ABI PRISM® 7700 Sequence Detection System: Routine Maintenance

Overview

The ABI PRISM® 7700 Sequence Detection System (SDS) and the Macintosh® computer that runs the SDS need to be properly and routinely maintained to ensure optimum performance of the system. This document covers the following maintenance topics:

- Maintenance of the ABI PRISM® 7700 SDS instrument

- Performance verification of the ABI PRISM® 7700 SDS instrument

- Maintenance of the Macintosh® computer system

ABI PRISM® 7700 SDS Instrument Maintenance

Applied Biosystems recommends that the ABI PRISM® 7700 SDS be powered on at all times to maintain the internal components at a constant temperature. The constant temperature ensures that the camera, spectrograph, and laser are all functioning properly. Laser function is not affected because the laser is programmed to go into a sleep mode during periods when the instrument is not running, thereby conserving laser power.

In cases where the instrument will not be used for an extended period of time, the instrument can be powered off. When returning to use the instrument, power on the instrument at least 1 to 2 hours before use to allow all the components to warm up and reach a constant temperature.

ABI PRISM® 7700 SDS Sample Block Maintenance

Applied Biosystems recommends that the ABI PRISM® 7700 SDS sample block be regularly cleaned because use of the system can result in contamination of the sample block with PCR products or fluorescent materials. To protect against such contamination, Applied Biosystems recommends checking the block regularly for fluorescence contamination and cleaning regularly. Applied Biosystems recommends cleaning the block every 3 to 6 months (depending on use) and then running new Background components and Pure Spectra.

Checking the block for contamination and cleaning the block

1. Pipette 50 µL of water into all the wells of a MicroAmp® 96-well optical plate (P/N N801-0560) and cover the wells with ABI PRISM™ optical caps (P/N 4323032) or an ABI PRISM™ optical adhesive cover (P/N 4311971) and compression pad (P/N 4312639). Place the plate into the sample block. Slide the cover over the block and tighten the lid.

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2. Launch the SDS software, then select **File** > **New Plate**. Select **Background** as the Plate Type. Select **OK**. The software automatically sets up a run for 2 minutes at 60°C.

3. Select **Show Analysis**. Then, select the **Run** button.

4. When the run is complete, analyze the Raw Spectra. Verify that all wells are below 1200 fluorescent spectral units (FSU); (Figure 1). Wells above 1200 FSU are considered irregular and could be contaminated. To identify the location of contaminated wells, deselect the spectra listed in the Data Series until the wells above 1200 FSU disappear. Please note the location of these wells.

5. If any wells are over 1200 FSU, use a 10% bleach solution and a cotton swab to scrub the affected wells. Gently rinse the wells several times with a cotton swab and deionized water, followed by a final wash with a cotton swab soaked with 95% ethanol to remove any residual bleach. **DO NOT** slide the cover over the wells during this cleaning process because any bleach not removed can damage the well lenses.

   Use a vacuum suction or a swab to remove any remaining liquid. Allow the sample block to thoroughly dry by letting the instrument idle with the heated cover slid back away from the wells.

   Repeat steps 1 through 4 after cleaning. If wells repeatedly show fluorescence over 1200 units, the contamination may be on the optical lenses within the heated cover. To check for lens contamination, perform the following procedure for checking the well lenses.

