

# FilmArray<sup>®</sup> 2.0 Computer System Quick Guide

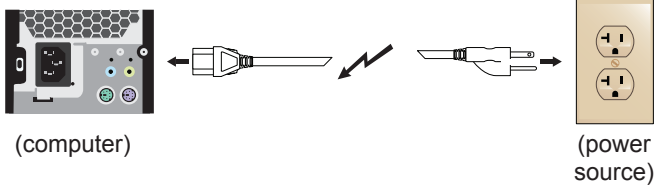
## Step 1: Unpack All Parts

**Note:** The computer system requires outlets for 4 power cords. An additional power outlet will be required for each Instrument (total of 12 outlets for a full 8 instrument setup).



## Step 2: Connect Computer

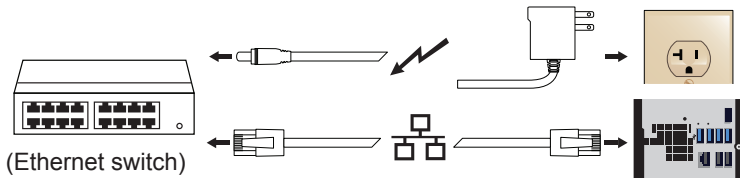
- Connect computer power cord.



## Step 3: Connect Ethernet Switch

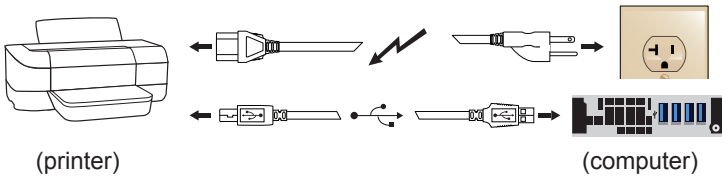
- Connect Ethernet switch power cord and Ethernet cable.

**Note:** Use Port 16 on the Ethernet Switch.



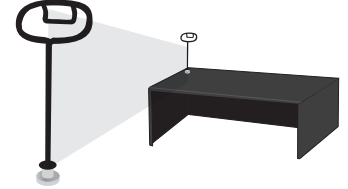
## Step 4: Connect Printer

- Connect printer power cord and printer USB cable.
- Refer to printer documentation to set up paper trays and ink cartridges.



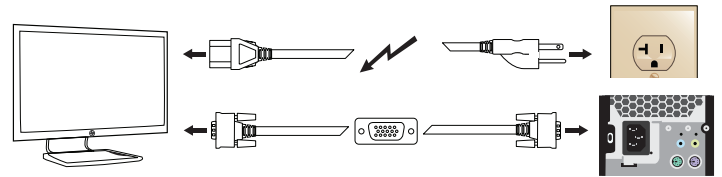
## Step 5: Set Up Barcode Reader

- Insert threaded end of barcode reader stand through printer cover (use the hole closest to the instruments).
- Screw silver thumb nut onto barcode reader stand on the underside of printer cover.
- Insert plastic plug into the unused hole in printer cover.
- Place computer stand over printer with barcode reader stand closer to the back of the computer stand.



## Step 6: Connect Monitor

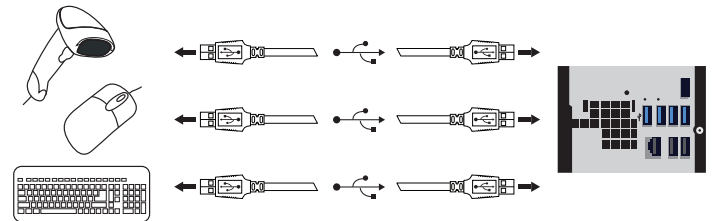
- Connect power cord and VGA cable.



**Note:** When finished, place monitor on computer stand.

## Step 7: Connect Barcode Reader, Mouse and Keyboard

- Connect using USB cables.



## Step 8: Power Up System and Install FilmArray Instruments

- Turn on the power for the computer, monitor and printer.
- Install the printer driver from the disk provided with the printer and print a test page to confirm the printer works properly.
- Follow the steps on the FilmArray 2.0 Instrument Set Up Quick Guide to install FilmArray instruments into the system.



**Note:** For additional information, please refer to the FilmArray 2.0 Operator's Manual.

# FilmArray 2.0 Computer System Parts List



❑ Computer



❑ Computer Power Cord



❑ Monitor



❑ Monitor Power Cord



❑ VGA cable



❑ Computer Stand



❑ Keyboard



❑ Ethernet Switch



❑ Ethernet Switch Power Cord



❑ Ethernet Cable



❑ Barcode Reader



❑ Barcode Reader Stand



❑ Printer



❑ Printer Power Cord



❑ Printer Accessories



❑ Mouse



❑ Computer System Quick Guide



❑ FilmArray Software CD

# FilmArray 2.0 Computer System Overview

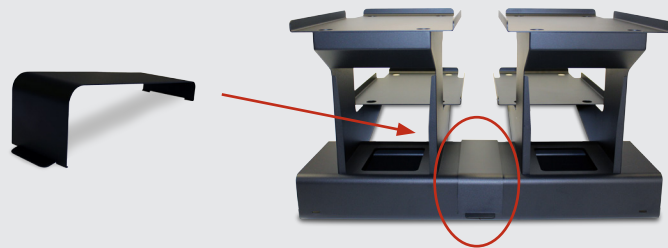


# FilmArray<sup>®</sup> 2.0 Instrument Set Up Quick Guide

**Note:** Set up the FilmArray 2.0 computer system first if it has not been set up yet. (Follow the steps on the FilmArray 2.0 Computer System Quick Guide.)

## Step 1: Unpack and Set Up Instrument Rack

- If you are not using an instrument rack, go to Step 2.
- If you are using more than one instrument rack, lock adjoining racks together using the included rack clip.



## Step 2: Unpack Instrument and Accessories

- If using an instrument rack, place the FilmArray instrument on the instrument rack filling the bottom position first.
- If not using an instrument rack, place the FilmArray instrument on a level surface.

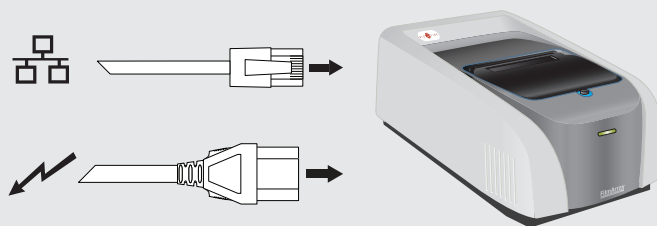


Or



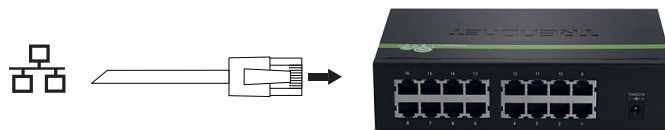
## Step 3: Connect Cables to FilmArray Instrument

- Connect the end of the Ethernet cable with the right angle plug to the Ethernet port on the back of the FilmArray instrument.
- Connect the instrument power cord to the power cord port on the back of the FilmArray instrument.



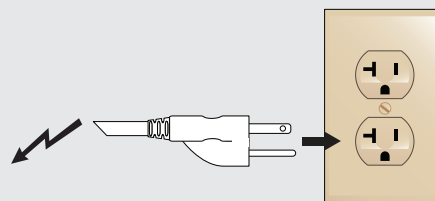
## Step 4: Connect Ethernet Cable to Ethernet Switch

- Use port 1 for the first FilmArray instrument.
- Use port 2 for the second FilmArray instrument and so on.



## Step 5: Connect to Power Source

- Connect the instrument power cable to the appropriate electrical outlet.
- Power on the FilmArray instrument.



## Step 6: Add the Instrument to the FilmArray System Dashboard

- From the FilmArray software menu, select Tools > Instrument Configuration.
- Click the **+** in the Instrument Configuration window.
- Click the **+** for the Instrument in the Detected Instruments window.
- Click **Save** in the lower right corner of the Instrument Configuration window.



# FilmArray 2.0 Instrument Parts List



❑ FilmArray 2.0 Instrument



❑ Instrument Rack (ordered separately)



❑ Rack Clip



❑ Instrument Power Cord



❑ Ethernet Cable



❑ Pouch Loading Station

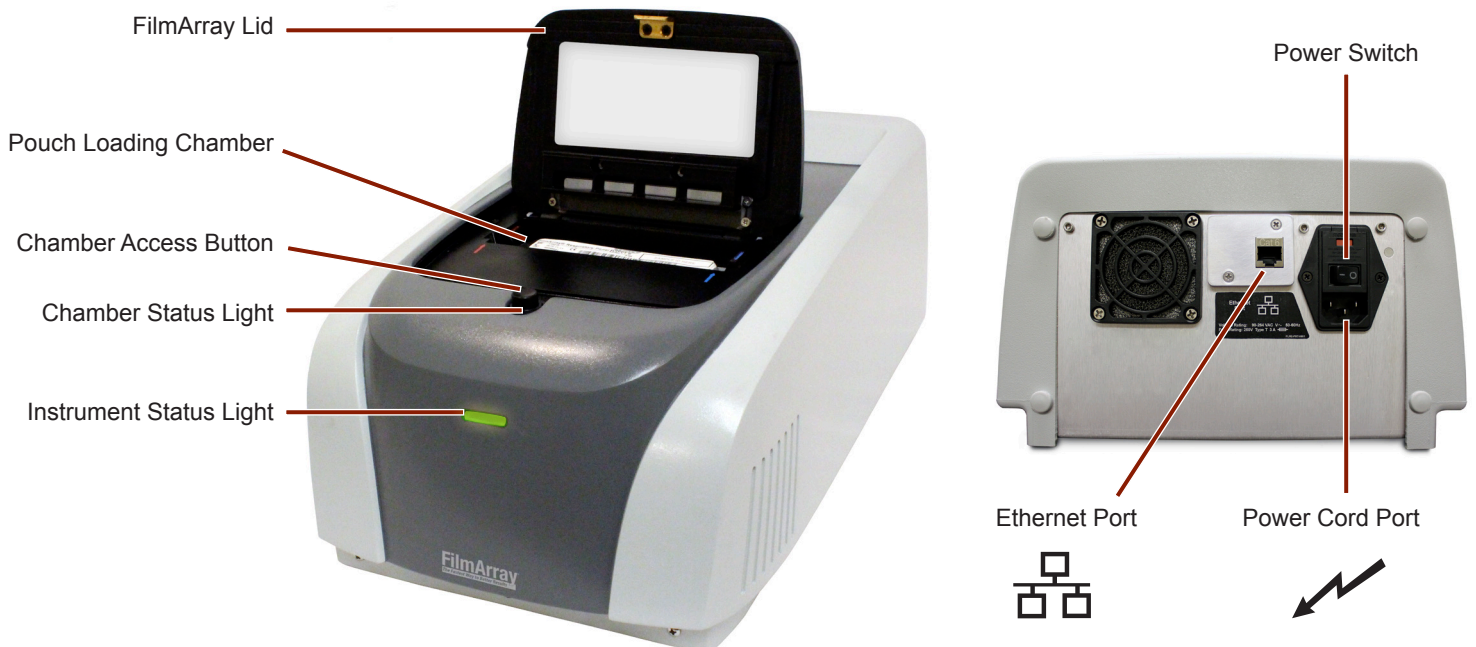


❑ FilmArray Instrument Information CD (includes Operator's Manual & Quick Guides in several languages)



❑ Instrument Set Up Quick Guide

# FilmArray 2.0 Instrument Overview







# FilmArray<sup>®</sup> 2.0

## Operator's Manual

*For In Vitro Diagnostic Use*

IVD

CE

BIO  FIRE<sup>®</sup>  
A BIOMÉRIEUX COMPANY

This document is used solely for the purpose of FilmArray instrument operation. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of BioFire Diagnostics, LLC.

Always maintain the instrument in good working order. If the instrument is used in a manner not specified by BioFire Diagnostics, LLC, then protection provided by the equipment may be impaired.

A printed version of this manual is available upon request.



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*FilmArray® 2.0 Operator's Manual IVD*

FLM2-PRT-0002-02 March 2015

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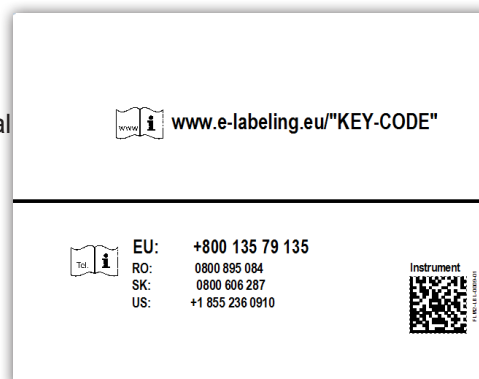
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## E-Labeling

The manual for this product can be accessed online at [www.e-labeling.eu/](http://www.e-labeling.eu/)"KEY-CODE". The product "KEY-CODE" is provided on the outer box label at the end of the URL (example shown). The KEY-CODE for this operator's manual is also highlighted below. Additionally, a paper copy is available upon request by fax, e-mail, or regular mail by calling the free of charge telephone numbers provided on the outer label of the box (see example). Further instructions regarding e-labeling can be found at [www.e-labeling.eu/QAR100618](http://www.e-labeling.eu/QAR100618) in the Qarion® E-labeling Services "Manual for the End-User".

FilmArray Operator's Manual KEY-CODE: **IT10025**























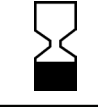


## Customer and Technical Support

Customer and Technical Support for U.S. Customers	
<p><b>Reach Us on the Web</b> <a href="http://www.biofiredx.com">www.biofiredx.com</a></p> <p><b>Reach Us by E-mail</b> <a href="mailto:support@biofiredx.com">support@biofiredx.com</a></p> <p><b>Reach Us by Mail</b> 390 Wakara Way Salt Lake City, UT 84108 USA</p>	<p><b>Reach Us by Phone</b> 1-800-735-6544 –Toll Free (801) 736-6354 - Utah</p> <p><b>Reach Us by Fax</b> (801) 588-0507</p>
Customer and Technical Support Outside of the U.S.	
Contact the local bioMérieux sales representative or an authorized distributor for technical support.	

## Table of Symbols

The following symbols can be found on the instrument, on pouches, or throughout this manual. Use the definitions below as a guideline to interpreting the symbols.

	Manufacturer		Biological Risks		Caution
	Consult Instructions for Use		Instructions for Use available online		Instructions for Use available by telephone
	<i>In vitro</i> Diagnostic Medical Device		Catalog Number		Serial Number
	Lot Number		European Union Conformity		European Community Authorized Representative
	Underwriter's Laboratory Listing Mark		Electrical Power		Protective Ground
	Off		On		Ethernet Cable
	Alternating current		WEEE - Do not throw in trash		USB Cable
	The NOTE symbol explains how to operate the instrument more efficiently.				Expiry Date YYYY-MM-DD



## Abbreviation of Terms

A.....	amp (ampere)
cm .....	centimeters
DNA .....	deoxyribonucleic acid
dNTP.....	deoxyribonucleotide triphosphate
kg.....	kilograms
Hz .....	hertz
in .....	inches
IVD.....	<i>in vitro</i> diagnostic
lbs .....	pounds
m.....	meters
nmPCR .....	nested multiplex PCR
PCR .....	polymerase chain reaction
PPE.....	personal protective equipment
RNA .....	ribonucleic acid
rt.....	reverse transcription
Taq .....	enzyme from <i>Thermus aquaticus</i>
Tm.....	melting temperature
VAC.....	volt, alternating current

# TABLE OF CONTENTS

E-Labeling .....	i
Customer and Technical Support.....	i
Table of Symbols.....	ii
Abbreviation of Terms .....	iii

## Chapter 1:

<b>FilmArray System .....</b>	<b>1</b>
FilmArray Intended Use .....	1
Limitations of Use .....	2
FilmArray Pouch .....	3
FilmArray Instrument .....	3
FilmArray Software .....	4

## Chapter 2:

<b>FilmArray Setup .....</b>	<b>5</b>
Setup Requirements .....	5
FilmArray Computer System .....	6
FilmArray Instrument .....	7
FilmArray Instrument Rack .....	7
FilmArray System Setup .....	7
FilmArray Computer System Setup .....	7
FilmArray Instrument Setup.....	9
FilmArray Instrument Status .....	10

## Chapter 3:

<b>Principles of Operation .....</b>	<b>11</b>
PCR Basics .....	11
Nested Multiplex PCR .....	12
High Resolution Melting Analysis .....	12

## Chapter 4:

<b>Performance Specifications .....</b>	<b>14</b>
FilmArray System Specifications .....	14

## Chapter 5:

<b>FilmArray Operating Instructions .....</b>	<b>16</b>
FilmArray Reagent Kits .....	16

FilmArray Test Procedure .....	17
General Precautions .....	17
Start FilmArray Run .....	18
View and/or Print Report .....	21
Error Messages .....	23

## Chapter 6:

### **FilmArray Software .....** 24

Introduction .....	24
FilmArray Software .....	24
FilmArray Software Menu .....	24
Pouch Management.....	25
Instrument Configuration .....	26
Instrument Dashboard .....	31
Instrument Control .....	33
Start Run in Instrument Control.....	34
Browse Runs .....	36
Search and View Run Data .....	37
Notes and Tags.....	37
Browse Runs Context Menu.....	38
View Report Tab .....	40
Evaluator .....	42
View Melting Curve Analysis Results .....	43
Database Management.....	44
Archive Runs .....	44
Restore Runs.....	46
Export Runs.....	47
Import Runs .....	48
Export Anonymous Runs .....	49
System Administrator Tasks (Windows).....	50

## Chapter 7:

### **Precautions when Working**

### **with the FilmArray System .....** 51

Laboratory Safety and Biohazards .....	51
General Safety Precautions.....	51
Laboratory Precautions.....	51
General PCR Precautions .....	52
Decontamination and Cleaning Procedures .....	52
Cleaning Materials.....	52
Pouch Loading Station Decontamination .....	53
Decontamination Related to Pouch Leakage .....	53
Instrument Decontamination.....	53
Decontamination of Bench Tops and Other Areas .....	54
Check Function of Decontaminated Instrument .....	54

## Chapter 8:

### **Preventative Maintenance and Troubleshooting.....** 55

Introduction .....	55
--------------------	----

General Maintenance.....	55
Error Reporting Tools.....	55
Troubleshooting .....	56
Hardware Troubleshooting.....	56
Barcode Reader.....	57
Diagnostic Errors .....	57
Software Troubleshooting.....	58
Pouch Troubleshooting.....	61

**Appendix A:**

**FilmArray Support Information ..... 62**

Instrument Return Procedure.....	62
Disposal Recommendation .....	62
FilmArray Ordering Instructions .....	62
Warranty Information.....	63

**Appendix B:**

**Barcode Calibration..... 64**



# CHAPTER 1: FILMARRAY SYSTEM

## FilmArray Intended Use

The FilmArray 2.0 system is an automated *in vitro* diagnostic (IVD) device intended for use with FDA cleared or approved IVD FilmArray panels. The FilmArray 2.0 system is intended for use in combination with assay specific reagent pouches to detect multiple nucleic acid targets contained in clinical specimens. The FilmArray 2.0 instrument interacts with the reagent pouch to both purify nucleic acids and amplify targeted nucleic acid sequences using nested multiplex PCR in a closed system. The resulting PCR products are evaluated using DNA melting analysis. The FilmArray software automatically determines the results and provides a test report.

The FilmArray 2.0 system is composed of one to eight FilmArray 2.0 instruments connected to a computer running FilmArray software. The FilmArray software controls the function of each instrument and collects, analyzes, and stores data generated by each instrument.



## Limitations of Use

- This product can be used only with FilmArray pouches.
- For prescription use only.
- The FilmArray 2.0 is intended to be used in combination with FilmArray panels that have been FDA cleared for use on the FilmArray 2.0.
- Use only the supplied cables when connecting the instrument to the computer.
- Do not use cable extenders to increase cable length.
- Do not install any software other than the BioFire Diagnostics FilmArray software on the computer unless required by peripheral devices (printers, flash drives, other USB devices).
- Do not install any antivirus software on the computer.
- Do not enable Windows Automatic Updates on the computer.
- Do not change screensaver settings on the computer.
- Do not run other software programs when running the FilmArray software.
- Do not change language settings on the computer.
- Do not enable wireless network connections.
- Do not modify the FilmArray software or configuration settings.
- Do not adjust system settings (such as date/time) while instruments are running.
- Do not re-run a pouch associated with an error, incomplete run, or invalid result.
- Only authorized service personnel should perform service or repairs on the system.

