

Agilent G4900DA
SureScan Microarray Scanner System
Microarray Scan Control Software 9.1
User Guide

For Research Use Only. Not for use in diagnostic procedures.

Revision C0, November 2022



Notices

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Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA

This guide applies to the Microarray Scan Control Software 9.1.3 or higher until superseded.

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In This Guide...

This user guide contains instructions to get started with, use, troubleshoot, and maintain your SureScan Microarray Scanner System. The system is comprised of the SureScan microarray scanner, computer workstation, and control and analysis programs.

1 Introduction

This chapter describes the microarray scanner and preparation for its operation.

2 Getting Started

In this chapter, learn how to operate the SureScan scanner safely and learn how to set up and then scan slides with the Agilent Microarray Scan Control program.

3 Using the Scan Control Program

This chapter describes how you use the Scan Control program to set up and run the scanner.

4 Using Scan Control Tools

In this chapter, learn how to use commands in the Scan Control Tools menu. This chapter includes how to set up scan protocols and scan regions, display log files, and select default settings for the program.

5 Maintaining and Troubleshooting Your System

This chapter describes maintenance procedures and tips, as well as error messages for troubleshooting your system.

6 Reference

This chapter includes descriptions of the Scan Control windows and dialog boxes. It also contains scanner and slide specifications and regulatory compliance information.

South Korean Class A EMC Declaration

This equipment has been evaluated for its suitability for use in a commercial environment. When used in a domestic environment, there is a risk of radio interference.

사용자안내문

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

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1

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This chapter provides a general introduction to the SureScan Microarray Scanner System.

A Powerful Tool for Microarray Analysis

The SureScan scanner is part of the SureScan system solution from Agilent Technologies. The scanner is a sophisticated laser-induced fluorescence scanner designed to read microarrays printed on standard 1 in x 3 in slides.

The scanner measures the fluorescence intensity of labeled sample nucleic acid (DNA and RNA) bound to microarrays. Its ability to measure fluorescence from two dyes simultaneously facilitates all two-color microarray studies. This technology provides for rapid, high-quality, automated scanning of microarrays.



Figure 1 SureScan scanner

Each slide is scanned in minutes, and the files are prepared for feature extraction analysis.

System Description

In this section you find listings of hardware and software features, parts, and computer requirements. A physical description of the SureScan scanner and information on site preparation and safety are also provided.

Hardware and software features

The SureScan scanner provides the following features:

- Dynamic autofocus
- Single and dual color scanning
- Automatic PMT gain calibration before each scan
- 2-, 3-, 5-, or 10-micron pixel size
- Dynamic range of $>10^4$ for a single scan in 16-bit scan mode, $>10^5$ for a single scan in 20-bit scan mode, and $>10^6$ for a dual scan in 16-bit scan mode (XDR)
- Uniformity specification of $<5\%$ CV (Coefficient of Variation)
- TIFF image file compression
- Flip and rotate images
- Internal and external barcode reading

The Agilent Microarray Scan Control program allows you to select the dye (fluorescence) channels, scan regions, resolution, dynamic range, PMT gain, and output folders for each of the slides in the cassette. You can load these settings automatically from saved application-specific protocols, or set them manually in the slot table.

Parts list

The G4900DA SureScan microarray scanner system consists of the following components:

- G2600D SureScan scanner with integral 24-slide cassette
- 24 slide holders
- Computer workstation with recovery software on CD
- Power cords and network cable
- Agilent Microarray Scan Control Software installed
- Agilent Feature Extraction Software installed
- Agilent Installation Qualification Tool Software installed
- Declaration of Conformity

Computer system requirements

The SureScan Microarray Scanner System comes with a computer that meets or exceeds the following configuration. Agilent Technologies supports only the computer provided with the system.

Software

- Windows 10 64-bit Pro operating system – For more details, see the release notes for your specific version of the Scan Control program or visit the Scan Control download site at: <https://www.agilent.com/en/download-surescan-scan-control-software>

Hardware

- Intel Core 2 Duo E8500 3.16 GHz or equivalent
- 8 GB RAM
- Minimum 250-GB hard disk. (Proper disk maintenance is required to ensure that you always have available disk space for data generation. See [Table 11](#) on page 79 for estimated sizes of scanned images.)

Scanner physical description

Scanner front view

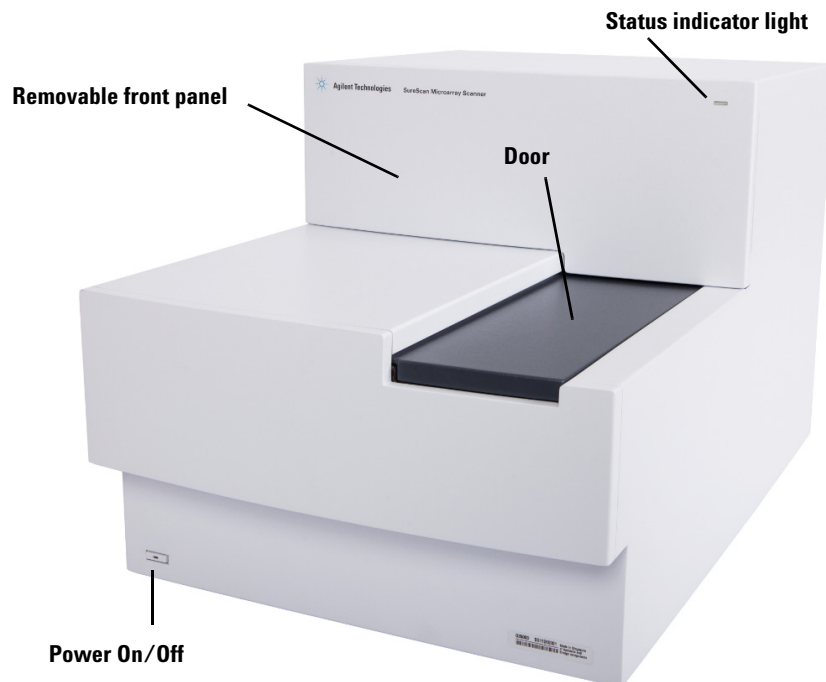


Figure 2 SureScan scanner, front view

Scanner rear view

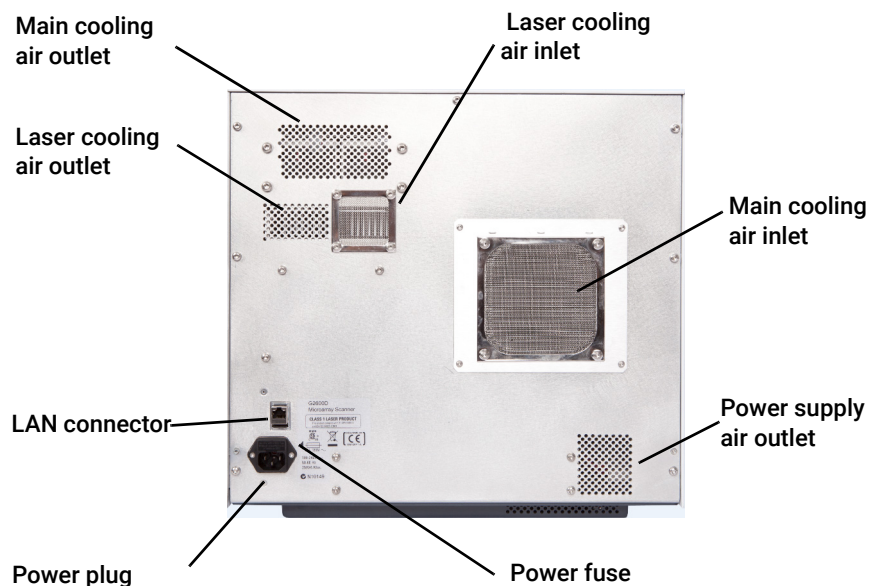


Figure 3 SureScan scanner, rear view

Site preparation

Make sure that the environment meets the ["SureScan Scanner Specifications"](#) on page 90 of Chapter 6. If you have any questions, contact your local Agilent sales and support center or www.agilent.com.

Safety guidelines

The SureScan scanner is designed for safety and ease of use. Be sure that you understand and observe all the warnings and cautions before operating the SureScan scanner.

WARNING

Do not attempt to repair or gain access to SureScan scanner internal components. You risk exposure to high voltage and harmful laser radiation. Removing the main cover voids the warranty

WARNING

Connect the SureScan scanner to a grounded power outlet. It relies on a protective earth ground for safety.

CAUTION

In order to minimize vibration due to the rapid scanning of the laser excitation across the microarray, install the scanner on a sturdy lab bench or table. Do not install the scanner in proximity to other lab equipment that might cause vibration.

CAUTION

The SureScan scanner is sensitive to condensing humidity conditions. Follow precautions stated in product documentation. See [“Tips to prevent problems”](#) on page 52 of Chapter 5 and the relative humidity specifications on [page 90](#) of Chapter 6.

Principles of Operation

This section describes the operating features of the SureScan scanner.

Slide positioning

The SureScan scanner holds up to 24 1 in × 3 in slides in a nonremovable cassette. During scanning, the slides are sequentially transported into scanning position, scanned, and then returned to the cassette. Slides can be added to and removed from the scanner queue dynamically without stopping the scanner.

Laser excitation

The SureScan scanner uses two lasers; a green diode-pumped solid-state laser (532 nm) and a red diode laser (640 nm). The lasers excite Cyanine-3 (Cy-3) and Cyanine-5 (Cy-5) labeled RNA or DNA to measure fluorescence after hybridization of the target nucleic acid to the microarray probes. Dyes similar to Cy-3 and Cy-5, such as Alexa 647, 555, and 660 dyes, can also be used.

The SureScan scanner is optimized for high signal-to-noise performance in the Cy-3 (550 – 610 nm) and Cy-5 (650 – 750 nm) emission bands. It has a wide dynamic range and low spectral crosstalk, allowing for measurement of a broad range of target concentrations and for higher data confidence at lower signal levels.

Scanning

The laser excitation is scanned rapidly up and down across the microarray. The dynamic autofocus ensures that the microarray is always positioned in the focal plane of the scan lens, resulting in a uniform and calibrated-intensity scan.

Fluorescence detection

Fluorescence from the labeled samples is converted to an electrical signal by a high-performance PMT. Very low noise amplifiers and digital integrators process the PMT signal into a digital measurement that is recorded in the TIFF file.

Programs Installed on the Computer Workstation

The computer that is included with your SureScan Microarray Scanner System has the following software programs preinstalled.

Agilent Microarray Scan Control program – used to set up and operate the scanner.

Agilent Feature Extraction program – automatically performs feature extraction using scanned image files created by the scanner. You can also run the Feature Extraction program manually to examine images and set up feature extraction options.

Agilent Installation Qualification Tool program – verifies that the Scan Control program was installed correctly and was not corrupted after installation. Produces an Installation Qualification Report for your records.

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This chapter describes how to operate the scanner, including how to set up and scan your slides quickly and easily.

If you have any problems, see [Chapter 5](#) for troubleshooting information.

Operating the Scanner

The following steps explain how to operate the scanner. For more information on how to use the Scan Control program, see Chapter 3, [“Using the Scan Control Program,”](#).

Step 1. Turn on the SureScan scanner and start the Scan Control program

NOTE

To learn how to set up the lasers to turn off automatically when not in use, see [“To set the laser saver delay”](#) on page 47.

- 1 Turn on the scanner using the power switch on the front of the instrument. After you turn on the scanner, the scanner loads and initializes its firmware.
When the scanner is ready (about two minutes), the status indicator light turns off.
- 2 Turn on the computer workstation and wait for it to boot up.
- 3 Double-click the Agilent Microarray Scan Control icon to start the Scan Control program.
Or
Click **Start > All Programs > Agilent > Agilent Microarray Scan Control**.



Figure 4 Agilent Microarray Scan Control icon

When the program starts, the Agilent Microarray Scan Control program main window opens and the scanner performs its initialization sequence. See [“Scan Control main window”](#) on page 67.

- The Scan Control program communicates with the scanner via the LAN cable, sending commands and parameters, and receiving status and data.
- The lasers turn on and start to warm up.
- The autoloader initializes and performs a slide eject cycle (to make sure that no slide is loaded).

NOTE

If the scanner has 24 slides loaded when you turn it on, the initialization will fail because it cannot perform the slide eject cycle.

- The scanning system is initialized and the data acquisition system is calibrated.

After the initialization sequence finishes, the Open Door button is enabled and you can load slides.

For more information on the Scan Control program window, see [“Scan Control Program Window Reference”](#) on page 67.

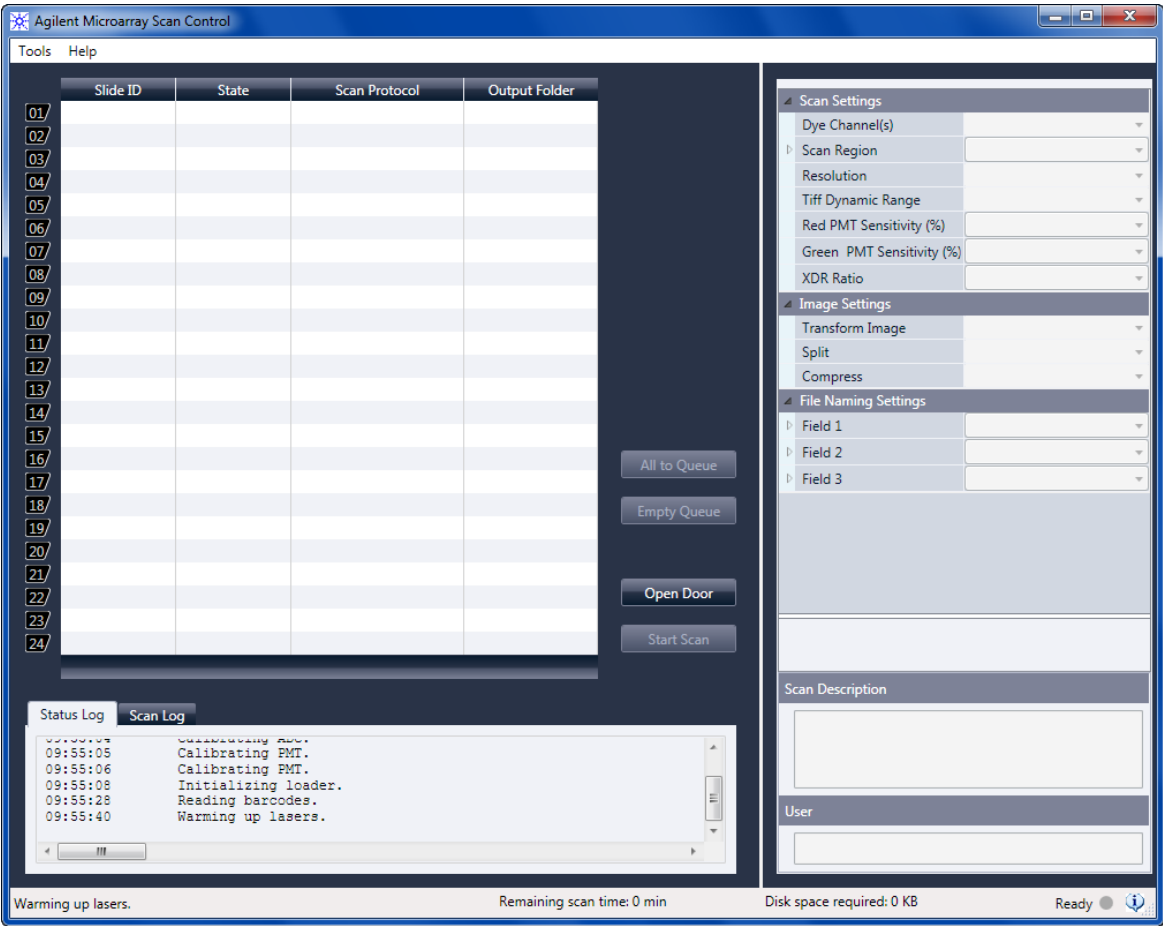


Figure 5 Agilent Microarray Scan Control program window – ready to add slides

The status of the scanner is indicated at the lower right corner of the Scan Control window, in the status bar.

Initialize The scanner is initializing. When the initialization is finished, the Open Door button is enabled, and the lasers continue to warm up.

WarmUp The lasers typically take less than 30 seconds to warm up. During warm-up, you can load slides, set protocols, and add slides to the queue. Once the lasers are warmed up, you can start scanning.

LasersOff Indicates that the lasers are turned off.

Ready You can load slides or begin a scan.

Error Indicates that the scanner has encountered an error. Close the Scan Control program then shut off the scanner. Restart the scanner and the Scan Control program. If the error continues, contact Agilent technical support.

NOTE

You cannot start scanning until both lasers are warmed up, at least one slide is in the queue, and the scanner status is *Ready*.

