do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

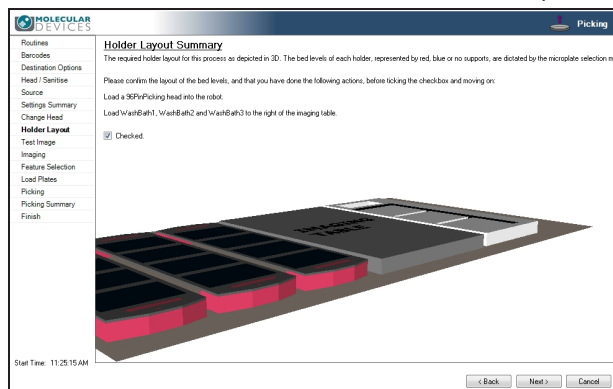
To run a picking routine:

1. Open the Picking page. See [Opening the Picking Page on page 40](#).
2. Select the picking routine to run. See [Selecting Picking Routines on page 40](#).
If you do not need to make changes to the routine, select the **Skip Steps** checkbox before you click **Next**.
3. Review the settings for the routine. See [Viewing the Settings Summary on page 46](#).
4. On the Settings Summary page, click **Next** to arrange the source plates in the instrument.

Arranging the Plate Layout

To arrange the plate layout:

1. Open the instrument door.
2. On the Holder Layout Summary page, follow the instructions to correctly arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.



4. After you finish making the changes, click **Next**.



CAUTION! At this point, you cannot go back and change settings. To make changes now, you must cancel the process and start again.

5. Remove all plate lids.
6. On the Load Plates page, follow the instructions to correctly place the destination plates.
7. Click **Next**.
8. When the Please Load Source page displays, load the source receptacles in the correct locations on the instrument deck.



Tip: If needed, you must install the filter between the lightbed and the source tray before you continue.

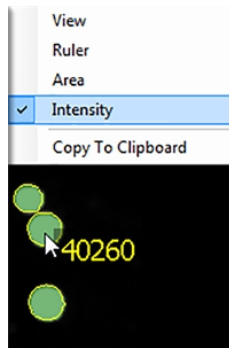
9. Close the instrument door.
10. Click **Next** to take a white light test image of the source receptacles.

Adjusting the White Light Test Image

On the Test Image page, view detected features as potential colonies to pick. To make sure that only colonies are detected, adjust the test image using the Exposure and Gain settings, the Detection settings, the Display settings, the Debris settings, and the Depth settings.

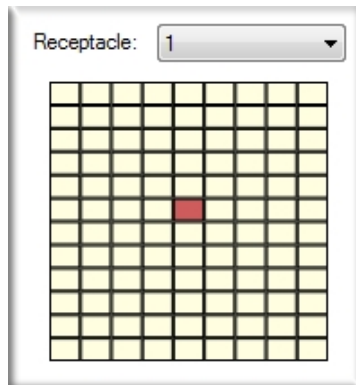
To set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image to display the pixel intensity value.



To adjust the test image:

1. Click the **Receptacle** drop-down and select the number of the receptacle to view and then select the frame to view in the receptacle image below the list. The frame is in red.

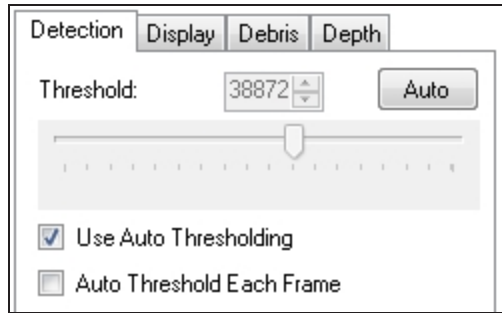


2. Under Acquisition, in the **Exposure** field, enter the number of milliseconds to expose the sample to light when acquiring the image (from 10 to 1000).

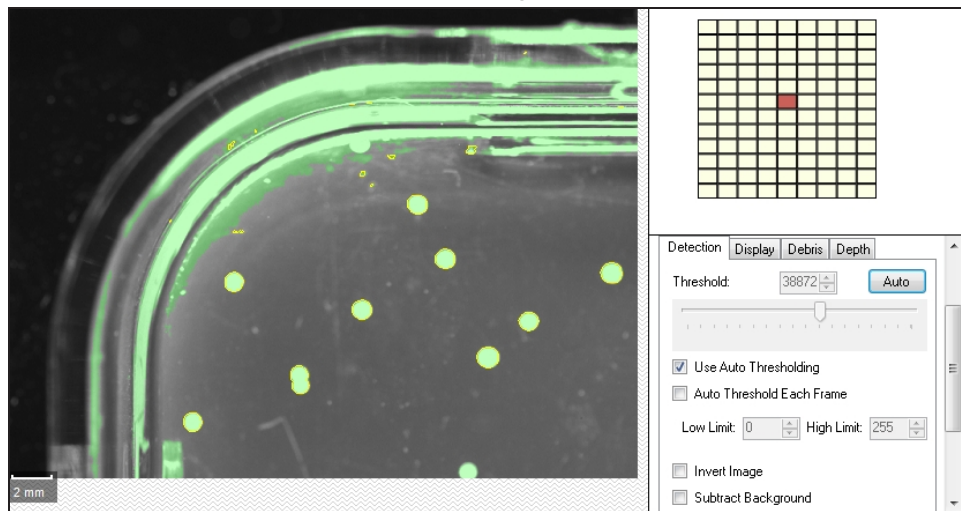


3. Adjust the **Gain** to increase the image signal without changing the light exposure.
4. Click **Grab Image** to apply the settings to the test image.

5. Select the **Detection** tab.



6. Select the **Use Auto Thresholding** checkbox to have the software automatically detect the colonies in the image.
Clear the **Use Auto Thresholding** checkbox to manually detect the colonies. Drag the slider until the colonies are detected and the background is not.

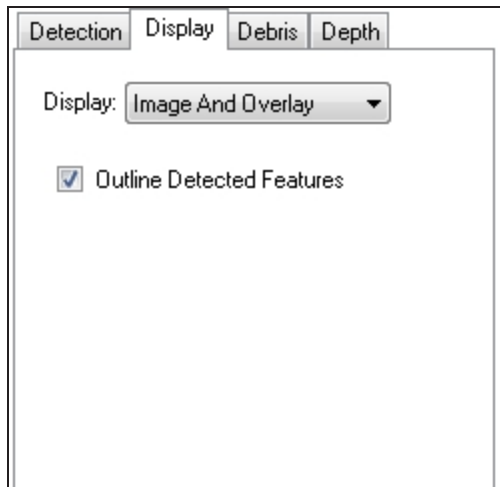


7. Select the **Auto Threshold Each Frame** checkbox to process each frame with its own uniquely calculated value.
Clear the **Auto Threshold Each Frame** checkbox to process the frames using an average value calculated from the entire image.
8. If you select the **Auto Threshold Each Frame** checkbox, enter threshold values in the **Low Limit** and **High Limit** fields.
 - To determine the Low Limit value, clear the **Use Auto Thresholding** checkbox and then drag the slider to the left until some background is clearly detected. Select the **Use Auto Thresholding** checkbox and select the **Auto Threshold Each Frame** checkbox again and then enter the value from the **Threshold** field into the **Low Limit** field.
 - To determine the High Limit value, clear the **Use Auto Thresholding** checkbox and then drag the slider to the right until some colonies start to become undetected. Select the **Use Auto Thresholding** checkbox and the **Auto Threshold Each Frame** checkbox again and enter the value from the **Threshold** field into the **High Limit** field.
9. Select the **Invert Image** checkbox to make dark areas bright and bright areas dark.

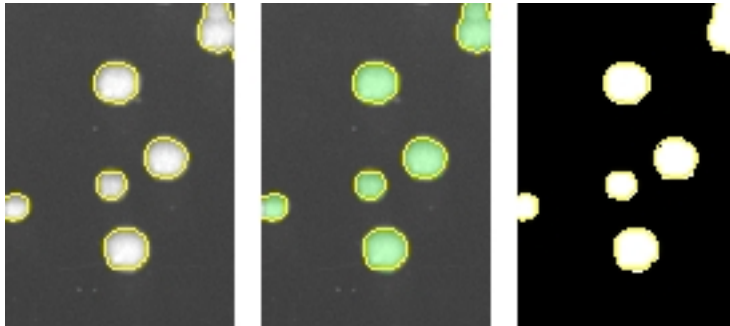
*** Tip:** This is useful when you image plaques.

10. Select the **Subtract Background** checkbox to have the background become nearly black.

11. Select the **Display** tab.



12. Click the **Display** drop-down:
- Select **Image Only** to display the detected colonies in white with yellow rings and a gray background. The yellow ring shows the colony detection.
 - Select **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background. The green shows the threshold overlay.
 - Select **Overlay Only** to display the detected colonies in white with yellow rings and a black background.



Clear the **Outline Detected Features** checkbox to remove the yellow ring from the detected colonies.

13. Select the **Debris** tab.
14. Adjust the Diameter and Axis Ratio to exclude objects that are smaller than the desired colonies. Each detected feature displays within a yellow ring while excluded features do not have a yellow ring.
- In the **Diameter** field enter the minimum diameter of the required colonies.
 - In the **Axis Ratio** field, define the minimum roundness ratio of the required colonies.
15. Select the **Depth** tab.

16. Adjust the Agar Depth.
 - In the **Agar Depth** field, enter the depth that the picking head descends into the source agar.
 - The **Agar Height** field displays the height, or thickness, of the detected agar within the source tray.
 - The **Max. Agar Height** field displays the maximum agar height for a long pin head to descend into the source agar.



Note: You can do further refinement for colony detection on a higher-resolution image on the Feature Selection page.

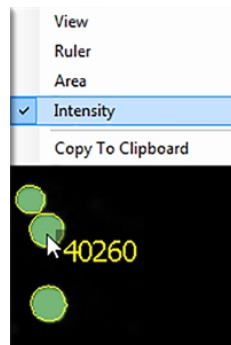
17. Click **Next**.
 - If you run a routine for white light only, the system captures and processes a higher-resolution image and then displays the Feature Selection page.
 - If you run a routine for white light and fluorescent imaging, the Fluorescent Test Image page displays.

Adjusting the Fluorescent Test Image

If you run a routine for white light and fluorescent imaging, the Fluorescent Test Image page displays after you make adjustments for the white light test image. This option is available only for instruments with a fluorescence imaging module.

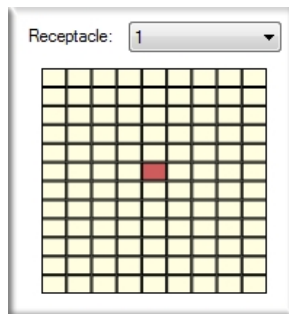
To set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image to display the pixel intensity value.



To adjust the test image:

1. Click the **Receptacle** drop-down and select the number of the receptacle to view and then click the frame to view in the receptacle image below the list. The frame is in red.



2. In the **Exposure** field, enter the number of milliseconds to expose the sample to light when acquiring the image (from 10 to 1000).
3. Adjust the **Gain** to increase the image signal without changing the light exposure.
4. Click **Grab Image** to take a new test image with the new settings.
5. Click **Next** to capture and process a higher-resolution image and display the Feature Selection page.

Selecting Colonies for Picking

After you adjust and refine test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the Feature Selection page.

Feature Selection
Review images and set the feature selection criteria.

Auto6366016649074295320

— Selection —

Compactness \geq 0.65

Axis Ratio \geq 0.65

Min Diameter (mm) \geq 0.25

Max Diameter (mm) \leq 5.00

Min Proximity (mm) \geq 0.45

Total Feature Count: **1247**

Limit Colonies: 1247

Barcode	Found	Pickable	Picking
Auto6366...	1903	1247	1247

Edit Picking Counts...

Zoom: Contrast:

Export Image

Delete Polygon

On the Feature Selection page, pickable objects display in yellow and unpickable object display in red outline. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

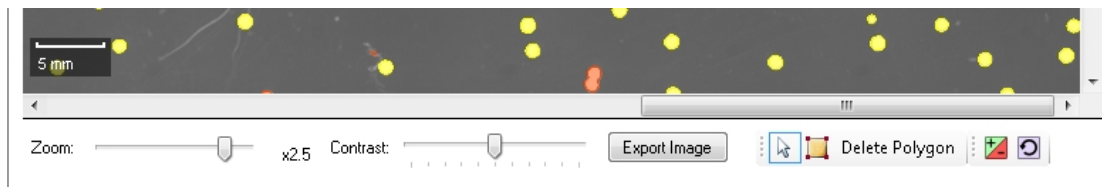
To view the details of a colony, hold the cursor over that colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion displays in red text.

Excluded By Criteria	Included By Criteria
Compactness: 0.73	Compactness: 0.83
Axis Ratio: 0.43	Axis Ratio: 0.86
Minimum Diameter: 0.76	Minimum Diameter: 0.82
Maximum Diameter: 1.78	Maximum Diameter: 0.96
Proximity: 0.49	Proximity: 0.74
Mean Intensity: 61274.33	Mean Intensity: 59714.24
Median Intensity: 65520.00	Median Intensity: 65520.00
Geometric Mean Intensity: 35403.95	Geometric Mean Intensity: 29550.89
Centre Mean Intensity: 65520.00	Centre Mean Intensity: 65520.00



Note: During image processing, each object without a yellow ring in the test image is excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image and drag the **Contrast** slider to change the contrast between the objects and the background.

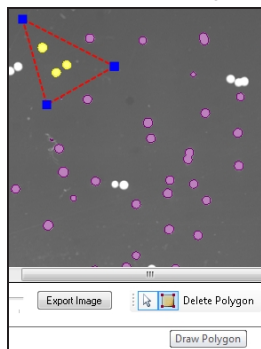


Click **Export Image** to save the image in .bmp, .jpg, or .png format.


To select a smaller region of interest (ROI) in the image, draw a polygon around the region.

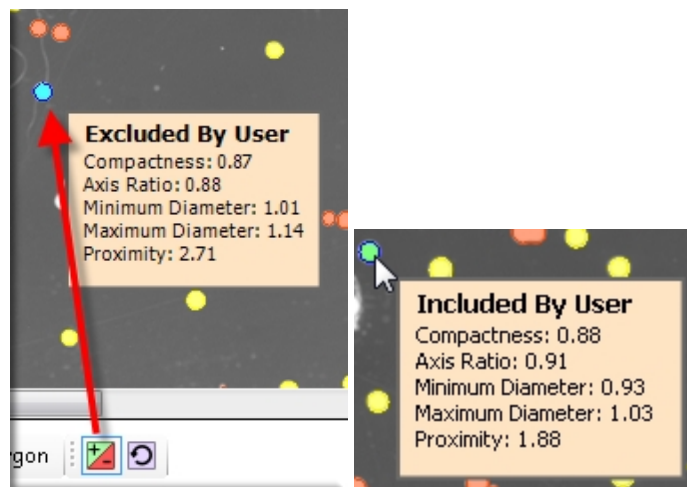


- To draw a polygon, click the **Draw Polygon** icon and then click the image to define the corners of the polygon. When you draw a polygon on the image, the system detects and picks colonies only from within the defined region of interest.



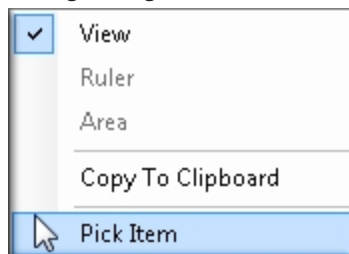
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

To change the selection of the system-chosen pickable objects that display in the image map, click  to override the system-chosen and unchosen objects, and then click the objects in the image map to change.



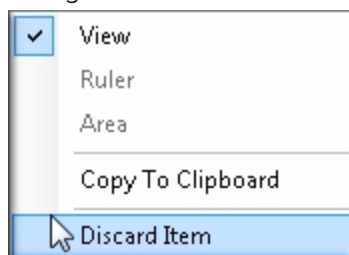
- When you click  as an override, the yellow-marked pickable objects change to blue and become unpickable.


To undo the selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.

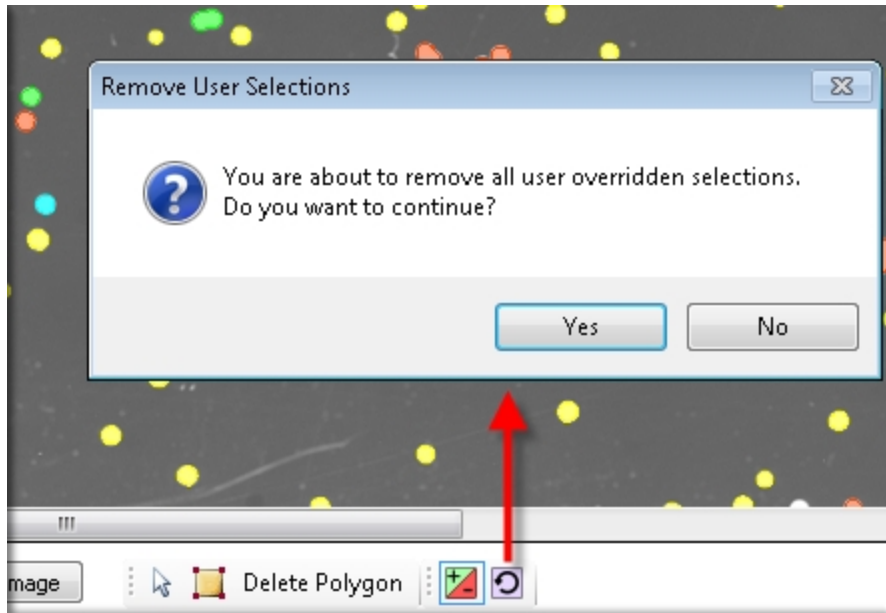


- When you click  as an override, the red-marked unpickable objects change to green and become pickable.

To undo the selection, right-click over the image map and select **Discard Item**. The object changes to blue and becomes unpickable.



To undo all selections, click  to display the Remove User Selections dialog. Click **Yes**.



If you run a routine for white light and fluorescent imaging, two tabs are available.

- The White Light tab displays the image taken with white light.
- The other tab is labeled with the fluorescent filter pair and displays the image taken with fluorescent light.

Switch between the two images to define the pickable colonies. This option is available only for instruments with a fluorescence imaging module.

To select the colonies for picking:

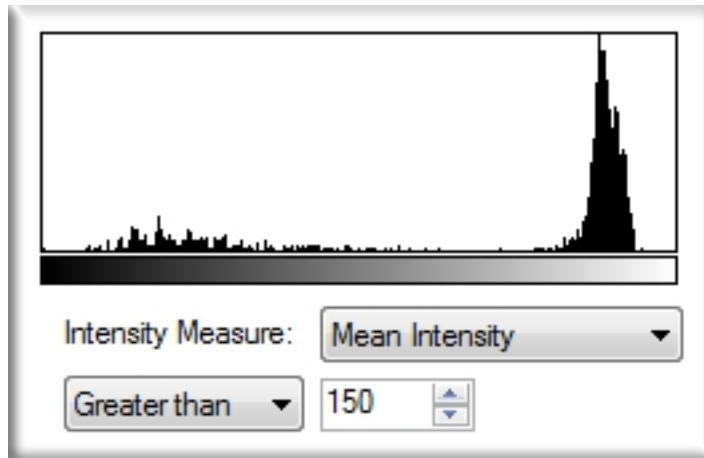
1. From the list in the upper-right area, select the barcode or identifier of the receptacle to view.
2. Refine the colony Selection criteria.
 - **Compactness:** Sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. A colony equal to or less than 0.65 is not picked by default.
 - **Axis Ratio:** Measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies is closer to 0 and round colonies is closer to 1. A colony equal to or less than 0.65 is not picked by default.
 - **Min Diameter:** Sets the minimum diameter of colonies for picking. A colony equal to or less than the value in this field is not picked.



Note: The Min Diameter cannot be lower than the Diameter value set in the Debris Discard section of the test image.

- **Max Diameter:** Sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
- **Min Proximity:** Sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.

- For a fluorescent image, adjust the **Intensity Measure** as shown in the histogram. This option is available only for instruments with a fluorescence imaging module.



- **Mean Intensity:** The average fluorescence of the detected colony (the fluorescence of all the pixels within the colony perimeter divided by the number of pixels within the colony perimeter).
- **Median Intensity:** The middle fluorescence value of all the pixels within the detected colony perimeter.
- **Geometric Intensity:** The geometric intensity of the detected colony or the fluorescence of all the pixels within the colony perimeter.
- **Centre Mean Intensity:** The average fluorescence value of the middle 9 pixels within the detected colony perimeter.

Select **Greater Than**, **Less Than**, or **Between** and enter a value in the field to define the fluorescence intensity threshold. For **Between**, enter two values to define the range.

- Change the pickable property of individual objects.
 - To define an object as pickable, right-click the object and select **Pick Item** to display the object in green.
 - To define an object as unpickable, right-click the object and select **Discard Item** to display the object in blue.
- In the **Limit Colonies** field, enter the maximum number of colonies to pick from each receptacle.



Note: If a limit was previously set for the maximum number of colonies on the Source page, the Limit Colonies option is not available on the Feature Selection page. See [on page 45](#).

The **Total Feature Count** field displays the total number of pickable objects in the receptacle.

- Select the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle displays, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria. To save the data in .csv format, right-click and then click **Export**.
- Select the **Display Options** tab to change the display options of the source receptacle image.
- Select the **Display Detected Features** checkbox to display all detected features with a yellow circle.

9. Select the **Shade Features** checkbox to give the detected colonies some shading for clearer visualization.
10. Select the **Display Proximity Indicators** checkbox to display connecting red lines between a detected colony and its closest neighbor.
11. Select the **Shade Exclusion Zone** checkbox to display a red-shaded exclusion zone where the system cannot pick.
12. Click **Next**.
13. In the Continue or Save New Routine dialog or the Save Changes to Routine dialog, select whether to save the routine before you continue with the picking process.

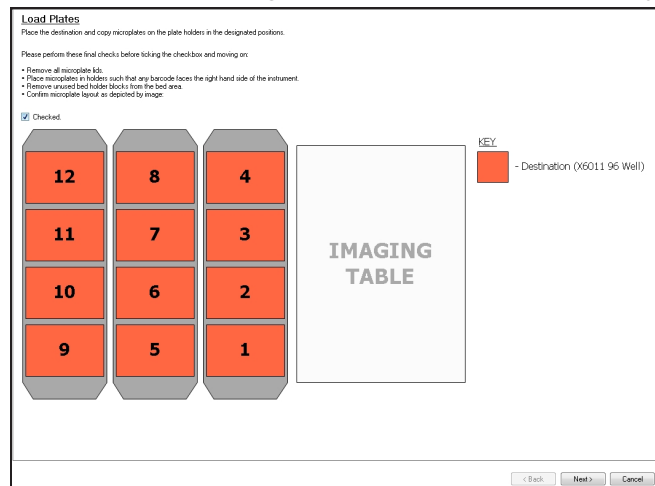
If you create a new routine, the Continue or Save New Routine dialog displays.

- To save the settings for the routine before you continue, click **Save Routine**, enter the routine **Name** and **Description**, and then click **Save**.
- To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

If you edit a routine, the Save Changes to Routine dialog displays.

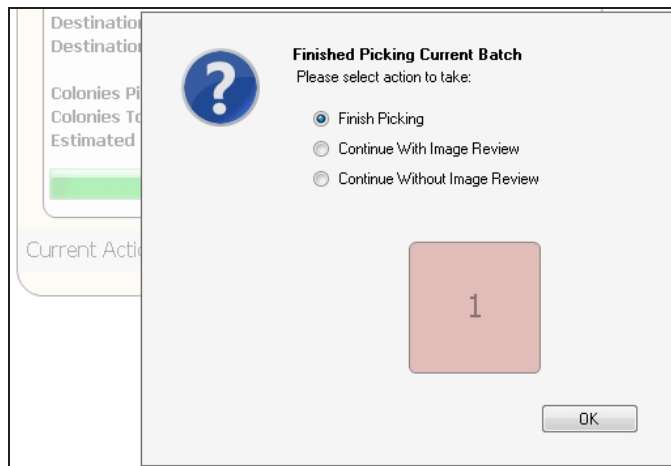
- To save the settings for the routine before you continue, click **Save**.
- To save the settings as a new routine without changing the existing routine, click **Save As**, enter the routine **Name** and **Description**, and then click **Save**.
- To continue without saving the settings for the routine, click **No**.

14. On the Load Plates page, follow the instructions to verify that the plates are set up correctly.



15. Select the **Checked?** checkbox to confirm that the plates are set up correctly.
16. Make sure that the instrument door is closed.
17. Click **Next** to start the picking process.

18. When the Finished Picking Current Batch dialog displays, select an option for how to continue, then click **OK**.



Viewing the Picking Progress

While the picking routine runs, the Picking Progress page displays a summary of the routine.

- **Start Time:** The time the picking of the colonies began.
- **Source Barcode:** The barcode or identifier of the source receptacle being picked from.
- **Pin:** The picking pin used for the picking operation.
- **Copy Plate No:** The barcode of the copy receptacle that is being inoculated, if you select Make Copy for the routine.
- **Destination Barcode:** The barcode of the destination receptacle that is being inoculated.
- **Destination Offset:** The reference well for where the pins are lowered. This value changes for 384-well plates.
- **Colonies Picked:** The number of colonies picked so far.
- **Colonies To Pick:** The total number of colonies to be picked.
- **Estimated Time Remaining:** The remaining time in the routine.
- **Current Action:** What the system is doing, such as *Pick* when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all the colonies have been picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

Continuing or Ending the Picking Routine

After all the colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

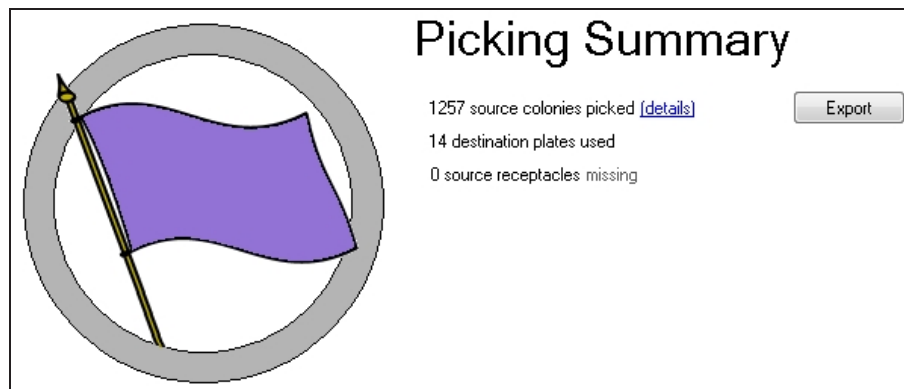
If there are no more source receptacles to pick, click **Finish Picking** and then click **OK**.

To continue picking more source receptacles:

1. Select whether to review images of the new receptacles.
 - Click **Continue With Image Review** to review images and select colonies for the new source receptacles.
 - Click **Continue Without Image Review** to use the current image settings for the next batch of source receptacles.
2. Click the **Select Number of Positions to Use** drop-down and select the number of receptacle holders to load on the instrument deck.
3. Click **OK**.
4. When the Please Load Source dialog displays, replace the picked receptacles with the new receptacles on the instrument deck.
5. Close the instrument door.
6. Click **Next** to continue running the picking routine.
 - If you click **Continue With Image Review**, the system takes a white light test image of the source receptacles and the Test Image page displays. See [Adjusting the White Light Test Image on page 49](#).
 - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and the Feature Selection page displays. See [Selecting Colonies for Picking on page 53](#).

Viewing the Picking Summary

After the picking routines complete, the Picking Summary page displays the number of source colonies picked, the number of destination plates used, and missing source receptacles.



- Click **Export** to save the information in .csv format.
- Click **Details** to view details of all activities related to the source and destination receptacles.
- Click **Close** to display the Picking Summary page.

On the Picking Summary page, click **Next** and then click **Finish** to display the Picking page.

Changing the Picking Head

The Change Head page reminds you which picking to load, based on the Setting Summary routine you configure, and allows you to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Check the pin alignment and picking height before continuing.
9. Click **Next** to run the picking routine.



Chapter 7: Blue-White Picking Processes

7

The QPix 420 Microbial Colony Picking System can pick colonies from receptacles using either standard picking or regional picking. You can set up control wells for the destination plates before you run a picking process.

On the Navigation page under Picking Processes, select **Blue-White Picking** to pick blue or white colonies from receptacles.



Note: Before you run a picking process, you should do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

If this is your first picking process, you must edit or create a Sanitise profile to use with the picking process. See [Creating and Editing Sanitise Profiles on page 35](#).

Blue-White Colony Detection is a technique that uses the E. Coli LacZ gene to permit visual detection of colonies that contain plasmids with DNA inserts. The Blue-White Picking function must be used with a QPix® Chroma Filter. Place this filter on the light bed of the instrument under a QTray or a Petri dish holder that contains the blue and white colonies to detect. QPix Chroma Filters are consumables you can purchase individually and in packs of 25. See [Replacement Parts and Optional Extras on page 209](#).



CAUTION! When you reuse a QPix Chroma Filter, use gentle handling, because crinkles and bends can compromise image quality. Replace damaged filters.

This is a white light imaging picking processes only that requires the *QPix® Chroma Colorimetric Colony Selection Software License Blue/White Colony Selection Software License*.



Note: Due to inherent biological variations, some picked white colonies lose their insertions and might later be viewed to be blue. These effects are inherent to the biology and are not due to the picking or selection processes. When you select the insertion methodology, take care to make sure that the desired results are achieved.

Creating and Editing Blue-White Picking Processes

The procedures to create and edit picking processes are similar. The regional picking process has more options available to define the regions to pick. Blue-White picking can be run as either a standard picking process or a regional picking process.


To run a Blue-White regional picking process, see [Blue-White Regional Picking Processes on page 117](#).



Note: Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

Opening the Blue-White Picking Page

To open the Blue-White Picking page:

1. On the Navigation page under Picking Processes, double-click  **Blue-White Picking**.
2. Click **Start** to home the drives and display the Routines dialog.

Selecting Blue-White Picking Routines

Use the Routines dialog to select a Blue-White picking routine.

To select a Blue-White picking routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit.
Select the **Skip Steps** checkbox to run the routine without making changes.
3. Click **Import** to import a routine.
4. Click **Export** to export the routine you select. See [Exporting Routines on page 65](#).
5. Click **Delete** to delete the routine you select.
6. Click **Next**.
 - If you select New Routine or Run Existing Routine and leave the Skip Steps checkbox clear, see [Selecting Barcode Options on page 65](#).
 - If you select Run Existing Routine and you select the Skip Steps checkbox, see [Viewing the Settings Summary on page 69](#).

Importing and Exporting Blue-White Picking Routines

The Select Routine list displays the routines that match the type of routine you are creating. For example, a white light and fluorescent imaging routine is not included in the Select Routine list if you are creating a White Light only routine.

Importing Routines

To import a routine:

1. Export the routine from the other computer in .xml format.
2. Save the export file on the system computer.
3. On the system computer, click **Import**.
4. Locate and select the file.
5. Click **Import** to add the routine to the database.

If the routine is of the same type as the one you are creating, then the imported routine displays in the Select Routine list.

Exporting Routines

To export a routine:

1. Click **Export**.
2. Navigate to the location that you want to save the .xml file.
3. You can change the name of the file.
4. Click **Export** to save the routine in .xml format.

Selecting Barcode Options

When you create or edit a routine for white light only, the Barcodes page displays.

Using a Barcode Reader



Note: You should always use barcodes for accurate data tracking.

To use a barcode reader:

1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes.
2. Select a Read Failure Option to define the system response when a barcode cannot be read.
 - Select **Manual Prompt** to have the software display a dialog where you enter a barcode or name for the receptacle.
 - Select **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.



Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

- Select **Auto Generate** to allow the system to assign a barcode and continue the routine.
3. Use the Validation Barcode list to define the barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, a message displays.
 - To manually enter the barcodes, enter each barcode in the field below the list and then click **Insert**.
 - To import barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
 - To use a from the database, click **From Database**.
 - To remove a barcode from the list, select the barcode and click **Remove**.
 4. Click **Next** to define the destination receptacles.