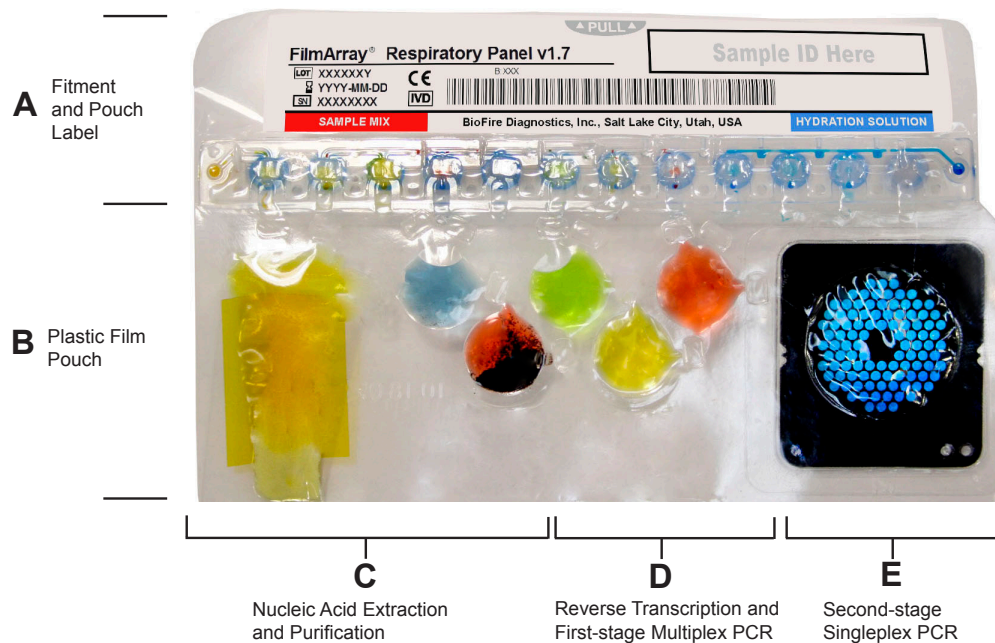
## FilmArray Pouch

Each FilmArray pouch is a self-contained, closed system disposable that houses all the chemistry required to isolate, amplify, and detect nucleic acid from a sample. The reservoirs in the rigid plastic component, or fitment, of the pouch (A) contain freeze-dried reagents. The flexible plastic film portion of the pouch (B) is divided into discrete segments (blisters) which, via interactions with actuators and sensors in the FilmArray instrument, are where the following chemical processes are performed:

(C) Extraction and purification of nucleic acids from a raw sample using mechanical lysis (bead beating) and magnetic bead technology

(D) First-stage multiplex PCR (including reverse transcription of target RNAs)

(E) Second-stage singleplex PCR and melting analysis within a multi-well array



**NOTE:** The colored liquid in this image of a FilmArray pouch is for visualization only. FilmArray pouches do not contain colored fluid.

Each pouch contains at least one internal process control. Control material is lysed and the nucleic acids of the control material are extracted along with that of the organisms contained in the sample. When the internal control is positive, proper operation of the instrument and chemical processes have been demonstrated.

## FilmArray Instrument

The components and operations of the FilmArray instrument and accessories are described below. Specific step-by-step operating instructions can be found in Chapter 5 and in the instruction booklet for each FilmArray reagent kit.

### Instrument and Pouch Interaction

After the run is started, a series of plungers, pneumatic actuators, and hard seals work together to move and mix liquid reagents between the blisters of the pouch. The FilmArray instrument controls

these functions automatically based on the run protocol selected for a specific pouch and sample type in the FilmArray software.

### **Mechanical Lysis**

The first step in processing a sample is to break the outer membrane of the target cells or organisms contained in the sample using a device called a bead-beater. A sensor detects the speed and operation of the bead-beater motor and aborts the run if the bead-beater is not working properly.

### **Nucleic Acid Extraction**

Following bead-beating, the nucleic acids contained in the sample are purified by magnetic bead technology. A retractable magnet is used to capture or release the magnetic beads during washes.

### **Thermal Control**

The purified nucleic acids are mixed with PCR reagents, which amplify all of the targets identified by the pouch as well as the control material. A Peltier device drives the thermocycling (heating and cooling of the solution) of the reverse transcription and/or first-stage PCR reactions. A second Peltier device controls thermocycling for second-stage PCR and DNA melting. This reaction takes place in the array located in the final pouch blister. The thermocycling conditions are controlled by the run protocol associated with each specific reagent pouch and sample type.

### **Optics and Imaging**

To identify targets from positive PCR reactions, DNA melting curve analysis is performed. The fluorescence emitted by the LCGreen® Plus dye is imaged by a camera. DNA melting curves are captured by slowly increasing the temperature of the PCR array and capturing the fluorescent signal. These images are processed automatically by the computer, and the data is analyzed to determine if the control reactions passed and which targets were detected in the sample.

The optics system contained in the FilmArray instrument is aligned, focused, and calibrated at the factory. Proper operation and calibration of instrument optics is monitored by the instrument self tests and pouch control reactions.

## **FilmArray Software**

The FilmArray software provided with the system controls the operation of the FilmArray instrument. The software also collects, stores, and analyzes data generated by the instrument. Results of analyses are presented in a test report. Detailed information about the features and operation of the FilmArray software is provided in Chapter 6.



# CHAPTER 2: FILMARRAY SETUP

## Setup Requirements

Select a clean, well-ventilated area for the FilmArray system that is large enough to fit the FilmArray instrument(s), instrument rack(s), printer, computer stand, computer and Ethernet switch.

- The depth of the bench-top space should be at least 24 in (61 cm).
- The width of the counter space required depends on the number of instrument rack(s) being set up:
  - 1 Rack – 36 in (91 cm)
  - 2 Racks – 48 in (122 cm)
  - 3 Racks – 60 in (155 cm)
  - 4 Racks – 72 in (185 cm)
- The height of the space required is at least 36 in (91 cm).
- Power Specifications: 100–240VAC, 50-60Hz 1.2A input (grounded outlet)



**NOTE:** A full eight-instrument setup requires 12 electrical/power outlets.



**NOTE:** One instrument rack can hold one or two instruments. A rack is optional if using a single instrument.

The FilmArray system complies with the emission and immunity requirements in IEC 61326. It is advisable to evaluate the electromagnetic environment prior to operating the device.



**CAUTION:** Do not use this device in close proximity to sources of strong electromagnetic radiation (unshielded intentional radio frequency sources, for example) because these may interfere with the operation of the system.

## Components of the FilmArray System

Each FilmArray system comes with an instrument, accessories, computer system, a printer, and an instrument rack (optional). The system ships with three or four boxes: two computer system boxes, the instrument box, and the instrument rack box if ordered. Materials provided in each box:

## FilmArray Computer System



Computer



Computer Power Cord



Monitor



Monitor Power Cord



Mouse



Keyboard



Ethernet Cable



VGA Cable



Barcode Reader



Barcode Reader Stand



Ethernet Switch



DVI Cable



Printer



Printer Power Cord



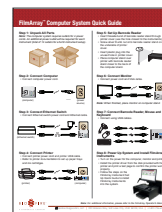
Printer Accessories



Computer Stand



FilmArray Software CD



FilmArray Computer System Quick Guide (Paper copy & on Information CD)



**NOTE:** An extra DVI cable and USB cable are included with the monitor. An extra USB cable is also included with the printer. These cables are not needed and may be discarded.



**NOTE:** The computer comes preloaded with the FilmArray Software and training video.

## FilmArray Instrument



FilmArray  
Instrument



FilmArray Instrument  
Power Cord



Ethernet  
Cable



FilmArray Pouch  
Loading Station



FilmArray Instrument  
Setup Quick Guide



FilmArray Instrument  
Information CD

## FilmArray Instrument Rack



Instrument Rack



Rack Clip



**NOTE:** The instrument rack is optional and is shipped separately in its own box. The instrument rack also includes a clip to attach to an additional rack (if applicable).

## FilmArray System Setup



**CAUTION:** Use only the supplied cables when connecting the instrument to the computer. Do not use cable extenders to increase cable length.

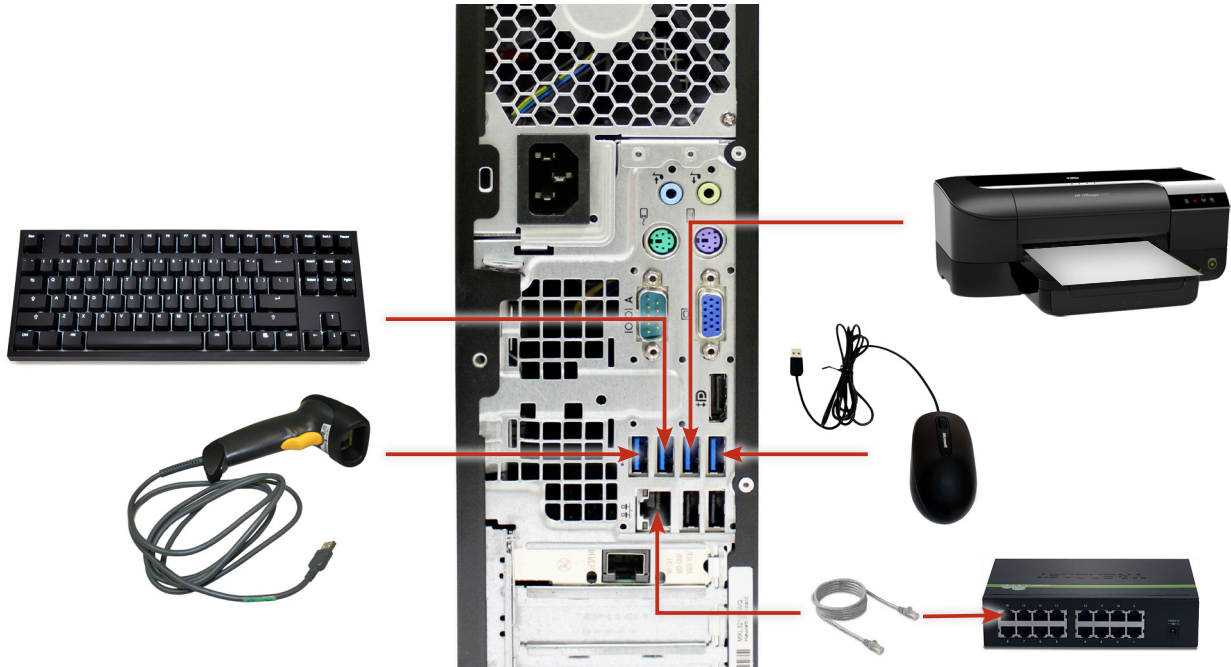
### FilmArray Computer System Setup

1. Open both computer system boxes, remove all components, and FilmArray Computer System Quick Guide. The quick guide provides abbreviated setup instructions.
2. Place the computer vertically toward the back of the workbench and plug in the computer power cord.



## Chapter 2: FilmArray Setup

3. Place the Ethernet switch vertically toward the back and plug in the power cord for the switch.
4. Place the printer in front of the computer. Refer to the instructions included with the printer to set up the paper trays and ink cartridges. Plug in the printer power cord and USB cables.
5. Connect the barcode scanner, keyboard, mouse and printer to USB ports on the computer as shown. Plug the Ethernet cable from the computer into port 16 on the Ethernet switch.



6. Place the computer stand over the printer and mount the barcode reader stand onto the computer stand. Place the monitor, keyboard and mouse on top of the computer stand. Plug the monitor into the VGA monitor port on the computer.
7. Plug the power cords for the computer, monitor, printer, and Ethernet switch into a grounded power source.
8. Turn on power to the computer, monitor, and printer.
9. Install the driver for the printer using the disk provided with the printer. Print a test page to make sure the printer works properly.



**NOTE:** The computer is equipped with additional USB ports that can be used for connecting flash drives and other USB devices. The required drivers for these USB devices can be installed on the computer.



**CAUTION:** Do not install any software other than the FilmArray software on this computer unless required by peripheral devices as described above.

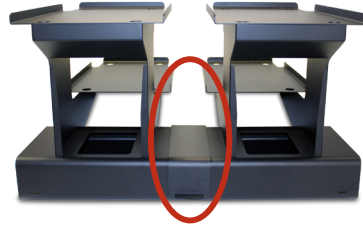


**CAUTION:** Do not remove any USB device before ejecting it. Failing to do so may result in the USB device not operating properly. If the USB device is not operating properly, restart the computer and try again. Never start a computer with a flash drive connected to it.



## FilmArray Instrument Setup

1. Unpack the instrument rack (optional) and place it on a flat, sturdy surface. When using more than one rack, lock together adjoining racks using the rack clip.

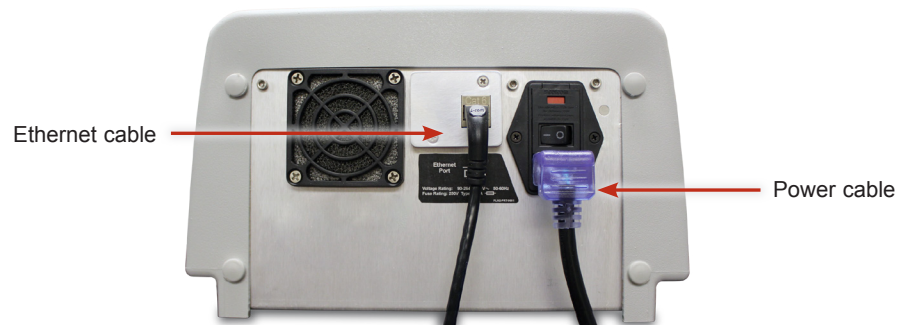


2. Unpack the FilmArray instrument and place on the instrument rack or on a flat, sturdy surface.



**NOTE:** If placing the instrument on an instrument rack, fill the bottom position first.

3. Connect the instrument Ethernet cable and instrument power cord to the back of the instrument as shown.




4. Plug the instrument power cord into a power source. Plug the instrument Ethernet cable into the Ethernet switch.



 **NOTE:** Use port 1 for instrument 1, port 2 for instrument 2, and so on.













5. Turn the FilmArray instrument ON using the power switch on the back of the instrument near the power cord.
6. Launch the FilmArray training video by clicking on the training icon found on the desktop. See Chapter 6, *FilmArray Software*, for detailed information on instrument configuration.

 **NOTE:** The FilmArray instrument does not require routine shutdown, but can be turned OFF using the power switch on the back of the instrument near the power cord. The computer can be shut down and restarted as needed.



## FilmArray Instrument Status

The light on the front of the FilmArray instrument shows the status of the instrument. The light around the button indicates the status of the chamber.

Instrument Status Light		Chamber Status Light	
	Off	No Power	
	Yellow Blinking	Locate Instrument	
	On	Instrument Ready	
	Green Blinking	Instrument Running	
	Red Blinking	Instrument Error	
	Purple Blinking	Instrument Error (Requires restart)	
	White	Initializing	
	Yellow Solid	No Network Connection	

# CHAPTER 3: PRINCIPLES OF OPERATION

FilmArray is an automated *in vitro* diagnostic (IVD) system that utilizes nested multiplex PCR (nmPCR) and high-resolution melting analysis to detect and identify multiple nucleic acid targets from clinical specimens. The user of the FilmArray system loads the sample into a reagent pouch, places the pouch into the FilmArray instrument, and starts the run. The FilmArray instrument interacts with the reagent pouch to extract nucleic acids from the sample and to amplify pathogen specific DNA sequences that are targeted by the assays. The resulting PCR products are evaluated using DNA melting analysis and the results are automatically determined and presented by the FilmArray software in a test report.

## PCR Basics

Polymerase chain reaction (PCR) is the process of making billions of copies of DNA. Copies are made by melting the DNA into separate strands and using each strand as a template for generation of a new strand. To identify specific pathogens using PCR, primers (short pieces of a specific DNA sequence) are included in the PCR reaction to target unique segments of the pathogen genome. If the organism of interest has an RNA genome, a process called reverse transcription (rt) is performed prior to PCR in order to convert the RNA template into a DNA template (rt-PCR).

There are 3 steps to a PCR cycle:

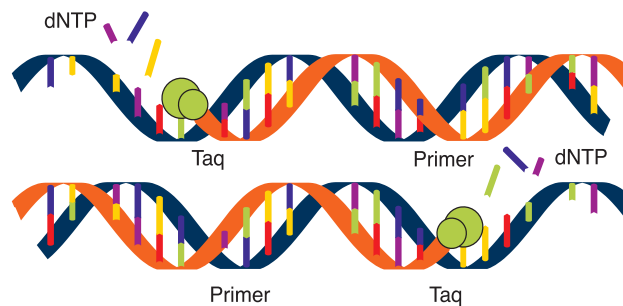
**Step 1: Denaturation** - The sample is heated to about 94°C to denature or ‘melt’ the double-stranded target DNA into single strands.



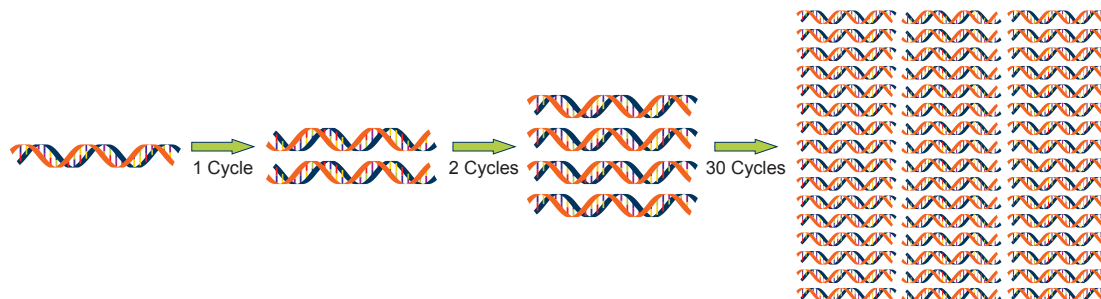
**Step 2: Primer annealing** - The sample is cooled to about 60°C, allowing the primers to bind or “anneal” to the target DNA strands at a specific site.



**Step 3: Primer extension** - an enzyme (Taq DNA polymerase) binds to the DNA/primer complex and makes a copy of the original double stranded DNA by adding nucleotides (dNTPs A, G, T or C) that are complementary to the nucleotide sequence of the target DNA.



At the end of a cycle, each piece of double-stranded target DNA has been duplicated. The new DNA copies act as templates in the next cycles, so after 30 cycles, as many as 1 billion copies of a single piece of DNA can be produced. With this duplication process, it becomes possible to detect DNA or RNA from even a low concentration of pathogens in the original sample.



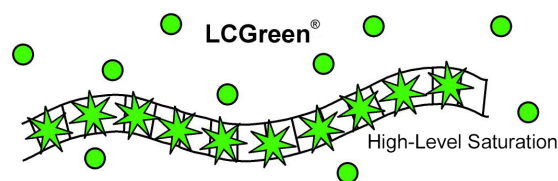
### Nested Multiplex PCR

Nested multiplex PCR (nmPCR) uses two stages of PCR. During the first-stage PCR, multiple “outer primers” are used to perform multiplex PCR on the target templates present in the sample.

Second-stage PCR is performed in a singleplex format to further amplify the DNA copies generated during the first-stage PCR. The “inner primers” used in second-stage PCR are made up of sequences “nested” within the first-stage PCR product(s).

