Affymetrix® GeneChip® Fluidics Station 400

User's Guide

Version 5.0

For use with Affymetrix® Microarray Suite Software

For Research Use Only.

Not for use in diagnostic procedures.

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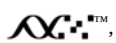
Affymetrix®, GeneChip®, EASI™,  ,  ,  , HuSNP™, GenFlex™, Jaguar®, MicroDB®, 417™, 427™ 418™, 428™, Pin-and-Ring™, NetAffx™, CustomExpress™ and Flying Objective™ are trademarks owned or used by Affymetrix, Inc.

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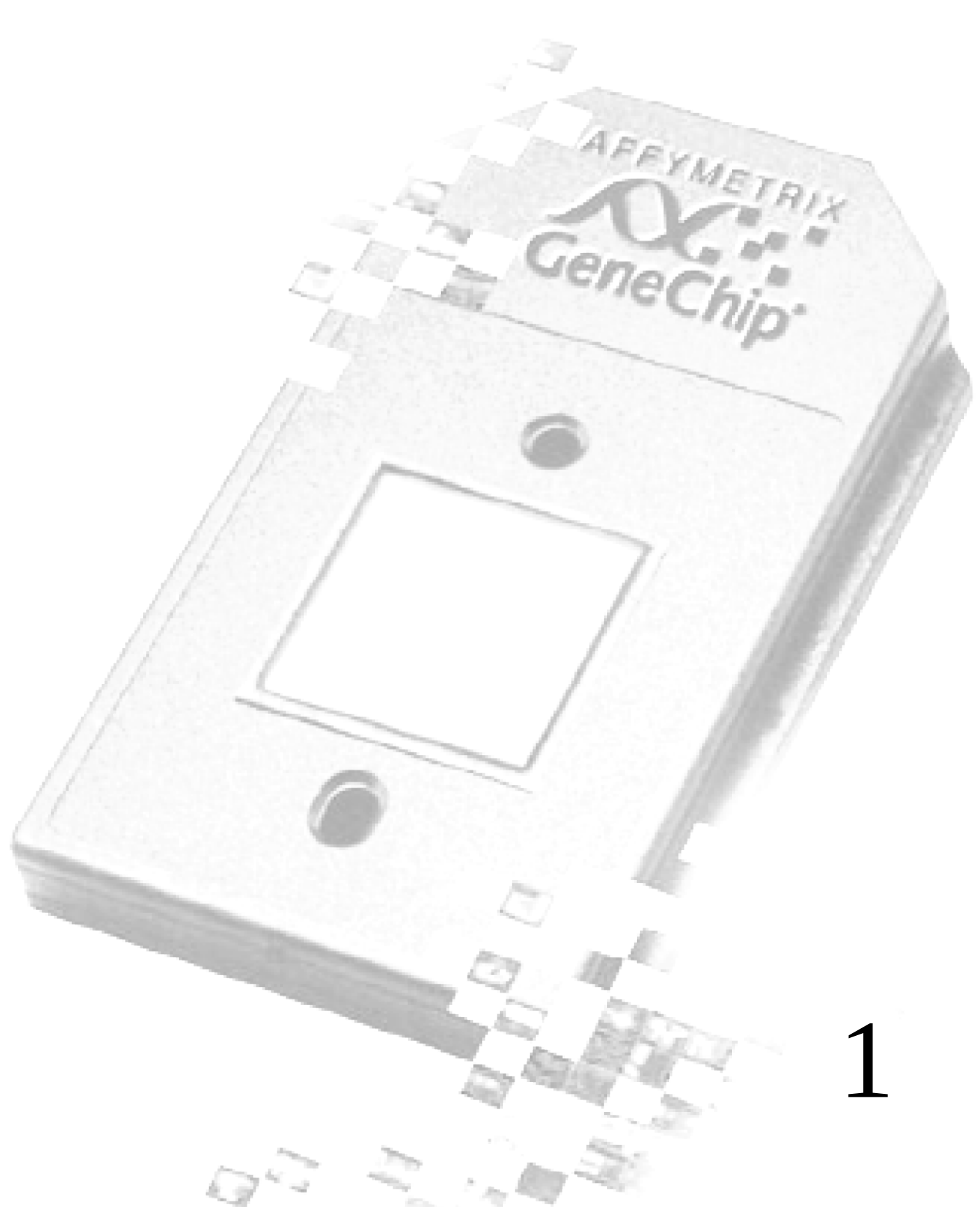
Contents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Chapter 1

Introduction

This chapter introduces the Affymetrix® GeneChip® Fluidics Station 400 and its components, gives an overview of how the fluidics station works, and covers the safe use of the fluidics station.

Warnings and Precautions

- The fluidics station is for research use only. It is not for use in diagnostic procedures.
- All biological specimens and materials with which they come in contact should be handled as if capable of transmitting infection and should be

disposed of with proper precautions in accordance with federal, state, and local regulations—including adherence to the OSHA Bloodborne Pathogens Standard (29 CFR 1910.1030) for blood-derived and other samples governed by this act. Never pipette by mouth. Avoid specimen contact with skin and mucous membranes.

- Wear gloves when using the fluidics station.
- Exercise standard precautions when obtaining, handling, and disposing of potentially carcinogenic reagents.
- Do not send your instrument elsewhere for service or attempt to service it yourself. To protect your warranty and ensure safe operation, the instrument should be serviced only by Affymetrix or its representatives. If the instrument is not working correctly, please contact your Affymetrix Technical Support representative.
- Do not use the fluidics station in ways not specified by Affymetrix. Doing so may impair the protections provided by the fluidics station.

▲ WARNING

Do not place hands or fingers inside the cartridge holder. See **Figure 1.1 on page 10**. *Under fault conditions, the area behind the cartridge holder can have temperatures that rise to 100°C or higher.*

- The fluidics station requires two people to lift and handle it safely. Each person should firmly grasp the base of the instrument at the end opposite the other to lift. Use OSHA standards for lifting techniques.

The LCDs in front of the instrument are sensitive to static discharge. Avoid touching them with the fingers or any object that may be carrying an electric charge.

Caution Notices:

C A U T I O N

- **The power supply cord is used as the main disconnect device. Ensure that the socket outlet is located and installed near the equipment and is easily accessible.**

A T T E N T I O N

- **Le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée à proximité du matériel et être facile d'accés.**

A C H T U N G

- **Zur sicheren Trennung des Gerätes vom Netz ist der Netzstecker zu ziehen. Vergewissern Sie sich, daß die Steckdose leicht zugänglich ist.**

Regulatory

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.

Customer Support Information

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Instrument Components

The GeneChip® probe array Fluidics Station 400 contains four modules; each module can hold one GeneChip® probe array cartridge. The Microarray Suite software on the workstation, which is connected to the instrument, can control each of the four modules independently of the others. A single workstation can control as many as eight fluidics stations. You can use any or all of the modules at the same time. You can also choose a different protocol for each module. The modules are numbered 1 through 4 near the LCD window.

The GeneChip Fluidics Station 400 includes the following components. See **Figure 1.1 on page 10**.

1. Sample Holder — holds the sample vial
2. Module Door — protective cover for the peristaltic pump on the module
3. Cartridge Holder — holds the cartridge during hybridization
4. Washblock — part of the cartridge holder that completes the fluid path when a cartridge is not in place (used for cleaning out or draining the fluidics station)
5. Cartridge Lever — engages or releases the cartridge holder
6. LCD Window — displays messages during processes
7. Lid Release Buttons — one on each side
8. Wash Bottles (2) — hold wash buffers and tubing that pulls buffer through system
9. DI Water Bottle — holds deionized water and tubing that pulls water through system
10. Waste Bottle — collects waste from hybridizations and washes
11. Metal Sampling Tube — fits inside the sample vial (Sample is pulled up and into the system through the sampling tube.)
12. Cartridge Needles (not shown in figure) — fit inside the septa on the cartridge or the washblock (Fluids are circulated through the cartridge via the cartridge needles.)

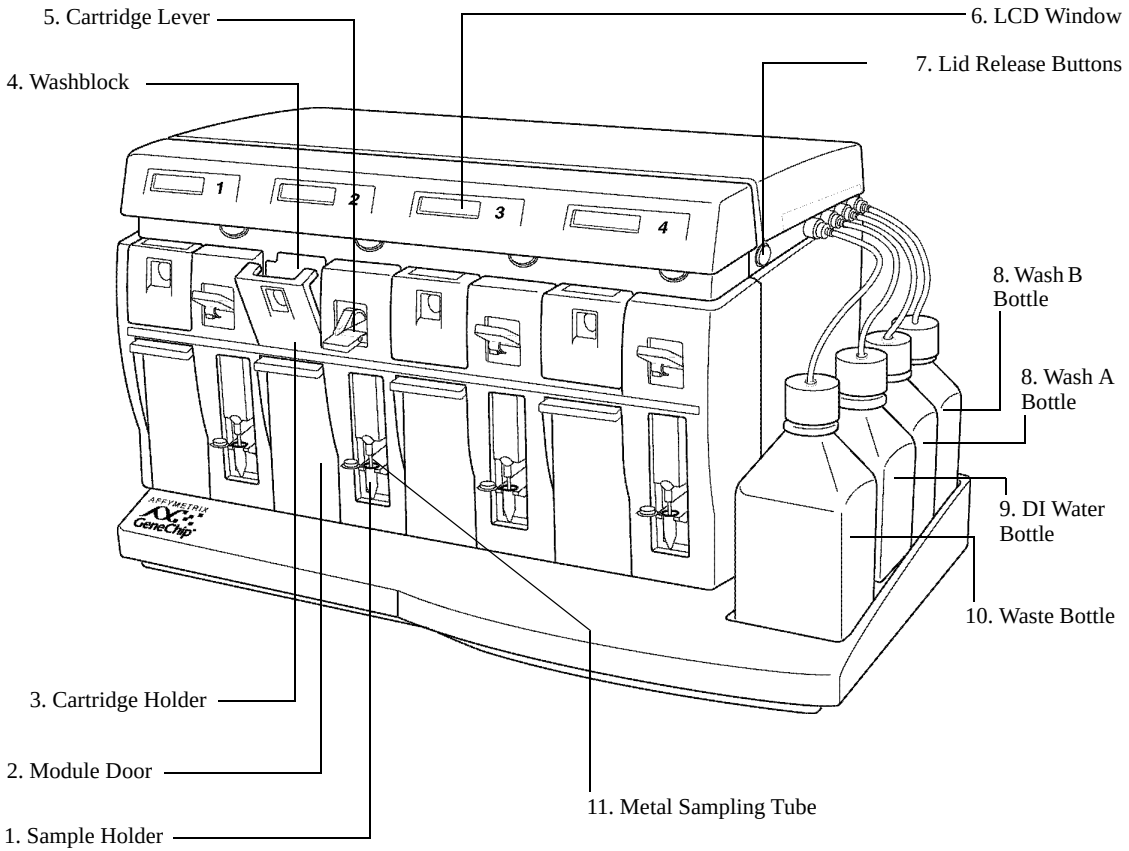


Figure 1.1
The GeneChip® Fluidics Station 400 and components

Accessory Kit

The GeneChip® Fluidics Station 400 also includes an accessory kit.

Contents of Accessory Kit

Component Item	Part Number	Quantity
Terminator Plug Assembly	340011	1
Cable Assembly, CPU, DB9P, M/F	350001	1

Contents of Accessory Kit

Component Item	Part Number	Quantity
Power Cord	350014	1
4A Fuse, 5 × 20 mm	370013	1
8.5" Silicone Peristaltic Tubing	400110	4
5/32" T-Handle Ball-Tip Hex Driver	400113	1
1/4" Tip Flathead Screwdriver	400115	1
Washblock Assy	400116	2
500 ml Square Media Bottle (Fluidics DI Water/Buffer)	400118	5
1000 ml Square Media Bottle (Fluidics Waste Bottle)	400119	1
9/64" T-Handle Hex Driver	400127	1
Pre-drilled Bottle Cap	400137	4
Sample Needle	410016	4
GeneChip® Fluidics Station 400 User's Guide	700103	1

How the Fluidics Station Works

For further instructions, see *Using the Fluidics Station 400* on page 17.

Standard Hybridization and Wash Protocol

1. Use the Microarray Suite software to define an experiment and start the fluidics station protocol.
2. After preparing the target in the laboratory according to the relevant GeneChip probe array package insert, place the labeled target solution into a sample vial. Then place the vial into the sample holder on the fluidics station.
3. Place the appropriate cartridge into the cartridge holder on the selected module of the fluidics station and close the cartridge holder by pushing the holder into the module until it clicks into place. Remove your hand from the exterior of the cartridge holder and engage the cartridge holder by lifting the cartridge lever quickly. Avoid performing these two steps in the opposite order, as doing so may damage the cartridge needles.

4. The target circulates through the cartridge and hybridizes to the GeneChip probe array.

   The fluidics station will perform the following actions to hybridize the target to the cartridge. The fluidics station will

   - draw target solution from the sample vial into the cartridge and mix it by alternately draining and filling the cartridge at a selected temperature;
   - expel the target solution into the waste or into the sample vial;
   - wash the cartridge repeatedly with wash solutions at selected temperatures;
   - fill the cartridge with wash solution for scanning;
   - clean the metal sampling tube and module tubing for the next sample.