Defining Unique Identifiers Without Barcodes

To define unique identifiers without barcodes:

- Clear the **Use Barcode Reader** checkbox to define unique identifiers for source receptacles without scanning for barcodes.

Random Identifiers

To have the software generate random identifiers:

1. Clear the **Use Barcode Reader** checkbox.
2. Select the **Generate Random Barcodes** checkbox to have the software generate random barcodes with the prefix Auto for the source receptacles. No other parameters are required for this option.

Manually Create Identifiers

To manually create an identifier list:

3. Clear the **Use Barcode Reader** checkbox.
4. Clear the **Generate Random Barcodes** checkbox.
5. Either:
 - In the text field below the list, enter an identifier and click **Insert**.
 - Click **Import** and then select the file from which to import the identifiers to import identifiers for the source receptacles from a text or .csv file.
 - Click **Generate List**. See below for additional steps.
6. Select an identifier in the list and click **Remove** to remove an identifier.

Generating an Identifier List

*** Tip:** The Preview area shows examples of the first and last generated identifiers.

To generate a barcode identifier list:

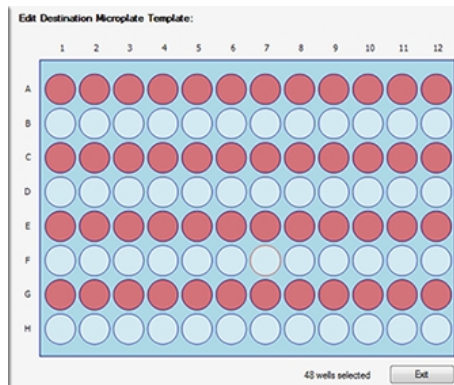
1. In the **Prefix** field, enter text to describe the identifier.
2. In the **Start Number** field, enter the first number to generate.
3. In the **Digit Padding** field, enter the number of digits in the generated number.
4. In the **Number to Generate** field, enter the number of identifiers to generate.
5. Click **Generate** to view the generated identifiers in the Barcodes list.
6. Click **Next** to define the destination receptacles.

Setting Destination Plate Options

Use the Destination Options page to set destination plate options.

To set destination plate options:

1. Click the **Select Destination Microplate** drop-down and select the plate type to inoculate with the picked colonies.
2. Select an option.
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Destination** to stir the wells of the destination plate during inoculation.
3. Select the **Make Copy** checkbox, then click the **Select Copy Microplate** drop-down and select the plate type to use for a duplicate copy of the destination plate.
4. Select the Deposit Order:
 - Select **By Columns** to deposit the picked colonies by column.
 - Select **By Rows** to deposit the picked colonies by row.
5. Select the Deposit Strategy.
 - Click **Fill All Microplates** to fill every selected well of a destination plate before starting a new destination plate.
 - Click **New Microplate for Each Position** to start a new destination plate whenever the instrument starts picking from a different source QTray or Petri dish.
 - Click **New Microplate for Each Batch** to start a new destination plate whenever the instrument deck is loaded with new QTrays, OmniTrays, or other source plates.
 - Click **New Microplate Per Number of Positions** to start a new destination plate after the specified number of source plates is reached.
6. Under Destination Microplate Template, click **Edit** to define the wells to dip or skip. You can skip wells you use as blank or control wells. This template is used for all the destination plates during the picking routine.



- To skip a well, click the well. Wells to be skipped show in light blue.
- To skip multiple contiguous wells, right-click and drag across the wells.
- To dip a well that you skip, click the well again. Wells to be dipped show in light red.

After you define the wells to dip or skip, click **Exit**.

7. Click **Next** to define the picking head and the Sanitise profile.

Selecting the Head and Sanitizing Options

Use the Head and Sanitise page to select the head and sanitizing options.

To select the head and sanitizing options:

1. Click the **Picking Head** drop-down and select the head to use for the picking routine.
2. In the **Pin Columns (Rows) Before Inoculation** list, select the number of pins to use to pick in each column or row before transferring the picked colonies to the destination plate.
For the fastest transfer rate, select **All** to use all picking pins to pick colonies before inoculating the destination plate.

For smaller picking groups, the selections depend on the Deposit Order selection you made on the Destination Options page.

- If you select By Columns, you can pick colonies using from **1** to **11** columns.
- If you select By Rows, you can pick colonies using from **1** to **7** rows.

To run the wash routine from the Sanitise profile after each partial pick and inoculation, select the **Wash Between Partial Inoculation** checkbox. Clear the **Wash Between Partial Inoculation** checkbox to wait until all pins have been used for picking and inoculation before running the wash routine.

3. In the **Destination** field, enter the distance above the bottom of the destination plate wells to dip the pins for the inoculation.

If you select **Make Copy** for the destination plate, enter a value for the copy.

4. Click the **Sanitise Profile** drop-down and select the Sanitise profile to use for the picking routine.

If the profiles are not suitable for the picking routine, exit the picking process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).

5. Click **Next** to define the source receptacle options.

Setting Source Receptacle Options

Use the Source page to set source receptacle options.

To set source receptacle options:

1. Click the **Holder** drop-down and select the type of holder for the source receptacles on the instrument deck.
2. Click the **Receptacle** drop-down and select the type of receptacle to use for the source. The preview image displays a representation of the holder and receptacle.
3. In the **Positions** field, enter the number of receptacles to use for picking.
4. In the **Offset** field, enter the position of the first receptacle to use for picking. The preview image displays the defined locations of the receptacles.



Note: If you use Validation barcodes, only one source receptacle shows, and the Positions and Offset fields are not available.

5. In the **Picking Depth Into Agar** field, enter the depth to insert the pins in the agar for picking.
6. Select the **Limit Max. Number of Features Per Position** checkbox. In the **Max. Number of Features Per Position** field, enter the maximum number of colonies to pick from a single QTray or Petri dish.



Note: Setting a limit for the maximum number of colonies on the Source page prevents selecting a maximum number on the Feature Selection page when you run the picking routine. See [Selecting Colonies for Picking on page 53](#).

7. Click **Next** to view a summary of the settings.

Viewing the Settings Summary

The Settings Summary page displays a summary of the picking routine settings.

Review the summary details to make sure that the settings and options are configured correctly for the picking routine. To make changes, click **Back** until you return to the page where the changes can be made.

To print the summary, click **Print**.

To run the picking routine, click **Next**.

Changing the Picking Head

The Change Head page reminds you which picking head to load, based on the Setting Summary routine you configure, and provides an opportunity to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to run the picking routine.

Running Blue-White Picking Processes

After you configure the blue-white picking routine, you can run the process on the instrument.



Note: Before you run a picking process, it is important that you do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

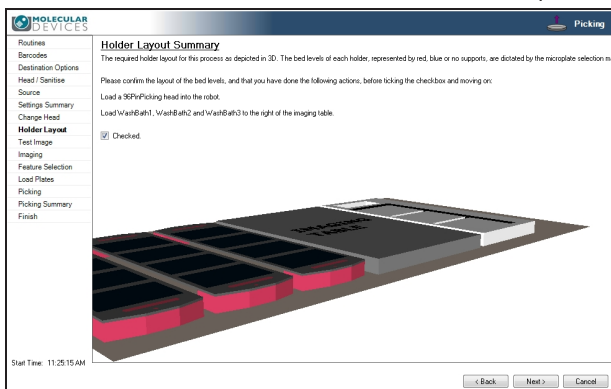
To run a blue-white picking routine:

1. Open the Blue White Picking page. See [Opening the Blue-White Picking Page on page 63](#).
2. Select the picking routine to run. See [Selecting Blue-White Picking Routines on page 64](#).
If you do not need to make changes to the routine, select the **Skip Steps** checkbox before you click **Next**.
3. Review the settings for the routine. See [Viewing the Settings Summary on page 69](#).
4. On the Settings Summary page, click **Next** to arrange the source plates in the instrument.

Arranging the Plate Layout

To arrange the plate layout:

1. Open the instrument door.
2. On the Holder Layout Summary page, follow the instructions to correctly arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.



4. After you finish making the changes, click **Next**.



CAUTION! At this point, you cannot go back and change settings. To make changes now, you must cancel the process and start again.

5. Remove all plate lids.
6. On the Load Plates page, follow the instructions to correctly place the destination plates.
7. Click **Next**.
8. When the Please Load Source page displays, load the source receptacles in the correct locations on the instrument deck.



Tip: If needed, you must install the filter between the lightbed and the source tray before you continue.

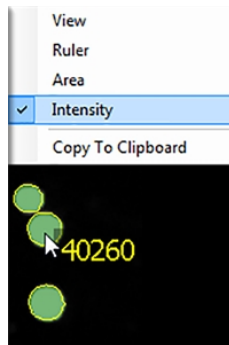
9. Close the instrument door.
10. Click **Next** to take a white light test image of the source receptacles.

Adjusting the Blue-White Regional White Light Test Image

On the Test Image page, all detected features are viewed as potential colonies to pick for inoculation of the destination plates. To make sure that only blue or white colonies are detected, adjust the test image using the Exposure and Gain settings, the Detection settings, the Display settings, and the Debris settings.

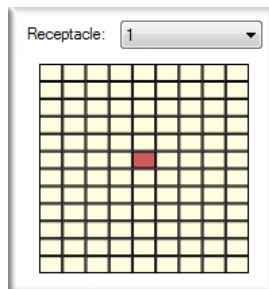
To set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image to display the pixel intensity value.



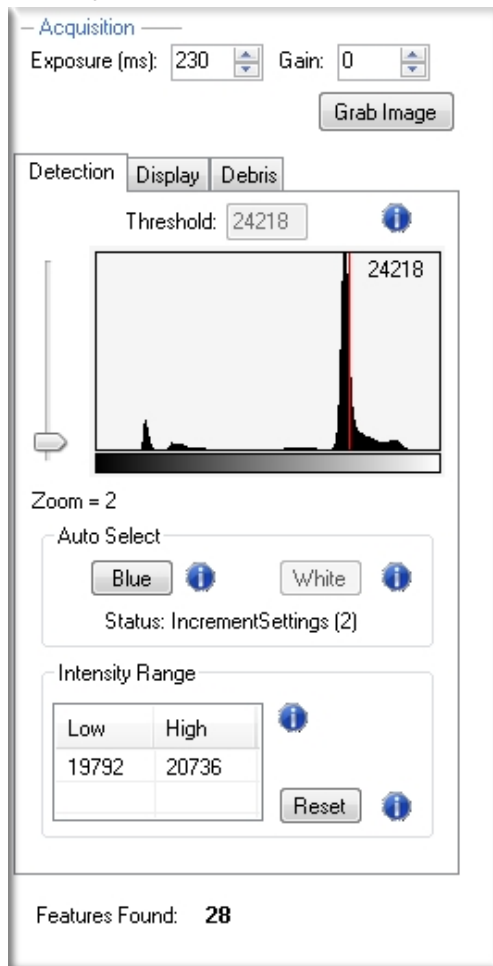
To adjust the test image:

1. Click the **Receptacle** drop-down and select the number of the receptacle to view and then select the frame to view in the receptacle image below the list. The frame is in red.



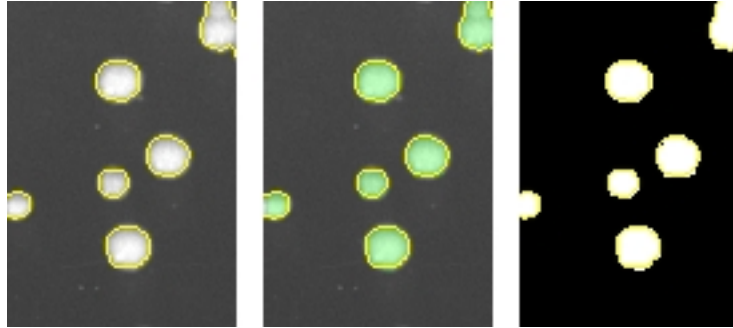
2. In the Acquisition area, in the **Exposure** field, enter the number of milliseconds to expose the sample to light when acquiring the image (from 1 to 2000).
3. Adjust the **Gain** to increase the image signal without changing the light exposure. You should not adjust the default gain setting.
4. Click **Grab Image** to apply the settings to the test image.

5. Select the **Detection** tab. In the Threshold intensity histogram, the X-axis represents the intensity, and the Y-axis represents the relative area at that intensity.



6. To use Auto Select, click either **Blue** or **White**. Click the button as many times as required to intensify the target colonies. Generally, two or three clicks achieve the optimal value. Click **Reset** to restore the previous intensity settings.
7. To manually select **White Colonies**, drag the red slider line to the right to increase the minimum detectable threshold and to view the White colonies as green spots. This allows the exclusion of the agar, which is predominantly the large black area in the background, and the colonies that are less intense than the threshold value.
8. To manually select **Blue Colonies**, drag the red slider to the left to decrease the minimum detectable threshold and view the Blue colonies as dark black spots against the background that starts near the left side of the histogram and ends to the left of the large spike that represents the largest area, which is the agar.
9. In the Intensity Range table, select the Low and High Threshold values.
- To select the **Low** intensity value, move the histogram red slider line left to the lowest preferred value, and **Ctrl+Click**. The value displays in the table cell.
 - To select the **High** intensity value, move the histogram red slider line right to the highest preferred value, and **Ctrl+Click**. The value displays in the table cell.
10. Select the **Display** tab.

11. Select the method to view the detected colonies in the image.
 - Click **Image Only** to display the detected colonies in white with yellow rings and a gray background.
 - Click **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background.
 - Click **Overlay Only** to display the detected colonies in white with yellow rings and a black background.



To remove the yellow ring from the detected colonies, clear the **Outline Detected Features** checkbox.

12. Select the **Debris** tab.
13. Adjust the Diameter and Axis Ratio to exclude objects that are smaller than the desired colonies. Each detected feature displays within a yellow ring while excluded features do not have a yellow ring.
 - In the **Diameter** field enter the minimum diameter of the required colonies.
 - In the **Axis Ratio** field, define the minimum roundness ratio of the required colonies.

The **Features Found** field displays the number of objects detected as colonies. The value changes as you make adjustments.



Note: You can further refine colony detection on a higher-resolution image on the Feature Selection page.

14. Click **Next**.

Selecting Blue-White Colonies for Picking

After you adjust and refine test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the Feature Selection page.

On the Feature Selection page, pickable objects show in yellow and unpickable objects show in red outline. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

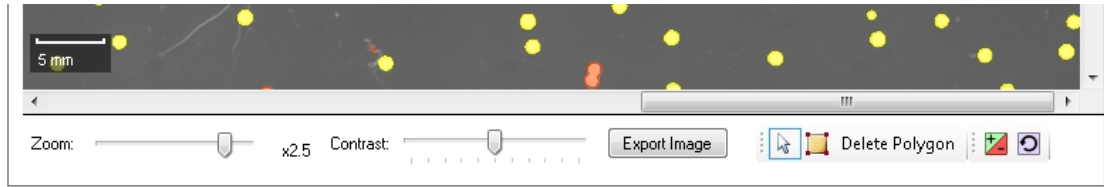
To view the details of a colony, hold the cursor over a colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion displays in red text.

Excluded By Criteria	Included By Criteria
Compactness: 0.73	Compactness: 0.83
Axis Ratio: 0.43	Axis Ratio: 0.86
Minimum Diameter: 0.76	Minimum Diameter: 0.82
Maximum Diameter: 1.78	Maximum Diameter: 0.96
Proximity: 0.49	Proximity: 0.74
Mean Intensity: 61274.33	Mean Intensity: 59714.24
Median Intensity: 65520.00	Median Intensity: 65520.00
Geometric Mean Intensity: 35403.95	Geometric Mean Intensity: 29550.89
Centre Mean Intensity: 65520.00	Centre Mean Intensity: 65520.00



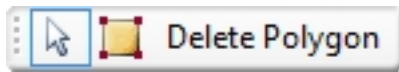
Note: During image processing, each object without a yellow ring in the test image is excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image and drag the **Contrast** slider to change the contrast between the objects and the background.

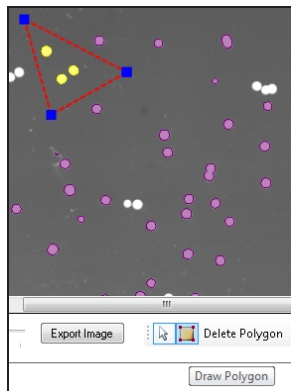


Click **Export Image** to save the image in .bmp, .jpg, or .png format.


To select a smaller region of interest (ROI) in the image, draw a polygon around the region.

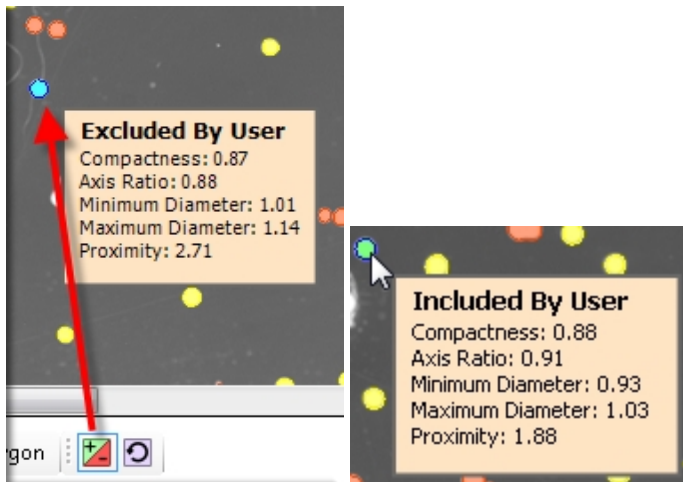



- To draw a polygon, click the **Draw Polygon** icon and then click the image to define the corners of the polygon.



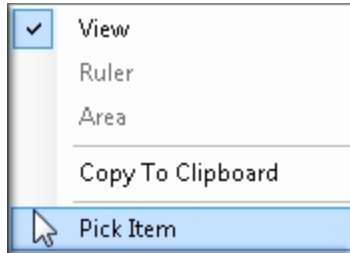
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

To change the selection of the system-chosen pickable objects that are displayed in the image map, click  to override the system-chosen and unchosen objects, and then click the objects in the image map to change.



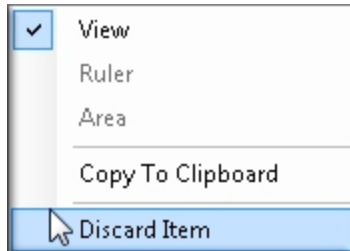
- When you click  as an override, the yellow-marked pickable objects change to blue and become unpickable.


To undo the selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.

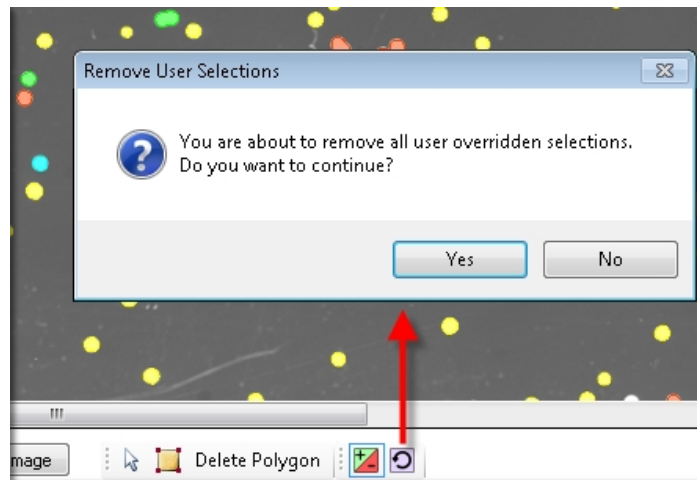


- When you click  as an override, the red-marked unpickable objects change to green and become pickable.

To undo the individual selection, right-click over the image map and select **Discard Item**. The object changes to blue and becomes unpickable.



To undo all the selections, click  to display the Remove User Selections dialog. Click **Yes**.



If you run a routine for white light and fluorescent imaging, two tabs are available.

- The **White Light** tab displays the image taken with white light.
- The other tab is labeled with the fluorescent filter pair and displays the image taken with fluorescent light.

Switch between the two images to define the pickable colonies. This option is available only for instruments with a fluorescence imaging module.

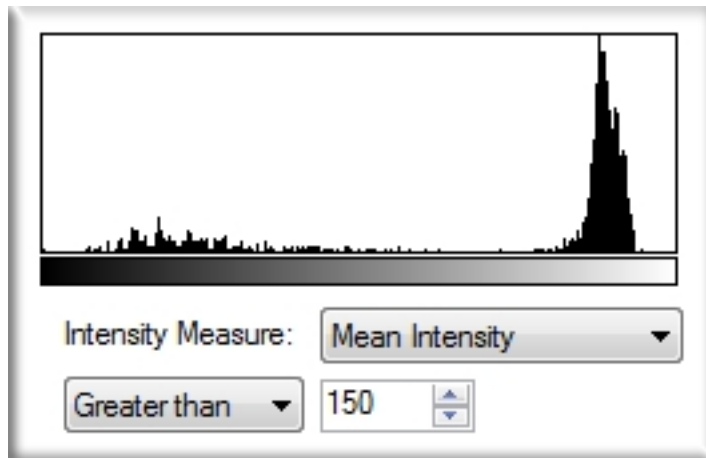
To select the colonies for picking:

1. From the list in the upper-right area, select the barcode or identifier of the receptacle to view.
2. Refine the colony Selection criteria.
 - **Compactness:** Sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. A colony equal to or less than 0.65 is not picked by default.
 - **Axis Ratio:** Measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies is closer to 0 and round colonies is closer to 1. A colony equal to or less than 0.65 is not picked by default.
 - **Min Diameter:** Sets the minimum diameter of colonies for picking. A colony equal to or less than the value in this field is not picked.



Note: The Min Diameter cannot be lower than the Diameter value set in the Debris Discard section of the test image.

- **Max Diameter:** Sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
 - **Min Proximity:** Sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.
3. For a fluorescent image, adjust the **Intensity Measure** as shown in the histogram. This option is available only for instruments with a fluorescence imaging module.



- **Mean Intensity:** The average fluorescence of the detected colony (the fluorescence of all the pixels within the colony perimeter divided by the number of pixels within the colony perimeter).
- **Median Intensity:** The middle fluorescence value of all the pixels within the detected colony perimeter.
- **Geometric Intensity:** The geometric intensity of the detected colony or the fluorescence of all the pixels within the colony perimeter.
- **Centre Mean Intensity:** The average fluorescence value of the middle 9 pixels within the detected colony perimeter.

Select **Greater Than**, **Less Than**, or **Between** and enter a value in the field to define the fluorescence intensity threshold. For **Between**, enter two values to define the range.

4. Change the pickable property of individual objects.
 - To define an object as pickable, right-click the object and select **Pick Item** to display the object in green.
 - To define an object as unpickable, right-click the object and select **Discard Item** to display the object in blue.
5. In the **Limit Colonies** field, enter the maximum number of colonies to pick from each receptacle.



Note: If a limit was previously set for the maximum number of colonies on the Source page, the Limit Colonies option is not available on the Feature Selection page. See [on page 45](#).

The **Total Feature Count** field displays the total number of pickable objects in the receptacle.

6. Select the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle displays, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria. To save the data in .csv format, right-click and then click **Export**.
7. Select the **Display Options** tab to change the display options of the source receptacle image.
8. Select the **Display Detected Features** checkbox to display all detected features with a yellow circle.
9. Select the **Shade Features** checkbox to give the detected colonies some shading for clearer visualization.
10. Select the **Display Proximity Indicators** checkbox to display connecting red lines between a detected colony and its closest neighbor.
11. Select the **Shade Exclusion Zone** checkbox to display a red-shaded exclusion zone where the system cannot pick.
12. Click **Next**.
13. In the Continue or Save New Routine dialog or the Save Changes to Routine dialog, select whether to save the routine before you continue with the picking process.

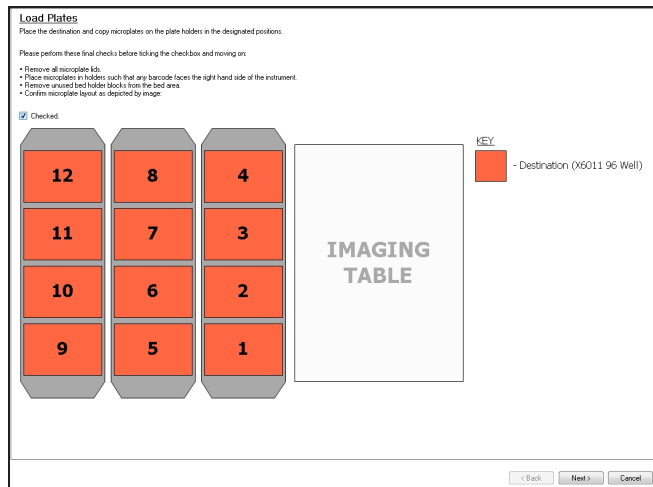
If you create a new routine, the Continue or Save New Routine dialog displays.

- To save the settings for the routine before you continue, click **Save Routine**, enter the routine **Name** and **Description**, and then click **Save**.
- To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

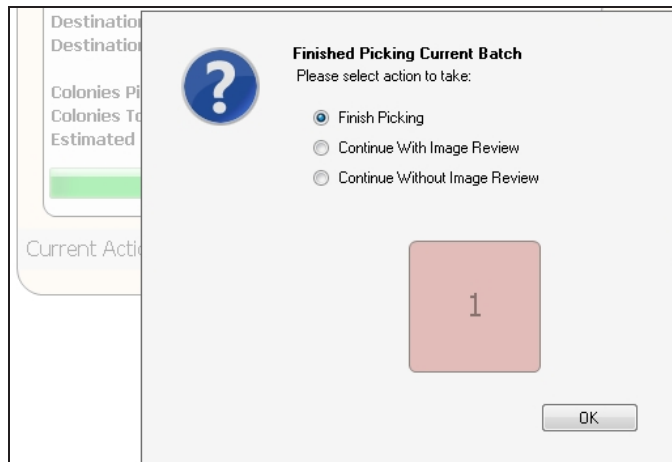
If you edit a routine, the Save Changes to Routine dialog displays.

- To save the settings for the routine before you continue, click **Save**.
- To save the settings as a new routine without changing the existing routine, click **Save As**, enter the routine **Name** and **Description**, and then click **Save**.
- To continue without saving the settings for the routine, click **No**.

- On the Load Plates page, follow the instructions to verify that the plates are set up correctly.



- Select the **Checked?** checkbox to confirm that the plates are set up correctly.
- Make sure that the instrument door is closed.
- Click **Next** to start the picking process.
- When the Finished Picking Current Batch dialog displays, select an option for how to continue, then click **OK**.



Viewing the Picking Progress

While the picking routine runs, the Picking Progress page displays a summary of the routine.

- **Start Time:** The time that the picking of the colonies began.
- **Source Barcode:** The barcode or identifier of the source receptacle being picked from.
- **Pin:** The picking pin being used for the current picking operation.
- **Copy Plate No:** The barcode of the copy receptacle that is being inoculated, if you select Make Copy for the routine.
- **Destination Barcode:** The barcode of the destination receptacle that is currently being inoculated.
- **Destination Offset:** The reference well for where the pins are lowered. This value changes for 384-well plates.
- **Colonies Picked:** The number of colonies picked so far.
- **Colonies To Pick** The total number of colonies to be picked.
- **Estimated Time Remaining** The remaining time in the routine.
- **Current Action** Displays what the system is currently doing, such as Pick when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

Continuing or Ending the Picking Routine

After all colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

If there are no more source receptacles to pick, click **Finish Picking** and then click **OK**.

To continue picking more source receptacles:

1. Select either:
 - Click **Continue With Image Review** to review images and select colonies for the new source receptacles.
 - click **Continue Without Image Review** to use the current image settings for the next batch of source receptacles.
2. Click the **Select Number of Positions to Use** drop-down and select the number of receptacle holders to load on the instrument deck.
3. Click **OK**.
4. When the Please Load Source page displays, replace the picked receptacles with the new receptacles on the instrument deck.
5. Close the instrument door.
6. Click **Next**.
 - If you select **Continue With Image Review**, the system takes a white light test image of the source receptacles and the Test Image page displays. See [Adjusting the Blue-White Regional White Light Test Image on page 72](#).
 - If you select **Continue Without Image Review**, the system captures and processes a higher-resolution image and the Feature Selection page displays. See [Selecting Blue-White Colonies for Picking on page 75](#).

Viewing the Picking Summary

After picking routines complete, the Picking Summary page displays the number of source colonies picked, the number of destination plates used, and missing source receptacles.

Click **Export** to save this information in .csv format.

Click **Details** to view details of all activities related to the source and destination receptacles.

- Click **Export** to save the detailed information in .csv format.
- Click **Close** to display to the Picking Summary page.

Click **Next** and then click **Finish** to display the Blue-White Picking page.

Chapter 8: Zone of Inhibition Detection Picking Processes

8

The QPix 420 Microbial Colony Picking System can pick colonies from receptacles using either standard picking or regional picking. You can set up control wells for the destination plates before you run a picking process.

From the Navigation page under Picking Processes, select **Zone of Inhibition Detection Picking** to pick colonies with detectable zones of inhibition from receptacles using the standard process.



Note: Before you run a picking process, you should do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

If this is your first picking process, you must edit or create a Sanitise profile to use with the picking process. See [Creating and Editing Sanitise Profiles on page 35](#).

You can pick colonies with the standard picking processes based on the detected zones of inhibition that contain certain properties, for the purposes of:

- Clearance Zone of Inhibition Detection, which you can use for antibiotic resistance screening, bacteria-killing drugs grown on a lawn of drugs.

The Zone of Inhibition Detection Picking processes is a white light only picking process that requires the *Zone of Inhibition Detection Software License*.

Creating and Editing Zone of Inhibition Detection Picking Processes


The procedures to create and edit picking processes are similar. The regional picking process has more options available to define the regions to pick. Zone of Inhibition Detection picking is similar to the standard picking process.



Note: Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

Opening the Zone of Inhibition Detection Picking Page

To open the Zone of Inhibition Detection Picking page:

1. On the Navigation page under Picking Processes, double-click  **Zone of Inhibition Detection Picking**.
2. Click **Start** to home the drives and display the Routines dialog.

Selecting Zone of Inhibition Detection Picking Routines

Use the Routines dialog to select a Zone of Inhibition Detection picking routine.

To select a Zone of Inhibition Detection picking routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit.
Select the **Skip Steps** checkbox to run the routine without making changes.
3. Click **Import** to import a routine.
4. Click **Export** to export the routine you select. See [Exporting Routines on page 85](#).
5. Click **Delete** to delete the routine you select.
6. Click **Next**.
 - If you select New Routine or Run Existing Routine and leave the Skip Steps checkbox clear, see [Selecting Barcode Options on page 85](#).
 - If you select Run Existing Routine and you select the Skip Steps checkbox, see [Viewing the Settings Summary on page 89](#).

Importing and Exporting Zone of Inhibition Detection Picking Routines

The Select Routine list displays the routines that match the type of routine you are creating. For example, a white light and fluorescent imaging routine is not included in the Select Routine list if you are creating a White Light only routine.

Importing Routines

To import a routine:

1. Export the routine from the other computer in .xml format.
2. Save the export file on the system computer.
3. On the system computer, click **Import**.
4. Locate and select the file.
5. Click **Import** to add the routine to the database.

If the routine is of the same type as the one you are creating, then the imported routine displays in the Select Routine list.

Exporting Routines

To export a routine:

1. Click **Export**.
2. Navigate to the location that you want to save the .xml file.
3. You can change the name of the file.
4. Click **Export** to save the routine in .xml format.

Selecting Barcode Options

When you create or edit a White Light only routine, the Barcodes page displays.

Using a Barcode Reader



Note: You should always use barcodes for accurate data tracking.

To use a barcode reader:

1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes.
2. Select a Read Failure Option to define the system response when a barcode cannot be read.
 - Select **Manual Prompt** to have the software display a dialog where you enter a barcode or name for the receptacle.
 - Select **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.



Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

- Select **Auto Generate** to allow the system to assign a barcode and continue the routine.
3. Use the Validation Barcode list to define the barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, a message displays.
 - To manually enter the barcodes, enter each barcode in the field below the list and then click **Insert**.
 - To import barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
 - To use a from the database, click **From Database**.
 - To remove a barcode from the list, select the barcode and click **Remove**.
 4. Click **Next** to define the destination receptacles. See [Setting Destination Plate Options on page 87](#).