Step 2. Insert slides into slide holders

NOTE

Fingerprints cause errors in the fluorescence detection. For accurate readings, touch only the edges of the slide and always use gloves when handling slides.

Also, do not write on the slides with markers or place any labels on the slide other than an appropriate barcode.

A slide is inserted into a slide holder before loading it into the scanner.

- 1 Before you insert the slide, place the slide holder on a flat surface, with the clear cover facing up, and the tab on the right. This helps to ensure that you have the slide aligned properly when you insert it into the slide holder.
- 2 Gently push in and pull up on the tabbed end of the clear plastic cover to open it.

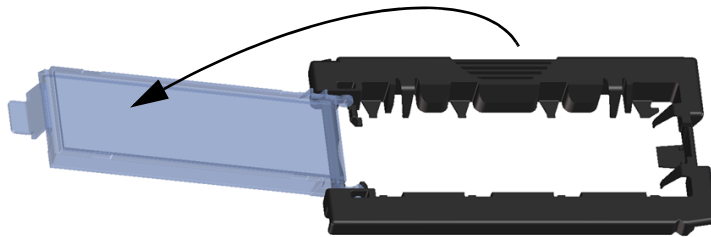


Figure 6 Opening the slide holder

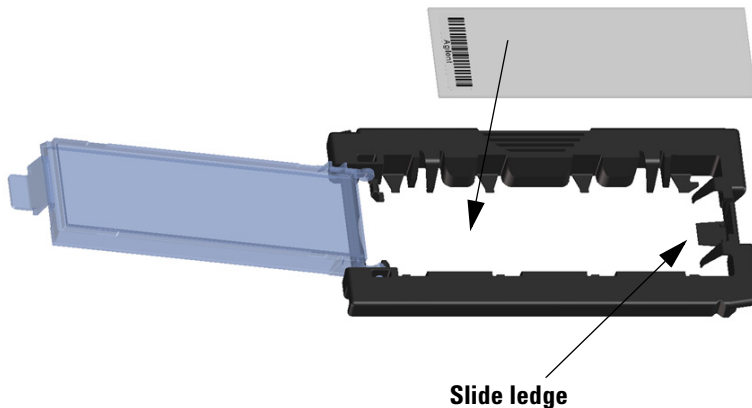


Figure 7 Inserting slide into the slide holder

- 3 Insert the slide into the holder, as follows:
 - a Hold the slide at the barcode end.
 - b Make sure that the active microarray surface faces up, toward the slide cover, with the barcode on the left.

- c Carefully place the end of the slide without the barcode label onto the slide ledge. See [Figure 7](#).
 - d Gently lower the slide into the slide holder. See [Figure 8](#).
 - e Close the plastic slide cover, pushing on the tab end until you hear it “click”. This moves the slide into position in the holder.
 - f Gently push in and pull up on the tabbed end of the clear plastic cover to open it again and verify that the slide is correctly positioned.
- Once inserted, the slide lies flat and matches up with the alignment points on the slide holder.
- g Close the plastic slide cover, pushing on the tab end until you hear it “click”. See [Figure 9](#).

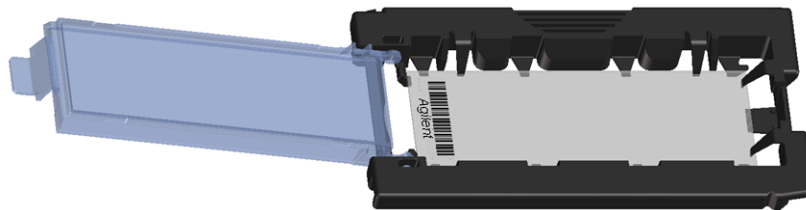


Figure 8 Slide inserted in slide holder

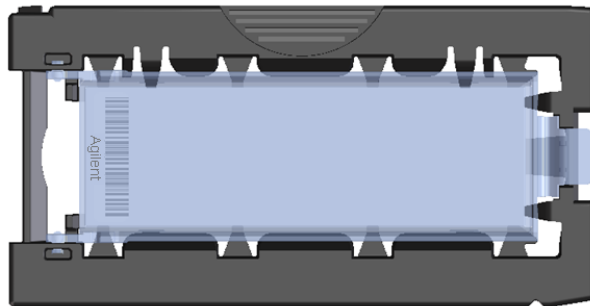


Figure 9 Slide holder – closed with slide

For instructions on removing the slides, see [“Step 7. Remove the slides”](#) on page 25.

Agilent slides have two barcodes, one on each side of the glass. See [Figure 10](#). Typically, non-Agilent slides have only one barcode. For both Agilent and non-Agilent slides, place the active microarray side of the slide facing toward the slide holder cover.

If you have a slide whose active surface is on the side opposite to the barcode, the scanner cannot read the barcode.

NOTE

See [“Barcode and barcode label specifications”](#) on page 92 to apply a second readable barcode.

CAUTION

An improperly inserted slide can damage the scanner.

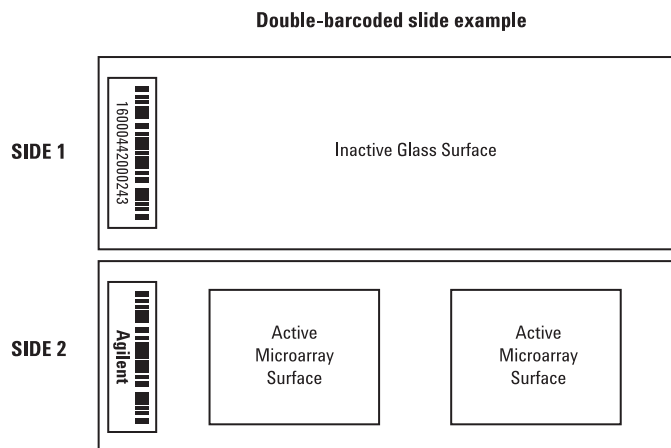


Figure 10 Slide orientation

Step 3. Load the slide holders into the cassette

When the slides are properly inserted in the slide holders, you can load the slide holders into the cassette. The cassette and slide holders are designed to ensure that the slide holders are inserted correctly.

NOTE

Do not load slide holders that do not contain slides into the scanner.

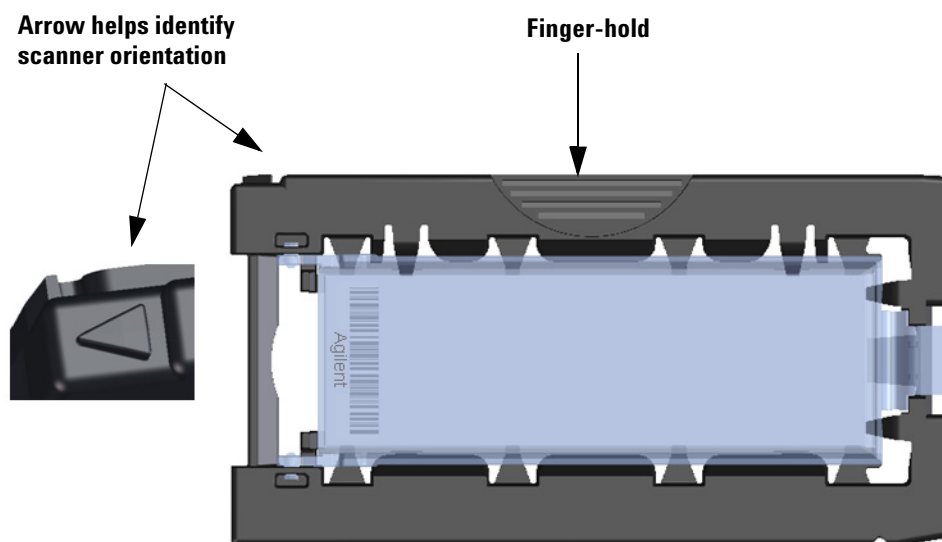


Figure 11 Slide holder helps you to insert slides correctly

- 1 In the Scan Control program window, click **Open Door** to open the scanner door.

CAUTION

The correct way to open the scanner door is using the Open Door button in the Scan Control program. Do not attempt to open the door manually.

- 2 Pick up the slide holder using the finger hold. The arrow on top of the slide holder points to the left when you pick up the slide holder correctly. See [Figure 11](#).

Insert a slide holder into any open slot. The slot numbers are clearly labeled on the slide cassette. Do not force the slide holder into the cassette; it inserts easily if properly aligned with the finger-hold on top and the arrow facing to the left.

NOTE

The scanner scans slides in the order set in the scan queue. The scanner skips over any empty slots. See ["To add a slide to the scan queue"](#) on page 31.



Figure 12 Inserting slide holder into cassette

- 3 Make sure that the slide holder is seated in the bottom of the cassette slot.
The slot number for the loaded slide blinks blue.
- 4 Repeat steps 2 and 3 until all slide holders are loaded in the cassette.

The slide numbers next to the cassette and in the slot table of the Scan Control program window change color to indicate the state of the slot. For more information, see [Table 8](#) on page 70.

CAUTION

Improper placement of the slide holder in the cassette can result in severe damage to the scanner.

- 5 In the Scan Control program, click **Close Door**. The following events happen:
 - The scanner door closes.
 - The scanner reads the barcode for each slide.
 - The barcode is displayed under Slide ID in the Scan Control software slot table.
 - Default output folder is applied.

- For slides that have a scan protocol mapped to their design, the scan protocol is assigned in the Slot Table, and the slot State changes to *Ready for queue*.

For slides that do not have a scan protocol mapped to their design, the scan protocol remains empty and the slot State remains "Present". Assign a scan protocol, as described in **"Step 4. Set or change protocol scan settings"**. For more information on the Scan Control program main window, see ["Scan Control Program Window Reference"](#) on page 67.

For information on how to map scan protocols to slide designs, see ["To map a scan protocol to a slide design"](#) on page 49.

You can add slides to the cassette while a scan is in process. See ["About Adding Slides"](#) on page 88.

Step 4. Set or change protocol scan settings

The first time you set up to scan a slide, select a scan protocol to use. See ["About Scan Protocols"](#) on page 26. Once the slide is scanned, the program remembers that scan protocol and assigns it to all slides with the same microarray design. You can change these assignments later. You can also manually set scan settings for a selected slide.

- 1 For each slide in the slot table, click the Scan Protocol and select a scan protocol to use for scanning the slide. See ["About Scan Protocols"](#) on page 26 and ["To set or change the scan protocol"](#) on page 30.
- 2 (Optional) For a selected slide, in the scan settings pane, change one or more scan settings to use for scanning only that slide. See ["Changing Slide Scan Settings"](#) on page 34.

The current scan protocol settings are displayed for each selected slide in the right pane of the Scan Control software main window. For more information on these settings, see ["Scan Control Program Window Reference"](#) on page 67.

Step 5. Add slides to the scan queue

NOTE

Once you add a slide to the scan queue, you cannot change its scan settings. To change the scan settings, remove the slide from the queue.

To add a slide to the scan queue, its State must be *Ready for queue*.

- 1 In the Scan Control main window, click **All to Queue** to add all slides in the slot table with a State of *Ready for queue* to the scan queue.
A confirmation dialog box appears. Click **Yes** to add the slides to the queue.
Or
In the Scan Control slot table, click the State cell for the first slide to scan and click **Add to Queue**.
- 2 For each additional slide you want to scan,
 - Click the State cell and select **Add to queue first** to add the slide to the top of the scan queue.
 Or

- Click the State cell and select **Add to queue last** to add the slide to the bottom of the scan queue.

As each slide is added to the queue, its State indicates that it is in the queue and the order in which the slide is scanned. (In queue 1, In queue 2, for example.) The status indicator light changes to solid blue.

Step 6. Scan your slides

A *scan* refers to creating an image of the probes on a single slide.

- 1 If necessary, in the Scan Control main window, click **Close Door**.
Wait until the door closes and the Start Scan button is enabled.
- 2 In the Scan Control main window, click **Start Scan** to begin scanning the slides that were added to the queue. The scanner scans the slides in their order in the scan queue. See [“Step 5. Add slides to the scan queue”](#) on page 24.
During a scan, you see the following:
 - The slot status indicator light for the current slide blinks green during the scan process, and the scan progress (for example, Scanning 50%) is displayed in the slot State.
 - The remaining scan time and required disk space are displayed at the bottom of the Scan Control main window. See [“Scan Control Program Window Reference”](#) on page 67.
 - Events during the scan are logged in the Scan Log and Status Log. See [“Log tabs”](#) on page 74.

Step 7. Remove the slides

When the Open Door button is enabled, you can unload the slide holders from the cassette and then remove the slides from the slide holders. If the Open Door button is not available, you cannot open the door. Check to make sure that the scanning process is finished.

- 1 In the Scan Control main window, click **Open Door** to open the scanner door.
- 2 Remove the slide holders from the cassette.
- 3 Remove the slides from the slide holders, as follows:
 - a Hold the slide holder on the sides with the Agilent logo facing up.
 - b Gently push in and pull up on the tabbed end of the clear plastic cover to open it.
 - c Push up on the barcode end of the slide from underneath the slide holder to avoid fingerprints on the sample area.
 - d Grasp the slide from the sides and remove from the slide holder.

About Scan Protocols

A scan protocol is a collection of scan and image settings that, when selected, is applied to the slide as it is scanned.

Agilent supplies eight preloaded protocols for your selection and use with Agilent high density (HD) microarrays, Agilent G3 microarrays, and non-Agilent microarrays.

AgilentHD_GX_2Color Agilent HD 2-color gene expression microarrays

AgilentHD_GX_1Color Agilent HD 1-color gene expression microarrays

AgilentG3_GX_2Color Agilent GX 2-color gene expression microarrays

AgilentG3_GX_1Color Agilent GX 1-color gene expression microarrays

AgilentHD_CGH Agilent HD CGH/CNV/ChIP microarrays

AgilentG3_CGH Agilent G3 CGH/CNV/ChIP microarrays

AgilentHD_miRNA Agilent HD miRNA microarrays

AgilentG3_miRNA Agilent G3 miRNA microarrays

For Agilent slides, you select the predefined protocol that applies to your type of Agilent microarray.

For non-Agilent slides it is necessary to change individual scan settings. Or, you can create a protocol from an existing one. For information on how to create a scan protocol or change an existing protocol, see [“To create a scan protocol”](#) on page 37 or [“To change an existing scan protocol”](#) on page 37.

Offline Mode

If no instrument is available, the Scan Control program runs in “offline mode”. In this mode, you can create, import, and export scan protocols and scan regions. You can also open log files, display recent errors, set general settings, and map scan protocols to design IDs.

Turning Off the SureScan Scanner

- 1 In the Scan Control program window, make sure that the scanner is not scanning, ejecting, or loading a slide.
- 2 Click **Open Door** to open the scanner door.
- 3 Remove the slide holders from the scanner cassette.
- 4 Remove the slides from the slide holders.
- 5 Click **Close Door**.

CAUTION

You cannot open the scanner door manually. Use the Open Door/Close Door button in the Scan Control program to open and close the door.

- 6 In the Scan Control main window, click the red X at the upper right corner to close the program. The lasers are turned off automatically when you close the program.
- 7 Turn off the power switch on the front of the scanner.

3 Using the Scan Control Program

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The Scan Control program is used to control all features of the SureScan scanner, including setting and changing scan settings and protocols, starting and stopping scans, reviewing scan status, and troubleshooting.

This chapter describes how you use the Scan Control program to set up and run the SureScan scanner. For information on how to use the Scan Control Tools to change protocols and scan regions, and to turn on and off the lasers, see [Chapter 4](#), “Using Scan Control Tools.”

Using the Slot Table

The slot table provides a display of the cassette and its contents. Once you load slides into the cassette and close the door, the Scan Control software reads the barcode for each slide and shows it as the Slide ID in the slot table. The numbers to the left of the table correspond to the slots in the scanner cassette. The color of the number indicates the status of the slot. For details on the Scan Control main window, see [“Scan Control Program Window Reference”](#) on page 67.

The topics in this section describe how to use the Scan Control slot table to prepare for scanning slides.

To change a Slide ID

The Slide ID is used in the image file name. By default, it is the slide barcode read by the scanner. See [“Barcode and barcode label specifications”](#) on page 92 for information on barcodes.

Typically, the scanner automatically reads the barcode for a slide and displays it as the Slide ID in the slot table. To add or change the Slide ID in the table, follow the instructions below.

- 1 In the slot table, click the Slide ID cell for the slide you want to add or change. Cell editing is enabled only when the slot has a slide loaded and is not yet in the queue.
- 2 Type the new slide ID.

NOTE

After you change the Slide ID, move your mouse cursor over the Slide ID cell in the scan table to see the barcode for the slide. The barcode appears in a tooltip.

To set or change the scan protocol

A scan protocol is a predefined set of scan settings. Several default scan protocols are provided with the software. See [“About Scan Protocols”](#) on page 26.

If no scan protocol is selected for a slide, or if you want to change the scan protocol, follow the instructions below.