5. After hybridization, the Agilent GeneArray® scanner scans the cartridge by laser light to obtain fluorescence intensity data.

For more information on how the scanner works, refer to the appropriate scanner manual.

Sample Recovery and Staining Protocol

1. Use the Microarray Suite software to define an experiment and start the fluidics station protocol.
2. After the hybridization of the sample to the cartridge, place the cartridge into the cartridge holder on the selected module of the fluidics station.
3. Place an empty sample vial in a sample vial holder. The fluidics station transfers the sample to the empty sample vial.
4. Remove the sample vial and place a vial containing the stain solution into the sample vial holder.
5. The fluidics station will perform the following actions to stain the bound target on the cartridge and prepare it for scanning. The fluidics station will:
   - wash the array with wash solution (or solutions) at selected temperatures;
   - draw staining solution from the vial into the cartridge and mix it by alternately draining and filling the cartridge at a selected temperature;
   - expel the staining solution to the waste line;

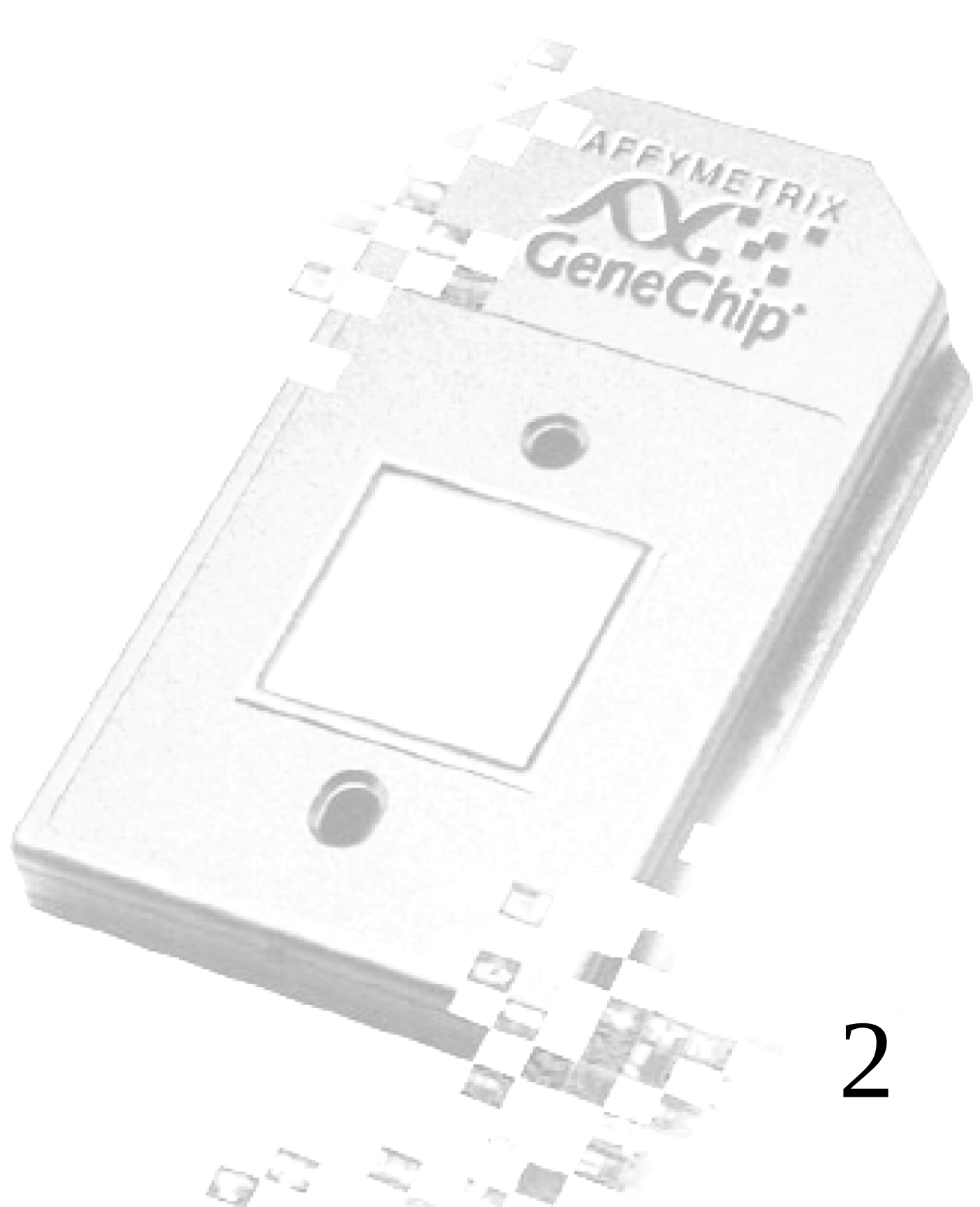
- wash the cartridge with wash solution (or solutions) at a selected temperature;
- fill the cartridge with wash solution for scanning;
- clean the metal sampling tube and module tubing for the next cartridge to be processed.

6. After staining and washing, the Agilent GeneArray® scanner scans the cartridge by laser light to obtain fluorescence intensity data.

For more information on how the scanner works, refer to the appropriate scanner manual.

✔ Note

In addition to the preceding protocols, the fluidics station can perform variations of the steps described in both procedures. For more information about the protocols that can be performed on the fluidics station, please contact your Affymetrix Technical Support representative.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Chapter 2

Using the Fluidics Station 400

This section describes how to use the Affymetrix® GeneChip® Fluidics Station 400 with sample protocols.

Starting Up

1. Check to ensure that the fluidics station is connected to the power main through the power cord provided.
2. Check to ensure that the fluidics station is connected to the workstation. CommLink connections are located on the back of the fluidics station. See **Figure 2.1 on page 18**.
3. Flip the ON/OFF switch for the fluidics station to the ON position. The switch is located on the left side of the fluidics station. See **Figure 2.1 on page 18**. The LCD window should display the following:

   Power-On Done

   NOT PRIMED 25°C

4. Turn on the workstation. The Microarray Suite software should automatically open. If it does not, open the software program by double-clicking its icon.

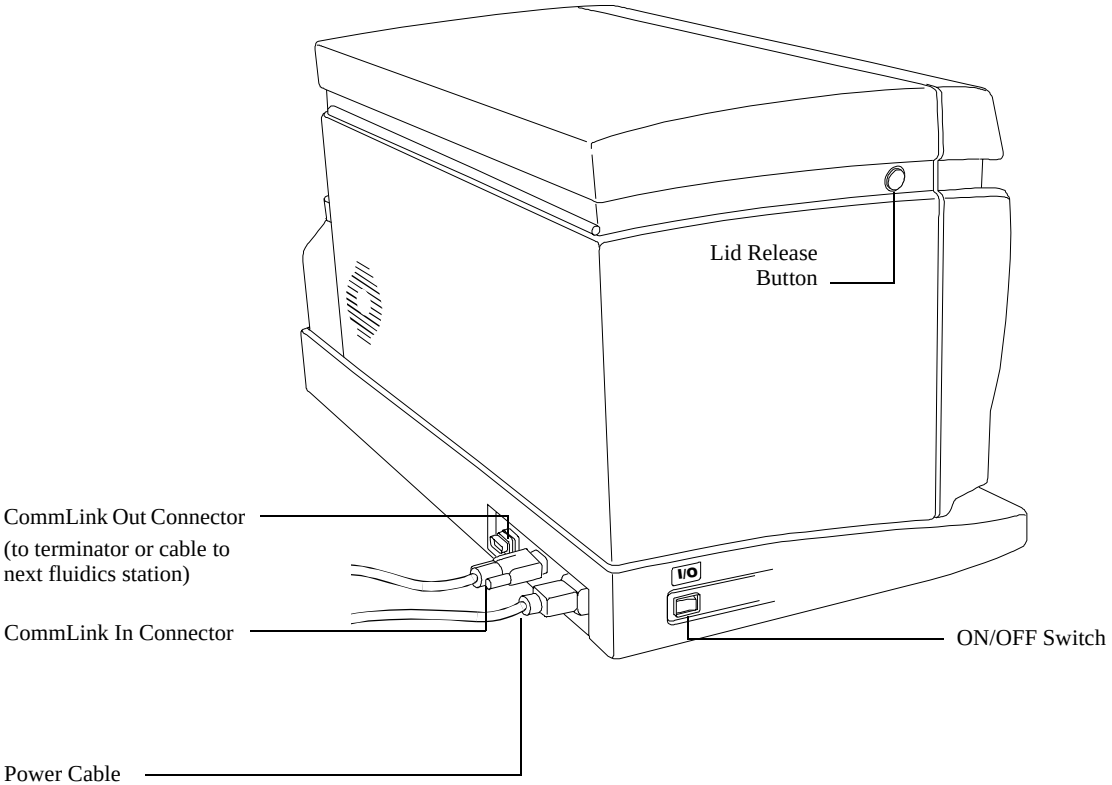


Figure 2.1
Location of the serial ports and ON/OFF switch

Handling the Probe Array Cartridge

The GeneChip® probe array chip comes mounted in a plastic package to form a cartridge. See **Figure 2.2 on page 19**. The probe array chip contains a collection of oligonucleotide probes that have been arrayed on the inner glass surface. A chamber in the plastic package directly under the chip acts as a reservoir where hybridization and washing occur.

Although the inner glass surface is protected, any contamination or scratches on the outer surface of the glass can compromise the integrity of the scan. Avoid touching the surface of the chip with your fingers. Skin oils and other

substances, such as lotions or ink, can fluoresce. If the surface of the probe array chip is noticeably dirty, you should carefully clean the chip with a nonabrasive laboratory tissue.

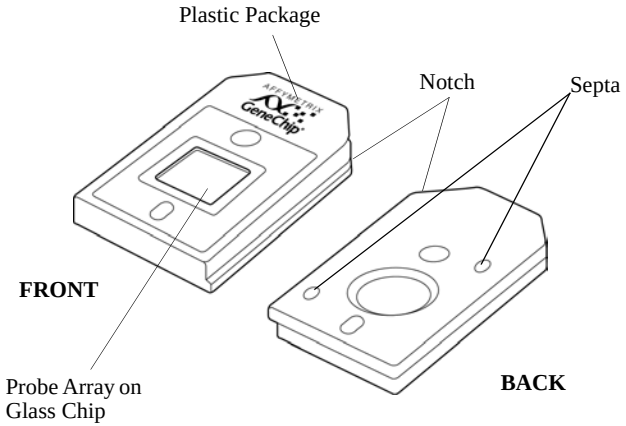


Figure 2.2
The GeneChip® probe array cartridge

Setting Up an Experiment

Before running a hybridization on the fluidics station, you must first define an experiment. For information on defining an experiment, refer to the Microarray Suite software user's guide or to the appropriate package insert.

Defining the Experiment

In the Microarray Suite software, open the **Experiment Info** dialog box under the **Run** menu. An **Experiment Information** dialog box appears.

1. In the **Experiment Information** dialog box, fill in the name of the experiment and select cartridge name from the drop-down list. Do this for each experiment. Refer to the Microarray Suite software user's guide or to the appropriate package insert for additional information about the **Experiment Information** dialog box.
2. Save the experiment by clicking the **Save** button.

3. Close the **Experiment Information** dialog box.

Priming the Fluidics Station

A prime is necessary to ensure that the wash lines are full of the appropriate buffer and that the fluidics station is ready to process a cartridge. You should prime the fluidics station:

- whenever you first start the fluidics station and whenever you change the wash solutions;
- before processing a cartridge if you have performed a shutdown on any module, and
- if the LCD window instructs you to run a prime.

1. Check to ensure that all the wash lines are in the appropriate wash bottles. Please consult the probe array package insert that came with the cartridge kit for the appropriate wash buffer solutions, or contact your Affymetrix Technical Support representative.
2. If it is not already open, open **Fluidics** under the **Run** menu on the computer workstation.

   ⇒ The **Fluidics Station** dialog box appears. If more than one fluidics station is present, select the one to be primed in the drop-down list.
3. In the **Fluidics Station** dialog box, click **Protocol**, then choose **Prime** for each module under the **Protocol** drop-down list. Click the **Run** button for each module to be primed.

   ⇒ Follow the instructions in the LCD window as the prime progresses. You must load a standard 1.5 mL microcentrifuge tube in the sample holder of each module that is to be primed. The LCD window on the fluidics station and the **Fluidics Station** dialog box will indicate the status of the prime and when priming is completed.

Hybridizing the Target Solution to the Probe Array

After you have primed the fluidics station, it is ready to hybridize a sample. For more specific information on hybridizing the target to the probe array cartridge, refer to the appropriate package insert.

1. If it is not already open, click **Fluidics** under the **Run** menu on the workstation.

   ⇒ The **Fluidics Station** dialog box appears. If more than one fluidics station is present, select the appropriate instrument from the drop-down list.

2. In the **Fluidics Station** dialog box, select the module that is ready for use and choose the experiment name in the drop-down **Experiment** list. Check to ensure that the experiment name matches the sample and cartridge to be run.

3. In the **Protocol** drop-down list, choose the protocol that matches the cartridge type.

✔ Note

*You can also choose a customized hybridization-wash or wash protocol here. Refer to the Microarray Suite user's guide or to Customizing the Protocol on page 24. If you are running a customized protocol, check the parameters of each of the protocols chosen to be sure they are appropriate for your experiment. This can be done in the **Fluidics Protocol** dialog box found by choosing **Edit Protocol** under the **Tools** menu.*

4. Click the **Run** button to begin hybridization of the sample.

   ⇒ The protocol will begin.The LCD window on the fluidics station and the **Fluidics Station** dialog box on the workstation will indicate the status of the hybridization as it progresses.