Defining Unique Identifiers Without Barcodes

To define unique identifiers without barcodes:

- Clear the **Use Barcode Reader** checkbox to define unique identifiers for source receptacles without scanning for barcodes.

Random Identifiers

To have the software generate random identifiers:

1. Clear the **Use Barcode Reader** checkbox.
2. Select the **Generate Random Barcodes** checkbox to have the software generate random barcodes with the prefix Auto for the source receptacles. No other parameters are required for this option.

Manually Create Identifiers

To manually create an identifier list:

3. Clear the **Use Barcode Reader** checkbox.
4. Clear the **Generate Random Barcodes** checkbox.
5. Either:
 - In the text field below the list, enter an identifier and click **Insert**.
 - Click **Import** and then select the file from which to import the identifiers to import identifiers for the source receptacles from a text or .csv file.
 - Click **Generate List**. See below for additional steps.
6. Select an identifier in the list and click **Remove** to remove an identifier.

Generating an Identifier List

*** Tip:** The Preview area shows examples of the first and last generated identifiers.

To generate a barcode identifier list:

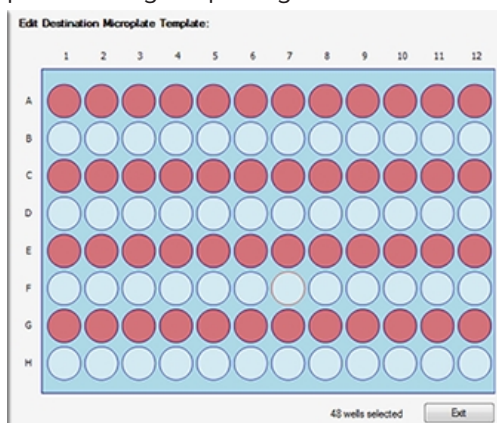
1. In the **Prefix** field, enter text to describe the identifier.
2. In the **Start Number** field, enter the first number to generate.
3. In the **Digit Padding** field, enter the number of digits in the generated number.
4. In the **Number to Generate** field, enter the number of identifiers to generate.
5. Click **Generate** to view the generated identifiers in the Barcodes list.
6. Click **Next** to define the destination receptacles.

Setting Destination Plate Options

Use the Destination Options page to set destination plate options.

To set destination plate options:

1. Click the **Select Destination Microplate** drop-down and select the plate type to inoculate with the picked colonies.
2. Select an option:
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Destination** to stir the wells of the destination plate during inoculation.
3. Select the **Make Copy** checkbox, then click the **Select Copy Microplate** drop-down and select the plate type to use for a duplicate copy of the destination plate.
4. Select the Deposit Order:
 - Select **By Columns** to deposit the picked colonies by column.
 - Select **By Rows** to deposit the picked colonies by row.
5. Select the Deposit Strategy:
 - Click **Fill All Microplates** to fill every selected well of a destination plate before starting a new destination plate.
 - Click **New Microplate for Each Position** to start a new destination plate whenever the instrument starts picking from a different source QTray or Petri dish.
 - Click **New Microplate for Each Batch** to start a new destination plate whenever the instrument deck is loaded with new QTrays, OmniTrays, or other source plates.
 - Click **New Microplate Per Number of Positions** to start a new destination plate after the specified number of source plates is reached.
6. Under Destination Microplate Template, click **Edit** to define the wells to dip or skip. You can skip wells you use as blank or control wells. This template is used for all the destination plates during the picking routine.



- To skip a well, click the well. Wells to be skipped show in light blue.
- To skip multiple contiguous wells, right-click and drag across the wells.
- To dip a well that you skip, click the well again. Wells to be dipped show in light red.

After you define the wells to dip or skip, click **Exit**.

7. Click **Next** to define the picking head and the Sanitise profile.

Selecting the Head and Sanitizing Options

Use the Head and Sanitise page to select the head and sanitize options.

To select the head and sanitize options:

1. Click the **Picking Head** drop-down and select the head to use for the picking routine.
2. In the **Pin Columns (Rows) Before Inoculation** list, select the number of pins to use in each column or row before transferring the picked colonies to the destination plate.

For the fastest transfer rate, select **All** to use all picking pins to pick colonies before inoculating the destination plate.

For smaller picking groups, the selections depend on the Deposit Order selection made on the Destination Options page.

- If you select By Columns, you can pick colonies using from **1** to **11** columns.
- If you select By Rows, you can pick colonies using from **1** to **7** rows.

To run the wash routine from the Sanitise profile after each partial pick and inoculation, select the **Wash Between Partial Inoculation** checkbox. Clear the **Wash Between Partial Inoculation** checkbox to wait until all pins have been used for picking and inoculation before running the wash routine.

3. In the **Destination** field, enter the distance above the bottom of the destination plate wells to dip the pins for the inoculation.

If you select **Make Copy** for the destination plate, enter a value for the copy.

4. Click the **Sanitise Profile** drop-down and select the Sanitise profile to use for the picking routine.

If the profiles are not suitable for the picking routine, exit the picking process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).

5. Click **Next** to define the source receptacle options.

Setting Source Receptacle Options

Use the Source page to set the source receptacle options.

To set the source receptacle options:

1. Click the **Holder** drop-down and select the type of holder to hold the source receptacles on the instrument deck.
2. Click the **Receptacle** drop-down and select the type of receptacle for the source.
The preview image displays a representation of the holder and receptacle.
3. In the **Positions** field, enter the number of receptacles to use for picking.
4. In the **Offset** field, enter the position of the first receptacle to use for picking.
The preview image displays the defined locations of the receptacles.



Note: If you use Validation barcodes, only one source receptacle shows, and the Positions and Offset fields are not available.

5. In the **Picking Depth Into Agar** field, enter the depth to insert the pins in the agar for picking.
6. Select the **Limit Max. Number of Features Per Position** checkbox. In the **Max. Number of Features Per Position** field, enter the maximum number of colonies to pick from a single QTray or Petri dish.



Note: Setting a limit for the maximum number of colonies on the Source page prevents selecting a maximum number on the Feature Selection page when you run the picking routine. See [Selecting Zone of Inhibition Detection Colonies for Picking on page 93](#).

7. Click **Next** to view a summary of the settings.

Viewing the Settings Summary

The Settings Summary page displays a summary of the picking routine settings.

Review the summary details to make sure that the settings and options are configured correctly for the picking routine. To make changes, click **Back** until you return to the page where the changes can be made.

To print the summary, click **Print**.

To run the picking routine, click **Next**.

Changing the Picking Head

The Change Head page reminds you which picking head must be loaded, based on the Setting Summary routine you configure, and provides you an opportunity to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to run the picking routine.

Running Zone of Inhibition Detection Picking Processes

After you configure a picking routine, you can run the process on the instrument.



Note: Before you run a picking process, it is important that you do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

To run a Zone of Inhibition Detection picking routine:

1. Open the Zone of Inhibition Detection Picking page.
2. Select the picking routine to run.
If you do not need to make changes to the routine, select the **Skip Steps** checkbox before you click **Next**.
3. Review the settings for the routine. See [Viewing the Settings Summary on page 89](#).
4. On the Settings Summary page, click **Next** to arrange the source plates in the instrument.

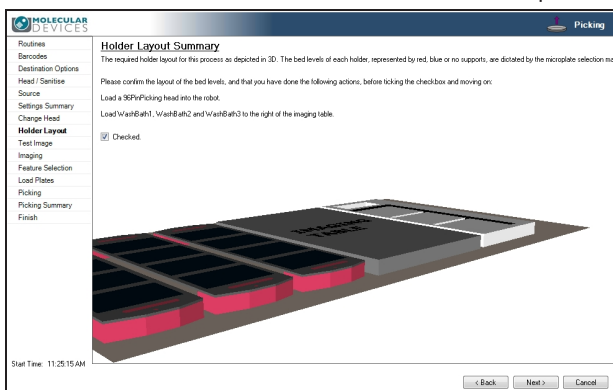


Note: Zone of Inhibition Detection Picking is a white light only process.

Arranging the Plate Layout

To arrange the plate layout:

1. Open the instrument door.
2. On the Holder Layout Summary page, follow the instructions to correctly arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.



4. After you finish making the changes, click **Next**.



CAUTION! At this point, you cannot go back and change settings. To make changes now, you must cancel the process and start again.

5. Remove all plate lids.
6. On the Load Plates page, follow the instructions to correctly place the destination plates.
7. Click **Next**.
8. When the Please Load Source page displays, load the source receptacles in the correct locations on the instrument deck.



Tip: If needed, you must install the filter between the lightbed and the source tray before you continue.

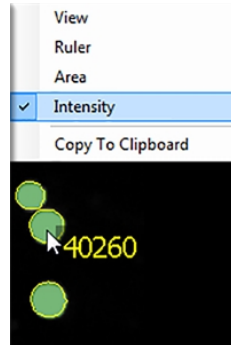
9. Close the instrument door.
10. Click **Next** to take a white light test image of the source receptacles.

Adjusting the Zone of Inhibition Detection White Light Test Image

On the Test Image page, use the Exposure and Gain settings to adjust the exposure level to best view the foreground image from the background.

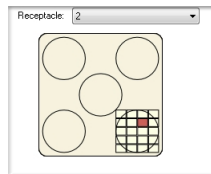
To set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image to display the pixel intensity value.

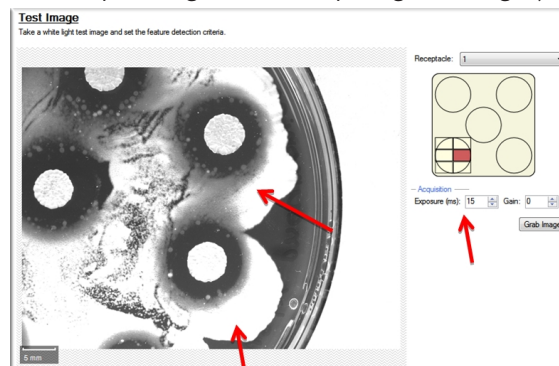


To adjust the test image:

1. Click the **Receptacle** drop-down and select the number of the receptacle to view and then select the frame to view in the receptacle image below the list. The frame is in red.



2. In the Acquisition area, in the **Exposure** field, enter the number of milliseconds to expose the sample to light when acquiring the image (from 10 to 1000).



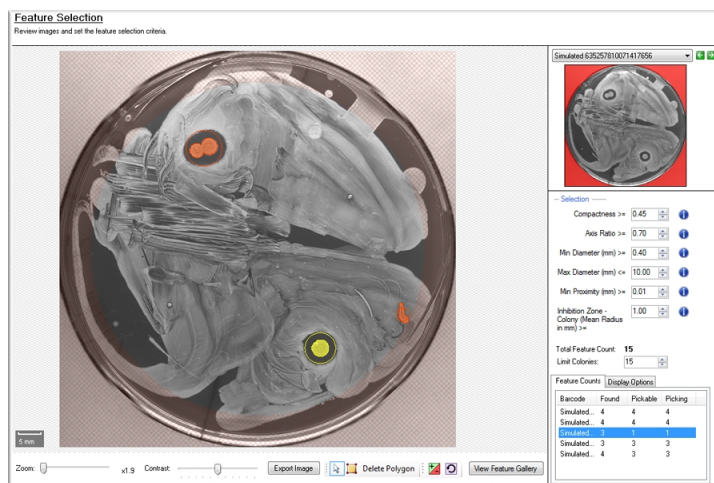
*** Tip:** Increase the Exposure until the secondary layer is highly exposed and appears very white.

3. Adjust the **Gain** to increase the image signal without changing the light exposure.
4. Click **Grab Image** to apply the settings to the test image.
5. Click **Next**.

Zone of Inhibition Detection picking runs a routine for white light only, the system captures and processes a higher-resolution image and then displays the Feature Selection page.

Selecting Zone of Inhibition Detection Colonies for Picking

After you adjust and refine test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the Feature Selection page.



On the Feature Selection page, pickable objects show in yellow and unpickable object show in red. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

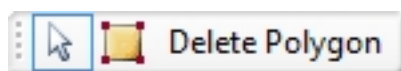
To view the details of a colony, hold the cursor over the colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion shows in red text.

Excluded By Criteria	Included By Criteria
Compactness: 0.37	Compactness: 0.63
Axis Ratio: 0.43	Axis Ratio: 0.90
Minimum Diameter: 5.28	Minimum Diameter: 6.41
Maximum Diameter: 12.20	Maximum Diameter: 7.16
Proximity: 3.27	Proximity: 3.27
Inhibition Radius - Feature Radius: 3.96	Inhibition Radius - Feature Radius: 1.42

Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.

Click **Export Image** to save the image in .bmp, .jpg, or .png format.

To select a smaller region of interest (ROI) in the image, draw a polygon around the region.




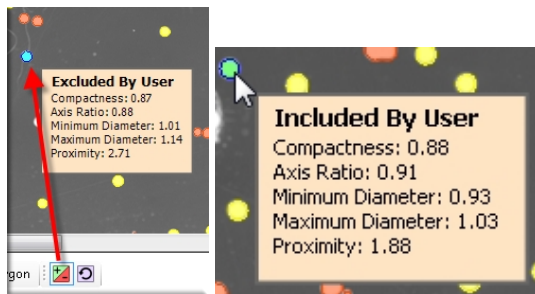
- To draw a polygon, click the **Draw Polygon** icon and then click the image to define the corners of the polygon.
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.


Click **View Feature Gallery** to display all found colonies in a gallery. The first time the gallery opens, a message displays while the gallery thumbnails generate. This displays on the first opening for each run. The gallery displays an image for each detected colony along with specific colony selection details.

- Select the **Outline Inhibition** checkbox to outline the colony inhibition area.
- Select the **Outline Colony** checkbox to outline the colony.
- In the **Order By** field, select a different selection criteria to view the images in a different order, . Changes made in the Selection criteria section display in real-time through the gallery images to show the colonies that meet or fail to meet the criteria.
- Click **Return to Image** to exit the gallery.

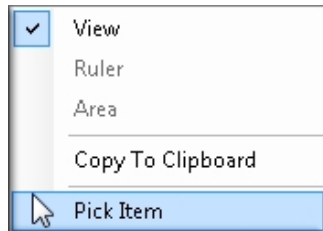
Switch between the two views to define the pickable colonies.


To change the selection of the pickable objects that display in the image map, click  to override the system-chosen and unchosen objects, and then click the objects in the image map to change.



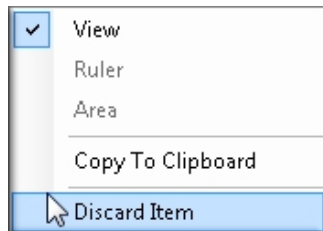
- When you click  as an override, the yellow-marked pickable objects change to blue and become unpickable.


To undo the selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.

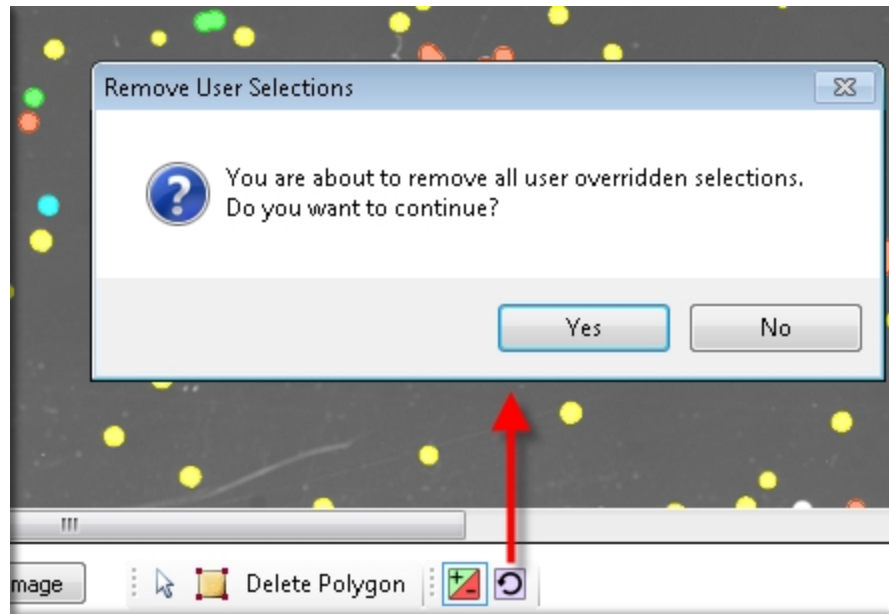


- When you click  as an override, the red-marked unpickable objects change to green and become pickable.

To undo the selection, right-click over the image map and select **Discard Item**. The object changes to blue and becomes unpickable.



To undo all your user selections, click  to display the Remove User Selections dialog. Click **Yes**.



To select the colonies for picking:

1. From the list in the upper-right area, select the barcode or identifier of the receptacle to view.
2. Refine the colony **Selection** criteria.
 - **Compactness:** Sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
 - **Axis Ratio:** Measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies are closer to 0 and round are closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
 - **Min Diameter:** Sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.



Note: The Min Diameter cannot be lower than the Diameter value set in the Debris Discard section of the test image.

- **Max Diameter:** Sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
- **Min Proximity:** Sets the distance between colonies to pick, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.
- **Inhibition Zone - Colony:** Sets the criteria for picking colonies based on the size of the inhibition zone.

3. Change the pickable property of individual objects.
 - To define an object as pickable, right-click the object and select **Pick Item** to display the object in green.
 - To define an object as unpickable, right-click the object and select **Discard Item** to display the object in blue.
4. In the **Limit Colonies** field, enter the maximum number of colonies to pick from each receptacle.



Note: If you previously set a maximum number of colonies on the Source page, the Limit Colonies option is not available on the Feature Selection page. See [on page 45](#).

The **Total Feature Count** field displays the total number of pickable objects in the receptacle.

5. Select the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle display, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria.
6. Select the **Display Options** tab to change the display options of the source receptacle image.
 - Select the **Display Detected Features** checkbox to display all detected features with a yellow circle.
 - Select the **Shade Features** checkbox to give the detected colonies some shading for clearer visualization.
 - Select the **Display Proximity Indicators** checkbox to display connecting red lines between a detected colony and its closest neighbor.
 - Select the **Shade Exclusion Zone** checkbox to display a red-shaded exclusion zone where the system cannot pick.
7. Click **Next**.
8. In the Continue or Save New Routine dialog or the Save Changes to Routine dialog, select whether to save the routine before continuing with the picking process.

If you create a new routine, the Continue or Save New Routine dialog displays.

 - To save the settings for the routine before continuing, click **Save Routine**, enter a **Name** and a short **Description** for the routine, and then click **Save**.
 - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

If you edit a routine, the **Save Changes to Routine** dialog displays.

 - To save the settings for the routine before continuing, click **Save**.
 - To save the settings as a new routine without changing the existing routine, click **Save As**, enter a **Name** and a short **Description** for the routine, and then click **Save**.
 - To continue without saving the settings for the routine, click **No**.
9. If the Load Plates page displays, make sure that the destination plates are loaded in the correct locations and follow the on-screen directions before you select the **Checked?** checkbox.
10. Make sure that the instrument door is closed.
11. Click **Next** to start the picking process.

Viewing the Picking Progress

While the picking routine runs, the Picking Progress page displays a summary of the routine.

- **Start Time:** The time that the picking of the colonies began.
- **Source Barcode:** The barcode or identifier of the source receptacle being picked from.
- **Pin:** The picking pin being used for the current picking operation.
- **Copy Plate No:** The barcode of the copy receptacle that is being inoculated, if you select Make Copy for the routine.
- **Destination Barcode:** The barcode of the destination receptacle that is being inoculated.
- **Destination Offset:** The reference well for where the pins are lowered. This value changes for 384-well plates.
- **Colonies Picked:** The number of colonies picked so far.
- **Colonies To Pick:** The total number of colonies to be picked.
- **Estimated Time Remaining:** The remaining time in the routine.
- **Current Action:** What the system is currently doing, such as *Pick* when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

Viewing the Zone of Inhibition Detection Picking Summary

After all picking routines complete, the Zone of Inhibition Detection Picking Summary page displays the number of source colonies picked, the number of destination plates used, and missing source receptacles.

Click **Export** to save this information in .csv format.

Click **Details** to view details of the activities related to the source and destination receptacles.

- Click **Export** to save the detailed information in .csv format.
- Click **Close** to display the Zone of Inhibition Detection Picking Summary page.

On the Zone of Inhibition Detection Picking Summary page, click **Next** and then click **Finish** to display the Zone of Inhibition Detection Picking page.

Click **Close Process** to return to the Navigation page.



The QPix 420 Microbial Colony Picking System can pick colonies from receptacles using either standard picking or regional picking. You can set up control wells for the destination plates before you run a picking process.

From the Navigation page under Picking Processes, select **Regional Picking** to pick colonies from receptacles using the regional process.



Note: Before you run a regional picking process, you should do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

If this is the first regional picking process, you must edit or create a Sanitise profile to use with the regional picking process. See [Creating and Editing Sanitise Profiles on page 35](#).

Depending on the features of your system, you can use either white light or fluorescence imaging for the regional picking processes. If you have a white light only system and would like to add fluorescence capability, contact your Molecular Devices representative or technical support. See [Obtaining Support on page 203](#).



Note: If you have a fluorescence imaging module on the system and run a regional picking process that uses white light only, the process takes longer than a white light regional picking process on a white light only system, since the fluorescence imaging module captures more images during the process.

Creating and Editing Regional Picking Processes

The procedures to create and edit standard or regional picking processes are similar. The regional picking process has more options available for defining the regions for picking.

If this is the first regional picking process, you must edit or create a Sanitise profile to use with the regional picking process. See [Creating and Editing Sanitise Profiles on page 35](#).

Opening the Regional Picking Page

To open the Regional Picking page:

1. From the Navigation page under Picking Processes, double-click the **Regional Picking** icon.
2. On the Regional Picking page, click **Picking Type** to view the picking type options.
 - Select **White Light** to use only white light to illuminate and identify the colonies to pick.
 - Select **White Light And Fluorescent** to use white light to illuminate and identify colonies, and fluorescent light to determine the colonies to pick. This option is available only for instruments with a fluorescence imaging module.
3. Click **Apply**.
4. Click **Start** to home the drives and display the Routines page.

Selecting Regional Picking Routines

Use the Routines dialog to select a Regional Picking routine.

To select a Regional Picking routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit.
Select the **Skip Steps** checkbox to run the routine without making changes.
3. Click **Import** to import a routine.
4. Click **Export** to export the routine you select. See [Exporting Routines on page 101](#).
5. Click **Delete** to delete the routine you select.
6. Click **Next**.
 - If you select New Routine or Run Existing Routine and leave the Skip Steps checkbox clear, see [Selecting Barcode Options and Filter Pairs for Fluorescent Imaging on page 101](#).
 - If you select Run Existing Routine and you select the Skip Steps checkbox, see [Viewing the Settings Summary on page 105](#).

Importing and Exporting Regional Picking Routines

The Select Routine list displays the routines that match the type of routine you are creating. For example, a white light and fluorescent imaging routine is not included in the Select Routine list if you are creating a White Light only routine.

Importing Routines

To import a routine:

1. Export the routine from the other computer in .xml format.
2. Save the export file on the system computer.
3. On the system computer, click **Import**.
4. Locate and select the file.
5. Click **Import** to add the routine to the database.

If the routine is of the same type as the one you are creating, then the imported routine displays in the Select Routine list.

Exporting Routines

To export a routine:

1. Click **Export**.
2. Navigate to the location that you want to save the .xml file.
3. You can change the name of the file.
4. Click **Export** to save the routine in .xml format.

Selecting Barcode Options and Filter Pairs for Fluorescent Imaging

When you create or edit a routine for white light only, the Barcodes page displays.

When you create or edit a routine for white light and fluorescent imaging, the Filter Pair and Barcodes page displays.


Selecting a Filter Pair

To select a filter pair when the instrument has the fluorescence imaging module.

- Click the **Filter Pair** drop-down and select a fluorescent excitation and emission pair.

Using a Barcode Reader

To use a barcode reader:

1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes.
 2. Select a Read Failure Option to define the system response when a barcode cannot be read.
 - Select **Manual Prompt** to have the software display a dialog where you enter a barcode or name for the receptacle.
 - Select **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.
-
- 

Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.
-
- Select **Auto Generate** to allow the system to assign a barcode and continue the routine.
 3. Use the Validation Barcode list to define the barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, a message displays.
 - To manually enter the barcodes, enter each barcode in the field below the list and then click **Insert**.
 - To import barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
 - To use a from the database, click **From Database**.
 - To remove a barcode from the list, select the barcode and click **Remove**.
 4. Click **Next** to define the destination receptacles.

Defining Unique Identifiers Without Barcodes

To define unique identifiers without barcodes:

- Clear the **Use Barcode Reader** checkbox to define unique identifiers for source receptacles without scanning for barcodes.

Random Identifiers

To have the software generate random identifiers:

1. Clear the **Use Barcode Reader** checkbox.
2. Select the **Generate Random Barcodes** checkbox to have the software generate random barcodes with the prefix Auto for the source receptacles. No other parameters are required for this option.

Manually Create Identifiers

To manually create an identifier list:

3. Clear the **Use Barcode Reader** checkbox.
4. Clear the **Generate Random Barcodes** checkbox.
5. Either:
 - In the text field below the list, enter an identifier and click **Insert**.
 - Click **Import** and then select the file from which to import the identifiers to import identifiers for the source receptacles from a text or .csv file.
 - Click **Generate List**. See below for additional steps.
6. Select an identifier in the list and click **Remove** to remove an identifier.

Generating an Identifier List

*** Tip:** The Preview area shows examples of the first and last generated identifiers.

To generate a barcode identifier list:

1. In the **Prefix** field, enter text to describe the identifier.
2. In the **Start Number** field, enter the first number to generate.
3. In the **Digit Padding** field, enter the number of digits in the generated number.
4. In the **Number to Generate** field, enter the number of identifiers to generate.
5. Click **Generate** to view the generated identifiers in the Barcodes list.
6. Click **Next** to define the destination receptacles.

Setting Destination Plate Options

Use the Destination Plates page to set the destination plate options.

To set the destination plate options:

1. Click the **Select Destination Microplate** drop-down and select the plate type to inoculate with the picked colonies.
2. Select an option:
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Destination** to stir the wells of the destination plate during inoculation.
3. Select the **Make Copy** checkbox, then click the **Select Copy Microplate** drop-down and select the plate type to use for a duplicate copy of the destination plate.
4. Click **Next** to define the regional picking source.

Selecting the Regional Picking Source

Use the Source page to select the regional picking source.



Note: The types of source receptacles to use for regional picking are limited. Depending on the configuration of the system, there may be only one option in the Holder list, in which case the Receptacle option is preset and cannot be changed. If the type of source receptacle that you need is not listed, contact Molecular Devices to add a new source receptacle type. See [Obtaining Support on page 203](#).

To select the regional picking source:

1. Click the **Holder** drop-down and select the type of holder for the source receptacles on the instrument deck.
2. Click the **Receptacle** drop-down and select the type of receptacle to use for the source. The preview image displays a representation of the holder and receptacle.
3. In the **Positions** field, enter the number of receptacles to use for picking.
4. In the **Offset** field, enter the position of the first receptacle to use for picking. The preview image displays the defined locations of the receptacles.



Note: If you use Validation barcodes, only one source receptacle displays, and the Positions and Offset fields are not available.

5. In the **Picking Depth Into Agar** field, enter the depth to insert the pins in the agar for picking.
6. Click **Next** to the source and destination options.

Setting Regional Picking Source and Destination Options

Use the Destination/Source Options page to set the regional picking source and destination options.

To set the regional picking source and destination options:

1. Select the **Limit Max. Number of Features Per Region** checkbox and then in the **Number of Features Per Region** field, enter the maximum number of colonies to pick from a single source receptacle.



Note: Setting a limit for the maximum number of colonies on the Destination/Source Options page prevents selecting a maximum number on the Feature Selection page. See [Selecting Colonies for Regional Picking on page 111](#).

- Select the **Reserve Wells for Regions** checkbox to leave wells empty if the number of colonies per region is not reached. For example, if you select to pick 8 colonies per region, but only 6 colonies were eligible to pick, wells 7 and 8 would be left blank.
 - Select the **Skip Region If Number of Features Not Found** checkbox to ignore the region if the target number of features in Number of Features Per Region is not met.
 - Select the **Keep Picked Regions Together** checkbox to have colonies that are picked from the same region delivered to the same destination plate.
 - If you select the Reserve Wells for Region checkbox, select the **Skip Region If Picking Count is Zero** checkbox to skip regions that have a picking count of zero.
2. Select the Deposit Order:
 - Select **By Columns** to deposit the picked colonies by column.
 - Select **By Rows** to deposit the picked colonies by row.
 3. Select the Deposit Strategy.
 - Select **Fill All Microplates** to fill every selected well of a destination plate before starting a new destination plate.
 - Select **New Microplate for Each Position** to start a new destination plate whenever the instrument starts picking from a different source QTray or Petri dish.
 4. Select the Pick Order:
 - Select **Standard** to pick from regions in straight columns from the source receptacle, such as A1 to A8, B1 to B8, and so on.
 - Select **Plating Order** to pick from square blocks of eight regions, such as A1 to B4, A5 to B8, and so on.
 5. Under Destination Microplate Template, click **Edit** to define the wells to dip or skip. You can skip wells that you use as blank or control wells. The defined template is used for all the destination plates during the picking routine.
 - To skip a well, click the well. Wells to skip display in light blue.
 - To skip multiple contiguous wells, right-click and drag across the wells.
 - To dip a well that you skip, click the well again. Wells to dip display in light red.

After you define the wells to dip or skip, click **Exit**.
 6. Click **Next** to define the picking head and the Sanitise profile.

Selecting the Head and Sanitizing Options

Use the Head and Sanitise page to select the head and sanitizing options.

To select the head and sanitizing options:

1. Click the **Picking Head** drop-down and select the head for the picking routine.
2. Click the **Pin Columns (Rows) Before Inoculation** drop-down and select the number of pins to use for picking in each column or row before transferring the picked colonies to the destination plate.

For the fastest transfer rate, select **All** to use all picking pins to pick colonies before inoculating the destination plate.

For smaller picking groups, the available selections depend on the Deposit Order selection you made on the Destination/Source Options page.

- If you select **By Columns**, you can pick colonies using from **1 to 11** columns.
- If you select **By Rows**, you can pick colonies using from **1 to 7** rows.

To run the wash routine from the Sanitise profile after each partial pick and inoculation, select the **Wash Between Partial Inoculation** checkbox. Clear the **Wash Between Partial Inoculation** checkbox to wait until all pins are used for picking and inoculation before running the wash routine.

3. In the **Destination** field, enter the distance above the bottom of the destination plate wells to dip the pins for the inoculation.
If you select **Make Copy** for the destination plate, enter a value for the copy.
4. Click the **Sanitise Profile** drop-down and select a Sanitise profile for the picking routine.
If the available profiles are not suitable for the regional picking routine, exit the regional picking process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).
5. Click **Next** to view a summary of the settings.

Viewing the Settings Summary

The Settings Summary page displays a summary of the picking routine settings.

Review the summary details to make sure that the settings and options are configured correctly for the regional picking routine. To make changes, click **Back** until you return to the page where the changes can be made.

Click **Print** to print the summary.

Click **Next** to run the regional picking routine.

Changing the Picking Head

The Change Head page reminds you which picking head must be loaded, based on the Setting Summary routine you configure, and allows you to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to run the picking routine.

Running Regional Picking Processes

After you configure a regional picking routine, you can run the process on the instrument. If you have not configured the regional picking routine to run, you must create a new regional picking routine or edit a routine. See [Creating and Editing Regional Picking Processes on page 99](#).



Note: Before you run a regional picking process, it is important that you do the cleaning and set up procedures in [Preparing to Run Processes on page 29](#).

Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

To run a regional picking routine:

1. Open the Regional Picking page. See [Opening the Regional Picking Page on page 99](#).
2. Select the picking routine to run. See [Selecting Regional Picking Routines on page 100](#).
If you do not need to make changes to the routine, select the **Skip Steps** checkbox before you click **Next**.
3. Review the settings for the routine. See [Viewing the Settings Summary on page 105](#).
4. On the Settings Summary page, click **Next** to arrange the source plates in the instrument.

