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About This Manual

Document Purpose and Intended Audience

This document provides the users of the Spirit Sampler with instructions for setting up and measuring spirits with their instrument.

What’s New in this Document

This version of the Spirit Sampler Installation and Operation Manual updates maintenance information.

Document Summary

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<th>Chapter</th>
<th>Description</th>
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<tbody>
<tr>
<td>Chapter 1:</td>
<td>Contains descriptive information about the Spirit Sampler.</td>
</tr>
<tr>
<td>Chapter 2:</td>
<td>Provides instructions for setting up the Spirit Sampler.</td>
</tr>
<tr>
<td>Chapter 3:</td>
<td>Provides instructions for using the Brand Manager and Authenticator software.</td>
</tr>
<tr>
<td>Appendix A:</td>
<td>Contains maintenance information for the flow cells, battery and light source.</td>
</tr>
<tr>
<td>Appendix B:</td>
<td>Lists product specifications.</td>
</tr>
</tbody>
</table>

Product-Related Documentation

You can access documentation for Ocean Optics products by visiting our website at http://www.oceanoptics.com. Select Support → Technical Documents, then choose the appropriate document from the available drop-down lists.

Upgrades

Occasionally, you may find that you need Ocean Optics to make a change or an upgrade to your system. To facilitate these changes, you must first contact Customer Support and obtain a Return Merchandise Authorization (RMA) number. Please contact Ocean Optics for specific instructions when returning a product.
Warranty

Our 1-Year Warranty covers Ocean Optics OEM equipment from manufacturing defects: http://www.oceanoptics.com/warranty.asp

This comprehensive warranty ensures you of the highest level of craftsmanship and reliability.

The warranty covers parts and labor needed to repair manufacturing defects that occur during the warranty period. We also will cover the costs of shipping warranty-related repairs from our customers to Ocean Optics and from us to our customers.
Chapter 1

Introduction

Spirit Sampler Overview

The Spirit Sampler is an instrument for identifying the authenticity of spirits by comparing the spectrum of the sample to be verified against a standard spectrum for the chosen brand. The measurement taken is an absorbance spectrum - light absorbed by the sample is compared against a standard reference liquid, typically distilled water. The resulting spectrum is compared against the expected spectrum using a widely used statistical technique known as the sum of squares of Z-scores. The result is a score that allows a simple classification: pass, fail or almost matches. The Authenticator software is an easy to use interface that guides the user through the steps necessary to perform these measurements and automatically performs the necessary calculations, returning a quick and simple result.

The system is installed in a protective hard shell traveling case, allowing you to take the power of a quality control lab with you into any environment.

Other convenience features include:

- Fast sample analysis (in less than 15 seconds)
- Simple data presentation in an easy-to-understand format
- Easy loading of samples with separate channels for clear, light and dark spirits
- Simple, on-screen prompts to guide you through a measurement
System Description

The Spirit Sampler Pelican Case™ stores the following Spirit Sampler components:

- USB2000+ Spectrometer and UV-VIS lamp built into the case for taking measurements.
- A removable touchscreen tablet computer, which can be coupled to the mounted keyboard for data entry, email and other Windows applications, or detached for truly portable offline data analysis.
- Three pairs of fluid ports labeled for injection and removal of clear (vodka), light (whisky), or dark (rum) spirit samples
- Three outflow tubes
- Four syringes
- LED indicators for battery charge status.
- Two standard USB ports for data transfer and peripherals
- A standard power connector for overnight recharging
- A multi-pocket accessory bag.

The case also includes a cavity for accessory storage.
Spirit Sampler Software

The Spirit Sampler software provides for setting up a customized database and authenticating spirit samples. It consists of these two main functions:

- **Authenticator** -- Used to collect brand sample absorbance data to initially collect absorbance data for the Brand Manager to develop spirit profiles. The Authenticator Admin preferences function allows you to customize your Spirit Sampler system for use in the field to authenticate spirits. See Chapter 3: *Operation* for more information on how to use the Authenticator software.

- **Brand Manager** -- Used to develop absorbance profiles for brands specific to your needs and then export this database for use by the Authenticator in field testing. See Chapter 3: *Operation* for more information on using the Brand Manager software.
Chapter 2

System Set-up

Overview

The set-up of the Spirit Sampler is quick and easy. Just apply power to the system, turn on the tablet, and set up your sampling ports.