- 1 In the slot table, click the Scan Protocol cell for the selected slide and then click again to show the list of available scan protocols.
- 2 Click a scan protocol from the drop-down list.

NOTE

You cannot change scan protocols for slides in the queue.

To change the output folder for a scan

The output folder is where the scanned image files for a slide are saved. By default, the output folder is D:\ScanData.

- 1 In the slot table, click the Output Folder cell for a slide.
- 2 Click the browse icon. 
The Browse For Folder dialog box opens.
- 3 Browse to the location where you want to save the scanned image files for this slide, and click **OK**.

To apply a selection to multiple slides

Within the slot table, you can select more than one slide and then make a selection for Scan Protocol and Output Folder.

- 1 In the slot table, click to highlight the first slide.
- 2 To select multiple contiguous slides, hold down the Shift key and then select a second slide.
All slides between and including the selected slides are highlighted in the slot table.
Or
To select a series of noncontiguous slides, hold down the Ctrl key and then click additional slides you want to select. Selected slides are highlighted in the slot table.
- 3 Within the last selected slide, select the Scan Protocol or Output Folder cell.
The selection is applied to all highlighted slides.

NOTE

You cannot make changes to slides in the queue.

To add a slide to the scan queue

- 1 In the slot table, click the State cell for the slide you want to add to the queue.
- 2 Click **Add to queue** (if no other slides are in the queue).
Or
Click **Add to queue first** to add the slide to the beginning of the queue.
Or
Click **Add to queue last** to add the slide to the end of the queue.

To add all slides to the queue

- 1 In the Scan Control main window, click **All to Queue**.
A confirmation dialog box opens.
- 2 Click **Yes**.

All slides in the slot table with a State of *Ready for queue* are added to the queue, in the order they appear in the slot table.

To move a slide in the queue

- 1 In the slot table, click the State cell for the slide you want to move.
- 2 Click again to show selections for the slide.
- 3 Click one of the following possible options to move the slide position in the queue:
 - Move to first** — Move the slide to the first position
 - Move to last** — Move the slide to the last position
 - Move up** — Move the slide up one position
 - Move down** — Move the slide down one position

To remove a slide from the scan queue

- 1 In the slot table, click the State cell for the slide you want to remove from the queue.
- 2 Click again to show selections for the slide.
- 3 Click **Remove from queue**.
The slide is removed from the queue and its State changes to *Ready for queue*.

To remove all slides from the scan queue

- 1 In the Scan Control main window, click **Empty Queue**.
A confirmation dialog box opens.
- 2 Click **Yes**.
All queued slides are removed from the queue, and the State changes to *Ready for queue*.

To open the scanner door

- In the Scan Control main window, click **Open Door**.

NOTE

You must use the Scan Control program to open the scanner door.
You cannot open the door while the scanner is loading or ejecting a slide.

To close the scanner door

- In the Scan Control main window, click **Close Door**.

NOTE

You must close the door before you can start a scan. After the scan begins, you can open the door and add or remove slides.

You must use the Scan Control program to close the scanner door.

To start a scan

- In the Scan Control main window, click **Start Scan**.
The slot status indicator light blinks green during the scan process. The scan progress (for example, Scanning 50%) is displayed in the slot State cell.

Changing Slide Scan Settings

When you select a slide in the slot table of the Scan Control main window, the scan settings for that slide are shown in the Settings Pane on the right side of the window. See [“Scan Control Program Window Reference”](#) on page 67. The values displayed are defined in the selected Scan Protocol for that slide.

There are two ways to change scan settings:

- Make one-time changes to the scan settings for a slide before it is added to the queue. These instructions are shown in the following sections.
- Select a scan protocol or create a new one. See [“To create a scan protocol”](#) on page 37.

You can also apply setting changes to multiple slides. For information, see [“To apply a selection to multiple slides”](#) on page 31.

To change settings for a single slide

You can only change the scan settings for a slide when it is not in the scan queue. See [“To remove a slide from the scan queue”](#) on page 32.

- 1 In the scan table, select the slide whose settings you want to change.
- 2 In the Scan Settings area, click the arrow next to the setting you want to change, and then select the new setting.

When you manually change a setting, the Scan Protocol for the slide changes to <Customized>.

- 3 When you are finished changing the settings, click the State cell and add the slide to the queue. See [“To add a slide to the scan queue”](#) on page 31.

For more information on all the settings, see [Chapter 6](#), “Reference.”

To change settings for multiple slides

You can only change the scan settings for a slide when it is not in the scan queue. See [“To remove a slide from the scan queue”](#) on page 32.

- 1 In the scan table, click to select the first slide whose settings you want to change.
- 2 Hold down the Ctrl key and then click to select other slides.

Or

To select a contiguous block of slides, click to select the first slide, and then hold down the Shift key and then click the last slide.

- 3 In the Scan Settings area, click the arrow next to the setting you want to change, and then select the new setting.

When you manually change a setting, the Scan Protocol for the selected slides changes to <Customized>.

- 4 When you are finished changing the settings, add the slides to the queue. See [“To add a slide to the scan queue”](#) on page 31 or [“To add all slides to the queue”](#) on page 31.

To add a description for the slide

NOTE

You can only change the slide scan description for a slide when it is not in the scan queue. See [“To remove a slide from the scan queue”](#) on page 32.

- 1 In the slot table, select the slide whose settings you want to change.
- 2 In the Scan Description area, type the desired information about the slide and scan.
- 3 When you are finished typing the description, click the State cell and add the slide to the queue. (See [“To add a slide to the scan queue”](#) on page 31.)

To add a user name

You can only change the user name for a slide when it is not in the scan queue. See [“To remove a slide from the scan queue”](#) on page 32.

- 1 In the slot table, select the slide whose settings you want to change.
- 2 In the User area, type user information.
- 3 When you are finished typing the user, click the State cell and add the slide to the queue. (See [“To add a slide to the scan queue”](#) on page 31.)

4 Using Scan Control Tools

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The Tools menu in the Scan Control program provides general settings and functions that help with troubleshooting. Scan control tools let you

- Create or change scanner protocols
- Change the scanning region for slides
- Input barcodes
- Switch on and off lasers
- Display recent errors and log files
- Create a “snapshot” file of the current scanner state
- Reset calibration warnings
- Perform a self test
- Set general scanner settings
- Map protocols to slide designs

This chapter describes how to use the tools available in the Scan Control program.

Creating and Changing Scan Protocols

The Scan Control program comes with a default set of protocols that are designed to work with typical Agilent microarray slide designs. See ["About Scan Protocols"](#) on page 26.

To create a scan protocol

You can create a protocol from any existing protocol by saving the existing protocol with a new name.

NOTE

You cannot modify a protocol that is currently assigned to a slide in the slot table.

- 1 Click **Tools > Scan Protocol Editor**.
- 2 Select an existing protocol that is similar to the protocol you want to create.
- 3 Click **Save As** to save the existing protocol with a new name.
The Save As New Name dialog box opens.
- 4 Type a new name for the protocol, and then click **Save**.
The scan protocol settings become active.
- 5 Change the scan and image settings as desired. For information on the available settings, see ["Scan Protocol Editor dialog box"](#) on page 78.
- 6 When you are finished, click **Save**.

To change an existing scan protocol

NOTE

You cannot change the default protocols provided with the scanner. To change one of these protocols, save it with a different name first.

- 1 Click **Tools > Scan Protocol Editor**.
- 2 Select an existing protocol you want to change.
- 3 In the Scan Protocol Editor dialog box, change one or more settings.
- 4 Click **Save**.

To export a scan protocol

You can export one or more protocols to a file on your hard disk, as a backup, or to import on another SureScan Microarray Scanner System.

- 1 Click **Tools > Scan Protocol Editor**.

The Scan Protocol Editor dialog box opens.

- 2 Click **Export**.

The Export Scan Protocol dialog box opens. A list of protocols in the program is displayed.

- 3 Click to select a protocol to export.

Or

To select a series of contiguous protocols to export, click to select a protocol, and then hold down the Shift key and click another protocol.

Or

Click to select a protocol, and then hold down the Ctrl key and select additional noncontiguous protocols to export.

- 4 Click **Export**.

The Save As dialog box appears.

- 5 Browse to the location where you want to save the exported protocols file.

- 6 Type a name for the exported protocols file, and click **Save**.

To import a scan protocol

- 1 Click **Tools > Scan Protocol Editor**.

The Scan Protocol Editor dialog box opens.

- 2 Click **Import**.

The Open dialog box opens.

- 3 Browse to where the exported protocols file you want to import is located. Exported protocols files have .exp extensions.

- 4 Click to select the protocols file, and click **Open**.

The protocols in the file are imported.

NOTE

If a protocol in the file has the same name as an existing protocol, the program does not import it.

To remove a scan protocol

NOTE

You cannot remove any of the default protocols or any protocols that are currently assigned to a slide in the slot table.

- 1 Click **Tools > Scan Protocol Editor**.
The Scan Protocol Editor dialog box opens.
- 2 In the Scan Protocol list, select a protocol to remove.
- 3 Click **Remove**.

Creating and Changing Scan Regions

The *scan region* determines the area of the slide that is scanned. The larger the region, the longer the scan time. If you use non-Agilent slides, you can create your own scan region or change a scan region, up to the maximum scan region of 71 mm x 21.6 mm. The new region appears as a selection in the slot table and in the Protocol Editor.

To create a scan region

Make sure that the scan region is at least 4 mm away from the barcode label and does not overlap any other opaque or translucent areas of the slide.

- 1 In the Scan Control program menu bar, click **Tools > Scan Region Editor**.

The Scan Region Editor opens.

- 2 In the list next to **Scan Region**, select **New Scan Region**.

Or

To use an existing scan region as a template,

- a In the list next to **Scan Region**, select one of the available scan regions.

- b Select **Save As**.

The Save As New Name dialog box opens.

- c Type the name for the new scan region, and then click **OK**.

The scan region settings become active.

- 3 Under **Scan Region**, type the measurements (in mm) for the region. If you type an invalid value, a red box appears around the measurement.

The red box at the top of the dialog box shows the scan region currently defined.

- 4 Click **Save**.

If no errors are found, the Scan Region Editor appears with the new region listed in the Scan Region Editor.

Change an existing scan region for non-Agilent slides

You can only change the scan regions that you created. You cannot change or remove the regions provided by Agilent.

When creating a scan region or using existing scan regions, make sure that the scan region is at least 4 mm away from the barcode label.

- 1 In the Scan Control program menu bar, click **Tools > Scan Region Editor**.

The Scan Region Editor opens.

- 2 In the list next to **Scan Region**, select the scan region you want to modify.

- 3 Change the measurements for the region, as desired. For more information on the settings available, see ["Scan Region Editor dialog box"](#) on page 83.

- 4 Click **Save** to save the changes for the selected scan region.

To export a scan region

- 1 In the Scan Control program menu bar, click **Tools > Scan Region Editor**.
The Scan Region Editor opens.
- 2 Click **Export**.
The Export Scan Region dialog box opens.
- 3 Click to select the scan region you want to export.
Or
To select noncontiguous scan regions to export, hold down the Ctrl key and then click additional scan regions.
Or
To select a contiguous set of scan regions to export, click to select the first scan region, and then hold down the Shift key and then click to select the last scan region to export.
- 4 Click **Export**.
- 5 The Save As dialog opens.
- 6 Browse to the location where you want to save the exported scan region file.
- 7 In File name, type the name for the exported scan region file.
- 8 Click **Save**.

To import a scan region

- 1 In the Scan Control program menu bar, click **Tools > Scan Region Editor**.
The Scan Region Editor opens.
- 2 Click **Import**.
The Open dialog box opens.
- 3 Browse to where the exported scan regions file you want to import is located. Exported scan regions files have .exp extensions.
- 4 Click to select the scan regions file, and click **Open**.

NOTE

If a scan region in the file has the same name as an existing scan region, the program does not import it.

To remove a scan region

NOTE

You cannot remove any of the default scan regions or any scan region that is currently used in a protocol.

- 1 Click **Tools > Scan Region Editor**.
The Scan Region Editor dialog box opens.
- 2 In the Scan Region list, select a scan region to remove.
- 3 Click **Remove**.

Adding a Barcode

Barcodes are the means by which microarray slides are identified, both physically and within the Scan Control program. In addition, the barcode is saved in the metadata of the TIFF image, and is displayed in Feature Extraction reports.

NOTE

By default, the scanner reads the barcode of a slide and displays it as the Slide ID in the Scan Control program Scan Table. If you change the Slide ID, you can still see the barcode of the slide by moving the mouse cursor over its Slide ID. The barcode appears in a tooltip.

To add a barcode

If the barcode of a microarray slide is missing or is not readable by the scanner, you can add it manually by either typing it in or using an external barcode reader. To add a barcode manually, at least one slot of the cassette must be available.

- 1 If the scanner door is not open, in the Scan Control program main window, click **Open Door**, and wait for the door to open.
- 2 If the barcode for a slide already in a slot is unreadable, remove the slide holder that contains the slide from the cassette.
- 3 In the Scan Control main window, click **Tools > Input Barcode**.
The Input Barcode dialog box opens.
- 4 Enter the barcode using an external barcode reader or type the barcode into the Barcode text box.
- 5 Insert the slide holder that contains the slide into the designated slot of the cassette.
- 6 Click **Set**.
In the Scan Table, the barcode is displayed in the Slide ID for that slot. The slot State changes to "Present."
- 7 If desired, follow [step 3](#) through [step 6](#) to add another barcode.
- 8 When finished, click **Close**.

Turning on Lasers Manually

The lasers are turned on automatically when you start the Scan Control program, or when you add slides to the queue. They turn off automatically, based on the Laser Saver Delay settings. See [“To set the laser saver delay”](#) on page 47. This section describes how to turn on the lasers manually.

NOTE

Once the lasers are turned on, it takes up to 5 minutes for them to warm up before the instrument is ready to scan

To turn on lasers

- In the Scan Control program window, click **Tools > Switch on Lasers**.
The lasers are turned on. The Status Log displays “Warming up lasers” and the status bar displays “Warming up.”
When the lasers are warmed up, the status bar displays “Ready.”

Troubleshooting Tools

To help with troubleshooting, you can display recent errors, or open log files that were generated for the scanner. You can also create a file that contains a “snapshot” of the current state of the instrument.

NOTE

The troubleshooting tools described in this section are typically used when you are working with an Agilent technical support specialist.

To display recent errors

- In the Scan Control program menu bar, click **Tools > Show Recent Errors**.
The LogMessages.txt file opens in Notepad (or your default text editor program).

To display log files

- 1 In the Scan Control program menu bar, click **Tools > Log Files**.
The C:\ProgramData\Agilent\MicroArrayScanner\Logs folder opens with a list of log files:
ScanLog.csv – contains information about scan activity
SysLog-<datestamp>-<timestamp>.csv – contains information about system activity
ExceptionLog.txt – contains information about special conditions that affect the software execution
- 2 Double-click to select and open a log file.
Files with the .csv (comma-separated variable) extension are opened by default with an available spreadsheet program. Files with the .txt extension are opened by default with an available text editor.

To create a snapshot of the instrument state

- In the Scan Control program menu bar, click **Tools > State Snapshot**.
A file is created in the C:\ProgramData\Agilent\MicroArrayScanner\Snapshots\StateSnapshots folder.

To reset calibration warnings

During typical operation, the scanner calibrates the PMTs before every scan. It also calibrates the lasers during system initialization. If the calibration is unsuccessful, or if the calibration changes significantly since the previous time it was performed, the scanner software records this information, and generates warnings in the Scan Log.

The PMT calibration warning is set when the PMT gain changes by more than 20% from the previous calibration value.

The laser calibration warnings are set when the lasers cannot achieve their specified power within the warm-up period. If this problem occurs, the system sets the warning, and recalibrates the lasers at 80% of their specified power. The Scan Control program scales the TIFF file to compensate for the lower laser power.

If the next calibration is again unsuccessful, and the warnings reappear, contact your local Agilent sales and support center.

To reset calibration warnings,

- In the Scan Control menu bar, click **Tools > Reset Calibration Warnings**.

To run a self test

NOTE

To run a self test, remove all slide holders from the scanner. The Self Test command is enabled when the scanner is *Ready* and the door is closed.

The self-test does not test all subsystems or specifications. For a full retest, contact Agilent service for a preventative maintenance and scanner check.

- 1 In the Scan Control menu bar, click **Tools > Self Test**.

The Self Test dialog box opens.

- 2 Click **Start**.

The self test examines various scanner subsystems to check for out-of-specification behavior. After the self test is finished, a summary of the results is opened in your internet browser.

Setting up Scanner Defaults

To set the default scan data folder

This location is the default output folder where the image files generated by the scanner are deposited. This file is shown by default as the Output Folder in the slot table. You can change the output folder manually for a scan before it is added to the queue. By default, the scan data output folder is D:\ScanData.