5. Follow the instructions on the LCD window or in the **Fluidics Station** dialog box. A selection of the available prompts is given below as examples:

   a. If prompted to "Remove Vial," remove any remaining vial from the sample holder of the fluidics station.

   b. If prompted to "Load Cartridge," open the cartridge holder by pressing down on the cartridge lever to the Eject position.

      Place the appropriate cartridge into the cartridge holder corresponding to the module set up in the experiment. Push the cartridge holder back to engage the latch See **Figure 2.3 on page 22**.

      After you hear a light click, push firmly up on the cartridge lever, which inserts the cartridge needles into the septa.

✔ Note

Do not push the lever all the way up until the cartridge hold is latched. Doing so will bend the cartridge needles.

c. If prompted to "Load Vial," place the experiment sample vial into the sample holder on the fluidics station.

   As the hybridization progresses, check to ensure that the cartridge is filling properly and that bubbles are not forming. If it is not filling properly, see the note below in this chapter.

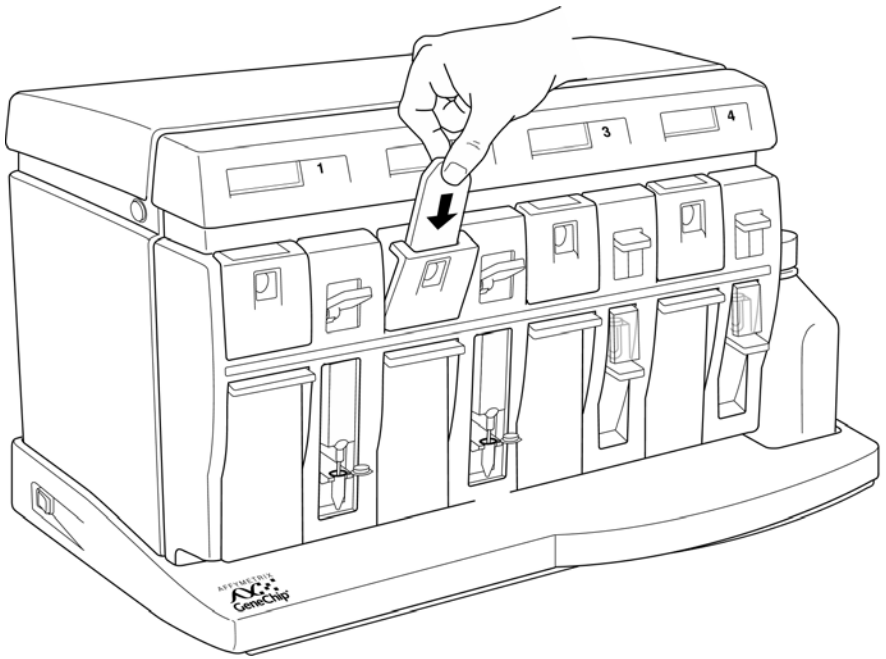


Figure 2.3
Inserting the cartridge into the cartridge holder

6. When the hybridization or washing is complete, the LCD window should display the following:

Eject Cartridge

7. Eject the cartridge by pushing down on the cartridge lever. The LCD window should display the following:

Engage Washblock

✔ Note

If bubbles are present in the cartridge, return it to the cartridge holder. Latch the cartridge holder by gently pushing it inward until you hear a light click. Engage the cartridge by pushing up on the cartridge lever to the Engage position.

The fluidics station will drain the cartridge and then fill it with a fresh volume of the last wash buffer used. When it is finished, if the LCD window displays EJECT CARTRIDGE again, remove the cartridge and inspect it again for bubbles. If no bubbles are present, it is ready to scan. Proceed to step 10.

If you have made ten attempts to fill the cartridge without bubbles and have been unsuccessful, the fluidics station will no longer display EJECT CARTRIDGE after refilling the cartridge. Instead, it will terminate with the prompt DO CLEAN CYCLE. Remove the cartridge and run the Cleanout procedure on the particular module. Fill the cartridge manually by inserting a pipette tip or syringe needle through the bottom septum and by using a second pipette tip or syringe needle in the top septum to permit air to escape.

Refer to Troubleshooting and Assistance on page 33 for possible causes and solutions to bubbles appearing in the cartridge.

8. Latch the cartridge holder by pushing up on the lever to engage it. You should hear a light click. Confirm that you have securely latched the cartridge holder before pushing up the lever.
9. Engage the washblock by pushing up on the cartridge lever to the Engage Position.
10. The fluidics station will automatically perform a Cleanout procedure. The LCD window will indicate the progress of the Cleanout procedure. When the Cleanout procedure is complete, the LCD window should display the following:

Remove Vial

11. Remove the sample vial from the sample holder.

Customizing the Protocol

To be effective, you must modify a protocol before starting it on the fluidics station. Protocol changes will not affect runs in progress. For more specific instructions, refer to the Microarray Suite user's guide or contact your Affymetrix Technical Support representative.

1. Select **Edit Protocol** from the **Tools** menu on the workstation.
   ⇒ The **Edit Protocol** dialog box appears.
2. In the **Edit Protocol** dialog box under **Protocol Name**, click the arrow to open a list of protocols. Click the protocol to be changed.
   ⇒ The **Protocol Name** text box displays the protocol name. The conditions for that protocol are displayed on the right side of the **Edit Protocol** dialog box.
3. Select the item to be changed and enter the new parameters as needed. The parameters must be within the ranges shown below:

Parameter	Valid Range
Hybridization or Stain Time (Seconds)	0 to 86,399
Temperature (°C)	15 to 50
Number of Wash Cycles	0 to 99
Mixes per Wash Cycle	1 to 99

✔ Note

Enter 0 (zero) for the hybridization time if you desire only a wash. Enter 0 (zero) for the number of wash cycles for a wash solution that you will not use.

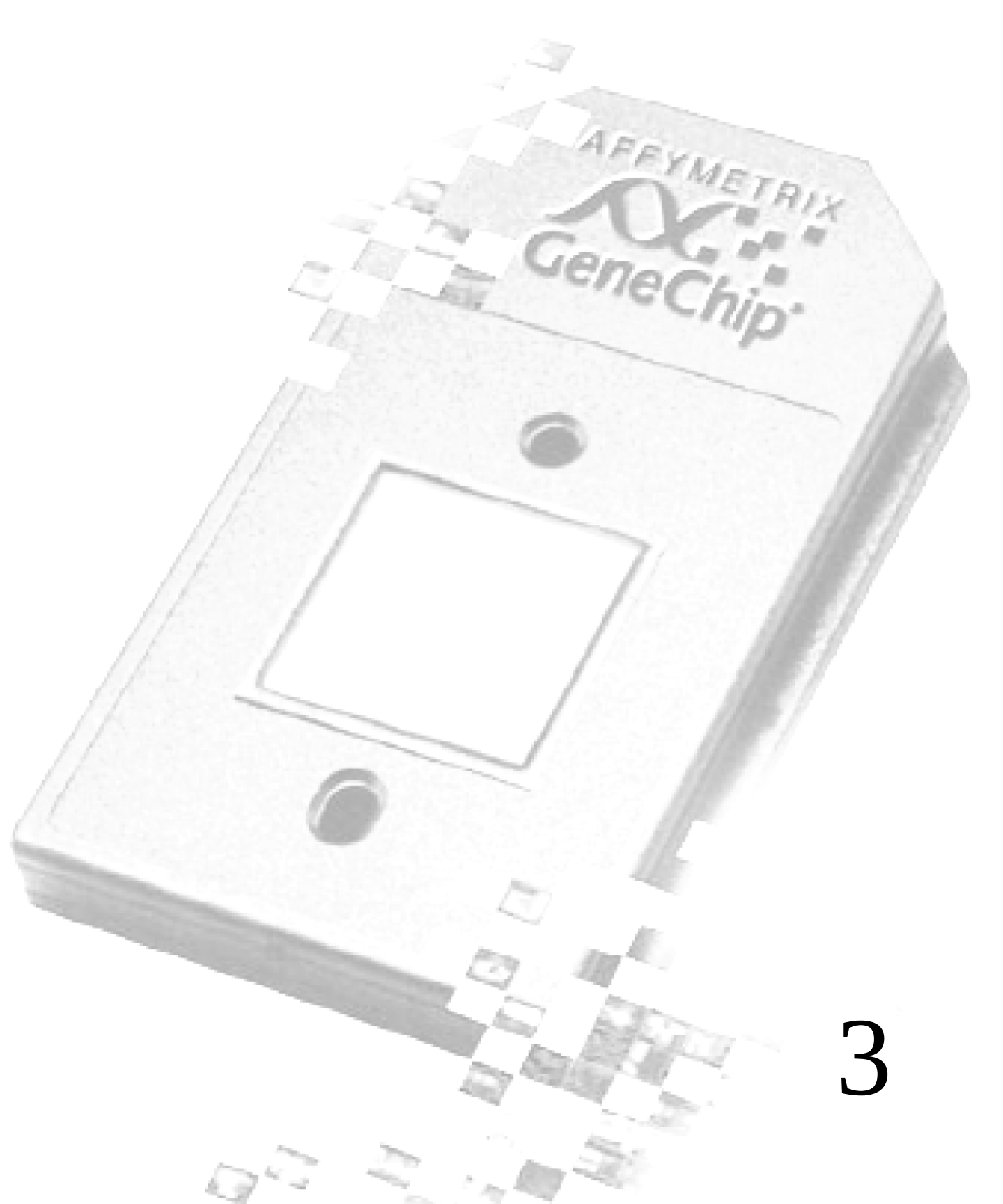
4. To return to the default values for the protocol selected, click the **Defaults** button.
5. Once you have modified all the protocol conditions, click the **Save** button to save the modified protocol. To save the modified protocol under a different name, enter the new name in the **Protocol Name** box before clicking the **Save** button.

6. Click the **Close** button to leave the dialog box.

Shutting Down

You should perform the Shutdown procedure at the end of a session. *Do not keep the fluidics station on if you will not use it again within the next 12 hours. The instrument runs the risk of salt buildup.*

1. Replace wash bottles with bottles filled with deionized water.
2. From the **Protocol** drop-down list, choose **Shutdown** for all modules and then click the **Run** button for all modules.
3. Follow the instructions that appear in the LCD window. As with the prime procedure, a 1.5 mL microcentrifuge tube is required for each module.
4. After the Shutdown protocol is complete, flip the ON/OFF switch to the **OFF** position.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Chapter 3

Instrument Care and Maintenance

This chapter provides instructions on caring for and maintaining the instrument, and on troubleshooting if problems arise.

Instrument Care

- Use a surge protector on the power line to the fluidics station.
- Always run a Shutdown protocol when the instrument will be off or unused overnight or longer. This will prevent salt crystals from forming within the fluidics system.
- When not using the instrument, leave the sample holder in the raised position with an empty vial in it. This will prevent leakage of any fluids from the sample line into the system or onto the tabletop.
- Always use distilled or deionized water to prevent contamination of the lines. Change buffers with freshly prepared buffer at each system startup.
- The fluidics station should be positioned on a strong, level bench away from extremes in temperature and away from moving air.

Instrument Maintenance

To ensure proper functioning of the fluidics station, you should perform periodic maintenance.

Weekly Maintenance

1. To open the top to the fluidics station, firmly push the lid release buttons located on the sides of the fluidics station. See **Figure 1.1 on page 10**.
2. Check the overflow tray for liquid. If liquid is present, absorb it with disposable wipes. See **Figure 3.1 on page 30**.

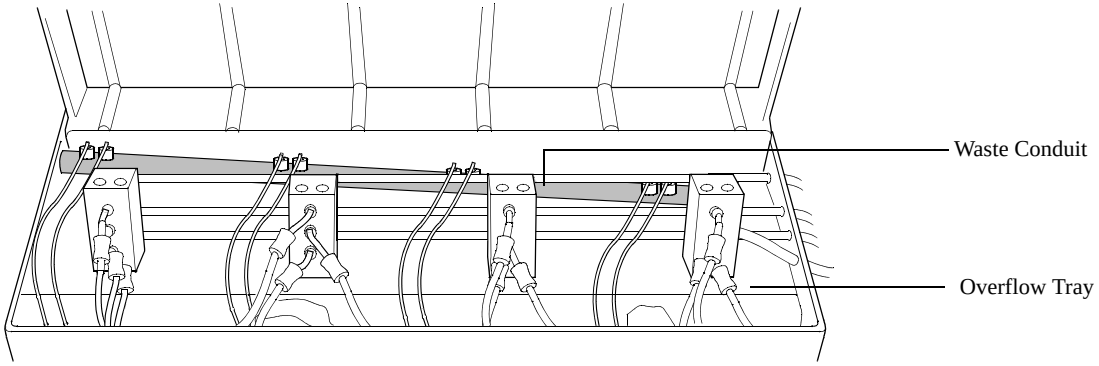

Figure 3.1
Open chassis of fluidics station

3. Check for salt deposits around tubing and fittings. Clean around tubing and fittings with a cotton swab if deposits are present.

If deposits persist, there may be a leak in the tubing or fittings. Call Affymetrix Technical Support if you suspect a leak.