### High Resolution Melting Analysis

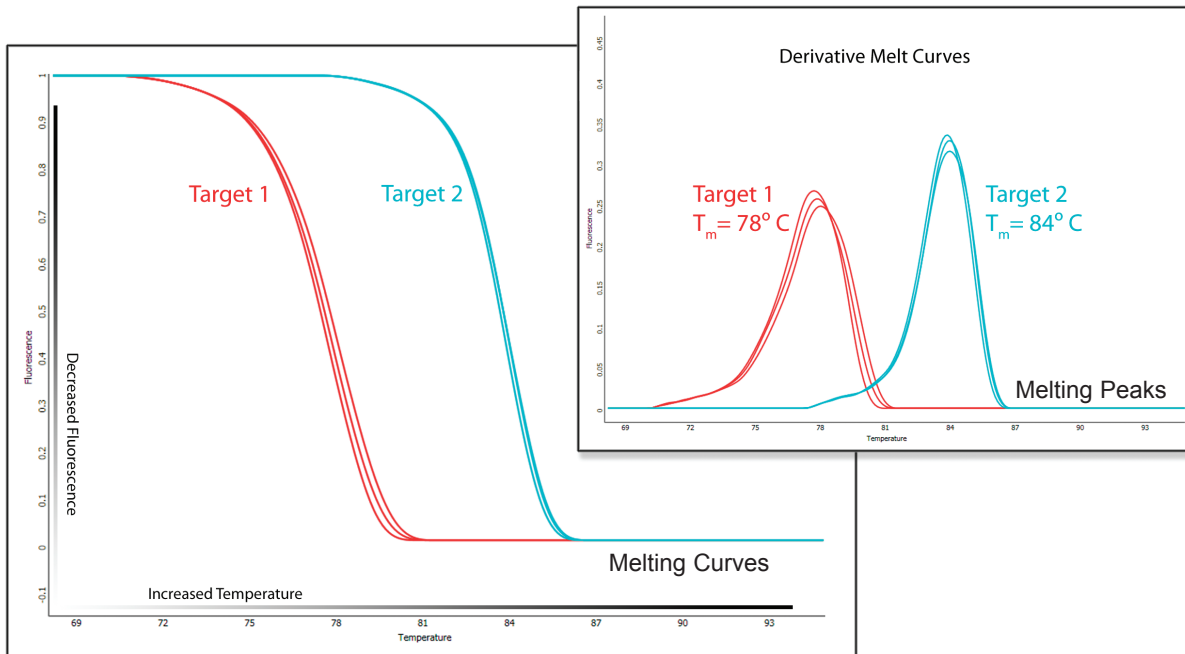
FilmArray PCR reactions contain the DNA binding dye LCGreen® Plus. LCGreen Plus is incorporated into the copies of DNA as they are made during each PCR cycle. When bound to double-stranded DNA, the dye fluoresces and the fluorescence is detected by the FilmArray instrument. As the temperature is increased and the copies of double-stranded DNA melt, the LCGreen Plus dye is released and a reduction in fluorescence is detected.



Copies of double-stranded DNA generated during PCR (called PCR products or amplicon) will have unique sequences based on the template that was amplified. Amplicon length and sequence determines the temperature at which the double-stranded DNA will melt apart, which is known as the melting temperature ( $T_m$ ) of the amplicon. PCR products made from different targets will have different sequences and, therefore, different  $T_m$ s.

After the last cycle of PCR, the FilmArray instrument gradually raises the temperature of the reaction from approximately 60°C to 94°C. As the temperature reaches the  $T_m$  of an amplicon, the amplicon denatures and fluorescence drops, releasing LCGreen Plus. This produces a melting curve, seen in the graph below, which shows the rapid decline in fluorescence. A melting peak with a specific  $T_m$  is generated for each amplicon by plotting the negative derivative of the melting curve.

#### Melting Curves for two Different Targets with Unique Amplicon Sequences



The FilmArray uses melting curve analysis to identify pathogen specific PCR product. Since the sequence and  $T_m$  of an amplicon from a specific target is known and consistent, pathogen specific PCR product can be identified as being copied from that target. Non-specific PCR products with different  $T_m$ s are excluded.

# CHAPTER 4: PERFORMANCE SPECIFICATIONS

## FilmArray System Specifications

Sample Description	<ul style="list-style-type: none"> <li>• One sample capacity per instrument</li> </ul>
Run Time	<ul style="list-style-type: none"> <li>• Sample run time about one hour</li> </ul>
User Interface	<ul style="list-style-type: none"> <li>• Computer and (optional) barcode reader</li> </ul>
Data Output	<ul style="list-style-type: none"> <li>• Automatic analysis with end-of-run interpretive reports</li> </ul>
Fluorescence Acquisition	<ul style="list-style-type: none"> <li>• Single color optics module: 475nm excitation, 545nm emission, and sensor imaging</li> </ul>
Temperature Control	<ul style="list-style-type: none"> <li>• Operating temperature 15°C to 30°C</li> <li>• Peltier devices:             <ul style="list-style-type: none"> <li>• Ambient to 100°C</li> <li>• Ramp rate from 0.1–0.5°C /sec on melt</li> </ul> </li> </ul>
Operations Specification	<ul style="list-style-type: none"> <li>• 15°C to 30°C @ 20 to 80% humidity (non-condensing)</li> <li>• -16m to 3098m</li> <li>• Indoor use only</li> </ul>
Shipping Specifications	<ul style="list-style-type: none"> <li>• -30°C to 70°C @ 5 to 95% humidity (non-condensing)</li> <li>• -16m to 10,600m</li> </ul>
Power Requirements	<ul style="list-style-type: none"> <li>• 100-240VAC 50-60Hz 1.2A input</li> </ul>
Fuse	<ul style="list-style-type: none"> <li>• 250V 3A Type T</li> </ul>
Dimensions and Weight	<ul style="list-style-type: none"> <li>• 10 x 15.5 x 6.5 in (25.4 x 39.3 x 16.5 cm) (W x D x H; instrument only)</li> <li>• Weight*: Approximately 88 lbs (40 kg):             <ul style="list-style-type: none"> <li>• Instrument – 16 lbs (7.3 kg)</li> <li>• Rack – 16 lbs (7.3 kg)</li> <li>• Computer &amp; Peripherals – 56 lbs (25 kg)                 <ul style="list-style-type: none"> <li>• Computer – 16 lbs (7.3 kg)</li> <li>• Monitor – 11 lbs (5 kg)</li> <li>• Printer Cover, Keyboard, Mouse, Bar-Code Scanner – 14 lbs (6.4 kg)</li> <li>• Printer – 14 lbs (6.4 kg)</li> <li>• Ethernet Switch – 1 lb (0.5 kg)</li> </ul> </li> </ul> </li> </ul> <p>* Base system with instrument, computer, and one rack</p>



EMC Requirements	<ul style="list-style-type: none"> <li>• The FilmArray system complies with the emission and immunity requirements in IEC 61326</li> </ul>
CPU	<ul style="list-style-type: none"> <li>• Intel® Core™ i7/3.40 GHZ or faster</li> </ul>
Storage and Memory	<ul style="list-style-type: none"> <li>• 500 GB Hard Drive or greater</li> <li>• 4 GB RAM or greater</li> <li>• 8X DVD+/-RW or better</li> </ul>
Interfaces and Peripherals	<b>Computer</b> <ul style="list-style-type: none"> <li>• 2 Ethernet network interfaces</li> <li>• 4 USB connections or more</li> <li>• VGA connection</li> </ul>
	<b>Ethernet Switch</b> <ul style="list-style-type: none"> <li>• 16 Ethernet network interfaces</li> </ul>
	<b>Instrument</b> <ul style="list-style-type: none"> <li>• One Ethernet network interface</li> </ul>
Display	<ul style="list-style-type: none"> <li>• 20 in (51 cm)</li> <li>• VGA (analog)</li> <li>• 1600 x 900 resolution or equivalent</li> <li>• Dedicated video card</li> </ul>
Operating System	<ul style="list-style-type: none"> <li>• Microsoft® Windows® 7 Pro 64 bit</li> </ul>

# CHAPTER 5: FILMARRAY OPERATING INSTRUCTIONS



**NOTE:** Additional instruction on how to operate the FilmArray is provided in the FilmArray training video found on the computer.



**NOTE:** Pouch preparation may vary depending on the pouch type used. Please consult the instruction booklet for each FilmArray reagent kit for specific preparation steps.

Using the FilmArray system involves three main steps:

1. Adding patient sample to the FilmArray pouch.
2. Loading the FilmArray pouch into the instrument and performing a run.
3. Viewing and/or printing a report.

## FilmArray Reagent Kits

Each kit includes FilmArray pouches and all components required to run tests on the FilmArray instrument. Components will vary based on the type of FilmArray reagent kit. Refer to the instruction booklet or quick guide for specific preparation and testing procedures.



**CAUTION:** Do not attempt to use components from one reagent kit to prepare a different pouch type. Components are pouch specific.

Each FilmArray pouch is labeled with:

**LOT**

Lot Number

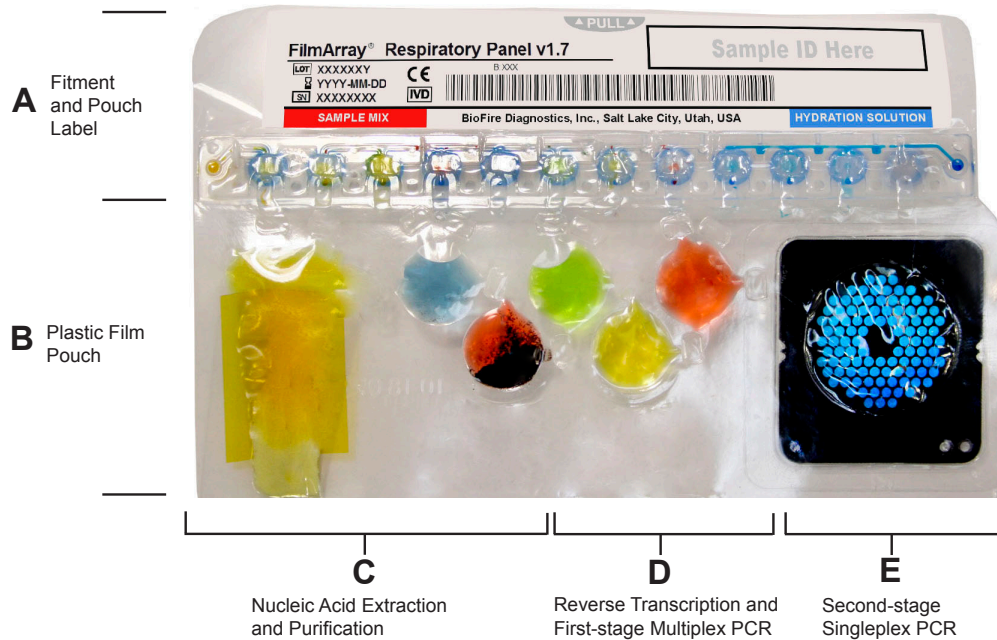


Expiry Date

**SN**

Serial Number

This information is both human-readable and contained in the barcode. The pouch also includes a space to write the Sample ID or affix a Sample ID barcode.



## FilmArray Test Procedure

### General Precautions



**BIOLOGICAL RISKS:** When working with the FilmArray system, personnel may come in contact with contaminants or potentially infectious material. Appropriate biohazard guidelines for working with potentially infectious samples should be followed. Refer to the *Safety Precautions* section of the appropriate FilmArray reagent kit instruction booklet for additional safety information.

It is recommended that the handling of potentially infectious samples be performed in a biological safety cabinet or hood, or behind a protective shield. Once patient sample has been added to the FilmArray pouch, move the pouch to a separate area to perform the test.

One of the most important guidelines for a test using PCR is to avoid contamination. Some important rules to follow are:

1. Sample collection, pouch loading, and FilmArray instrument operation should each be performed in separate locations or work areas.
2. Do not leave a work area or return to a previous work area without first completing decontamination procedures (i.e., washing the area and changing protective clothing and gloves).
3. Prepare and load only one pouch at a time.
4. Always dispose of used pouches, or pouches that have come in contact with a sample, in a biohazard waste container. Change gloves after handling a used pouch.

FilmArray pouches are stored under vacuum in individually-wrapped canisters. To preserve the integrity of the pouch vacuum for proper operation, be sure that a FilmArray instrument will be available and operational before unwrapping any pouches for loading.

## Start FilmArray Run

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Refer to the *Procedure* section of the appropriate FilmArray reagent kit instruction booklet for step by step instructions for sample and pouch preparation.

The FilmArray software includes a step-by-step tutorial that 1) walks the operator through placing the FilmArray pouch into the FilmArray instrument and 2) demonstrates how to perform a run.

Follow the on-screen instructions located in the Next Step box to perform the run.

1. Open the FilmArray software (if not already open) by double-clicking on the FilmArray software desktop icon.
2. Ensure that the instrument is properly configured. Refer to Chapter 6, *FilmArray Software*, for more information about the instrument configuration process.
3. Open the instrument lid (if not already open).
4. Load the pouch into the FilmArray instrument.



Position the pouch with the black array on the right side and the film portion of the pouch entering the instrument first. The pouch will lock into place when it is properly inserted.

Ensure that the red and blue labels on the pouch align with the red and blue arrows on the FilmArray instrument as shown in the figure above. If inserted correctly, the barcode label is visible on the top of the FilmArray pouch. There is an audible click when the pouch is securely in place.

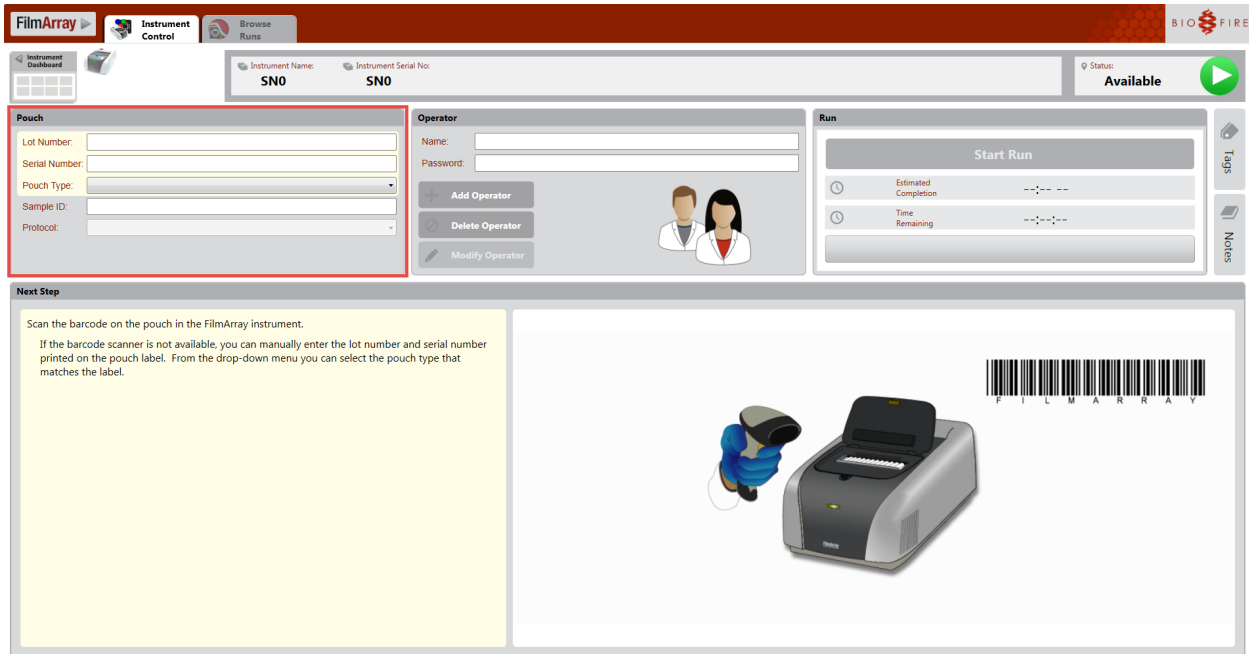
If the FilmArray pouch is not completely in place, the instrument and software will not continue to the next step.



**NOTE:** The instrument lid must be opened completely. If the pouch cannot be easily inserted into the pouch chamber of the instrument, gently push the instrument lid back completely and try again.

- Scan the barcode on the FilmArray pouch label using the barcode scanner provided. If the barcode scanner is not available, manually enter the lot number and serial number printed on the pouch label. Use the drop-down menu to select the pouch type that matches the label. Be sure that all barcode labels are as smooth and flat as possible. Hold the scanner about 10 centimeters from the barcode. Center the aiming beam on the barcode to scan.

Pouch information and protocols are preprogrammed in the rectangular barcode located on the FilmArray pouch. The first three fields of the FilmArray pouch section of the screen (Lot Number, Serial Number, and Pouch Type) will be filled in by scanning the barcode.



**NOTE:** Keep the lens of the barcode reader free of dust and scratches.



**NOTE:** A pouch must be placed in the instrument prior to being scanned. A warning message “The lid needs to be open and a pouch loaded in order to scan” (see figure below) is displayed if the scanned pouch is not in the instrument.

**Pouch**

The lid needs to be open and a pouch loaded in order to scan.

Lot Number:

Serial Number:

Pouch Type:

Sample ID:

Protocol:

## Chapter 5: FilmArray Operating Instructions

6. Scan the Sample ID. If a Sample ID barcode was not used, manually enter the Sample ID written on the label when the pouch was prepared.

The screenshot shows the FilmArray software interface. At the top, there are navigation tabs for 'Instrument Dashboard', 'Instrument Control', and 'Browse Runs'. The 'Instrument Control' tab is active, displaying 'Instrument Name: SNO' and 'Instrument Serial No: SNO'. A status indicator shows 'Available' with a green play button. The main interface is divided into three sections: 'Pouch', 'Operator', and 'Run'. The 'Pouch' section contains fields for Lot Number (506073), Serial Number (1234568878), Pouch Type (Respiratory Panel v1.7), Sample ID (highlighted with a red box), and Protocol (NPS v3.0). The 'Operator' section has fields for Name and Password, and buttons for 'Add Operator', 'Delete Operator', and 'Modify Operator'. The 'Run' section has a 'Start Run' button and a table for 'Estimated Completion' and 'Time Remaining'. Below these sections is a 'Next Step' area with a yellow background, containing instructions: 'Scan or enter the Sample ID of the pouch in the FilmArray instrument. If a Sample ID barcode was not used, you may manually enter the Sample ID written on the label when the pouch was prepared.' To the right of the text is a barcode and an illustration of the FilmArray instrument and a handheld scanner.

7. Confirm or select the correct protocol for the sample type from the protocol drop down list.



**NOTE:** If only one protocol is available, it will be automatically selected.

8. Enter the operator name and password in the Name and Password fields. Use the Add Operator button to create a new account if needed.

The screenshot shows the FilmArray software interface, similar to the previous one. The 'Operator' section is highlighted with a red box, showing the 'Name' and 'Password' fields. The 'Next Step' area has a yellow background with instructions: 'Enter the operator name and password. If this is your first time, use the Add Operator button to create your own account.'



**NOTE:** The font color of the name and password is red until the user name is recognized by the software.

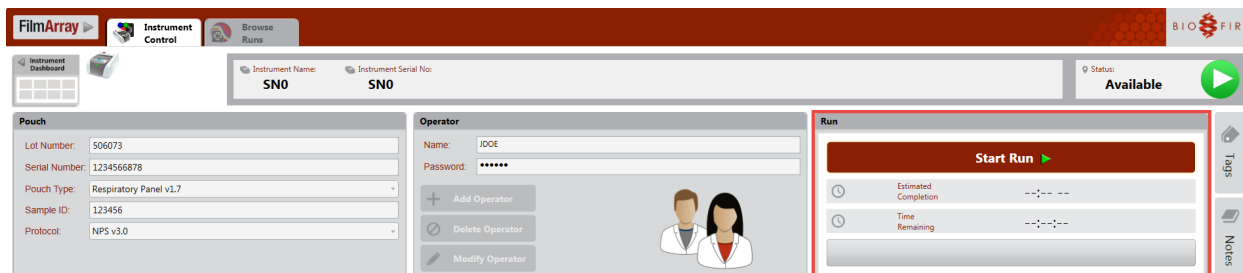


**NOTE:** See Chapter 6, *FilmArray Software*, for more information on creating a user name and password and adding or deleting operators.

9. Close the lid on the FilmArray instrument.

**CAUTION:** Use caution when closing the lid to avoid pinching fingers.

- Click the Start Run button on the software screen. The software will start the run on the selected instrument.



A checklist of steps is displayed in the Next Step section of the main Instrument Control screen. As the instrument proceeds through each step, a checkmark appears by the step. The approximate remaining run time is displayed in the Run box.

Once a run has started the user can navigate to the Instrument Dashboard and perform tasks on other instruments.

If it is necessary to stop a run before it is finished, select Abort Run. When a run is aborted, any data that has been generated for that run will not be available for analysis. An aborted run cannot be restarted or rerun.

If communication is lost during a run, the run will continue and data will be uploaded when communication is re-established.

**CAUTION:** Do not adjust system settings, including date/time, during a run. Do not change instrument or dashboard configuration during a run.

**NOTE:** The FilmArray software has an option for an audible alert sound upon run completion. See Chapter 6, *FilmArray Software*, for more information on selecting this option.

- At the end of the run, remove the pouch from the FilmArray instrument.

The flashing blue light indicates that the test is complete. The lid on the instrument may be opened and the pouch removed. Removing the pouch clears all the fields on the screen and prepares the instrument for another test.

## View and/or Print Report

When a run is finished:

- On the Instrument Control screen, the View Report tab will open automatically at the completion of a run to display the report.
- On the Instrument Dashboard, a report icon will appear in the top right corner of the Instrument Dashboard box for the instrument with a completed run. Click anywhere in that box to view the report.