System Power-on

The Spirit Sampler can draw power from either the system battery or through the supplied power cord from the mains. Two status LEDs are provided next to the main power switch. Their meanings are as follows:

<table>
<thead>
<tr>
<th>System LEDs Condition</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green, Off</td>
<td>The power cord is NOT plugged in to the system. The main battery is the power source.</td>
</tr>
<tr>
<td>Green, Blinking</td>
<td>The power cord is plugged in to the system and mains is the source of power. The main battery is actively charging.</td>
</tr>
<tr>
<td>Green, Steady</td>
<td>The main battery is fully charged. The power cord can be disconnected.</td>
</tr>
<tr>
<td>Red, Off</td>
<td>The system is turned OFF. Power switch is OFF and/or the tablet is turned OFF. If power switch is on and the red LED is OFF, then either the tablet is not turned on, or there is an error condition. The system has no power. Either the power switch has not been set to ON, or the battery is dead and needs to be recharged by plugging the power cord into a power source.</td>
</tr>
<tr>
<td>Red, Blinking</td>
<td>N/A</td>
</tr>
<tr>
<td>Red, Steady</td>
<td>The system is turned ON. Power switch is ON and the tablet may be turned ON.</td>
</tr>
</tbody>
</table>
There is also a small LED on the tablet itself, just to the right of the power button (along the top-left edge when opened, viewable from above). This LED has the following states:

<table>
<thead>
<tr>
<th>Tablet LED Condition</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark</td>
<td>Mains power is not connected. The tablet may boot if it has sufficient internal battery charge, or it may fail to boot if its internal battery is fully discharged.</td>
</tr>
<tr>
<td>Orange</td>
<td>Mains power is connected, and the tablet is actively charging. The tablet may or may not have sufficient charge to boot. If it does not boot and the light is orange, please wait 10 minutes for it to accrue enough charge to boot.</td>
</tr>
<tr>
<td>White</td>
<td>Mains power is connected, but the tablet is not charging because it is fully charged. There should be no reason for the tablet to fail to boot while a white light is showing.</td>
</tr>
</tbody>
</table>

**Procedure**

To turn on the Spirit Sampler system,

1. Turn on the main power switch (back left).
2. Boot the tablet by pressing the thin black button along the top-left edge (when opened as a laptop) of the tablet display. The tablet should then boot directly to the Spirit Sampler Authenticator software application.

---

**Caution**

If the main power switch is turned off while the Authenticator software is running, undefined behavior can result. Turn the power switch back on, and then reboot the tablet.

---

**Note**

If the main power switch is turned off (or the main battery is completely discharged), the tablet itself can continue to operate through its own internal battery. However, the tablet will not be able to authenticate new samples (the spectrometer, lamp and shutters will be unpowered). Also, the two external USB ports exposed on the main system tray (back center) will also be unpowered, preventing the tablet from accessing thumb drives, printers, etc.
Tablet Start-up

► Procedure

To reboot the Spirit Sampler tablet,
1. Be sure that the system is powered on (see System Power-on).
2. On the tablet, swipe from right side of screen.
   a. Tap Settings.
   b. Tap Power.
   c. Tap Restart.

Tablet Removal from the Case

The tablet can be removed from the case by raising the front lid (exposing the keyboard of the tablet), then pressing the silver button in the back center of the keyboard.

If you decide to remove the tablet for offline operation, the micro-USB power cable will need to be disconnected for removal, and then reconnected when the tablet is restored.

Connecting the Outflow Tubes

The system includes three clear plastic outflow tubes, which may be in the accessory bin (back right) or accessory bag (lid cavity). These tubes attach to the clear, light and dark channel ports.

Slide these three outflow tubes over the three labeled outflow ports, such that their free ends hang over the edge of the case (outside the system). Place a beaker or cup beneath these tubes (all three tubes may point into a single beaker) since they release excess water and spirits from the system during use.