Arranging the Plate Layout

To arrange the plate layout:

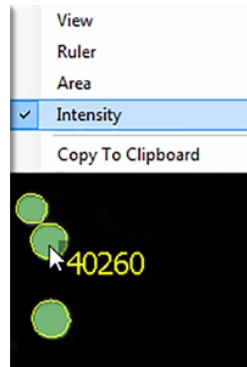
1. Open the instrument door.
2. On the Holder Layout Summary page, follow the instructions to correctly arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.
4. Click **Next**.
5. Remove all plate lids.
6. In the Load Plates window, follow the instructions to correctly place the destination plates.
7. Select the **Checked?** check box to confirm the destination plate layout.
8. Click **Next**.
9. When the Please Load Source page displays, load the source receptacles in the correct locations on the instrument deck.
10. Close the instrument door.
11. Click **Next** to take a white light test image of the source receptacles.

Adjusting the White Light Test Image

On the Test Image page, view detected features as potential colonies to pick for inoculation of the destination plates. To make sure that only colonies are detected, adjust the test image using the Exposure and Gain settings, the Detection settings, the Display settings, the Debris settings, and the Depth settings. Each detected feature displays within a yellow ring.

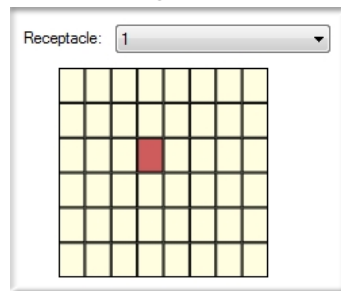
To set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map to display the pixel intensity value.



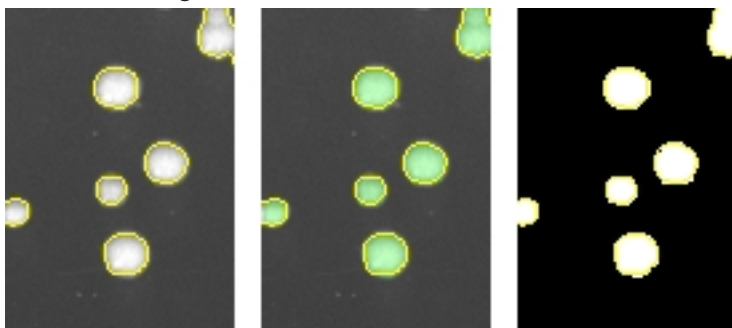
To adjust the test image:

1. Click the **Receptacle** drop-down and select the number of the receptacle to view and then select the region to view in the receptacle image below the list. The region is in red.



2. Under Acquisition, in the **Exposure** field, enter the number of milliseconds to expose the sample to light when acquiring the image (from 10 to 1000).
3. Adjust the **Gain** to increase the image signal without changing the light exposure.
4. Click **Grab Image** to apply the new settings to the test image.
5. Select the **Detection** tab.
6. Select the **Use Auto Thresholding** checkbox to have the software automatically detect the colonies in the image.
Clear the **Use Auto Thresholding** checkbox to manually detect the colonies. Drag the slider until all the desired colonies are detected and the background is not.
7. If you select the Use Auto Thresholding checkbox, enter threshold values in the **Low Limit** and **High Limit** fields.
 - To determine the Low Limit value, clear the **Use Auto Thresholding** checkbox and then drag the slider to the left until some background is clearly detected. Select the **Use Auto Thresholding** checkbox and select the **Auto Threshold Each Region** checkbox again and then enter the value from the **Threshold** field into the **Low Limit** field.
 - To determine the High Limit value, clear the **Use Auto Thresholding** checkbox and then drag the slider to the right until some colonies start to become undetected. Select the **Use Auto Thresholding** checkbox and select the **Auto Threshold Each Region** checkbox again and then enter the value from the **Threshold** field into the **High Limit** field.
8. Select the **Invert Image** checkbox to make dark areas bright and bright areas dark.

9. Select the **Subtract Background** checkbox to have the background become nearly black.
10. Select the **Display** tab.
11. Click the **Display** drop-down:
 - Select **Image Only** to display the detected colonies in white with yellow rings and a gray background.
 - Select **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background.
 - Select **Overlay only** to display the detected colonies in white with yellow rings and a black background.



Clear the **Outline Detected Features** checkbox to remove the yellow ring from the detected colonies.

12. Select the **Debris** tab.
13. Adjust the Diameter and Axis Ratio to exclude objects that are smaller than the desired colonies. Each detected feature displays within a yellow ring while excluded features do not have a yellow ring.
 - In the **Diameter** field enter the minimum diameter of the required colonies.
 - In the **Axis Ratio** field, define the minimum roundness ratio of the required colonies.
14. Select the **Depth** tab.
15. Adjust the Agar Depth, Height, and Maximum Height.
 - In the **Agar Depth** field, enter the depth that the picking head descends into the source agar.
 - The **Agar Height** field displays the height, or thickness, of the detected agar within the source tray.
 - The **Max. Agar Height** field displays the maximum agar height for a long pin head to descend into the source agar.



Note: You can do further refinement for colony detection on a higher-resolution image on the Feature Selection page.

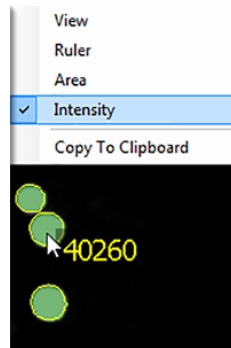
16. Click **Next**.
 - If you run a routine for white light only, the system captures and processes a higher-resolution image and then displays the Feature Selection page.
 - If you run a routine for white light and fluorescent imaging, the Fluorescent Test Image page displays.

Adjusting the Fluorescent Test Image

If you run a routine for white light and fluorescent imaging, the Fluorescent Test Image page displays after you make adjustments for the white light test image. This option is available only for instruments with a fluorescence imaging module.

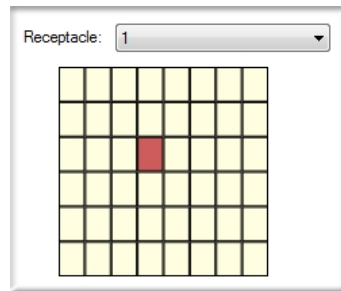
To set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image to display the pixel intensity value.



To adjust the test image:

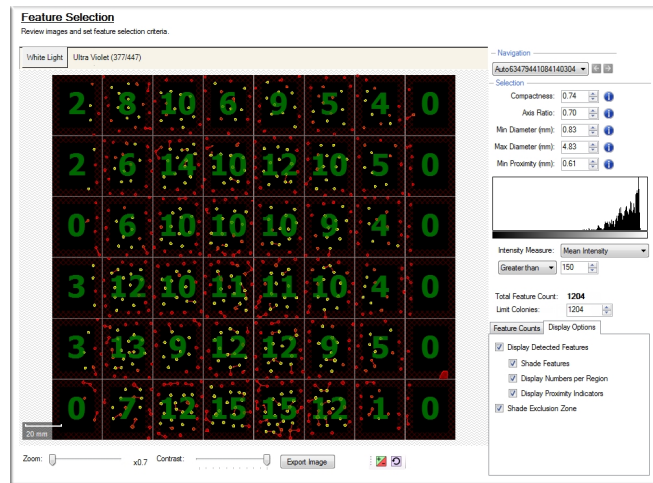
1. Click the **Receptacle** drop-down and select the number of the receptacle to view and then select the region to view in the receptacle image below the list. The region is in red.



2. In the **Exposure** field, enter the number of milliseconds to expose the sample to light when acquiring the image (from 10 to 1000).
3. Adjust the **Gain** to increase the image signal without changing the light exposure.
4. Click **Grab Image** to take a new test image with the new settings.
5. Click **Next** to capture and process a higher-resolution image and display the Feature Selection page.

Selecting Colonies for Regional Picking

After you adjust and refine test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the Feature Selection page.



On the Feature Selection page, pickable objects display in yellow and unpickable object display in red. The number of pickable colonies in each region display in green. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

To view the details of a colony, hold the cursor over that colony to display the properties of that colony. If a colony is not selected as pickable, the reason for the exclusion displays in red text.


Excluded By Criteria	Included By Criteria
Compactness: 0.73	Compactness: 0.83
Axis Ratio: 0.43	Axis Ratio: 0.86
Minimum Diameter: 0.76	Minimum Diameter: 0.82
Maximum Diameter: 1.78	Maximum Diameter: 0.96
Proximity: 0.49	Proximity: 0.74
Mean Intensity: 61274.33	Mean Intensity: 59714.24
Median Intensity: 65520.00	Median Intensity: 65520.00
Geometric Mean Intensity: 35403.95	Geometric Mean Intensity: 29550.89
Centre Mean Intensity: 65520.00	Centre Mean Intensity: 65520.00

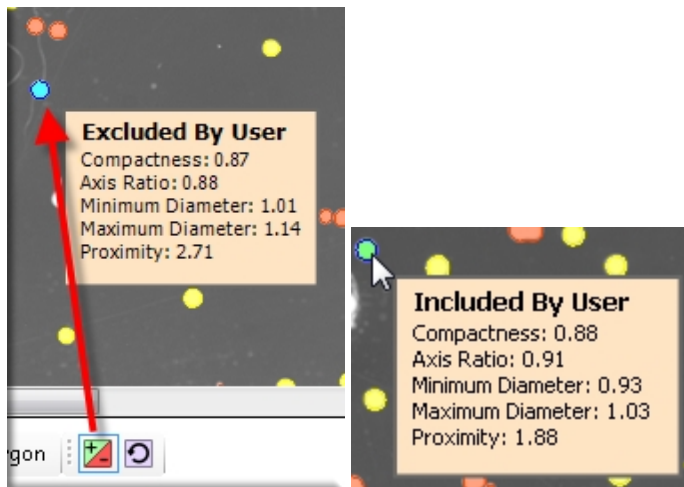


Note: During image processing, each object with no yellow ring in the test image is excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.

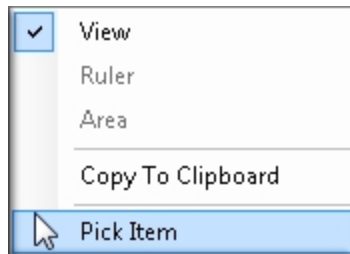
Click **Export Image** to save the image in .bmp, .jpg, or .png format.

To change the selection of the system-chosen pickable objects that display in the image map, click  to override the system-chosen and unchosen objects, and then click the objects in the image map to change.



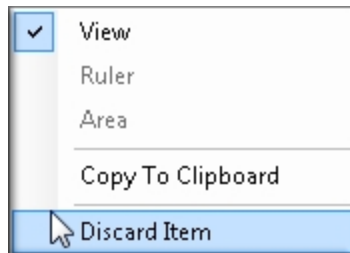
- When you click  as an override, the yellow-marked pickable objects change to blue and become unpickable.

To undo the selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.

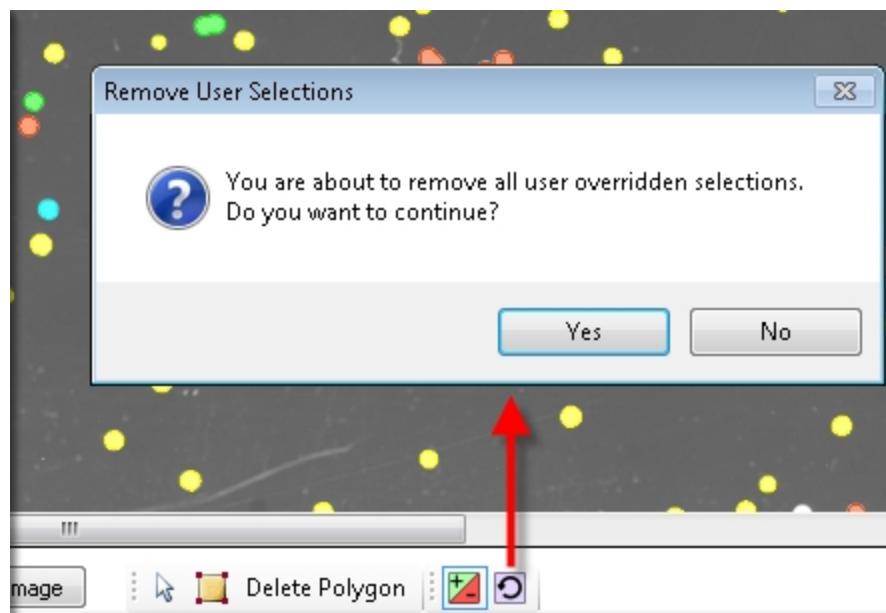


- When you click  as an override, the red-marked unpickable objects change to green and become pickable.

To undo the selection, right-click over the image map and select **Discard Item**. The object changes to blue and becomes unpickable.



To undo all selections, click  to display the Remove User Selections dialog. Click **Yes**.



If you run a routine for white light and fluorescent imaging, two tabs are available.

- The White Light tab displays the image taken with white light.
- The other tab is labeled with the fluorescent filter pair and displays the image taken with fluorescent light.

Switch between the two images to define the pickable colonies. This option is available only for instruments with a fluorescence imaging module.

To select the colonies for regional picking:

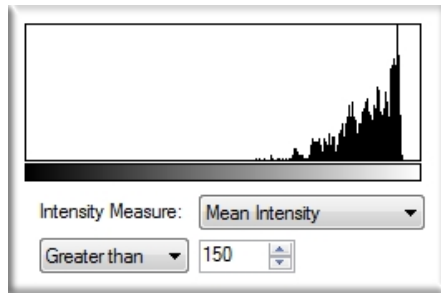
1. From the list in the upper-right, select the barcode or identifier of the receptacle to view.
2. Refine the colony Selection criteria.
 - **Compactness:** Sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
 - **Axis Ratio:** Measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies are closer to 0 and round colonies are closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
 - **Min Diameter:** Sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.



Note: The Min Diameter cannot be lower than the Diameter value set in the Debris Discard section of the test image.

- **Max Diameter:** Sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
- **Min Proximity:** Sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.

- For a fluorescent image, adjust the **Intensity Measure** as shown in the histogram. This option is available only for instruments with a fluorescence imaging module.



- **Mean Intensity:** The average fluorescence of the detected colony (the fluorescence of all the pixels within the colony perimeter divided by the number of pixels within the colony perimeter).
- **Median Intensity:** The middle fluorescence value of all the pixels within the detected colony perimeter.
- **Geometric Intensity:** The geometric intensity of the detect colony or the fluorescence of all the pixels within the colony perimeter.
- **Centre Mean Intensity:** The average fluorescence value of the middle 9 pixels within the detected colony perimeter.

Select **Greater than**, **Less than**, or **Between** and enter a value in the field to define the fluorescence intensity threshold. For **Between**, enter two values to define the range.

- Change the pickable property of individual objects.
 - To define an object as pickable, right-click the object and select **Pick Item** to display the object in green.
 - To define an object as unpickable, right-click the object and select **Discard Item** to display the object in blue.
- In the **Limit Colonies** field, enter the maximum number of colonies to pick from each region. If you previously set a maximum number of colonies on the Destination/Source Options page, the Limit Colonies option is not available on the Feature Selection page. See [on page 45](#).
The **Total Feature Count** field displays the total number of pickable objects.
- Select the **Feature Counts** tab to view the number of found features in the regions of the source receptacle configured in columns.
 - The **Well** column identifies the region of the source receptacle.
 - The **Found** column gives the number of colonies found in that region.
 - The **Pickable** column gives the number of pickable colonies in that region, based on the selection criteria.
 - The **Picking** column gives the number of colonies that are to be picked in that region, based on the selection criteria.

To save the data in .csv format, right-click and then click **Export**.

- Select the **Display Options** tab to change the display options of the source receptacle image.
- Select the **Display Detected Features** checkbox to display all detected features with a yellow circle.
- Select the **Shade Features** checkbox to give the detected colonies some shading for clearer visualization.

10. Select the **Display Numbers per Region** checkbox to display the number of pickable colonies for each region on the receptacle image. If you do not place a limit on the number of colonies to pick for each region, all the numbers display in green. If you create a limit on detectable colonies, the number displays in green if the criteria are acceptable and display red if they are not.
11. Select the **Display Proximity Indicators** checkbox to display connecting red lines between a detected colony and its closest neighbor.
12. Select the **Shade Exclusion Zone** checkbox to display a red-shaded exclusion zone where the system cannot pick.
13. Click **Next**.
14. Select whether or not to save the routine before you continue with the regional picking process.

If you create a new routine, the Continue or Save New Routine dialog displays.

- To save the settings for the routine, click **Save Routine**, enter the routine **Name** and **Description**, and then click **Save**.
- To continue without saving the settings, click **Routine Without Saving** and then click **OK**.

If you edit a routine, the Save Changes to Routine dialog displays.

- To save the settings before continuing, click **Save**.
- To save the settings as a new routine without changing the existing routine, click **Save As**, enter the routine **Name** and **Description**, and then click **Save**.
- To continue without saving the settings for the routine, click **No**.

15. Make sure that the instrument door is closed.
16. Click **OK** to start the regional picking process.

Viewing the Regional Picking Progress

While the regional picking routine runs, the Regional Picking Progress page displays a summary of the routine.

- **Start Time:** The time that the picking of the colonies began.
- **Source Barcode:** The barcode or identifier of the source receptacle being picked from.
- **Pin:** The picking pin being used for the picking operation.
- **Copy Plate No:** The barcode of the copy receptacle that is being inoculated, if you select Make Copy for the routine.
- **Destination Barcode:** The barcode of the destination receptacle that is being inoculated.
- **Destination Offset:** The reference well for where the pins are lowered. This value changes for 384-well plates.
- **Colonies Picked:** The number of colonies picked so far.
- **Colonies To Pick:** The total number of colonies to be picked.
- **Calculate Remaining Time:** The remaining time in the routine.
- **Current Action:** What the system is doing, such as *Pick* when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all the colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

Continuing or Ending the Regional Picking Routine

After all colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

If there are no more source receptacles to pick, click **Finish Picking** and then click **OK**.

To continue picking more source receptacles:

1. Select whether to review images of the new receptacles.
 - Select **Continue With Image Review** to review images and select colonies for the new source receptacles.
 - Select **Continue Without Image Review** to use the current image settings for the next batch of source receptacles.
2. Click the **Select Number of Positions to Use** drop-down and select the number of receptacle holders to load on the instrument deck.
3. Click **OK**.
4. When the Please Load Source dialog displays, replace the picked receptacles with the new receptacles on the instrument deck.
5. Close the instrument door.
6. Click **Next** to continue running the picking routine.
 - If you click **Continue With Image Review**, the system takes a white light test image of the source receptacles and then displays the Test Image page. See [Adjusting the White Light Test Image on page 107](#).
 - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and the Feature Selection page displays. See [Selecting Colonies for Regional Picking on page 111](#).

Viewing the Regional Picking Summary

After the regional picking routines complete, the Regional Picking Summary page displays the number of source colonies picked, the number of destination plates used, and missing source receptacles.

- Click **Export** to save this information in .csv format.
- Click **Details** to view details of all activities related to the source and destination receptacles.
- Click **Close** to display the Regional Picking Summary page.

On the Regional Picking Summary page, click **Next** and then click **Finish** to display the Regional Picking page.

The QPix 420 Microbial Colony Picking System can pick colonies from receptacles using either standard picking or regional picking. You can set up control wells for the destination plates before you run a picking process.

On the Navigation page under Picking Processes, select **Blue-White Regional Picking** to pick blue or white colonies from receptacles using the regional process.



Note: Before you run a picking process, you should do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

If this is the first picking process, you must edit or create a Sanitise profile to use with the picking process. See [Creating and Editing Sanitise Profiles on page 35](#).

Blue-White Colony Detection is a technique that uses the E. Coli LacZ gene to permit visual detection of colonies that contain plasmids with DNA inserts. The Blue-White Picking function must be used with a QPix Chroma Filter. Place this filter on the light bed of the instrument under a QTray or a Petri dish holder containing the blue and white colonies to detect.

QPix Chroma Filters are consumables you can purchase individually and in packs of 25. See [Replacement Parts and Optional Extras on page 209](#).



CAUTION! When you reuse a QPix Chroma Filter, use gentle handling, because crinkles and bends can compromise image quality. Replace damaged filters.

This is a white light imaging picking processes only that requires the purchase of *QPix® Chroma Colorimetric Colony Selection Software License Blue/White Colony Selection Software License*.



Note: Due to inherent biological variations, some picked white colonies lose their insertions and might later be viewed to be blue. These effects are inherent to the biology and are not due to the picking or selection processes. When you select the insertion methodology, take care to make sure that the desired results are achieved.

Creating and Editing Blue-White Regional Picking Processes

The procedures to create and edit standard or regional picking processes are similar. The regional picking process has more options available to define the regions for picking.

To run a Blue-White standard picking process, see [Blue-White Picking Processes on page 63](#).



Note: Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

Opening the Blue-White Regional Picking Page

To open the Blue-White Picking page:

1. On the Navigation page under Picking Processes, double-click the **Blue-White Regional Picking** icon to display the Blue-White Picking page.
2. Click **Picking Type** to view the picking type options.
 - Select **Blue/White Picking** to use white light to illuminate and identify blue and white colonies to pick.
 - Select **White Only Picking** to use white light to illuminate and identify only white colonies to pick.
3. Click **Apply**.
4. Click **Start** to home the drives and display the Routines dialog.

Selecting Blue-White Regional Picking Routines

Use the Routines dialog to create a routine or to edit a routine.

To create a routine or to edit a routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit.

Select the **Skip Steps** checkbox to run the routine without making changes.
3. Click **Import** to import a routine. See [Importing Routines on page 119](#).
4. Click **Export** to export the routine you select. See [Exporting Routines on page 119](#).
5. Click **Delete** to delete the routine you select.
6. Click **Next**.
 - If you select New Routine or Run Existing Routine and leave the Skip Steps checkbox clear, see [Selecting Barcode Options on page 119](#).
 - If you select Run Existing Routine and you select the Skip Steps checkbox, see [Viewing the Settings Summary on page 123](#).

Importing and Exporting Blue-White Regional Picking Routines

The Select Routine list displays the routines that match the type of routine you are creating. For example, a white light and fluorescent imaging routine is not included in the Select Routine list if you are creating a White Light only routine.

Importing Routines

To import a routine:

1. Export the routine from the other computer in .xml format.
2. Save the export file on the system computer.
3. On the system computer, click **Import**.
4. Locate and select the file.
5. Click **Import** to add the routine to the database.

If the routine is of the same type as the one you are creating, then the imported routine displays in the Select Routine list.

Exporting Routines

To export a routine:

1. Click **Export**.
2. Navigate to the location that you want to save the .xml file.
3. You can change the name of the file.
4. Click **Export** to save the routine in .xml format.

Selecting Barcode Options

When you create or edit a routine for white light only, the Barcodes page displays.

Using a Barcode Reader



Note: You should always use barcodes for accurate data tracking.

To use a barcode reader:

1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes.
2. Select a Read Failure Option to define the system response when a barcode cannot be read.
 - Select **Manual Prompt** to have the software display a dialog where you enter a barcode or name for the receptacle.
 - Select **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.



Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

- Select **Auto Generate** to allow the system to assign a barcode and continue the routine.

3. Use the Validation Barcode list to define the barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, a message displays.
 - To manually enter the barcodes, enter each barcode in the field below the list and then click **Insert**.
 - To import barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
 - To use a from the database, click **From Database**.
 - To remove a barcode from the list, select the barcode and click **Remove**.
4. Click **Next** to define the destination receptacles.

Defining Unique Identifiers Without Barcodes

To define unique identifiers without barcodes:

- Clear the **Use Barcode Reader** checkbox to define unique identifiers for source receptacles without scanning for barcodes.

Random Identifiers

To have the software generate random identifiers:

1. Clear the **Use Barcode Reader** checkbox.
2. Select the **Generate Random Barcodes** checkbox to have the software generate random barcodes with the prefix Auto for the source receptacles. No other parameters are required for this option.

Manually Create Identifiers

To manually create an identifier list:

3. Clear the **Use Barcode Reader** checkbox.
4. Clear the **Generate Random Barcodes** checkbox.
5. Either:
 - In the text field below the list, enter an identifier and click **Insert**.
 - Click **Import** and then select the file from which to import the identifiers to import identifiers for the source receptacles from a text or .csv file.
 - Click **Generate List**. See below for additional steps.
6. Select an identifier in the list and click **Remove** to remove an identifier.

Generating an Identifier List

The screenshot shows a dialog box titled "Generate Barcode List". It features an information icon in the top right corner. On the left side, there are four input fields: "Prefix" (a text box), "Start Number" (a text box), "Digit Padding" (a spin box currently set to 0), and "Number To Generate" (a spin box currently set to 1). On the right side, there is a "Preview" section with labels for "First:" and "Last:". At the bottom of the dialog, there are two buttons: "Generate" and "Cancel".

 **Tip:** The Preview area shows examples of the first and last generated identifiers.

To generate a barcode identifier list:

1. In the **Prefix** field, enter text to describe the identifier.
2. In the **Start Number** field, enter the first number to generate.
3. In the **Digit Padding** field, enter the number of digits in the generated number.
4. In the **Number to Generate** field, enter the number of identifiers to generate.
5. Click **Generate** to view the generated identifiers in the Barcodes list.
6. Click **Next** to define the destination receptacles.

Setting Destination Plate Options

Use the Destination Plates page to set destination plate options.

To set destination plate options:

1. Click the Select Destination Microplate drop-down and select the plate type to inoculate with the picked colonies.
2. Select an option:
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Destination** to stir the wells.
3. Select the **Make Copy** checkbox, then click the **Select Copy Microplate** drop-down and select the plate type to use for a duplicate copy of the destination plate.
4. Click **Next** to define the regional picking source.

Selecting the Regional Picking Source

Use the Source page to select the regional picking source.



Note: The types of source receptacles to use for regional picking are limited. Depending on the configuration of the system, there may be only one option in the Holder list, in which case the Receptacle option is preset and cannot be changed. If the type of source receptacle that you need is not listed, contact Molecular Devices to add a new source receptacle type to the list. See [Obtaining Support on page 203](#).

To select the regional picking source:

1. Click the **Holder** drop-down and select the type of holder for the source receptacles on the instrument deck.
2. Click the **Receptacle** drop-down and select the type of receptacle to use for the source. The preview image displays a representation of the holder and receptacle.
3. In the **Positions** field, enter the number of receptacles to use for picking.
4. In the **Offset** field, enter the position of the first receptacle to use for picking. The preview image displays the defined locations of the receptacles.



Note: If you use Validation barcodes, only one source receptacle displays, and the Positions and Offset fields are not available.

5. In the **Picking Depth Into Agar** field, enter the depth to insert the pins in the agar for picking.
6. Click **Next** to the source and destination options.

Setting Regional Picking Source and Destination Options

Use the Destination/Source Options page to set picking source and destination options.

To set regional picking source and destination options:

1. Select the **Limit Max. Number of Features Per Region** checkbox and then in the **Number of Features Per Region** field, enter the maximum number of colonies to pick from a single source receptacle.



Note: Setting a limit for the maximum number of colonies on the Destination/Source Options page prevents selecting a maximum number on the Feature Selection page when you run the picking routine. See [Selecting Colonies for Regional Picking on page 111](#).

- Select the **Reserve Wells for Regions** checkbox to leave wells empty if the number of colonies per region is not reached. For example, if you select to pick 8 colonies per region, but only 6 colonies are eligible, then wells 7 and 8 would be left blank.
 - Select the **Skip Region If Number of Features Not Found** checkbox to ignore the region if the target number of features in Number of Features Per Region is not met.
 - Select the **Keep Picked Regions Together** checkbox to have colonies that are picked from the same region delivered to the same destination plate.
 - If you select the **Reserve Wells for Region** checkbox, select the **Skip Region If Picking Count is Zero** checkbox to skip regions that have a picking count of zero.
2. Select the Deposit Order:
 - Select **By Columns** to deposit the picked colonies by column.
 - Select **By Rows** to deposit the picked colonies by row.
 3. Select the Deposit Strategy.
 - Select **Fill All Microplates** to fill every selected well of a destination plate before starting a new destination plate.
 - Select **New Microplate for Each Position** to start a new destination plate whenever the instrument starts picking from a different source QTray or Petri dish.
 4. Select the Pick Order:
 - Select **Standard** to pick from regions in straight columns from the source receptacle, such as A1 to A8, B1 to B8, and so on.
 - Select **Plating Order** to pick from square blocks of eight regions, such as A1 to B4, A5 to B8, and so on.
 5. Under Destination Microplate Template, click **Edit** to define the wells to dip. Skip wells to use as blank or control wells. The defined template is used for all the destination plates during the picking routine.
 - To skip a well, click the well. Wells to skip display in light blue.
 - To skip multiple contiguous wells, right-click and drag across the wells.
 - To dip a well that you select to skip, click the well again. Wells to dip display in red.

After you define the wells to dip or skip, click **Exit**.
 6. Click **Next** to define the picking head and the Sanitise profile.

Selecting the Head and Sanitizing Options

Use the Head and Sanitise page to select the head and sanitizing options.

To select the head and sanitizing options:

1. Click the **Picking Head** drop-down and select the head to use for the picking routine.
2. click the **Pin Columns (Rows) Before Inoculation** drop-down and select the number of pins to use to pick in each column or row before transferring the picked colonies to the destination plate.

For the fastest transfer rate, select **All** to use all available picking pins to pick colonies before inoculating the destination plate.

For smaller picking groups, the available selections depend on the Deposit Order selection you made on the Destination/Source Options page.

- If you select **By Columns**, you can pick colonies using from **1 to 11** columns.
- If you select **By Rows**, you can pick colonies using from **1 to 7** rows.

To run the wash routine from the Sanitise profile after each partial pick and inoculation, select the **Wash Between Partial Inoculation** checkbox. Clear the **Wash Between Partial Inoculation** checkbox to wait until all pins are used for picking and inoculation before running the wash routine.

3. In the **Destination** field, enter the distance above the bottom of the destination plate wells to dip the pins for the inoculation.

If you select **Make Copy** for the destination plate, enter a value for the copy.

4. click the **Sanitise Profile** drop-down and select a Sanitise profile to use for the picking routine.

If the available profiles are not suitable for the regional picking routine, exit the regional picking process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).

5. Click **Next** to view a summary of the settings.

Viewing the Settings Summary

The Settings Summary page displays a summary of the picking routine settings. Review the summary details. To make changes, click **Back** until you return to the page where the changes can be made.

Click **Print** to print the summary.

Click **Next** to run the blue-white regional picking routine.

Changing the Picking Head

The Change Head page reminds you which picking head must be loaded, based on the Setting Summary routine you configure, and allows you to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to run the picking routine.

Running Blue-White Regional Picking Processes

After you configure a regional picking routine, you can run the process on the instrument.



Note: Before you run a regional picking process, it is important that you do the cleaning and set up procedures in [Preparing to Run Processes on page 29](#).

To run a regional picking routine:

1. Open the Blue-White Regional Picking page.
2. Select the picking routine to run.
If you do not need to make changes to the routine, select the **Skip Steps** checkbox before you click **Next**.
3. Review the settings for the routine. See [Viewing the Settings Summary on page 123](#).
4. In the Settings Summary page, click **Next** to arrange the source plates in the instrument.

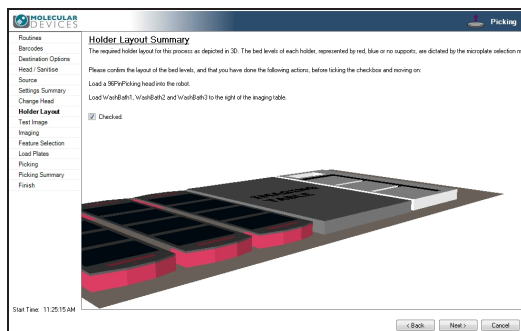


Note: You must place the QPix Chroma Filter on the light-bed before you place any tray over it on the instrument deck. See [Replacement Parts and Optional Extras on page 209](#) for purchasing details.

Arranging the Plate Layout

To arrange the plate layout:

1. Open the instrument door.
2. On the Holder Layout Summary page, follow the instructions to correctly arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.