- 1 In the Scan Control program menu bar, click **Tools > Settings**.
The Settings dialog box opens.
- 2 Next to **Default Scan Data Folder**, type the path for the folder where you want to save the scan images.
Or
Click **Browse** and browse to the location where you want to save the scan images, and then click **OK**.
- 3 Click **Save**.

Changes to the scan data folder setting are not applied to slides with barcodes already read by the scanner. To change the default setting for slides already in the slot table, open and then close the scanner door so that the scanner reads the barcodes again.

To set the laser saver delay

The laser saver delay is designed to turn off the lasers automatically when not in use, to maximize the lifetime of the lasers.

NOTE

The lasers turn on automatically when you start the Scan Control program, and after you add scans to a queue. You can also turn them on manually. See ["Turning on Lasers Manually"](#) on page 44.

- 1 In the Scan Control program menu bar, click **Tools > Settings**.
The Settings dialog box opens.
- 2 Next to **Laser Saver Delay**, select a value for the number of minutes the scanner waits after the last scan before it turns off the lasers.
- 3 Click **Save**.

To set the location of the Feature Extraction program

If you want to run the Feature Extraction program automatically at the end of a scan, you must set the location where the Feature Extraction program is installed.

- 1 In the Scan Control program menu bar, click **Tools > Settings**.
The Settings dialog box appears.

- 2 Click **Browse** and browse to the folder where the Feature Extraction program is installed, select FENoWindows.exe, and then click **OK**.
By default, this location is C:\Program Files (x86)\Agilent\MicroArray\FeatureExtraction\FENoWindows.exe.
- 3 Click **Save**.

To select to run Feature Extraction after scanning

You can select to run the Feature Extraction program automatically at the end of a scan. For more information, see ["Settings dialog box – General Settings"](#) on page 85 and ["Performing Feature Extraction on Scanned Images"](#) on page 89.

- 1 In the Scan Control program menu bar, click **Tools > Settings**.
The Settings dialog box opens.
- 2 Next to **Run Feature Extraction after scan is finished**, select **Yes**.
- 3 Click **Save**.

Mapping Scan Protocols to Designs

The first time you scan a microarray of a given design, the Scan Control program assigns, or “maps” the selected protocol to that design. After that, any time the Scan Control program recognizes a slide with the same design, the Scan Control program automatically fills in that protocol for the slide in the slot table. You can also assign protocols to slide designs manually.

To map a scan protocol to a slide design

- 1 In the Scan Control program menu bar, click **Tools > Settings**.
The Settings dialog box opens.
- 2 Click the Design to Protocol Mapping tab.
- 3 Under **Design ID**, type the Design ID number for the design you want to assign to the protocol. The Design ID is determined from an Agilent slide barcode. All barcodes start with 25. The following five digits are the Design ID. For example, the Design ID for barcode 251727810298 is 17278.
- 4 Under **Scan Protocol**, select a protocol to use for slides for the selected design.
- 5 (Optional) Under **Description**, type information about the protocol or design.
- 6 Click **Save**.
Whenever you add a slide with the same ID, the program automatically uses the selected protocol in the slot table.

5 Maintaining and Troubleshooting Your System

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This chapter provides maintenance and troubleshooting information for the SureScan Microarray Scanner System.

Maintaining Your System

Use proper care and maintenance to keep your SureScan Microarray Scanner System running trouble-free. When in doubt about the use or care of the system, contact your local Agilent sales and support center to answer your questions.

Scheduled software maintenance

Perform these tasks to help maintain the performance of your computer workstation and operating system:

- At least once a week, check disk space and archive data as needed.
- Once a week delete any temporary files (*.mp, *.tmp files) from the C:\Temp folder.

Scheduled hardware maintenance

The SureScan Microarray Scanner System contains no user-serviceable parts.

Inspecting the vents

Good air flow through the scanner is essential to proper operation. Blocked vents can adversely affect performance.

Check all vents weekly to ensure that they are not blocked by dust, debris, furniture, or other instrumentation.

Tips to prevent problems

Follow these tips to help you maintain the SureScan Microarray Scanner System and its performance.

Tips to avoid data loss

- Avoid running software programs that cause high CPU workload, that can affect the acquisition of data during scanning.

Tips to avoid damage to the scanner

- Keep liquids and vapors away from the scanner.
- Never place anything on the scanner or on the scanner door.
- Minimize and control temperature fluctuations.

Do not place the scanner in direct sunlight. Do not locate the scanner near windows even if they have blinds or window coverings. The hot sun can heat up the scanner housing in a nonuniform fashion, which can cause problems with the alignment of the optics.

Scan only when the laboratory temperature is consistent with the operating temperature specifications for the scanner. To assure optimal scanner performance, operate the scanner only in the specified temperature ranges. (See ["SureScan Scanner Specifications"](#) on page 90.)
- Control the humidity.

The scanner is sensitive to condensing humidity conditions. To ensure optimal performance, operate the scanner only in the specified humidity ranges. (See ["SureScan Scanner Specifications"](#) on page 90.) Always allow 12 hours thermal equilibration time on site before opening the shipping box.
- If the power cord needs to be replaced, use a power cord that is appropriately rated.

Tips to maintain hardware performance

- Avoid moving the scanner.

If you must move the scanner, there is a chance for adverse affects on performance. Call your local Agilent sales and support center for assistance in moving the scanner.
- Place the scanner on a sturdy lab bench or table.
- Avoid leaning on the scanner.
- To extend the life of the lasers, set up your lasers to turn on and off automatically. See ["To set the laser saver delay"](#) on page 47.
- After turn-on, allow time for laser warm-up and stabilization. Typical warm-up time is less than five minutes.
- To clean the exterior surfaces of the scanner, wipe down with laboratory wipes moistened with 70% isopropanol. Do not use acetone or other solvents for cleaning.
- Do not allow the electronic components of the scanner to become contaminated.
- For maintenance of the slide holders, see Agilent publication G5761-90004.

WARNING

Do not remove the main cover. Do not attempt to repair or gain access to internal components. You risk exposure to high voltage and harmful laser radiation.

Troubleshooting Your System

The scanner was designed for low maintenance and high ease of use. If you cannot resolve a problem with the system, read this chapter. If the problem still exists, contact your local Agilent sales and support center.

Technical Support

Technical support is available for the SureScan Microarray Scanner System. Read the rest of this chapter before calling your local Agilent sales and support center.

Use the web to reach technical support

The Help menu of the Scan Control program provides a link to Agilent technical support for the scanner.

- Click **Help > Online Support**.

Computer workstation support

If you have a problem with your computer workstation, see the documentation that came with the computer.

If you are still unable to resolve the problem, contact your local Agilent sales and support center or click **Help > Online Support**.

SureScan Microarray Scanner System support

If you have a problem with your SureScan Microarray Scanner System that requires assistance from your local Agilent sales and support center, be prepared to provide the latest diagnostic log files created by the Scan Control program. To open the folder that contains the log files, in the Scan Control program main window, click **Tools > Log Files**. Log files are located in the folder C:\ProgramData\Agilent\MicroArrayScanner\Logs.

Each scanner has a unique 10-character serial number. The serial number is located on the front of the instrument at the lower right and on the rear of the instrument.

When corresponding with your local Agilent sales and support center about your SureScan Microarray Scanner System, be sure to include the model number and 10-character serial number of the scanner.

Make a note of the serial number of your scanner, the software version # and the installation date in the spaces shown (if you print the following page) or on a sheet of paper that you keep close to your scanner.

Scanner information

Model #: _____

Serial #: _____

Installation Date: _____

Software Version#: _____

Software Update Version#/Date: _____

Software Update Version#/Date: _____

Find the version information for scanner software

- 1 Click **Help > About** in the menu bar to find version information.
- 2 To close the program, click **OK**.

Frequently Asked Questions (FAQs)

The following are frequently asked questions (FAQs) that can help you operate and maintain the SureScan Microarray Scanner System and troubleshoot issues that occur.

Table 1 FAQs

FAQ	Answer
I want to move the scanner to another area.	The move can adversely affect scanner performance. Call your local Agilent sales and support center for assistance in moving the scanner and assuring proper operation afterward.
Can I save files over the network while scanning?	Agilent recommends that you save your data files directly to the local hard disk. You can also save data files to a network folder. If a network access problem is experienced during the scan, data is saved to a temporary local folder, and a warning is included in the scan log.
Where do I find support information, such as drivers, guides, and troubleshooting solutions, for my computer workstation?	If you have a problem with your computer workstation, see the documentation that came with the computer. If you are still unable to resolve the problem, contact your local Agilent sales and support center.
Can I open the door to the scanner manually?	No. You must use the Open Door/Close Door button in the Scan Control program to open or close the scanner door.
The scanner is turned on and the Scan Control program is open, but the scanner does not scan.	<ol style="list-style-type: none">1 Close and then restart the Scan Control program. You must turn on the scanner before starting the Scan Control program. If you started the Scan Control program first, the connection is not made when the scanner is turned on.2 Contact your local Agilent sales and support center.
I want to remove a slide from the scanner, but the Scan Control program will not let me open the door.	The Scan Control program prevents you from opening the door while it is loading or ejecting a slide. Wait until the Open Door button is available to open the door. If you continue to have problems, check the Status Log and contact Agilent technical support.

Hardware Troubleshooting

Except for the power fuse, the SureScan Microarray Scanner System has no user-serviceable parts. The status indicator light on the front of the scanner indicates possible problems. You can also replace the fuses that protect the system. For any other problems, including jams, contact your local Agilent sales and support center.

If you are having a problem with your computer workstation, see ["Computer workstation support"](#) on page 53 for support information.

Troubleshooting with the status indicator light

The front panel has an indicator light that shows the status of the SureScan scanner.



Figure 13 Location of the status indicator light

Table 2 describes the possible states of the indicator light.

Table 2 Scanner status indicator light states

Light state	Meaning/action required
Yellow	Scanner is initializing. The yellow light appears after you turn on the scanner, and also when the Scan Control program connects and initializes communication with the scanner.
Off	Scanner is fully initialized
Green	Scanning is in process.
Red	An error has occurred. Check the Scan Control Status log, Scan log, and list of recent errors, and then contact Agilent technical support.

Checking and replacing scanner fuses

The scanner has two fuses for the power supply, on the rear of the scanner. The power supply fuses are directly above the power cord plug.

The fuses are ordered directly from Agilent Technologies.

WARNING

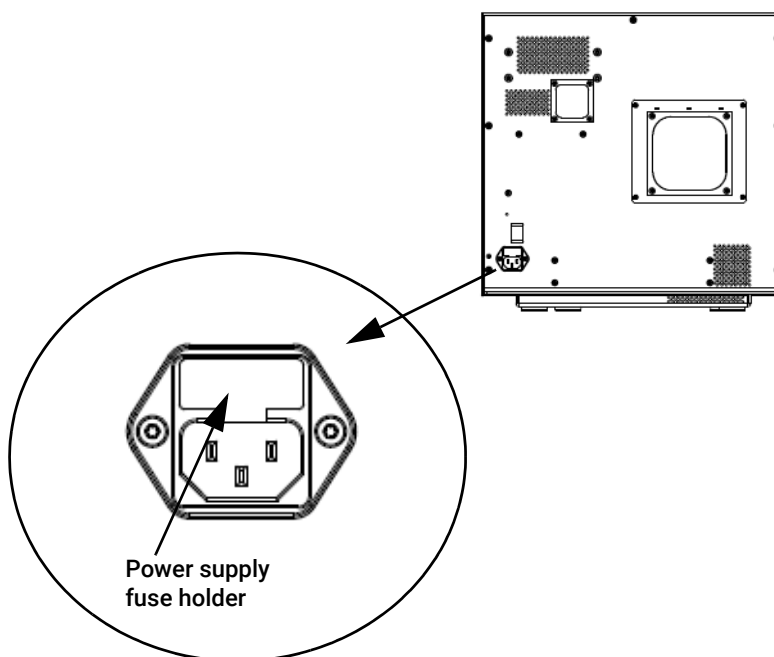
Always disconnect the power cord before checking or replacing the fuses.

Checking and replacing the power supply fuses If you cannot turn on the scanner, even though the power outlet is active when tested, check, and replace the fuses if needed.

- 1 Disconnect the power cord.
- 2 Use a small flat-edge screwdriver to pry up the small plastic tab on the bottom edge of the fuse holder until it releases.
- 3 Pull out the fuse holder, and check the fuse integrity.
- 4 If a fuse is blown, replace the fuse with a T4A, 250 VAC rated fuse (part number 2110-1491).
- 5 Push the fuse holder back in until it clicks into place.
- 6 Plug in the power cord.

CAUTION

Replace the fuses with only the same or equivalent rated fuses. If you are unsure about the fuses, contact your local Agilent sales and support center before installing.



Software Troubleshooting

In case you experience a computer failure or you want to reload the hard drive image that Agilent ships with the computer, Agilent supplies a recovery CD that lets you re-image the hard drive.

File locations

The SureScan Microarray Scanner System uses the following folders:

Scan Control program files (installation folder)

C:\Program Files (x86)\Agilent\ScanControl

Log files

C:\ProgramData\Agilent\MicroarrayScanner\Logs

Scanned image files (default – otherwise as set in Scan Control Settings)

D:\ScanData

Scanned image files (in case of failure to find a network storage location)

If the Default Scan Data Folder set in Tools > Settings is not available, the program performs the following actions:

- Posts an error message in the Status Log
- Clears the Default Scan Data Folder set in **Tools > Settings**
- Sets the Output Folder in the Slot Table to C:\ProgramData\Agilent\MicroArrayScanner\Temp

System error messages

This section explains how to use error messages and error logs generated by the SureScan Microarray Scanner System.

Hardware monitoring

The scanner continuously monitors internal temperatures and fan speeds, as well as fault conditions on many subsystems.

- If the monitored parameters reach warning levels, a message is displayed in the status log, and the instrument goes into a “scanning suspended” state. In this state, the currently running scan finishes, but no new scan starts.
- If the monitored parameters reach alarm levels, the instrument immediately stops scanning, and reduces its power consumption as much as possible.

To display details of the fault that shut down the instrument, in the Scan Control program, click **Tools > Show Recent Errors**.

Where scanner error messages can appear

Error messages appear in the following places:

- Error messages appear in the Status Log in the Scan Control program main window. If the error can result in compromised data, it also appears in the Scan Log.
- Errors are also captured in greater detail in the system log file. System log files are saved as comma separated value files, with extension .csv. They can be opened with a text editor program (such as Notepad) or with Microsoft Excel. To open the folder where system log files are located, click **Tools > Log Files**.
- To display the most recent errors, click Tools > Show Recent Errors. The recent errors are opened in Notepad.

Troubleshooting with error messages

The SureScan Microarray Scanner System creates error messages to help you solve issues that arise. Many of the error messages include a solution within the text box; follow those instructions.

The following table contains some of the error messages that appear in popup dialog boxes, along with descriptions and suggested actions. If a problem continues after you try the suggested action, contact Agilent technical support.

Table 3 Error messages in popup dialog boxes

Error message	Description and suggested action
A slide has been placed in the active slot (Slot number {*}). Remove the slide to allow scanning to continue.	A slide is currently in the active slot and the scanner cannot return the scanned slide to its slot in the cassette. No additional scans can take place, and Close Door is disabled. Remove the slide from the active slot.
Cannot connect to instrument: Firmware version is more recent than host software version. Firmware version: {*} Host software version: {*} Contact Agilent product support.	Instrument firmware does not match the Scan Control program version. Contact Agilent technical support.
Cannot connect to instrument: Verify firmware failed. {*} Contact Agilent product support.	Scan Control cannot communicate with the scanner due to a firmware problem and goes into offline mode. Contact Agilent technical support.
Check disk space failed: {*}	Occurs when you try to add a scan to the queue but there is not enough disk space for the scan to complete. Clean up your hard disk to provide adequate space for storage of scan files.
Configuration items are missing from config files. Cannot save.	Reinstall the Scan Control program.
Configuration items missing.	Reinstall the Scan Control program.
Error during shutdown: {*}	An error occurred when closing the Scan Control program. Restart the Scan Control program and try again.
Find log files failed: {*}	Close the Scan Control program and restart it. If the problem continues, reinstall the Scan Control program.