The software can be configured to automatically print the report at the end of the run (see below). At any time when viewing a report the operator can select the Print button to print the report or Save to



## Chapter 5: FilmArray Operating Instructions

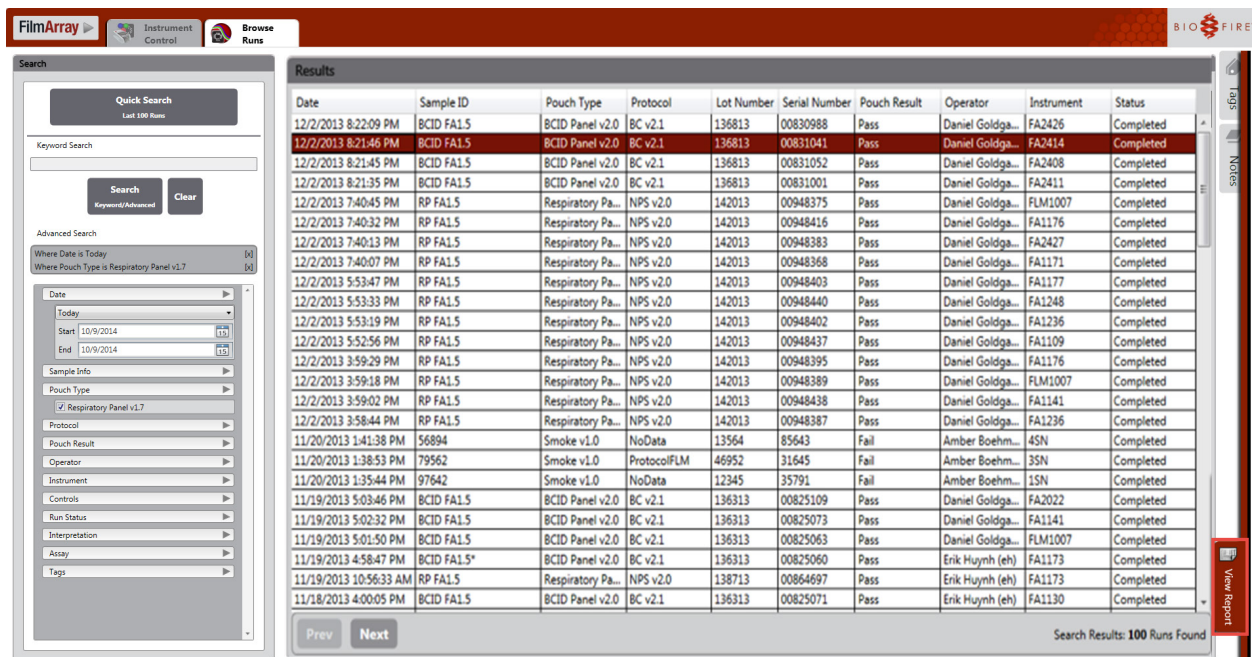
save the report as a PDF file.

Refer to the instruction booklet for the appropriate FilmArray reagent kit for more details about the information provided in the report.

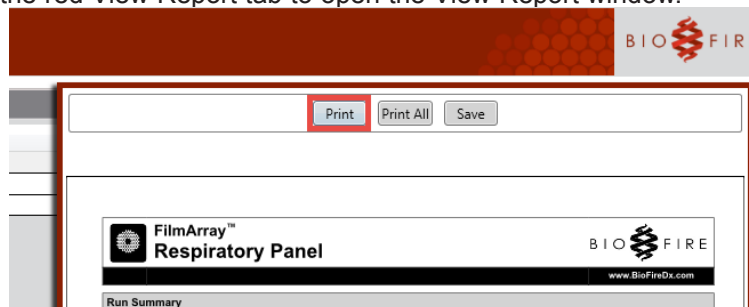
To view or print a report from a previous FilmArray pouch run stored in the database:



1. Navigate to the Browse Runs tab in the FilmArray software.
2. Use the Quick Search, Keyword Search, or Advanced Search options to locate runs in the database.
3. Select the desired run from the Results table by clicking and highlighting the appropriate table row.



4. Click on the red View Report tab to open the View Report window.



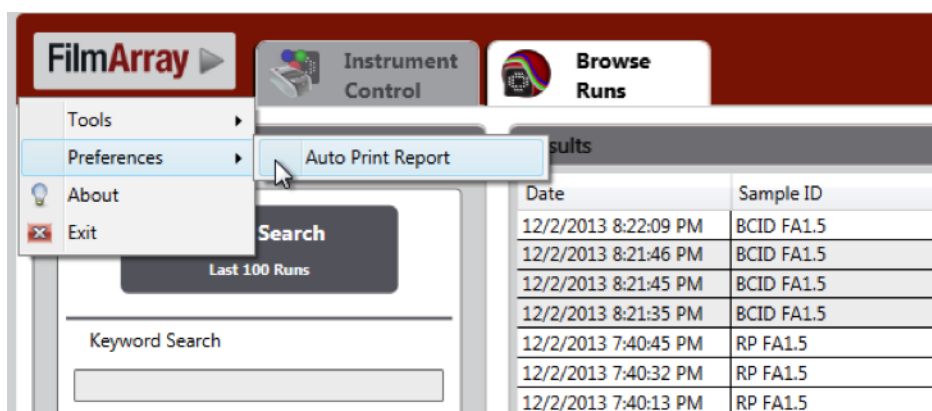
5. To print the report, click the Print button at the top of the View Report window.

The report for a run or runs can also be printed by right-clicking the applicable runs in the

Browse Runs table and selecting Print Reports from the Browse Runs context menu:

To configure the software to automatically print the report at the end of each run:

1. Highlight the Preferences option in the FilmArray software menu.



2. Click on Auto Print Report to enable automatic printing of the report.
3. Navigate to Devices and Printers in the Windows Start menu. Set the default printer by right-clicking on the icon for the desired device and checking the Set as default printer option. A green check mark is displayed on the icon for the selected device.
4. The FilmArray software will print the report to the default printer.
5. After completion of the next run, the report will automatically print.

## Error Messages


Errors in the FilmArray system may originate in the instrument, in the software, or in communication between the two. Any run that receives an error message should be repeated with a new pouch. See Chapter 8, *Preventative Maintenance and Troubleshooting*, for more information on viewing and handling error messages.

# CHAPTER 6: FILMARRAY SOFTWARE

## Introduction

The FilmArray software comes preinstalled on the FilmArray computer. It communicates with the FilmArray instrument(s), and is used to enter pouch and sample information, start a run, analyze data, and provide a report with all test results. This chapter explains how to use the FilmArray software, set up the Instrument Dashboard, and manage the database.

## FilmArray Software

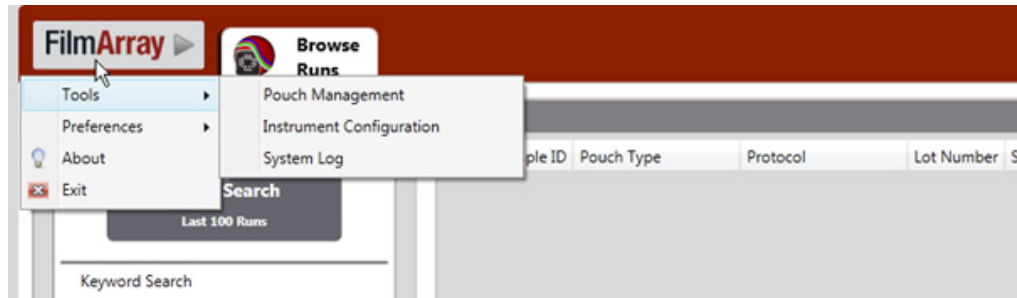
The FilmArray computer is preconfigured with the FilmArray software. No password is required when logging on. To open the FilmArray software, turn the computer on and double-click the FilmArray software icon  found on the desktop.

### FilmArray Software Menu

To access the FilmArray software menu, click the FilmArray button, located in the top left-hand corner of the window.

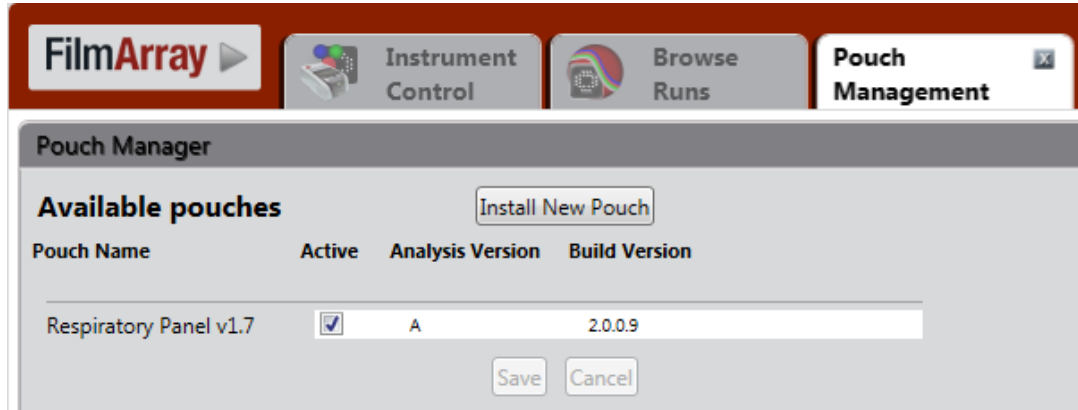
The table below lists all the features available in the FilmArray menu.

FilmArray Software Menu	Description
Tools	<p><b>Pouch Management:</b> Enables the operator to view existing and install new FilmArray pouch modules. For more information see the <i>Pouch Management</i> section in this chapter.</p> <p><b>Instrument Configuration:</b> Enables the operator to add FilmArray instruments to the FilmArray system. For more information see the <i>FilmArray Instrument Configuration</i> section in this chapter.</p> <p><b>System Log:</b> Provides details about error messages. For more information see the <i>Software Troubleshooting</i> section in Chapter 8.</p>
Preferences	<p><b>Auto Print Report:</b> Enables the operator to set reports to auto print. For more information see the <i>View and/or Print Report</i> section in Chapter 5.</p>
About	Provides the software version, end-user license and build information.
Exit	Exits the software.



## Pouch Management

The Pouch Management feature enables the operator to see which FilmArray pouch modules are currently installed and available for use. This feature also enables the operator to install new pouch modules. These pouch modules contain definitions, instrument protocols, analysis and reporting for specific FilmArray reagent kits.



### Pouch Module Installation

When new pouch modules are received from BioFire Diagnostics, Pouch Manager must be used to add these to the list of available pouches.

The operator can access the FilmArray Pouch Manager via the FilmArray software menu. To add a new pouch to the system:

1. Select Tools > Pouch Management to open the Pouch Manager.
2. Click Install New Pouch to add a new pouch to the system.

To inactivate a pouch module, deselect the Active checkbox next to the pouch name.

## Instrument Configuration

The FilmArray instrument Configuration window enables the operator to add one to eight instruments to a FilmArray system and configure them.



**NOTE: A FilmArray instrument must be added to the FilmArray system before the FilmArray software can be used to set up and perform runs on that instrument, save runs to the FilmArray database, or view the results.**

The figure below shows where each of the following features is located in the Instrument Configuration window.

1. Add an instrument to the system.
2. Rename the instrument.
3. Assign an end-of-run sound that alerts the operator when a run has finished.
4. Verify the correct instrument has been selected before configuration changes are made by clicking the Blink LED button.
5. Remove the instrument from the system.





### Add Instruments to System

A FilmArray instrument can only be added in Instrument Configuration if that instrument is on and connected.

1. If the instrument is not yet connected to the system, connect all cables as indicated in Chapter 2, *FilmArray Setup*
2. Turn the instrument on. The instrument will connect within 10 seconds.



**NOTE:** If the instrument is not connecting, see the *Hardware Troubleshooting* section in Chapter 8.

3. Select Tools > Instrument Configuration from the FilmArray software menu. The Instrument Configuration window will open.
4. Click the Add button  from the Instrument Configuration window. The Detected Instruments window will open as shown to the right.
5. Click the Blink LED button to verify the correct instrument is selected.
6. Click the Add button . The Detected Instruments window closes automatically after an instrument is selected. The instrument's icon is now shown in the Instrument Configuration window.
7. Click Save. The Instrument Configuration window will close.



### Rename Instrument

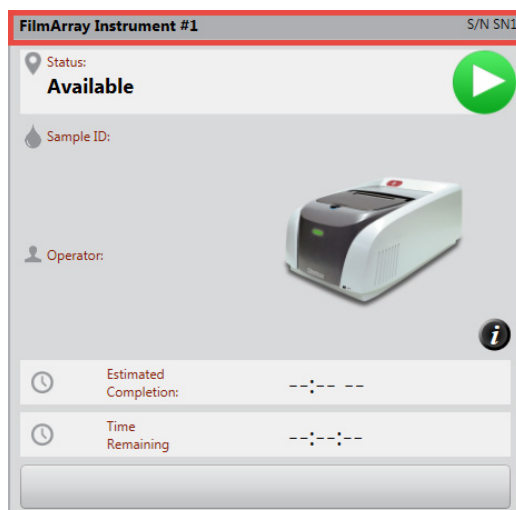
The operator can change the name of an instrument when first added in the Instrument Configuration window or any time thereafter.

1. From the FilmArray software menu, select Tools > Instrument Configuration. The Instrument Configuration window will open.
2. Click in the field next to Name and enter the desired name.



3. Click the Save button at the bottom left of the window.

4. The Instrument Dashboard will display the new name for that instrument.



### Assign End-of-Run Sound

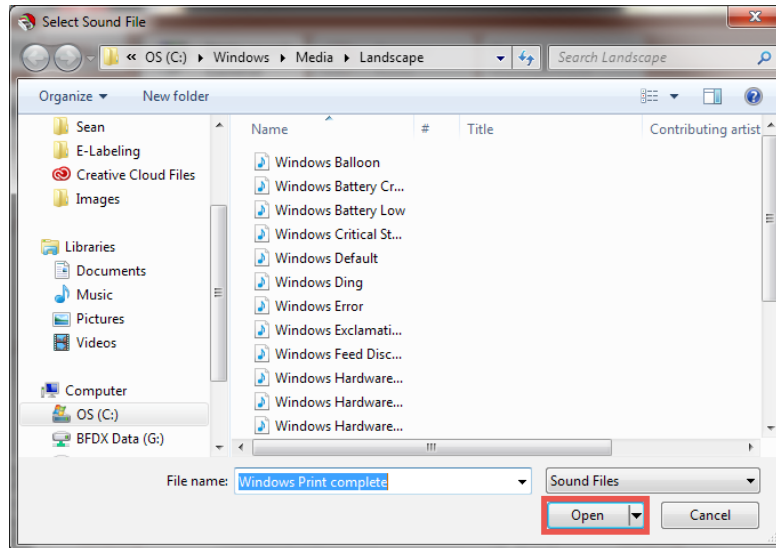
Each instrument in the FilmArray system can be assigned a sound to alert when a run has ended. The operator can assign or change an end-of-run sound on any instrument when the instrument is first added in the Instrument Configuration window or any time thereafter. The end-of-run sound may also be muted.

1. From the FilmArray software menu, select Tools > Instrument Configuration. The Instrument Configuration window will open.
2. In the End-of-Run Sound field for an instrument that has been added to the system, note the sound file name ending in “.wav”.

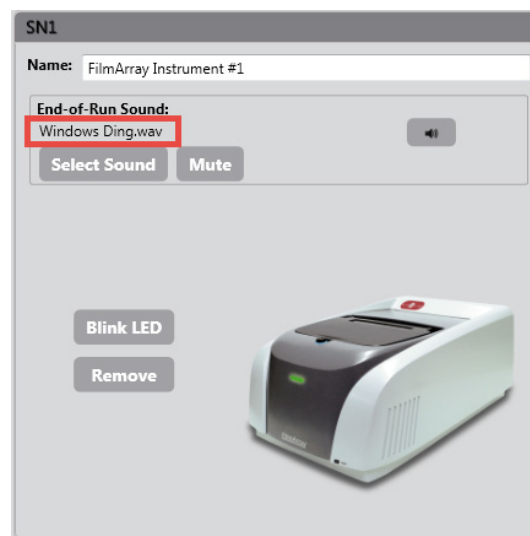


3. To change the sound file, click the Select Sound button. A window will open with a list of options for an end-of-run sound.

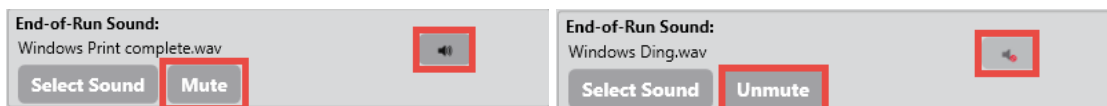




4. Choose a sound file and click Open.
5. The sound file chosen will display in the End-of-Run Sound field.



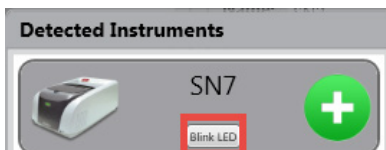
6. To mute an alert at the end of a run, click the Mute button. The button will now be labeled "Unmute". In addition, the speaker symbol located to the right of the Mute button will have a crossed-out red circle next to it.



7. To unmute the end-of-run sound, click on the Unmute button. The speaker symbol will now have a sound wave symbol next to it.
8. Click the Save button at the bottom left of the window.

### Blink LED

When adding an instrument in the Instrument Configuration window, the Blink LED button in the Detected Instruments window can be used to verify that the correct instrument is being added to the system. Clicking the Blink LED button for the selected instrument will make the status light flash on that instrument.



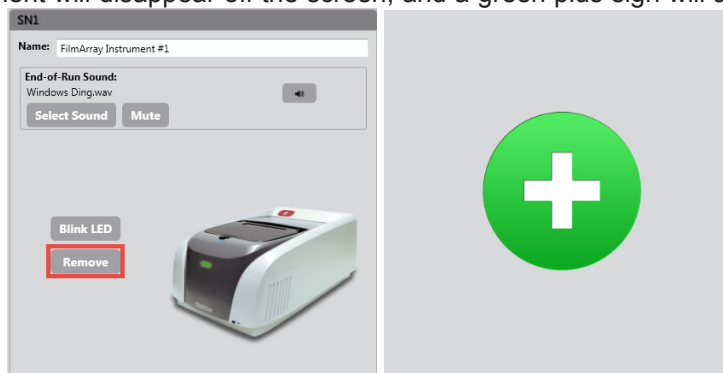
The operator can arrange the Instrument Configuration window and dashboard to match the physical placement of the instrument in the rack. The Blink LED button for each instrument displayed in the Instrument Configuration window can assist with instrument placement. It can also verify that the correct instrument has been selected before any configuration changes are made to that instrument in the software.



### Remove Instrument from Instrument Configuration

Each instrument can be removed from Instrument Configuration by using the following steps:

1. From the FilmArray software menu, select Tools > Instrument Configuration. The Instrument Configuration window will open.
2. Find the instrument to remove. Click on the Remove button located next to that instrument. The instrument will disappear off the screen, and a green plus sign will appear in its place.