Preventive Maintenance

Peristaltic tubing is included in the accessory kit that comes with the fluidics station. As needed, replace the peristaltic pump tubing as follows:

Wear gloves when changing tubing, and do not allow fluid from old tubing to spill onto surfaces.

1. Open the drop-down door to the module to access the peristaltic pump tubing. See **Figure 3.2 on page 31**.

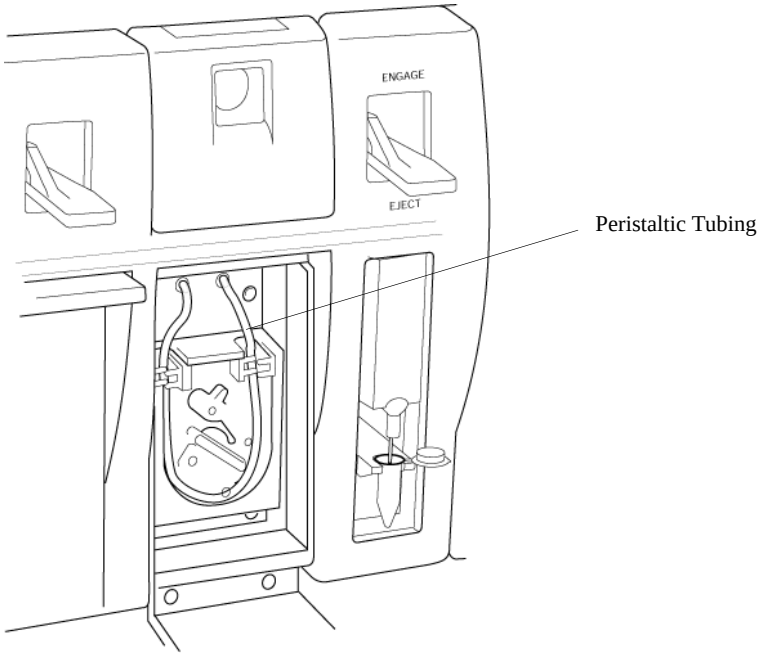

Figure 3.2
Module open, showing peristaltic tubing

2. Open the white clamps to release tubing on both sides. See **Figure 3.3 on page 32**.

Do not attempt to replace the tubing on a module where the module has been removed from the case of the fluidics station.

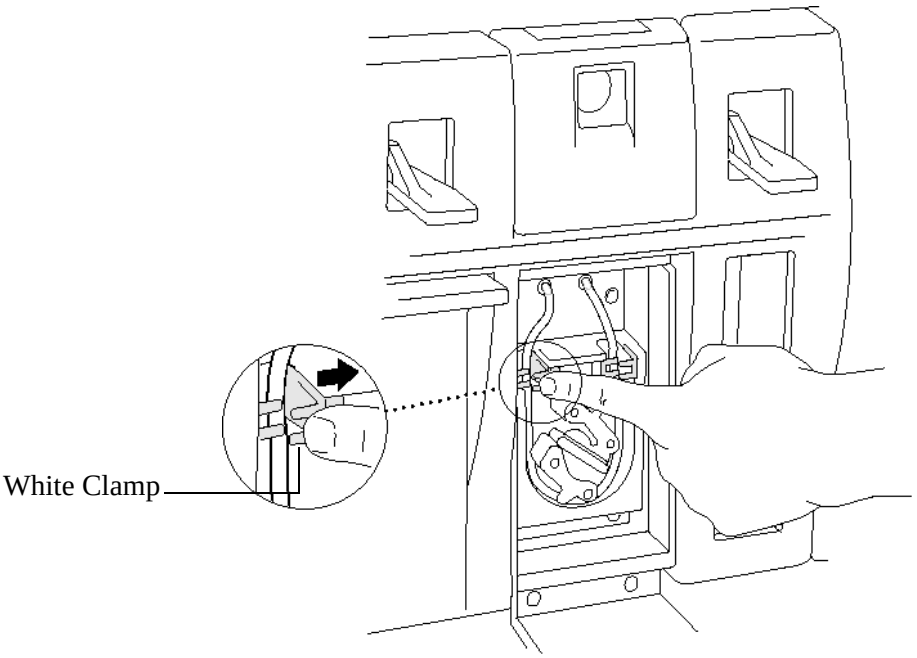

Figure 3.3
Releasing peristaltic tubing

3. Pull tubing off while gently turning the peristaltic pump head. Discard old tubing.
4. Replace tubing with new peristaltic tubing supplied with the accessory kit as described below:
    a. Attach one end of the new tubing to the fitting on the right at the top of the pump enclosure.
    b. Insert the tubing into the clamp under the fitting without stretching the portion of the tubing between the fitting and the clamp. There should be a small amount of slack in that portion of the tubing.
    c. Work the tubing into the pump head while slowly turning the pump.
    d. Insert the free end of the tubing into the other clamp, and attach it to the other fitting.
    e. Close the drop-down module door.
5. Order more replacement tubing.

Troubleshooting and Assistance

If problems arise with the fluidics station, use the following table to locate the description that matches the problem. If you cannot find a solution, call Affymetrix Technical Support for assistance.

Problem	Possible Cause	Solution
Cartridge not filling completely with sample solution or buffer during initial stages of hybridization wash or staining protocol. Displayed as "Missing Fluid Error."	Possible holes in the septa of the cartridge	Run Recover script, then use another cartridge.
	Sample or staining solution not in place properly	Run Recover script. Make sure sample or stain vial is in the sample holder.
	Insufficient volume of sample or staining solution (500 µL)	Run Recover script. Add more sample solution to the sample vial.
	Blocked sampling tube or line of the fluidics station	Run Recover script. Run the Clean or Prime script with fresh deionized (DI) water to flush out salt blockage.
	Failure of one of the fluidics sensors	Call Affymetrix Technical Support for service.
	Pump tubing stretched too tightly around the pump	Loosen the tubing clamps, allow tubing to relax, close the clamps.
Cartridge not filling completely with buffer during wash script. Displayed as "Missing Fluid Error."	Buffer bottle empty	Fill buffer bottles.
	Deionized water used instead of buffer	Replace water with buffer, and prime instrument lines.
	Module not primed	Prime module.
Recovered less sample than initial input during Recover script	Loose tubing attachments inside the fluidics station	Call Affymetrix Technical Support for service.
"Fluidics Station X Does Not Respond" error message on workstation	Power not switched on at the fluidics station	Turn fluidics station power on, then try to connect again.
	Incorrect fluidics station designated for communication	Designate correct fluidics station on workstation.
	Loose cables	Firmly connect cables to fluidics station.
"Sensor Timeout" error message on workstation	No user response to "Remove Vial" prompt or other prompt	Start the selected script again.

Problem	Possible Cause	Solution
"Error While Draining" or "Error While Filling" error message on workstation	Defective septa in cartridge	Use a new cartridge.
	Insufficient sample or stain volume	Add more sample solution to sample vial.
	Excessive bubbling in cartridge	Change the buffer: reduce detergent.
	Buffer conductivity too low	Change the buffer: increase salt.
	Failure of one of the fluid sensors	Call Affymetrix Technical Support for service.
"Temperature Timeout" error message on workstation	Fluidics station not at the designated temperature in time	Call Affymetrix Technical Support for service.
Air bubbles left in cartridge at the end of a hybridization-wash script	Air bubble in wash line	See *Hybridizing the Target Solution to the Probe Array* on page 20
Buffer leaking inside the fluidics station	Loose tubing attachments inside the fluidics station	Call Affymetrix Technical Support for service.
	Washblock requires replacement	Refer to *Appendix C*, *Replacing the Washblock* on page 49
	Salt buildup in the lines of the fluidics station	Run the Clean or Prime script with fresh DI water to flush out salt blockage.
Cartridge needles of the fluidics station not engaging with the cartridge	Possible defective septa on the cartridge	Use another cartridge.
	Extra flashing on the cartridge	Use another cartridge, or call Affymetrix Technical Support for service.
	Salt buildup on the cartridge needles	Run the Clean script with fresh DI water to flush out salt blockage. Clean cartridge needles with a wet cotton swab.
	Cartridge holder aligned and attached to the fluidics station improperly	Call Affymetrix Technical Support for service.
	Cartridge holder not properly engaged to the fluidics station	Place the cartridge into the cartridge holder. Push the holder door shut, and firmly lift the lever to engage the cartridge needles.

When to Contact Affymetrix Technical Support

Under any of the following conditions, unplug the instrument from the power source and contact Affymetrix Technical Support:

- when the power cord is damaged or frayed;
- if any liquid has penetrated the instrument;
- if, after service or calibration, the instrument does not perform to the specifications stated in Appendix D.

If the instrument must be returned for repair, call Affymetrix Technical Support.

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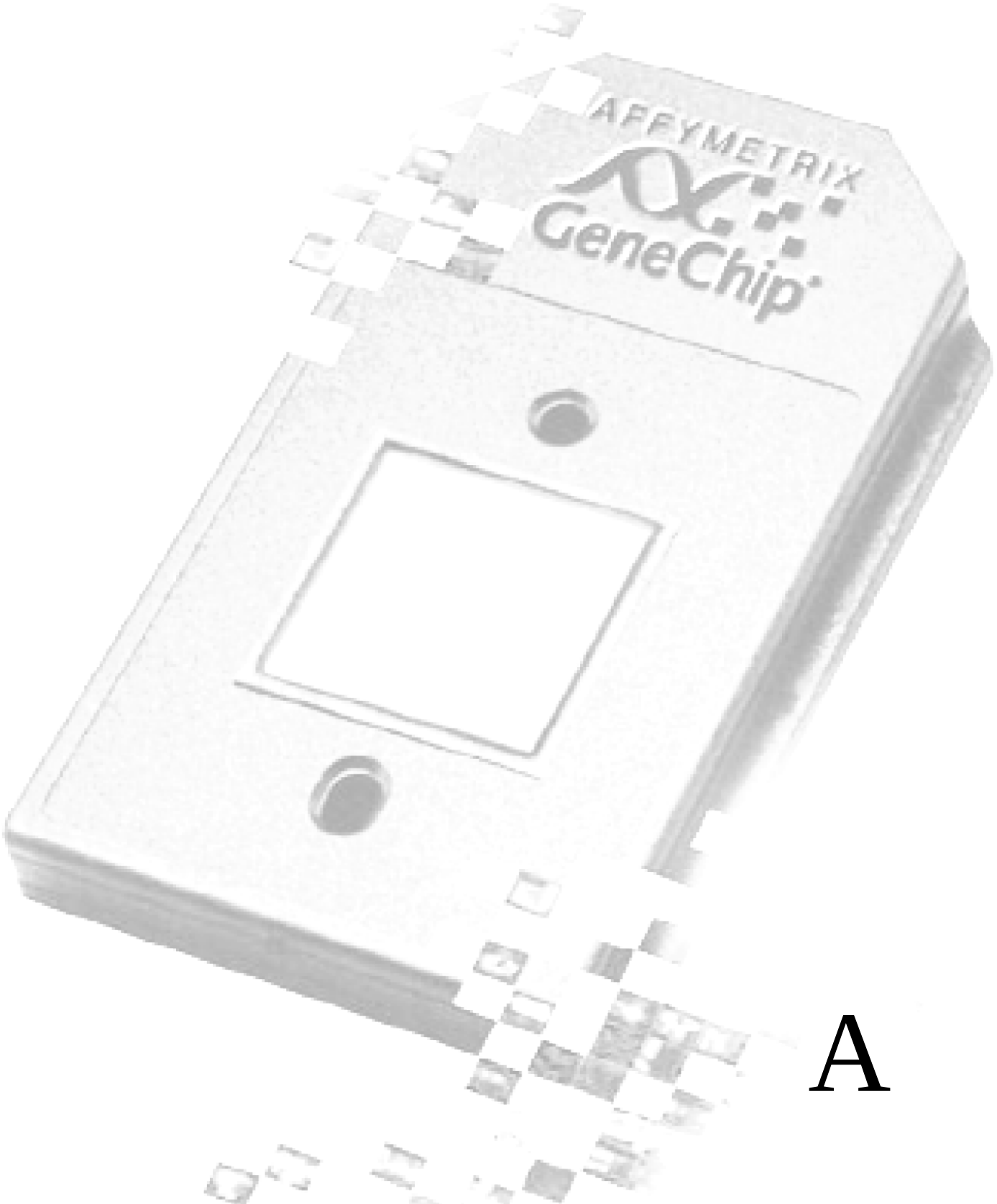
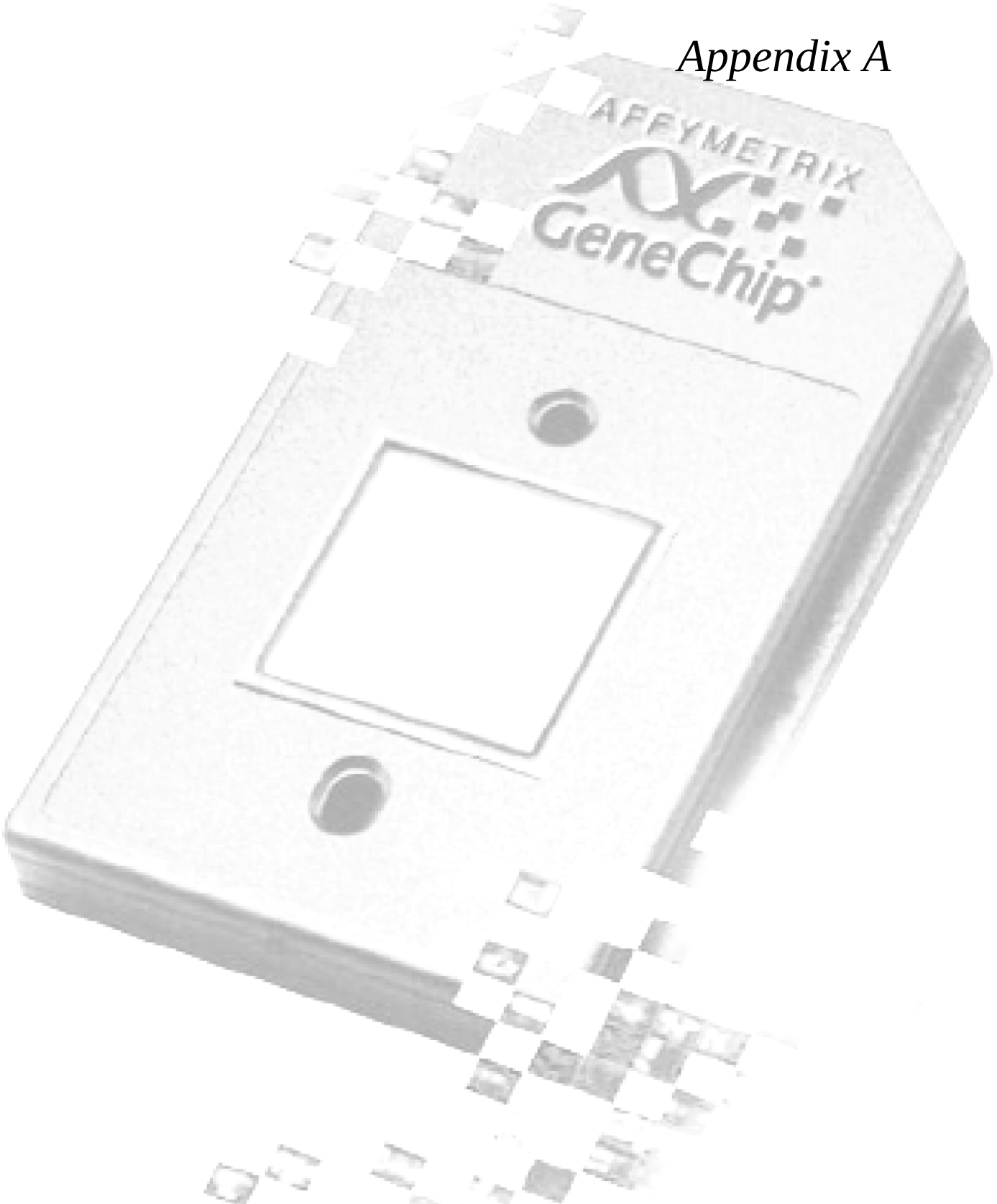