4. After you finish making the changes, click **Next**.



CAUTION! At this point, you cannot go back and change settings. To make changes now, you must cancel the process and start again.

5. Remove all plate lids.
6. On the Load Plates page, follow the instructions to correctly place the destination plates.
7. Click **Next**.
8. When the Please Load Source page displays, load the source receptacles in the correct locations on the instrument deck.



Tip: If needed, you must install the filter between the lightbed and the source tray before you continue.

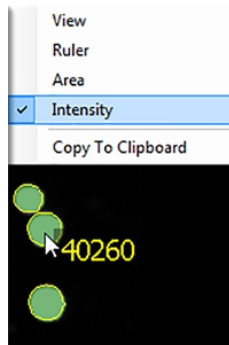
9. Close the instrument door.
10. Click **Next** to take a white light test image of the source receptacles.

Adjusting the Blue-White Regional White Light Test Image

On the Test Image page, view detected features as potential colonies to pick for inoculation of the destination plates. To make sure that only blue or white colonies are detected, adjust the test image using the Exposure and Gain settings, the Detection settings, the Display settings, and the Debris settings. Each detected feature displays within a yellow ring.

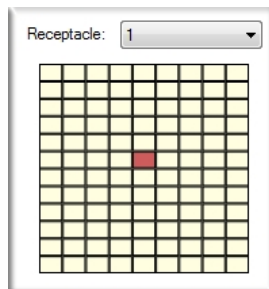
To set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image to display the pixel intensity value.



To adjust the test image:

1. Click the **Receptacle** drop-down and select the number of the receptacle to view and then click the frame to view in the receptacle image below the list. The frame is in red.

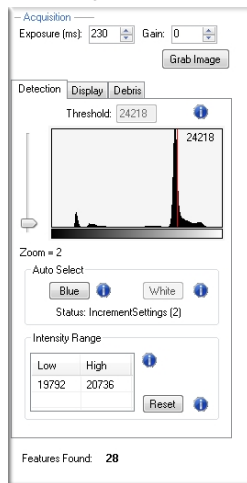


2. Under Acquisition, in the **Exposure** field, enter the number of milliseconds to expose the sample to light when acquiring the image (from 1 to 2000).
3. Adjust the **Gain** to increase the image signal without changing the light exposure.

*** Tip:** You should not change the default Gain setting for Blue-White colony detection.

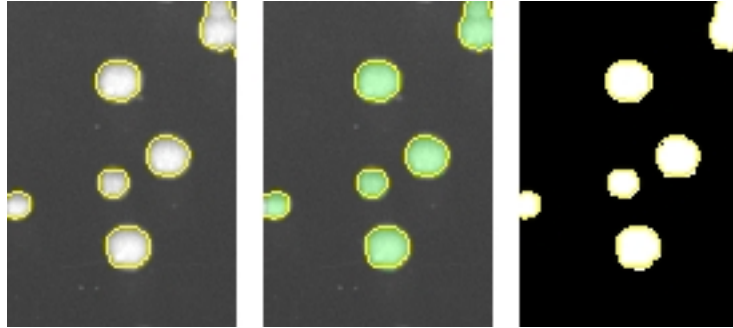
4. Click **Grab Image** to apply the settings to the test image.

5. Select the **Detection** tab. In the Threshold Intensity histogram, the X-axis represents the intensity and the Y-axis represents the relative area at that intensity.



6. To use Auto Select, click either **Blue** or **White**. Click the button as many times as required to intensify the target colonies. Generally, two or three clicks get you the optimal value. Click **Reset** to restore the previous intensity settings.
7. To manually select **White Colonies**, drag the red slider line to the right of the large spike and to view the White colonies as green spots. This allows the exclusion of the agar, which is predominantly the large black area in the background, and the colonies that are less intense than the threshold value.
8. To manually select **Blue Colonies**, drag the red slider to the left to decrease the minimum detectable threshold and view the Blue colonies as dark black spots against the background that starts near the left side of the histogram and ends to the left of the large spike that represents the largest area, which is the agar.
9. In the Intensity Range table, select the Low Threshold value and the High Threshold value.
- To select the **Low** intensity value, move the red slider line left to the lowest value, and **Ctrl+Click**. The value displays in the table cell.
 - To select the **High** intensity value, move the red slider line right to the highest value, and **Ctrl+Click**. The value displays in the table cell.
10. Select the **Display** tab.

11. Select the method to view the detected colonies in the image.
 - Click **Image Only** to display the detected colonies in white with yellow rings and a gray background.
 - Click **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background.
 - Click **Overlay only** to display the detected colonies in white with yellow rings and a black background.



To remove the yellow ring from the detected colonies, clear the **Outline Detected Features** checkbox.

12. Select the **Debris** tab.
13. Adjust the Diameter and Axis Ratio to exclude objects that are smaller than the desired colonies. Each detected feature displays within a yellow ring while excluded features do not have a yellow ring.
 - In the **Diameter** field, enter the minimum diameter of the required colonies.
 - In the **Axis Ratio** field, define the minimum roundness ratio of the required colonies.

The **Features Found** field displays the number of objects detected as colonies. The value changes as you make adjustments.

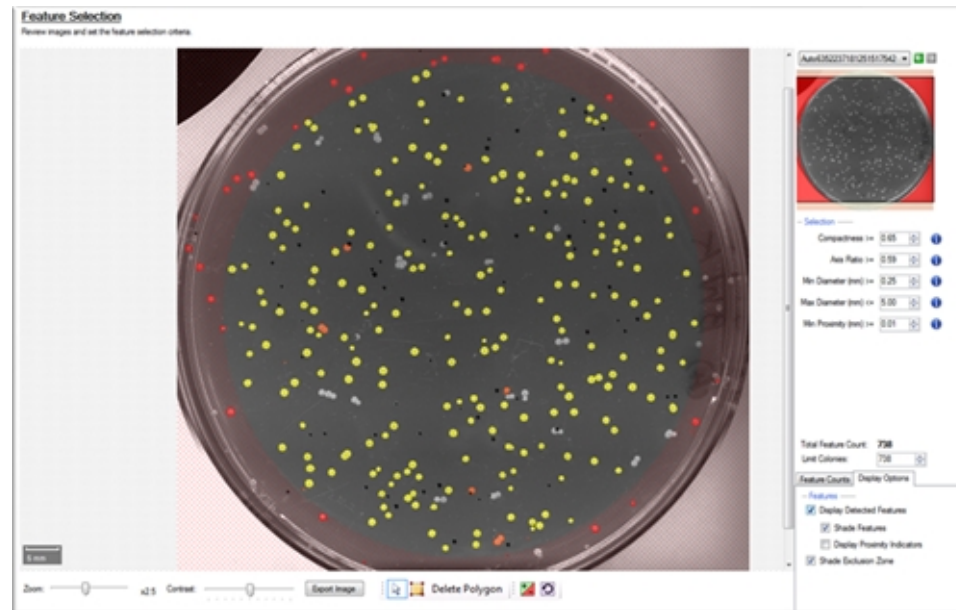


Note: You can further refine colony detection on a higher-resolution image on the Feature Selection page. See [Selecting Blue-White Colonies for Regional Picking on page 129](#).

14. Click **Next**.

Selecting Blue-White Colonies for Regional Picking

After you adjust and refine test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the Feature Selection page.



On the Feature Selection page, pickable objects show in yellow and unpickable objects show in red. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

To view the details of a colony, hold the cursor over the colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion shows in red text.



Note: During image processing, each object with no yellow ring in the test image is excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.


Click **Export Image** to save the image in .bmp, .jpg, or .png format.

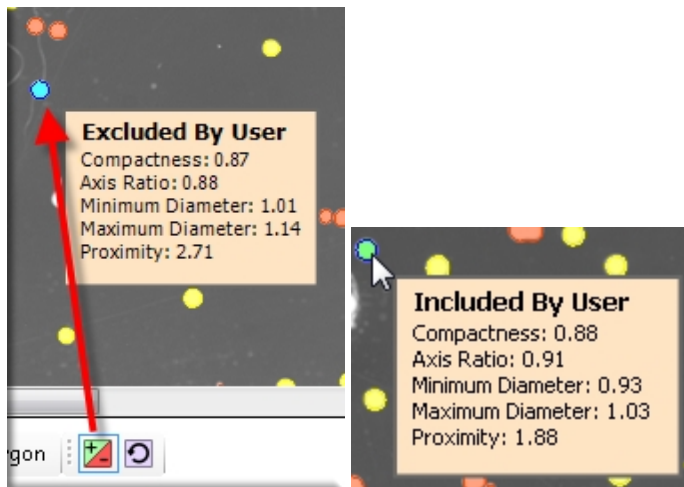
To select a smaller region of interest (ROI) in the image, draw a polygon around the region.



- To draw a polygon, click the **Draw Polygon** icon and then click the image to define the corners of the polygon.
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

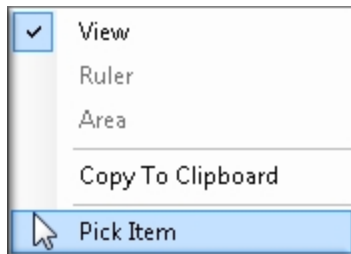
When you draw a polygon on the image, the system detects and picks colonies only from within the defined region of interest.


To change the selection of the system-chosen pickable objects that display in the image map, click  to override the system-chosen and unchosen objects, and then click the objects in the image map to change.



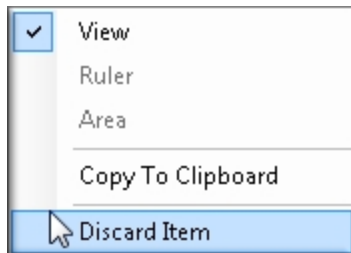
- When you click  as an override, the yellow-marked pickable objects change to blue and become unpickable.


To undo the selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.

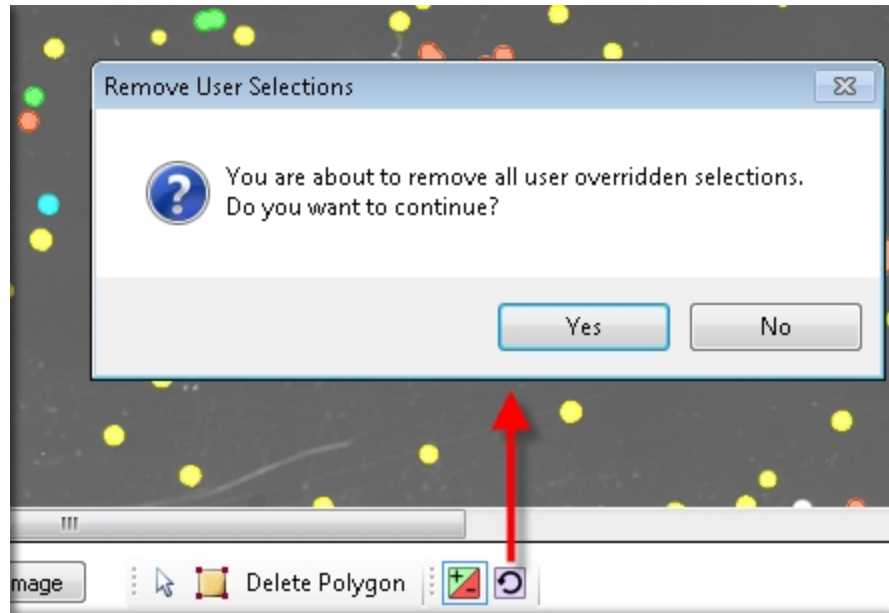


- When you click  as an override, the red-marked unpickable objects change to green and become pickable.

To undo the selection, right-click over the image map and select **Discard Item**. The object changes to blue and becomes unpickable.



To undo all selections, click  to display the Remove User Selections dialog. Click **Yes**.



To select the colonies for picking:

1. From the list in the upper-right area, select the barcode or identifier of the receptacle to view.
2. Refine the colony Selection criteria.
 - **Compactness:** Sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
 - **Axis Ratio:** Measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies are closer to 0 and round colonies are closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
 - **Min Diameter:** Sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.



Note: The Min Diameter cannot be lower than the Diameter value set in the Debris Discard section of the test image.

- **Max Diameter:** Sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
- **Min Proximity:** Sets the distance between colonies to pick, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.

3. In the **Limit Colonies** field, enter the maximum number of colonies to pick from each receptacle.



Note: If you previously set a limit for the maximum number of colonies on the Source page, the Limit Colonies option is not available on the Feature Selection page. See [on page 45](#).

The **Total Feature Count** field displays the total number of pickable objects in the receptacle.

4. Select the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle displays, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria. To save the data in .csv format, right-click and then click **Export**.
5. Select the **Display Options** tab to change the display options of the source receptacle image.
6. Select the **Display Detected Features** checkbox to display all detected features with a yellow circle.
7. Select the **Shade Features** checkbox to give the detected colonies some shading for clearer visualization.
8. Select the **Display Proximity Indicators** checkbox to display connecting red lines between a detected colony and its closest neighbor.
9. Select the **Shade Exclusion Zone** checkbox to display a red-shaded exclusion zone where the system cannot pick.
10. Click **Next**.
11. In the Continue or Save New Routine dialog or the Save Changes to Routine dialog, select whether or not to save the routine before you continue with the picking process.
If you create a new routine, the Continue or Save New Routine dialog displays.
 - To save the settings for the routine before you continue, click **Save Routine**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.If you edit a routine, the Save Changes to Routine dialog displays.
 - To save the settings for the routine before you continue, click **Save**.
 - To save the settings as a new routine without changing the existing routine, click **Save As**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings, click **No**.
12. Make sure that the instrument door is closed.
13. Click **OK** to start the picking process.

Viewing the Regional Picking Progress

While the regional picking routine is running, the Regional Picking Progress page displays a summary of the routine.

- **Start Time:** The time that the picking of the colonies began.
- **Source Barcode:** The barcode or identifier of the source receptacle.
- **Pin:** The picking pin being used for the picking operation.
- **Copy Plate No:** The barcode of the copy receptacle that is being inoculated, if you select Make Copy for the routine.
- **Destination Barcode:** The barcode of the destination receptacle that is being inoculated.
- **Destination Offset:** The reference well for where the pins are lowered. This value changes for 384-well plates.
- **Colonies Picked:** The number of colonies picked so far.
- **Colonies to Pick:** The total number of colonies to be picked.
- **Calculate Remaining Time:** The remaining time in the routine.
- **Current Action:** What the system is doing, such as *Pick* when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

Continuing or Ending the Regional Picking Routine

After all the colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

If there are no more source receptacles to pick, click **Finish Picking** and then click **OK**.

To continue picking more source receptacles:

1. Select either:
 - Click **Continue With Image Review** to review images and select colonies for the new source receptacles.
 - Click **Continue Without Image Review** to use the current image settings for the next batch of source receptacles.
2. Click the **Select Number of Positions to Use** drop-down and select the number of receptacle holders to load on the instrument deck.
3. Click **OK**.
4. When the Please Load Source page displays, replace the picked receptacles with the new receptacles on the instrument deck.
5. Close the instrument door.
6. Click **Next**.
 - If you click **Continue With Image Review**, the system takes a white light test image of the source receptacles and the Test Image page displays. See [Adjusting the Blue-White Regional White Light Test Image on page 126](#).
 - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and the Feature Selection page displays. See [Selecting Blue-White Colonies for Regional Picking on page 129](#).

Viewing the Regional Picking Summary

After regional picking routines complete, the Regional Picking Summary page displays the number of source colonies picked, the number of destination plates used, and missing source receptacles.

Click **Export** to save this information in .csv format.

Click **Details** to view details of all activities related to the source and destination receptacles.

- Click **Export** to save the information in .csv format.
- Click **Close** to display the Regional Picking Summary page.

On the Regional Picking Summary page, click **Next** and then click **Finish** to display the Regional Picking page.

The QPix 420 Microbial Colony Picking System can pick colonies from receptacles using either standard picking or regional picking. You can set up control wells for the destination plates before you run a picking process.

On the Navigation page under Picking Processes, double-click **Control Plate Creation** to create a batch of plates that contain control samples. These can be created by picking colonies from source receptacles into destination wells.



Note: Before you run a control plate creation process, you should do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

If this is your first control plate creation process, you must edit or create a Sanitise profile to use with the control plate creation process. See [Creating and Editing Sanitise Profiles on page 35](#).

The control plate creation process uses only white light imaging.



Note: If there is a fluorescence imaging module on the system and you run a control plate creation process that uses white light only, the process takes longer than a control plate creation process on a white light only system, since the fluorescence imaging module captures more images during the process.

Creating and Editing Control Plate Creation Processes


After you create the routine, you can close the process and run it later, or you can run it immediately.



Note: Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

Opening the Control Plate Creation Page

To open the Control Plate Creation page:

1. From the Navigation page under Picking Processes, double-click  **Control Plate Creation** to display the Control Plate Creation page.
2. Click **Start** to home the drives and display the Routines dialog.

Selecting Control Plate Creation Routines

Use the Routines dialog to select a Control Plate Creation routine:

To select a Control Plate Creation routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit.
Select the **Skip Steps** checkbox to run the routine without making changes.
3. Click **Import** to import a routine.
4. Click **Export** to export the routine you select. See [Exporting Routines on page 137](#).
5. Click **Delete** to delete the routine you select.
6. Click **Next**.
 - If you select New Routine or Run Existing Routine and leave the Skip Steps checkbox clear, see [Selecting Barcode Options on page 137](#).
 - If you select Run Existing Routine and you select the Skip Steps checkbox, see [Viewing the Settings Summary on page 139](#).

Importing and Exporting Control Plate Creation Routines

The Select Routine list displays the routines that match the type of routine you are creating. For example, a white light and fluorescent imaging routine is not included in the Select Routine list if you are creating a White Light only routine.

Importing Routines

To import a routine:

1. Export the routine from the other computer in .xml format.
2. Save the export file on the system computer.
3. On the system computer, click **Import**.
4. Locate and select the file.
5. Click **Import** to add the routine to the database.

If the routine is of the same type as the one you are creating, then the imported routine displays in the Select Routine list.

Exporting Routines

To export a routine:

1. Click **Export**.
2. Navigate to the location that you want to save the .xml file.
3. You can change the name of the file.
4. Click **Export** to save the routine in .xml format.

Selecting Barcode Options



Note: You should always use barcodes for accurate data tracking.

Use the Barcodes page to select barcode options.

To select barcode options:

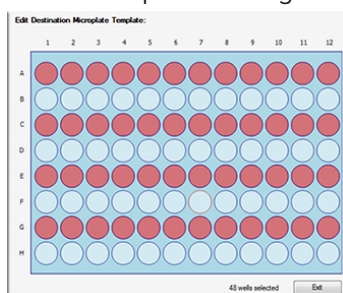
1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes.
2. Select the **Generate Random Barcodes** checkbox to have the software generate random identifiers with the prefix **Auto** for the source and destination receptacles.
3. Click **Next** to define the destination receptacles.

Setting Destination Plate Options

Use the Destination Options page to set the destination plate options.

To set the destination plate options:

1. click the **Select Destination Microplate** drop-down and select the plate type to be inoculated with the control colonies.
2. Select an option:
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Destination** to stir the wells of the destination plate during inoculation.
3. In the **Number of Control Microplates** field, enter the number of duplicate plates to create (maximum 70).
4. Under Destination Microplate Template, click **Edit** to define the wells to dip or skip. You can skip wells to use as blank or non-control wells. The defined template is used for all the destination plates during the control plate creation routine.



- To skip a well, click the well. Wells to be skipped show in light blue.
- To skip multiple contiguous wells, right-click and drag across the wells.
- To dip a well that you skip, click the well again. Wells to be dipped show in light red.

After you define the wells to dip or skip, click **Exit**.

5. Click **Next** to define the picking head and the Sanitise profile.

Selecting the Head and Sanitizing Options

Use the Head and Sanitise page to select the head and sanitize options.

To select the head and sanitize options:

1. Click the **Picking Head** drop-down and select the head to use for the control plate creation routine.
2. In the **Destination** field, enter the distance above the bottom of the destination plate wells to dip the pins for the inoculation.
3. Click the **Sanitise Profile** drop-down and select the Sanitise profile to use for the picking routine.

If the available profiles are not suitable for the control plate creation routine, exit the control plate creation process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).

4. Click **Next** to define options for the source receptacle.

Setting Source Receptacle Options

Use the Source page to set source and receptacle options.

To set source and receptacle options:

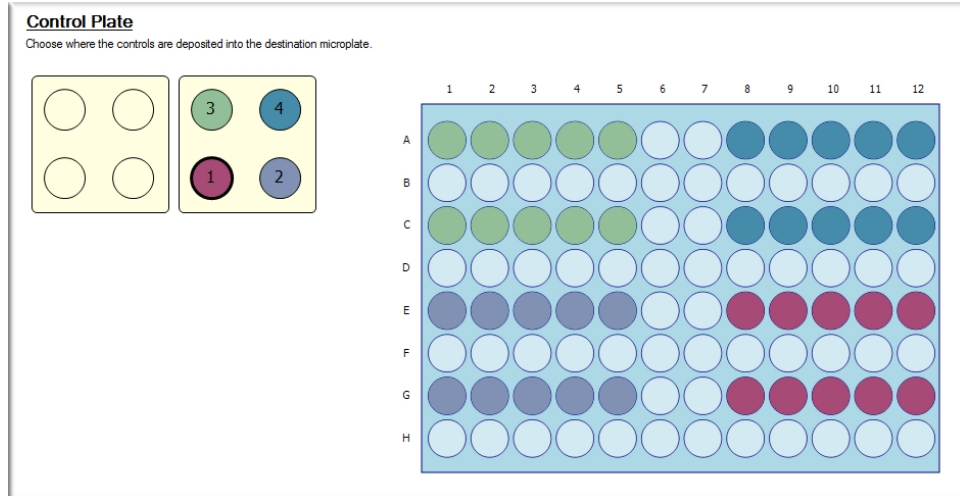
1. Click the **Holder** drop-down and select the type of holder for the source receptacles on the instrument deck.
2. Click the **Receptacle** drop-down and select the type of receptacle to use for the source. The preview image displays a representation of the holder and receptacle.
3. In the **Positions** field, enter the number of receptacles to use for picking.
4. In the **Offset** field, enter the position of the first receptacle to use for picking. The preview image displays the defined locations of the receptacles.
5. In the **Picking Depth Into Agar** field, enter the depth to insert the pins in the agar for picking.
6. Click **Next** to define the layout of the control wells on the plate.

Defining the Control Wells

Use the Control Plate page to define the control wells.

To define the control wells:

1. Click a source receptacle on the left.



2. In the destination plate on the right, click the well or wells to place the control colonies from the receptacle.
 - To select a well, click the well. Selected wells are color coded to match the source receptacle.
 - To select multiple contiguous wells, click and drag across the wells.
 - To deselect a well, click the well again. Wells that have not been selected show in light blue.
3. Continue to click receptacles and wells until you define all the control wells.
4. Click **Next** to display a summary of the settings.

Viewing the Settings Summary

The Settings Summary page displays a summary of the control plate creation routine settings.

Review the summary details to make sure that the settings and options are configured correctly for the control plate creation routine. To make changes, click **Back** until you return to the page where the changes can be made.

Click **Print** to print the summary.

Click **Next** to run the control plate creation routine.

Changing the Picking Head

The Change Head page reminds you which picking head to load, based on the Setting Summary routine you configure, and provides an opportunity to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to run the picking routine.

Running Control Plate Creation Processes

After you configure control plate creation routine, you can run the process on the instrument.



Note: Before you run a picking process, it is important that you do the cleaning and set up procedures in [Preparing to Run Processes on page 29](#).

Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

To run a control plate creation routine:

1. Open the Control Plate Creation page. See [Opening the Control Plate Creation Page on page 135](#).
2. Select the picking routine to run. See [Selecting Control Plate Creation Routines on page 136](#).
If you do not need to change the routine, select the **Skip Steps** checkbox before you click **Next**.
3. Review the settings for the routine. See [Viewing the Settings Summary on page 139](#).
4. On the Settings Summary page, click **Next** to arrange the source plates in the instrument.

Arranging the Plate Layout

Use the Holder Layout Summary page to arrange the plate layout.

To arrange the plate layout:

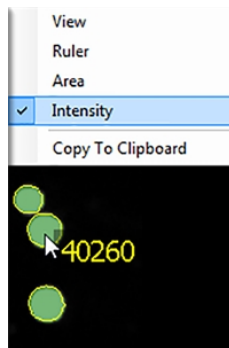
1. Open the instrument door.
2. Follow the instructions to arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.
4. Click **Next**.
5. Remove all plate lids.
6. On the Load Plates page, follow the instructions to correctly place the destination plates.
7. Select the **Checked?** checkbox to confirm the destination plate layout.
8. Click **Next**.
9. When the Please Load Source page displays, load the source receptacles in the correct locations on the instrument deck.
10. Close the instrument door.
11. Click **Next** to take a white light test image of the source receptacles.

Adjusting the White Light Test Image

On the Test Image page, all detected features are viewed as potential colonies to pick for inoculation of the destination plates. To make sure that only colonies are detected, adjust the test image using the Exposure and Gain settings, the Threshold settings, and the Debris settings. Each detected feature displays within a yellow ring.

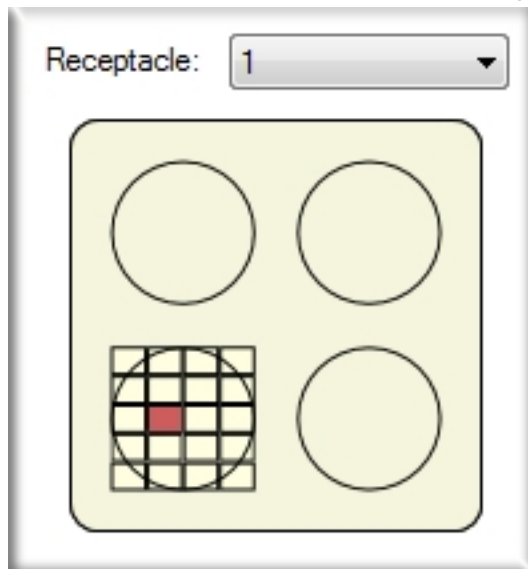
To set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image to display the pixel intensity value.



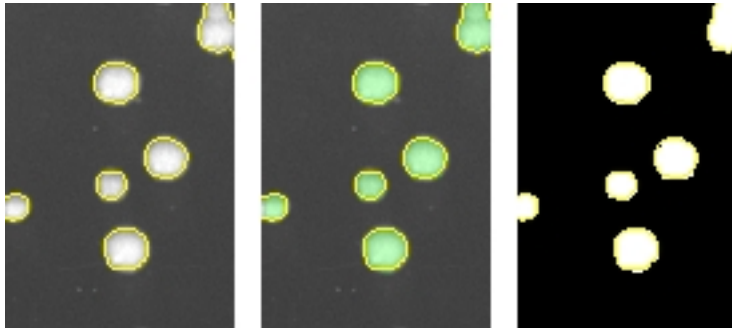
To adjust the test image:

1. Click the **Receptacle** drop-down and select the number of the receptacle to view and then click the frame to view in the receptacle image below the list. The frame is in red.



2. In the Acquisition area, in the **Exposure** field, enter the number of milliseconds to expose the sample to light when acquiring the image (from 10 to 1000).
3. Adjust the **Gain** to increase the image signal without changing the light exposure.
4. Click **Grab Image** to apply the new settings to the test image.
5. Select the **Detection** tab.
6. Select the **Use Auto Thresholding** checkbox to have the software automatically detect the colonies in the image.
Clear the **Use Auto Thresholding** checkbox to manually detect the colonies. Drag the slider until the desired colonies are detected and the background is not.
7. Select the **Auto Threshold Each Frame** checkbox to process each frame with its own uniquely calculated value.
Clear the **Auto Threshold Each Frame** checkbox to process the frames using a value calculated of the entire image.

8. If you select the **Auto Threshold Each Frame** checkbox, enter threshold values in the **Low Limit** field and the **High Limit** field.
 - To determine the **Low Limit** value, clear the **Use Auto Thresholding** checkbox and drag the slider to the left until some background is clearly detected. Select the **Use Auto Thresholding** checkbox and the **Auto Threshold Each Frame** checkbox again and then enter the value from the **Threshold** field into the **Low Limit** field.
 - To determine the **High Limit** value, clear the **Use Auto Thresholding** checkbox and drag the slider to the right until some colonies start to become undetected. Select the **Use Auto Thresholding** checkbox and the **Auto Threshold Each Frame** checkbox again and then enter the value from the **Threshold** field into the **High Limit** field.
9. Select the **Invert Image** checkbox to make dark areas bright and bright areas dark.
10. Select the **Subtract Background** checkbox to have the background become nearly black.
11. Select the **Display** tab.
12. Select the method for viewing the detected colonies in the image.
 - Click **Image Only** to display the detected colonies in white with yellow rings and a gray background.
 - Click **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background.
 - Click **Overlay only** to display the detected colonies in white with yellow rings and a black background.



To remove the yellow ring from the detected colonies, clear the **Outline Detected Features** checkbox.

13. Select the **Debris** tab.
14. Adjust the **Diameter** and **Axis Ratio** to exclude objects that are smaller than the desired colonies. Each detected feature displays within a yellow ring while excluded features do not have a yellow ring.
 - In the **Diameter** field, enter the minimum diameter of the required colonies.
 - In the **Axis Ratio** field, define the minimum roundness ratio of the required colonies.
 The **Features Found** field displays the number of objects detected as colonies. The value changes as you make adjustments.



Note: You can further refine colony detection on a higher-resolution image on the **Feature Selection** page.

15. Click **Next** to process a higher-resolution image.

Selecting Colonies for Picking

After you adjust and refine test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the Feature Selection page.

On the Feature Selection page, pickable objects show in yellow and unpickable object show in red. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

To view the details of a colony, hold the cursor over that colony to display the properties of that colony. If a colony is not selected as pickable, the reason for the exclusion shows in red text.

Excluded By Criteria	Included By Criteria
Compactness: 0.73	Compactness: 0.83
Axis Ratio: 0.43	Axis Ratio: 0.86
Minimum Diameter: 0.76	Minimum Diameter: 0.82
Maximum Diameter: 1.78	Maximum Diameter: 0.96
Proximity: 0.49	Proximity: 0.74
Mean Intensity: 61274.33	Mean Intensity: 59714.24
Median Intensity: 65520.00	Median Intensity: 65520.00
Geometric Mean Intensity: 35403.95	Geometric Mean Intensity: 29550.89
Centre Mean Intensity: 65520.00	Centre Mean Intensity: 65520.00



Note: During image processing, each object with no yellow ring in the test image is excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image and drag the **Contrast** slider to change the contrast between the objects and the background.

Click **Export Image** to save the image in .bmp, .jpg, or .png format.

To select a smaller region of interest (ROI) in the image, draw a polygon around the region.



- To draw a polygon, click the **Draw Polygon** icon and then click the image to define the corners of the polygon.
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

When you draw a polygon on the image, the system detects and picks colonies only from within the defined region of interest.

To select the control colonies for picking:

1. From the list in the upper-right area, select the barcode or identifier of the receptacle to view.
2. Refine the colony Selection criteria.
 - **Compactness:** Sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
 - **Axis Ratio:** Measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies are closer to 0 and round colonies are closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
 - **Min Diameter:** Sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.



Note: The Min Diameter cannot be lower than the Diameter value you set in the Debris Discard section of the test image.

- **Max Diameter:** Sets the maximum diameter of colonies to pick. A colony equal to or greater than the value in this field is not picked.
 - **Min Proximity:** Sets the distance between colonies to pick, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.
3. Manually change the pickable property of individual objects.
 - To define an object as pickable, right-click the object and select **Pick Item** to display the object in green.
 - To define an object as unpickable, right-click the object and select **Discard Item** to display the object in blue.
 4. In the **Limit Colonies** field, enter the maximum number of colonies to pick from each receptacle.
The **Total Feature Count** field displays the total number of pickable objects in the receptacle.
 5. Select the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle displays, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria. To save the data in .csv format, right-click and select **Export**.
 6. Select the **Display Options** tab.