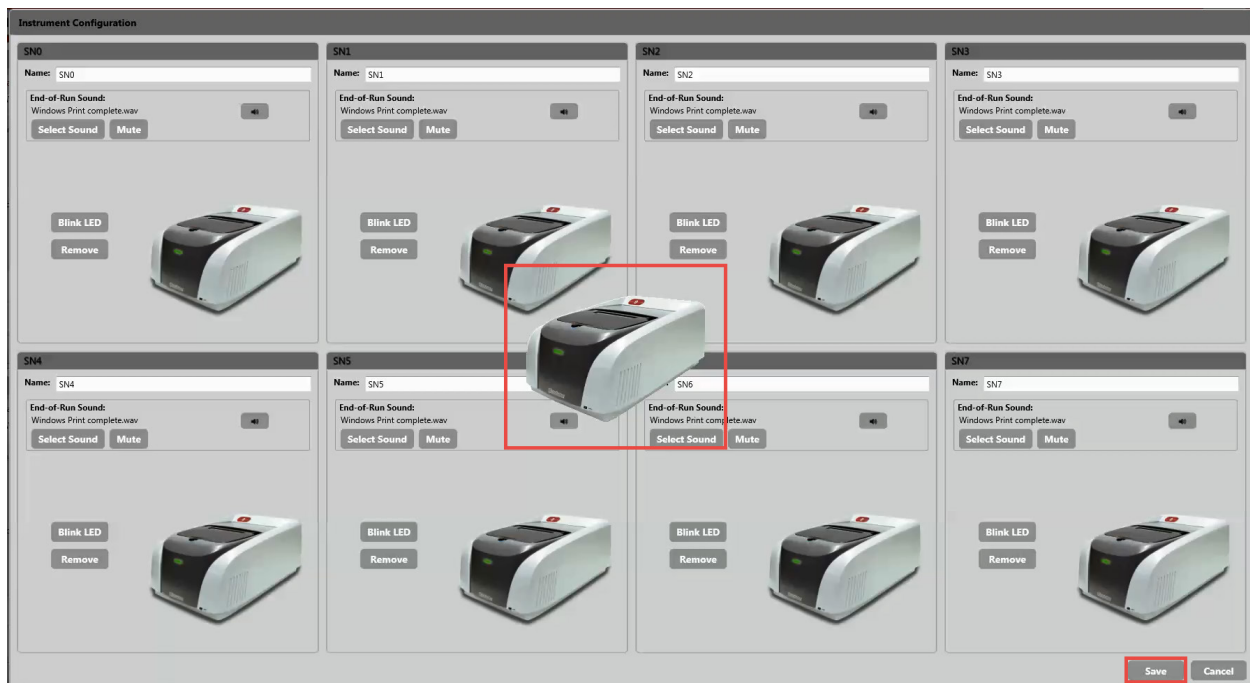


3. Click the Save button at the bottom left of the window when finished.

## Rearrange Instruments in Instrument Configuration

The operator can rearrange the Instrument Configuration and Instrument Dashboard to match to the physical placement of the instrument(s) in the rack.

1. From the FilmArray software menu, select Tools > Instrument Configuration. The Instrument Configuration window opens.
2. Use the Blink LED button to verify the instrument in the software corresponds to the correct instrument. For more information see the *Blink LED* section in this chapter.
3. To move an instrument that is displayed in the Instrument Configuration window, click anywhere within the box for that instrument and drag it to the new position. The cursor will appear as an icon of the instrument when moving instrument positions.



4. Click the Save button at the bottom left of the window when finished.

## Instrument Dashboard

The operator will not have access to the Instrument Dashboard until at least one instrument has been added to the FilmArray software. Once the instrument has been added, the Instrument Dashboard will be displayed automatically. Please see the *Instrument Configuration* section in this chapter for more information about adding a FilmArray instrument.

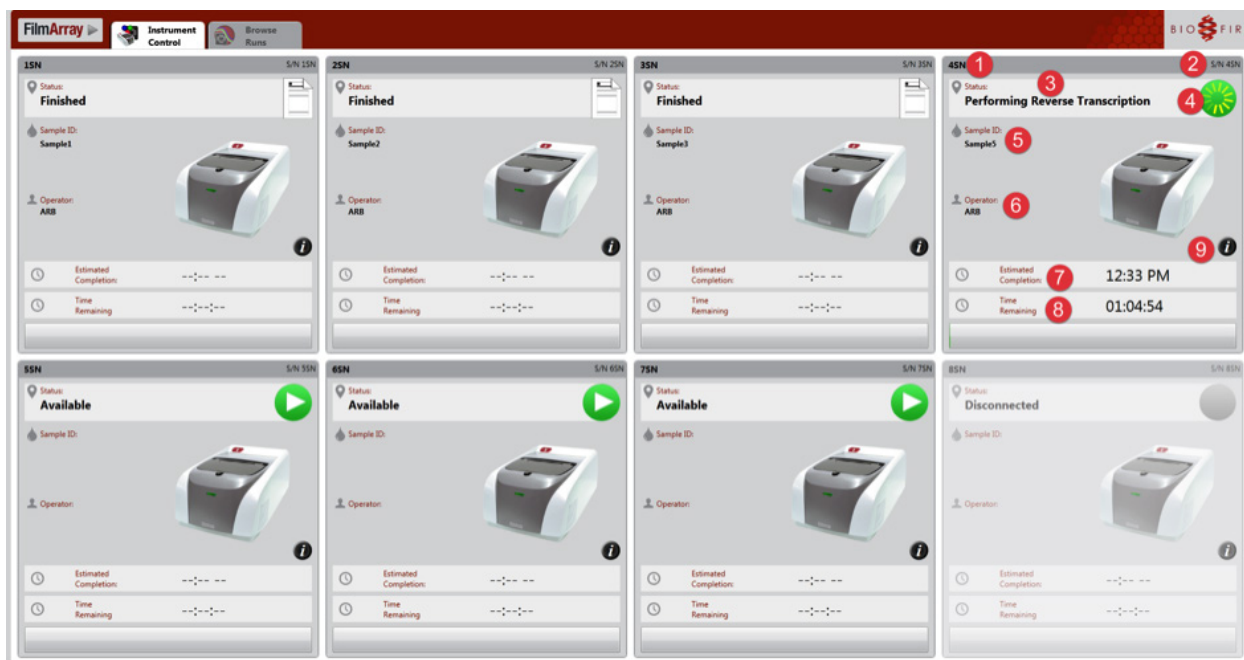
The Instrument Dashboard can display instrument details for one to eight instruments. The details include the following:

1. Instrument name
2. Instrument serial number
3. Instrument status
  - Available
  - Error

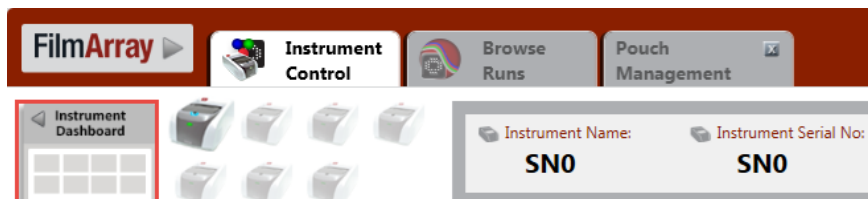
## Chapter 6: FilmArray Software

- Disconnected
  - Finished
  - Run stage in progress, showing each stage of the run as it takes place
4. Instrument status icon
  5. Sample ID
  6. Operator name
  7. Estimated Completion field shows the end time of the current run
  8. Time Remaining field
  9. The Instrument Information button, which provides additional details about the instrument and its current status

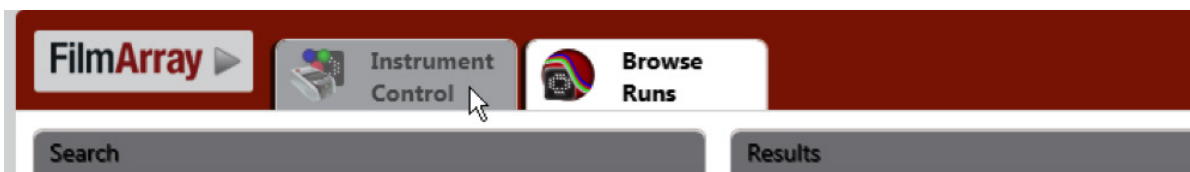
The figure below shows where each feature is located on the Instrument Dashboard. Information for each instrument is displayed in its own box. The Instrument Control tab is highlighted when the Instrument Dashboard is displayed. For information about the Instrument Control tab, please see the *Instrument Control* section in this chapter.



To access the Instrument Dashboard from the main Instrument Control screen, click the Instrument Dashboard button, located in the upper left-hand side of the screen as shown below.



To return to the Instrument Dashboard from the Browse Runs tab, click the Instrument Control tab as shown below.



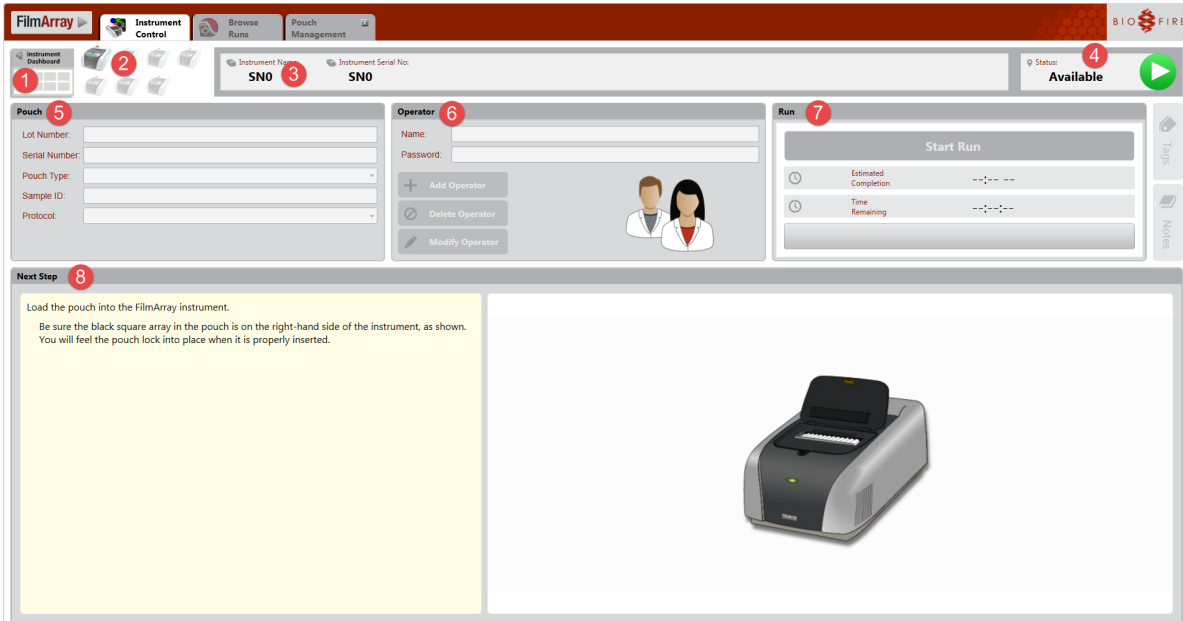
**NOTE:** Upon clicking the Instrument Control tab, either the Instrument Dashboard or the main Instrument Control screen will be displayed, depending on which feature was last displayed in that tab.

## Instrument Control

The main Instrument Control screen helps the operator to set up and perform runs on an instrument, save runs to the FilmArray database, and view the results of runs.

The following table describes each feature and the figure below where each feature is located on the main Instrument Control screen.

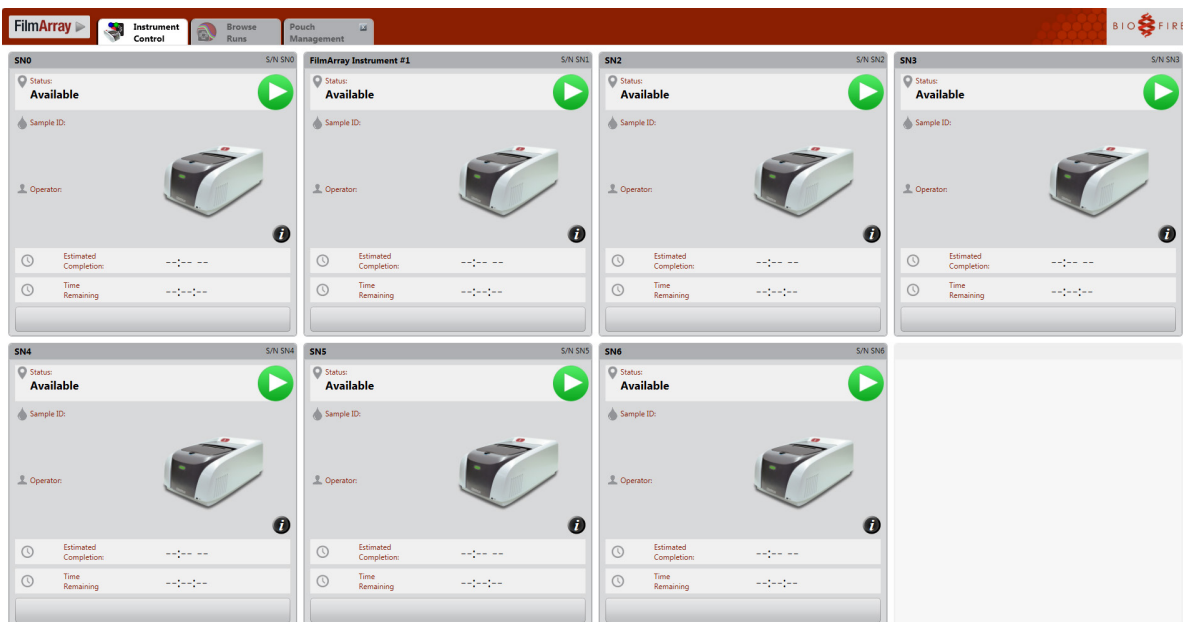
Feature	Description	Number in Figure Below
Instrument Dashboard button	Click this button to access the FilmArray Instrument Dashboard.	1
FilmArray instrument icons	There is an instrument icon for each FilmArray instrument in the FilmArray system. Click any icon to access Instrument Control for that instrument.	2
Instrument name and serial number	These details are provided for the instrument that is currently selected.	3
Instrument Status	Instrument Control displays the current status of the selected instrument: Disconnected, Available, Running, Finished, or Error.	4
Pouch box	This box contains fields for information to be entered about the pouch, including Lot Number, Serial Number, Pouch Type, Sample ID, and Protocol.	5
Operator box	This box contains the User Name and Password fields to verify the operator of the run. Operator credentials can also be added, modified, or deleted.	6
Run box	This box contains the Start Run button for a run, and displays the estimated completion time for and time remaining in the current run.	7
Next Step box	This box uses text, graphics and animation to guide the operator through loading a pouch and performing a FilmArray run.	8



## Start Run in Instrument Control

The operator cannot access Instrument Control until at least one instrument in the FilmArray system has been added to the FilmArray software using the Instrument Configuration window. Please see the *Instrument Configuration* section in this chapter for more information about adding a FilmArray instrument.

Once an instrument has been added, the Instrument Control tab appears, and the Instrument Dashboard is displayed.



1. Click anywhere in the dashboard box for an instrument that has been configured and the main Instrument Control screen for that instrument will be displayed.

2. Refer to the Next Step box of the main Instrument Control window for step-by-step instructions on inserting a pouch, populating the fields correctly in the Pouch and Operator boxes, and starting a run.

### Create New Operator(s)

An operator name and password are required to run a pouch on the FilmArray instrument. The FilmArray software prompts the operator to enter these credentials after the pouch has been inserted into the instrument and the pouch information has been scanned.

To create a new operator:

1. In the Operator box of the main Instrument Control screen, click the Add Operator button.



## Chapter 6: FilmArray Software

- When the Add/Modify Operator dialog box is displayed, enter a User Name, the First Name and Last Name of the operator, and a password in both the Password and Confirm fields.
- Click Ok when complete.



**NOTE:** The Confirm field will display the password dots in red until the Password and Confirm fields match.

## Browse Runs

Browse Runs displays information for all runs stored in the database according to search criteria. It contains the following:

Feature	Description	Number in Figure Below
Search	Searches for runs using a variety of methods.	1
Results	Displays the runs that meet the search criteria.	2
Notes and Tags tabs	Adds notes or tags to a run.	3

## Search and View Run Data

The Browse Runs tab is always displayed in the upper left-hand corner of the window. Select this tab to search and view run data.

### Quick Search

To quickly search for recent runs, click the Quick Search button located in the Search box. The Results box will display the 100 most recent runs stored in the FilmArray database.

A search can also be performed using a keyword. Type the keyword into the Keyword Search field (beneath the Quick Search button) and click Search. The Results section will display a list of runs that meet the search criteria.

### Advanced Search

The Advanced Search has multiple menus the operator can use to select search criteria. Selecting multiple search criteria will help to narrow the search for the desired run. The following table describes the search criteria that can be used to locate a desired run.

Criteria	Description
Date	Search by a date range for the desired run(s).
Sample Info	Search by pouch lot number, serial number, or sample ID.
Pouch Type	Place a check mark next to the specific panel of interest.
Protocol	Place a check mark next to the protocol of interest.
Pouch Result	Place a check mark next to the pouch outcome of interest: Pass, Fail or Invalid.
Operator	Place a check mark next to the operator of interest.
Instrument	Place a check mark next to the instrument of interest.
Controls	Search by results of specific controls.
Run Status	Search by run status: Completed, Incomplete, Aborted, Instrument Error, or Software Error.
Interpretation	Search by the specific organism detected.
Assay	Search by the specific assay detected.
Tags	Search by tags designed to organize groups of data.

### Viewing All Runs

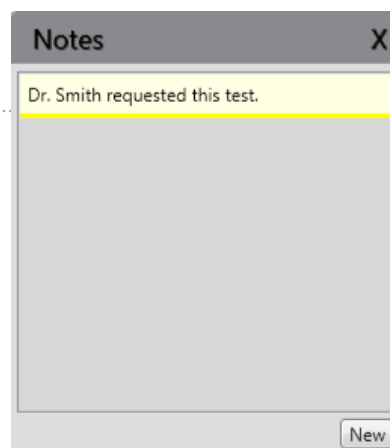
To view all runs saved in the database, remove all Advanced Search selections and click the Search button. The total number of runs saved in the database is displayed at the bottom of the Results table.

### Notes and Tags

Information can be added to a run using notes or tags. Notes can be viewed on a run-by-run basis. Runs with the same or multiple tags can be retrieved using the Advanced Search options (see previous section).

#### Notes Tab

The Notes tab is located on the right-hand side of the screen. This tab is used for longer notations about a selected run. To enter a notation:



1. Select a run in the Browse Runs tab.
2. Click on the Notes tab on the right side of the window.
3. Click on the New button to display the Notes dialog box.
4. Enter the note and click Save. This note will now be associated with the selected run and cannot be edited or removed. The notes are only visible in the Browse Runs tab. These do not appear on a report.

### Tags Tab

Tags are short notations that identify a particular event or situation with a run. This feature can be used to identify a specific group of related runs. To create custom tags:

1. Select one or more runs in the Browse Runs tab.
2. Click on the Tags tab on the right side of the window.
3. The Unselected section lists all tags that are currently in the database. The Selected section lists all tags that are currently selected for the run(s) that are highlighted.
4. In the field at the top of the Tags window, enter in the text for the new (or desired) tag. The new tag will be added to the list of tags under Unselected. Place a check mark next to the tag in the Unselected section to assign the tag to the run. The tag will then appear in the Selected section. The tags are only visible in the Browse Runs tab. These do not appear on a report.
5. To remove the tag from a run, remove the check mark next to the tag in the Selected section.



**NOTE:** If the tag is removed and is no longer applied to any runs in the database, it will be removed from the database and will no longer be displayed as an option in the Unselected section of the Tags tab.

### Browse Runs Context Menu

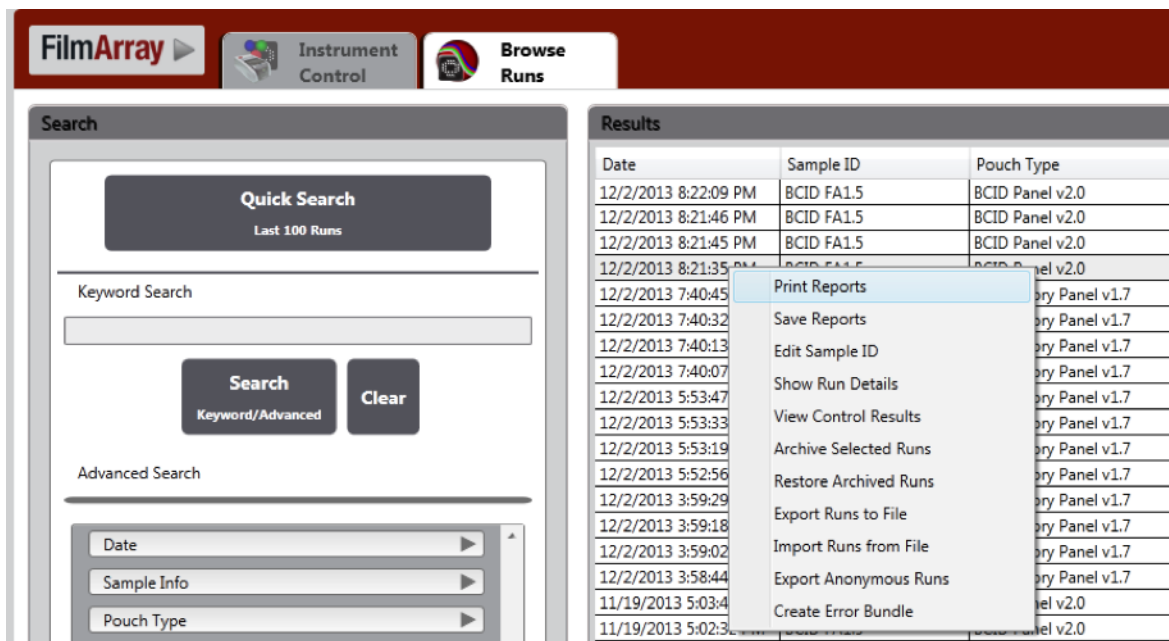
The Browse Runs context menu presents a list of actions the operator can take on FilmArray runs. These actions are presented in the table that follows.