A

Appendix A



Removing a Module for Servicing

Affymetrix Technical Support may request that a module be disconnected to be serviced. Follow these steps to disconnect a module from the fluidics station.

1. Open the top to the fluidics station by firmly pushing the lid release buttons located on the sides of the fluidics station. See **Figure 1.1 on page 10**.
2. Disconnect the three reagent tubing lines from the tubes that connect to the reagent manifold (¼-turn quick-disconnect fittings), leaving them attached to the module. Loosely tuck the tubing into the top of the module.
3. Open the **Fluidics Station** dialog box on the computer workstation, and select the module to be removed.
4. Choose **Drain** for the module to be removed, and click the **Run** button.
5. After the **Drain** is completed, turn the power off to the fluidics station and unplug it from the outlet.

Do not attempt to remove a module without turning off power to the fluidics station.

6. Disconnect the two waste tubing lines connected to the waste conduit, leaving them attached to the module. Loosely tuck the tubing into the top of the module.

Do not allow liquid from the tubing lines to drip into the main compartment or module.

7. Unscrew the two screws on the bottom of the front bezel of the fluidics station by using the 5/32” hex key included in the accessory kit.
8. Unscrew the three horizontal screws on the top of the bezel (inside the instrument), using the 5/32” hex key included in the accessory kit.
9. On all modules, remove all cartridges, latch all cartridge holders, and place all cartridge levers in the neutral, or horizontal, position.
10. Pull the white bezel off the front of the fluidics station.
11. With the flathead screwdriver included in the accessory kit, unscrew the bottom screw of the module to be removed.
12. Unscrew the two top screws, using the 9/64” hex key included in the accessory kit.
13. Pull the module forward to disconnect it from the fluidics station.
14. Replace the front bezel, and return power to the fluidics station.

You can continue to use the remaining modules.

Replacing a Module

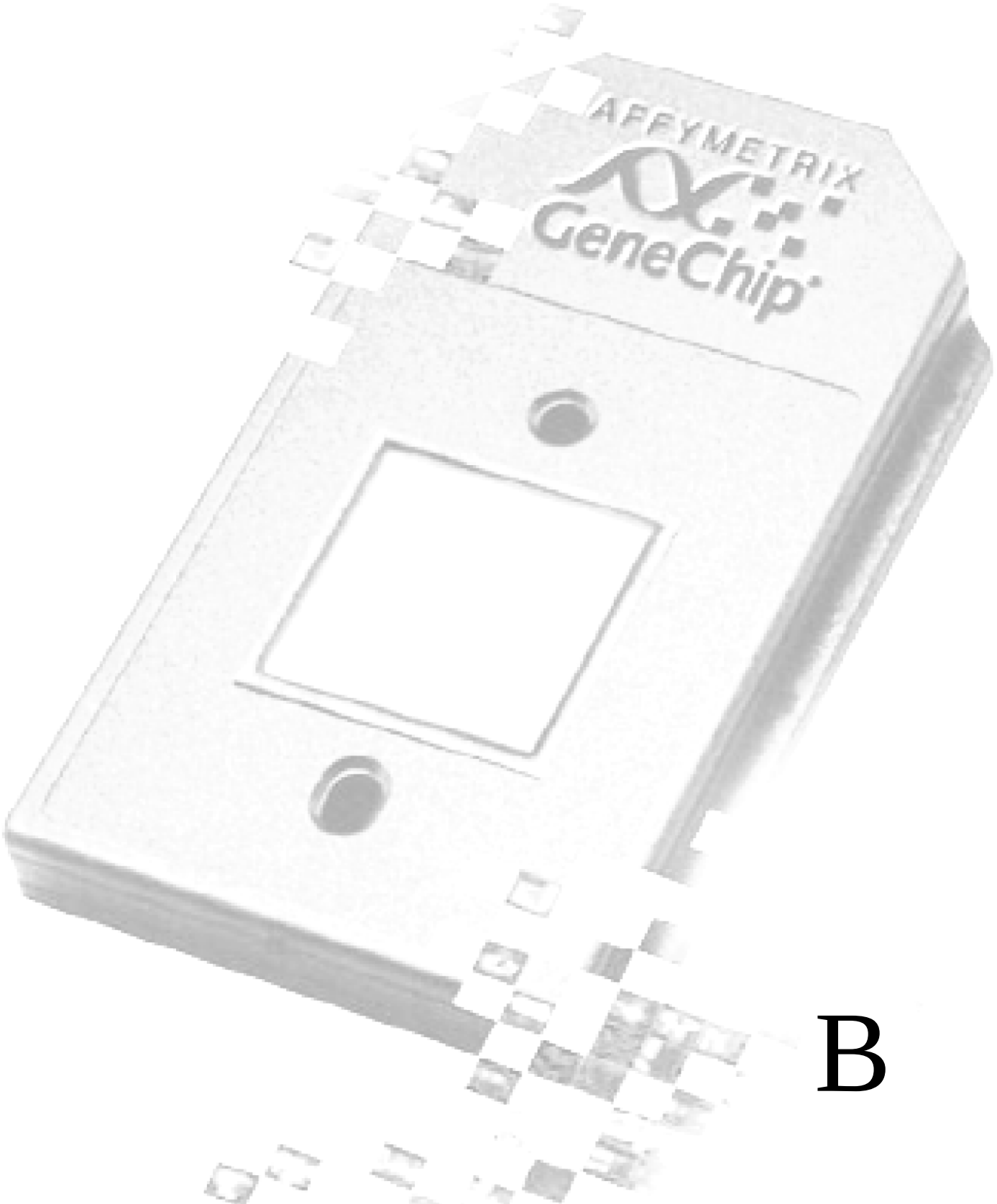
To replace a serviced module, follow these instructions:

1. Turn the power off to the fluidics station, and unplug it from the outlet.

Do not attempt to replace a module without turning off power to the fluidics station.

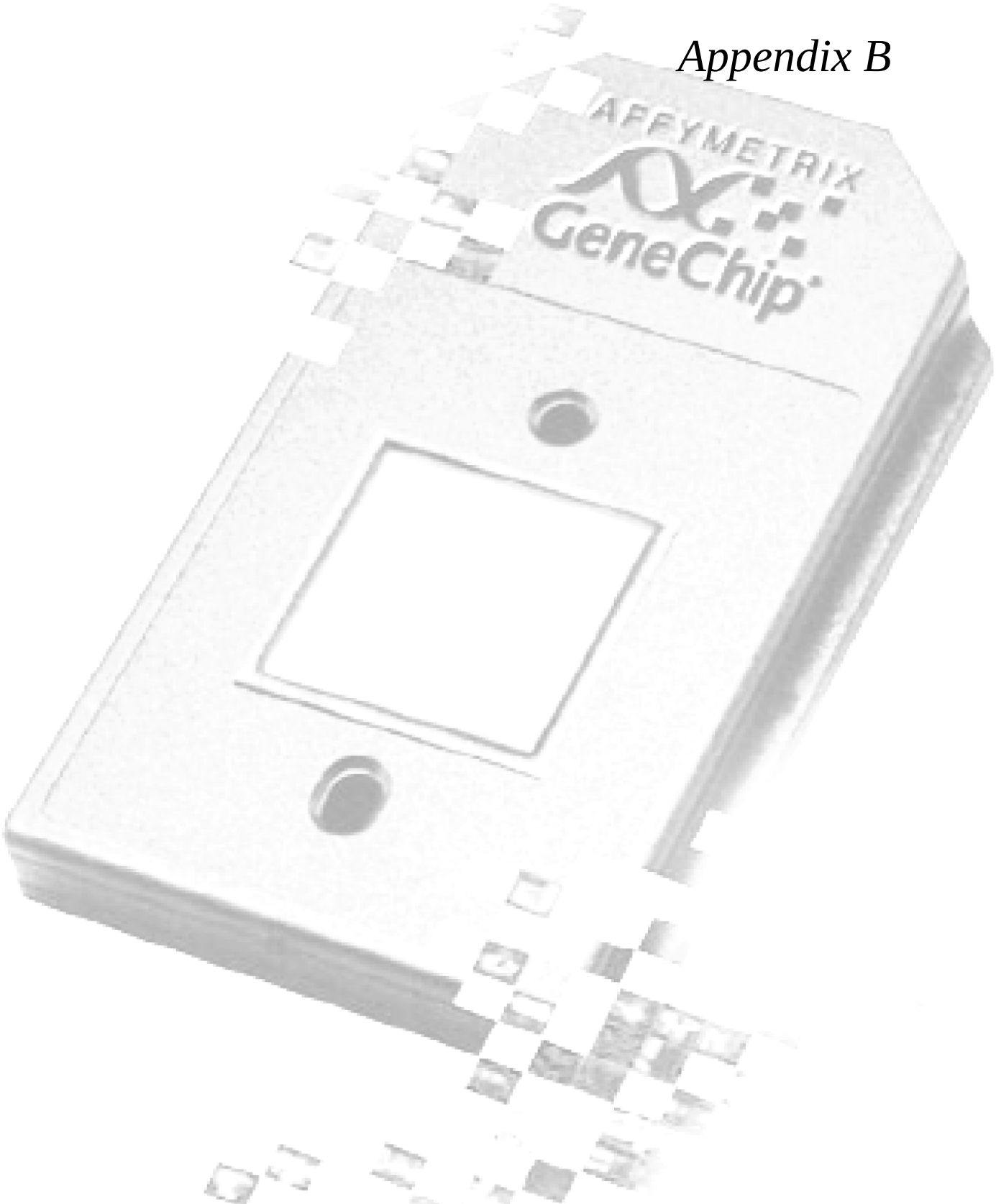
2. Open the top to the fluidics station by firmly pushing the lid release buttons located on the sides of the fluidics station. See **Figure 1.1 on page 10**.
3. Unscrew the four screws on the bottom of the front bezel of the fluidics station, using the 5/32” hex key included in the accessory kit.
4. Unscrew the three horizontal screws on the top of the bezel (inside the instrument), using the hex key included in the accessory kit.
5. Remove all cartridges, latch all cartridge holders, and place all cartridge levers in the neutral, or horizontal, position on all modules.