Spirit Sampler Outflow Ports

The Spirit Sampler system, includes a cup holder, it is recommended to unfold it and place it in front of the outflow tubes and place inside of it a cup to dispose the spirits.
Spirit Sampler Cup Holder
Chapter 3

Operation

Overview

The standard Spirit Sampler Authenticator software menu is organized as follows:
3: Operation

Start-up
- Default Session Folder
- User selection
- Warm-up
- Reference

Main Menu
- Authenticate
  - Prepare Sample
    - Cancel
    - Load
      - Done
      - Reload
      - Next (Identify Sample)
  - Identify Sample
  - Analyze Sample
    - Cancel
    - Rereference
    - Resample
    - Save
    - Graph
  - Analyze Complete
- Reference
  - Insert Reference
  - Take Reference
Starting Authenticator Software

► Procedure

1. Double-click the executable. The Spirit Sampler Authenticator Software opens with a dialog window asking for the default session folder.

2. Click Yes to use the default session folder, located at C:\Users\Spirit Sampler\Documents\Ocean Optics\Spirit Sampler\sessions\(Spirit Sampler serial number-Automatic default Session number).

   or

   Click No to use a different location for the session folder. The Browse For Folder dialog window appears for you to browse for the desire location or create a new folder. Then click OK.
3. Choose to for the software to behave in **Admin mode** or **Field mode**:

- **Admin mode** – provides full functionality to the configuration options (such as add, edit and modify libraries and parameters of the software itself).
- **Field mode** -- provides only the ability to authenticate spirits.
4. To work in **Field mode**, click the **Switch User…** button. In the Admin Login window, type the password and click **Login**. After you have entered the admin password, you can switch between the Admin and Field modes just by clicking the **Switch User** button in the upper right corner.

5. Allow the system to warm up. There is a minimum recommended warm-up period of around 10 minutes that must be allowed for the light source to stabilize. The Authenticator software enforces this warm-up period by disabling any further action in the software until the period has expired. Wait until the status progress bar finishes and click **Next**.
Notes

If the tablet appears to be working, but the lamp disconnects itself during the warm-up procedure (causing an audible beep) this may indicate a low main system battery. Please plug the system into mains power and let it charge for an hour, and the problem should not recur.

The **Skip** button is only for factory debugging purposes; it is never recommended to use this function. If you do wish to bypass this warm-up period with Administrator privileges, click the **Skip** button. A new dialog window appears for you to enter the admin password and click **Login**.
Collecting Reference Samples

The Spirit Sampler Authenticator software walks you through taking reference measurements to be used by the Brand Manager for creating a profile database. If the unit is being operated for a prolonged period it may be necessary to perform a reference measurement again to recalibrate the instrument. The software automatically keeps track of how long it has been since the instrument was referenced and prompts you when a new reference is necessary.

► **Procedure**

1. Inject 30 ml of distilled water from a syringe into the ports on the top row to clear the system to take a reference measurement. Be sure that the tubes connected to the overflow ports on the bottom row are resting in a container to collect the excess water. Then click Next.
 Allow some time for the system to auto-calibrate. The **Taking Reference** window appears.

---

**Note**

The **Skip** button is only for factory debugging purposes; it is never recommended to use this function. If you do wish to bypass this warm-up period with Administrator privileges, click the **Skip** button. A new dialog window appears for you to enter the admin password and click **Login**.
6. The **Taking Reference** screen offers the option to perform the following tasks:
   - **Admin**: Displays the **Admin Menu**.
   - **Retry**: Retakes the reference auto-calibration.
   - **Next**: Displays the **Main Menu**.

### Main Menu

The Main Menu allows you to perform the following functions:

- **Authenticate**: Takes the user to the Authentication procedure. See [Authenticate](#).
- **Reference**: Takes the user to the Reference procedure. See [Collecting Reference Samples](#).
- **Admin**: Takes the user to the Admin menu.
- **Shutdown**: Closes the software.
Authenticate

The Spirit Sampler Authenticator software enables you to analyze spirit samples to confirm product quality and identity, and to detect counterfeit samples.

Preparing the Sample

► Procedure

1. Inject the spirit to be measured into the appropriate port as follows:
   - Clear – Vodka
   - Light – Whisky
   - Dark – Rum
2. On the Brand drop down menu, select the brand you wish to verify.

3. You now have the option to perform one of the following tasks:
- **Cancel**: Return to the **Main Menu**
- **Load**: Authenticate previously saved samples
- **Next**: Display the **Identify Sample** screen

### Authenticating Previously Saved Samples

The **Load** button on the **Prepare Sample** window allows an operator with Administrative privileges to re-authenticate one or many previously-saved samples to be able to test a recently updated Brand database.