Figure 1. Contaminated Wells
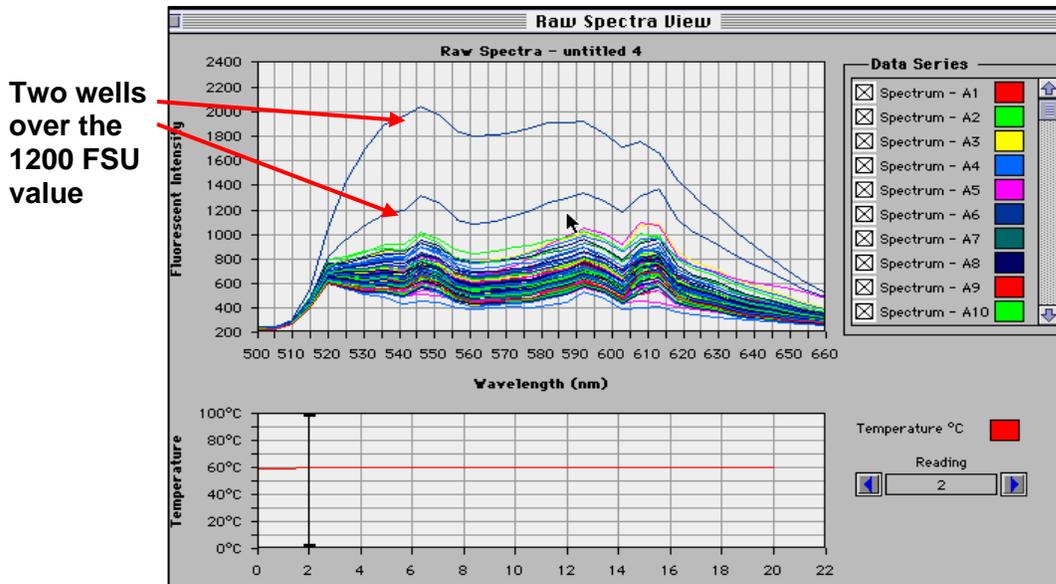
Checking the well lenses

1. Locate the blackboard tray (P/N 604094) supplied with the instrument (Figure 2).

2. Place the blackboard tray on the block (brown side up) by positioning the holes over the two pins at the back of the block. Close the heated cover.

3. Launch the SDS software and select **File** > **New Plate**. Select **Background** as the Plate Type. Select **OK.** The software automatically sets up a run for 2 minutes at 60 °C.
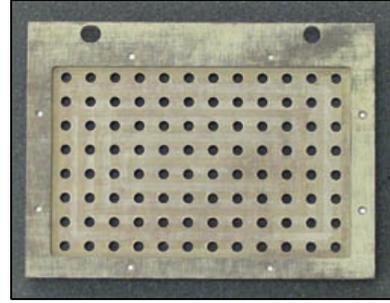
Figure 2. Blackboard tray

4. Select **Show Analysis**. Then, select the **Run** button.

5. When the run is complete, analyze the Raw Spectra. If fluorescence is still above 1200 FSU (Figure 1), potential contamination is likely along some point of the optical path. Service by an Applied Biosystems service technician will be needed to remove the fluorescent contamination. **NOTE: You should not attempt to clean the heated cover lenses.**

6. If fluorescence is not above 1200 FSU when you run the blackboard tray, then the block is contaminated. Repeat the procedure for checking and cleaning the block.

Generating new spectra components

Applied Biosystems recommends that a new Background and Pure Spectra be generated every 3 to 6 months (depending on use), or anytime the block is cleaned. Refer to User Bulletin #4, "Generating Spectra Components" (Document P/N 4306234, available at http://docs.appliedbiosystems.com/pebiodocs/04306234.pdf) to generate new Pure Spectra and Background components using the spectral calibration kit (P/N 4305822).

Note: The Background and Pure Spectra files are saved in the Spectra Components folder on the hard drive in the SDS folder (hard drive > system folder > preferences > SDS > Spectra Components; Figure 3). A Background and Pure Dye Spectra file must be in the SDS folder to open a new plate or start a run.
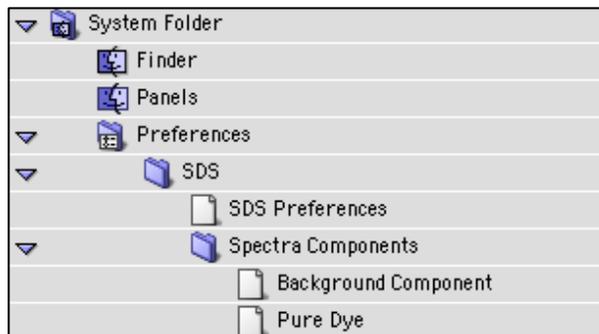
Figure 3. Location of the Background and Pure Dye Spectra files

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Verifying the performance of the instrument

Applied Biosystems recommends that you verify the performance of the instrument every 6 months. The TaqMan® RNase P Instrument Verification Plate (P/N 4310982) is used to verify the instrument performance.