6. Pull the white bezel off the front of the fluidics station.
7. Push the serviced module back into its housing in the fluidics station. Be sure it connects to the connector in the back.
8. Attach the two top screws by using the 9/64" hex key included in the accessory kit.
9. With the flathead screwdriver included in the accessory kit, attach the bottom screw of the module to the fluidics station.
10. Attach the white bezel to the front of the fluidics station with the three horizontal screws on the top of the bezel, using the 5/32" hex key included in the accessory kit.
11. Attach the two screws to the bottom of the front bezel of the fluidics station, using the hex key included in the accessory kit.
12. Connect the two waste tubing lines on the module to the waste conduit.
13. Connect the three reagent tubing lines on the module to the reagent manifold, following the color code (red to red, white to white, blue to blue).
14. Close the top of the fluidics station, and restore power.
15. Prime the module.



B

Appendix B



Using More Than One Fluidics Station

Using one workstation, you can connect up to eight fluidics stations together. Follow these steps to connect more than one fluidics station to the workstation.

! CAUTION *When making connections, always turn off power to all devices in the chain. Failure to do so can cause loss of information.*

Setting the Address

Setting the address on the fluidics stations will enable the computer to recognize and correctly control each of the fluidics stations. Each fluidics station connected to a given workstation must have a unique address. You must assign addresses consecutively starting with 1. It is preferable, though not necessary, to number the fluidics stations in the order in which they are connected.

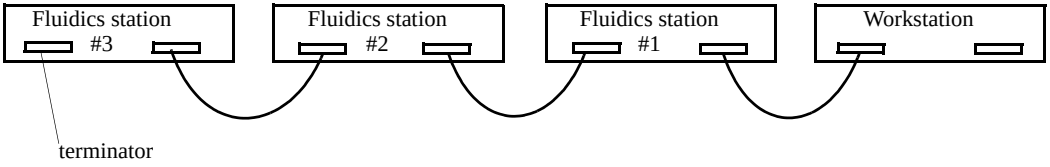


Figure B.1
Addressing fluidics stations consecutively

1. Use a pen or pencil to set each of the three DIP switches on the back of the fluidics station to the ON or OFF position, according to the desired address. Push up for ON and down for OFF.

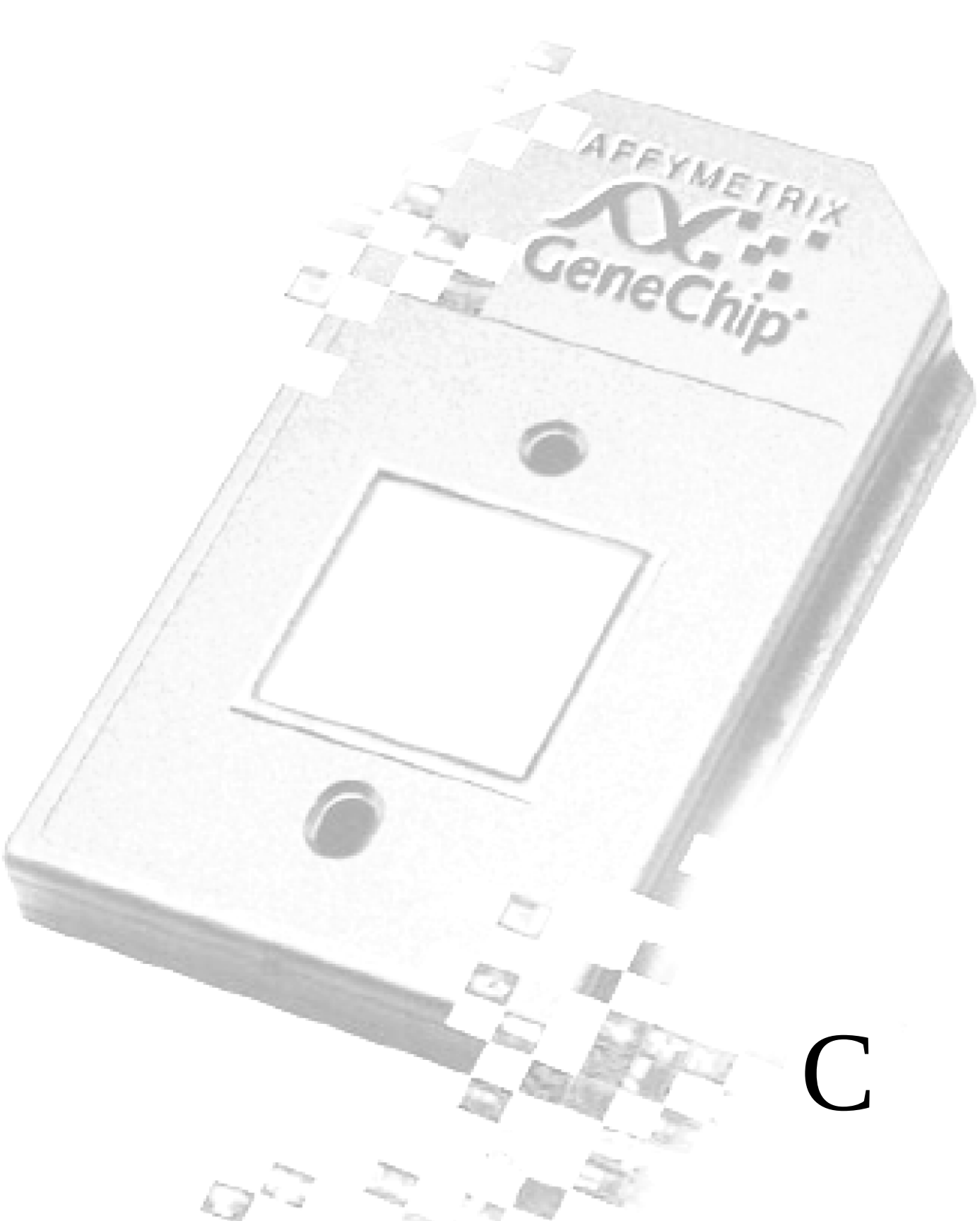
   All three DIP switches need to be set. Use the following table as a guide.

DIP Switch Settings for the Fluidics Station Address

Left	Middle	Right		
ON	ON	ON	=	1
ON	ON	OFF	=	2
ON	OFF	ON	=	3
ON	OFF	OFF	=	4
OFF	ON	ON	=	5
OFF	ON	OFF	=	6
OFF	OFF	ON	=	7
OFF	OFF	OFF	=	8

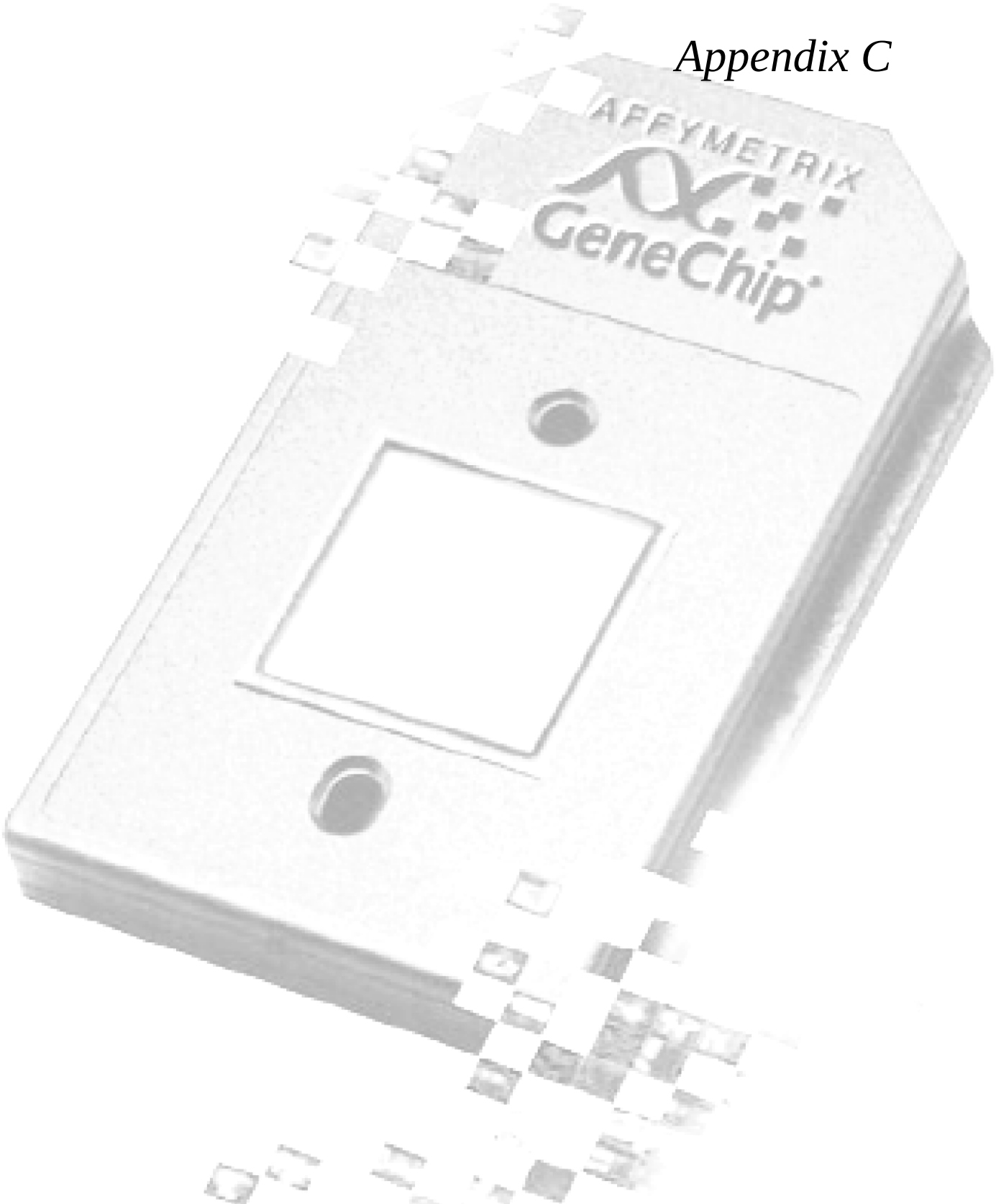
Connecting Fluidics Stations Together

1. Insert the plug end of a nine-pin serial cable into the serial board on the workstation.
2. Insert the other end of the cable into the **CommLink In** nine-pin connector on the back of the first fluidics station.
3. Insert a second nine-pin serial cable into the **CommLink Out** (socket) nine-pin connector on the back of the first fluidics station.
4. Insert the other end of the cable into the **Comm Link In** nine-pin connector on the back of the second fluidics station.
5. Connect the remaining fluidics stations in a chain following the above pattern.
6. Insert a terminator plug into the **Comm Link Out** (socket) nine-pin connector on the back of the last fluidics station in the chain.



C

Appendix C



Replacing the Washblock

1. Open the top to the fluidics station by firmly pushing the lid release buttons located on the sides of the fluidics station. See **Figure 1.1 on page 10**.
2. Unscrew the two screws on the bottom of the front bezel of the fluidics station, using the 5/32” hex key included in the accessory kit.
3. Unscrew the three horizontal screws on the top of the bezel (inside the instrument), using the same hex key included in the accessory kit.
4. On all the modules, remove all cartridges, latch all cartridge holders, and place the cartridge levers in the neutral, or horizontal, position.
5. Pull the white bezel off the front of the fluidics station.
6. Eject the washblock by pushing the cartridge lever down.
7. Using a Phillips head screwdriver, unscrew the two screws in the cartridge holder of the washblock that needs replacing.
8. Mount the new washblock in the cartridge holder. Confirm that the washblock is in the proper orientation, i.e., that the top of the washblock is even with the top of the sensor block, and that the dimples on the washblock lock into the front of the cartridge holder. Apply a small amount of Loctite (222 ms) to the nylon screw threads or the washblock threads. Install screws and tighten until the screws bottom out. Back off approximately ¼ turn.
9. Prime the module.