Table 3 Error messages in popup dialog boxes (continued)

Error message	Description and suggested action
Find recent errors failed: {*}	Close the Scan Control program and restart it. If the problem continues, reinstall the Scan Control program.
Get 'About' information failed: {*}	Close the Scan Control program and restart it. If the problem continues, reinstall the Scan Control program.
Initialize logger failed: {*}	Log file is open in another application. For the Exception logger, locate the log file (named <i>ExceptionLog.txt</i>). Rename the file (e.g., <i>ExceptionLog_old.txt</i>) but do not delete it. Then, restart the Scan Control program. A new <i>ExceptionLog.txt</i> file is created. To avoid re-occurrence of this error message, always exit the Scan Control program and allow it to close completely before powering off the scanner.
Instrument is busy: Please wait for the instrument to become idle.	Occurs when you attempt a command that cannot be completed while the instrument is busy. Wait and try the action again.
Instrument self test failed: {*}	Reinstall the Scan Control program.
Load application configuration failed: {*}	Scan Control program installation is corrupt. Reinstall the Scan Control program.
Load instrument configuration failed: {*}	Scan Control program installation is corrupt. Reinstall the Scan Control program.
Load scan configurations failed: {*}	Scan Control program installation is corrupt. Reinstall the Scan Control program.
Load test script set failed: {*}	Reinstall the Scan Control program.
Open Online Support website failed: {*}	Web page is currently unavailable. Check your internet connection. Try again later.
Open Scanner Home Page website failed: {*}	Web page is currently unavailable. Check your internet connection. Try again later.
Open Users Guide '{*}' failed: {*}	Close the Scan Control program and restart it. If the problem continues, reinstall the Scan Control program.
Recovering door jam failed: {*}	An error occurred when the instrument tried to recover from a door jam. Close the Scan Control software, restart the scanner, and then restart the Scan Control program.
Save instrument state failed: {*}	Close the Scan Control program and restart it. If the problem continues, reinstall the Scan Control program.
Show 'About' information failed: {*}	Close the Scan Control program and restart it. If the problem continues, reinstall the Scan Control program.
Update firmware failed: {*}	Update of the instrument firmware failed. Contact Agilent technical support.

* Detail added when the message is generated

The following table shows error messages that appear in the Status Log or Scan Log. When an error occurs, to display additional information, click **Tools > Show Recent Errors**.

Table 4 Error message in logs

Error message	Description and suggested action
{*} State Machine unknown error during state '{*}': {*}.	Low-level error. Contact Agilent technical support.
Activity EjectSlide failed.	Multiple possible causes. Try restarting the scanner and Scan Control program. If the problem persists, contact Agilent technical support.
Activity InitLoader failed	Multiple possible causes. Try restarting the scanner and Scan Control program. If the problem persists, contact Agilent technical support.
Activity InitStages failed	Multiple possible causes. Try restarting the scanner and Scan Control program. If the problem persists, contact Agilent technical support.
Activity LaserWarmup completed with warnings	Lasers failed to warm up at calibrated power.
Activity LaserWarmup failed.	Lasers did not stabilize within a certain time.
Activity LoadSlide failed	Multiple possible causes. Try restarting the scanner and Scan Control program. If the problem persists, contact Agilent technical support.
AutoFocus hold percentage is more than warning limit	Dirt or obstructions on the slide; slide not installed correctly in slide holder.
Data system calibration completed with warnings	Indicates data system calibration failure. If the problem persists, call service.
Data system calibration failed	Indicates data system calibration failure. If the problem persists call service.
Default scan data folder verification '{*}' failed: {*}	The default folder has been removed or cannot be accessed. Recreate it or fix the network connection.
Eject failed: unable to move slide into cassette.	Restart the scanner to attempt to clear fault.
Failed to create FE project file	This message indicates FE project file creation failed. Check to make sure the Feature Extraction program is set up properly.
Failed to start FE application	This message indicates the program failed to launch the Feature Extraction application. Make sure the Feature Extraction program is installed properly.
Fanspeed error detected: Instrument operation halted	Hardware problem — contact Agilent technical support.
Fanspeed warning cleared: Instrument operation resuming	Hardware problem — contact Agilent technical support.
Fanspeed warning detected: Instrument operation suspended.	Hardware problem — contact Agilent technical support.
Find focus failed	Multiple possible causes. Try restarting the scanner and Scan Control program. If the problem persists, contact Agilent technical support.
General communication failure.	Check the LAN cable. Restart the scanner and the Scan Control program.
Green Laser power is not set to calibrated value	Laser power has been reduced. Compensation was applied to the output TIFF. The green laser may fail soon.

Table 4 Error message in logs (continued)

Error message	Description and suggested action
Green PMT calibration completed with warnings	Indicates PMT calibration completed successfully, but some of the values it calculated are not good.
Hardware error detected in subsystem '{*}':Instrument operation halted	Low-level error. Contact Agilent Technical support.
Hardware warning detected in subsystem '{*}':Instrument operation suspended	Low-level error. Check recent errors and contact Agilent technical support.
High temperature error detected: Instrument operation halted	Check ventilation slots.
High temperature warning cleared: Instrument operation resuming	Check ventilation slots.
High temperature warning detected: Instrument operation suspended	Check ventilation slots.
PMT calibration failed	Indicates PMT calibration failure. If the problem persists, call service.
Red Laser power is not set to calibrated value	Laser power has been reduced. Compensation was applied to the output TIFF. The red laser may fail soon.
Red PMT calibration completed with warnings	Indicates PMT calibration issues. If the problem persists, call service.
Scan slide failed	Multiple possible causes. Click Tools > Show Recent Errors for more information. Try restarting the scanner and the Scan Control program. If the problem persists, contact Agilent technical support.
State machine failure {*}	Low-level software error. Contact Agilent technical support.
Status communication failure	Check connection to instrument.
Suspending autoloader operation due to autoloader errors	Click Tools > Show Recent Errors for more information.
Unable to access folder \"{*}\": Saving output file in folder \"{*}\"	Destination folder was not available during the scan.
Watchdog communication failure: {*}	Low-level error. If the problem recurs, call Agilent technical support.

* Detail added when the message is generated

If an error message does not appear in the table

This table does not list all the possible error messages. If you have an error message that is not listed and you are unable to resolve the problem, do the following:

- 1 Write down the error message.
- 2 Restart the Scan Control program.

- 3** If step 2 does not solve the problem, do the following:
 - a** Close the Scan Control program.
 - a** Restart the computer workstation.
 - b** Turn off the scanner, and then back on.
 - c** Restart the Scan Control program.
- 4** If step 3 does not solve the problem, contact your local Agilent sales and support center.

Using the Diagnostic Display

The scanner diagnostic display is used for advanced troubleshooting tasks. This display is located on the front of the instrument, behind the upper front cover. To open the cover, grasp the finger holds on the sides of the cover, and pull forward. You see the diagnostic display and a 4-way control switch.

NOTE

Use the diagnostic display switch only when requested by Agilent technical support.

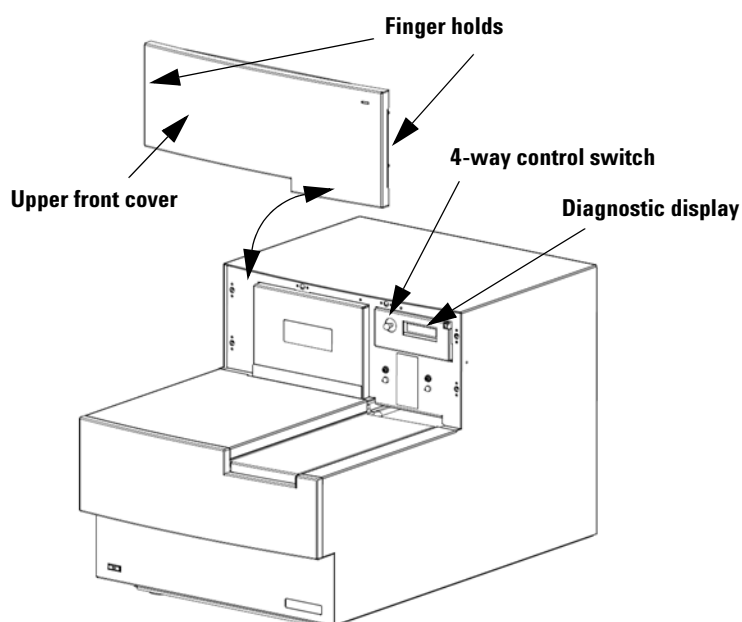


Figure 14 Diagnostic display location


The diagnostic display control switch has the following capabilities:

- Before Scan Control connects to the instrument, the display shows the IP address of the scanner. If the IP address is not displayed, the firmware is not running.
- Toggle the switch Up to cycle through a menu, with the following choices:
 - The first item lets you reset the IP address to factory default (10.0.0.2).
 - The second item lets you reboot the firmware. (The firmware is also reset by power cycling the instrument.)
- To perform the selected operation, move the switch to the right (to the Select position).
- Once the Scan Control program connects to the instrument, the display reads "Client Connected".

Updating the Scanner Firmware and Scan Control Program

Agilent Technologies occasionally makes software updates available. Firmware updates (if necessary) are included with the Scan Control program update. This section describes how to update the scanner program and firmware.

To check if an update is available

If an update for the Scan Control program is available, an Information icon appears at the lower right of the Scan Control main window: . Click the icon to display information about your installed version and the most recent version available.

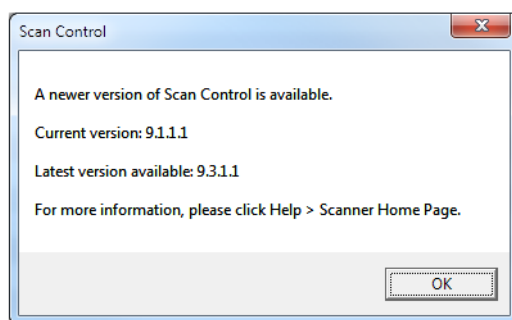


Figure 15 Update notification dialog box

To update the Scan Control program and firmware

- 1 From the Scan Control main window, click **Help > Scanner Home Page**.
The Agilent Technologies Genomics – High Resolution Scanner Overview web page opens.
- 2 In the web page, click **Download Software**.
- 3 Follow the instructions to read the Release Notes and Installation Notes
- 4 Click **Download Software** to download the software installer and save it to your computer.
- 5 Start the software installer and follow the prompts to install the software. Accept the defaults. It is not necessary to remove the previous version of the software.

NOTE

Software updates do not overwrite scan regions, protocols, or the calibration of the instrument

- 6 When the software installation is finished, start the Scan Control program.
- 7 If a firmware update is needed, a message appears, and the Scan Control program changes to Offline Mode.
- 8 Close the Scan Control program.

- 9 Turn off the power to the scanner.
- 10 Wait 10 seconds, and then turn on the scanner power.
- 11 Start the Scan Control program.
The Scan Control program and scanner firmware are now updated. If you have problems, contact Agilent technical support.

To verify the software installation

The SureScan Microarray Scanner System workstation includes an installation qualification tool (IQT). Use this program after updating your software to verify that the update installed correctly.

- 1 Click **Start > All Programs > Agilent Technologies > Installation Qualification Tool**.

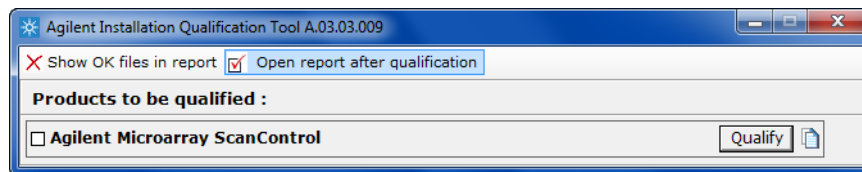


Figure 16 Agilent Installation Qualification Tool dialog box

- 2 Mark the check box next to **Agilent Microarray Scan Control**.
- 3 Under **Products to be qualified**, click **Qualify**.
The installation is verified, and an installation qualification report is generated. If you selected **Open report after qualification**, the installation qualification report opens in your internet browser.
- 4 When finished, click the close button in the upper right corner of the program dialog box.

6 Reference

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This chapter includes descriptions of the Microarray Scan Control program windows and dialog boxes. It also contains specifications and regulatory information.

Scan Control Program Window Reference

This section describes the main window of the Microarray Scan Control program and its contents.

Scan Control main window

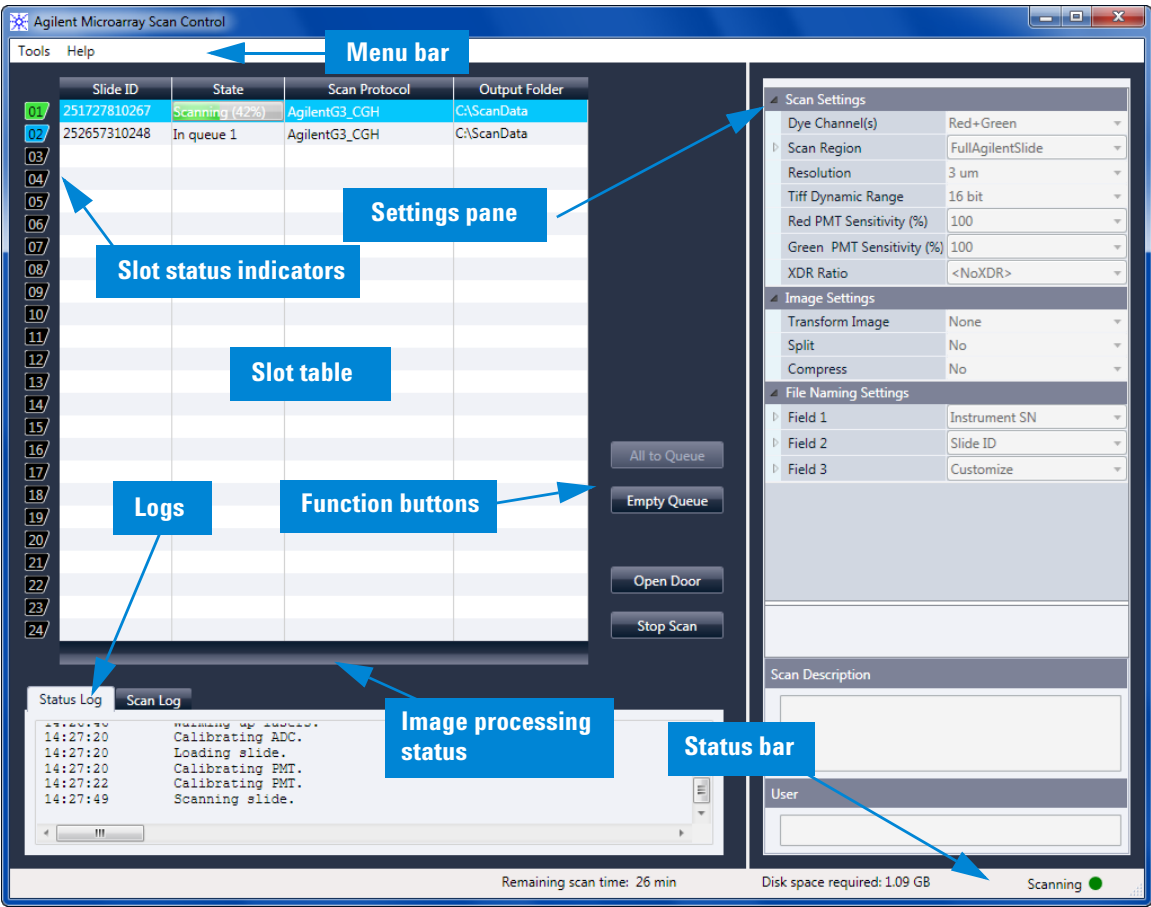


Figure 17 Agilent Microarray Scan Control main window

The Microarray Scan Control window appears when you start the Microarray Scan Control Program. It has the following features:

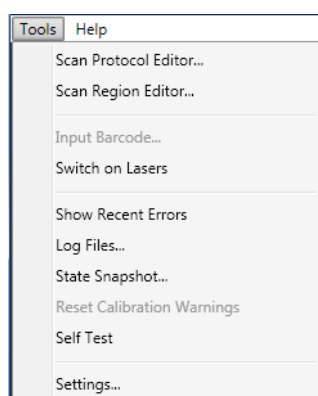
Table 5 Scan Control window features

Feature	Description
Menu bar	Open tools menu and help.
Slot table	Display status, scan protocols, and output folders for microarray slides currently in the scanner.

Table 5 Scan Control window features

Feature	Description
Settings pane	Display settings for selected slide. For slides not in the queue, you can change settings from here.
Slot status indicators	Indicates the status of the slot. Matches the slot indicator lights on the cassette.
Function buttons	<ul style="list-style-type: none"> Add and remove slides from the scan queue Open and close the scanner door Start and stop a scan
Logs	Display instrument and scan status logs.
Status bar	Show status of scanner, remaining scan time, and disk space required for the scan.

Tools menu

**Figure 18** Tools menu

The following functions are available on the Tools menu:

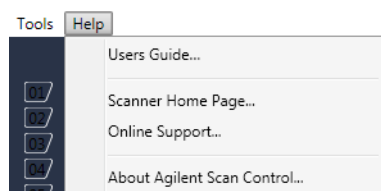
Table 6 Scan Control Tools commands

Tool	Description
Scan Protocol Editor	Opens the Scan Protocol Editor dialog box, where you can create, change, or remove scan protocols.
Scan Region Editor	Opens the Scan Region Editor dialog box, where you can create, change, or remove custom slide scan regions.
Input Barcode	Lets you use the keyboard or a “keyboard emulation” barcode reader to enter a barcode for a slide that does not have a barcode, or a when the scanner cannot read a barcode.
Switch on Lasers	If the lasers are off, use this command to turn on the scanner lasers.
Show Recent Errors	Opens notepad (or your default text editor) and displays details of the most recent errors.