The sealed plate is preloaded with the necessary reagents for the detection and quantification of genomic copies of the human RNase P gene. The RNase P gene is a single-copy gene encoding the RNA moiety of the RNase P enzyme. Each well contains preloaded reaction mix (1X TaqMan® Universal PCR Master Mix, RNase P primers, and FAM™ dye-labeled probe) and template.

The TaqMan® RNase P Instrument Verification Plate satisfies the same requirements as the ABI PRISM® 7700 installation procedure. To pass installation, an ABI PRISM® 7700 SDS instrument must demonstrate the ability to distinguish between 5,000 and 10,000 genomic equivalents with a 99.7% confidence level for a subsequent sample run in a single well.

The ABI PRISM® 7700 SDS installation specifications are verified if the following equation is satisfied:

$$[(Copy.Unk.1) - 3(STDev.Unk.1)] > [(Copy.Unk.2) + 3(STDev.Unk.2)]$$

where

Copy.Unk.1 = The average copy number of unknown #1

STDev.Unk.1 = The standard deviation of unknown #1

Copy.Unk.2 = The average copy number of unknown #2

STDev.Unk.2 = The standard deviation of unknown #2

For more detailed instructions on how to run the plate, refer to the product insert (Document P/N 4314333).

Operating and Maintaining the Macintosh Computer

The Macintosh® Computer that operates the ABI PRISM® 7700 needs to be maintained properly for optimal performance. Many errors perceived as SDS Software errors are the result of improper computer maintenance.

Use the following guidelines to maintain your Macintosh® computer:

1. Program installation and networking

  a. Do **not** install nonessential programs on the computer running the ABI PRISM® 7700 instrument.

  b. Do not connect the computer to a network. Networks interfere with the computer's ability to communicate with the instrument.

  c. If the computer is networked, unplug the network cable during instrument operation.

d. Do not upgrade the Macintosh® Operating Systems software without first contacting an authorized Applied Biosystems Representative.

2. Archive data regularly

a. Archive files using Macintosh® OS-formatted Zip® disks or CDs.

b. Keep no more than five real-time run files or raw data files (or no greater than 50 MB of data) in the SDS Runs ƒ folder.   Routinely move these run files to another location on the hard drive or to an external storage medium.

c. If you have more than 50 MB of data stored in the folder, the following error message appears when the software is launched (Figure 4). If this message is displayed, move the run files to another location.

There is more than 50 megabytes of data in the Runs folder. You should archive the data and remove it from your hard drive.

OK
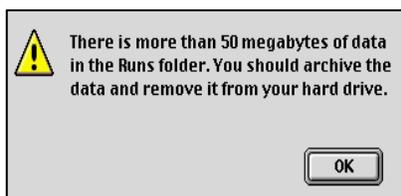
Figure 4.   50 MB Error Message

If a run is initiated after this error message appears, or if there is more than 50 MB of data in the file, the software may not create a run file for the new run, and no data will be collected.

3. Run Norton Utilities® software

a. A Norton Utilities® software CD is provided with the instrument. Run both Norton Disk Doctor® (to optimize the system directories) and Speed Disk (to defragment the hard drive) utilities directly from the CD. Start the computer by inserting the CD and holding down the 'c' key while restarting. **Do not install this program onto the hard drive of the computer.**

b. Applied Biosystems recommends performing Norton Disk Doctor and Speed Disk utilities weekly or monthly, depending on instrument use.