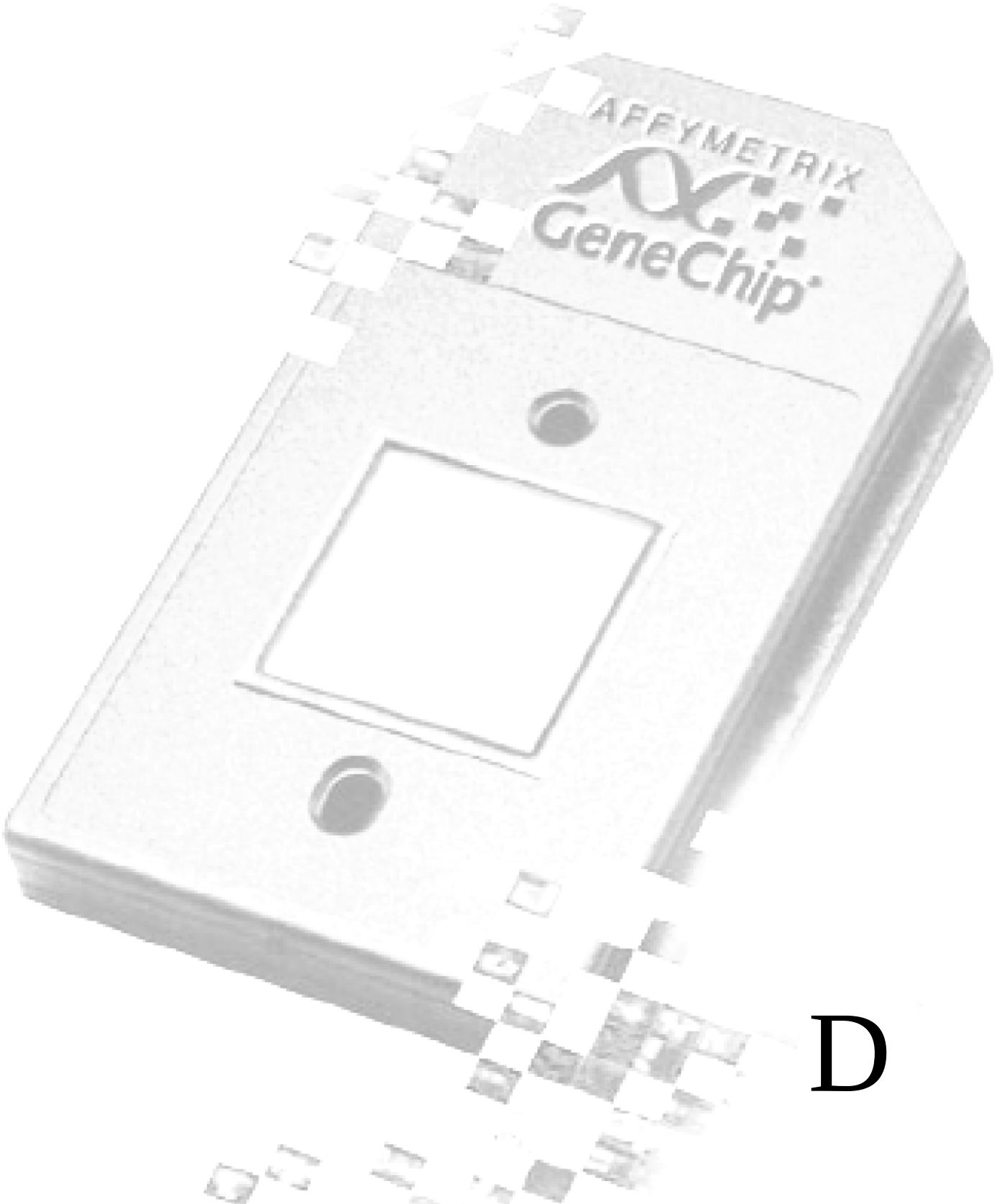
   During priming, observe the new washblock for leaks. If leaks occur, stop the Prime script, loosen the four Phillips screws in the corners of the cartridge holder, adjust the front part of the cartridge holder until the cartridge needles appear to pass through the centers of the holes in the

washblock, and gently tighten the screws. Repeat this step until no leaks occur during priming.

10. With the three horizontal screws on the top of the bezel, and using the 5/32” hex key included in the accessory kit, attach the white bezel to the front of the fluidics station.

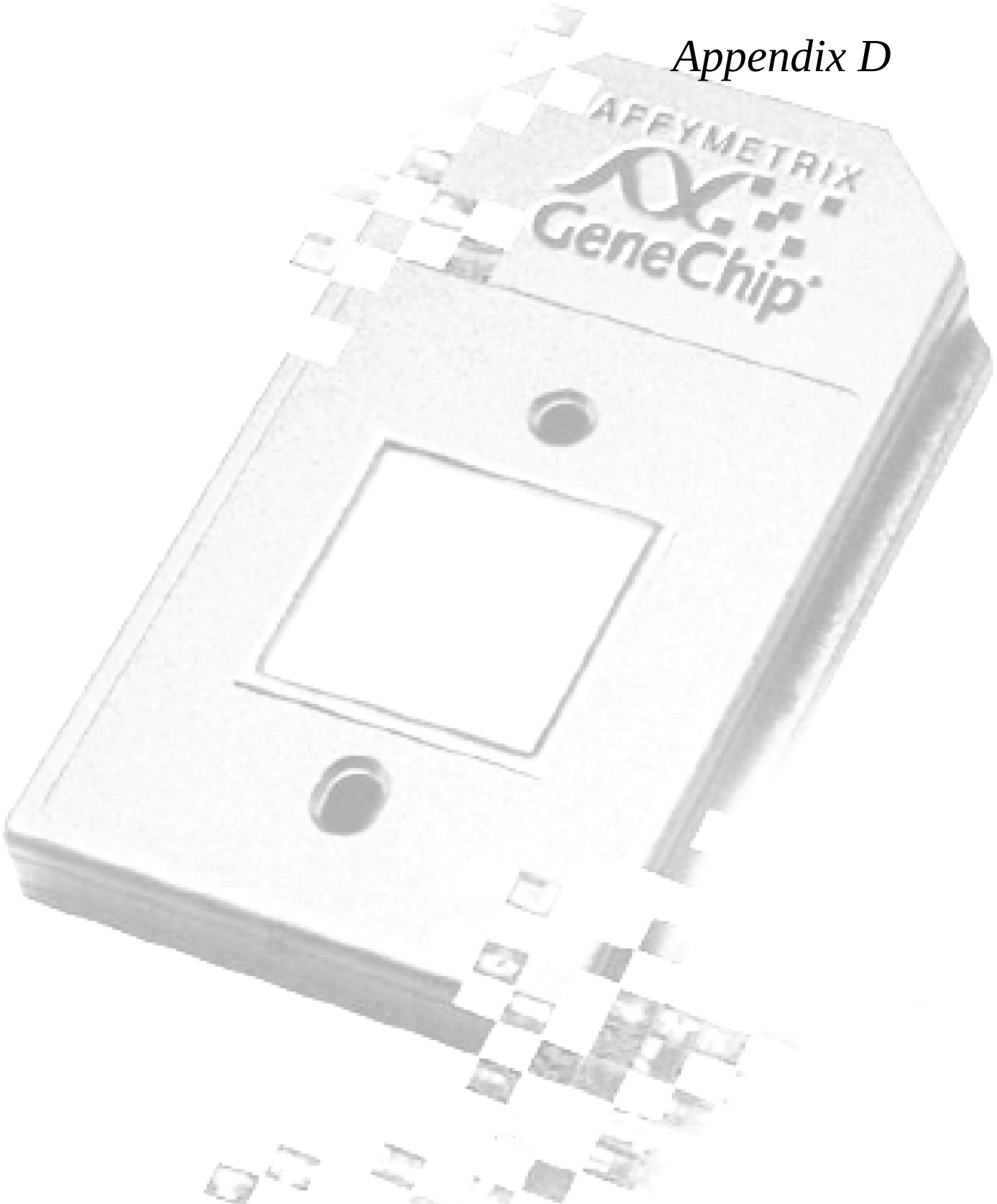
11. Attach the four screws to the bottom of the front bezel of the fluidics station, using the same hex key included in the accessory kit.

12. Close the top of the fluidics station.



D

Appendix D



Specifications

Instrument Specifications

Fluidics Station Dimensions:

(height, depth, width)
40.2 x 41.0 x 71.1 cm or 15 13/16 x 16 1/8 x 28 inches

Product Weight:

Approximately 80 pounds

Power Input:

100 to 240 V**~,** 3 A
300 watts or less
Main supply voltage fluctuations not to exceed 15% of the nominal supply voltage.

Temperature:

Operating: 15° to 30°C
Storage (non-operating):-10° to 60°C

Humidity:

Operating: 10-90% RH, non-condensing
Storage (non-operating):10% to 95% RH

Other:

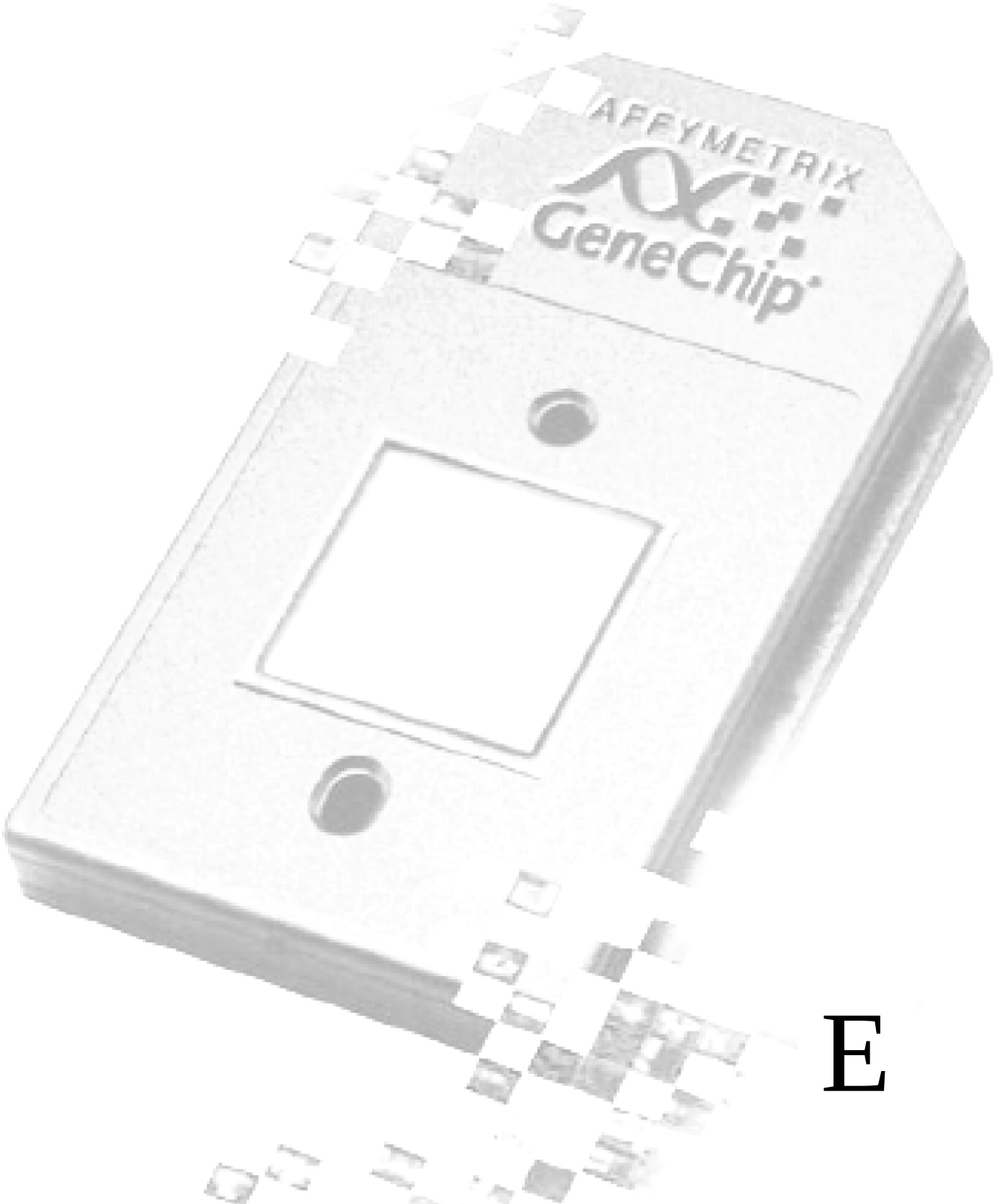
Pollution degree, 2
Installation category, II

Electrical Supply

The electrical supply shall meet the input specified on the instrument label. Voltage fluctuations shall not exceed 15% nominal supply voltage.