Table 6 Scan Control Tools commands (continued)

Tool	Description
Log Files	Opens the Logs folder, where you can open any of the logs created by the program.
State Snapshot	Creates a file that contains the status of the scanner at the time the snapshot was created. This file is helpful in troubleshooting.
Reset Calibration Warnings	Laser calibration warnings are set when the lasers cannot achieve their specified power within the warm-up period. If this problem occurs, the system sets the warning, and recalibrates the lasers at 80% of their specified power. Use this function to reset the warnings to default settings.
Self Test	The self test examines various scanner subsystems to check for out-of-specification behavior. After the self test is finished, a summary of the results is opened in your internet browser.
Settings	Opens the Settings dialog box, where you can set defaults and map scan protocols to microarray designs.

Help menu

**Figure 19** Scan Control Help menu

The following commands are available in the Help menu:

Table 7 Scan Control Help commands

Item	Description
Users Guide*	Opens this guide in Adobe Reader.
Scanner Home Page	Opens the Agilent Technologies website for the SureScan Microarray Scanner System in your internet browser.
Online support	Opens the Agilent Technologies Technical Support web page, where you can find support information for your scanner.
About Agilent Scan Control	Displays version information for the Scan Control program and the serial number and model of your scanner.

* The first time you open the Scan Control software, you are prompted to select your preferred version of the User Guide. Until the preferred version is selected, the User Guide option on the Help menu is unavailable for selection. You can change the selected User Guide at any time from the Settings dialog box (see [“Settings dialog box – General Settings”](#) on page 85).

Slot table

	Slide ID	State	Scan Protocol	Output Folder
01	251727810267	Scanning (10%)	AgilentG3_CGH	C:\ScanData
02	252657310248	In queue 1	AgilentHD_CGH	C:\ScanData
03	251727810212	In queue 2	AgilentG3_CGH	C:\ScanData
04	251727810296	In queue 3	AgilentG3_CGH	C:\ScanData
05	252657310211	In queue 4	AgilentHD_CGH	C:\ScanData
06	251727810231	In queue 5	AgilentG3_CGH	C:\ScanData
07	252657310233	In queue 6	AgilentHD_CGH	C:\ScanData
08	251727810236	In queue 7	AgilentG3_CGH	C:\ScanData
09	251727810298	In queue 8	AgilentG3_CGH	C:\ScanData
10	251727810268	In queue 9	AgilentG3_CGH	C:\ScanData
11	252657310249	In queue 10	AgilentHD_CGH	C:\ScanData
12	251727810213	In queue 11	AgilentG3_CGH	C:\ScanData
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Figure 20 Scan Control program slot table

The slot table is a virtual representation of the contents of your scanner cassette. It is used to set up, start/stop, and monitor the progress of scans.

Slot Status Indicator Numbers to the left of the slot table are identical to the slot status indicator lights on the cassette. The color of the number changes to indicate the status of the slot and scan, as described in [Table 8](#) on page 70.

Slide ID The Slide ID used to name the scanned image file. After you load slides into the scanner cassette and close the scanner door, the program reads the barcode label for each slide in the cassette and displays it in this column. You can change the Slide ID to any text acceptable in a file name. The barcode for the slide is retained, and is shown when you move the mouse over its Slide ID in the Scan Table.

State Displays the current state of the slot. Possible states and the color of the slot status indicator are shown in the following table.

Table 8 Slot states and indicators

Slot status indicator	State	Meaning
Off	Empty	No slide is present in the cassette.
Blinks blue	Present	Slide is present in the cassette slot. When barcode is read successfully, it appears in Slide ID. Slide is not ready to add to a queue because it has no scan protocol assigned yet.
Blinks blue	Ready for queue	The slide is ready to add to a scan queue.

Table 8 Slot states and indicators (continued)

Slot status indicator	State	Meaning
Solid blue	In queue x	Slide is in the scan queue, in position x, where x indicates the order in which the slides are scanned.
Blinks green	Scanning (x%)	Slide is in the process of scanning, where x% indicates the percent of completion for the scan.
Solid green	Complete	Scan finished successfully.
Yellow	Warning	A warning was generated during the scan.
Red	Error	An error occurred during the scan.
Blinks yellow	Removed	A slide that was "Ready" or "In Queue" was removed from the cassette.
Blinks yellow	Replaced	<p>A slide was placed into a slot whose state was "Removed."</p> <ul style="list-style-type: none"> • If the barcode matches the original slide that was removed, the State is changed back to "Ready" or "In Queue." • If the barcode does not match the slide that was removed, the Status changes to "Ready" if a protocol is mapped to the slide Design ID. It changes to "Present" if no protocol is mapped to the slide Design ID.

Menu selections for State

For slides that are not scanning, commands are available that let you add or remove a slide from the queue. The selections available for a particular slide vary depending on the location of the slide in the queue, or if the slide is ready to add to the queue.

Table 9 Menu selections for State

Selection	Description
Move to First	Moves the slide to the first position in the queue.
Move to Last	Moves the slide to the last position in the queue.
Move up	Moves the slide one place up in the scan queue.
Move down	Moves the slide one place down in the slide queue.
Remove from queue	Removes the slide from the scan queue and sets the State to Ready for Queue.
Add to queue	Available if no slides are in the scan queue. Adds the selected slide to the scan queue.
Add to queue first	Adds slide to the first position in the queue. If a scan is already in process, the slide becomes the first slide to scan after completion of the current scan.
Add to queue last	Adds the slide to the last position in the queue.

Scan Protocol Displays the scan protocol to use for scanning the selected slide. Available scan protocols include the default Agilent-supplied scan protocols and any scan protocols that were created or imported. See ["About Scan Protocols"](#) on page 26.

Output Folder Displays the folder where image files created by the scanner are saved. By default, this location is D:\ScanData. You can change the default output folder in **Tools > Settings**. You can change the output folder for a slide before it is added to the queue. The Browse button lets you select a folder to store the data from each scan. Agilent recommends that the data be acquired to a local folder on a secondary hard drive. You can also select a network folder. If a network access problem is experienced during the scan, data is saved to a temporary local folder, and a warning is included in the scan log.

Function buttons

Buttons next to the slot table are available depending on the instrument status.

- All to Queue** Adds all slides not currently in the slide queue to the slide queue. Slides are added to the queue in the order they appear in the slot table.
- Empty Queue** Removes all slides from the queue, except those currently scanning.
- Open Door/
Close Door** Opens or closes the door on the scanner.
- Start Scan/
Stop Scan** Starts or stops the scan. Slides are scanned in the order they appear in the scan queue.

Settings pane

Scan Settings

Dye Channel(s)

Red+Green

Scan Region

FullAgilentSlide

Resolution

3 um

Tiff Dynamic Range

16 bit

Red PMT Sensitivity (%)

100

Green PMT Sensitivity (%)

100

XDR Ratio

<NoXDR>

Image Settings

Transform Image

None

Split

No

Compress

No

File Naming Settings

Field 1

Instrument SN

Field 2

Slide ID

Field 3

Customize

Scan Description

User

Figure 21 Scan Control – settings pane

The settings pane lets you change individual settings for a selected slide. To change settings, the slide must not be in the scan queue. For more information on the settings available in this table, see [“Scan Protocol Editor dialog box”](#) on page 78.

- Scan Settings

Displays scan settings from the assigned scan protocol. To change a setting, click next to the setting name and select a new value from the list. For more information, see [“Scan Settings”](#) on page 79.
- Image Settings

Some data analysis programs have specific requirements for the images. This section lets you change how the image is created from the scan. For more information, see [“Image Settings”](#) on page 81.
- File Naming Settings

Shows selections for how the program names scan files. For more information, see [“File Naming Settings”](#) on page 81.
- Scan Description

In this area, you can type information about the microarray slide or scan. This information becomes part of the file information that can be displayed in the Feature Extraction program.
- User

In this area, you can type information about the operator who set up and performed the microarray scans. This information becomes part of the file information that can be displayed in the Feature Extraction program.

Log tabs

The software documents instrument and scan status in log files that are saved in the C:\ProgramData\Agilent\MicroArrayScanner\Logs folder. These logs are also displayed in the Log tabs at the bottom of the Scan Control program window.

Status Log tab

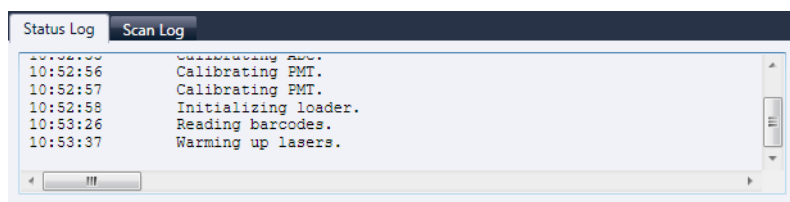


Figure 22 Status Log tab

Displays information about the status of the instrument.

Scan Log tab

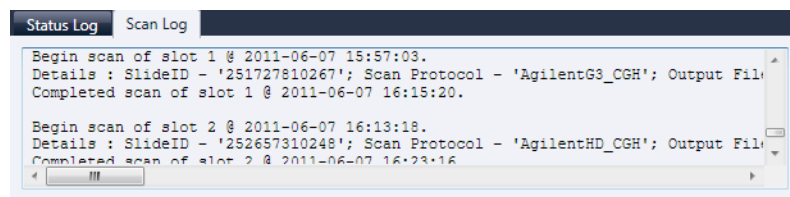


Figure 23 Scan Log tab

Displays information about the scans. When you start the Scan Control program, the Scan Log displays the scans from the previous 30 days.

Right-click in one of the log tabs to open a shortcut menu with the following options:

Table 10 Shortcut menu options for log tabs

Menu command	Description
Clear	Clears the contents of the tab. The contents of the log file is not affected.
Copy	Active after you hold down the mouse button and drag to select a portion of the log. Copies the selected region to the Clipboard. You can paste the selection into a text editor or program of your choice.
Select all	Selects all of contents of the log tab.
Auto Scroll	Turns auto scrolling within the log on or off. If autoscroll is on, when a new message appears, the program automatically scrolls to the bottom of the log so you can see it easily. If autoscroll is off, the pane does not scroll when new messages appear. Turning off autoscroll is useful if you want to review the log while the scanner is active.

Scan Control Program Dialog Box Reference

This section contains descriptions of the parameters available in the dialog boxes that appear when you use the Scan Control program. The dialog box descriptions appear in alphabetical order.

Agilent Installation Qualification Tool

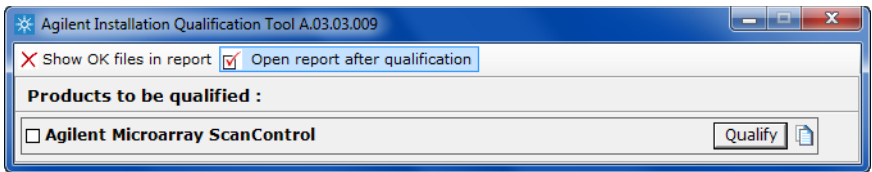



Figure 24 Installation Qualification Tool dialog box

Purpose: Verifies that the Scan Control program was installed correctly and generates an Installation Qualification report.

To open: In the Windows Start menu, click **All Programs > Agilent Technologies > Installation Qualification Tool**.

Show OK files in report	When selected, the qualification report includes a list of all files verified as OK. (Default is not selected. Invalid files are always shown.)
Open report after qualification	When selected, the qualification report opens in your web browser, after the installation qualification is finished.
Products to be qualified	Displays a list of Agilent software products that you can qualify with the tool.
Qualify	Starts the installation qualification for the selected product.
Re-Qualify	Appears after installation qualification. Lets you requalify the installation. Requalify after you correct any problems, to generate a new installation qualification report.
Report saved at	Appears after installation qualification is finished. Displays a link to the location of the qualification report. Click the link to open the report in your web browser.
	Opens the IQT reports folder.

Export Scan Protocol dialog box

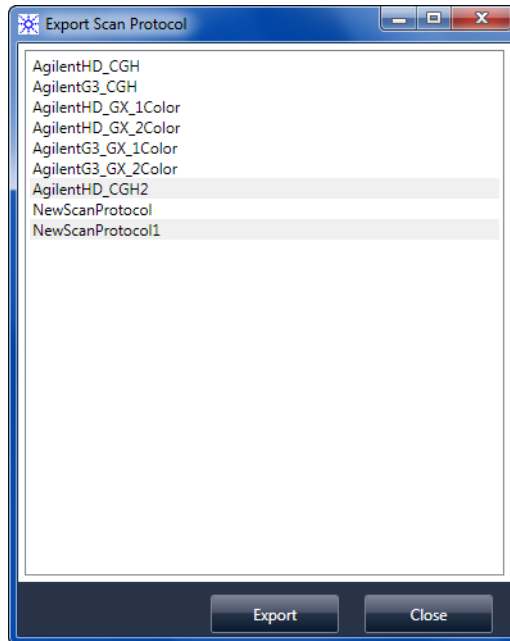


Figure 25 Export Scan Protocol dialog box

Purpose: Lets you select available scan protocols to export.

To open: In the Scan Protocol Editor dialog box, click **Export**.

Export When one or more scan protocols are selected, this command opens the Save As dialog box, where you select a location and file name for the exported protocols file.

Close Closes the dialog box.

Export Scan Region dialog box

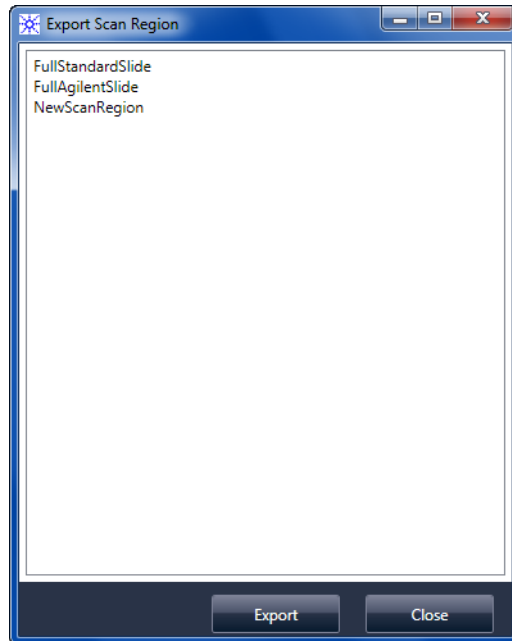


Figure 26 Export Scan Region dialog box

Purpose: Displays available scan regions that you can select to export.

To open: In the Scan Regions Editor dialog box, click **Export**.

Export When one or more scan regions are selected, this command opens the Save As dialog box, where you select a location and file name for the exported scan regions file.

Close Closes the dialog box.

Input Barcode dialog box

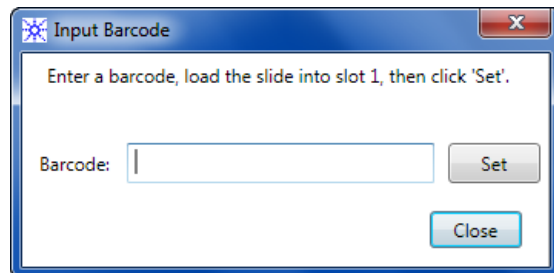


Figure 27 Input Barcode dialog box

Purpose: Used to type or enter a barcode for a slide without a barcode or whose barcode is unreadable by the scanner.

To Open: In the Scan Control program, click **Tools > Input Barcode**.

- Barcode** The barcode you enter using an external barcode reader or your keyboard.
- Set** After the barcode is entered and the slide is loaded into slot 1 of the scanner, this button is used to assign the barcode to the slide in slot 1.
- Close** Used to close the dialog box.