#### Procedure

1. Select the desired Brand in the drop-down menu and click the **Load** button.
2. On the new window, select the proper .csv brand file(s). These files are usually saved in the default location: `C:\Users\Spirit Sampler\Documents\Ocean Optics\Spirit Sampler\sessions\spirit-sampler-xxxxx`.
3. Click the **Open** button.
The software re-authenticates the sample(s) in rapid succession. It graphs all of the samples, overlapping them on the chart for you to see exactly how they compare in absorbance. The graph legend shows exactly which samples “Matched,” “Almost Matched” and “Failed.”
4. To zoom in on the graph, click the Shift key + Mouse Right button + Point with the mouse to the area of interest. You can easily identify by color the authentication result.

- **Red** = Failed
- **Yellow** = Almost Matched
- **Green** = Matched

To zoom back out on the graph in X and Y dimensions, click the small buttons at the bottom-left of the chart, beneath and beside the scroll-bar arrows.

5. Select the legend to highlight its corresponding brand file to display an information table.
6. The **Back** button displays the **Analyze Sample** screen with the last authenticated saved brand file.

7. You now have the option to perform one of the following tasks:
   - **Done**: Returns to the Main Menu.
3: Operation

- **Reload**: Allows you to authenticate more previously saved samples. Go on to Step 8.

8. After clicking the **Reload** button, on the new window, select the proper .csv brand file(s) that are usually saved on the default location: C:\Users\Spirit Sampler\Documents\Ocean Optics\Spirit Sampler\sessions\spirit-sampler-xxxxx. Then click the **Open**.

The software re-authenticates the sample(s) in rapid succession and stays in the **Analyze Sample** screen, displaying the last saved brand file authentication result.
9. To see the Sample Detail screen, click the Graph button. Otherwise click Done to go to the Main Menu.

10. Click Next to go to Identify Sample screen.

Identify the Sample

On the Identify Sample screen, you can enter optional comments about the sample.

► Procedure

1. Enter Notes, Ref Num Id, Ref Text Id and Location entries, as desired.
2. Click Next.
Analyse the Sample

1. On the Analyse Sample screen, the Spirit Sampler system takes a measurement of the sample and displays the result: Failed to Match, Almost Matched or Matched.
2. To see the actual absorbance Graph, click the **Graph** button.
3. Click **Back** to return to the **Analyze Sample** screen.

4. In the **Analyze Sample** screen, you have the option to perform the following tasks:
   - **Cancel**: Returns to the **Main Menu**.
   - **Rereference**: Takes you to the Reference procedure. Go to Step 5.
3: Operation

- **Resample**: Measures the spirit again, with the same notes. Go to Step 6.
- **Save**: Saves the spectrum. Go to Step 7.
  If the user wishes to “Rereference”. A window message will open, asking “Do you want to re-take a water reference on channel X only”.

5. **Rereference**: If the unit is being operated for a prolonged period it may be necessary to perform a reference measurement again to recalibrate the instrument:
   - Click **Yes** to continue, but be sure to reload 30ml of distilled water in the port, and then click **OK**.
   - Click **No** to cancel the Rereference procedure.
6. **Resample**: Measures the spirit again, with the same notes and parameters.

7. **Save**: To save the spectrum, click the **Save** button. The file will be saved to the default location: C:\Users\Spirit Sampler\Documents\Ocean Optics\Spirit Sampler\sessions\spirit-sampler-xxxxx. When the saving procedure is done, the **Analysis Complete** screen displays.
8. The **Analyze Complete** screen offers the following tasks:
   - **Next sample:** Displays the **Identify Sample** screen.
   - **Another Brand:** Displays the **Prepare Sample** screen.
   - **Home:** Displays the **Main Menu** screen.

**Admin Functions**

The **Admin menu** functions allow you to configure the device and perform various utilities. It is mainly used for Factory Testing and Factory Configuration. It is highly recommended that you do not, under any circumstances, change or modify any settings on this section unless recommended by the manufacturer.

---

**Caution**

Changing the factory settings on the Admin menu could result in bad testing and authentication.

---

The following functions are available on the **Admin** menu for **Device Configuration**:

- **Preferences:** Change device settings and defaults.
- **Brand Database:** Select brand database for authentication.
- **Factory Config:** Change factory configuration settings.
The following functions are available for the utilities:

- **Brand Manager**: Create or Modify Brand Databases.
- **Scope Mode**: View spectra directly for alignment.
- **Session Report**: Generate a session report.