4. Rebuild the desktop

a. Hold down the **Option** and **Apple** keys while restarting the computer. Continue to hold the keys down until you are prompted to rebuild the desktop.

b. Applied Biosystems recommends rebuilding the desktop weekly.

5. Throw out the SDS Preferences

The SDS preferences file is overwritten every time a run is performed. Because the file can become corrupted over time, regularly move the file to the Trash.

a. Go to the SDS Preferences file at **Hard Drive** > **System Folder** > **Preferences** > **SDS** > **SDS Preferences** (Figure 5).

Drag only the SDS Preferences file to the trash.
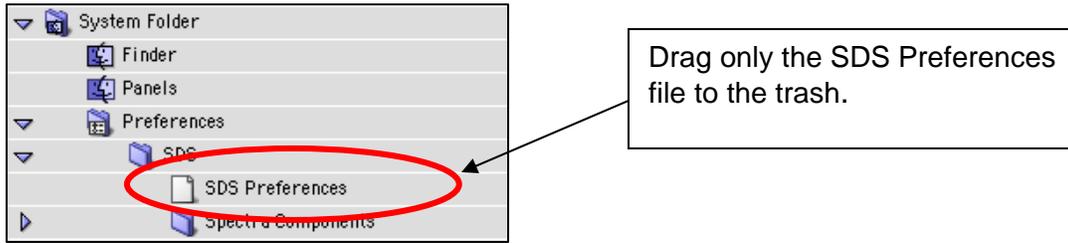
Figure 5. Location of the SDS Preferences file

b. Drag the file to the trash, then empty the trash and restart the computer.

c. Perform this function weekly.

WARNING! DO NOT throw away any other items in the SDS folder. Calibration will be lost.

6. Energy Saver Settings
a. The Energy Saver extension should be set to **on** and the Energy Saver functions should be set to **never**.

b. Go to the Apple menu and select **Energy Saver**. All functions should be set to never (Figure 6).
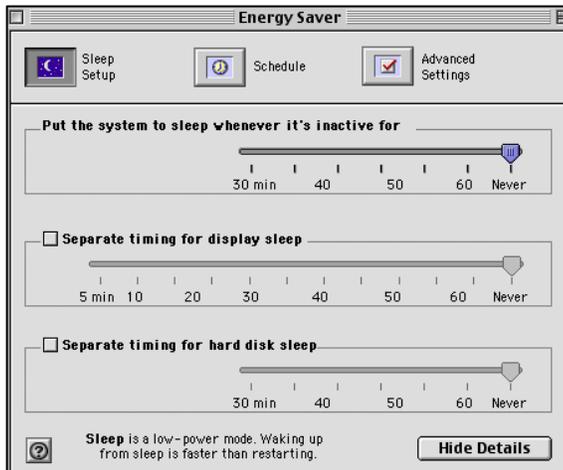
Figure 6. Energy Saver Settings

Summary

Instrument Operation and Maintenance

Leave the ABI PRISM® 7700 SDS on at all times, especially during high use of the instrument.

- The software must have a Pure Spectra and Background file to open a new plate or start a run.

- Check the thermal block for contamination, and clean it regularly.

Macintosh® Computer Operation and Maintenance

- Maintenance of the Macintosh® computer that runs the instrument can improve overall system performance and reduce potential downtime of the system.

- Networking and installation of nonessential programs are not recommended for the Macintosh® computer used with the ABI PRISM® 7700 SDS.

Use Norton Utilities software on a continual basis to ensure computer performance. Never load Norton Utilities directly to your hard drive. Always run the program from the CD.
Maintenance Schedule

	Weekly	Monthly	Every 3-6 months	Every 6 months
Rebuild Desktop	X			
Check Energy Settings	X			
Trash SDS Preferences	X			
Archive Data*	X	X		
Run Norton Utilities Software*	X	X		
Check for Fluorescent Contamination			X	
Generate new spectra components			X	
Instrument Verification				X

Depending on instrument usage

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