7. Select the **Display Detected Features** checkbox to display all detected features with a yellow circle.
Select the **Shade Features** checkbox to give the detected colonies some shading for clearer visualization.
Select the **Display Proximity Indicators** checkbox to display connecting red lines between a detected colony and its closest neighbor.
Select the **Shade Exclusion Zone** checkbox to display a red-shaded exclusion zone where the system cannot pick.
8. Click **Next**.
9. In the Continue or Save New Routine dialog or the Save Changes to Routine dialog:
If you create a new routine, the Continue or Save New Routine dialog displays.
 - To save the settings for the routine before continuing, click **Save Routine**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.If you edit a routine, the Save Changes to Routine dialog displays.
 - To save the settings for the routine before you continue, click **Save**.
 - To save the settings as a new routine without changing the existing routine, click **Save As**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **No**.
10. Make sure that the instrument door is closed.
11. Click **OK** to start the control plate creation process.

Viewing the Control Plate Creation Progress

While the routine runs, the Picking Progress page displays a summary of the routine.

- **Start Time:** The time that the picking of the colonies began.
- **Source Barcode:** The barcode or identifier of the source receptacle being picked from.
- **Pin:** The picking pin being used for the picking operation.
- **Copy Plate No:** The barcode of the copy receptacle that is being inoculated, if you select Make Copy for the routine.
- **Destination Barcode:** The barcode of the destination receptacle that is being inoculated.
- **Destination Offset:** The reference well for where the pins are lowered. This value changes for 384-well plates.
- **Colonies Picked:** The number of colonies picked so far.
- **Colonies To Pick:** The total number of colonies to pick.
- **Estimated Time Remaining:** The remaining time in the routine.
- **Current Action:** Displays what the system is currently doing, such as *Pick* when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

After the colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

Continuing or Ending the Control Plate Creation Routine

After the colonies are picked from the source receptacles and delivered to the destination plates, the Finished Picking Current Batch dialog displays.

If there are no more source receptacles to pick, click **Finish Picking** and then click **OK**.

To continue picking more source receptacles:

1. Select an option:
 - Click **Continue With Image Review** to review images and select colonies for the new source receptacles.
 - Click **Continue Without Image Review** to use the current image settings for the next batch of source receptacles.
2. Select an option:
 - Click **Only Reload Exhausted Source** to replace only source receptacles from which colonies have been fully picked.
 - Click **Reload All Source** to replace the source receptacles with a new set of source receptacles.
3. Click **OK**.
4. When the Please Load Source page displays, replace the picked receptacles with the new receptacles on the instrument deck.



Note: Make sure that the source receptacles are in the exact same tray locations so that the instrument can locate them.

5. Close the instrument door.
6. Click **Next** to continue running the picking routine.
 - If you click **Continue With Image Review**, the system takes a white light test image of the source receptacles and the Test Image page displays. See [Adjusting the White Light Test Image on page 141](#).
 - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and the Feature Selection page displays. See [on page 143](#).

Viewing the Control Plate Creation Summary

After control plate creation routines complete, the Picking Summary page displays the number of source colonies picked, the number of destination plates used, and missing source receptacles.

Click **Export** to save this information in .csv format.

Click **Details** to view details of activities related to the source and destination receptacles.

- Click **Export** to save the detailed information in .csv format.
- Click **Close** to display the Picking Summary page.

On the Picking Summary page, click **Next** and then click **Finish** to display the Control Plate Creation page.



The QPix 420 Microbial Colony Picking System can pick colonies from receptacles using either standard picking or regional picking. You can set up control wells for the destination plates before running a picking process.

On the Navigation page under Picking Processes, double-click **Manage Regional Trays** to add, modify, or remove new regional tray source definitions to the regional picking source type database, which you can select for use in the regional picking process.

For the instruments licensed for Regional Picking, you can define new custom plate receptacles to pick from using an OmniTray holder in a Regional Picking process.

Create New Regional Trays

Your instrument must be licensed for Regional Picking to use this feature.

The new plate source tray must be able to be loaded within an OmniTray holder that fits on the light table of the instrument. The OmniTray supports trays that conform to the external dimensions within the ANSI/SLAS specification for plates with the following standard dimensions:

- Length: 127.76 mm ± 0.25 mm (5.0299 in. ± 0.0098 in.)
- Width: 85.48 mm ± 0.25 mm (3.3654 in. ± 0.0098 in.)

To create a new regional tray:

1. On the Navigation page under Picking Processes, double-click the **Manage Regional Trays** icon to display the New Plate definition page.

2. In the **Regional Tray Name** field, enter the regional tray name.
3. Complete all the parameter fields on the left using the specification document from the manufacturer.

Failure to input correct plate dimensions can result in damage to the picking head and pins.

4. Select the **Defined Tray** tab to see a visual representation of the parameters.

Complete the definition below to define a new tray to use in the regional picking application.

The new tray must be able to fit within the omni tray holder.

Guide | **Defined Tray** | Manage Previously Created Trays

Regional Tray Name:

Number of Columns:

Number of Rows:

Region Shape:

Distance A:

Distance B:

Distance C:

Distance D:

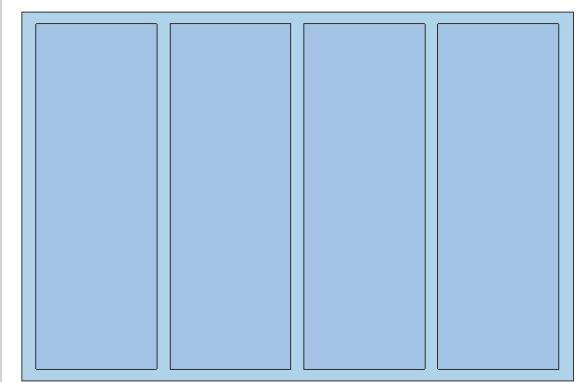
Distance E:

Distance F:

Distance G:

Distance H:

Height (Without Lid):



5. After you enter the tray dimensions and confirm the new tray is ready to save, click **Create Regional Tray**.



Note: After you click Create Regional Tray, you can go back and make changes.

6. In the Tray Created dialog, click **OK** to display the Navigation page.


F:

G:

H:

id):

Tray Created

 A new regional tray named 'My New Regional Tray' has been created and is available to use in the Regional Picking Process.

The new tray is now available for use in a Regional Picking process. See [Regional Picking Processes on page 99](#).

Modifying Regional Trays

Use the Manage Regional Trays page to edit or remove a regional tray.

To modify a regional tray:

1. On the Navigation page under Picking Processes, double-click the **Manage Regional Trays** icon to display the New Plate Definition page.
2. Select the **Manage Previously Created Trays** tab.
3. In the Defined Trays list, select the name of the tray to modify.

Complete the definition below to define a new tray to use in the regional picking application.

The new tray must be able to fit within the omni tray holder.

Guide | **Defined Tray** | Manage Previously Created Trays

Regional Tray Name:

Number of Columns:

Number of Rows:

Region Shape:

Distance A:

Distance B:

Distance C:

Distance D:

Distance E:

Distance F:

Distance G:

Distance H:

Height (Without Lid):

Defined Trays

- Genetix Omni 96 Well Plate 1
- Genetix 96-well
- Custom-Omni
- My New Regional Tray**

- To modify the definition, edit the parameter fields on the left using the specification document from the manufacturer and then click **Save Regional Tray**.
 - To make a copy of the definition, enter a new name for the regional tray in the **Regional Tray Name** field and then click **Save Regional Tray**.
 - To delete the definition, click **Remove**.
4. In the confirmation message, click **Yes**.
 5. Click **Close** to display the Navigation page.



The QPix 420 Microbial Colony Picking System is capable of replicating colonies between plates.

The following options are available on the Navigation page under Replication Processes:

- **Library Replication** replicates between plates that have the same number of wells.
- **Library Compression** replicates from 96-well plates to 384-well plates, compressing the samples.
- **Library Expansion** replicates from 384-well plates to 96-well plates, expanding the samples.



Note: Before you run a replicating process, you should do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

If this is the first replication process, you must edit or create a Sanitise profile to use with the replication process. See [Creating and Editing Sanitise Profiles on page 35](#).

Creating and Editing Replication Processes

The procedures to create and edit the replicating processes are similar. Differences and exceptions are identified within the instructions.




After you create the routine, you can close the process and run it later, or you can run it immediately.



Note: Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

Opening the Replication Page

To display the Replication page:

1. On the Navigation page under Replication Processes, double-click the icon for the type of replication process.
 -  **Library Replication** replicates between plates that have the same number of wells.
 -  **Library Compression** replicates from 96-well plates to 384-well plates, compressing the samples.
 -  **Library Expansion** replicates from 384-well plates to 96-well plates, expanding the samples.
2. On the Library Replication, Library Compression, or Library Expansion page, click **Start** to home the drives and display the Routines dialog.

Selecting Replication Routines

Use the Routines dialog to select a Replication routine:

To select a Replication routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit.
To run the routine without making changes, select the **Skip Steps** checkbox.
3. Click **Import** to import a routine.
4. Click **Export** to export the routine you select.
5. Click **Delete** to delete the routine you select.
6. Click **Next** to set the barcode options.

Importing and Exporting Replication Routines

The Select Routine list displays the routines that match the type of routine you are creating.

You can import the routine if you save a routine on a different computer. You can also export a routine from the database so you can import the routine into the database on a different computer.

Importing a Routine

To import a routine:

1. Export the routine from the other computer in .xml format.
2. Save the export file on the system computer.
3. On the system computer, click **Import**.
4. Locate and select the file.
5. Click **Import** to add the routine to the database.

If the routine is of the same type as the one you are creating, then the imported routine displays in the Select Routine list.

Exporting a Routine

To export a routine:

1. Click **Export**.
2. Navigate to the location that you want to save the .xml file.
3. You can change the name of the file.
4. Click **Export** to save the routine in .xml format.

Selecting Barcode Options

You can scan source and destination plates for barcodes or define unique identifiers for source plates without scanning for barcodes.

Using a Barcode Reader



Note: You should always use barcodes for accurate data tracking.

To use a barcode:

1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes.
2. Select a Read Failure Option to define the system response when a barcode cannot be read.
 - Select **Manual Prompt** to have the software display a dialog where you enter a barcode or name for the receptacle.
 - Select **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.



Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

- Select **Auto Generate** to allow the system to assign a barcode and continue the routine.
3. Use the Validation Barcode list to define the barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, a message displays.
 - To manually enter the barcodes, enter each barcode in the field below the list and then click **Insert**.
 - To import barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
 - To use a from the database, click **From Database**.
 - To remove a barcode from the list, select the barcode and click **Remove**.
4. Click **Next** to define the plate options and select a Sanitise profile.

Defining Unique Identifiers Without Barcodes

To define unique identifiers without barcodes:

- Clear the **Use Barcode Reader** checkbox to define unique identifiers for source receptacles without scanning for barcodes.

Random Identifiers

To have the software generate random identifiers:

1. Clear the **Use Barcode Reader** checkbox.
2. Select the **Generate Random Barcodes** checkbox to have the software generate random barcodes with the prefix Auto for the source receptacles. No other parameters are required for this option.

Manually Create Identifiers

To manually create an identifier list:

3. Clear the **Use Barcode Reader** checkbox.
4. Clear the **Generate Random Barcodes** checkbox.
5. Either:
 - In the text field below the list, enter an identifier and click **Insert**.
 - Click **Import** and then select the file from which to import the identifiers to import identifiers for the source receptacles from a text or .csv file.
 - Click **Generate List**. See below for additional steps.
6. Select an identifier in the list and click **Remove** to remove an identifier.

Generating an Identifier List

*** Tip:** The Preview area shows examples of the first and last generated identifiers.

To generate a barcode identifier list:

1. In the **Prefix** field, enter text to describe the identifier.
2. In the **Start Number** field, enter the first number to generate.
3. In the **Digit Padding** field, enter the number of digits in the generated number.
4. In the **Number to Generate** field, enter the number of identifiers to generate.
5. Click **Generate** to view the generated identifiers in the Barcodes list.
6. Click **Next** to define the plate options and select a Sanitise profile.

Selecting the Plate and Sanitizing Options

Use the Microplates and Sanitise page to select the plate and sanitize options.

To select the plate and sanitize options:

1. Click the **Source Microplate** drop-down and select the source plate type to hold the colonies to replicate.
 - For Library Replication, you can select either 96-well or 384-well plates.
 - For Library Compression, you can select 96-well plates, only.
 - For Library Expansion, you can select 384-well plates only.
2. Select an option: either to dip the pins a number of times or t.
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Source** to stir the wells of the source plate.
3. Click the **Destination Microplate** drop-down and select the destination plate type to hold the replicated colonies.
 - For Library Replication, you can select only plates with the same number of wells as the source plate.
 - For Library Compression, you can select 384-well plates, only.
 - For Library Expansion, you can select 96-well plates only.
4. Select an option:
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Source** to stir the wells of the destination plate.
5. To make a second copy of the destination plate, in the **Copies** field, enter **2**.
6. Select the **Sanitise Between Copies** checkbox to clean the pins between copies of the destination plates.
7. From the Sanitise Profile list, select the **Sanitise** profile to use for the replication routine. If the available profiles are not suitable for the replication routine, exit the replication process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).
8. Click **Next** to set the head options.

Selecting the Head Options

Use the Head page to select the head options.

To select the head options:

1. Click the **Select Head** drop-down and select the head for the replication routine.
2. Select the **Sanitise Between Copies** checkbox to clean the pins between copies of the destination plates.
3. In the **Inoculation Heights Above Well Bottom** field, enter the distance above the bottom of the plate where the pins stop in the **Source** and **Destination** plate wells.
4. Click **Next** to view the settings summary.

Viewing the Settings Summary

The Settings Summary page displays a summary of the replication routine settings.

Review the summary details to make sure that the settings and options are configured correctly for the replication routine. To make changes, click **Back** until you return to the page where the changes can be made.

Click **Print** to print the summary.

Click **Next** to change the head.

Changing the Picking Head

Use the Change Head page to view which picking head you must load, based on the Setting Summary routine you configure, and allows you to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

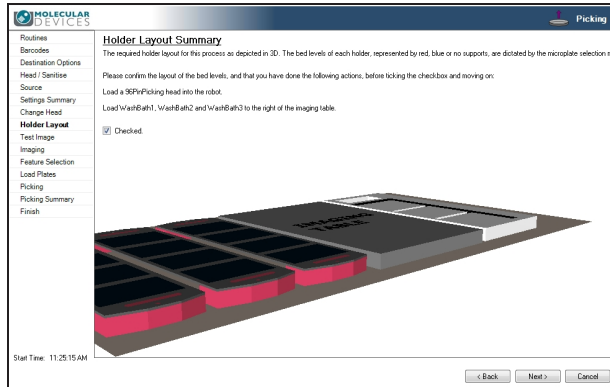
To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to arrange the source plates in the instrument.

Arranging the Plate Layout

To arrange the plate layout:

1. Open the instrument door.
2. On the Holder Layout Summary page, follow the instructions to correctly arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.



4. After you finish making the changes, click **Next**.



CAUTION! At this point, you cannot go back and change settings. To make changes now, you must cancel the process and start again.

5. Remove all plate lids.
6. On the Load Plates page, follow the instructions to correctly place the destination plates.
7. Click **Next**.
8. When the Please Load Source page displays, load the source receptacles in the correct locations on the instrument deck.



Tip: If needed, you must install the filter between the lightbed and the source tray before you continue.

9. Close the instrument door.
10. Click **Next** to take a white light test image of the source receptacles.

Running Replication Processes

After you configure the replication routine, you can run the process on the instrument.

To run a replication routine:

1. Open the Library Replication, Library Compression, or Library Expansion page.
2. Select the replication routine to run.
To not make changes to the routine, select the **Skip Steps** checkbox before you click **Next**.
3. Review the settings for the routine.
4. On the Settings Summary page, click **Next** to display the Continue or Save New Routine dialog or the Save Changes to Routine dialog.
5. Select whether or not to save the routine before you continue with the replication process.
If you create a new routine, the Continue or Save New Routine dialog displays.
 - To save the settings for the routine before you continue, click **Save Routine**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.
 If you edit a routine, the Save Changes to Routine dialog displays.
 - To save the settings for the routine before continuing, click **Save**.
 - To save the settings as a new routine without changing the existing routine, click **Save As**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **No**.
6. Make sure that the instrument door is closed.
7. Click **Next** to run the replication routine. The Library Replication Progress, Library Compression Progress, or Library Expansion Progress page displays.

Viewing the Replication Progress

The Library Replication Progress, Library Compression Progress, or Library Expansion Progress page displays a summary of the routine.

- **Start Time:** The time the replication process began.
- **Source Plate No:** The number of the source plate that is being replicated.
- **Source Barcode:** The barcode or identifier of the source plate that is being replicated.
- **Source Offset:** The well in the source plate into which the A1 pin is being lowered. This value changes for 384-well plates.
- **Depositing Into:** The well or plate into which the sample is being deposited.
- **Destination Plate No:** The number of the plate into which the sample is being deposited.
- **Destination Barcode:** The barcode of the plate into which the sample is being deposited.
- **Destination Offset:** The well in the destination plate into which the A1 pin is being lowered. This value changes for 384-well plates.
- **Calculating Remaining Time:** The remaining time in the routine.
- **Current Action:** What the system is doing, such as *Wash Head* when the system is running the Sanitise profile.

To safely pause the routine, click **Pause**.

After the source plates are replicated to the destination plates, the Replicating Process page displays.

Viewing the Replicating Summary

After the replication routine completes, the Replicating Process page displays the number of source wells that were replicated, how many destination plates were used, and how many source plates were missing.

Click **Details** to view details of all activities related to the source and destination plates.

- Click **Export** to save the detailed information in .csv format.
- Click **Close** to display the Replicating Process page.

On the Replicating Process page, click **Next** and then click **Finish** to display the Library Replication, Library Compression, or Library Expansion page.



The QPix 420 Microbial Colony Picking System is capable of rearranging, or redepositing, colonies between one or more source and destination plates. Use the rearranging process to organize, or cherry-pick, your picked source colonies into destination subsets of a more specific and orderly layout.



Note: Before you run a rearranging process, you should do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

If this is your first rearranging process, you must edit or create a Sanitise profile to use with the rearranging process. See [Creating and Editing Sanitise Profiles on page 35](#).

Creating and Editing Rearranging Processes

After you create the routine, you can close the process and run it later, or you can run it immediately.



Note: Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

Opening the Rearranging Page

To open the Rearranging page:

1. On the Navigation page under Rearranging Processes, double-click **Rearranging** to display the Rearranging page.
2. Click **Start** to home the drives and display the Routines dialog.

Selecting Rearranging Routines

Use the Routines dialog to select a Rearranging routine.

To select a Rearranging routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit.
To run the routine without making changes, select the **Skip Steps** checkbox.
3. Click **Delete** to delete the routine you select.
4. Click **Next** to set the barcode options.

Selecting Barcode Options

You can scan source and destination plates for barcodes.

Using a Barcode Reader



Note: You should always use barcodes for accurate data tracking.

To use a barcode reader:

1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes.
2. Select a Read Failure Option to define the system response when a barcode cannot be read.
 - Select **Manual Prompt** to display a dialog where you enter a barcode or name for the receptacle.
 - Select **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.



Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

- Select **Auto Generate** to allow the system to automatically assign a barcode and continue the routine.
3. Click **Next** to define the source plate options.

Selecting the Source Plate Options

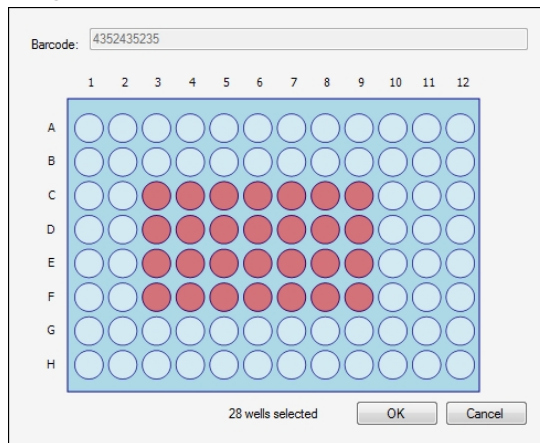
Use the Source page to select the source plate options.

To select the source plate options:

1. Click the **Source Microplate** drop-down and select the source plate type to hold the colonies to be rearranged.
2. Use the **Source Microplate** list to define all the source plates for the process.
 - To import source plates from a previously saved .frd (Fusion) or .imp (QSoft) file, click **Import** and select the file from which to import the plate information.
 - To use source plates in the database, click **From Database** to display the Barcode Search dialog.
 - Select the **By Tag** tab to search for a tagged routine, receptacle, or location (colony). See [Working With Tags on page 184](#).
 - Select the **By Process** tab to search by barcode or identifier from previously run routines.

In the list on the left, click the process that was used to create the source plate, and then select the routine from the expanded list. In the **Destination** list on the right, click the source plate and then click **Add Selected Barcode**. If you add a plate to the Selected Barcodes list that is not a source for this routine, then select the plate and click **Remove**. When all source plates are in the Selected Barcodes list, click **Import**.

3. Select a barcode or identifier in the Source Microplate list, and then click **Insert** to open an image of the plate from which to define the wells to dip or skip for the rearranging routine.



- To dip a well, click the well. Wells to dip display in red.
- To dip multiple contiguous wells, right-click and drag across the wells.
- To skip a well that you select to dip, click the well again. Wells to skip display in light blue.

After you define the wells to dip or skip, click **OK**.

4. Define the wells to dip or skip for each of the plates in the Source Microplate list.
5. To export the list of source plates to a new .frd (Fusion) or .imp (QSoft) file, click **Export**. The new file can be used for importing source plates into a different rearranging routine.
6. To edit a plate in the Source Microplate list, select the plate and then click **Edit**.
7. To remove a plate from the Source Microplate list, select the plate and then select **Remove**.
8. To clear the entire Source Microplate list, click **Remove All**.
9. To stir the wells before picking the colonies, select the **Stir Source** checkbox.
10. To reduce the pin-firing speed, select the **Slow Pin Fire** checkbox.
Reducing the pin-firing speed can prevent cross-contamination due to occasional splashing that can occur with normal pin-firing speed. However, this significantly increases the amount of time required for the process.
11. In the **Microplates to Process Before Depositing** field, enter the number of source plates from which to pick colonies before depositing the colonies into the destination plates.
12. Click **Next** to set the destination source options.

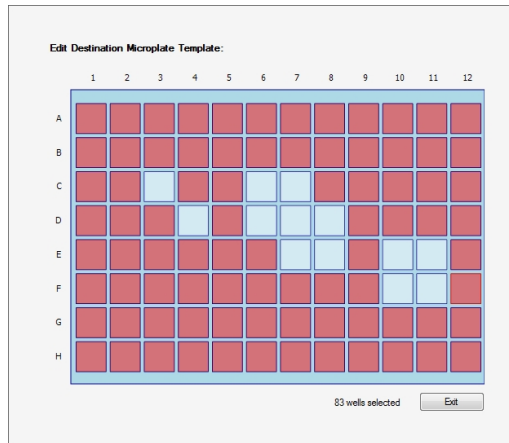
Selecting the Destination Plate Options

Use the Destination page to select the destination plate options.

To select the destination plate options:

1. Click the **Select Destination Microplate** drop-down and select the plate type to receive the colonies picked from the source plates.
2. Select an option:
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Destination** to stir the wells of the destination plate during inoculation.
3. Select the Deposit Order:
 - Select **By Columns** to deposit the picked colonies by column.
 - Select **By Rows** to deposit the picked colonies by row.

- Under Destination Microplate Template, click **Edit** to define the wells to dip or skip. You can skip wells that you want to use as blank or control wells. This template is used for all the destination plates during the rearranging routine.



- To skip a well, click the well. Wells to skip display in light blue.
- To skip multiple contiguous wells, right-click and drag across the wells.
- To dip a well that you select to skip, click the well again. Wells to dip display in light red.

After defining the wells to dip or skip, click **Exit**.

- Click **Next** to select the head options.

Selecting the Head Options

Use the Head page to select the head options.

To select the head options:

- Click the **Select Head** drop-down and select the head to use for the rearranging routine.
- Under **Inoculation Heights Above Well Bottom**, enter the distance above the bottom of the plate where the pins stop in the **Source** and **Destination** plate wells.
- Click **Next** to select a Sanitise profile.

Selecting the Sanitizing Options

Use the Sanitise page to select the sanitize options.

To select the sanitize options:

- Click the **Sanitise Profile** drop-down and select the Sanitise profile to use for the rearranging routine.
If the available profiles are not suitable for the rearranging routine, exit the rearranging process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).
- Click **Next** to view the settings summary.

Viewing the Settings Summary

The Settings Summary page displays a summary of the rearranging routine settings.

Review the summary details to make sure that the settings and options are configured correctly for the rearranging routine. To make changes, click **Back** until you return to the page where the changes can be made.

Click **Print** to print the summary.

Click **Next** to change the head.

Changing the Picking Head

The Change Head page reminds you which picking head must be loaded, based on the Setting Summary routine you configured and allows you to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to arrange the source plates in the instrument.

Arranging the Plate Layout

To arrange the plate layout:

1. Open the instrument door.
2. On the Holder Layout Summary page, follow the instructions to correctly arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.
4. Click **Next**.
5. Remove all plate lids.
6. On the Load Plates page, follow the instructions to correctly place the plates.
7. Select the **Checked?** checkbox to confirm the plate layout.
8. Close the instrument door.
9. Click **Next** to start rearranging.

Running Rearranging Processes

After you configure the rearranging routine, you can run the process on the instrument.



Note: Before you run a rearranging process, it is important that you do the cleaning and set up procedures in [Preparing to Run Processes on page 29](#).

Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

To run a configured rearranging routine:

1. Open the Rearranging page.
2. Select the rearranging routine to run.
If you do not need to make changes to the routine, select the **Skip Steps** checkbox before clicking **Next**.
3. Review the settings for the routine.
4. On the Settings Summary page, click **Next** to display the Continue or Save New Routine dialog or the Save Changes to Routine dialog.
5. Select whether or not to save the routine before you continue with the rearranging process. If you create a new routine, the Continue or Save New Routine dialog displays.
 - To save the settings for the routine before you continue, click **Save Routine**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.If you edit a routine, the Save Changes to Routine dialog displays.
 - To save the settings for the routine before continuing, click **Save**.
 - To save the settings as a new routine without changing the existing routine, click **Save As**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **No**.
6. Make sure that the instrument door is closed.
7. Click **Next** to display the Rearranging Progress page and run the replication routine.

Viewing the Rearranging Progress

While the rearranging routine is running, the Rearranging Progress page displays a summary of the routine.

- **Start Time:** The time the rearranging process began.
- **Source Plate No:** The number of the source plate that is being rearranged.
- **Source Barcode:** The barcode or identifier of the source plate that is being rearranged.
- **Source Well:** The well from which the sample is being picked.
- **Pin:** The picking pin that is being used.
- **Destination Plate No:** The number of the plate into which the sample is being deposited.
- **Destination Barcode:** The barcode or identifier of the plate into which the sample is being deposited.
- **Destination Offset:** The well in the destination plate into which the "A1" pin is being lowered. This value changes for 384-well plates.
- **Total Wells Rearranged:** The number of wells that have been rearranged.
- **Total Wells to Rearray:** The total number of wells to be rearranged.
- **Estimated Time Remaining:** The remaining time in the routine.
- **Current Action:** What the system is currently doing, such as *Deposit* when the system is depositing colonies into the destination plate.

To safely pause the routine, click **Pause**.

After all the source plates are rearranged to the destination plates, the Rearranging Process page displays.

Viewing the Rearranging Summary

After rearranging routine completes, the Rearranging Process page displays the number of source wells that were rearranged, how many destination plates were used, and how many source plates were missing.

Click **Details** to view details of all activities related to the source and destination plates.

- Click **Export** to save the detailed information in .csv format.
- Click **Close** to close the picking details and to display the Rearranging Process page.

On the Rearranging Process page, click **Next** and then click **Finish** to display the Rearranging page.



The QPix 420 Microbial Colony Picking System uses the gridding process to collect liquid samples from one or more source plates and then to deposit the liquid on the surface of one or more filters or on the surface of the agar in one or more QTrays. The gridding head stamps the sample in a defined grid pattern on the filter or agar.



Note: Before you run a gridding process, you should do the cleaning and set up procedures. See [Preparing to Run Processes on page 29](#).

If this is the first gridding process, you must edit or create a Sanitise profile to use with the gridding process. See [Creating and Editing Sanitise Profiles on page 35](#).

Creating and Editing Gridding Processes

After you create the routine, you can close the process and run it later, or you can run it immediately.



Note: Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

Opening the Gridding Page

To open the Gridding page:

1. On the Navigation page under Gridding Processes, double-click the **Gridding** icon to display the Gridding page.
2. Click **Start** to home the drives and display the Routines page.

Selecting Gridding Routines

Use the Routines dialog to select a Gridding routine.

To select a Gridding routine:

1. Select **New Routine** to create a new routine.
2. Select **Run Existing Routine**, then click the **Select Routine** drop-down and select an existing routine to run or to edit.
To run the routine without making changes, select the **Skip Steps** checkbox.
3. Click **Delete** to delete the routine you select.
4. Click **Next**.

Selecting Barcode Options

You can scan source and destination receptacles for barcodes or define unique identifiers for receptacles without scanning for barcodes.

Using a Barcode Reader



Note: You should always use barcodes for accurate data tracking.

To use a barcode:

1. Select the **Use Barcode Reader** checkbox to scan source and destination receptacles for barcodes. Barcodes compatible with the barcode reader are code 11, code 39, code 93, and code 128.
2. Select a Read Failure Option to define the system response when a barcode cannot be read.
 - Select **Manual Prompt** to have the software display a dialog where you enter a barcode or name for the receptacle.
 - Select **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.



Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

- Select **Auto Generate** to allow the system to assign a barcode and continue the routine.
3. Use the Validation Barcode list to define the barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, a message displays.
 - To manually enter the barcodes, enter each barcode in the field below the list and then click **Insert**.
 - To import barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
 - To use a from the database, click **From Database**.
 - To remove a barcode from the list, select the barcode and click **Remove**.
4. Click **Next** to define the head and choose a Sanitise profile.

Defining Unique Identifiers Without Barcodes

To define unique identifiers without barcodes:

1. Clear the **Use Barcode Reader** checkbox to define unique identifiers for source receptacles without scanning for barcodes.

Random Identifiers

To have the software generate random identifiers:

1. Clear the **Use Barcode Reader** checkbox.
2. Select the **Generate Random Barcodes** checkbox to have the software generate random barcodes with the prefix Auto for the source receptacles. No other parameters are required for this option.

Manually Create Identifiers

To manually create an identifier list:

3. Clear the **Use Barcode Reader** checkbox.
4. Clear the **Generate Random Barcodes** checkbox.
5. Either:
 - In the text field below the list, enter an identifier and click **Insert**.
 - Click **Import** and then select the file from which to import the identifiers to import identifiers for the source receptacles from a text or .csv file.
 - Click **Generate List**. See below for additional steps.
6. Select an identifier in the list and click **Remove** to remove an identifier.

Generating an Identifier List

*** Tip:** The Preview area shows examples of the first and last generated identifiers.

To generate a barcode identifier list:

1. In the **Prefix** field, enter text to describe the identifier.
2. In the **Start Number** field, enter the first number to generate.
3. In the **Digit Padding** field, enter the number of digits in the generated number.
4. In the **Number to Generate** field, enter the number of identifiers to generate.
5. Click **Generate** to view the generated identifiers in the Barcodes list.
6. Click **Next** to define the head and choose a Sanitise profile.

Selecting the Head and Sanitizing Options

Use the Head and Sanitise page to select the head and sanitize options.

To select the head and sanitize options:

1. Click the **Gridding Head** drop-down and select the head to use for the gridding routine.
2. Click the **Sanitise Profile** drop-down and select the Sanitise profile to use for the gridding routine.
If the available profiles are not suitable for the gridding routine, exit the gridding process and create a new Sanitise profile. See [Creating and Editing Sanitise Profiles on page 35](#).
3. Click **Next** to define options for the source and destination receptacles.

Setting Source and Destination Options

Use the Microplates and Filters page to select source and destination options:

To select source and destination options:

1. Click the **Select Microplate** drop-down and select the plate type for the source.
2. Select an option: either to dip the pins a number of times or
 - Select **Multi Dip** and in the **Number of Dips** field, enter the number of times to dip the pins.
 - Select **Stir Source** to stir the wells of the source plate.
3. In the **Inoculation Height** field, enter the distance above the bottom of the plate where the pins stop in the Source plate wells.
4. Click the **Destination Receptacle** drop-down and select **Filter**, **OmniTray**, or **QTray**.
5. Click **Next** to define the filter design layout.