### Device Configuration

#### Preferences
Changes device settings and defaults. In the Preferences screen there are 7 different tabs:

- **Labels**: Edit labels within the software.
- **Device**: Modify acquisition parameters in the spectrometer.
- **Timing**: Modify timing acquisition parameters of the software.
- **Integration**: Modify integration time parameters of the spectrometer.
- **Quality**: Modify ratio test parameters for quality control of the spectrum.
- **SSZ**: Modify thresholds and validation for the spirit authentication.
- **Monitoring**: Modify temperature and battery preferences.

---

**Caution**

Changing these parameters is **not** recommended.

---

**Labels**

There are options to change the name and amount of the reference liquid that you are prompted to insert when taking the reference measurement, the name and amount of the port flush liquid, and the labels applied to each of the three channels available for measurement.
Device
These settings change some of the basic parameters used by the spectrometer:

- **Scans to average** – The number of spectra averaged during the measurement.
- **Boxcar Half-Width** – Each spectrum is smoothed by applying a boxcar filter. This sets the number of pixels on each side of the central pixel to use for the averaging.
- **Electric Dark Correction** – This correction subtracts the electric dark contribution to each spectrum automatically. The check box turns this feature on if checked, or off if unchecked.
- **Nonlinearity Correction** – Corrects the nonlinear response of the detector in the spectrometer automatically. The check box turns this feature on if checked, off if unchecked.
- **Debug Mode** – Turns on some additional software features to make it easier to track down any faults in the software.
- **System ID** – The name used to identify the unit. By default it is the serial number of the spectrometer.
- **Password** – The Administrator password.
Timing

- **Warm Up Time** – The amount of time in minutes that must be allowed for the light source to reach a stable temperature.
- **Select Channel Delay** – A delay introduced before acquisition to allow the shutters time to operate.
- **Settle Acquisitions** – Reserved for future use.
- **Lamp Timeout** – The light source will power down after this period of inactivity.
- **Allow Skipping Warm-Up** – Allows you to skip the system warm-up period.
Integration
The system automatically attempts to set an optimal integration time during the reference measurement step.

- **Target Counts** – The system attempts to set an integration time for each channel that achieves this target intensity.
- **Error Margin** – The upper and lower bounds of the target intensity that are acceptable, specified as a fraction of the target intensity.
- **Min Integ** – The minimum allowable integration time.
- **Max Integ** – The maximum allowable integration time.
- **Default** – The default integration time, used to initialize the attempt to set the integration time.

Quality

- **Wavelength UV** – Reserved for future use.
- **Wavelength VIS** – Reserved for future use.
- **Min ratio** – Reserved for future use.
- **Max ratio** – Reserved for future use.
- **Reference QC Enabled** – Enables or disables checking the reference liquid against a standard reference spectrum.
SSZ

- **Pass** – Maximum score for the sample to qualify as a pass.
- **Fail** – The minimum score for the sample to qualify as a fail.
- **Number of Samples per Authentication** – Each authentication generates this many spectra and saves each one in a file.
- **Intra-Sample Delay** – Reserved for future use.
Monitoring

- Enable Monitoring – Turn monitoring on or off.
- Battery Monitoring – Turn battery monitoring on or off.
- Period – The period between checks on the temperatures and battery levels.
- Number of Samples – Reserved for future use.
- Low Battery Level – The maximum battery level that is reported as low battery.
- Critical Battery Level – The maximum battery level that is reported as critical battery.
- Fan Always On – Sets the fan to always be on.
- Number of Temp Samples – Reserved for future use.
- High Temp Level – The minimum temperature that is reported as high.
- Critical Temp Level – The minimum temperature that is reported as critical.

Caution

Changing these parameters is not recommended.

Brand Database

This menu option allows you to select a brand database. A dialog box is displayed to select the location in the file system of the brand database to be used. Once selected this brand database becomes the default for any subsequent operations.
On the new Window select the proper database you wish to use for Authentication. Usually is on this folder: C:\Users\Spirit Sampler\Documents\Ocean Optics\Spirit Sampler\databases\XXXXX.

Inside that folder there is a file named: database.cfg. Highlight the file and click **Open**.