Menu Item	Description
Print Reports	Use this feature to print a report(s) of the results associated with the applicable run.
Save Reports	Selecting this option opens a Windows file navigator dialog that enables the operator to save the entire report(s) to the chosen location.
Edit Sample ID	If a mistake was made during run setup when entering the sample ID, this feature enables the operator to make the necessary corrections. A history is recorded of all changes. The Change History helps laboratories meet electronic signature and records requirements.
Show Run Details	With this feature the operator can view system details, messages, and errors associated with a particular run.

Menu Item	Description
View Control Results	<p>This feature allows the operator to view control data for runs. The data in the table can be copied and pasted into an external application, such as Notepad or Microsoft Excel. Notepad is installed on the FilmArray computer and can be found under Start &gt; All Programs &gt; Accessories. It is recommended to copy and paste the Control Results table into Notepad and saving the data as a .txt file. This file can then be transferred to another computer via external media, and imported into a different application, such as Microsoft Excel.</p>
Archive Selected Runs	<p>The FilmArray database reliably stores up to 8,000 runs. Should this number be exceeded, this feature can be used to remove run files from the database and store the data in a separate location.</p> <p>For more information on archiving runs, see the <i>Database Management</i> section in this chapter.</p>
Restore Archived Runs	<p>With this feature the operator can restore runs to the database that were previously removed from the database and stored in a separate location.</p> <p>For more information on restoring archived runs, see the <i>Database Management</i> section in this chapter.</p>
Export Runs to File	<p>This feature enables the operator to write runs to a file while leaving the original runs in the FilmArray database. The copied runs can then be imported into the FilmArray software on a different computer.</p> <p>For more information on exporting runs to a file, see the <i>Database Management</i> section in this chapter.</p>
Import Runs from File	<p>This feature enables the operator to import FilmArray runs from another FilmArray database into the database on the FilmArray computer being used.</p> <p>For more information on importing runs from a file, see the <i>Database Management</i> section in this chapter.</p>
Export Anonymous Runs	<p>This feature works like the Export Runs to File option, but also replaces the Sample ID in the run files with the text “Anonymous”. If a copy of the database files must be sent to an external site—for example, if a run error occurs, and a technical support representative requests that a copy of the run file be sent to BioFire Diagnostics for investigation—this option should be used to protect patient confidentiality.</p> <p>For more information on exporting anonymous runs, see the <i>Database Management</i> section in this chapter.</p>
Create Error Bundle	<p>If an error occurs that is associated with a FilmArray run, a technical support representative may request that the operator create an error bundle for that run and send it to BioFire Diagnostics. The error bundle is designed to assist in troubleshooting errors associated with a run. It packages files related to the state of the user’s system, instrument and software, including System Log data.</p> <p>For more information on creating an error bundle, see the <i>Error Bundle</i> section in Chapter 8.</p>


Follow these steps to access items in the Browse Runs context menu:

1. In the Browse Runs tab, highlight one or more desired runs.
2. Right-click the highlighted runs to open the Browse Runs context menu.



 **NOTE:** The operator can select the options **Edit Sample ID** and **Create Error Bundle** only if a single run has been selected. All other options apply to both single and multiple runs.

3. Select the appropriate menu item and follow the directions in the dialog box or tab that opens.

 **NOTE:** **Import Runs from File** and **Restore Archived Runs** are the only menu items that are independent of the selected runs: The operator can click on a run or runs to access these options, but the particular run(s) selected are immaterial.

Any tables accessed using the menu can be sorted by clicking on the column headers. Column width can be resized by dragging the column header boundaries to the desired size.

### View Report Tab

When a run is completed on the instrument, the software generates a report with the results of the run.

The operator can view the report using the View Report tab that is displayed at the end of the run. If the operator is on the main Instrument Control screen for that instrument when the run ends, this tab automatically displays the report over the Instrument Control screen.

**Instrument Control**

Instrument Name: SNO    Instrument Serial No: SNO

**Pouch**

Lot Number: 09251983  
 Serial Number: 07271983  
 Pouch Type: Respiratory Panel v1.7  
 Sample ID: 09112009  
 Protocol: NPS v3.0

**Operator**

Name: JOE  
 Password: \*\*\*\*\*

Buttons: Add Operator, Delete Operator, Modify Operator

**Next Step**

Remove the pouch from the FilmArray instrument.  
 The flashing blue light indicates that the test is complete and that you may now open the lid on the instrument and remove the pouch.  
 Removing the pouch clears all the fields on the screen and prepares the instrument for another test.

**View Report**

**FilmArray™ Respiratory Panel**

Run Summary

Sample ID: 09112009    Run Date: 09 Oct 2014 12:17 PM  
 Detected: Human Rhinovirus/Enterovirus    Controls: Passed  
 Parainfluenza Virus 3  
 Mycoplasma pneumoniae

Equivalent: None

**Result Summary**

Not Detected	Adenovirus
Not Detected	Coronavirus 229E
Not Detected	Coronavirus HKU1
Not Detected	Coronavirus NL63
Not Detected	Coronavirus OC43
Not Detected	Human Metapneumovirus
Not Detected	Human Rhinovirus/Enterovirus
Not Detected	Influenza A
Not Detected	Influenza B
Not Detected	Parainfluenza Virus 1
Not Detected	Parainfluenza Virus 2
Not Detected	Parainfluenza Virus 3
Not Detected	Parainfluenza Virus 4
Not Detected	Respiratory Syncytial Virus
Not Detected	Rhinovirus/enterovirus
Not Detected	Chlamydia pneumoniae
Not Detected	Mycoplasma pneumoniae

**Run Details**

Pouch: Respiratory Panel v1.7    Protocol: NPS v3.0  
 Run Status: Completed    Operator: John Doe (JOE)  
 Serial No: 07271983    Instrument: SNO  
 Lot No: 09251983

If the operator is not on that screen when the report ends, it is possible to return to the main Instrument Control screen for that instrument and click the View Report tab to access the report.

The View Report tab is also displayed whenever a run is highlighted in the Results table in Browse Runs.

**Browse Runs**

Search

Quick Search: Last 100 Runs

Keyword Search

Search    Clear

Advanced Search

Where Date is Today

Date: Today

Start: 10/9/2014    End: 10/9/2014

Sample Info

Pouch Type:  Respiratory Panel v1.7

Protocol

Pouch Result

Operator

Instrument

Controls

Run Status

Interpretation

Assay

Tags

**Results**

Date	Sample ID	Pouch Type	Protocol	Lot Number	Serial Number	Pouch Result	Operator	Instrument	Status
12/2/2013 8:22:09 PM	BCID FA1.5	BCID Panel v2.0	BC v2.1	136813	00830988	Pass	Daniel Goldga...	FA2426	Completed
12/2/2013 8:21:46 PM	BCID FA1.5	BCID Panel v2.0	BC v2.1	136813	00831041	Pass	Daniel Goldga...	FA2414	Completed
12/2/2013 8:21:45 PM	BCID FA1.5	BCID Panel v2.0	BC v2.1	136813	00831052	Pass	Daniel Goldga...	FA2408	Completed
12/2/2013 8:21:35 PM	BCID FA1.5	BCID Panel v2.0	BC v2.1	136813	00831001	Pass	Daniel Goldga...	FA2411	Completed
12/2/2013 7:40:45 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948375	Pass	Daniel Goldga...	FLM1007	Completed
12/2/2013 7:40:32 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948416	Pass	Daniel Goldga...	FA1176	Completed
12/2/2013 7:40:13 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948383	Pass	Daniel Goldga...	FA2427	Completed
12/2/2013 7:40:07 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948368	Pass	Daniel Goldga...	FA1171	Completed
12/2/2013 5:53:47 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948403	Pass	Daniel Goldga...	FA1177	Completed
12/2/2013 5:53:33 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948440	Pass	Daniel Goldga...	FA1248	Completed
12/2/2013 5:53:19 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948402	Pass	Daniel Goldga...	FA1236	Completed
12/2/2013 5:52:56 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948437	Pass	Daniel Goldga...	FA1109	Completed
12/2/2013 3:59:29 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948395	Pass	Daniel Goldga...	FA1176	Completed
12/2/2013 3:59:18 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948389	Pass	Daniel Goldga...	FLM1007	Completed
12/2/2013 3:59:02 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948438	Pass	Daniel Goldga...	FA1141	Completed
12/2/2013 3:58:44 PM	RP FA1.5	Respiratory Pa...	NPS v2.0	142013	00948387	Pass	Daniel Goldga...	FA1236	Completed
11/20/2013 1:41:38 PM	56894	Smoke v1.0	NoData	13564	85643	Fail	Amber Boehm...	4SN	Completed
11/20/2013 1:38:53 PM	79562	Smoke v1.0	ProtocolFLM	46952	31645	Fail	Amber Boehm...	3SN	Completed
11/20/2013 1:35:44 PM	97642	Smoke v1.0	NoData	12345	35791	Fail	Amber Boehm...	1SN	Completed
11/19/2013 5:03:46 PM	BCID FA1.5	BCID Panel v2.0	BC v2.1	136313	00825109	Pass	Daniel Goldga...	FA2022	Completed
11/19/2013 5:02:32 PM	BCID FA1.5	BCID Panel v2.0	BC v2.1	136313	00825073	Pass	Daniel Goldga...	FA1141	Completed
11/19/2013 5:01:50 PM	BCID FA1.5	BCID Panel v2.0	BC v2.1	136313	00825063	Pass	Daniel Goldga...	FLM1007	Completed
11/19/2013 4:58:47 PM	BCID FA1.5*	BCID Panel v2.0	BC v2.1	136313	00825060	Pass	Erik Huynh (eh)	FA1173	Completed
11/19/2013 10:56:33 AM	RP FA1.5	Respiratory Pa...	NPS v2.0	138713	00864697	Pass	Erik Huynh (eh)	FA1173	Completed
11/18/2013 4:00:05 PM	BCID FA1.5	BCID Panel v2.0	BC v2.1	136313	00825071	Pass	Erik Huynh (eh)	FA1130	Completed

Search Results: 100 Runs Found

**NOTE:** The View Report tab is not an option when more than one run is highlighted in the Results table. It is only visible when one run is selected.



The report can be saved locally as a PDF or printed.

To print reports use either of the following:

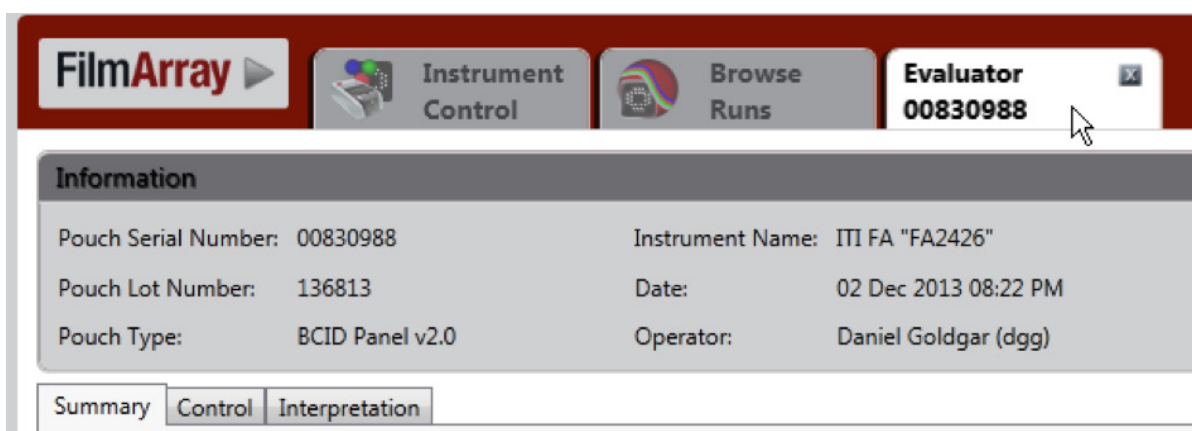
- Print a single report—use the Print Reports option in the Browse Runs context menu. For more information, see the *Browse Runs Context Menu* section in this chapter. A report can also be printed from the View Report tab.
- Set all reports to auto print—use the Auto Print Report option in the FilmArray software menu. Select Preferences > Auto Print Report.

To close the report, click the View Report tab.

## Evaluator

The Evaluator enables the operator to view melting curve analysis results for each control and pathogen assay in a run. It is only used to evaluate the test results and cannot be used to operate the instrument or perform a run.

The Evaluator is accessed from the Browse Runs tab. When an individual run has been selected and opened from Browse Runs, a new, run-specific tab appears and is identified by the Pouch Serial Number.

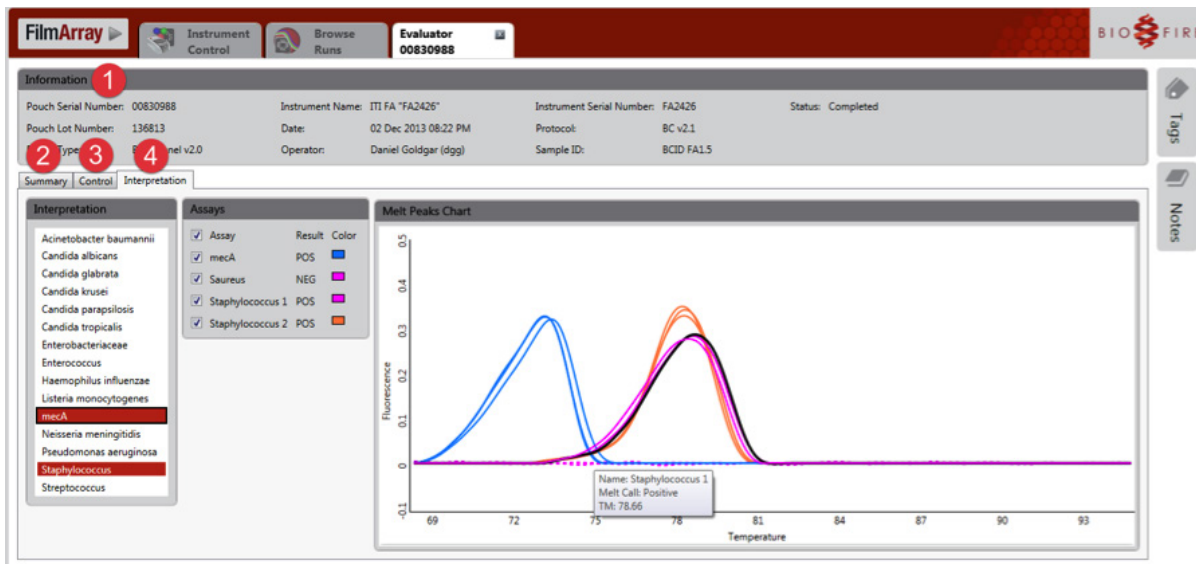


Multiple run-specific windows can be open at the same time. Each window contains the following features. The figure that follows shows where each feature is located on the screen.

Feature	Description	Number in Figure Below
Information bar	This section of the screen summarizes information about the run in the following fields: Pouch Serial Number, Pouch Lot Number, Pouch Type, Instrument Name, Date, Operator, Protocol, Sample ID, and Status.	1
Summary tab	This tab shows the pouch status, organisms that were positive in the run, and whether the controls passed or failed. If there is a positive interpretation or a failed control, the operator can double-click on the text to display the curves.	2
Control tab	This tab shows each control used in the run and whether it passed. To view melt curve data for a control, select the control name from the list in the Control section. The selected control's curve will be displayed in the graph, and information regarding the control will display in the Assays box.	3



Feature	Description	Number in Figure Below
Interpretation tab	<p>To view information and the curves for each interpretation, click on the individual organism. The Interpretation tab displays each of the organisms tested in the FilmArray pouch.</p> <p>To view melt curve data in the Melt Peaks Chart box for an organism:</p> <ol style="list-style-type: none"> <li>1. Select the organism interpretation from the list in the Interpretation tab. The selected curves will be displayed in the Melt Peaks Chart box, and information for the assays used for the interpretation will be displayed in the Assays box.</li> <li>2. Additional information about the individual curve is displayed in the Tool Tip when the cursor is placed on top of the curve.</li> </ol>	4



## View Melting Curve Analysis Results

To access run-specific Evaluator tabs: In the Browse Runs tab, double-click the desired run in the Results table. The tab for that run will open.

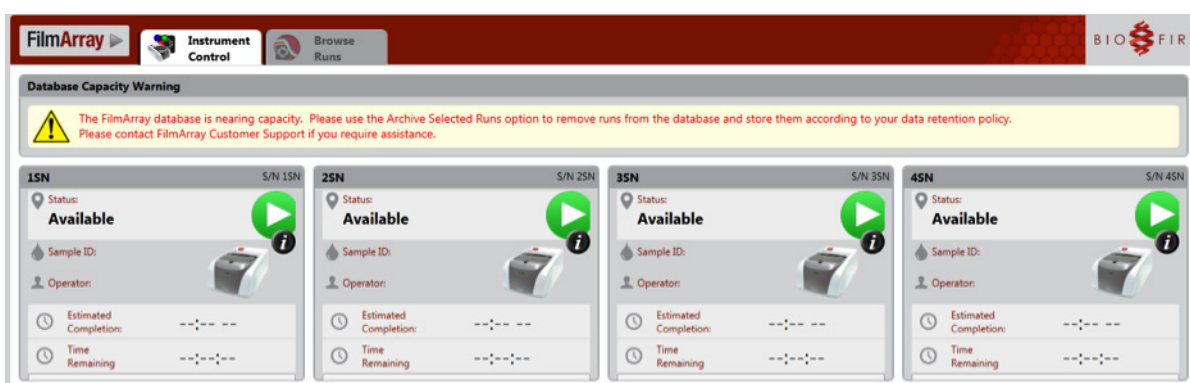
For information on using the Summary, Control and Interpretation tabs associated with the Evaluator, see the *Evaluator* section in this chapter

## Database Management

A local database on the computer stores all of the run data generated by the FilmArray system. The runs saved in the FilmArray database are listed in the Results table in the Browse Runs tab. For more information on the function and use of the Browse Runs tab, see the *Browse Runs* section in this chapter.

The database stores up to 8,000 runs reliably. If this number is approached, use the Archive Selected Runs feature in the Browse Runs context menu to remove run files from the database and store the data in a separate location. Information follows on archiving runs.

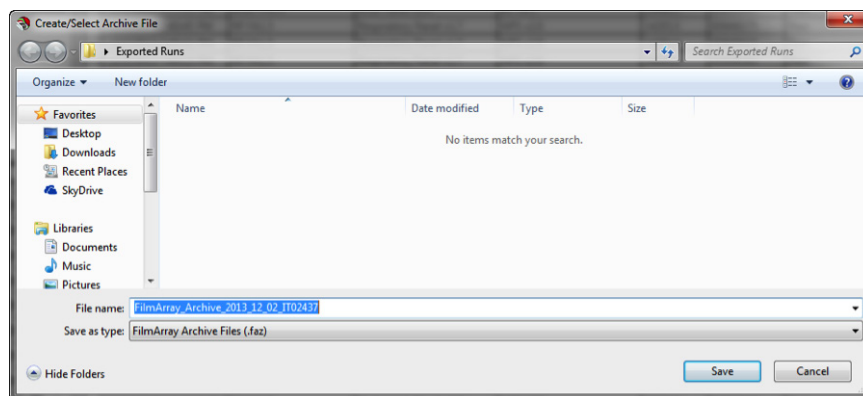
When the number of runs in the database nears capacity, the following Database Capacity Warning message is displayed, “The FilmArray database is nearing capacity. Please use the Archive Selected Runs option to remove runs from the database and store them according to your data retention policy. Please Contact FilmArray Customer Support if you require assistance.” This prompts the operator to archive runs from the database.



## Archive Runs

To archive runs stored in the FilmArray database:

1. In the Browse Runs tab, highlight one or more desired runs. Use the Quick Search, Keyword Search or Advanced Search options to search for particular runs to archive. For more information, see the *Search and View Run Data* section in this chapter.
2. Right-click the highlighted runs to open the Browse Runs context menu.
3. Select the menu item Archive Selected Runs. The Create/Select Archive File dialog is displayed.