Scan Protocol Editor dialog box

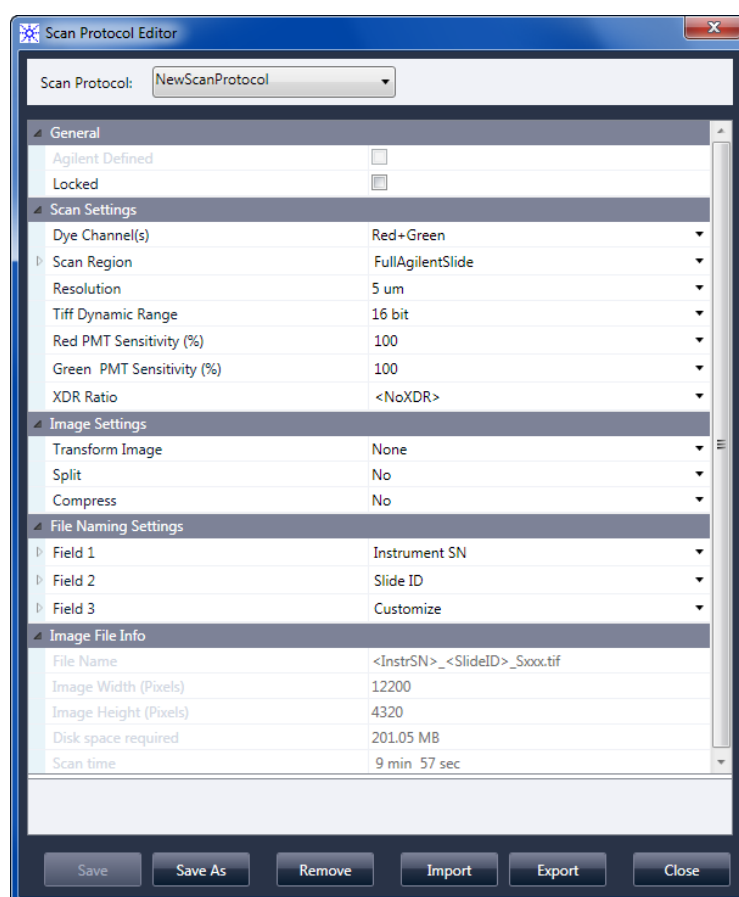


Figure 28 Scan Protocol Editor dialog box

Purpose: Used to create or change scan protocols.

To open: In the Scan Control program window, click **Tools > Scan Protocol Editor**.

Scan Protocol Displays a list of available scan protocols. The settings for the selected scan protocol are displayed in the Scan Protocol Editor dialog box.

General

Agilent Defined A protocol provided by Agilent.

Locked When a protocol is locked, it cannot be changed.

Scan Settings

Dye channel Determines whether only red (for example, Cy-5 dye), only green (for example, Cy-3 dye), or both dye channel information is gathered. The selection has no effect on the scan time, but selecting only one dye channel does reduce file size up to a factor of 2.

Scan region The *scan region* determines the area of the slide that is scanned. It must be large enough to capture the entire print region of the microarray. It must be small enough to avoid scanning too close to the barcode or other nontransparent border areas of the slide and affecting the ability of the scanner to auto focus properly. Minimizing the scan region also reduces scan time and save storage space.

Agilent provides a scan region suitable for all Agilent High Density and G3 slides, and another suitable for scanning full 1 x 3 slides without barcode labels.

For non-Agilent slides, you may need to use a custom scan region that better matches the printed region. See ["Creating and Changing Scan Regions"](#) on page 40.

Resolution Sets the scan resolution (pixel size) to 2, 3, 5 or 10 microns.

For 10-micron scans, each row of pixels in the TIFF image represents the average of two scan lines, one acquired in each direction. For 5-, 3- and 2-micron scans, you can select double-pass scanning to perform this averaging, or acquire only a single scan line for each image row.

A high-sensitivity scan mode is also available at all scan resolutions. The high-sensitivity mode provides sensitivity comparable to the double-pass mode but with scan times reduced by 25%. The high-sensitivity mode can be selected in the Resolution pull-down menu of the Scan Protocol Editor.

TIFF Dynamic Range Sets the dynamic range to 16-bit or 20-bit. The G4900DA scanner has extended the dynamic range of the PMT and signal processing electronics. When you select the 20-bit TIFF file option, you can access this extended range, enabling quantitation of high and low signal features in a single scan.

The Scan Control software still enables conventional XDR 16-bit scanning, as described below.

NOTE

If 20-bit option is selected, no XDR option is allowed; if an XDR option is selected already, it is reset automatically.

Table 11 shows the storage space and scan time for single and double pass scans for each resolution selected, for either a 16-bit TIFF dynamic range or a 20-bit range. The Scan Region is 61 X 21.6 mm.

The status bar at the bottom of the Scan Control main window shows an estimate of the storage space and run time required for the current queue of slides.

Table 11 Storage space and scan time

Resolution	Storage Space, Mb, 16-bit	Storage Space, Mb, 20-bit	Scan Time, min.
2-micron single pass	1300	1600	24
3-micron single pass	620	760	16

Table 11 Storage space and scan time (continued)

Resolution	Storage Space, Mb, 16-bit	Storage Space, Mb, 20-bit	Scan Time, min.
5-micron single pass	200	300	10
10-micron single pass	52	115	10
2-micron double pass	1300	1600	46
3-micron double pass	620	760	31
5-micron double pass	200	300	19
2-micron high-sensitivity	1300	1600	36
3-micron high-sensitivity	620	760	24
5-micron high-sensitivity	200	300	15
10-micron high-sensitivity	52	115	15

Double pass scans do not require more storage space than single pass scans, but they take twice as long to finish.

Red PMT Sensitivity (%) and Green PMT Sensitivity (%)

Sets the sensitivity level of the red channel and green channel PMTs. The PMT detects fluorescence emitted by the microarray.

The default output level (100%) sets the gain to the factory-calibrated level; this setting is recommended for Agilent microarrays. You can reduce each color channel setting independently to as low as 1%.

If a microarray is so bright that the upper end of the output signal is saturated, the PMT sensitivity level can be lowered to a sensitivity range that allows all the information to be read.

XDR Ratio

Before 20-bit TIFF file dynamic range was available, the eXtended Dynamic Range function was used on both the scanner and Feature Extraction program to capture all the data scanned between very low signal features and very high signal features. Now, instead of using XDR, you can select the 20-bit TIFF file dynamic range to capture the wide dynamic range of data.

NOTE

If 20-bit option is selected, no XDR option is allowed.

With the XDR function turned on, the scanner automatically scans the same slide twice, at two different PMT sensitivity levels. It generates two linked images that Feature Extraction coprocesses to yield a single unified set of extracted intensity data. This data covers up to 6+ orders of magnitude.

The Red or Green PMT Gain sets the high sensitivity level. The XDR function is automatically turned off at values lower than 10%.

The XDR ratio setting instructs the scanner to perform a second scan at lower PMT settings. For example, if the Red and Green PMTs are set to 100%, and the XDR ratio is set to 0.1, then the second scan is performed with the PMTs set to 10%. Available values are: <NoXDR>, 0.5, 0.2, 0.1, and 0.05.

Image Settings

Transform Image Some analysis programs require data from one-color images rotated 90 degrees. If you select Flip/Rotate, the image is transformed as shown in [Figure 29](#).

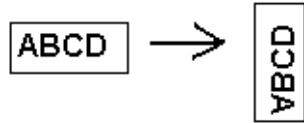


Figure 29 Image with Flip/Rotate option set

Split When you select Yes, the color file is split into two color files. The split files now have the names of *FileName_green* and *FileName_red*, where *FileName* is the name that was automatically assigned to the file before it was split.

This option is available only for 16-bit TIFF dynamic range scans.

NOTE

If a single dye channel, 20-bit scan, or any XDR option is selected, no Split option is allowed; if the Split option is selected already, it is reset automatically.

Compress When you select Yes, the program reduces the final amount of storage space occupied by scan images by compressing the TIFF files. The compression algorithm used, LZW, reduces the storage space by 20 to 70 percent.

File Naming Settings

Field 1, Field 2, and Field 3 Displays the settings used for naming TIFF image files created by the scanner. Choices are shown in [Table 12](#).

Table 12 Choices for file naming fields

Choice	Description
<none>	The field is not included in the image file name.
Instrument SN	Includes the serial number of the scanner in the image file name.
Slide ID	Includes the slide identification number (barcode) in the image file name.
Scan DateTime	Includes the date and time of the scan in the image file name.
Customize	Lets you type custom information to include in the image file name. After you select Customize , double-click Field X . (Where X = the field number 1, 2, or 3.) In the adjacent box, type the custom information to include in the file name.

Scan files are named using the following rules.

For *standard scans*, the Scan Control program uses up to three user-defined name prefixes to compose the file name. These prefixes are defined in the scan protocol.

Field1_Field2_Field3_ScanNumber.tif

For *XDR scans*, an additional segment (either _H or _L) is added to the file name to distinguish the XDR Hi image from the XDR Lo image:

Field1_Field2_Field3_ScanNumber_H.tif Field1_Field2_Field3_ScanNumber_L.tif

The Scan Control program automatically assigns the *Scan Number*.

The program compares the file name of a new scan with file names in the selected data folder.

If Field1_Field2_Field3 is unique, the scan number is set to S01.

If a match is found, the scan number is increased until the file name is unique.

Example

US4510PP02_251485023883_S03.tif

- Instrument Serial # = US4510PP02
- Slide ID = 251485023883
- ScanNumber = S03. Indicates the third scan file in the folder with the same Instrument Serial # and Slide ID.

Image File Info

This section is a read-only area that displays information about the image file name, geometry of the slide, disk space required for the file, and estimated time to finish the scan.

Scan Region Editor dialog box

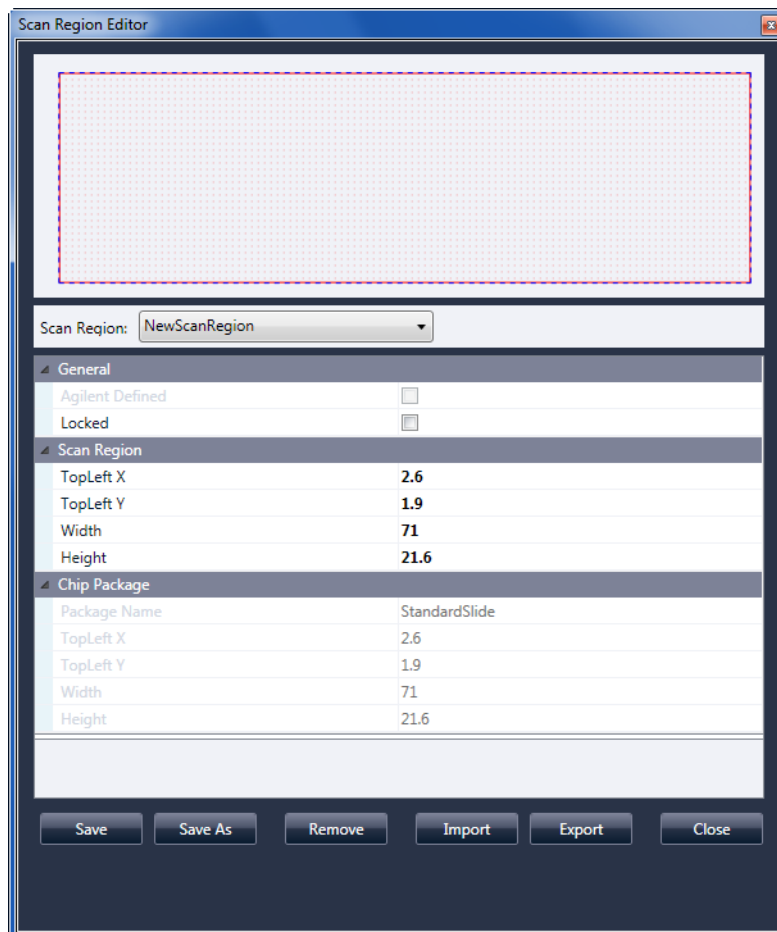


Figure 30 Scan Region Editor dialog box

Purpose: Lets you adjust or define the area of the slide that is scanned.

To open: In the Scan Control program menu bar, click **Tools > Scan Region Editor**.

General

Agilent Defined A protocol provided by Agilent.

Locked When a protocol is locked, it cannot be changed.

Scan Region

TopLeft X X-axis measurement for the upper left corner. Type this measurement and that of the Y-axis in mm to position the region on the slide.

TopLeft Y Y-axis measurement for the upper left corner.

Width Width of the scan region measured from the end of the x-axis measurement in the upper left corner.

Height Height of the scan region measured from the end of the Y-axis measurement in the upper left corner.

Chip Package

A chip package describes the maximum size of the scan region for slides of a designated type. This read-only area displays the default scan region for the selected chip package. There are two types of chip packages; Full Agilent for Agilent slides with barcode labels, and Full Standard for slides without barcode labels.

Save Saves the current scan region values in the current slide scan region. This button is unavailable if the scan region is an Agilent defined scan region or if it is used in an existing scan protocol.

Save As Opens the Save As New Name dialog box, where you can save the current scan region with a new name.

Remove Removes the selected scan region. This button is unavailable if the scan region is an Agilent defined scan region or if it is used in an existing scan protocol.

Import Opens the Open dialog box, where you select an exported scan region file to import to the program.

Export Opens the Export Scan Region dialog box, where you select one or more scan regions to export.

Close Closes the dialog box.

Self Test dialog box

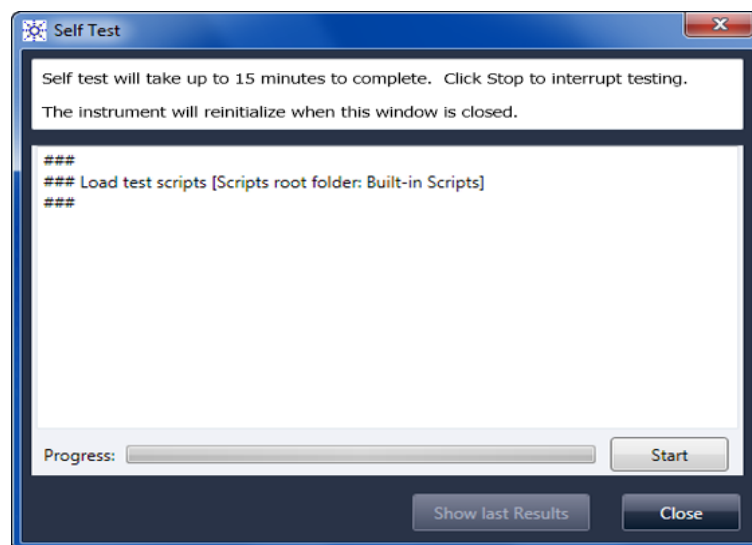


Figure 31 Self Test dialog box

Purpose: Examines various scanner subsystems to check for out-of-specification behavior. After the self test is finished, a summary of the results is opened in your internet browser. The test results are also saved in the C:\ProgramData\Agilent\MicroArrayScanner\SelfTestReport folder.

To open: In the Scan Control program menu bar, click **Tools > Self Test**.

- Start/Stop** Starts or stops the self-test.
- Show Last Results** If more than one self test was run without closing this dialog box, this command opens your internet browser with the results.
- Close** Closes the Self Test dialog box and reinitializes the scanner.

Settings dialog box – General Settings

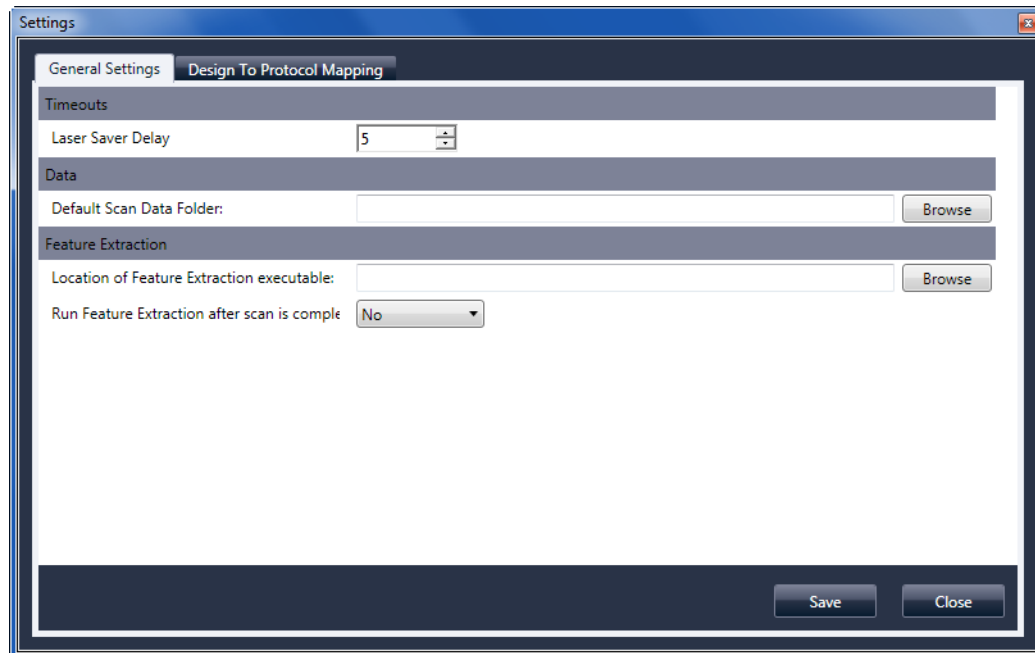


Figure 32 Settings dialog box – General Settings tab

- Browse** For settings that require a folder location, lets you browse to the folder and select it, rather than typing the path.
 - Save** Saves the settings. If you change settings and want to save them, select this button before you close the dialog box.
 - Close** Closes the dialog box without saving changes.
- Timeouts**
- Laser Saver Delay** When no scan or scan queue is running, the lasers automatically turn off after this amount of time (in minutes).
- Data**
- Default Scan Data Folder** Displays the folder where images created by the scanner are stored by default. You can change this folder for a scan in the Scan Table.