**Factory Config**
The Factory Configuration menu option allows the user to:
- Restore the unit to the original factory settings
- Set the theme of the user interface.
- Set the time period for prompting the user to retake a reference measurement.
- Set the super user password.
- Set the minimum and maximum wavelength for the device.

---

**Caution**

The system will ask for a password. This menu should only be accessed by Ocean Optics.
Caution

This functionality is for use by Ocean Optics only.
Utilities

Brand Manager

The Spirit Sampler Brand Manager allows you to manage database libraries of spirit brands and manage these brands according to your application needs. The Authenticator software uses these libraries to authenticate sample spirits.

Database Management

The Brand Database menu option allows you to select, create, edit or delete a brand database. Additionally, it is possible to import a legacy database from an earlier implementation of the Authenticator and to export a database for deployment on field instruments.

- **Select Database** – Navigate to the location of a brand database and to select it as the current database to be used. Click **Select Database** to browse to the location where libraries are stored of an existing database and then open the selected brand library. Usually they are on this folder: C:\Users\Spirit Sampler\Documents\Ocean Optics\Spirit Sampler\databases\XXXXX.
Create Database – Use this function to create a new Brand Database customized to your measurement needs and save it to a specified location (typically C:\Users\Spirit Sampler\Documents\Ocean Optics\Spirit Sampler\databases\XXXXX). You are asked to supply a name for the database and an optional description.
• **Edit Database** – Change the name and description of an existing database.

![Image of Edit Database](image)

• **Import Database** – Use this function to import a legacy Brand database from an older version. Navigate to the location of a legacy brand database created using a previous version of the Authenticator.

![Image of Import Database](image)
- **Export Database** – Export the currently selected database to a location in the file system for deployment to other (field) Spirit Sampler units.

- **Delete Database** – Permanently delete the currently selected Brand database. This is irreversible. Confirmation is required by entering a password.
Brand Management

Brand Management allows you to select, edit or delete a brand signature within the currently selected brand database (define brand signature spectrum you have created/defined in the brand library). There is also the option to import a brand signature created elsewhere.

- **Select Brand** – Select one of the existing Brand Signatures in the current brand database for tasks such as editing.
Procedure

1. To add a new sample by acquiring a spectrum immediately, press New. You are prompted to inject the sample into the channel selected in the Color field.

2. Click the Yes button. The acquisition of the spectrum begins and a progress bar is displayed – this step may take a few minutes. When the acquisition is complete you are prompted to save the source sample.

3. Click Yes. The name of the saved file appears in the Source Samples list, and the spectrum will appear in the preview graph.

4. Add more samples by repeating this process or by clicking the Add button to include source data files that have already been created. Each file that is added will appear in the Source Samples list and be previewed in the graph.

   You can select one or more spectra by selecting the source sample file. The associated spectrum in the graph will be highlighted. You can also select one or more spectra in the graph by typing Ctrl + left-clicking the mouse. The associated source sample will be highlighted in the list.

5. Select the wavelengths that will be used in the SSZ model for authentication against this new brand. A list of wavelengths is displayed in the Wavelengths field and highlighted by vertical lines in blue on the preview graph. The list of wavelengths can be changed by using the Add and Del buttons underneath the list of wavelengths. The highlighted wavelengths previewed in the graph are updated as you add and remove wavelengths. Check the Auto-Compute box to perform the calculation of the standard deviation for each wavelength.

6. Choose the maximum score for categorizing a sample as a pass with the Thresholds Pass spin-box. Choose the minimum score for categorizing a sample as a fail with the Thresholds Fail spin-box.

7. Click the Save button to create the new brand. From the Brand Manager you can click the Select Brand button to confirm that the brand is now in the database.
• **Edit Brand** -- Use this function to edit the selected brand signature.

![Brand Editor SZ](image)

**Procedure**

1. You can edit the wavelengths that will be used in the SSZ model for authentication against this new brand. A list of wavelengths is displayed in the Wavelengths field and highlighted by vertical lines in blue on the preview graph. The list of wavelengths can be changed by using the **Add** and **Del** buttons underneath the list of wavelengths. The highlighted wavelengths previewed in the graph are updated as you add and remove wavelengths. Check the **Auto-Compute** box to perform the calculation of the standard deviation for each wavelength.