Creating Filter Design Layouts

Use the Filter Design page to define the Spot Pattern to stamp on the destination surface in the Field Pattern.

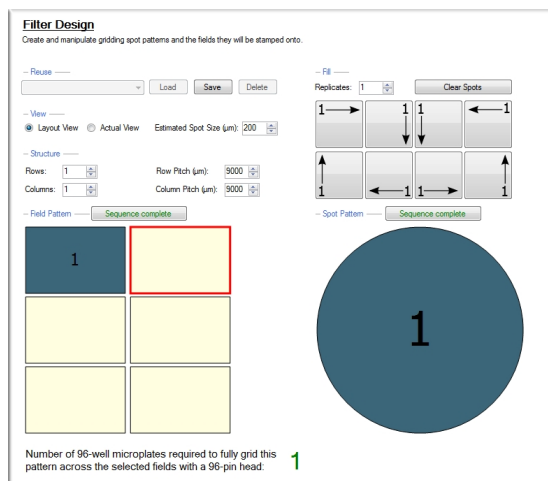
- The Spot Pattern determines the pattern and the number of times that a pin is stamped on the destination surface. The numbers and colors represent the samples taken from separate plates and stamped on the surface in the defined locations.
- The Field Pattern divides the destination surface into areas, or fields, that are the size of a 96-pin head. Each field represents one head stamp of the defined Spot Pattern. The colors and numbers identify the fields. Duplicate fields can be created where two or more fields have the same number and color. The field number also influences the sample deposit order. Field 1 is visited before field 2. Six fields are available for QTray and Filter destination receptacles, while only one field is available for an OmniTray destination receptacle.

Although, the numbers and colors used in the patterns look similar, there is no relation between the numbers and colors used in the Spot Pattern and the Field Pattern.

You can stamp from a maximum of 57600 samples to a minimum of 96 samples on the destination surface.

Number of 384-well microplates required to fully grid this pattern across the selected fields with a 384-pin head: 150

The maximum number of samples can be defined with 25 spots in the Spot Pattern and 6 fields in the Field Pattern that requires 150 filled 384-well plates.



The minimum number of samples can be defined with 1 spot in the Spot Pattern and 1 field in the Field Pattern that requires 1 filled 96-well plate.

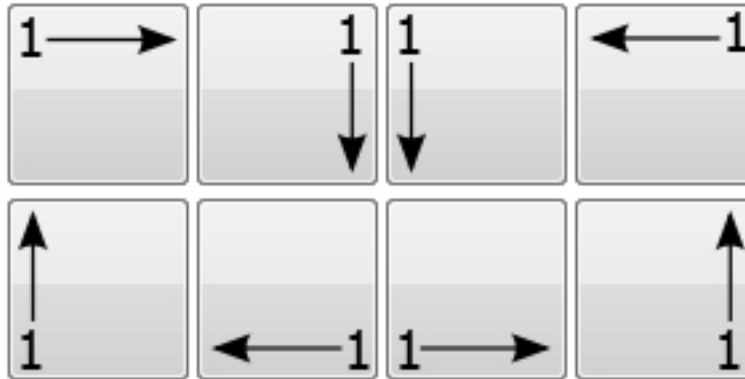
Defining the Filter Design Layout

Use the Filter Design page to define the filter design layout.

To define the filter design layout:

1. Click the **Reuse** drop-down and select a filter design layout.
If there are no filter designs in the Reuse list, or if the existing designs do not meet your needs, skip to step 4.
2. Click **Load** to display a Load Gridding Pattern message.
3. Click **Yes**.
4. To use the filter design layout without making changes, click **Next** to select the destination positions.
5. Select the View for the filter design.
 - Select **Layout View** to edit the filter design layout.
 - Select **Actual View** to see a realistic representation of the layout and spot pattern of the pins.
To change the representation of the spot size, in the **Estimated Spot Size** field, enter a value up to 1500.
6. In **Structure** field, enter the number of **Rows** and **Columns** to stamp in the **Spot Pattern** for each pin.
7. In the **Row Pitch** and **Column Pitch** fields, enter values to define the space between each spot in the **Spot Pattern**.
The values in the Row Pitch and Column Pitch fields change depending on the number spots in the pattern. You can reduce the space between spots, but you cannot exceed the maximum values computed by the software.
8. In the **Replicates** field, enter the number of times to replicate each sample in the Spot Pattern.

9. Click the direction buttons that represents the starting point for the first pin and the direction for the Spot Pattern.



10. In the Fill Pattern message, click **OK** to create and display a Spot Pattern based on the values in the Rows, Columns, and Replicates fields.
11. Edit the Spot Pattern.
 - To change the assigned number for a spot, select the existing number in the spot and then enter a new number.
The spot pattern must have a logical numerical sequence, such as 1,2,3,4 or 1,2,2,4. If you create an illogical sequence, such as 1,3,4,3 or 1,4,1,2, a message *Can't Calculate* displays in red text, the No Sequence button displays in red, and the Spot Pattern Status message appears to describe the error.
 - To reset the Spot Pattern, click the direction buttons.
 - To skip a spot, select the existing number in the spot and then press the **Delete** key.
 - To clear all the spots in the pattern, click **Clear Spots** and then in the Clear Pattern message, click **OK**.
12. Edit the **Field Pattern** to define the layout of the destination surface. Each field represents one head stamp of the defined Spot Pattern.
 - To change the assigned number for a field, select the number in the field and then enter a new number from 1 to 6. Each different number assigned to a field represents a different sample to be stamped in that field.
The field pattern must have a logical numerical sequence to it, such as 1,2,3,4,5,6 or 1,2,2,3,3,4. If you create an illogical sequence, such as 1,1,2,5,3,5, the No Sequence button displays in red. For information about the error, click **No Sequence** to display a Field Pattern Status message.
 - To skip a field, select the number in the field and then press the **Delete** key.
 - If the layout contains two identical fields with the same color and number, the fields become copies of each other.
13. To include the filter design layout in the Reuse list, click **Save** at the top of the page and give the new design a name.
14. Click **Next** to select the filter layout.

Selecting the Destination Positions

For the QPix 420 Microbial Colony Picking System, no options are available on the Filter Layout page for QTray usage. Click **Next** to select the stamping and inking options.

Use the Filter Layout page to select the destination positions.

To select the destination positions:

1. In the Positions to Use list, enter the number of positions to use for gridding.
 - For filters, 3 positions are available.
 - For OmniTrays, 2 positions are available.
2. In the **Receptacle Offset** field, enter the number of the first position to use for gridding. The preview image displays the positions of the destination.
3. Click **Next** to select the stamping and inking options.

Selecting Stamping and Inking Options

Use the Substrate page to select the stamping and inking options.

To select the stamping and inking options:

1. In the **Stamps Per Spot** field, enter a number from 1 to 5 for the number of times to stamp the pins in each spot.
2. To dip the pins in the source plate between multiple stamps, select the **Re-Ink After # of Stamps** checkbox and enter a number in the field for the number of stamps to do before returning to the source plate.
3. Select a Multiple Stamp Loop method:
 - Select **Cyclic** to stamp all the spots for a sample the number of times before returning to the source plate.
For example, if the sample has three replicate spots to stamp four times and re-ink after two stamps, the Cyclic method stamps all three spots two times before returning to the source plate to collect more sample, and then stamps all three spots two more times.
 - Select **Immediate** to stamp one of the spots for a sample the number of times before returning to the source plate.
For example, if the sample has three replicate spots to stamp four times and re-ink after two stamps, the Immediate method stamps the first spot two times before returning to the source plate to collect more sample, and then stamps the second spot two times before returning to the source plate to collect more sample, and then stamps the third spot two more times.
4. In the **Stamp Time** field, enter the number of milliseconds to press the pins against the destination surface for each stamp.
5. In the **Dwell Time** field, enter the number of milliseconds to dip the pins in the source plate wells.
6. In the **Overtravel Adjustment** field, enter the number of millimeters for the pins to travel below the detected surface of the destination (from 1 to 15). This allows all the pins to make firm enough contact with an uneven surface for a good transfer of sample.
7. Click **Next** to lock the instrument door and view a summary of the settings.

Viewing the Settings Summary

The Settings Summary page displays a summary of the gridding routine settings.

Review the summary details to make sure that the settings and options are configured correctly for the gridding routine. To make changes, click **Back** until you return to the page where the changes can be made.

Click **Print** to print the summary.

Click **Next** to change the head.

Changing the Picking Head

The Change Head page reminds you which picking head to load, based on the Setting Summary routine you configure and allows you to change the head.

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the picking head.
 - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.
Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
 - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to arrange the source plates in the instrument.

Arranging the Plate Layout

To arrange the plate layout:

1. Open the instrument door.
2. On the Holder Layout Summary page, follow the instructions to correctly arrange the plate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** checkbox to confirm the plate holder layout.
4. Click **Next**.
5. Remove all plate lids.
6. On the Load Plates page, follow the instructions to correctly place the source plates.
7. Select the **Checked?** checkbox to confirm the source plate layout.
8. Close the instrument door.
9. Click **Next** to start gridding.

Running Gridding Processes

After you configure the gridding routine, you can run the process on the instrument.



Note: Before you run a gridding process, it is important that you do the cleaning and set up procedures in [Preparing to Run Processes on page 29](#).

Some steps that are included in these procedures might not be available, depending on the features included with the instrument and license.

To run a gridding routine:

1. Open the Gridding page. See [Opening the Gridding Page on page 171](#).
2. Select the gridding routine to run. See [Selecting Gridding Routines on page 171](#).
To not make changes to the routine, select the **Skip Steps** checkbox before you click **Next**.
3. On the Settings Summary page, review the routine settings and click **Next** to display the Continue or Save New Routine dialog or the Save Changes to Routine dialog.
4. Select whether or not to save the routine before you continue with the gridding process. If you create a new routine, the Continue or Save New Routine dialog displays.
 - To save the settings for the routine before continuing, click **Save Routine**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

If you edit an existing routine, the Save Changes to Routine dialog displays.

- To save the settings for the routine before continuing, click **Save**.
 - To save the settings as a new routine without changing the existing routine, click **Save As**, enter the routine **Name** and **Description**, and then click **Save**.
 - To continue without saving the settings for the routine, click **No**.
5. When the Please Load Destination page displays, load the destination receptacles in the correct locations on the instrument deck.
 6. Close the instrument door.
 7. Click **Next** to run the gridding routine and to display the Gridding Progress page.

Viewing the Gridding Progress

While the gridding routine runs, the Gridding Progress page displays a summary of the routine.

- **Start Time:** The time the gridding process began.
- **Source Plate No:** The number of the source plate from which the sample is being taken.
- **Source Barcode:** The barcode or identifier of the source plate from which the sample is being taken.
- **Destination Receptacle No:** The number of the destination receptacle onto which the sample is being stamped.
- **Destination Barcode:** The barcode of the destination receptacle onto which the sample is being stamped.
- **Field:** The field on the destination receptacle onto which the sample is being stamped.
- **Spot:** The spot on the destination receptacle onto which the sample is being stamped.
- **Field Replicate:** The current destination field replicate onto which the sample is being stamped.
- **Spot Replicate:** The current destination spot replicate onto which the sample is being stamped.
- **Stamp:** The current stamp being gridded.
- **Estimated Time Remaining:** The estimate of the time remaining in the gridding process in hours, minutes, and seconds.
- **Current Action:** What the system is currently doing, such as *Washing* when the system is running the Sanitise profile.

To safely pause the routine, click **Pause**.

After all samples are transferred from the source plates to the destination receptacles, the Gridding Process page displays.

Viewing the Gridding Summary

After the gridding routine completes, the Gridding Process page displays the number of spots that were stamped and the number of source plates from which the samples were taken.

Click **Details** to view details of all activities related to the source and destination receptacles.

- Click **Export** to save the detailed information in .csv format.
- Click **Close** to close the picking details and to display the Gridding Process page.

On the Gridding Process page, click **Next** and then click **Finish** to display the Gridding page.




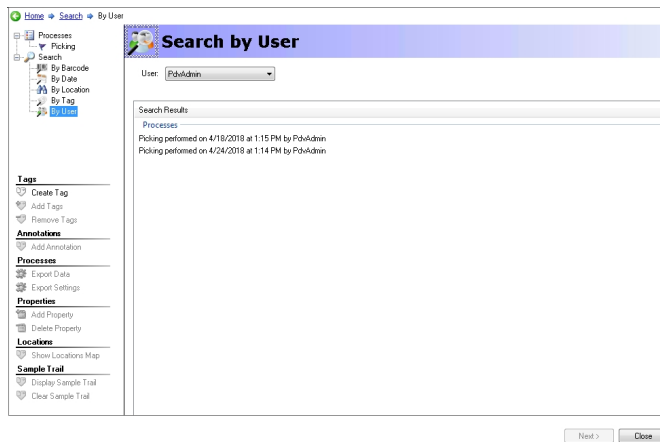
The database stores information about the routines run on the QPix 420 Microbial Colony Picking System. You can view the data details and manage the database with Data Viewer processes.

Finding Data in the Database

Use the Data Viewer page to find data in the database.

To find data in the database:

1. On the Navigation page under Data Viewer Processes, double-click  **Data Viewer** to display the Data Viewer page.
2. In the list on the left, select a process or search method.



- Select a process to display the list of the routines that the process ran. Select a routine to display the list of used receptacles and annotations for the routine. Below Barcoded Receptacles click **More** to display the Source Receptacles dialog or the Destination Receptacles dialog that contains additional receptacles.
 - Select **By Barcode** to search for a receptacle by barcode.
 - Select **By Date** to filter the list of routines to those that were run on that date. Select a routine to display the list of used receptacles and annotations for the routine. Below Barcoded Receptacles click **More** to display the Source Receptacles dialog or the Destination Receptacles dialog that contains additional receptacles.
 - Select **By Location** and then either use the **Barcode** field or the **Well** drop-down list to search for the receptacle or well.
 - Select **By Tag** and then move tags from the **Available Tags** list to the **Search Tags** list to display the items related to tags you select. See [Working With Tags on page 184](#).
 - Select **By User** to display a list of all the routines that were run by a specific user. Select a routine to display a list of used receptacles and annotations for the routine. Below Barcoded Receptacles click **More** to display the Source Receptacles dialog or the Destination Receptacles dialog that contains additional receptacles.
3. Double-click an item to display details.
 4. Double-click items until you reach the level of detail you need.
 5. Click **Close** to display to the Navigation page.

Displaying the Settings for Routines

To display the settings for routines:

1. Find the routine for which you want to display the settings.
2. Double-click the routine to display details.
3. Click the **Settings** link at the top to display the settings for the routine.
4. Click **Print** to print the settings.
5. Click **Exit** to return to the details display.

Working With Tags

Use the Data Viewer page to create, add, or remove tags. A tag is an identifier for a routine, receptacle, or location that allows you to identify data of interest. You must create one or more tags before you can add the tags to routines, receptacles, or locations. You can use tag names to find tagged items.

Creating Tags

Use the Create Tag dialog to create tags:

To create tags:

1. On the Navigation page under Data Viewer Processes, double-click the **Data Viewer** icon to display the Data Viewer page.
2. On the left, click **Create Tag** to display the Create Tag dialog.
3. In the **Tag** field, enter the tag name.
4. In the **Description** field, enter a description.
5. Click **Create Tag** to display the Data Viewer page.

Adding Tags to Routines, Receptacles, and Locations

After you create tags, you can add tags to a routine, receptacle, or location.

To add tags to routines, receptacles, and locations:

1. Find and select the routine, receptacle, or location to which you want to add tags. See [Finding Data in the Database on page 183](#).
2. On the left, click **Add Tag** to display the Select Tags to Add dialog.
3. Select either **Process**, **Receptacle**, or **Location** to define the type of item to tag. The available items depend on the level of detail you select on the Data Viewer page.
4. Select one or more tags to add. To select multiple tags, press the **Ctrl** key as you click each tag.
5. Click **Add Tags** to display the Data Viewer page. The tags you add display on the right side.

Removing Tags from Routines, Receptacles, and Locations

To remove tags from routines, receptacles, and locations:

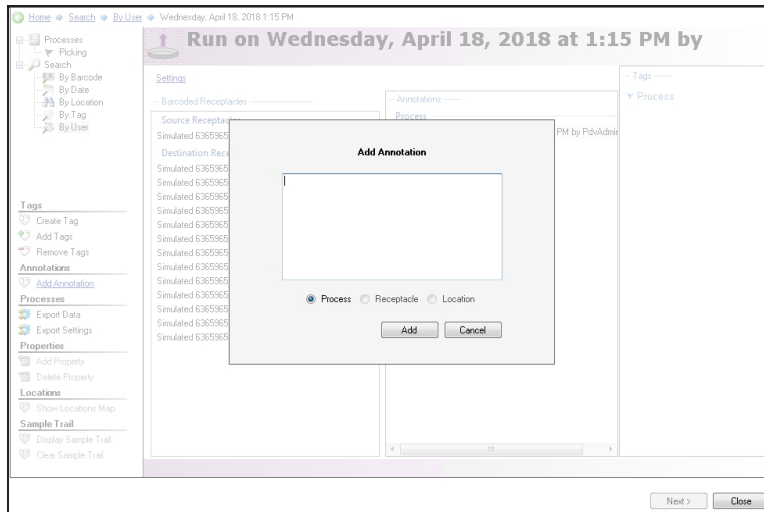
1. Find and select the routine, receptacle, or location from which to remove tags.
2. On the left, click **Remove Tag** to display the Select Tags to Remove dialog.
3. Select one or more tags to remove. To select multiple tags, press the **Ctrl** key as you click each tag.
4. Click **Remove** to display the Data Viewer page.

Adding Annotations to Routines, Receptacles, and Locations

Use the Add Annotations dialog to add annotations to routines, receptacles, and locations.

To add annotations to routines, receptacles, and locations:

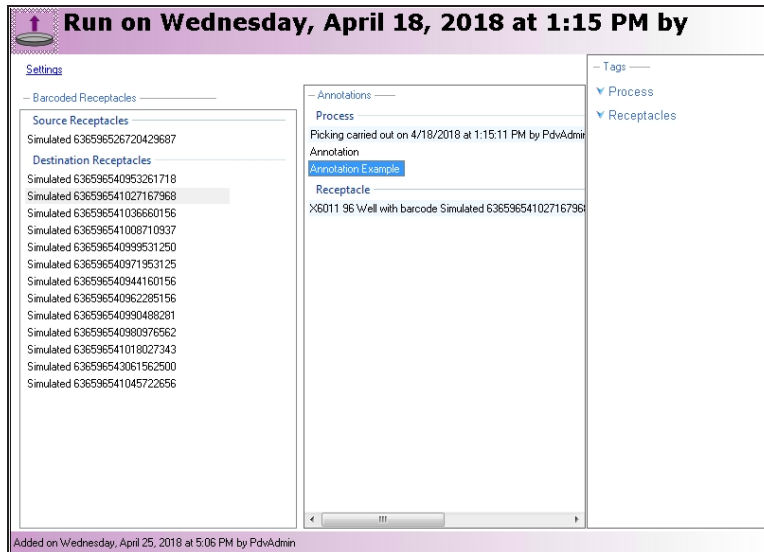
1. Find and select the routine, receptacle, or location to which you want to add an annotation. See [Finding Data in the Database on page 183](#).
2. On the left, click **Add Annotation** to display the Add Annotations dialog.
3. In the text field, enter the annotation.



4. Select either **Process**, **Receptacle**, or **Location** to define the type of item to which to add the annotation.

The available items depend on the level of detail you select on the Data Viewer page.

5. Click **Add**.



Exporting Data and Settings

To export data and settings:

1. Find and select the routine from which you want to export the data or the settings.
2. On the left select the type of export.
 - Click **Export Data** to export the data from the routine in .csv format.
 - Click **Export Settings** to export the settings from the routine in .html format.
3. In the Export dialog, navigate to the folder in which to save the file and enter a file name.
4. Click **Save**.

Working With Plate Properties

You can add properties to the default properties related to individual wells in the plates used for routines. You can add or remove plate properties on the Data Viewer page. You cannot remove the default properties related to a plate well.

Adding Plate Properties

Use the Add Property dialog to add plate properties.

To add plate properties:

1. Find and select the plate well to which to add the property. See [Finding Data in the Database on page 183](#).
2. On the left click **Add Property** to display the Add Property dialog.
3. In the **Property Name** field, enter the property name.
4. In the **Property Value** field, enter the property value.
5. In the **Property Type** list, select the type of value to use for the property.
 - Select **String** if the value is text, such as Positive Sample.
 - Select **Int** if the value is an integer, such as 5.
 - Select **Double** if the value is a decimal number, such as 6.75.
 - Select **Bool** if the value is Boolean, such as True.
6. Click **Add** to add the property to the plate well. The new property displays in the Location Properties list to the right of the plate image.

Deleting Plate Properties

To delete plate properties:

1. Find and select the plate well from which you want to delete the property.
2. In the Location Properties list on the right, select the property to delete.
You cannot remove the default properties related to a plate well.
3. On the left, click **Delete Property** to display the Delete Property dialog.
4. Confirm that the property information belongs to the property to delete.
5. Click **Delete Property**.

Viewing Receptacle Location Maps

To view a map of receptacle locations:

1. Find and select the plate well to view the location map.
2. On the left, click **Show Locations Map** to display the Add Property dialog.
3. In the **Property Name** field, enter the property name.

The Location Map dialog displays the connection between the plate and the related source or destination receptacle. For example, a destination plate can be mapped to a source QTray in a picking process.

4. Click **Close**.

Working With Sample Trails

Use a sample trail to display the details of how one or more wells were used in a plate for a routine. Add wells to the Sample Trail list in the lower-right corner of the Data Viewer page. After you define a sample trail, you can display or clear the sample trail from the list on the left.

After you create a sample trail for the plate, you can display the sample trail and clear the sample trail.

Display Sample Trails

To display the details of a sample trail for a plate:

1. On the left side of the Data Viewer page, click **Display Sample Trail** to display the Sample Trail Locations dialog.
2. Click **Save** to save the details in .csv format.

Clear Sample Trails

To delete a sample trail definition from a plate:

- On the left side of the Data Viewer page, click **Clear Sample Trail**.

Creating and Editing Sample Trails

To create and edit sample trails:

1. Find and select the plate to which to add a sample trail. See [Finding Data in the Database on page 183](#).
2. In the Sample Trail list area of the Data Viewer page, click **Add/Remove** to display the Edit Sample Trail dialog.
3. Select the wells to include in the sample trail.
Unselected wells are yellow, and selected wells are red.
To deselect a well, click it again.
4. Click **OK** to display the selected wells in the Sample Trail list in the lower-right area of the Data Viewer page.



Perform only the maintenance tasks described in this guide. Contact a Molecular Devices service engineer to inspect and perform a preventive maintenance service on the instrument each year. See [Obtaining Support on page 203](#).

Before you operate the instrument or perform maintenance operations, make sure you are familiar with the safety information in this guide. See [Safety Information on page 7](#).

Maintenance and troubleshooting procedures that can be done by users to ensure optimal operation of the instrument.



CAUTION! Maintenance procedures other than those specified in this guide must be performed by Molecular Devices. When service is required, contact Molecular Devices technical support.

Doing Preventive Maintenance

You are responsible for doing daily and weekly maintenance. Also, Molecular Devices strongly recommends that a complete instrument maintenance be done every six (6) months by an approved service engineer.

Daily Maintenance

- Ensure that the interior of the instrument is free from dirt and dust. Check the surface of the x-drive drag-chain support bracket. Dust and debris collected here can be swept onto the instrument bed during operation. See [Cleaning the Instrument on page 190](#).
- Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
- Remove, clean, and sanitize the wash bath and brushes.
- Check the air regulator for signs of moisture. If necessary, twist the drain clockwise approximately a half turn to force out moisture. Some types of regulators might require the drain purge to be pushed up towards the regulator bowl.

Weekly Maintenance

- Check the operation of the **Emergency Stop** button. See [Emergency Stop on page 28](#).
- If you use the external air compressor, drain the accumulated moisture from the internal air tank weekly.
- If the instrument door shows signs of damage, request a replacement door from Molecular Devices. See [Obtaining Support on page 203](#).

Semi-Annual Maintenance

- Completely disassemble the head and thoroughly clean all component parts.
- A complete instrument maintenance should be done every six months by an approved service engineer. To obtain a maintenance contract or schedule a service visit, contact your representative or technical support. See [Obtaining Support on page 203](#).

Cleaning the Instrument

For efficient decontamination of pathogenic micro-organisms, wipe all non-removable parts within the instrument with a cloth using 70% ethanol.



CAUTION! Molecular Devices recommends that you spray ethanol on a cloth for cleaning the instrument. Autoclaving is not compatible with anodized parts. Do not use the ethanol on acrylic parts. Use water and then turn on the UV lamp. Do not use abrasive cleaners, as they can damage the surface of the bed.

Alternatively, instead of soap and water, clean the imaging glass and front door with a 10% vinegar and water solution, Spor-Klenz Ready-To-Use Cold Sterilant (US/EU/ Asia), or PeraSafe (EU).

The instrument can be left in a laboratory during formaldehyde vapor fumigation at a safe concentration. However, excessive formaldehyde treatment can damage sensitive electrical and optical components.

You can clean all components that come into close contact with biological materials.

You can remove the picking head and pins for cleaning. See [Changing the Head on page 30](#). Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.

You should sonicate the pins weekly. See [Cleaning the Head and Pins on page 190](#).



CAUTION! Do not clean the imaging glass and front door with ethanol because it degrades the surfaces.

Cleaning the Head and Pins

The reusable pins in the head are sanitized when you run a process that includes a Sanitise profile. They are cleaned before the first pick, between each cycle of picking, and at the end of the run. A Sanitise profile consists of the following configurable tasks:

- Brush the pins in one or more of the three wash baths.
- Use the halogen dryer to remove residual ethanol from the pins.

For more thorough cleaning of the head and pins, remove the head from the actuator. See [Changing the Head on page 30](#).

The head is housed in an actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, you should use the software to safely move the actuator into position to remove or install the head.



WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

Before storing or cleaning the head, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.

For further decontamination, soak the head in 100% ethanol. Before reassembly, make sure that all parts are thoroughly dry.



CAUTION! Molecular Devices recommends that you spray ethanol on a cloth for cleaning the instrument. Autoclaving is not compatible with anodized parts. Do not use the ethanol on acrylic parts. Use water and then turn on the UV lamp.

Automated cleaning with a Sanitise profile does not replace sonicating the pins. See [Sonicating the Pins and Springs](#) on page 192.

Cleaning the Wash Baths and Bristle Insert

The plastic ethanol wash bath and nylon bristle insert is filled with 70% ethanol in normal use. It can be treated by filling it with sterilizing agent for 10 minutes before flushing through with 70% ethanol.



CAUTION! Never autoclave the wash bath.



If contamination is suspected, the nylon bristle insert can occasionally be autoclaved using standard conditions: 121°C (249.8°F) at 15 psi (103 kPa) for 20 minutes.

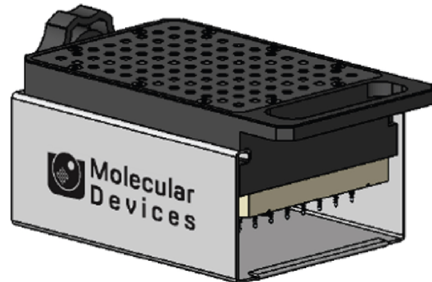


CAUTION! Slight distortion of the nylon block after autoclaving is normal, and this can be forced back to straightness; however, do not use a severely warped insert because it can cause pin and instrument damage.

Sonicating the Pins and Springs

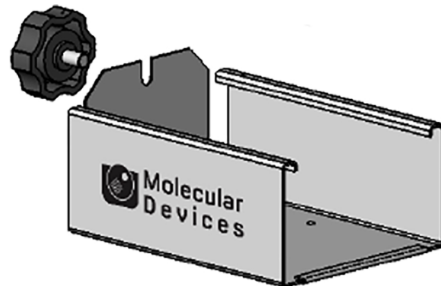
You should sonicate the pins weekly. Before you sonicate the pins, remove the pins from the head and sonicate the pins and springs only.

Removing the Pins from the Head



To remove the pins from the head:

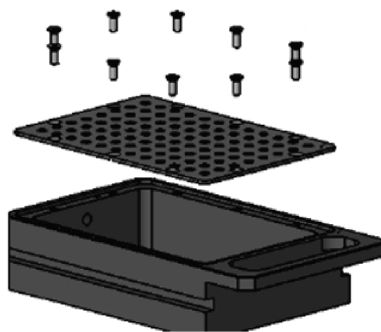
1. Remove the head from the actuator. See [Changing the Head on page 30](#).
2. Slide the head into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.





3. Remove the 10 screws that secure the top plate to the head.



CAUTION! Use care to not damage the screws, because the screws are soft stainless steel.



The screws that secure the top plate can differ depending on the type of head and the date of manufacture. Use the correct tool for removing the screws. Check the following:

- If the screw head looks like , use a slot-head screwdriver.
- If the screw head looks like , use a 3 mm hex key.
- If the screw head looks like , use a Pozidriv screwdriver.

- Remove the picking head retaining plate to expose the pins.



- Carefully pull the pins and springs up to remove them from their head mounting holes.



Note: A gridding head does not contain springs.

- Separate the springs from the pins, as applicable.
- Sonicate or autoclave to clean and sterilize the pins.
- When clean, reassemble the head.

Sonicated the Picking Pins and Springs

To sonicate the picking pins and springs:

- Prepare a 2% solution of aQu Clean Microarray Pin Cleaning Solution.
- Sonicate the pins in the 2% aQu Clean solution for 10 minutes.
- Rinse the pins with deionized water.
- Sonicate the pins in deionized water for 10 minutes.
- Rinse the pins with 100% ethanol or autoclave.
- Allow the pins to thoroughly dry in a biosafety hood for a few hours or overnight.
- (Optional) UV sterilize in the head upside-down in the instrument with the UV lamp on.



CAUTION! Do not autoclave the anodized metal picking head.

You can soak the springs and screws in 100% ethanol and then let them thoroughly dry.

Replacing the Picking Pins and Springs in the Head

Before reassembly, make sure that all parts are thoroughly dry.

To reassemble the picking head:

- Insert each pin in its spring and then insert each pin assembly into a mounting hole, pointed side down.



Note: A gridding head does not contain springs.

- Place the top plate in position making sure that the countersinks for the screw holes are facing up, if applicable.
- Loosely tighten the 10 screws in their holes.

The screws that secure the top plate can differ depending on the type of head and the date of manufacture. Use the correct tool for installing the screws. Check the following:

- If the screw head looks like , use a slot-head screwdriver.
- If the screw head looks like , use a 3 mm hex key.
- If the screw head looks like , use a Pozidriv screwdriver.

- Evenly tighten the screws until they are snug, but do not over tighten them.

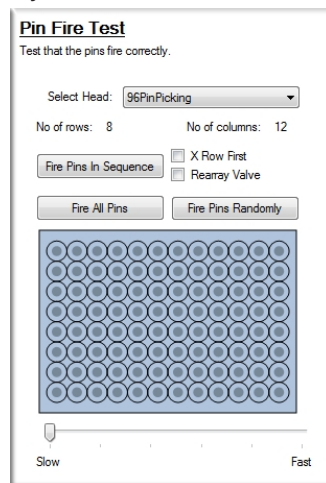
5. Verify that the screws are all flush with the retaining plate.
6. Install the head on the actuator. See [Changing the Head on page 30](#).
7. Test the fit in the actuator to be sure the fit is correct.
Any raised screw heads can foul the actuator when sliding the head into place, preventing the head from being fitted. If you see an issue, either swap the positions of the screws or replace the raised screw.
8. Run a Pin Fire Test. See [Testing the Pins on page 194](#).

Testing the Pins

This test checks that the pins on an installed head are obstruction-free and can move freely.

1. On the Navigation page under Utility Processes, double-click the **Instrument Utilities** icon to display the Instrument Utilities page.
2. Double-click the **Pin Fire Test** icon to display a Pin Fire Test message.
3. Make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.