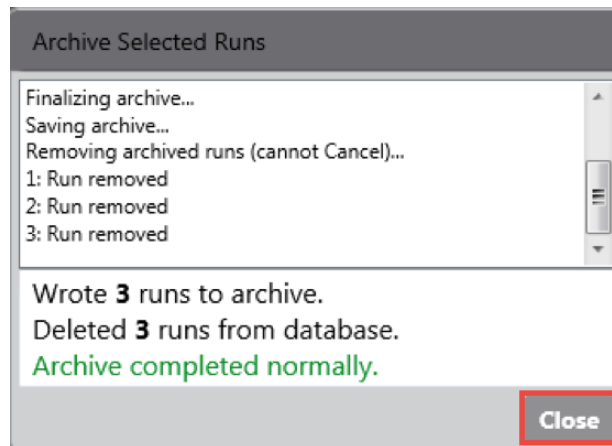


4. Navigate to the desired location, select a name for the file, and then click Save. As the figure illustrates, by default the selected runs are saved to a file with extension .faz and a name containing the first and last dates for the set of runs being archived as well as the name of the computer being used to perform the archive.
5. The software prompts the operator to verify removal of the selected runs from the database. Click Yes to continue, or No to cancel the archive process.
6. The software verifies that all runs have been saved to the file, and then deletes each run from the database one at a time. A progress dialog will display during the archive.



**NOTE: It is recommended that runs be archived in batches of no more than 500. Archiving 500 runs will take approximately one hour to complete.**

7. When the process is complete, a final status message “Archive completed normally” is displayed.

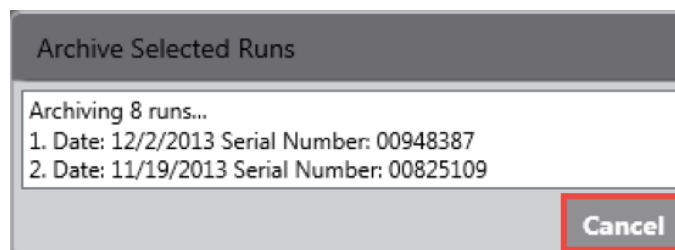


8. Click Close to close the dialog box.
9. The .faz file can be transferred from the computer using a portable media device and stored according to institutional data retention policies.

### Abort Archive Process

It is safe to abort the archive process during the first step, while the runs are being saved. The Archive Selected Runs dialog displays the message “Archiving <n> runs ...” and lists each run as it is saved individually to the file. To abort the process during this time:

1. Click the dialog's Cancel button.



2. The dialog will display the following message, "Wrote <n> runs to archive. Deleted 0 runs from database. User cancelled. No archive created."
3. Close the dialog and all the runs will still be in the database.



**NOTE:** It is not safe to abort the archiving process during the second step, while runs are being removed from the database. During this time, the software will not allow the operator to cancel the process.



**CAUTION:** Do not attempt to shut down the computer during the archiving process. Wait until the process is complete before shutting down the computer or performing other tasks.

## Restore Runs

If a run file must be accessed after it has been removed from the database, the runs stored in the .faz file can be restored to the FilmArray database by using the Restore Archived Runs option in the Browse Runs context menu.

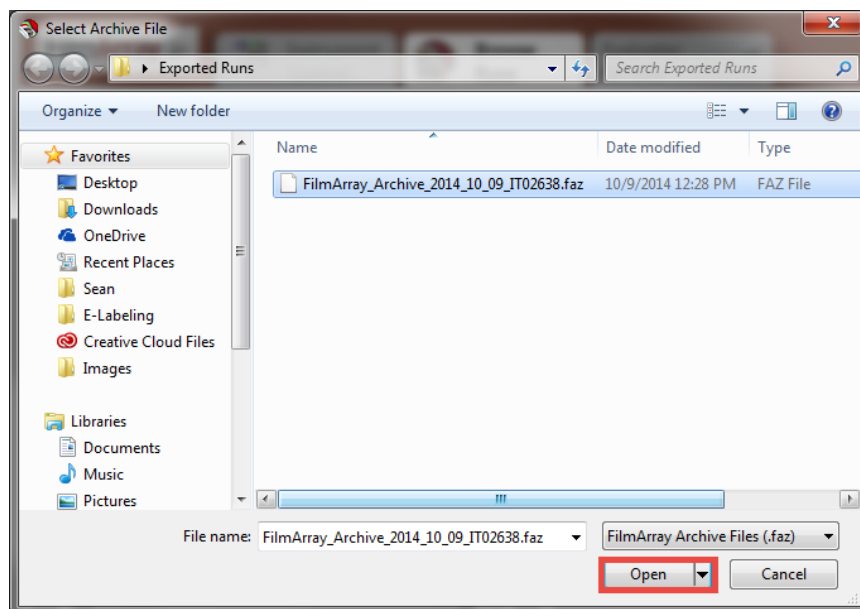
Prior to restoring runs to the database, verify that there is sufficient room in the FilmArray database for the runs. If approaching 8,000 runs in the database, remove some of the runs by using the Archive Selected Runs menu option. See the Archive Runs section in this chapter for more information.

To restore archived runs to the database:

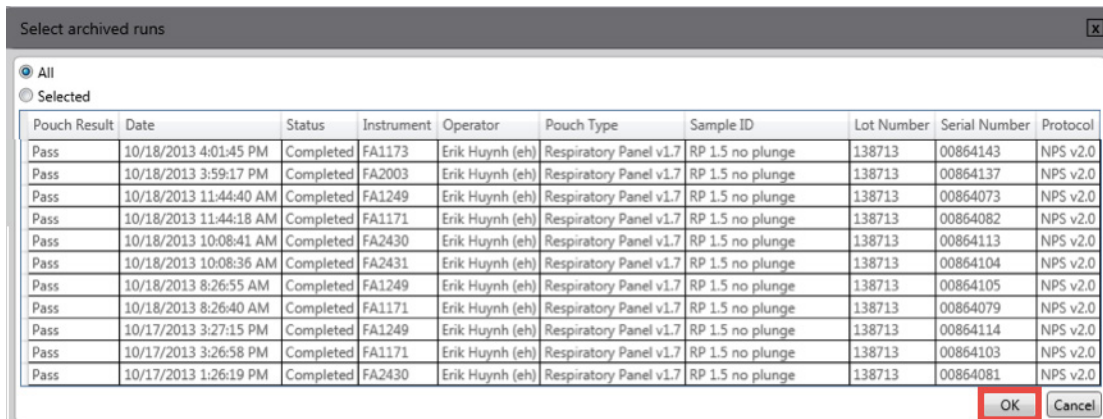
1. In the Browse Runs tab, highlight a run, right-click the highlighted run to open the Browse Runs context menu, and then select the menu item Restore Archived Runs. The Select Archive File dialog is displayed.



**NOTE:** Restore Archived Runs is one of two Browse Runs context menu options that are independent of the selected runs: The operator can click on a run or runs to access this option, but the particular run(s) selected are immaterial.



- Navigate to the desired .faz file(s) and click Open.
- The Select archived runs dialog is displayed. Select the files to restore by clicking All or selecting files individually.



- Click OK to start the restore process. A progress dialog will display during the restore. When the process is complete, a final status message will be displayed.



**NOTE:** The operator can cancel the restore process before it completes by clicking the Cancel button in the bottom-right corner of the dialog. Any runs that were restored to the database before clicking Cancel will remain in the database, but any runs not yet restored are not processed.

- Whether the operator allows the process to complete or clicks Cancel, it is necessary to click the Close button, when it appears, to close the dialog.

## Export Runs

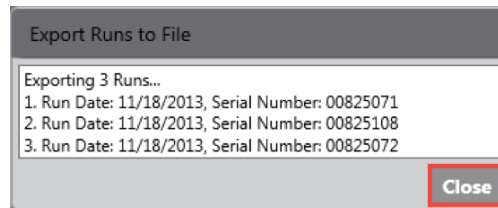
The Export Runs to File option is used to save a copy of one or more database run files while leaving the run files in the database. The copy of the database files can then be imported into the FilmArray software on a different computer. The exported database files are saved with the extension .db. To export runs to a file:

- In the Browse Runs tab, highlight one or more desired runs. Use the Quick Search, Keyword Search, or Advanced Search options to search for particular runs to archive. (For more information, see the *Search and View Run Data* section in this chapter.)
- Right-click the highlighted runs to open the Browse Runs context menu.
- Select the menu item Export Runs to File. The Create/Select Export File dialog will display. Navigate to the desired location, select a name for the .db file, and then click Save to start the export process.
- During the export process, the Export Runs to File dialog will display the run date and serial number of the runs being exported.



**NOTE:** The operator can cancel the export process before it completes by clicking the Cancel button in the bottom-right corner of the dialog. Any runs that were exported before clicking Cancel will be saved to the chosen location, but any runs not yet exported are not processed.

5. Whether the operator allows the process to complete or clicks Cancel, it is necessary to click the Close button, when it appears, to close the dialog.



## Import Runs

This feature enables the operator to import FilmArray runs from another FilmArray database onto the computer being used.

To import runs from a file:

1. In the Browse Runs tab, right-click a highlighted run to open the Browse Runs context menu, and then select menu item Import Runs from File. The Select Database dialog will display.



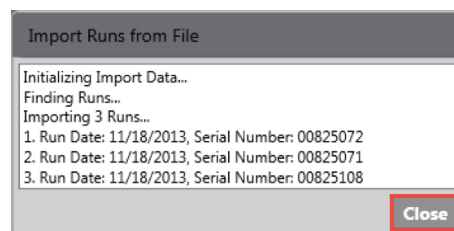
**NOTE:** Import Runs from File is one of two Browse Runs context menu options that are independent of the selected runs: The operator can click on a run or runs to access this option, but the particular run(s) selected are immaterial.

2. Navigate to the desired .db file(s) location and then click Open to start the import process.
3. During the import process, the Import Runs from File dialog will display the run date and serial number of the runs being imported.



**NOTE:** The operator can cancel the import process before it completes by clicking the Cancel button in the bottom-right corner of the dialog. Any runs that were imported before clicking Cancel will remain in the database, but any runs not yet imported are not processed.

4. Whether the operator allows the process to complete or clicks Cancel, it is necessary to click the Close button, when it appears, to close the dialog.



## Export Anonymous Runs

The Export Anonymous Runs option works like the Export Runs to File, but also replaces the Sample ID in the run files with the text “Anonymous”. If a copy of the database files must be sent to an external site—for example, if a run error occurs, and a technical support representative requests that a copy of the run file be sent to BioFire Diagnostics for investigation—this option should be used to protect patient confidentiality. The exported, anonymized database files are saved with extension .adb.



**NOTE: To prevent operators from overwriting a run file with an anonymized run file, the anonymized database files cannot be imported back into the FilmArray software.**

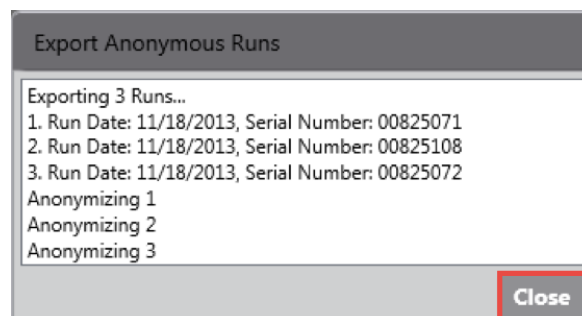
To export anonymous runs to a file:

1. In the Browse Runs tab, highlight one or more desired runs. Use the Quick Search, Keyword Search, or Advanced Search options to search for particular runs to archive. For more information, see the *Search and View Run Data* section in this chapter.
2. Right-click the highlighted runs to open the Browse Runs context menu.
3. Select the menu item Export Anonymous Runs. The Create/Select Export File dialog is displayed.
4. Navigate to the desired location, select a name for the .adb file, and then click Save to start the export process.
5. During the export process, the Export Anonymous Runs dialog will display the run date and serial number of the runs being exported.



**NOTE: The operator can cancel the export process before it completes by clicking the Cancel button in the bottom-right corner of the dialog. Any runs that were exported before clicking Cancel will be saved to the chosen location, but any runs not yet exported are not processed.**

6. Whether the operator allows the process to complete or clicks Cancel, it is necessary to click the Close button, when it appears, to close the dialog.





## System Administrator Tasks (Windows)

System Administrator tasks are specific to the Windows application. Please see Microsoft help for instructions on adding and deleting printers and changing the date and time. For further assistance, please contact technical support (see page i).



**NOTE: Do not perform administrative tasks on the computer—including setting the computer's date/time—while a run is in progress on the instrument.**

# CHAPTER 7: PRECAUTIONS WHEN WORKING WITH THE FILMARRAY SYSTEM

## Laboratory Safety and Biohazards

### General Safety Precautions

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Please note that while the FilmArray pouches and the FilmArray instruments are not themselves biohazardous, it is good laboratory procedure to handle all waste materials as potentially biohazardous material.

- a. Follow all safety instructions printed on, or attached to, the FilmArray instrument.
- b. Observe all general safety precautions that apply to electrical instruments.
- c. Never touch switches or power cords with wet hands.
- d. Do not open the housing of the FilmArray instrument or computer.



**CAUTION:** Use caution when closing the instrument lid to avoid pinching fingers.



**NOTE:** Only authorized service personnel should perform service or repairs required for this unit.

### Laboratory Precautions

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Handle all samples and waste materials as if they were capable of transmitting infectious agents. Refer to Biosafety in Microbiological and Biomedical Laboratories (Centers for Disease Control and Prevention and National Institutes of Health; available online at <http://www.cdc.gov/od/ohs/biosfty/bmb15/bmb15toc.htm>) or other appropriate Biosafety procedures.

Observe safety guidelines found in the Clinical and Laboratory Standards Institute (CLSI) Protection of Laboratory Workers from Occupationally Acquired Infections, Approved Guideline M29 or other appropriate safety guidelines.

Wear personal protective equipment (PPE) and disposable powder-free gloves while handling reagents or samples and change gloves often. Wash hands thoroughly after performing a run.

Refer to the instruction booklet for assay-specific safety precautions.



**CAUTION:** Use caution when removing pouches from the instrument; a tear in the pouch could contaminate the instrument and the surrounding area. Carefully dispose of pouches in a biohazard waste container.

## General PCR Precautions

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One of the most important guidelines when performing PCR is to avoid contamination. Some important rules to follow are:

- a. Perform sample collection, pouch preparation, and running the FilmArray instrument in separate locations.
- b. Load the pouch with sample behind a protective shield (or in a biological safety cabinet or hood whenever possible).
- c. Do not leave a laboratory area without first completing decontamination procedures (i.e., washing and changing protective clothing and gloves).

## Decontamination and Cleaning Procedures

The decontamination and cleaning procedures listed are intended to limit spread of contaminants as a result of a broken or leaked pouch. Decontamination is necessary to prevent false-positive results in subsequent runs.

If a pouch leak or breakage occurs, change gloves and other potentially contaminated personal protective equipment (PPE). Change gloves often during the decontamination process, especially during the first steps of decontamination and before touching any clean surface. All PPE should be disposed of after decontamination.



**CAUTION:** It is important that contamination from leaking and/or punctured pouches be contained and cleaned immediately. Pouches that break after PCR can contain large quantities of contaminants. This material, although noninfectious, is easily spread by normal human activity. Consequently, very small (molecular) quantities can be amplified by PCR in future runs, which can then be identified as positive by the FilmArray instrument. Treat all broken pouches as capable of contaminating the work area.



**BIOLOGICAL RISKS:** If the pouch contains potentially infectious material, the risk of bio-hazard contamination exists in addition to sample contamination.

## Cleaning Materials

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This list provides items that are necessary in a laboratory to keep contamination to a minimum.

- 10% bleach solution in a squeeze or spray bottle (1 part bleach to 9 parts water)
- Distilled water in a squeeze or spray bottle
- DNAZap™ or equivalent DNA degrading system
- Paper towels
- Bleach wipes

## Pouch Loading Station Decontamination

Routine cleaning of the Pouch Loading Station includes a 10% bleach wipe followed by two water wipes before each new pouch is loaded.

In the event of a sample spill or pouch leak, perform the following decontamination procedures.

1. Put on clean PPE, such as lab coat and gloves.
2. Fill a sink or bin with water and add bleach to create a 10% bleach solution.
3. Submerge the Pouch Loading Station until completely covered with bleach solution. Soak for 15 minutes.
4. Remove Pouch Loading Station from sink or bin. Replace bleach solution with distilled water.
5. Rinse the Pouch Loading Station by completely submerging in distilled water two additional times.

Contact BioFire Diagnostics, the local bioMérieux sales representative, or an authorized distributor to obtain a replacement Pouch Loading Station, if necessary.

## Decontamination Related to Pouch Leakage

If a pouch leaks, take the following precautions to avoid contamination:

1. Put on clean PPE, such as a lab coat and gloves.
2. Ensure no one uses the instrument or potentially contaminated areas until the decontamination is complete.
3. Decontaminate the instrument and work area and dispose of the pouch using the following steps:
  - a. Dispose of potentially contaminated gloves and put on clean gloves.
  - b. Dispose of the potentially contaminated lab coat and put on a clean lab coat.
  - c. Discard leaking pouch in biohazard container.
  - d. Change gloves.
  - e. Clean the instrument and affected work areas following the guidelines below.

 **CAUTION: Use only 10% bleach solution, distilled water, and/or DNAzap to decontaminate the instrument and Pouch Loading Station.**

## Instrument Decontamination

### Pouch Loading Chamber Decontamination

1. Put on clean PPE, such as a lab coat and gloves.
2. Remove pouch from instrument and discard in biohazard waste container.

## Chapter 7: Precautions When Working with the FilmArray System

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3. Wet a paper towel with 10% bleach (one part bleach to nine parts water) and wipe the inner chamber and under the lid. Change gloves.
4. Repeat Step 3 twice with fresh paper towels for a total of three bleach wipes.
5. Wet a paper towel with distilled water and wipe the inner chamber.
6. Repeat Step 5 with fresh gloves and paper towel.

### Instrument Exterior Decontamination

1. Put on clean PPE, such as a lab coat and gloves.
2. Wet a paper towel with the 10% bleach solution and wipe all exterior surfaces of the instrument, including the bottom and the bench top where the instrument had contact. Change gloves.
3. Repeat Step 2 twice with fresh paper towels and clean gloves, for a total of three bleach wipes.
4. Change gloves, then wet a new paper towel with distilled water and wipe the surfaces of the inner chamber, including under the lid, and the entire exterior of the instrument, including the bottom and the bench top where the instrument had contact.
5. Repeat Step 4, with fresh gloves and paper towel.

### Decontamination of Bench Tops and Other Areas

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1. Put on clean PPE, such as a lab coat and gloves.
2. Spray the 10% bleach solution on the area that may have been contaminated. Let it stand for at least three minutes to allow the bleach solution to react with any contaminants on the surface.
3. Wipe the area with a clean paper towel. Change gloves.
4. Repeat Steps 2 and 3 twice, for a total of three wipes.
5. Change gloves. Spray the area with distilled water.
6. Wipe the area dry with a new paper towel. Change gloves.
7. Spray the area with DNAZap or an equivalent product. Follow the product's instructions for correct use. Change gloves.
8. Rinse the area by spraying it with distilled water and wiping it dry.

### Check Function of Decontaminated Instrument

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1. Test a negative sample by preparing a pouch according to instructions in Chapter 5, using water as the sample. Use distilled, sterile or molecular grade water for this test.
2. If run is successful and all results are negative, continue using the instrument as normal.
3. If unexpected positive results are obtained, or the run fails, please contact BioFire Diagnostics, the local bioMérieux sales representative, or an authorized distributor for further instructions.

# CHAPTER 8: PREVENTATIVE MAINTENANCE AND TROUBLESHOOTING

## Introduction

This chapter provides step-by-step instructions for operators for performing basic maintenance and troubleshooting for the FilmArray instrument.

The tasks performed in this chapter are the only tasks that should be performed by the operator. Do not attempt to perform any additional maintenance without the guidance and direction of a specialist from BioFire Diagnostics, the local bioMérieux sales representative, or an authorized distributor.



**NOTE:** FilmArray instruments should not be disposed of as waste for any reason.

In the event that an instrument is taken out of service, it should be returned following the *Instrument Return Procedure* in Appendix A.



**CAUTION:** Before performing maintenance on the FilmArray, put on appropriate PPE, turn off the power to the instrument, and unplug the Ethernet and power cables.