2. Choose the maximum score for categorizing a sample as a pass with the **Thresholds Pass** spin-box. Choose the minimum score for categorizing a sample as a fail with the **Thresholds Fail** spin-box.

3. Click the **Save** button to create the new brand. From the Brand Manager you can click the **Select Brand** button to confirm that the brand is now in the database.
- **Import Brand** -- Use this function to import an existing brand from another Brand Database.

- **Delete Brand** -- Use this function to delete a Brand Signature from the current Brand Database. This is irreversible. Confirmation is required by entering a password.
Scope Mode

Scope mode allows you to see the detail of spectra taken. This is intended for expert users to allow them to fine tune the parameters of the system.

Scope mode takes a spectrum immediately on pressing the “Start” button. There are options to temporarily override the settings for the number of scans to average, delay and integration time for the spectrometer.

- **Channel** – Select the channel(s) to show in scope mode.
- **Shutter** – Select the shutter(s) to close in scope mode.
- **Override Integ Time** – Temporarily override the instrument integration time with the values specified on this screen.
- **Averaging** – Temporarily override the instrument scans to average with the value specified on this screen.
- **Reference QC** – Show the reference QC spectrum.
- **Take Optical Dark** – Acquire and show the dark spectrum.
- **Lamp Test** – Perform a lamp test and save the results.
Session Report

Session Report allows a set of measurements taken during a session to be summarized. You are prompted to select one or more result files saved during a session and to produce a summary report for the selected files. Files are added and removed for the Chosen list using the Add and Remove (or Remove All) buttons and a summary report is produced by pressing the Generate Report button.
Shutdown

Clicking the **Shutdown** button prompts you to flush the ports with a configurable volume and type of flushing liquid before shutting down the software.
Appendix A

Maintenance

Overview

The Spirit Sampler system consists of the Sprit Sampler itself, as well as containing a battery for power that requires charging, a light source, and a tablet.

Flow Cells

Solids’ precipitation from sample spirits can potentially lead to particulate build up in one of the Spirit Sampler flow cells, which sometimes can cause air bubbles to become trapped inside the cell. This air bubble will cause both reference and sample measurement data to become inaccurate, resulting in spurious results.

Such particulates can be removed by flushing the cell with either a solution of Ethanol/water or, if possible, concentrated Ethanol. Ensure the cell is fully purged and leave it for 3-4 hours before re-inspecting. In the case of stubborn, difficult to remove particulates, it may be necessary to leave the cell flushed for 24 hours to fully dissolve any residual solid materials.

Battery

The system includes a built-in battery to support up to eight hours of disconnected operation. However, the battery will eventually discharge and require recharging. If you flip the power switch on, and the green LED does not come on, the main battery is dead and must be charged.

To charge the main battery (including the secondary battery within the tablet computer), connect the included power cable to the power socket in the back-left of the main tray next to the power switch.
Light Source

The Sprit Sampler light source is a deuterium-tungsten halogen type with lamp life of ~1500 hours. The lamp automatically turns off after 60 minutes if it is not used, and then the Spirit Sampler system must be restarted.

Tablet

Refer to the manufacturer Asus for support.
### Appendix B

## Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>47 x 38 x 18 cm (18.5 x 14.1 x 6.9 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>9.4 kg (20.8 lbs.)</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>100 – 240 V; 50 – 60 Hz; auto-ranging</td>
</tr>
<tr>
<td>Battery Life</td>
<td>Over one working day on a single charge; &lt;30 minutes charging time</td>
</tr>
<tr>
<td>Spectrometer Wavelength</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>220 – 450 nm</td>
</tr>
<tr>
<td>Resolution</td>
<td>1.0 nm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>+/- 2.0 nm</td>
</tr>
<tr>
<td>Light Source</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Deuterium-Tungsten-Halogen</td>
</tr>
<tr>
<td>Wavelength range</td>
<td>210 – 1100 nm (deuterium); 400 – 1100 nm (tungsten)</td>
</tr>
<tr>
<td>Time to stable output</td>
<td>10 minutes (deuterium); 1 minute (tungsten halogen)</td>
</tr>
<tr>
<td>Lamp life</td>
<td>~1500 hours</td>
</tr>
<tr>
<td>Power consumption</td>
<td>7W</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0°C -- +55°C</td>
</tr>
</tbody>
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