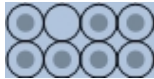
If you did not install the head to test, install it now. See [Changing the Head on page 30](#).



4. On the Pin Fire Test page, select the head to test from the **Select Head** list.
The page displays the number of rows and columns for the head.

5. Select the type of test to run.
 - Select **Fire Pins In Sequence** to test fire the pins one-by-one in column order unless you select the **X Row First** checkbox to fire the pins in row order. To dampen the pins as they retract, select the **Rearray Valve** checkbox. The test continues until you click **Stop** or all the pins have fired.
 - Select **Fire All Pins** to test fire all the pins at once.
 - Select **Fire Pins Randomly** to test fire the pins in a random order. To dampen the pins as they retract, select the **Rearray Valve** checkbox. The test continues until you click **Stop** or all the pins have fired.

The image on the page indicates which pin is fired by clearing the dot from the circle for its position on the picking head.



To define the speed at which the pins fire during the test, drag the slider below the image.



CAUTION! Wait for all pin firing to stop before you open the door.

Make sure the pins move smoothly. If sticky:

- a. Verify that the air-pressure is 100 psi.
 - b. If the pin head accumulates residue, clean the head and pins.
6. After you finish testing the pins, click **Next**.
 7. When the Pin Fire Test message displays, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position. The Instrument Utilities page displays.
 8. Click **Next**.

Aligning the Camera

To ensure accurate picking, you must calibrate and align the camera to get pin-to-spot precision, relating the image pixel coordinates with the instrument x and y coordinates. Do this process whenever the head is returned to the actuator or if the actuator is hit during a maintenance operation, as this can have a negative effect on picking precision.

For the camera alignment procedure, make sure that you use a standard 96-pin picking head.

To align the camera:

1. On the Navigation page under Utility Processes, double-click the **Camera Alignment Process** icon, and wait for the Camera Alignment Process page to display.
2. If you do not have a standard 96-pin picking head installed, click **Move to Load Position**. See [Changing the Head on page 30](#).
After you install the standard 96-pin picking head, click **Move to Park Position** and then click **Next**.
3. Select the type of source plate that you must place on the light table from the **Holder** and **Receptacle** fields.

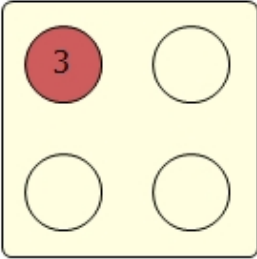
Source

Set the source receptacles and options to use.

Holder:

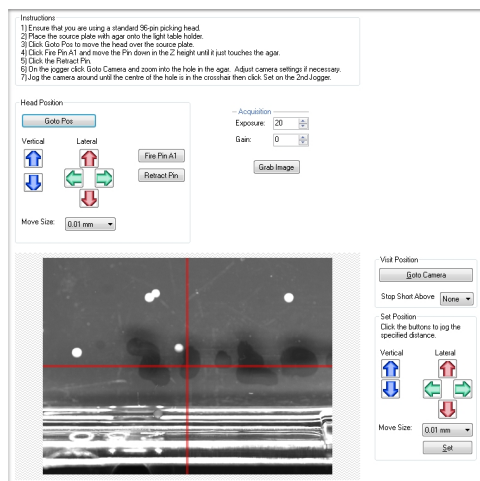
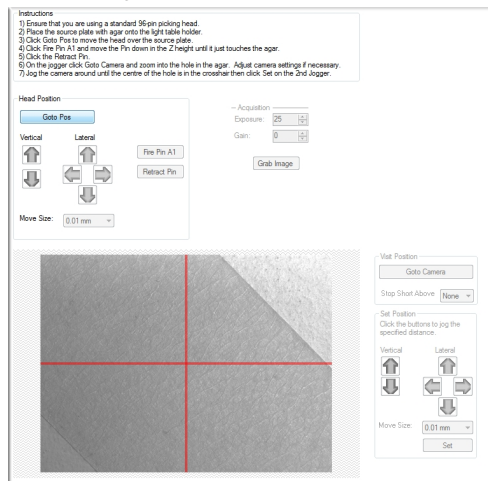
Receptacle:

Positions: Offset:



4. Change the **Offset** to specify an area of the source plate to use for the camera alignment process other than the default position.
5. Click **Next**.
6. Place the source plate with agar on the light table as instructed and then click **Next**.
7. Make sure that the lid is removed and that the source plate is in the position indicated and then click **Next**.

8. Click **Goto Pos** to enable the position screen controls and move the pin head over the source tray.



9. Under Head Position > Lateral, the red and green arrows move the pin head according to the millimeter distance increments you specify in the **Move Size** field.
10. Under Acquisition, edit the **Exposure** and **Gain** settings and click **Grab Image** until the image is clearly visible.
11. Click **Fire Pin A1** and then click the blue arrows on the left to move the pin down until it creates a visible indent in the agar.
Adjust the increment for each movement by editing the **Move Size** field under the positioning arrows.
12. Click **Retract Pin**.
13. Under Visit Position, click **Goto Camera**.
14. Under Lateral, click the red and green arrows to move the camera until the red crosshairs align with the center of the hole in the agar.
You can adjust the increment for each movement by selecting from the **Move Size** list.
15. Click **Set**.
16. Click **Close**.

Replacing Fuses

Fuses burn out sometimes and must be replaced.

If the instrument does not seem to be getting power after switching it on, check to see whether the supplied power cord is securely plugged into a functioning power outlet and to the power port on the rear of the instrument.

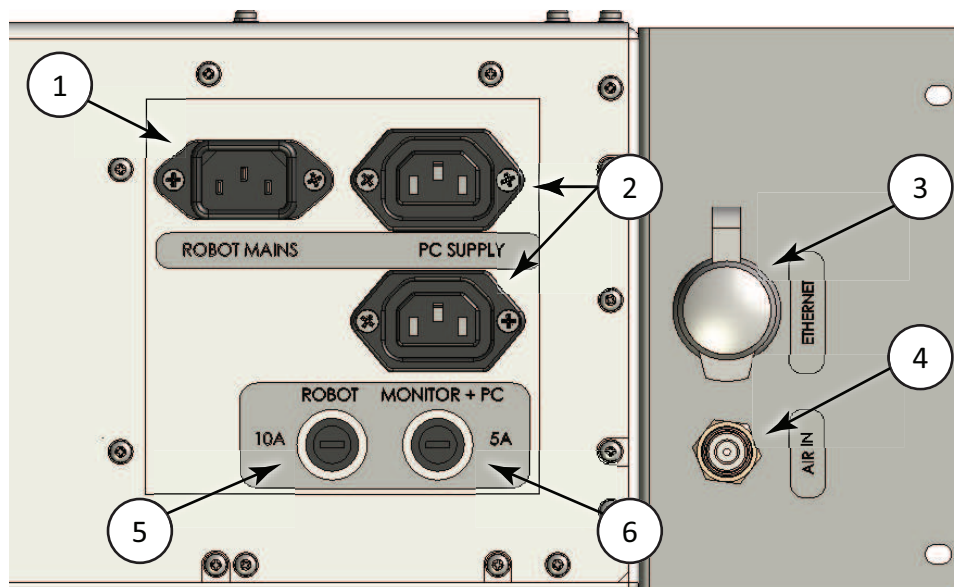
If the power failed while the instrument was on, check that the power cord is not loose or disconnected and that power to the power outlet is functioning properly.

If these checks fail to remedy the loss of power, replace the fuses. You can obtain replacement fuses from Molecular Devices. Fuses must be replaced with the correct type and rating as specified in [Technical Specifications on page 213](#).



CAUTION! Do not touch or loosen screws or parts other than those specifically designated in the instructions. Doing so could cause misalignment and possibly void the warranty.

The fuses are located in the fuse carriers on the side of the instrument.



Connection Ports and Fuses

Item	Description
1	Power Inlet: Instrument Mains
2	Power Outlets: Computer and Monitor
3	Ethernet port
4	Compressed air inlet
5	Fuse carrier: Instrument Mains
6	Fuse carrier: Computer and Monitor

The mains power inlet and the computer and monitor power outlets are separately fused.

To replace a fuse:



WARNING! HIGH VOLTAGE Power off the instrument and disconnect the power cord before you do maintenance procedures that require removal of a panel or cover or disassembly of an interior instrument component.

1. Switch the power switch on the front of the instrument to the off position.
2. Unplug the power cord from the power port.
3. Use a small slot-head screwdriver to turn the fuse carrier counter-clockwise and then pull the fuse carrier out to expose the fuse.
4. Use the screwdriver to gently lift the old fuse from the carrier.
5. Gently place a new fuse into the carrier by hand.
6. Slide the fuse carrier back into the instrument.
7. Use the screwdriver to turn the carrier clockwise until it is snug, but do not over tighten it.
8. Plug the power cord into the power port.
9. Turn on the power to the instrument.



Note: If the instrument still does not power on after changing the fuse, contact technical support.

Draining the Compressor

The following procedure is for the optional DynAir DA7001CS air compressor. The compressor collects water in the internal air tank. This water must be emptied into the externally mounted fluid collection bottle. Draining frequency depends on instrument use:

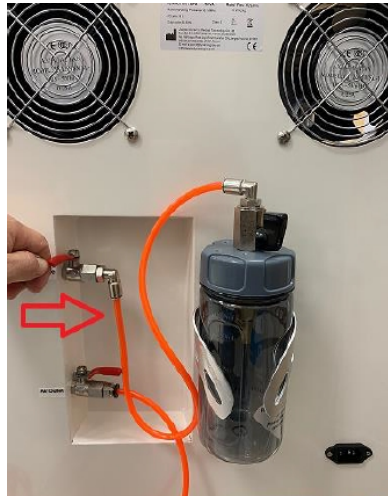
- High use - drain once a day
- Low use - drain once a week



To drain the air tank:

1. Verify that the compressor pressure is 105 psi.
2. Turn off the air compressor.

3. Slowly open the valve by turning the lever on the Drain Valve to the right about a quarter of the way open until you hear the sound of high pressure blowing air.



4. When the sound of air stops and fluid appears in the fluid collection bottle, close the valve by turning the lever all the way back to the left.



To empty the external fluid collection bottle:

1. Remove the fluid collection bottle from the metal holder, but leave the bottle cap lever vertical (open) and tube attached.
2. Unscrew the fluid collection bottle cap, and dispose of the fluid as required by your lab protocol.
3. Screw the fluid collection bottle cap back on, and return the bottle to the metal holder.

Moving the Instrument

The instrument should not be moved after installation. If relocation is necessary, standard lifting gear is sufficient but must be used only with supervision by an approved engineer.

Move the instrument into position using applicable handling equipment such as forklift trucks or dolly trucks. Make sure that the instrument is properly balanced on the forks before lifting.



CAUTION! Do not use part of the exterior body of the instrument to lift it, as this can cause irreparable damage.

Adding a New User to the SQL Server Database

If a new user cannot log on to the QPix® 420 Microbial Colony Picking System, add the user to the SQL database.



Note: This procedure requires a user with administrator privileges.


To add a new user to the SQL Server database:

1. Log in to the SQL Server database using Microsoft SQL Server Management Studio with an account that has administrator privileges.
2. In the Microsoft SQL Server Management Studio, expand the **Security** folder.
3. Right-click **Logins** and select **New Login**.
4. In the Login - New window in the **Login Name** field, enter the Windows user name.
5. Click the **Windows Authentication** option.
6. From the Default Database list, select **Receptacle Vault**.
7. From the Select a Page list on the left, click **User Mapping**.
8. From the Users Mapped to This Login list on the right, select the **Receptacle Vault** checkbox.
9. In the **User** field, enter the user name.
10. From the Database Role Membership for: Receptacle Vault list, select the **db_owner** and **public** checkboxes.
11. Click **OK**.
12. In the Microsoft SQL Server Management Studio, expand **Databases > ReceptacleVault > Security > Users**.
13. Confirm that the new user name is included in the list.
14. Close the Microsoft SQL Server Management Studio.

Running the Software as an Administrator

The QPix Microbial Colony Picking System Software must be run by a user with administrator privileges. If a user does not have administrator privileges, then change the program compatibility settings to run the program as an administrator.

To run the software as an administrator:

1. On the Windows desktop, right-click the  QPix Microbial Colony Picking System Software icon and select **Properties** to display the Properties dialog.
2. Select the **Compatibility** tab.
3. Under Privilege Level, select the **Run This Program as an Administrator** checkbox.
4. Click **OK**.

Resetting the Path to the SQL Server

If you rename the computer, you must reset the path to the SQL Server. The new computer is included in the path to the SQL Server, but the software continues to look for the original path that contains the original computer name. To update the SQL path in the software, retrieve the computer name and then edit the path statement in the software.

To retrieve the computer name:

1. On the Windows desktop, right click the **Computer** icon and then click **Properties**.
2. Under Computer Name, Domain, and Workgroup Settings, find the **Computer name**.
3. Write down the computer name exactly as it displays.



Note: Make sure that you use the Computer Name, not the Full Computer Name if it is different.

To edit the path statement in the software:

1. Close all open windows, and then start the QPix® 420 Microbial Colony Picking System.
2. On the Navigation page, click **Tools > Configuration** to display the Edit Configuration dialog.
3. Double-click **Verbs**.
4. From the Verbs list under **QPixDataManagerVerb**, click **QPixDataManager**.
5. In the list on the right, find the **ConnectionString** property.
6. Set the **Connection String** value so that the new computer name is included in the path statement:

```
Data Source=COMPUTERNAME\squlexpress;Initial Catalog=ReceptacleVault;Integrated Security=True
```

Where **COMPUTERNAME** is the current name of the computer.

7. Click **Close** to display the Edit Configuration dialog .
8. Close the Edit Configuration dialog by clicking the **X** in the upper-right corner.
9. On the Navigation page, click **File > Exit**.

To test the SQL Server connection:

1. Close all open windows, and then start the QPix® 420 Microbial Colony Picking System.
2. On the Navigation page under Data Viewer Processes, double-click the **Data Viewer** icon.

If the Data Viewer page displays without a message, the connection is successful.

Obtaining Support

Molecular Devices is a leading worldwide manufacturer and distributor of analytical instrumentation, software, and reagents. We are committed to the quality of our products and to fully supporting our customers with the highest level of technical service.

Our Support website—support.moleculardevices.com/—describes the support options offered by Molecular Devices, including service plans and professional services. It also has a link to the Molecular Devices Knowledge Base, which contains documentation, technical notes, software upgrades, safety data sheets, and other resources. If you still need assistance, you can submit a request to Molecular Devices Technical Support.

Please have your instrument serial number or Work Order number, and your software version number available when you call.



WARNING! BIOHAZARD. It is your responsibility to decontaminate components of the instrument before you return parts to Molecular Devices for repair. Molecular Devices does not accept items that have not been decontaminated where it is applicable to do so. If parts are returned, they must be enclosed in a sealed plastic bag stating that the contents are safe to handle and are not contaminated.

For more information about QPix instruments and accessories, go to www.moleculardevices.com/qpix-sw2.0.



This section describes some common problems that can occur and possible solutions.

Generally, crash recovery involves some form of the following procedure:

1. An error is identified in the software or the instrument stops.
2. If the error condition is caused by a receptacle or other item, then remove the item from the instrument.
3. Reactivate the software, generally by clicking **Next**.

Common Problems and Possible Solutions

The instrument does not start; the system does not function correctly.

- Make sure that the main power switch is turned on at the wall, the Emergency Stop button is pulled out, and the Start button is pressed. See [Start-Up and Shutdown Procedures on page 27](#).
- Make sure that the power cord is seated fully in the mains input of the instrument. See [Instrument Connections on page 17](#).
- Make sure that the mains input fuse is in good condition. See [Replacing Fuses on page 198](#).
- Turn off the instrument power and then turn it on again.

The computer does not start.

- Make sure that the power switch on the computer is in the on position and that the main power switch is turned on at the wall.
- Make sure that the fuses are in good condition. See [Replacing Fuses on page 198](#).

One or more of the axes do not move.

- Make sure that the main power switch is turned on at the wall, the Emergency Stop button is pulled out, and the Start button is pressed. See [Start-Up and Shutdown Procedures on page 27](#).

The drive system fails to home the actuator.

- Make sure that the door is closed.
- Manually move the head to the center of the instrument then close the door and retry the process. See the Knowledge Base article support.moleculardevices.com/s/article/QPix400-ClonePixFL-ClonePix2-Error-One-or-more-drivers-on-the-machine-failed-to-home-correctly.

The UV light does not turn on.

- Make sure that the door is closed.
- Make sure that filaments in the lamp are not burned out.

Lamp failure.

- Determine whether the halogen lamps must be replaced.

The Picking alignment is incorrect.

- Inspect the head for loose or bent pins.
- Run a Pin Fire Test. See [Testing the Pins on page 194](#).

The pins bend when inoculating in plate wells.

- Make sure that the plate is aligned correctly towards both arrows in the plate holder.
- Make sure that the correct plate, head, and spacer blocks are installed.

Poor picking results.

- Run the camera alignment process. See [Aligning the Camera on page 196](#).
- Run the Pin Fire Test to make sure the pins are firing correctly. See [Testing the Pins on page 194](#).
- Inspect for bent pins in picking process.
- Make sure that the head is fastened securely.
- Make sure that the picking height is set correctly.
- Make sure that you are using the correct wash bath routines and that the fluid levels are adequate.
- Make sure that the air pressure is at 100 psi (689 kPa).
- Make sure that colonies of an adequate size are being picked. 97% pick efficiency is expected with colonies from 1 mm to 1.5 mm.
- Check the size, roundness, axis ratio, and threshold parameters.
- Contact technical support to discuss the results. See [Obtaining Support on page 203](#).

The instrument crashes during destination well inoculation.

- Make sure that the plates are aligned correctly towards both arrows in the plate holder.
- Make sure that the lids are off the plates during the inoculation.

The picking pins bend on the edge of the bioassay tray.

- Check the agar volume setting, bioassay tray positioning, and tray holder positioning in the bed.

A Door Open warning displays.

- Make sure that the door is closed and locked.

Low air warning.

- If you are using a laboratory built-in air system, verify that the supplied air pressure is from 0.69 MPa to 0.83 MPa (100 psi to 120 psi) and that the control valve is switched on.
- If you are using a standalone air compressor, verify that the compressor is switched on and that the supplied air pressure is from 0.69 MPa to 0.83 MPa (100 psi to 120 psi).

A message displays indicating that the license is expiring soon.

- Follow the instructions in the software to send a license request file (.req) to Molecular Devices.

Failed to connect to devices error message displays.

- Make sure that the instrument is powered on.
- Make sure that the ethernet connections are seated fully for both the instrument and the computer. See [Instrument Connections on page 17](#).
- Restart the software.

The barcodes fail to be read correctly.

- Make sure that the barcodes are correctly positioned on the receptacle.
- Make sure that the barcodes are of the correct type. Barcodes compatible with the barcode reader are code 39, code 93, and code 128. See [Using Barcodes on page 18](#).

Cannot connect to the SQL Server.

- If a new user cannot log on, then add the user to the SQL database. See [Adding a New User to the SQL Server Database on page 201](#).
- If the user does not have administrator privileges, then change the program compatibility settings to run the program as an administrator. See [Running the Software as an Administrator on page 201](#).
- If you have recently renamed the computer, reset the path to the SQL Server. See [Resetting the Path to the SQL Server on page 202](#).

Troubleshooting Barcodes

If you use barcodes and the instrument does not detect them correctly, try the following:

- If one out of 10 plates fails to be read, check the placement of the barcode label on the plate. This might be fixed with a small change in the plate configuration.
- Add more white space at beginning or end.
- Restrict numbers to a maximum of six (6) digits.
- Verify that the codes meet the requirements. See [Using Barcodes on page 18](#).

If detection is still a problem, contact Molecular Devices Technical Support. See [Obtaining Support on page 203](#).

Fluorescence Problems and Possible Solutions**No signal is detected in the fluorescence channel**

- Confirm that the biology sample is fluorescing.
- Make sure that the correct filter pair is selected.
- Visually check that the light is coming through.
- Make sure that sufficient exposure time has been set.

Excessive background fluorescence

- Check the integrity of the biological sample. The fluorescence can leach into the agar.
- Reduce the exposure time.



Appendix A: Replacement Parts and Optional Extras



For an up-to-date list of replacement parts and optional extras, see the following web pages:

- www.moleculardevices.com/products/clone-screening/accessories-consumables/qpix-pins-and-heads#Orderingoptions
- www.moleculardevices.com/products/accessories-consumables
- www.moleculardevices.com/products/biologics/culture-media-reagents

QPix 420 System Microbial Colony Picking System Replacement Parts

Part Number	Description
SL9400-A06	QPix® Chroma Colorimetric Colony Selection Software License. Blue/White Colony Selection Software License for QPix 420 system Microbial Colony Picking System
SL9400-A07	Zone of Inhibition Detection Software License for QPix 420 system Microbial Colony Picking Systems.
SL9400-A08	QPix® 420 Software Version 2.0 or Newer Upgrade
X1101	QPix Chroma Filter, thin film optical filter for Blue/White colony selection, qty 1
X1102	QPix Chroma Filter, thin film optical filter for Blue/White colony selection, qty 25
X1103	QPix® Chroma Colorimetric Colony Selection Software Kit. Blue/White Colony Selection Software Kit with software license and 2 filters (X1101).
S-ME004541	Wash bath
S-ME004542	Wash brushes Note: Replacements included with service contracts.
X4390	Picking springs, 100 springs per pack
T0130	QPix® Pipette Tips, 130µl, 10 boxes

Picking Heads

Part Number	Description
X4006A	Picking head for E. coli/phagemid, 96-pin, tip diameter 0.55 mm, deep-well
X4006B	Picking head for Phage plaque, 96-pin, tip diameter 1 mm
X4006C	Picking head for Phage picker+, 96-pin, tip diameter 1.6 mm
X4006D	Picking head for yeast picker+, 96-pin, tip diameter 1.6 mm
X4006E	Picking head for streptomyces and yeast, 96-pin, tip diameter 1 mm
X4006F	Picking head for streptomyces and yeast, 96-pin, tip diameter 1 mm, deep-well
X4006G	Picking head for E. coli/phagemid, 96-pin, tip diameter 0.55 mm
X4006H	Picking head for Phage plaque, 96-pin, tip diameter 1 mm, deep-well
X4006J	Picking head for Phage picker+, 96-pin, tip diameter 1.6 mm, deep-well
X4006K	Picking head for yeast picker+, 96-pin, tip diameter 1.6 mm, deep-well

Gridding Heads

Part Number	Description
X4225	Gridding head for bacteria and phage, 96-pin for 96-well and 384-well plates, tip diameter 0.4 mm
X4226	Gridding head for DNA macroarrays, 96-pin for 96-well and 384-well plates, tip diameter 0.25 mm
X4227	Gridding head for protein macroarrays, 96-pin for 96-well and 384-well plates, tip diameter 0.15 mm
X4228	Gridding head for yeast and streptomyces, 96-pin for 96-well and 384-well plates, tip diameter 1 mm
X4260	Gridding head for Bacteria and Phage, 384-pin for 384-well plates, tip diameter 0.4 mm
X4261	Gridding head for DNA macroarrays, 384-pin for 384-well plates, tip diameter 0.25 mm
X4262	Gridding head for protein macroarrays, 384-pin for 384-well plates, tip diameter 0.15 mm
X4263	Gridding head for yeast and streptomyces, 384-pin 384-well plates, tip diameter 1 mm

Re-Arraying and Replicating Heads

Part Number	Description
X4310A	Re-arraying and replicating head for E. coli, standard transfer, 96-pin for 96-well and 384-well plates, tip diameter 0.55 mm, pin length 49.5 mm
X4310B	Re-arraying and replicating head for Yeast, standard transfer, 96 pin for 96-and 384-well plates, tip diameter 1.6 mm, pin length 49.5 mm

Picking Pins

Part Number	Description
X4370	Picking pin for E.coli/phagemid, tip diameter 0.55 mm
X4371	Picking pin for phage plaque, tip diameter 1 mm
X4372	Picking pin for yeast, tip diameter 1.6 mm
X4373	Picking pin for streptomyces, tip diameter 1 mm
X4375	Picking pin for E.coli/phagemid, tip diameter 0.55 mm, deep-well
X4376	Picking pin for yeast picker+, tip diameter 1.6 mm
X4377	Picking pin for yeast picker+, tip diameter 1.6 mm, deep-well
X4378	Picking pin for yeast, tip diameter 1.6 mm, deep-well
X4379	Picking pin for streptomyces, 1 mm, deep-well
X4380	Picking pin for Phage picker+, tip diameter 1.6 mm, deep-well

Gridding Pin

Part Number	Description
X4241	Gridding pins for DNA macroarrays, tip diameter 0.25 mm
X4242	Gridding pins for protein macroarrays, tip diameter 0.15 mm
X4243	Gridding pins for yeast and streptomyces, tip diameter 1 mm

Re-Arraying Pins

Part Number	Description
X4311	Re-arraying pin, high-capacity, standard transfer (E coli/high viability samples), tip diameter 0.55 mm
X4315	Re-arraying pin, high-capacity, standard transfer (E coli/high viability samples), tip diameter 0.55 mm, deep-well
X4320	Re-arraying pin, high-capacity (yeast/medium viability samples), tip diameter 1.6 mm
X4321	Re-arraying pin, high-capacity (yeast/medium viability samples), tip diameter 1.6 mm, deep-well

Petri Dishes, Microplates, and Holders

Part Number	Description
X9401	Petri dish holder, 4 hole
X9402	Petri dish holder, 1 hole
X9403	Petri dish holder, 5 hole
X9404	OmniTray holder, 2 hole
X6023	Vented QTray with cover, 242 mm x 240 mm x 20 mm
X6029	Vented QTray with cover and 48-Well Divider, 242 mm x 240 mm x 20 mm
X9401	Adjustable Petri dish holder, 1 hole, diameter 140 mm
X9402	Adjustable OmniTray holder, 2 hole
X9403	Adjustable Petri dish holder, 4 hole, diameter 100 mm
X9404	Adjustable Petri dish holder, 5 hole, diameter 90 mm

Replacement Fuses

Fuses must be replaced with the correct type and rating as specified in [Technical Specifications on page 213](#).

For instructions, see [Replacing Fuses on page 198](#).



Appendix B: Technical Specifications



The following tables list the technical specifications of the QPix 420 Microbial Colony Picking System.

If you are using the optional air compressor, see the documentation that comes with the compressor for more details.

Technical Specifications

Item	Description
Environment	Indoor use only
Power requirements	230 VAC \pm 10%, 50 Hz, 1250 VA maximum 115 VAC \pm 10%, 60 Hz, 1250 VA maximum 100 VAC \pm 10%, 50/60 Hz, 1250 VA maximum
Dimensions	144 cm (56.7 in.) W x 79 cm (31.1 in.) D x 78 cm (30.7 in.) H
Weight	Instrument: 184 kg (406 lb) Bio Workstation: 165 kg (364 lb) Total assembled unit: 349 kg (769 lb)
Power disconnect minimum clearance	To provide access for disconnecting power from the instrument, maintain a 66 cm (26 in.) minimum clearance area on the right side of the instrument.
Ambient operating temperature	15°C to 40°C (59°F to 104°F)
Ambient storage and transport temperature	-25°C to 55°C (-13°F to 131°F)
Humidity restrictions	20% to 80% (non-condensing)
Altitude restrictions	Up to 2,000 m (6,562 ft)
Sound pressure level	Maximum sound pressure at one meter: 70 dBA
Installation category (Overvoltage category)	II
Pollution degree	2
Fuses	Input F1: T10 A, 250 V (Instrument Mains and Halogen Heater) Output F2: T5 A, 250 V (Computer and Monitor)
Power connections	IEC Input: Instrument Mains and Halogen Heater IEC Output: Computer and Monitor
Mains power cord length	3 m (9.8 ft) maximum Ensure that all power connections for the instrument meet the specified power requirements for the country of use.
Data connection	10/100 Ethernet port
Compressor air requirements	support.moleculardevices.com/s/article/ClonePix2-CloneSelect-Imagers-Qpix-Series-House-air

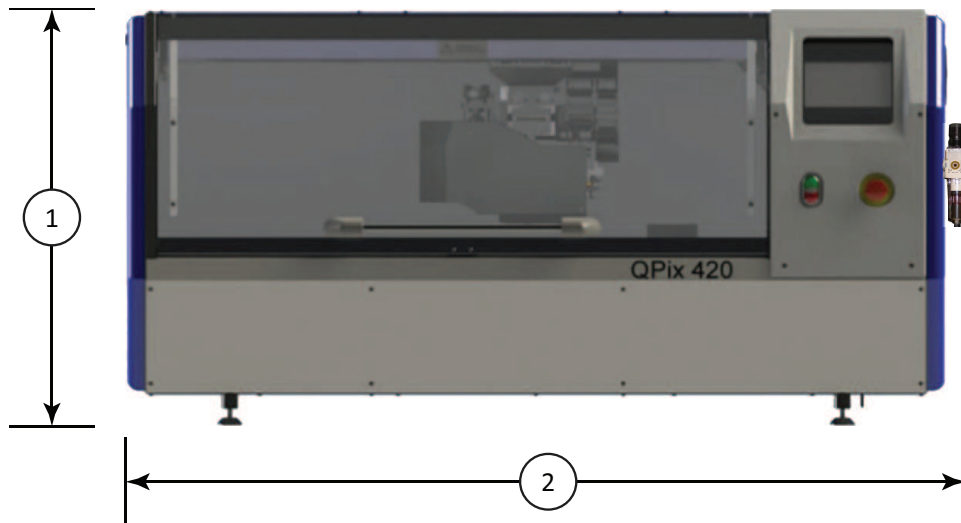
Technical Specifications (continued)

Item	Description
Air	Clean, oil-free with sub-micron filtration
Minimum operating pressure	6 bar (~90 psi)
Minimum operating volume	80 L/min

Optional air compressor

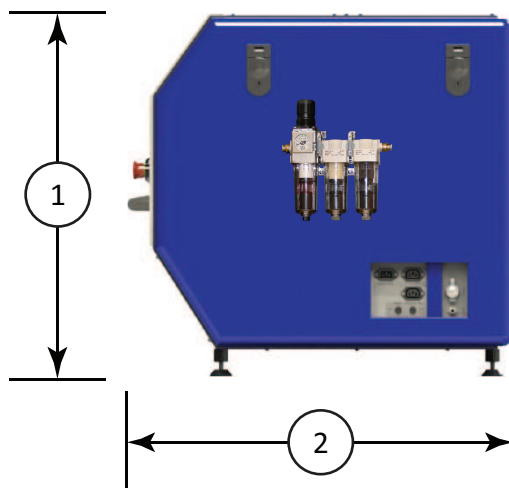
Item	Description
Compressor unit	DynAir DA7001CS, Clean, oil-free compressor with sub-micron filtration
Dimensions	440 mm (width) x 440 mm (depth) x 613 mm (height)
Weight	38 kg (84 lb)
Power	0.75 KW 115V/60 Hz
Tank size	9 L
Pump head number	2
Rated output free air	Max 5.37 CFM/152L. Min
Noise level	56 ±5 dBA
Drain	Manual / buffer bottle

Appendix C: System Diagrams and Dimensions



Front View of the QPix 420 Microbial Colony Picking System with Dimensions

Item	Description
1	Height of instrument: 78 cm (30.7 in.)
2	Width of instrument: 144 cm (56.7 in.)



Side View of the QPix 420 Microbial Colony Picking System with Dimensions

Item	Description
1	Height of instrument: 78 cm (30.7 in.)
2	Depth of instrument: 79 cm (31.1 in.)

Electromagnetic Compatibility

Regulatory for Canada (ICES/NMB-001:2020)

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

ISM Equipment Classification (Group 1, Class A)

This equipment is designated as scientific equipment for laboratory use that intentionally generate and/or use conductively coupled radio-frequency energy for internal functioning, and are suitable for use in all establishments, other than domestic and those directly connected to a low voltage power supply network which supply buildings used for domestic purposes.

Information to the User (FCC Notice)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 18 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense. Changes or modifications made to this equipment not expressly approved by the party responsible for compliance may void the FCC authorization to operate this equipment.

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