## General Maintenance

There is no general maintenance needed for the FilmArray instrument other than the periodic cleaning steps listed below:

1. Wipe down the surface of the FilmArray instrument, including the inner chamber, with a cloth or paper towel and a freshly prepared 10% bleach solution (one part bleach to nine parts water), followed by a water wipe.
2. Use a lens cloth and lens cleaner to clean the lens of the barcode reader.
3. The Pouch Loading Station should be wiped down between runs and decontaminated daily or whenever a pouch leak occurs (see *Decontamination and Cleaning Procedures* in Chapter 7).

## Error Reporting Tools

The FilmArray instrument performs self-diagnostics with every run. Malfunctions are reported as errors to the operator with instructions on how to correct them. Record any error messages to assist in troubleshooting. Questions should be directed to BioFire Diagnostics, the local bioMérieux sales representative, or an authorized distributor.

## Troubleshooting

### Hardware Troubleshooting

The table below lists potential symptoms and possible solutions for troubleshooting hardware issues with the FilmArray system. If the issue(s) persists after applying the recommended solutions, contact technical support for further assistance (see page i).

Note all error messages, as well as the instrument serial number, and any necessary pouch lot numbers before contacting technical support. Technical support personnel will use this information to identify and resolve the issue(s).

Symptom	Possible Solution
Instrument status lights are not on	<ul style="list-style-type: none"> <li>• Turn instrument on</li> <li>• Check power cord</li> <li>• Try different outlet</li> <li>• If problem persists, contact technical support</li> </ul>
Instrument status light is blinking red	<ul style="list-style-type: none"> <li>• Turn instrument off</li> <li>• Check and reconnect cables</li> <li>• Turn instrument on</li> <li>• If problem persists, contact technical support</li> </ul>
Instrument status light is blinking purple	<ul style="list-style-type: none"> <li>• Remove and discard the pouch</li> <li>• Turn instrument off and back on</li> <li>• If problem persists, contact technical support</li> </ul>
Software will not connect to instrument	<ul style="list-style-type: none"> <li>• Verify instrument is on</li> <li>• Check cable connections</li> <li>• Turn off instrument and disconnect all cables</li> <li>• Reconnect all cables and turn instrument on</li> <li>• Shut down and restart computer</li> <li>• If problem persists, contact technical support</li> </ul>
Pouch not recognized when inserted into or removed from instrument	<ul style="list-style-type: none"> <li>• Turn instrument off and back on</li> <li>• Shut down and restart computer</li> <li>• If problem persists, contact technical support</li> </ul>
Instrument lid close/open position not recognized by software	<ul style="list-style-type: none"> <li>• Turn instrument off</li> <li>• Check and reconnect cables</li> <li>• Turn instrument on</li> <li>• If problem persists, contact technical support</li> </ul>
Pouch is difficult to insert into instrument	<ul style="list-style-type: none"> <li>• Push instrument lid all the way back</li> <li>• If problem persists, contact technical support</li> </ul>
Pouch is difficult to remove from instrument after run	<ul style="list-style-type: none"> <li>• Push instrument lid all the way back</li> <li>• Turn instrument off and gently try removing pouch</li> <li>• If problem persists, contact technical support</li> </ul>
Instrument lid remains unlocked during run	<ul style="list-style-type: none"> <li>• Firmly press the lid down</li> <li>• If problem persists, contact technical support</li> </ul>
Instrument lid remains locked after a run has ended	<ul style="list-style-type: none"> <li>• Firmly press the lid down and try re-opening</li> <li>• Power instrument off and try re-opening</li> <li>• If problem persists, contact technical support</li> </ul>



Symptom	Possible Solution
Pouch does not remain firmly in place after insertion	<ul style="list-style-type: none"> <li>Contact technical support</li> </ul>
Instrument will not run	<ul style="list-style-type: none"> <li>Verify that the pouch has been inserted into the instrument correctly</li> <li>Verify that all required information has been entered into the software and click Start Run</li> <li>If problem persists, contact technical support</li> </ul>

## Barcode Reader

The barcode reader is included with the FilmArray system as an accessory. It is preprogrammed to read the pouch barcodes. Pouch information may be entered manually in the event the barcode scanner is not working.

If the issue persists after applying the recommended solution shown in the table below, contact technical support for further assistance (see page i).

Symptom	Possible Solution
Barcode will not scan	<ul style="list-style-type: none"> <li>Place the cursor in the Lot Number field of the Pouch box and try scanning</li> <li>Clean the barcode reader screen</li> <li>Check that the barcode reader is plugged in. If it still does not scan, see Appendix C: <i>Barcode Calibration</i></li> <li>Manually input the pouch serial number and lot number</li> </ul>

## Diagnostic Errors

Diagnostic errors are used mainly by technical support representatives to troubleshoot instrument problems. Diagnostic errors can be found in the System Log. See the *System Log* section in this chapter for details on accessing this information.

The table below lists potential error messages and possible solutions. If the error(s) persists after applying the recommended solutions, contact technical support for further assistance (see page i).

Note all error messages and numbers, as well as the instrument serial number, and any necessary pouch lot numbers before contacting technical support. Technical support personnel will use this information to identify and resolve the error(s).

Error Message	Possible Solution
1011 Lid not Closed	<ul style="list-style-type: none"> <li>Turn instrument off and back on</li> <li>If problem persists, contact technical support</li> </ul>
1012 Pouch Not Present	
1013 Failed To Store Run Data	
1014 Failed to Find Run Data	
1015 Failed to Read Run Data	
1016 Failed to Erase Run Data	
1034 ImageInterface command failure	
2003 Thermoboard is not present in the instrument	
2004 Valve board is not present in the instrument	
3001 Valve Board Response Timeout	
3002 Valve Board Malformed Response	

Error Message	Possible Solution
3003 Valve Board Command Error Response	<ul style="list-style-type: none"> <li>• Turn instrument off and back on</li> <li>• If problem persists, contact technical support</li> </ul>
3004 Thermocycler Board Response Timeout	
3005 Thermocycler Board Malformed Response	
3006 Thermocycler Board Command Error Response	
4001 Pressurization failed	
6001 Seal Seq Failed	
6002 Seal Bar Command Error Response	
7001 Camera Initialization Error	
7002 Failed To Find Mask	
7003 Failed Excitation Check	

## Software Troubleshooting

### Weekly Maintenance

It is recommended to shut down and restart the computer on a weekly basis. Prior to shutting down the computer, close the FilmArray software by selecting Exit from the FilmArray software menu or clicking the Close button in the upper right-hand corner of the window.

### Error Messages

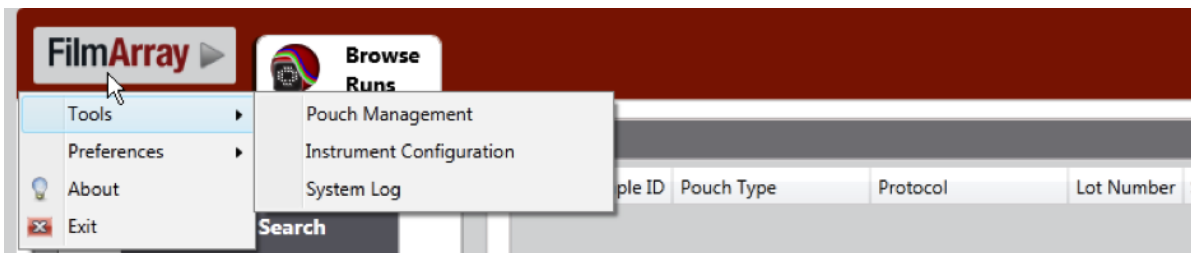
Errors in the FilmArray System may originate in the instrument, in the software, or in communication between the two. In each case, the FilmArray software reports a clear message with instructions that the operator can follow to resolve the issue. These messages and the suggested actions are reported in the table that follows.

Error Message	Possible Solution
Pouch serial number has already been used.	Verify the correct pouch has been loaded into the instrument. Discard any pouch that has already been run in a FilmArray instrument.
The lid needs to be open and a pouch loaded in order to scan.	Open the lid and scan the pouch that is loaded in the instrument.
The module for the scanned pouch is not installed. Please install the module.	Verify the correct pouch module is installed and the correct barcode has been scanned for the pouch.
Too many instruments with Lids Open and Pouches Inserted.  Please remove the pouches or close the lids of all FilmArray instruments indicated.	Remove the pouch(s) or close the instrument lid(s) indicated in the Next Step box of the main Instrument Configuration window.
The Run Setup window is in progress. To exit Run Setup, remove the pouch.  NOTE: All entered data will be lost.	Remove the pouch to exit Run Setup, or complete the run before attempting other actions using the software.

Error Message	Possible Solution
<p>The FilmArray database is nearing capacity. Please use the Archive Selected Runs option to remove runs from the database and store them according to your data retention policy.</p> <p>Please contact FilmArray Customer Support if you require assistance.</p>	<p>The FilmArray database stores up to 8,000 runs reliably. Should this number be approached, use the Archive Selected Runs feature in the Browse Runs context menu to remove run files from the database and store the data in a separate location. Contact technical support if the problem persists.</p>
<p>The FilmArray instrument is in an error state. Power down the instrument, wait 10 seconds, power it back on and try again.</p> <p>Please see the System Log for details. If the problem persists, contact FilmArray Customer Support for assistance.</p>	<p>Follow the error message as directed. Contact technical support if the problem persists.</p>
<p>The FilmArray instrument encountered an error during the run. The test results are invalid.</p> <p>Please see the System Log for details. If the problem persists, contact FilmArray Customer Support for assistance.</p>	<p>Discard the pouch and follow the error message as directed.</p> <p>This message should be accompanied by a flashing blue light on the instrument. This light indicates that the test is complete and the lid on the instrument can now be opened and the pouch removed. Removing the pouch clears all the fields on the screen and prepares the instrument for another test. Contact technical support if the problem persists.</p>
<p>The FilmArray instrument &lt;SerialNumber&gt; encountered an unexpected error.</p> <p>Please see the System Log for details. If the problem persists, contact FilmArray Customer Support for assistance.</p>	<p>Follow the error message as directed. Contact technical support if the problem persists.</p>
<p>The FilmArray software encountered an unexpected error.</p> <p>Please see the System Log for details. If the problem persists, contact FilmArray Customer Support for assistance.</p>	
<p>Run data was retrieved but cannot be analyzed because the &lt;pouch type&gt; pouch module was not installed in the software.</p> <p>For assistance, please contact FilmArray Customer Support.</p>	
<p>Data not associated with a test has been recovered from the FilmArray instrument &lt;SerialNumber&gt;.</p> <p>Please see the System Log for details. For assistance, contact FilmArray Customer Support.</p>	

### System Log

Depending on the error, the FilmArray software may refer to the System Log for details about the errors. The System Log is accessed via the FilmArray software menu, as shown below.



When the System Log is opened, a table is presented that displays the following information as shown in the figure below.

1. Date the log was created
2. Type of log event (run start, run processed, or in this case, error)
3. Instrument serial number
4. Sample ID
5. Pouch type
6. Pouch serial number
7. Run status
8. Error encountered

The screenshot shows the 'System Log' window in FilmArray. The table contains the following columns: Date, Event, Instrument, Sample ID, Pouch Type, Serial Number, Run Status, and Error. Red numbered callouts (1-8) are placed over the first row of data to identify the columns corresponding to the list above.

Date	Event	Instrument	Sample ID	Pouch Type	Serial Number	Run Status	Error
2014-09-11 12:46:16.542	Start	FA2469	RP_1.7_001	Respiratory Panel v1.7	RP_1.7_001	Completed	
2014-09-11 13:53:10.321	Processed	FA2469	RP_1.7_002	Respiratory Panel v1.7	RP_1.7_002	Completed	
2014-09-11 14:13:52.096	Start	FA2469	RP_1.7_003	Respiratory Panel v1.7	RP_1.7_003	Completed	
2014-09-11 15:20:52.577	Processed	FA2469	RP_1.7_003	Respiratory Panel v1.7	RP_1.7_003	Completed	
2014-09-11 15:27:01.531	Start	FA2469	RP_1.7_004	Respiratory Panel v1.7	RP_1.7_004	Completed	
2014-09-11 16:34:07.133	Processed	FA2469	RP_1.7_004	Respiratory Panel v1.7	RP_1.7_004	Completed	
2014-09-11 16:58:19.536	Start	FA2469	RP_1.7_005	Respiratory Panel v1.7	RP_1.7_005	Completed	
2014-09-11 18:05:14.590	Processed	FA2469	RP_1.7_005	Respiratory Panel v1.7	RP_1.7_005	Completed	
2014-09-15 09:46:53.272	Start	FA2469	RP_1.7_008	Respiratory Panel v1.7	RP_1.7_008	Completed	
2014-09-15 10:53:56.829	Processed	FA2469	RP_1.7_008	Respiratory Panel v1.7	RP_1.7_008	Completed	
2014-09-15 10:57:04.121	Start	FA2469	RP_1.7_009	Respiratory Panel v1.7	RP_1.7_009	Completed	
2014-09-15 12:04:10.832	Processed	FA2469	RP_1.7_009	Respiratory Panel v1.7	RP_1.7_009	Completed	
2014-09-15 12:10:43.325	Start	FA2469	RP_1.7_011	Respiratory Panel v1.7	RP_1.7_011	Completed	
2014-09-15 13:17:45.250	Processed	FA2469	RP_1.7_011	Respiratory Panel v1.7	RP_1.7_011	Completed	
2014-09-15 15:48:02.166	Start	FA2469	RP_1.7_010	Respiratory Panel v1.7	RP_1.7_010	Completed	
2014-09-15 16:54:57.597	Processed	FA2469	RP_1.7_010	Respiratory Panel v1.7	RP_1.7_010	Completed	
2014-09-15 16:58:54.115	Start	FA2469	RP_1.7_012	Respiratory Panel v1.7	RP_1.7_012	Completed	
2014-09-15 18:06:00.972	Processed	FA2469	RP_1.7_012	Respiratory Panel v1.7	RP_1.7_012	Completed	
2014-09-15 18:34:48.105	Start	FA2469	RP_1.7_013	Respiratory Panel v1.7	RP_1.7_013	Completed	
2014-09-15 19:41:50.373	Processed	FA2469	RP_1.7_013	Respiratory Panel v1.7	RP_1.7_013	Completed	
2014-09-16 11:42:43.028	Start	FA2469	RP_1.7_014	Respiratory Panel v1.7	RP_1.7_014	Completed	
2014-09-16 12:49:49.008	Processed	FA2469	RP_1.7_014	Respiratory Panel v1.7	RP_1.7_014	Completed	
2014-09-16 14:48:44.798	Start	FA2469	RP_1.7_015	Respiratory Panel v1.7	RP_1.7_015	Completed	
2014-09-16 15:55:44.273	Processed	FA2469	RP_1.7_015	Respiratory Panel v1.7	RP_1.7_015	Completed	
2014-09-16 16:06:43.668	Start	FA2469	RP_1.7_016	Respiratory Panel v1.7	RP_1.7_016	Completed	
2014-09-16 17:13:48.974	Processed	FA2469	RP_1.7_016	Respiratory Panel v1.7	RP_1.7_016	Completed	
2014-09-16 17:15:40.324	Start	FA2469	RP_1.7_017	Respiratory Panel v1.7	RP_1.7_017	Completed	
2014-09-16 18:22:48.616	Processed	FA2469	RP_1.7_017	Respiratory Panel v1.7	RP_1.7_017	Completed	
2014-09-17 09:24:37.101	Start	FA2469	RP_1.7_018	Respiratory Panel v1.7	RP_1.7_018	Completed	
2014-09-17 10:31:33.585	Processed	FA2469	RP_1.7_018	Respiratory Panel v1.7	RP_1.7_018	Completed	

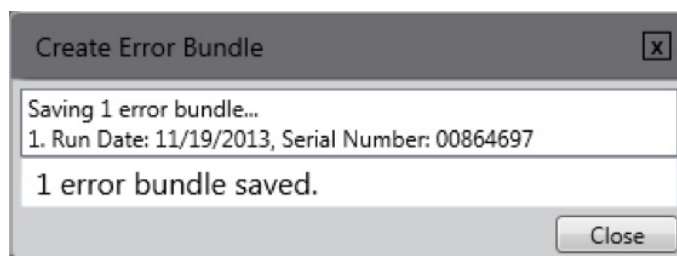
The System Log file has a maximum allowable size. When that size is reached, the System Log file is automatically saved, and a new one is started. To view older System Log files that have been saved, click the Open button and choose the desired System Log file from the list.

## Error Bundle

If an error occurs that is associated with a FilmArray run, a technical support representative may request the operator to create and provide an error bundle for that run. The error bundle is designed to assist in troubleshooting errors associated with a run. It packages files related to the status of the system, instrument, and software; including System Log data.

To create an error bundle:

1. Highlight the desired run in the Browse Runs tab.
2. Right-click the highlighted run to open the Browse Runs context menu.
3. Select the menu item Create Error Bundle. The Browse for Folder window opens.
4. Select an existing folder to store the zipped file in, or create a new one. The FilmArray software saves the file to the desired folder.
5. When the error bundle is complete the following box will appear.



## Pouch Troubleshooting

For problems encountered while using a FilmArray pouch, see the possible solutions below. If pouch leakage occurs, refer to Chapter 7 for proper decontamination procedures.

Problem	Possible Error Cause	Solution
Pouch packaging is not sealed tightly around pouch canister	Loss of vacuum in pouch packaging	Attempt to hydrate. If pouch hydration is successful, continue the run. Otherwise, discard the pouch and use a new pouch to test the sample.
Pouch does not automatically draw Hydration Solution or sample mix into pouch when loading	Loss of vacuum in pouch	Discard the pouch and use a new pouch to test the sample.
Failed controls	Hydration Solution not added or drawn into pouch	Retest sample in a new pouch.
	Sample mix not added or drawn into pouch	Retest sample in a new pouch.
	Pouch and/or instrument are not functioning properly	Retest sample in a new pouch. If controls continue to fail contact technical support.
Inadequate volume in Hydration Solution or Sample Buffer vials/ampoules	Evaporation or leakage	Discard vials/ampoules and obtain new ones.

# APPENDIX A: FILMARRAY SUPPORT INFORMATION

Instrument problems may be reported by contacting BioFire Diagnostics technical support, the local bioMérieux sales representative, or an authorized distributor.

## Instrument Return Procedure

If returning an instrument from within the United States, visit the Return Forms and Decontamination Procedures webpage:

- <http://www.biofiredx.com/support/return-forms/>

If returning an instrument from outside the United States, contact the local bioMérieux sales representative or an authorized distributor for detailed instructions.

## Disposal Recommendation



Components of the FilmArray 2.0 such as the FilmArray 2.0 Instrument, the computer, monitor, keyboard, etc. which are marked with the crossed-out wheeled bin symbol are covered by the European Directive 2012/19/EU.

These items must be disposed of via designated collection facilities appointed by government or local authorities.

For more information about disposal of your old product, please contact your city office or waste disposal service; or BioFire Diagnostics Customer Support Department, a local bioMérieux sales representative, or an authorized distributor.

## FilmArray Ordering Instructions

Customers inside the United States should contact BioFire Diagnostics to order any FilmArray equipment, accessories, and/or supplies.

BioFire Diagnostics accepts purchase orders and credit cards (Visa®, MasterCard®, and American Express®) as methods of payment.

Orders can be made via:

- E-mail: [salesorders@biofiredx.com](mailto:salesorders@biofiredx.com)
- Fax: 801-588-0507
- Phone: 800-735-6544 or 801-736-6354
  - Payment is by credit card only for phone orders.

If ordering from outside the United States, contact the local bioMérieux sales representative or an authorized distributor for detailed instructions.

## Warranty Information

Product warranty information is available online at:

- <http://www.biofire.com/support/>

For warranty information for customers outside the United States, contact the local bioMérieux sales representative or an authorized distributor.



# APPENDIX B: BARCODE CALIBRATION

If the barcode reader is not functioning, calibrate it by following the steps below:

1. Plug in the barcode reader and wait for the start-up sound.
2. Scan the barcodes sequentially to program the barcode reader. The reader sounds as codes are scanned.
3. If a code is skipped during calibration, begin with the first code and scan all codes again sequentially (the first code resets previous entries).

a.



**Set All Defaults**

b.



**Low Volume**

c.



**Erase All Rules**

d.



**Begin New Rule**

e.



**Send Control [**

f.



**Send All Data That Remains**

g.



**Send Control ]**

h.



**Save Rule**

i.



**Quit Entering Rules**



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*For additional information regarding our products  
and applications, please contact BioFire Diagnostics  
Customer Support Department, local bioMérieux sales  
representative or an authorized distributor.*