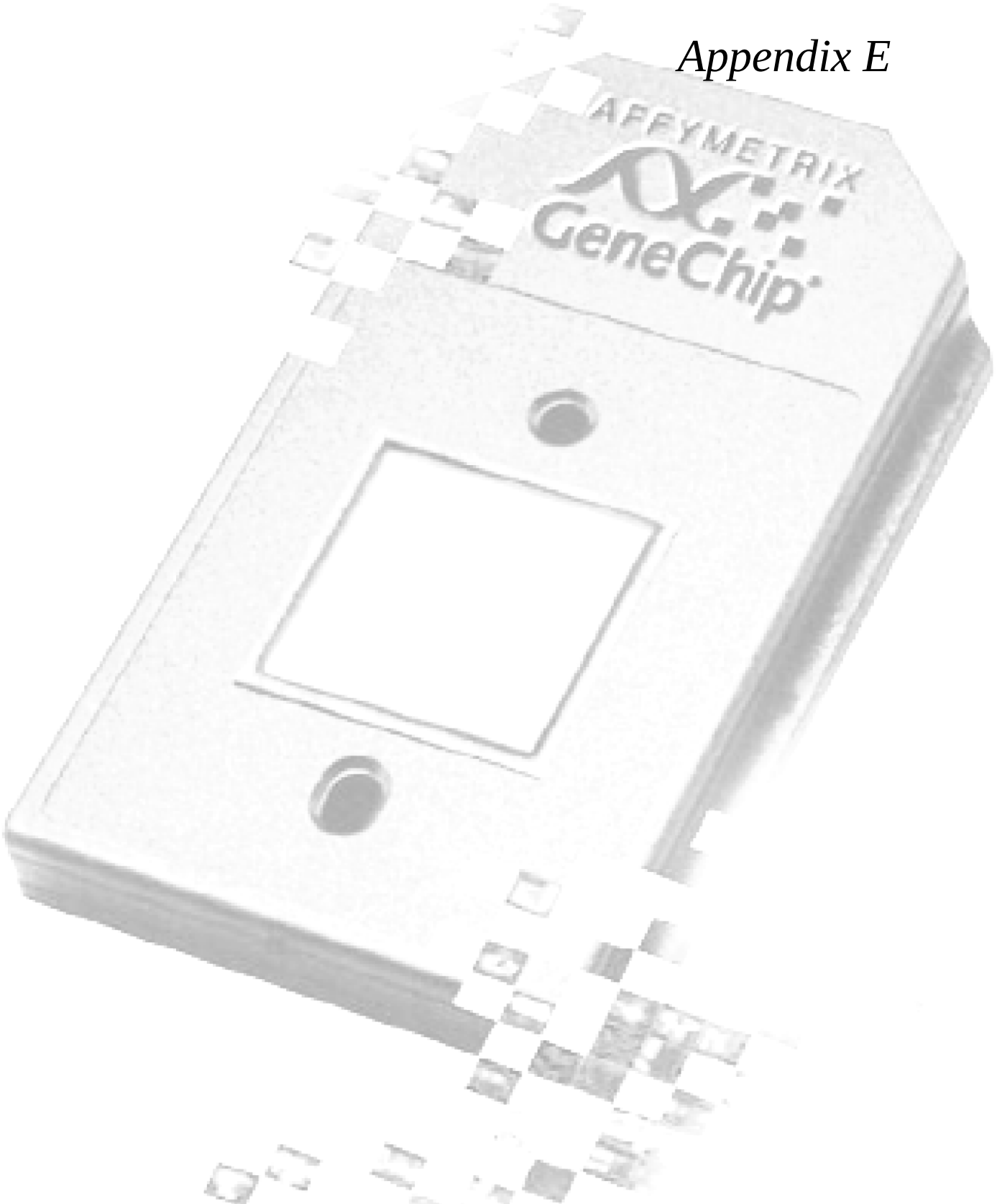
Altitude

<2000m



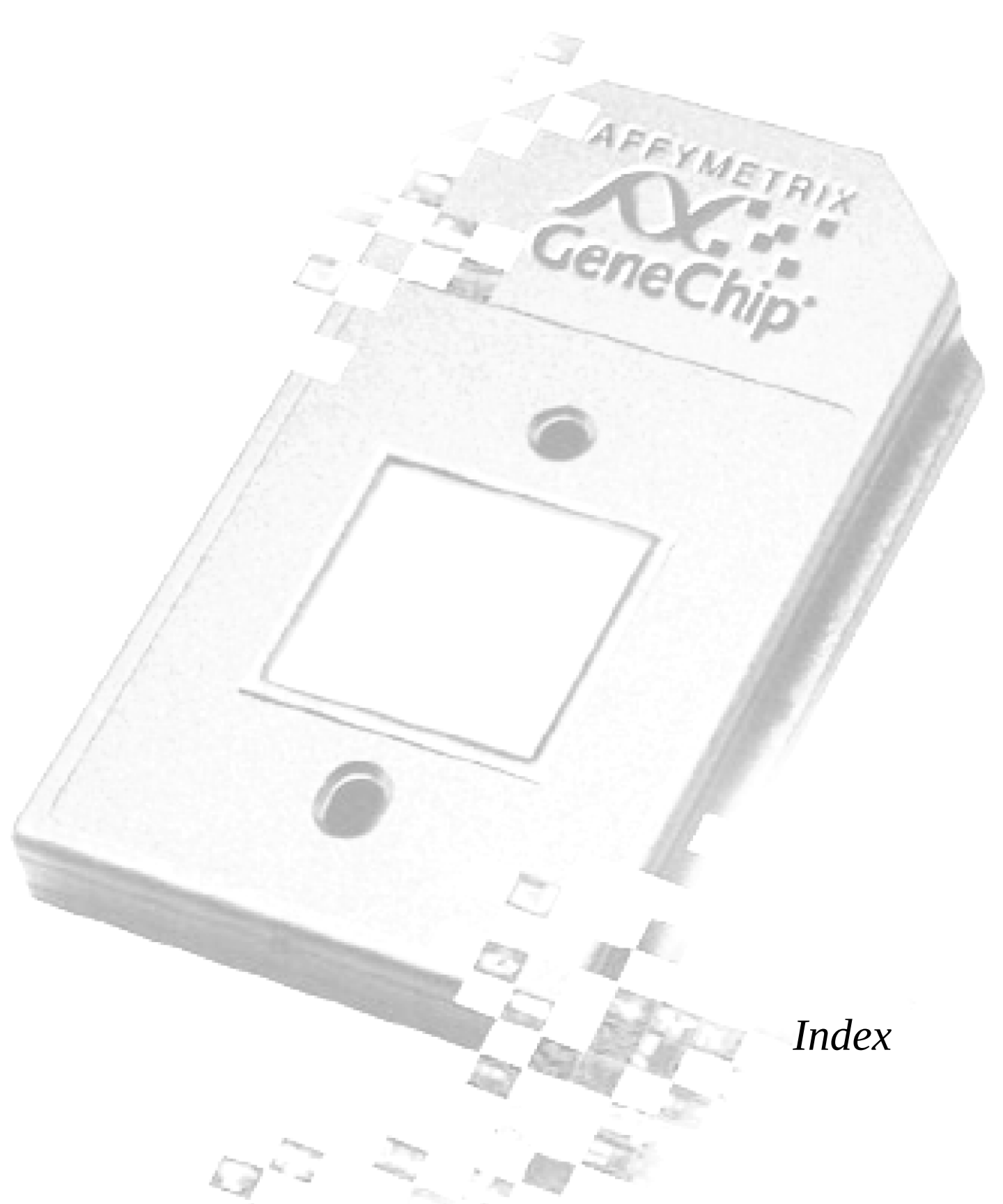
E

Appendix E



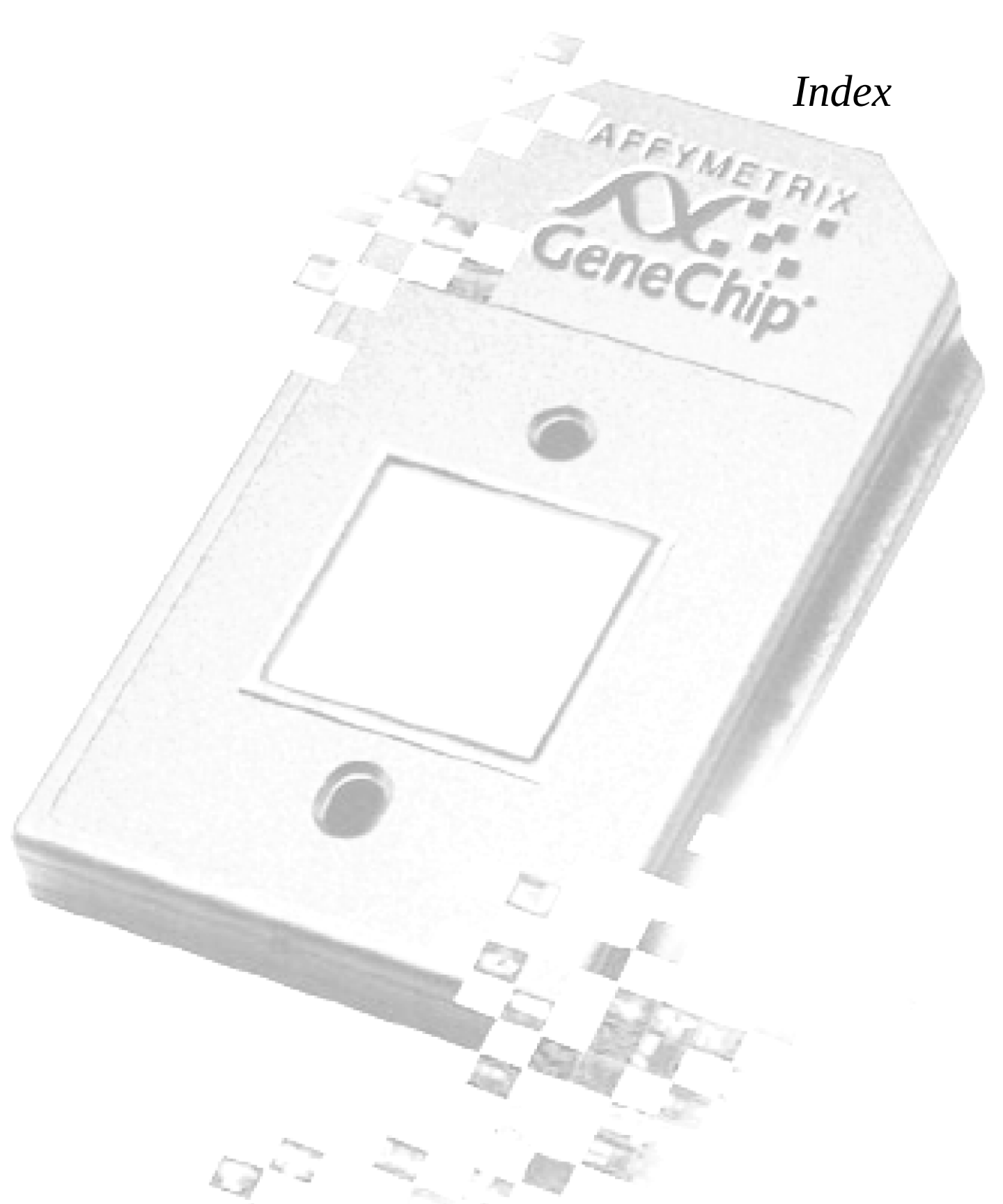
Warranty

The Affymetrix® Genechip® Fluidics Station 400 is warranted to the buyer by Affymetrix. Please refer to the Affymetrix Terms and Conditions received with this instrument at time of sale for information on the warranty.

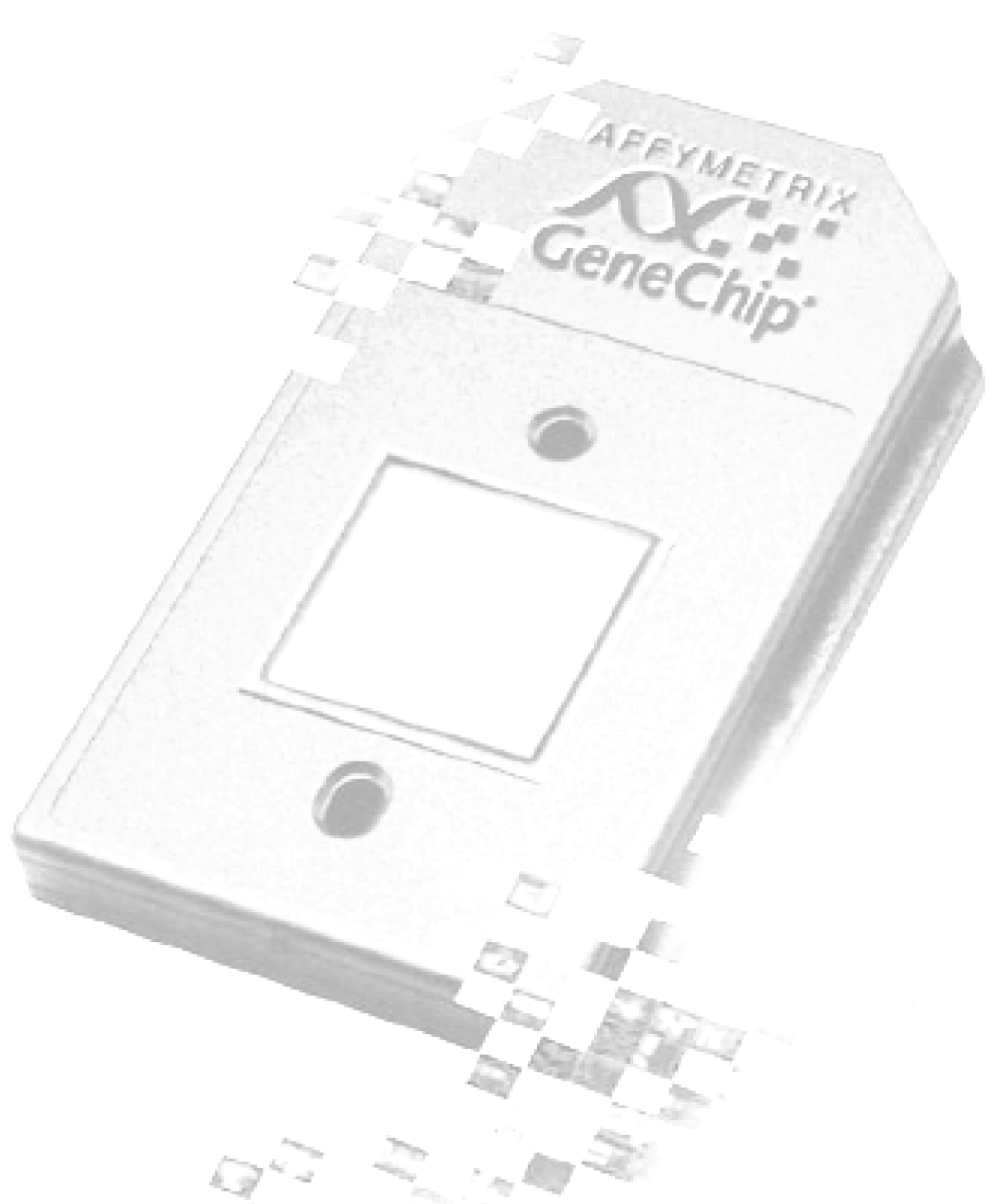


Index

Index



Index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