Feature Extraction

Location of Feature Extraction

The path to the FENoWindows.exe program file. By default, this location is C:\Program Files (x86)\Agilent\MicroArray\FeatureExtraction\FeNoWindows.exe.

Run Feature Extraction when scan is complete

When selected, slides are feature extracted automatically after they are scanned. To run Feature Extraction automatically, the design files for all images must already be present in the Feature Extraction database.

NOTE

To use Agilent CytoGenomics in auto-processing mode, do not select Run Feature Extraction when scan is complete. (The Agilent CytoGenomics program is not included with the SureScan Microarray Scanner System.)

Settings dialog box – Design To Protocol Mapping

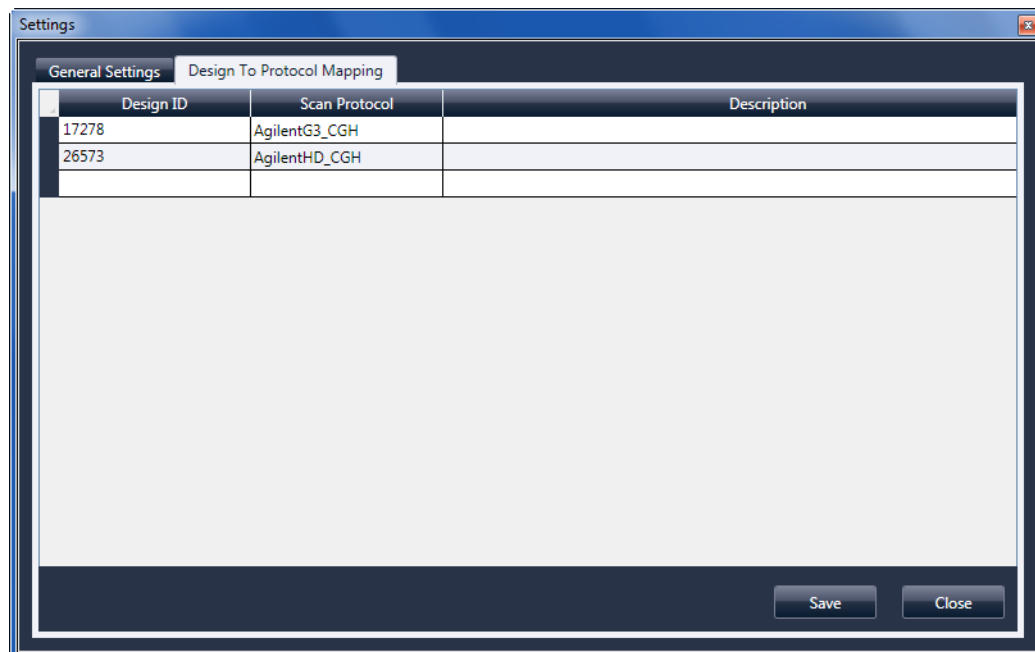


Figure 33 Settings dialog box - Design To Protocol Mapping tab

Purpose: Used to assign default scan protocols to microarray slide Design IDs. Whenever the scanner recognizes a slide that has a scan protocol mapped to its design, the program automatically fills in the mapped scan protocol in the Slot Table.

To open: In the Scan Control program menu bar, click **Tools > Settings** and then click **Design To Protocol Mapping**.

Design ID

For Agilent microarray slides, you can determine the Design ID from the barcode. All barcodes start with 25; the next five digits represent the Design ID. For example, the Design ID for barcode 251727810298 is 17278.

Scan Protocol	The scan protocol that is assigned to the Design ID. This scan protocol is automatically assigned in the Slot Table whenever the scanner recognizes a slide with the associated Design ID.
Description	An area where you can type information about the mapped scan protocol.

About Adding Slides

You can add slides to the scanner even when it is scanning. Use the following guidelines when adding slides to the scanner.

- You can add slides (in slide holders) to the cassette even when scanning is in process. If a slide is actively loading or unloading, you cannot open the door. Wait approximately 30 seconds for the loading or unloading process to finish.
- When the door is open, the scanner waits to eject a slide that is currently scanning.
- If the door is left open with no activity for 5 minutes, a message appears to warn you that the door is about to close, and then the door closes automatically.
- If you place a slide into the slot for a slide that is currently scanning, the slot status indicator turns red, and a message appears instructing you to remove the slide.
- If the door jams while closing (due to an incorrectly inserted slide holder, for example) a dialog is displayed that asks you to clear the jam and then click **OK** to try again.

Performing Feature Extraction on Scanned Images

NOTE

The Feature Extraction program is preinstalled on your scanner workstation.

The Agilent CytoGenomics program is not included with the SureScan Microarray Scanner System.

There are a number of ways you can do feature extraction on the scanned image files created by your scanner:

- Set up the Scan Control program to run Feature Extraction automatically as the slides are scanned. See [“To set the location of the Feature Extraction program”](#) on page 47 and [“To select to run Feature Extraction after scanning”](#) on page 48. The Scan Control program automatically creates a project file that is used to feature extract the image after it is scanned. The Feature Extraction database must contain the design (grid) for the image, or you must have the Feature Extraction program configured to use the eArray server during extraction.
- Run the Feature Extraction program manually after the scanned images are created. For information on using the Feature Extraction program, see the documentation provided with the program.
- To use Agilent CytoGenomics to feature extract the images, set the output folder to the auto-processing TIFF image folder configured in the Agilent CytoGenomics program. The CytoGenomics program picks up the images automatically and then feature extracts and analyzes them. For more information, see the Agilent CytoGenomics program documentation.

SureScan Scanner Specifications

The scanner operates within the following specifications:

Approximate dimensions	Height: 42 cm (16.5 in) Width: 43 cm (17 in) Depth: 67 cm (26 in)
Weight	56.8 kg (125 lbs)
Power input	100 – 240 Vac, 50 - 60 Hz, 250-VA max.
Fuses	Two power supply fuses: T4A, 250 VAC (part# 2110-1491)
Temperature range	Operating: 15 ° to 30 °C Storage: –40 ° to +50 °C
Humidity	Operating: 15% to 85% RH at 30 °C Potentially sensitive to condensing humidity conditions. Follow precautions stated in “Tips to avoid damage to the scanner” on page 52. Always allow 12 hours thermal equilibration time on site before opening the shipping box.
Altitude	Operating maximum: 3000 m Storage maximum: 9200 m (30,000 ft) at –40 °C
Usage	Indoor use
Laser information	Wavelengths: <ul style="list-style-type: none"> • Green solid-state laser: 532 nm • Red solid-state laser: 640 nm Power: both controlled to 13 mW
Maximum scan region	71 mm x 21.6 mm
Suggested microarray print region	1 mm smaller than scan region on the right, 2 mm on the left, and 0.6 mm on the top and bottom. For non-Agilent slides, the print region is smaller than this by an amount equal to the array printing tolerance.
Dyes supported	Cyanine-3 (Cy-3) and cyanine-5 (Cy-5) and dyes similar to Cy-3 and Cy-5 and Alexa 647, 555, and 660 dyes
Resolution (pixel size)	2, 3, 5 or 10 microns
Pixel placement error	< 1 pixel at 5-micron resolution
Uniformity	Average Global non-uniformity: $\leq 5\%$ using $100\ \mu\text{m}^2$ features Average Local non-uniformity: $\leq 2\%$ using $100\ \mu\text{m}^2$ features* * Typical average Local non-uniformity is $\leq 1\%$ using $100\ \mu\text{m}^2$ features

Scan time**Table 13** Scan Time for Single and Double Pass Scans for Agilent HD Scan Region 61 x 21.6 mm

Resolution	Scan Time, min.
2-micron single pass	24
3-micron single pass	16
5-micron single pass	10
10-micron single pass	10
2-micron double pass	46
3-micron double pass	31
5-micron double pass	19
2-micron high-sensitivity	36
3-micron high-sensitivity	24
5-micron high-sensitivity	15
10-micron high-sensitivity	15

Dynamic range

Single scan 16-bit dynamic range $>10^4$
Single scan 20-bit dynamic range $>10^5$
Dual scan extended dynamic range (XDR) $>10^6$

Slide Specifications

Scan dimensions

The scan region for a standard Agilent microarray is specified in [Figure 34](#). All dimensions are in millimeters and the reference point is the lower right side of the glass.

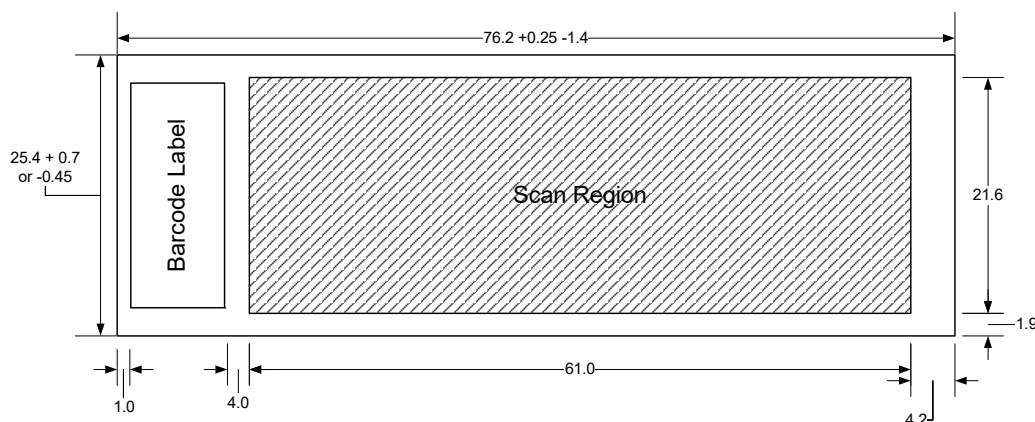


Figure 34 Default scan region for G4900DA scanner

Glass specifications

The scanner uses slide holders to move the microarrays in and out of the cassette. These slide holders are designed to accept a 1 in × 3 in nominal piece of glass.

The detailed specifications of the glass are as follows:

- 1 inch wide (25.4 mm, -0.45 mm, or +0.7 mm)
- 3 inches long (76.2 mm, +0.25 mm, or -1.4 mm)
- 1 mm thick (+/-0.1 mm)
- No mirrored slides
- High quality with low intrinsic fluorescence
- Index of refraction from 1.510 to 1.515

Barcode and barcode label specifications

Barcode specifications for Agilent slides

The G4900DA scanner reads barcodes placed on the active side of the slide.

For backwards compatibility with the G2565AA model scanners, Agilent microarrays continue to have barcodes on both sides. The label with the text "Agilent" denotes the active side; the label with the numeric value is the inactive side.

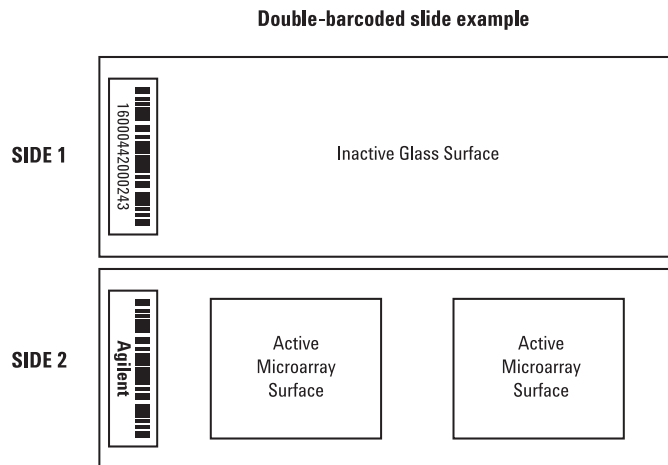


Figure 35 Agilent slide barcode orientation vs. microarray surface

Barcode specifications for non-Agilent slides

- The barcode label maximum thickness is 0.2 mm. Make sure that there are no bubbles in the label. Do not add labels on top of old labels or replace labels that are beginning to peel off.
- Do not place barcode labels on slides whose scan region exceeds 61 mm. Enter the slide identifier or barcode manually for slides whose scan regions exceed 61 mm.
- For a barcoded slide, the distance between the edge of the microarray scan region and the edge of the barcode label can be no less than 4 mm.

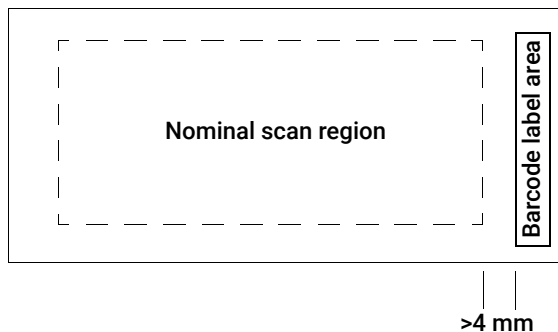


Figure 36 Barcode label location on non-Agilent slide

- The barcode label width should be about 6 mm; the recommended barcode label width is for use with the 61-mm scan region. Larger or longer barcode labels can be used by decreasing the scan region proportionally.
- Barcode labels should be narrow enough so as not to interfere with the slide holder tabs.
- Maximum allowable tilt in the placement of the barcode label on the slide is $\pm 3^\circ$.

The barcode must meet the following requirements:

- The minimum quiet zone (the region between the edge of the label and the start or end of the barcode) is ten times the X-dimension on each side of the barcode.
- Barcode lines must be parallel to the long edge of the slide within tilt tolerance of $\pm 3^\circ$.
- Agilent supports the following barcode formats:

- Code 128: Non-Agilent barcodes with 12 digits must not start with 2
- CODABAR: Maximum of eight digits; minimum line thickness = 6 mils
- Code 39: Maximum of eight digits; minimum line thickness = 6 mils
- Code 93: Maximum of eight digits; minimum line thickness = 6 mils
- Minimum height of barcode must be
 - Code 128: 15% of barcode length for Code 128
 - Code 39, Code 93, CODABAR: 5 mm or 15% of barcode length, whichever is greater

Regulatory Information

This section lists regulatory information for the SureScan Microarray Scanner System, which includes the G2600D SureScan microarray scanner, computer workstation, and control software.

For Research Use Only. Not for use in diagnostic procedures.

Acoustic noise information

Manufacturer's Declaration:

- | | |
|----------------|---|
| English | This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991. Sound Pressure $L_p < 70$ dB(A), at operator's position, normal operation, according to EN 27779/ISO 7779 (Type Test). |
| Deutsch | Die folgende Information wird in Übereinstimmung mit den Anforderungen der Maschinenlärminformationsverordnung vom 18. Januar 1991 erteilt. Schalldruckpegel am Arbeitsplatz bei normalem Betrieb, $L_p < 70$ dB(A), nach EN 27779/ISO 7779 (Typprüfung). |

Recycling and disposal

This device is designed to accommodate recycling at the end of its useful life. Please dispose of this device in accordance with local regulations.

Contact Agilent Technologies for more information on recycling and disposal.

Electromagnetic interference

The scanner is intended for use with shielded cables only.

- | | |
|------------------|---|
| Emissions | Complies with the emissions limits for Class A, Group 1 equipment specified in CISPR 11/EN5011 as required in IEC 61326-1 for Class A equipment. This equipment is not intended for use in residential areas. |
| Immunity | This device complies with the immunity levels required in IEC 61326-2-6 for a non-controlled, electromagnetic environment. This equipment is not intended for use in residential or industrial environment. See accompanying Declaration of Conformity for specific levels. |
| Canada | This ISM (Industrial-Scientific-Medical) device complies with Canadian ICES-001.
Cet appareil ISM est conforme a la norme NMB-001 du Canada. |

Safety information

This scanner complies with the following safety standards:

CAN/CSA- C22.2 No. 61010-1 - 04	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements
UL Std No. 61010-1 (2nd Edition)	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use: Part 1: General Requirements
IEC 61010-1:2001	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements
EN 61010-1:2001	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements
IEC 60825-1:2007	Safety of laser products Part 1: Equipment classification and requirements
EN60825-1:2007	Safety of Laser Product – Part 1: Equipment Classification and Requirements

- Pollution Degree: 2
- Installation Category: II
- Class I Equipment; requires a grounding system
- Class 1 Laser Product
- CSA and NRTL Certified Product

Manufacturer



Agilent Technologies Singapore (International)
Pte Ltd. No. 1 Yishun Avenue 7, Singapore 768923
Manufactured at:
Agilent Technologies Singapore Pte Ltd.
No. 1 Yishun Avenue 7, Singapore 768923
SINGAPORE
www.agilent.com

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